

Wildlife

Again, our concerns stem from what appears as an important resource being treated inconsistently given the increased development the forest proposes over the next 50 years

For example, the population estimate of every MIS is unknown! That sort of sets wildlife monitoring off on a shaky foot as this does not exactly meet minimum biological knowledge of the forest. We can't help but wonder why the Fishlake seems to know so much about timber and grazing resources and so little seems to be known about wildlife populations and requirements.

304 However on page III-35 the EIS states, "Existing population levels of management indicator species are below their habitat capabilities." Why? And how is that known, given the statements in Table III-18, page III-34 of the d. EIS? Are the MIS below the habitat capabilities due to overgrazing on the forest? Or other human impacts, including the restriction of fire in some timbered areas? The plan notes the riparian condition is only in poor to fair shape. Is the rest of the forest, from an ecological standpoint, in only fair to poor condition?

305 Given the lack of knowledge of population numbers for MIS the statement on page III-40 dealing with establishment of numbers by calculating 40% of the forest potential could be damning for some species. This could have serious consequences on old growth related species or riparian species, both of which have limited alternative habitat. Since the population numbers and distribution are unknown Prescription 6B should be abolished. Under no conditions should livestock-wildlife conflicts be resolved in the favor of livestock over the vast majority of the forest when such resolution could have obvious and clear impact on wildlife species the Forest Service has chosen to guide the ecological management of the forest. It is contradictory to regulation, good land management and multiple use. Literally it is single use management.

306 On critical winter wildlife range, critical calving, denning, cover and summer range where wildlife distribution and population is not known, conflicts should be resolved in favor of wildlife to assure the prevention of serious dents in habitat or distribution or population. At the minimum, conflicts should be resolved on a case by case basis, not a single use ranch-type basis.

This is particularly true when one realizes much of the Fishlake range is in far less superior condition than it should be and is presently over-obligated to domestic animals. The plan continues to allow grazing on poor condition riparian habitat (63% of the stream habitat is in poor

304. Habitat capability of a given area is dependent upon a variety of factors. Competing entities for food, cover, and water must be taken into consideration. However, even if there were no other competitors for the available habitat, most species would still be below the habitat capability. The reason for that is that most habitats can be improved from their existing situation. From there it gets incredibly complicated. For instance, do you improve big game habitat by chaining pinyon-juniper trees at the expense of the pinyon mouse or pinyon jay or do you improve the carrying capacity for early successional species at the expense of some old growth?

The statement referred to in your first sentence of this paragraph is not one which, in this case, is a derogatory condition. The answer to your question in sentences 4 and 5 of this paragraph is a qualified yes. All conditions are a result of past actions of some kind or another. This Plan will move forward to improving the existing situation a great deal.

The loss of habitat for native trout has occurred throughout their range and not specifically on the Fishlake National Forest. In particular, the Bonneville cutthroat trout has lost extensive amounts of lake habitat due to increased salinity and temperature in places such as Utah Lake and stream habitat due to irrigation and hydropower diversions. The main cause of decline on the Fishlake has been extensive stocking of non-native trout. Present populations of pure strain native cutthroat are being protected, their habitat is being improved; and additional transplant sites are being identified.

305. The Forest Service has a mandate to maintain viable populations of all animals found on the Forest. A concept called management indicator species (MIS) was devised to streamline the monitoring of all animals by using species which will act as proxy for other species. Because the Fishlake National Forest does not have baseline data for all the species selected as MIS, the Forest adopted a concept which would protect the habitat in any given area by requiring that no more than 60% of a habitat type be removed in a given management area. This remaining 40% of the habitat type will adequately provide for a viable population. Application of the Standards and Guidelines of the Plan will also provide protection for the wildlife of this Forest.

Your reference to Prescription 6B has been noted. The sentence you were concerned with has been removed, which should alleviate the rest of your concerns voiced in this paragraph.

306. Application of the Standards and Guidelines of the Plan, will for the most part, take care of these concerns. The Forest Service also cooperates and coordinates with other agencies to resolve conflicts. Conflicts are resolved using an interdisciplinary team approach on a case by case basis.

condition.) This does not give us great faith, nor should it give great faith to the Forest Service, that a cooperative management ethic with livestock interests will result in better conditions. The Fishlake has had a long time to work this out and it hasn't happened yet. And it won't happen with the emphasis on grazing.

307. For example, 10% of the wildlife funding goes to livestock range improvement. This only highlights the secondary nature of wildlife. It is already severely underfunded according to this plan.
- And that leads to the snag and old growth management. Like Ripley's "Believe it or Not," the EIS says snag management will be directed toward non-productive sites. This is contrary to statute and regulation. Why non-productive sites? Obviously the Fishlake has decided old growth habitat and cavity nesters should be constrained to poor timber sites. What will happen to the species dependent on that specific habitat in the "productive" timber sites? The plan assumes that 1) those species don't exist in such sites or are decidedly unimportant within the "productive sites," or 2) the non-productive sites are the best sites for such species and that is where they now reside, or 3) those species which will not be favored in the "productive" sites will move to the non-productive sites.
308. This then assumes the unproductive site niches are not already occupied and that there is no barrier preventing displacement into those sites. All of these assumptions are inadequate to meet the biological test of an indicator species or again (and we hate to flag a dead horse) good land planning and management. Again, this is timber absolutism in its grandest form and classic single use planning.
- With respect to MIS we would suggest the addition of a number of species which would give the forest a much better understanding of what is happening to the forest and force reasonable wildlife protection and management. First, we would suggest using black bear as a management indicator species. Across the state it is receiving much needed attention as to whether the bear even has a healthy population. Loss of habitat is the primary noted cause for the decline in the species. And central Utah forests, because of their aspen stands, are recognized as very important to the bear. It is also a high interest species from the non-consumptive, consumptive and predator control interests.
309. Second, the white-tailed jack rabbit, an ecological indicator (P III-30) with a downward trend, was not selected. Why? It is a sage type indicator and important for determination of quality winter range and likely riparian habitat. Was it not selected because of the downward trend? Why is the trend downward?
310. Second, the white-tailed jack rabbit, an ecological indicator (P III-30) with a downward trend, was not selected. Why? It is a sage type indicator and important for determination of quality winter range and likely riparian habitat. Was it not selected because of the downward trend? Why is the trend downward?

307. The 10% wildlife funding is on an "as available" basis and is applied only to vegetation manipulation projects within big game winter range. Any project within big game winter range automatically reserves 10% of the newly produced forage for big game regardless of funding. It is therefore appropriate that when funding is available that wildlife should pay for a share of the project.
308. The Fishlake snag policy, the Standards and Guidelines of the Plan and the overall multiple-use aspects of current decision making prevent most of the problems you have visualized. The location, size and type of old growth cuts determine the impacts to old growth dependent species. The topography of most "timber" areas does not allow for huge acres of clear cuts of old growth on this Forest. The Forest is mandated to manage for habitat diversity. This concept provides for retention of old growth as well as some harvest within "old growth" areas. There is nothing within this Plan which will significantly affect old growth species within the planning decade.
309. The MIS were selected because they will provide for the other species present on the Forest. Black bears on the Fishlake National Forest are believed to be at a viable population level but on an upward trend in numbers as well as distribution.
310. If the MIS that were chosen are adequately provided for, the white-tailed jack rabbit will also be provided for. If it is an indicator of sage as you suggest, it could be considered as a MIS under the sage brush guild concept.
- The reason for the downward trend is unknown. Until research is applied it cannot be determined whether it is habitat related, competition from the black-tailed jack rabbit or perhaps hunting pressures.

- 311 Third, both the merlin and particularly the osprey were not selected? Why? The osprey is a species of high interest and an indicator of quality riparian systems and old growth. The merlin is a sensitive species. Neither was selected even though both probably show more about environmental quality and diversity.
- 312 The plan notes native trout are greatly reduced due to "loss of habitat." Obviously that means quality streams. What specifically does this alternative do to increase stream quality?
- 313 What is the condition of wildlife habitat on the forest? With respect to big game summer and winter ranges, what is the ecological indication and trend? With respect to predators, what is the condition of the habitat for producing healthy quantities of mt. lion and black bear? How many bears and lion are killed on the forest annually by predator control to benefit one small sector of the public, the livestock interests? We oppose all predator control on the basis that predators are part of the natural system. To do "business" on the public's land a livestock operator must accept an increased risk to maintain a healthy wildlife population.
- 314 Again, impacts related to wildlife are so general that it is as though they were listed generically. The plan notes, for example, minimum viable populations for MIS will be met. We doubt this very much if extensive mineral development is allowed to occur as per the plan. In other words cumulative effects are not considered. If you look at the impacts to wildlife from increased timber harvesting, ORV use, mineral development as occurring at one time (the plan encourages this by not restricting mineral development or ORV use), there is hardly any doubt wildlife will have overwhelming stress placed on them. There is no discussion of road density on wildlife (elk included) and how the 63 miles of new roads in the first decade will impact wildlife or how the proposed 923(1) miles of roads over five decades will effect wildlife. There is no discussion of security areas for wildlife. There is no discussion of how and what roads will be closed after entry. There is no apparent test of how roads will be closed or a prescribed density at which roads will be closed (see the Wasatch National Forest Road Management Unit)
- 315 There is no old growth map. There is no indication whether there will be any old growth two-storied mature stands of fir and spruce and what will happen to species in need of such habitat. The point is the wildlife section of the plan falls short of the needed direction, disclosure or management to assure protection of the wildlife resource.
311. The osprey and the merlin were not selected as MIS because the MIS that were chosen adequately cover the habitats used by these two species.
312. The Plan establishes riparian area standards and guidelines both in the Forest Direction and in Prescription 9A. The monitoring plan portion of the Forest Plan establishes tolerance limits.
313. The first question asked in this paragraph is unanswerable at this time. Wildlife habitat is such an ambiguous or all encompassing term that it would take volumes to treat its meaning properly. There are over 300 of the better known species of wildlife with a wide array of specialized habitat needs on this Forest.
- The second question is also unanswerable because there is no known system for classification adopted by the various agencies that deal with habitat management of big game species. Generally speaking, elk ranges are trending upward. Deer summer ranges are trending upward in the unsuitable ranges due to the disappearance of sheep from most of the ranges of the Forest. Deer winter ranges are an unknown factor. The change from sheep to cattle and intensive range rehabilitation programs within deer winter range, coupled with the recent high precipitation for several years, appears to have winter ranges in an upward trend.
- The habitat condition for lion and black bears appears to be ample as both species are believed to be static to slightly increasing. Black bear sightings throughout the Forest have increased. Lion harvest has averaged 51 annually since 1976. Bear harvest has averaged 1 annually since 1974.
314. Cumulative impacts were taken into consideration for analysis. All of the questions you refer to concerning the roads on the Forest were taken into consideration and are covered in Appendix P of the Forest Plan. Your statement that ORV use will not be restricted is incorrect. Approximately 177,000 acres will be closed to ORV use while they will be restricted on an additional 365,000 acres.
315. Maps of habitat types were not a part of the Forest Plan. Such mapping is done on site specific areas. Your concern for old growth may be allayed by the Standards and Guidelines, both in Timber and Wildlife, and the management prescriptions for Timber and Wildlife. Also, the Management Indicator Species for old growth is the Goshawk. Management for this species should retain adequate old growth throughout the Forest, and there will be two storied mature stands of fir and spruce old growth sufficient for the needs of viable populations of the species dependent upon it for survival.

ROADS

316 The plan notes hundreds miles of roads will be built over the next five decades. How many roadless land will be penetrated by roads? The plan fails to clearly show where roads will be placed and fails to discuss how (the test for closure) roads will be closed

VISUALS

317 The plan notes (IV-11) alternative 4--non-market--will produce an average 892 acre reduction from natural appearing landscapes every year. This translates to nearly 45,000 acres over the 50 year period. Why would a non-market alternative produce any reduction of natural appearing landscapes as natural viewscapes are the simple essence of a non-market alternative?

316. It is estimated that a little over six miles of new road will be constructed each year to support the timber program. Most of these low standard roads will be closed following the timber activity through the use of gates and/or physical closures. During the plan period, total road construction will be approximately 62 miles. It should be pointed out that this mileage is an estimate. Exact mileage needed and specific location of roads is determined as the planning proceeds for individual timber sales.

317. Project activities still occur under the non-market alternative, but emphasis is on non-market resources. Projects such as game habitat and watershed improvement will be emphasized, while the timber and range programs will remain at current levels during the Plan period. These activities will produce some reduction in natural appearing landscapes.

Fire Management

318 The fire management plan is probably the most sophisticated effort by any Utah forest that we have seen to date. We fully support the intent and effort. There is no doubt the plan will add to the sound management of the environments hosted on the forest. It will create the needed diversity and productivity the plan strives to achieve.

319 With this kind of a plan in place the concern over diversity expressed earlier in the forest plan is really moot. We would also suggest utilizing prescribed fire rather than timber harvesting in timbered areas where harvesting is being used to control insects or disease or enhance wildlife habitat. Prescribed fire costs per acre are far less than timber harvesting per acre. And since the added costs of meeting other multiple use benefits (controlling disease or enhancing wildlife) must be attached to some timber harvests it would be far wiser and more prudent to use fire in these multiple use sales. Why doesn't the plan propose such an action?

Recreation

320 The plan simply fails to document the needs of recreation and the demand projections. More importantly the plan appears to fail to meet the needs of projected demand for recreation even though it is a critical resource use and a regional recreational center. The plan fails to discuss the relationship the forest has with surrounding National Park opportunities and how it is likely the forest recreation resource benefits from the surrounding park area and visitors.

In essence the plan states dollars will not be adequate to meet the demand for recreation. Rather the plan calls for large increases in dollars for timber management and range management--two resources costing the forest and taxpayer substantial sums and primarily benefiting a very specific public. However, the plan shows clearly recreation PVB is far greater than timber or range in any alternative--often times by three and four times!

321 The plan doesn't show demand projection by decade for each type of recreation use. We have already noted this with respect to wilderness spnm use. However, there is an implicit assumption that increased roads on the Fishlake will benefit roaded and semi-primitive motorized recreation. However, we suspect the demand for that type of recreation is easily achieved with no new roads because of the high density of roads on the forest and the low use of most of those roads. However, if lands are not protected for spnm and left in a natural state, that type of recreation will be substantially reduced and likely not achievable. Stated simply the Fishlake plan is not responsive to recreational needs on the forest.

318. The fire management program on the Forest will use prescribed fire to control disease and enhance wildlife for many low value timber stands. However, where timber can be utilized through sales made in harmony with other resources this option will generally be preferable.

319. The Plan does propose some vegetative treatments, in addition to timber harvest, to enhance diversity. The method of doing these treatments will be determined by site specific environmental analyses. Prescribed fire is certainly an option that will be considered.

320. The Plan does not meet projected demands for recreation although it does represent a 46% increase in funding for recreation above the current budget level (Alt. 1.) The Forest did not have the option to create unlimited budgets to meet all demands. Budgets were constrained for each alternative. The budget mix in the Plan represents what was felt to be the best mix to carry out the objectives of the Plan for all resources.

321. The Forest does not have the data to prepare demand projections for each type of recreation use by decade.

There is no assumption that increased roads will benefit roaded and semi-primitive motorized recreation. The only increase in roading will be in relation to the timber program - and most of these roads will be closed to public use following the timber activity.

Recreation should be the priority use on this forest

Alternatives

322 The alternative arrays are not substantial enough to meet the NFMA regulations or requirements of CEQ. We have already noted this in the timber and grazing sections in particular. The non-market alternative does not represent non-market outputs. Timber harvesting is increased or maintained at the current program in every alternative except the low budget alternative. There is no alternative which simply says harvesting will be constrained on the basis of alternative uses of resources to meet various thrusts and goals. There are alternatives and reasons for reducing timber outputs to meet public needs based on the resource not simply the budget. The plan offers no real variation in ORV closures and provides no protection for unroaded lands of special and public interest. The spm category, in fact, does not exist.

322. Disagree. This is a broad array of alternatives as defined in the National Forest Management Act.

There are variations in ORV closures in the alternatives. Look, for example, at the changes in the application of Prescription 3.

Research Natural Areas/Cultural Sites

The plan and draft EIS are not clear as to whether the two proposed RNAs, Eulion Canyon and Upper Fish Creek, are found in each alternative. Though this represents a simple problem to resolve---we simply propose the RNA recommendations in each alternative---we would like to know why each alternative does not narrow the RNA proposals? Certainly the thrust of each alternative should incorporate some level of research and ecosystem preservation to meet reasonable planning criteria and actual regulation. The RNA recommendations do not add to the diversity of the forest by prohibiting development and assuring some level of ecosystem succession to achieve floristic climax.

But a much more substantial problem exists which the plan and draft EIS do not note. Of course, we are referring to the inability to protect these RNAs, for the stated purpose of preserving a natural system for scientific research, from potential surface disturbing activity as a result of potential mineral entry. The draft EIS (IV-58) notes the problem exists by stating the areas are not withdrawn from mineral entry and, in fact, harbor mineral conflicts. What does the plan intend to do if mineral development is proposed on those two units? There is no potential for oil and gas but there exists potential hardrock mineral conflicts. Are the areas presently encumbered with mining claims? If not, the plan creates the problems by proposing no control on hardrock mineral entry by stating no alternative prohibits hardrock mineral activity. If claims exist how will the RNA values be maintained?

Our suggestion is to withdraw the RNAs and place restrictions on vehicular access in order to preclude any potential mineral entry via motorized access. In fact, the Management Requirements under Prescription 10A, call for a mineral withdrawal (IV-156, forest plan). This we support and wonder why it did not get into the draft EIS discussion noted above. With this action, which is really the only direction the Forest Service can go without deceiving the public, we strenuously support the RNA proposals and subsequent restrictions.

It is a supreme irony the alternatives with the most proposed surface disturbance are the alternatives most sensitive to identification of archeological and cultural sites on the forest. This is not a result of a built in sensitivity. Rather it responds to direct damage to irreplaceable sites. *The greater the threat to losing a site the more responsive we are to at least identifying the site. Ironically, the smaller the surface impact and thus impact to important archeological sites the less we care about our own history.* In anybody's mind that is nonsense. In particular, it is poor land management on a forest with confirmed archeological and cultural site importance such as the Fishlake.

Why doesn't the plan address archeological sites and the potential discovery and impact on such sites irrespective of surface damaging activity?

323. Alternatives 5 and 11 contain the Research Natural Area Proposals. To put these in all alternatives would be to violate the wide range of alternatives that you called for under your comments on "Alternatives"

324. The proposed Research Natural Areas in the Tushar Mountains presently have mining claims on them. Management Prescription 10A on page IV-156 of the plan calls for withdrawal of the RNA's from mineral entry. This is in conformance with manual direction FSM 4063.39 "Research Natural Areas should be withdrawn from mineral entry after establishment...."

325. The EIS is the statement of the situation and the problem. The Plan is the statement of how we intend to manage the areas.

326. The cultural resource management program (CRM) in the USDA Forest Service was largely conceived, and thereby operates, under the provisions of the National Historic Preservation Act (1966). Under the provisions of this act (36 CFR Part 800), the effects of a proposed Federal undertaking on cultural resources must be evaluated according to Section 106 of the Act and Section 2(b) of Executive Order 11593. Simply, we survey proposed project areas, inventory archeological sites within the projected area of disturbance, evaluate these sites and stipulate that significant sites must be avoided by the impending action.

The CRM program, within the Forest Service, is funded by the resource elements (i.e., timber, range, wildlife, etc.) that generate ground-disturbing project work. Project work, and associated ground disturbance, is the catalyst that generates cultural resource survey and inventory. Other than monies for general administrative tasks (e.g., maintenance of site files, etc.), there are no available funds (or time) to conduct independent site surveys and inventories in non-project areas.

327. Again, surface activity determines where, how and when a given area is surveyed.

Certainly the preferred alternative and Alternative 4 should incorporate an identification and preservation standard and guideline based on site protection independent of surface disturbance activity. This is particularly true for the non-market alternative. It is simply without logic to identify and "protect" sites only when they are proposed for destruction. The

328 identification of important sites, dictated by the plan, would then control where surface disturbance would be allowed. As it stands now the surface destruction and threat of site loss determines where archeological sites are identified. This is likely resulting in failure to identify some very important sites until they are threatened with destruction. Planning should be reversed with the important sites dictating where development can't occur in order to protect the history of cultural development of a particular area and not just the remnants of pottery or the like.

On the one hand the EIS states the forest believes that no alternative will accelerate the destruction of important sites. One paragraph later the document states that alternatives like #5, emphasis on dispersed recreation, could "potentially" be "very disruptive" to the cultural resource base. Why

329 isn't the same true for other alternatives such as #11 or #4? And why the rather obvious inconsistency in statements? Does the analysis show impacts will occur or not? Why won't timber harvests under Alt 11 impact cultural sites since Alt 11, in 50 years will be harvesting 176% more timber than now and building some 923 miles of additional roads on the forest?

328. One shared-services archeologist and one seasonal archeological technician cannot even begin to inventory, independent of project work, all the "important" sites on 3.5 million acres of National Forest System land (Fishlake and Dixie National Forests). To adequately inventory all "important" sites on this amount of ground, the Forest Service would need to employ a virtual army of archeologists over a long period of time. Actually, less than 7% of this land mass has been inventoried since the conception of the program in the mid-1970's. Typically, one archeologist can survey 35 to 40 acres/person-day.

If significant sites, inventoried within a project area, are avoided by the project action, how can this practice of management be called "poor" or "nonsense"? Important sites cannot always be preserved. An example of this would be the recent construction of a U.S. Interstate 70 segment in Clear Creek Canyon south of Richfield in which many significant archeological sites were destroyed. Before the destruction of these sites occurred, the Federal Highway Administration appropriated over \$800,000 to have the sites excavated and the scientific data recovered. At times, we must mitigate the effects of a project that will destroy significant sites, for the public good.

329. Dispersed recreation can and does occur anywhere on the above 3.5 million acres. How do you mitigate or prevent these types of impacts? We should and have physically restricted recreational activities on the surfaces of already inventoried sites (i.e., significant properties) that are vulnerable to this type of activity.

Regardless of how many miles of new roads or how much timber harvest occurs, we will not impact any greater percentage of sites than if the volumes were to remain low. Project areas must be surveyed before the projects are given the go-ahead. To do otherwise would throw the CRM program into non-compliance with Section 106 of the National Historic Preservation Act.

Economics

This portion of the plan and EIS needs vast improvement before it reaches required standards. For example, the budget for the preferred alternative is constrained to one and one half times the past average. Are we to assume the budget will equal that amount? Clearly, even an increase of 50% is an unprecedented step. A more realistic budget should be analyzed, particularly for the preferred alternative. If not, it is likely the Forest Service will need to do another plan and EIS revision to reflect the actual conditions. Budget projections must be realistic in order for the plan to have any value or meaning. We do have a question concerning budgets listed in the forest plan. The Alt 1 budget (current direction, 82 budget) is listed at M\$/yr 31993. However, Table II-22A shows the current direction budget at M\$/yr 4583. Which is accurate? The level of increase changes dramatically in the first decade and, in particular, in the out years depending upon which budget you are using as the current budget. The level of increase in the out years (and in this decade depending upon the budget figure use) is far beyond reasonable for Alt 11--around 28%. That kind of assumption doesn't meet reasonable budget predictions. What portions of this plan will not be funded if the required budget is not met?

There are several problems with the economic analysis of many resources. A notable example is the high value given to commodity resources in light of their costs and the inconsistencies in the costs and benefits of these resources.

The table on page II-94 in the EIS clearly shows inconsistencies in the manner in which costs and benefits are derived. The PVC listed for range in alternative 11 is listed as 19,114.9 (in thousands of dollars) and the benefit (PvB) is listed as 33,696.5. This attempts to show that range brings overall benefits. However, page B-106 lists the cost of an AUM as \$12 and page B-51 lists the benefit of one AUM of livestock forage as \$11.88. Using the Fishlake National Forest's own data, the costs outweigh the benefits (see the range section for more on range economics). Even using the inflated values contained in the plan/EIS for livestock AUMs, the end result is a negative PNV, not the positive PNV of some \$14,500 thousands of dollars as indicated by the table. The only assumption that can be made is the analysis assumes benefits for range will rise faster than costs. Of course this assumption has been proven false by the decrease in federal prices to = 1.35 for an AUM over the past few years. If we are to use that figure, one the livestock industry believes all the federal range is worth, the economics of the range program -- one that benefits only a very few individuals at the expense of other resources such as wildlife, and costs taxpayers -- become very bad.

The problems with the timber economics become apparent when viewing the confusing array of numbers and charts. Table B-6 indicates a selling

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Alternative 8 is the no action alternative. As such it is the one that the other alternatives are measured from.

This is the province of Congress. The Forest will propose this budget, Congress will produce a budget by functional area and by so doing, direct the Forest as to how the Plan will be amended.

You are correct in pointing out the error in the cost figure per AUM. Using the figure in the Draft EIS there could never be any net benefit from livestock grazing. This number was incorrectly computed. The correct cost number is \$6.24 for the first decade. By way of comparison, figures for actual use for the past two grazing seasons have been \$4.87 and \$4.31. The figure of \$11.88 is the true cost to the permittee. The \$5.31 is one formula for payment to the U.S. after subtracting costs for improvements constructed by the permittee.

- 333 price of \$1360 to \$1865 per MCF. This incredible bid price for timber translates to \$272 to \$373 dollars per MBF. This certainly must be a chart or typographical error.

The bid timber on the Fishlake cannot be more than a few dollars per MBF. Given an extraordinary value of \$15 per MBF, the costs (page 6-106) would be \$21 per MBF for a total loss of \$21,000 per year. This assumes the costs in appendix B are accurate. They probably do not reflect all costs. The information in appendix B on timber is hard to understand and it is impossible to determine if, in fact, it is consistent with the information on economics contained in Chapter II of the EIS.

The real question surrounding the economics of the Fishlake National Forest Plan is whether the minuscule amount of timber and the overallocated range is worth maintaining at present outputs while harming other more widely used and economically productive resources? All the plan proposes to do is to "mitigate" these other concerns. The Forest Service refuses to acknowledge the importance of other resources even when the agency's preferred resources are shown to be environmentally and economically unjustified at current levels.

333. The figures you quote of \$1360 to \$1865 per MCF are not the stumpage price you imply. These are the prices of finished lumber in terms of cubic feet.

NOTE: We disagree with the tone of this letter and the allegations that our efforts are "nonsense," that we are "deceptive" and are "trying to fool the public," that we have the "audacity" to do this or that, and that our attempts to promote diversity are a "sawyer's perspective." We do not believe that implementation of the Forest Plan will destroy the Fishlake National Forest. We believe the Plan represents responsible multiple-use management and will result in a healthy, diversified Forest.

The appendices to this letter are on file and available for review at the Forest Supervisor's Office in Richfield.

COMMENTS ON THE FOREST TRAVEL PLAN PRESENTED
BY THE SALINA LIONS CLUB
OCTOBER 30, 1985

The Salina Lions Club sponsored a public meeting the evening of October 30, 1985, to discuss, with Forest personnel, the proposed Fishlake National Forest Travel Plan. There were 57 members of the public present, of which 26 provided written comments. A content analysis was made of the 26 comments which led to the five issues listed below. A file of the letters evaluated in this process is available to the public at the Forest Supervisor's Office, Richfield, Utah.

The analysis was begun by taking pertinent parts of the letters, and categorizing them according to the subject they addressed. Like statements were then consolidated into issue statements which are as follows:

KEY ISSUES

1. Do not close any roads within the Salina Canyon Drainage.
2. Continue snowmobile use within the White Mountain area and all other areas not conflicting with wildlife.
3. Close all roads except main access roads and impose seasonal road closures to protect road surfaces.
4. Designate trails available for use by wheeled ATV's.
5. Provide better road maintenance.

DISCUSSION OF ISSUES

1. DO NOT CLOSE ANY ROADS WITHIN THE SALINA CANYON DRAINAGE. Over half of those providing written comment advocated no road closures. Their concerns were continued access for hunting deer and elk in the fall and for gathering fuelwood. Erosion along travel routes as well as harassment of wildlife were not reasons of significant importance to justify closing off present access. Some feel the availability of a wilderness experience exists in the Salina Canyon area without closing roads.

2. CONTINUE SNOWMOBILE USE WITHIN THE WHITE MOUNTAIN AREA AND ALL OTHER AREAS NOT CONFLICTING WITH WILDLIFE. With only two exceptions, everyone concerned with snowmobiling did not want the area around White Mountain closed to this activity. Comments were that snowmobiling did not hurt the soil resource, and the area around White Mountain was too high for wintering deer and elk.

Some of the responses indicated an exception for the winter feeding ranges of Big Game.

Those taking exception to this consider the White Mountain area as prime, beautiful country and closing it to all motorized vehicle use is justified. They feel there needs to be prime areas available for the backpacker and horseback rider. They felt the area was small enough that closing it would not impose an insurmountable hardship on those advocates of snowmobiling and other wheeled vehicle activities.

3. CLOSE ALL ROADS EXCEPT MAIN ACCESS ROADS AND IMPOSE SEASONAL ROAD CLOSURES TO PROTECT ROAD SURFACES: Nearly half of the responses favored closing all roads except main access routes and to impose seasonal road closures. They felt the primary cause of erosion and damage to the transportation system is travel during wet conditions.

These people feel it is important that the main system roads remain open to allow access into the forest for various activities. However, people should not drive off these travel routes.

4. PROVIDE TRAILS FOR ATV USE: A small portion of the responses indicated a need for development of ATV trails. The comments were that trail use by ATV's would be fun and there is a growing need for this type of use.

5. PROVIDE BETTER ROAD MAINTENANCE: Virtually everyone providing a written response indicated a need for additional road maintenance. They felt poor maintenance was the cause of a major portion of the erosion.

RESPONSE TO ISSUES

1. The objective of the Forest Travel Plan is to provide the broadest possible travel and recreation opportunities consistent with resource and public demands. When in conflict, resource needs over-ride public demand.

It is the intent of the Forest to provide travel routes on major, maintainable routes in the Salina Canyon area. Some of the system roads providing less important travel routes will be closed. These routes are. Duncan Draw, Pin Hollow, the northern one-half mile of the road beyond Lizonbee Administrative Site, the road north from Skumpah Reservoir, Oak Hollow, and the road from the second crossing of Salina Creek north to Jump Creek. The Oak Ridge Road north from the oil well site will be restricted to ATV's, as will the Flat Top Road, and road south from Flat Top Road to the head of Yogo Creek. All wheel track travel routes not classified as roads will be closed.

The purpose of these closures is to minimize soil resource damage, concentrate road maintenance activities, eliminate the growth of spontaneous travel routes, and to provide wildlife sanctuary.

2. Over-snow vehicle travel will not be restricted in any area except those areas of concentrated use by big game. These areas are located primarily in the lower P.J. types where over-snow activities are limited for lack of snow.

3. The primary access roads will remain open and are designated on the travel map. Seasonal road closures will be implemented as funds permit.

4. Approximately 23 miles of trails are designated for ATV activities. These trails are on the north and south side of I-70 and are designated on the travel map.

5. Better road maintenance is among the major reasons for reducing road mileage on the Forest. As time and funds permit, there will be a shift from merely grading roads to applying all-weather surfacing. To protect road surfaces during wet conditions, seasonal road closures are being implemented.

IV. MAILING LIST

A complete list of names and addresses of agencies, organizations, and persons to whom copies of the Statement are sent is on file in the Forest Supervisor's Office, Richfield, Utah.

The following received copies of the draft EIS and Proposed Forest Plan:

Federal Agencies

Department of Agriculture

Agricultural Stabilization and
Conservation Service
Salt Lake City, UT

Animal and Plant Health Inspection
Service
Hyattsville, MD

Office of Equal Opportunity
Washington, D.C.

Rural Electrification Administration
Washington, D.C.

Science and Education Administration
Washington, D.C.

Soil Conservation Service
Salt Lake City, UT

Department of Commerce

National Oceanic and Atmospheric
Administration
Ecology and Conservation Division
Washington, D.C.

National Oceanic and Atmospheric
Administration
Salt Lake City, UT

U.S. Department of Commerce
Washington, D.C.

Department of Energy

Western Area Power Administration
Salt Lake City, UT

Department of Interior

Advisory Council on Historic
Preservation
Washington, D.C.

Bureau of Indian Affairs
Phoenix, AZ

Bureau of Land Management
Richfield District
Richfield, UT

Bureau of Land Management
Utah State Office
Salt Lake City, UT

Bureau of Reclamation
Salt Lake City, UT

Capitol Reef National Park
Torrey, UT

Environmental Project Review Office
Washington, D.C. (18)

National Park Service
Salt Lake City, UT

U.S. Fish and Wildlife Service
Salt Lake City, UT

Environmental Protection Agency
Denver, CO

Federal Energy Regulatory Commission
Washington, D. C.

General Services Administration
Washington, D. C.

U.S. Department of Health and Human Services
Washington, D. C.

Interstate Commerce Commission
Washington, D. C.

Occupational Safety & Health
Washington, D.C.

Federal Aviation Administrator
Hawthorne, CA

Federal Highway Administration
Denver, CO

State of Utah

Governor
Utah Planning Coordinator
Utah State Legislator
Utah Division of Wildlife Resources
Cedar City, UT
Utah State Forestry & Fire Control
Richfield, UT
Utah State Extension Service
Richfield, UT
Utah Department of Transportation
Richfield, UT

Elected Officials

U.S. Senate
Honorable E. Jake Garn
Honorable Orrin G. Hatch
House of Representatives
Honorable James V. Hansen
Honorable David Monson
Honorable Howard Nielson

County and Local Governments

Six County Commissioners Organization
Plute County Commission
Sevier County Commission
Beaver County Commission
Millard County Commission
Wayne County Commission
Sanpete County Commission
Juab County Commission
City of Richfield
City of Salina
City of Monroe
City of Beaver
City of Fillmore
City of Loa
City of Oak City
Town of Marysvale
Town of Junction
Town of Circleville
Town of Kanosh
Town of Torrey
Town of Bicknell
Town of Elsinore
Town of Sigurd
Town of Annabella
Town of Redmond
Town of Aurora
Town of Joseph
Town of Glenwood
Town of Koosharem
Town of Kingston
Town of Antimony
Town of Hanksville
Town of Lyman
Town of Kanosh
Town of Meadow
Town of Holden

Indian Tribes

Paute Indian Tribe

Public and University Libraries

Richfield City Library
University of Utah Library
Utah State University Library
Weber State University Library
Brigham Young University Library
Beaver County Library
Delta City Library
Fillmore City Library
Elsinore Library
Salina Library
Southern Utah State College Library
Snow College Library

Organization and Industry

Escalante Sawmills - Escalante, UT
National Forest Products Association
The Wilderness Society - Denver, CO
Utah Woolgrowers - Salt Lake City, UT
Utah Audubon Society - Salt Lake City, UT
Coastal States Mining Co. - Salt Lake City, UT
Sierra Club - Salt Lake City, UT
Utah Wilderness Association - Salt Lake City, UT
Wasatch Mountain Club - Salt Lake City, UT
League of Women Voters - Salt Lake City, UT
Sohio Petroleum Company - Denver, CO
Mountain Fuel - Salt Lake City, UT
Gulf Oil Exploration & Pro. Co.
Chevron
Exxon
Utah Bass Association - Salt Lake City, UT
East Millard Wildlife Association - Fillmore, UT
Salt Lake County Fish & Game Association - Murray, UT
Utah Wildlife Federation - Salt Lake City, UT
South Central Utah Wildlife Association - Monroe, UT
Central Utah Wildlife & Recreation Association - Gunnison, UT
Beaver Wildlife - Beaver, UT
Dixie Wildlife - St. George, UT
Utah Predatory Animal Protection Association - Salt Lake City, UT
Utah Big Game Hound Dog Association - Payson, UT
Ducks Unlimited
Utah Bowmen Association - Lindon, UT
Trout Unlimited - Salt Lake City, UT
National Resources Defense Council - San Francisco, CA
Utah Nature Study Society - Salt Lake City, UT
Utah Petroleum Association
Champlin Petroleum
Southern California Edison Co. - Long Beach, CA
Atlantic Richfield
RMOGA
Utah Cattlemens Association - Salt Lake City, UT
Utah Farm Bureau Federation - Salt Lake City, UT

Utah Mining Association - Salt Lake City, UT
Intermountain Forestry Services - Ogden, UT
Forest Management Study Group - Yale Law School - New Haven, CT.
Southern Utah Wilderness Association - Escalante, UT
Freeport Exploration Co. - Reno, NV.
Phillips Petroleum Co. - Denver CO

Individuals

Randal O'Toole
Raymond L. Bruntmeyer
Dr. Timothy J. Fahey
Dr. K. Norman Johnson
Mr. Richard H. Johnson
Mr. James M. Baker
Mr. Rob Smith
Mr. William B. Morse
Mr. Charles Reichmuth
Ms. Debbie Murray
Mr. Tom Adair
Kenneth M. Goldsmith
T. Sanders
John R. Swanson
Harry Melts
Ms. Candace Weed
Steve Robins
Jean M. Cassidy

Summaries of the Draft Environmental Impact Statement have been sent to people and organizations on the Forest Plan mailing list. A copy of that list is on file at the Forest Supervisor's Office.

APPENDIX A.

I. ISSUES, CONCERNS, AND OPPORTUNITIES IDENTIFICATION PROCESS

Forest Planning seeks to utilize opportunities to favorably address public issues and management concerns (agency responsibility and employee concerns such as watershed protection and wildlife habitat improvement). On the Fishlake National Forest, issues, concerns and opportunities were identified through informal and formal public participation processes. These began in summer, 1980. Forest personnel collected initial public ideas and issues through field contact with recreationists and other summer users and informal discussions with individuals and groups from communities adjacent to the Forest. Forest employees were also encouraged to submit their ideas and opinions on Forest Management and problems. Some 430 public and employee comments were collected. Major resource-related issues and concerns were drawn up in a comprehensive list, set up in "Planning question" format.

In August 1980, the Forest published a briefing guide, "Letting You Know and Asking for Your Participation." The guide explained the Planning process and schedule, described resources and problems on the Forest, listed Planning questions drawn from initial public involvement, and detailed the issues and opportunities involved in each. The guide included a response form for comments and additional issues. It was mailed to 1,133 individuals and organizations on the Fishlake's mailing list. In addition, a shorter version was published as a supplement to seven newspapers in the Forest area.

Open houses were held at the Forest's four District Ranger offices during August and September 1980. These were publicized in the briefing guide and in newspaper articles. A total of 44 persons attended and submitted comments. In addition, the Forest received 33 written replies through response forms and letters from interest groups, individuals and companies. (Written response from government agencies is discussed under "Consultation With Others" in this appendix.)

The next step was to narrow the scope of issues, concerns and opportunities (ICOs) to determine which could be addressed in the Forest Plan. All ICOs were subjected to four screening criteria. These are listed.

- SCOPE: Is the issue located on the Fishlake National Forest or influenced by forest activities?
- DURATION: Will the issue continue after June 1981? Issues or concerns that would be resolved before then were considered short term and were not included in the Forest Plan.
- RESOLVABILITY: Can the issue be resolved within the authority of the Fishlake National Forest? Or, does the state of the art allow for its resolution?
- STATUS: Does the issue require additional analysis under the NEPA and NFMA process?

Issues not fulfilling all the criteria were removed from the Forest Planning process. However, these "non-planning issues" were dealt with by the Forest or forwarded to the appropriate level or agency. Most of these issues were considered operational; the opportunity to correct the problem simply required a minor shift in the way the Forest or a Ranger District conducted daily operations. For example, complaints about a messy campground could be resolved by a simple cleaning. A second category concerned those issues outside the jurisdiction of the Forest Service. Fencing to prevent deer kills on Interstate-70 in Salina Canyon was one such issue referred to the Utah Department of Transportation and Utah Division of Wildlife Resources. Other such issues were forwarded to the appropriate State or Federal agency. A third category of issues include Forest Service problems that required resolution at a level higher than the Forest. These were forwarded to the Forest Service Regional Office in Ogden.

Issues and concerns that passed the criteria were grouped into nine planning questions that encompassed major problems on the Forest: developed recreation; dispersed recreation; mineral and energy demand; livestock and wildlife forage conflicts; riparian area protection; transportation system, timber and firewood supply; water production; and quality, and mixed land ownership. For each question, planners developed a broad array of "opportunities" or favorable ways to address it. Compatible opportunities then were grouped to form possible management prescriptions--possible ways to manage a given area on the Forest. For each prescription they established goals--what resource use and development opportunities would be emphasized. They also described the areas on the Forest the prescription could be used on, how all resource uses would be managed to attain goals of the prescription, and what resources, uses or activities would be benefited most by applying the prescription.

The next step was to develop alternatives--combinations of management prescriptions applied in different locations to produce varying amounts of each resource or use on the Forest. The alternatives considered in the FEIS were developed in response to both legal requirements and the local situation. Since prescriptions combined opportunities derived from initial issues and concerns, each alternative showed various possible ways of responding to those issues and concerns. Outputs of the various alternatives were displayed in terms of tradeoffs between competitive opportunities inherent in each alternative.

In August, 1982, Forest officials held workshops in six towns surrounding the Forest to give citizens the opportunity to review, comment on, or offer additional proposals to the alternatives, fifty-four persons attended. The Forest also received nine letters from industry, interest groups or individuals. From this input, planners determined there was a broad enough array of alternatives to cover the diverse issues of the public response. The only exception was the timber interest, which wanted the Forest to include an alternative emphasizing a different level of timber outputs.

In summer, 1983, the Fishlake and all National Forests were asked by the Forest Service administration to reevaluate their roadless area acreages and include these revisions in the on-going Forest Plans. The Forest conducted additional public participation to give interested people a

chance to view, question, comment on and help revise boundaries on the new roadless acreages. Both formal and informal public participation sessions were held. Formal sessions included open houses in Salt Lake City and at Ranger District offices during October, 1983. Informal public involvement included letters and meetings with Salt Lake City based conservation groups (further detail is in Consultation With Others, which follows). Planners also met with District staff to further delineate roadless area boundaries according to criteria from the Wilderness Act of 1964 and roadless area criteria.

District Rangers and staff also discussed roadless area reevaluation informally with other interested individuals and groups.

Based on this input, an additional roadless area problem statement was added to the nine original planning questions drawn from issues, concerns and opportunities. In late 1984 the planning questions were reformulated as problem statements to better define competitive and complimentary relationships between the resources discussed in each question and other resources, along with social and economic impacts. As discussed in problem 10, the wilderness issue was resolved by the passage of the 1984 Utah Wilderness Act (P.L 98-428).

II. CONSULTATION WITH OTHERS

1. Other Agencies

Numerous Federal, State and local agencies along with user, special interest and industry groups also contributed to the Forest Plan through letters, response forms, telephone contacts and meetings with Forest planners and officials.

Several State, local or Federal agency representatives provided technical assistance, information or suggested adjustments to the Plan. The agency contacts, number, nature and purpose are listed.

<u>Contact</u>	<u>Number</u>	<u>Nature and Purpose</u>
Six County Association	4	One letter--on Information and Population projections, 3 meetings on wildlife boundaries, 2 on technical coordination of planning efforts.
Wayne County Commissioner	1	Letter--mostly on unoffical timber issues.
U.S. Water & Power Resources	1	Letter--reviewed Forest guide, no comment.
Federal Aviation Admin.	1	Letter--reviewed Forest guide, no comment.
U.S. Fish & Wildlife Service	1	Letter--offered data and technical assistance on plan for threatened and endangered species affected.
U.S. Geological Survey	4	Two letters--one requesting that plan address groundwater impacts; the other expressing concern about possible lack of access on roadless areas to USGS personnel collecting data. One tour--USGS provided information on Tushar Mtns. mineral potential. One meeting to discuss groundwater.
National Park Service	3	Letter--NPS requested inclusion as cooperating agency because Fishlake is adjacent to Capitol Reef National Park.

		Capitol Reef personnel attended Plan open house.
		Meeting with Park Superintendent at Park on coordination of roadless areas with contiguous Park Proposed Wildernesses.
U.S. Office of Surface Mining	2	Letter from Washington Office asking Forest coordination with OSM Regional Office on coal mining. Phone call to OSM Regional Office.
Utah Division of Wildlife Resources	3	Response form--Price official requests more emphasis on wildlife, cattle reductions. Meetings-2 with DWR officials, Richfield, Cedar City to determine wildlife winter range location and obtain other data.
U.S. Soil Conservation Service	1	Letter--reviewed Fishlake plan guide. Asked Forest to address management activities impacts on soils, watersheds, SCS projects.
Utah Dept. of Transportation	1	Letter-review of guide, requested that Forest consider highway access, road material availability and storage sites, highway impacts, and bicycle trails in plan.
Utah Division of Forestry	2	Meetings to discuss division request that plan include scheduling and locating timber sales on Forest to enable owners of private inholdings to sell timber as supplement to Federal timber sold.
Bureau of Land Management	3	Two meetings with BLM on transmission corridor. BLM representatives also attended a Forest Plan open house.
Utah Association of Counties	1	Forest planners attended briefing on roadless area reevaluation.

San Juan Co. Comm.-Cal Black	1	Forest officials attended Black's meeting on wilderness in Richfield.
Paiute Indian Tribe	1	Letter--requesting involvement in Forest Planning process.

Planners also reviewed plans of the Bureau of Land Management and Utah Division of State Lands and Forestry and checked with other agencies to see if they had other plans that might impact or be impacted by activities specified in the Forest Plan. Since counties encompassing the Forest had no comprehensive plans, Forest planners prepared social and economic assessments for each county. In evaluating effects of alternatives, planners considered impact of each on the two existing agency plans as well as impacts on local employment, income and social system.

2. Other Consultations

A variety of interest groups, industry representatives and others requested additional input to the Plan through personal contacts and meetings with Forest officials. Contacts, number, nature and purpose of these consultations are listed below.

<u>Contact</u>	<u>Number</u>	<u>Nature and Purpose</u>
Kaibab Industries Inc.	4	1 meeting, 3 letters--all concerned with this timber company's interest in maintaining timber supply from Forest.
Dave Fordyce, Forestry Consultant	3	Visit, phone call and meeting at Regional Office concerning timber supply.
Colorado River Board	3	Letters to Forest Service Regional Office, 6 Utah Forests including Fishlake that provide water into Colorado River, additional letter to Fishlake requesting that the Forest Plan provide more water through vegetative manipulation.

Nature Conservancy	6	Letter, five meetings with NC representatives requesting that the Forest consider including Research Natural Areas in the Plan.
Electric Utilities	3	Meetings on utilities corridors, power line problems.
Utah Wilderness Association	1	Three letters, 5 phone calls, 2 Salt Lake City meetings, one Richfield meeting. UWA representatives also attended District open houses on roadless area reevaluation. UWA concerned about boundary realignments reducing roadless acreage on the Forest.
Southern Utah Wilderness	1	Telephone call on roadless area reevaluation.

In addition, District personnel maintained informal contact with a variety of local people who had expressed interest in the planning process. These included sportsmen, local officials, merchants and permittees. These contacts are documented in district files.

III. ISSUES, CONCERNS, AND OPPORTUNITIES

Ninety-five public issues and 39 management concerns considered in the Forest Plan are described in detail in the Forest's 1980 briefing guide, "Letting You Know and Asking For Your Participation," available from the Fishlake National Forest Supervisor's Office in Richfield. For more detail on complementary and conflicting relationships among resources within and between issues, request an additional document, "Fishlake National Forest Identification of Issues, Concerns and Opportunities," published in April, 1981, as part of the planning process (Planning Step 1).

Because of difference in funding levels, resource outputs and management emphasis, all issues and concerns were treated differently in each alternative with one exception; prairie dog transplantation was treated the same in all alternatives to comply with federal law requiring recovery of endangered species. In this instance, the Forest provided specific sites in each alternative for prairie dog transplantation.

On the basis of the benchmarks analyzed in the Analysis of Management Situation the Forest has the potential capability to respond to each issue, with the exception of the 1980 RPA grazing levels. These grazing levels exceed the capacity of the Forest. Many of the issues are competitive, so that resolving one issue could reduce the degree of resolution of another issue. However, favorable resolution of one issue did not exclude at least partial resolution of another competing issue. Planning problem #3 pertaining to mineral and energy developments could conflict with all other planning problems except #6. Planning problem #4 on management of forage resources could conflict with #5, improvement of riparian areas, and #8, demand for more and higher quality water. Some of these conflicts could be quite significant.

Differences in budget levels and thrust of alternatives in terms of market or nonmarket emphasis are the factors primarily responsible for differences in the resolution of issues, concerns and opportunities between alternatives.

Issues, concerns, and opportunities were used to build alternatives through a multi-step process. Each issue gathered from the public, an agency, or an organization and each concern of the Forest Management Team was first grouped under an appropriate planning problem. Opportunities were next formulated that would favorably resolve each issue or concern. Some opportunities were compatible while others were not. Compatible opportunities were then combined to form multiple use management prescriptions. Some opportunities could appear in many of the prescriptions while others would be present in only a few. These management prescriptions were then used in various combinations and amounts to form alternatives. Alternatives were constrained to ranges established by the Benchmarks.

IV. PLANNING PROBLEMS

The process of combining individual issues, concerns and opportunities into planning questions is described in the Forest's briefing guide, "Letting You Know and Asking for Your Participation," and the document, "Identification of Issues, Concerns and Opportunities" available from the Forest Supervisor's Office. In early 1984 these planning questions were restated as planning problems and a 10th problem dealing with wilderness added. A detailed discussion of each problem follows.

1. PUBLIC DEMAND FOR DEVELOPED RECREATION SITES

The Fishlake National Forest presently provides 28 camp and picnic grounds, accommodating a total of up to 3,500 people at one time, facilities across the Forest need reconstruction work.

Demand for developed recreation should continue to increase. The 1980 census set the five-county population adjacent to the Forest at 31,000. Population is projected to rise dramatically because of increased coal mining and the Intermountain Power Project (IPP) development. Besides increasing numbers of local users, a large number of travelers from northern Utah and out-of-state utilize developed recreation areas on the Forest.

Demand calls for two distinct kinds of developed recreation facilities. Travelers and some local users need destination-only campgrounds. Local people need picnic sites adjacent to population centers. There is also a growing demand for facilities to accommodate church, Scout and other large group outings. The Forest currently lacks such facilities.

Development of new facilities and rehabilitation of existing facilities is needed to meet increasing public demand for developed recreation sites.

2. DEMANDS FOR RECREATION USE

Population increase is expected to put additional pressure on the Fishlake for hunting, fishing, and off-road vehicle use. There is growing demand for more trailheads, improved trail maintenance, and winter sports accommodations.

Increased recreation activities have also increased use conflicts and user impacts on Forest resources and environment. Conflicts are occurring between recreationists and livestock owners, and between motorized and non-motorized uses. Off-road vehicle use damages soils, water quality and conflicts with other resource uses. Use during hunting season heavily impacts Forest roads when they are wet and muddy. Dispersed recreation can also present littering, sanitation, and law enforcement problems. Although capacity exists Forestwide, popular areas are being overused.

The Forest will experience increased user conflict, resource damage, and administrative costs unless greater efforts are made to regulate ORV use and provide other dispersed recreational opportunities.

3. MINERAL AND ENERGY DEVELOPMENT

Mineral and energy-related activities on the Fishlake National Forest include development of coal, precious metals, limestone, clay, gravel, uranium, geothermal, oil and gas, and hydroelectric resources. Although prospecting and mining are a part of Forest history, energy and worldwide mineral shortages have sped up the quest for mineral development. The past decade has seen: increased lease acquisition to explore for oil, gas and coal, increased production from an existing coal mine; development of large-scale limestone and quartzite quarries; and construction of Utah's largest cement-producing facility. The most recent activity is a major dry steam geothermal discovery--one of four known in the world.

The current moderate activity has not severely impacted the Forest or surrounding communities. However, potential mineral developments could dramatically alter both the population size and economic base of the region, and cause significant direct and indirect effects on Forest Management. Mineral and energy exploration and development can conflict with other resource uses.

Under existing law the Forest Service does not actively manage the mineral resource but coordinates with State and other Federal agencies. The Forest Service is mandated to encourage private industry in mineral search and production in a manner compatible with other resource uses and activities.

Mineral and energy developments will increase social and economic impacts and conflicts with other resource uses. Development rate will depend on private markets. Existing law limits the Forest Service role in mineral activities to assuring protection of the public interest, other resource uses, and the environment.

4. LIVESTOCK AND WILDLIFE FORAGE RESOURCE

Livestock grazing is a major use of the Fishlake National Forest. Large areas of the Forest were overgrazed during the past 80 years, resulting in serious rangeland damage. Although grazing use has been reduced by about a third since the 1940's, livestock grazing continues to pose some unresolved conflicts with watershed, fisheries, wildlife and other uses. Because spring grazing lands would convert to pinyon-juniper if left untreated, intensive range restoration and treatment work is required to keep much of the land producing forage.

Currently, forage production on lands suitable for livestock grazing is below the amount needed to meet present livestock obligations. However, there is a surplus of forage produced on acres unsuited for livestock grazing. Deer and elk can utilize the forage, but also use some forage in areas grazed by cattle and sheep. The Forest Service, required by law to maintain viable wildlife populations, must assure

that total forage is not over-allocated to livestock. Analysis indicates that a modest allowance for wildlife needs can provide the necessary forage.

The major challenge will be in bringing grazing use by livestock into line with indicated capacity of suitable range. Severe grazing reductions would be detrimental to a large share of the local agricultural economy that depends on National Forest rangeland to support livestock operations.

If modest allowances are made for wildlife, Forest Service analysis indicates little conflict between wildlife and livestock on rangeland. The Forest is overobligated for livestock forage production. To a great extent, livestock grazing capacity is limited by budget allocations for range maintenance and restoration. There is a need to determine what levels of grazing numbers can be funded.

5. WILDLIFE AND FISH HABITAT FOR GAME AND NONGAME SPECIES

About 24 game and 257 nongame species of wildlife and fish live on the Fishlake National Forest. While other agencies manage wildlife populations, the Forest Service role is to protect and develop habitat.

This is done two ways. Forest officials cooperate with the Utah Division of Wildlife Resources and other agencies in modifying range, timber and other projects to enhance or protect wildlife habitat. They also do direct habitat improvement work. Many areas have been hurt by historic overgrazing, evidence by soil erosion, watershed damage, and permanent losses of aquatic habitat. Exotic species were introduced into many waters where they compete with native fish. Contemporary Forest uses, including reservoir construction, irrigation diversion, grazing, mineral development, and road construction, pose potential impacts on wildlife habitat.

Wildlife conflicts with other Forest uses. Domestic livestock and big game animals compete for rangeland. Recreationists harass wildlife. Livestock owners, accustomed to killing off Utah prairie dogs, question the Forest Service's mandate to protect the animals under the Threatened and Endangered Species Act. Big game hunts cause road damage, property damage and trespass problems.

The Forest needs to determine what areas will be emphasized for wildlife habitat improvement work and provide guidance for resolving conflicts between wildlife and other uses.

6. ROAD SYSTEM EXPANSION AND CLOSURES

There are approximately 1,400 miles of "system" roads on the Fishlake National Forest. Primitive "non-system" roads and jeep trails comprise two times this mileage. Tight budgets have limited road maintenance to 400-600 miles a year, with most work limited to major travel routes. There is little money for road system expansion or

improvement. Many system roads are inadequate for increased timber, mineral, coal and oil exploration, and development.

Meanwhile, mileage of non-system roads is increasing each year as off-road vehicle (ORV) use increases. As populations continue to climb, pressures on roads and trails will increase.

ORV use is causing resource damage and conflicts with other resource uses. Controversy abounds on how much roaded access the Forest should provide to various areas. Recreation, range, timber, hunting, mining and other user groups require roads but for different purposes and at different standards. Some roads, being damaged by use when wet, will have to be seasonally closed to curtail watershed and road maintenance problems.

Projected road use shows the Forest will face increasing pressure on its existing road system and continued expansion of non-system roads unless it initiates seasonal road closures, limits ORV access in some areas, and expand or improve roads in others.

7. COMERCIAL AND FUELWOOD TIMBER RESOURCES MANAGEMENT

Forest timber resources are limited. Although many small commercial timber operators acquire raw materials from the Forest, much of the commercial timber is in small, inaccessible stands. Lack of road access limits harvesting and hampers treatment of timber stands for insect and disease problems. Saw timber harvest on the Forest has remained fairly constant over the last 25 years.

Fuelwood demand is growing on the Forest; firewood is the most heavily utilized wood product. Firewood demand doubled between 1979 and 1980. Volume in 1980 was almost four times the volume of green timber sold annually. Most firewood is harvested for personal use and taken from dead material found in old chainings; from logged areas prior to cleanup; and from dead trees.

From an analysis of timber resources and projected timber demands, current commercial timber demand can be met, but increased production would require extensive access road construction. Forest capacity to meet anticipated growing fuelwood demand is unknown; fuelwood consumption and production should be studied in greater detail.

8. WATERSHED CONDITION, WATER QUALITY, AND WATER PRODUCTION

The Fishlake National Forest was established because local residents wanted to reduce flooding in the valleys. Livestock overgrazing had denuded slopes of watersheds above the valleys, causing severe flooding and property damage. Reduced grazing, revegetation, contour trenching and other watershed treatments have reduced flooding but have not solved the problem. Portions of some grazing allotments are still used too heavily. Many areas on the Forest are still in poor watershed condition and need rehabilitation. Riparian areas are of critical concern as conflicting uses from recreations, livestock and wildlife put additional pressure on them.

Water leaving the Fishlake meets State of Utah water quality standards. Continued monitoring is required to assure that water remains within the standards.

Current demand for water from the Forest is projected to grow with increasing industrialization and population growth in the valleys. The two major rivers draining the Forest, the Sevier and Colorado, are two of North America's most highly used rivers. Recent research efforts have demonstrated that cloud seeding, replacing water-consumptive plants with less consumptive plants, and building structures to accumulate snow can be used to increase runoff and downstream water production. However, many of these techniques appear to be environmentally expensive ways to produce marginal increases in water yield.

An analysis of watershed conditions on the Fishlake National Forest shows a need to stabilize some watersheds and a need to manage future Forest uses to prevent watershed degradation. The Forest probably will not be able to supply additional water to downstream users without damaging watersheds.

9. MIXED PUBLIC AND PRIVATE LAND OWNERSHIP

The Fishlake National Forest contains 109,462 acres of land owned by private interests or by the State of Utah. This has caused problems of uncertain property lines, public access to favorite recreation spots closed by private parties whose land they must cross, lack of right-of-way easements on roads across private lands, and subdivisions of homes built in key wildlife area or near water supplies. Development of private inholdings may increase these problems.

National Forests are authorized to exchange Federal lands for private inholdings, accept land donations, and acquire rights-of-way to provide public access across private lands. Since the mid-1970's the Forest has obtained many rights-of-way and has acquired 2,300 acres of land through the exchange program. The Forest can also sell small inholdings for certain purposes.

Private and state ownership of lands inside the Forest boundary will pose increasing problems in limiting public access and interfering with use of Forest resources. The Forest can exchange for Non-Federal lands to reduce the number of inholdings.

10. WILDERNESS RECOMMENDATIONS TO CONGRESS

The National Wilderness Act of 1964 recognized wilderness as a resource and as one of several multiple use objectives for National Forest management. Significant acreages on the Fishlake National Forest remain eligible for wilderness consideration. Several Utah environmental groups have proposed wilderness designation for some of these areas, including Tushar Mountain, Thousand Lake Mountain, Wayne Wonderland and Fishlake Mountain. Local sentiment is overwhelmingly opposed to wilderness designation for roadless areas on the Fishlake.

In 1973, the Forest Service evaluated roadless areas on National Forest lands in its first Roadless Area Review and Evaluation (RARE). This review assessed 447,860 acres on the Fishlake and recommended 86,840 for further study.

The National RARE I inventory had several weaknesses. Inventory criteria were too general. Some areas that did not meet wilderness criteria were included while other suitable areas were missed entirely. After a court challenge and an unsatisfactory attempt to consider roadless areas individually, another nationwide inventory called RARE II started in 1977.

RARE II evaluated 638,478 acres on the Fishlake. Fishlake Mountain, an area of 18,810 acres, was recommended to Congress for wilderness designation.

The initial planning regulations (36 CFR 219) directed Forest Planning to use the RARE II recommendations as a constant in all alternatives. Those planning regulations were revised in September 1983 because of a California Court case. The revised regulations (36 CFR 219.17) required that a wide range of wilderness alternatives be considered as part of the planning process.

In September, 1984, Congress passed the Utah Wilderness Act (PL 98-428), which resolved the Wilderness issue for this first planning cycle for the State of Utah and the Fishlake National Forest. No Wilderness areas or wilderness study areas were designated on the Fishlake Forest. The planning alternatives were modified to confirm to the Utah Wilderness Act.

APPENDIX B

DESCRIPTION OF THE ANALYSIS PROCESS

I. INTRODUCTION

A. General Planning Problem

The National Forest Management Act of 1976 (NFMA) charges the U. S. 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 be based on a determination of how best to meet public needs and desires within the capabilities of the land to produce goods and services. The capabilities of the Fishlake National Forest to produce the various goods and services are dependent on, and limited by, a short growing season, low precipitation level, high elevation, relatively low soil productivity, and a highly diverse landscape.

Public interests include diverse views about the relative importance of producing commodities such as timber and livestock forage, and providing amenities such as dispersed recreation opportunities and wildlife habitat. The major planning goal of the Fishlake is to display the information needed by decision makers to determine the mix of goods and services that will maximize net public benefits. Net public benefits is an expression used to signify 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. Thus net public benefits includes: priced outputs such as board feet of timber, and animal unit months, and nonpriced items such as visual quality, wildlife habitat diversity, water quality, and 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 to manageable proportions were available to the interdisciplinary planning team. These are described in this appendix.

B. The Planning Process:

The NFMA regulations (36 CFR 219.12) describe a 10-step planning process to be used in the preparation of a Forest Plan. These steps are listed below for information:

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

Steps 1, 2, 7, and 8 are generally considered to be judgmental steps and are described in Chapters I, II, IV and in Appendix A. Steps 9 and 10 are considered execution steps and are described in the proposed Forest Plan. Steps 3, 4, 5, and 6 are analytical steps. A brief explanation of the planning steps is provided below:

1. Identification of Purpose and Need. Through public participation including contacts with other Federal agencies, State and local governments, and contacts with a local Indian tribe, the Forest interdisciplinary team identified public issues, management concerns, and resource opportunities. These were evaluated and recommended to the Forest Supervisor, who determined which were the major public issues, management concerns, and resource opportunities that would be addressed in the planning process.
2. Development of Planning Criteria. Based on the selected issues, concerns, and opportunities, the Forest Management Team developed criteria to direct the collection and use of inventory data, analysis of the management situation, and the design, formulation, and evaluation of alternatives.
3. Inventory Data and Information Collection. The Interdisciplinary Team made a determination of what data was needed based on the identified issues, concerns, and opportunities. Most data requirements fit into one of the following categories: resource capabilities, demands, benefits and costs. Existing data was used whenever possible. Some supplemental information was developed to fill information gaps.
4. Analysis of the Management Situation. A simplified definition of this step is that it is a determination of the Forest's capability to provide the goods and services (supply) that comprise the public needs and desires (demand). The FORPLAN linear programming model was used at this stage to meet several specific requirements and also to define the feasible parameters (benchmarks) for production of several of the resource outputs; timber, water, and livestock forage. The specific requirements noted above include: (a) determining the maximum present net worth (PNW) the Forest can generate; (b) projecting the current management program; (c) evaluating the feasibility of meeting national production goals as expressed by the Resource Planning Act (RPA) targets; (d) displaying the minimum costs necessary to retain the lands in the National Forest system; and (e) providing a basis for formulating a broad range of reasonable alternatives.

The Analysis of the Management Situation (AMS) document is on file in the Fishlake National Forest Supervisor's Office in Richfield, Utah.

5. Formulation of Alternatives. The AMS (Step 4) sets the stage for developing a range of alternative management plans for the Forest. This range of alternatives is within the resource capability parameters established in the benchmarks in the AMS. Public issues, management concerns and opportunities are reflected in the formulation of alternatives as well as several specific alternative requirements:

- (a) alternatives were formulated to reflect a range of resource outputs and expenditure levels. The range of resource outputs, however, was restricted by their maximum and minimum potentials as determined by benchmark analysis;
- (b) all alternatives were formulated to facilitate analysis of opportunity costs, environmental tradeoffs, and the effects on present net value, benefits and costs;
- (c) alternatives were formulated to provide different ways to address major public issues, management concerns, and resource opportunities identified during the planning process. Also reasonable alternatives which may require a change in existing law or policy were considered;
- (d) the RPA Program tentative resource objectives for the Fishlake were included in an alternative;
- (e) each alternative was formulated so as to be the most cost efficient combination of management prescriptions examined to meet the objectives of the alternative;
- (f) the current program projected through time would be used to display costs and benefits of no change - the no action alternative;
- (g) the current budget was used to determine the flow of goods services under a constant budget at current levels;
- (h) all alternatives were formulated to be consistent with the 1984 Utah Wilderness Act (PL 98-428).
- (i) a reduced budget alternative was developed to display the costs, the benefits, and the flow of goods and services which could be provided if the budget were held to 75% of current;
- (j) other alternatives were included to emphasize commodity production and 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 to determine how the alternative meets the various goals and objectives, how the alternative responds to the public issues and management concerns, and how each alternative compares to the other alternatives. The output levels, benefits and costs were generated through the use of the FORPLAN model.

The analyses include: direct effects, indirect effects, cumulative effects, conflict with other existing governmental agency or Indian tribal land use plans, historical and cultural resources, energy and transportation corridor effects, mitigation measures needed to meet legal standards, and other environmental effects.

7. Evaluation of Alternatives. Using the previously selected planning criteria, the Interdisciplinary Team evaluated the significant physical, biological, economic, and social effects of each of the eleven alternatives considered in detail. The evaluation was based on a comparative analysis of the Forest-wide effects of the management alternatives including present net value, social and economic effects, outputs of goods and services, and overall condition of environmental resources. The analysis was done in a systematic manner that documented each step of the evaluation.
8. Preferred Alternative Recommendation. Using the evaluation described in the previous step, the Forest Supervisor recommended a preferred

alternative to the Regional Forester. This preferred alternative is identified in Chapter II of this Environmental Impact Statement, and is displayed as the proposed plan which accompanies this EIS.

9. Plan Approval. After the issuance of the Final Environmental Impact Statement, the Regional Forester shall review the proposed plan and the Final Environmental Impact Statement and shall either approve or disapprove the plan in accordance with 36 CFR 219.10(c). In the case of plan approval, a Record of Decision will be issued in accordance with NEPA procedures (40 CFR 1505.2). In addition to the NEPA procedures, the Record of Decision shall include a summarized comparison of the selected alternative with 1) any environmentally preferred alternatives and 2) any other alternatives with a higher present net value.
10. Monitoring and Evaluation. At intervals established in the plan, implementation will be evaluated on a sample basis to determine how well the objectives of the plan are being met and how closely management standards and guidelines are being followed. Based upon this evaluation, the interdisciplinary team will recommend to the Forest Supervisor such changes in management direction, revisions, or amendments to the Forest Plan as are deemed necessary. The monitoring plan includes 1) the actions, effects, or resources to be monitored, 2) the frequency of measurement, 3) the expected precision and reliability of the monitoring process, 4) the time when the evaluation will be reported, and 5) the allowable limits of variation. This is in chapter V of the proposed Forest Plan.

II. INVENTORY DATA AND INFORMATION COLLECTED

A. Data Base

The entire Fishlake National Forest was mapped on 7 1/2 minute orthophoto quads with transparent film to allow aggregation of several layers into capability areas.

1. Capability Areas

The capability area is the smallest delineation used in the analysis process on the Fishlake Forest. Each capability area is an aggregate of contiguous acres of land with similar characteristics and with similar responses to management practices and activities. Each capability area is unique in that it is site specific and occurs only once throughout the entire Forest.

The delineation of capability areas was based on the following stratification:

a. Level 1 - Human Resource Units (A spatial subdivision of the Forest).

- | | | | |
|-----------|--------------|----------|---------------------|
| 1. BEAVER | Map Code = 1 | Beaver | Human Resource Unit |
| 2. DELTA | Map Code = 2 | Delta | Human Resource Unit |
| 3. FILMOR | Map Code = 3 | Fillmore | Human Resource Unit |
| 4. FREMNT | Map Code = 4 | Fremont | Human Resource Unit |

- 5. PIUTE Map Code = 5 Piute Human Resource Unit
- 6. RCHFLD Map Code = 6 Richfield Human Resource Unit

b. Level 2 - (Not Used)

c. Level 3 - Special Areas

- 1. PMRNA Map Code = 1 Partridge Mtn Research Natural Area
- 2. FLHT Map Code = 2 Fish Lake Hightop
- 3. FSH-JV Map Code = 3 Fish Lake Johnson Valley Complex
- 4. BGWR Map Code = 4 Big Game Winter Range
- 5. OTHER Map Code = 5 All Other Lands

d. Level 4 - Work Group

- 1. P-PINE Map Code = 1 Ponderosa Pine
- 2. MEADOW Map Code = 2 Meadow
- 3. CONFER Map Code = 3 Conifer
- 4. SAGEBR Map Code = 4 Sagebrush Grass
- 5. MT-BR Map Code = 5 Mountain Brush
- 6. ASPEN Map Code = 6 Aspen
- 7. P-J Map Code = 7 Pinyon Juniper
- 8. BARREN Map Code = 8 Barren

e. Level 5 - Slope Class

- 2. 0-40 Map Code = 1 or 2 less than 40% slope
- 3. 40+ Map Code = 3 over 40 percent slope

f. Level 6 - Condition Class

- 1. OTHER
- 2. SEEDS Seeds and Saps
- 3. POLE Poles
- 3A. POL-A A Access Zone
- 3B. POL-B B Access Zone
- 3C. POL-C C Access Zone
- 4. IMM Immature Saw Timber
- 4A. IMM-A Immature - A Access Zone
- 4B. IMM-B Immature - B Access Zone
- 4C. IMM-C Immature - C Access Zone
- 5. Mature Saw Timber
- 5A. Mat-A Mature - A Access Zone
- 5B. Mat-B Mature - B Access Zone
- 5C. Mat-C Mature - C Access Zone
- 6. NONCOM Non-Commerical Forest Land
- 7. SOILS Unsuitable Forest Land Due to Shallow foils
- 8. LANDS Unsuitable Forest Land Due to Landslides
- 9. ROCKY Unsuitable Forest Land Due to Rocky Soils
- 10. PLANT Plantations

2. Analysis Areas

Capability areas having similar qualities were combined to form analysis areas. Each "level identifier" listed above in the section on capability areas covers the entire Forest. Each unique combination of Level 1 to Level 6 forms a capability area.

Analysis areas together with portions of analysis areas were grouped into zones for further analysis. The Fishlake was divided into 40 zones where prescriptions were applied in different combinations rather than just by analysis areas.

3. Production Coefficients

Scheduled outputs included in the FORPLAN model for the Fishlake included:

Timber	- in thousands of cubic feet
Livestock Forage	- in animal unit months
Range Non-Structural Improvements	- in acres
Range Structural Improvements	- in affected acres
Fisheries	- fish user days
Wildlife	- structural habitat improvement in structures
Timber	- plantation acres (timber)
Timber	- thinning acres
Local Road Construction	- in miles
Local Road Reconstruction	- in miles

The scheduled outputs listed above were represented in the model by production coefficients.

Production coefficients were developed for each output that could be produced on each analysis area or zone. Coefficients are based on the production capability of an acre or a zone and the intensity of management. They were entered in the FORPLAN model as coefficients for each decade or year. FORPLAN is one of the family of linear programs. A linear program schedules and allocates resources (inputs) so as to optimize outputs in the manner the user defines. FORPLAN is a linear program that has been specially adapted for Forest planning.

Further detail on production coefficients is available on file at the Fishlake National Forest.

4. Lands Suitable for Management Activities

Determination of suitability is the process of ascertaining, "The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices."

All 1,424,479 acres of the Forest were considered suitable for water production and for some types of recreation activities. Wildlife forage coefficients were developed for all lands unsuitable for livestock grazing in addition to those lands suitable for livestock grazing. All major streams and lakes were evaluated for fisheries production and for their potential production with the addition of structural habitat improvements.

Range

Determination of land available, capable and suitable for range production follows instructions in U.S. Forest Service, Intermountain Region, Range Analysis Handbook (FSH 2209.21). Livestock forage coefficients were developed for all areas that are inventoried in existing range analyses. Determination on lands lacking range analysis was accomplished by extrapolation.

Suitable range is land accessible or made accessible to livestock, which produces forage or has inherent forage producing capabilities, and can be grazed on a sustained yield basis under reasonable management goals (FSH 2209.21). Transitory range, which is timbered land made temporarily suitable for grazing through fire or as a result of timber management practices, theoretically exists on the Forest. However, it does not contribute a significant amount of forage to warrant inclusion in the evaluation. The planning assumption made is commercial timber land is unsuitable for forage production. For a more detailed explanation of the range suitability see the Analysis of the Management Situation document, and/or the process records located in the Forest Supervisor's Office.

Timber

National Forest System lands were identified by three major categories in the process of determining lands capable of timber production: productive forest land, nonproductive forest land, and nonforest land. All 1,424,479 acres of land were classified into one of the three categories as follows:

Productive Forest Land. Forest land which is capable of growing industrial crops of wood at or above the minimum biological growth established by the RPA program or the Regional Plan. This classification includes both accessible and inaccessible, stocked and non-stocked land.

Nonproductive Forest Land. Forest land which was identified as not capable of growing industrial crops of wood at least at the minimum biological growth potential established in the RPA program or the Regional Plan. Nonproductive forest land is classified as land not suited for timber production.

Nonforest Land. The Fishlake National Forest identified land that has never supported forests and lands formerly forested where use for timber production is precluded by development for other use (Note: Includes areas used for crops, improved pasture, residential or

administrative areas, improved roads of any width and adjoining clearings, powerline clearings of any width, barren, grass, etc. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide, and clearings, meadows, etc., more than one acre in size to qualify as nonforest land.) The nonforest land is classified as land not suited for timber production.

Productive (capable) Forest Land which has been legislatively or administratively withdrawn from timber production by the Secretary or the Chief of the Forest Service is not available. Productive not available forest land is classed as not suited for timber production.

Lands capable and available for timber production are evaluated for suitability utilizing a three stage test (FSM 2415). The following three stage test of suitability was used for all available and capable timber producing lands on the Fishlake National Forest:

Stage I - Physical Suitability

Stage II - Economic Suitability

Stage III - Objective and Theme of the Forest Plan Alternative considering multiple use values and effects on timber production.

Stage I - Physical Suitability. The first test was to determine if technology is available that will ensure timber production, including harvesting, from the land without irreversible resource damage to soil productivity or watershed condition. Areas so strewn with boulders that logging is impractical were classed as unsuitable. Another test for physical suitability is whether or not there is reasonable assurance that such lands can be adequately restocked within five years after final harvest.

Stage I was the step used to determine tentatively suitable timber lands. For a more detailed explanation, see the Analysis of the Management Situation document.

State II - Economic Efficiency. The purpose of the State II analysis is to organize capable, available, and tentatively suitable timber producing lands into analysis areas that significantly affect timber management costs and values at various levels of mangement intensities (prescriptions). Capable and available forest land will be considered as economically suitable for timber production if and only if it is included in the set of lands that are efficient in meeting the timber productive goals for the Forest Plan.

Stage III - Final Suitability Test. The choice of the timber production goals for the Forest Plan depends upon the issues and concerns addressed by the alternatives. An alternative which places a higher emphasis upon timber production will generally allocate a larger land base to timber production. The exception to this rule occurs where it is more efficient to manage timber more intensively rather than increase the land base for timber production.

Several important points must be recognized at this stage:

1. The analysis does not start with a fixed land base. If land is available and physically suitable, it is eligible for allocation to a mix of multiple uses including some intensity of timber production. The intensity of production assigned the Forest subunits will depend upon the objective of the alternatives and the comparative advantage of Forest subunits to provide mixes of multiple uses.
2. The extent to which tradeoffs are made among resources will depend upon their relative values only when surplus resources exist (land and capital) to meet the minimum output requirements of the Forest alternative.
3. 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 goals for a Forest alternative for any decade of the planning period is suitable for timber production. This includes lands required to efficiently meet timber production goals for the RPA planning horizon (50 years) and to efficiently meet sustained yield criteria for the remainder of the harvest period.
4. Each Forest alternative will probably have a different set of suitable lands, depending upon the objective of the alternative. The selected alternative defines the land unsuitable for timber production. No harvest for timber production purposes can occur on these lands. When the Forest Plan is revised, however, this land is again available to meet the objectives of the Forest alternatives. If social objectives and Forest conditions have not changed, it will be designated as unsuitable once again. If conditions have changed, a different set of lands, larger or smaller may be designated as unsuitable.

Once an alternative has been selected and adopted as the Forest Plan, any land tentatively identified as not suited in Stage III is combined with the land identified as such in Stage I and becomes the land unsuited for timber production during the plan period. 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 one plan are subject to review and revision in subsequent revisions of the plan.

5. Allocation and Scheduling

Multiple use management prescriptions were developed as described below. The Interdisciplinary Team then inspected these prescriptions to determine the intensity and schedule of activities called for in the prescription. These intensities and schedules were combined with the productivity of the zones to determine the production coefficients placed in the model. The model then allocated and scheduled the

prescriptions to the zones to achieve the constraints of the model in the most cost efficient manner.

In the FORPLAN model, prescriptions with timber harvesting activities were freed to allow a wide range of scheduling and allocation opportunities. Other prescriptions were limited to implementation in the early decades of the planning time period.

6. Monitoring and Evaluation

The planning data provides a base from which changes can be measured and as a control for the monitoring actions which are detailed in the Forest Plan. Assumptions and coefficients will be verified and the data will be refined and updated as the Forest Plan is implemented.

7. Plan Implementation

The physical and biological data contained in the planning data base provides starting point information for programming and plan implementation. As monitoring and use provide more accurate information, the data base will be improved and updated.

B. Sources of Data

Data used in the analysis was developed from the following sources:

1. Definitions of outputs, activities and effects - Forest Service Manual, Management Information Handbook (FSH 1309.11a).
2. Administrative boundaries and landownership - Fishlake National Forest base map.
3. Capability, analysis area and zone maps - 7 1/2 minute quads for the Fishlake.
4. Empirical timber yield data - 1978 inventory data.
5. Managed stand yield table - prognosis used.
6. Economics - Timber costs and values were obtained from the R-4 TIMBERVAL study. Other resource values were based on the 1980 RPA values as adjusted for local (R-4) condition.
7. Recreation coefficients in RVD's - Recreation Information Management (RIM) reports.
8. Recreation Opportunity Spectrum mapped on USGS quads.
9. Forage production potential calculated from average yields contained in existing allotment management plan analyses.
10. Salina Land Use Plan.

11. Visual Resource Study of Fish Lake-Johnson Valley and also the Tushar Mountains.

III. THE FOREST PLANNING MODEL (FORPLAN)

A. Overview

FORPLAN (short for FOREst PLANning model) was 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 RAM and 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 seeks to assign values to decision variables in such a way as to simultaneously satisfy a set of linear constraints and maximize or minimize 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 prescriptions (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, analysis areas represent both contiguous or noncontiguous areas of land. Noncontiguous analysis areas are generally representative of scattered areas of land possessing similar characteristics such as site productivity, cover type, degree of access, or some combinations thereof. The principal reason for this type of aggregation is to group areas with uniform response functions in biological and/or financial terms. Contiguous analysis areas seldom, if ever, occurred in the Fishlake Forest stratification process.

In the model, analysis areas form the basic units on which management decisions are made. A hierarchy of analysis area identifiers categorize these land units and provide a structure for formulating or describing resource allocation problems through the use of constraints and objective functions. The design of such a hierarchy is critical to the correct specification of production possibilities on the Forest.

An additional layer was added to the Forest in order to incorporate some type of contiguous boundary for which one can better coordinate the allocation and/or scheduling of management prescriptions to analysis areas. These areas were input as coordinated allocation zones (CAZ's) in the Version II FORPLAN model. Incorporating CAZ's into the FORPLAN model in this manner also allows representation of yield and cost information that is a function of the juxtaposition of management prescriptions over a 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 mix of outputs through time. Each prescription contains components of a production function for jointly produced outputs. Different analysis areas may utilize the same prescription, however different output levels, costs, or benefits would occur due to inherent differences between analysis areas. Management prescriptions are commonly identified by two factors, management emphasis and management intensity, within the FORPLAN data file. Timing and scheduling options are defined as an integral part of each prescription.

ACTIVITIES

Activities represent active or passive management of the land. Further, activities incur costs; hence, represent choices for the use of capital outlays. Activities may be specific, such as: harvest one acre of mature Engelmann spruce by clearcutting using a tractor logging method. Alternatively, the activity may be general, such as: increase heavy maintenance in developed recreation sites to reduce facility deterioration rate. The activities associated with each management prescription are further defined by standards and guidelines.

OUTPUTS AND ENVIRONMENTAL EFFECTS

Outputs and environmental effects result from the activities modeled. Generally, as more money is applied to the activity set, more outputs are produced from the land. However, qualitative criteria are also included in the model; hence, there may be exceptions to the above generalization. Outputs may be priced directly in the model or may be included without prices where estimation of prices is not practical. Environmental effects included in the model represent quality differentials and will typically be represented through the use of constraints.

CONSTRAINTS

Constraints are used to ensure that the assignment of prescriptions to analysis area conforms to the emphasis of a particular alternative. FORPLAN constraints fall into four categories: (1) constraints for technical implementability, (2) constraints to ensure conformance to the minimum management requirements, (3) general timber policy constraints; i.e., nondeclining yield and harvest of timber stands generated at or beyond mean annual increment, and (4) discretionary constraints designed to achieve various levels of outputs and expenditure levels. The first three categories of constraints define production limits common to most 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. Prescription Development

Management prescriptions were developed by the Interdisciplinary Team for all analysis areas. Each analysis area, and its characteristics, was reviewed for all the multiple-use activities and outputs that were considered probable under existing technology, issues, and demands. Then a full set of prescriptions was developed to fit the output types, levels, costs, and benefits that could be attained under various management philosophies. Basic assumptions used in developing prescription sets for each analysis area include:

- a. Every acre of the Fishlake Forest is available for assignment under one or more management prescriptions;
- b. A wide range of choices would be available to the model in reaching a cost-efficient solution.

C. Analysis Process and Analytical Tools

1. Analysis Prior to FORPLAN

Analysis conducted prior to FORPLAN modeling included items described above such as: stratification of the Forest into capability and analysis areas; design or development of management prescription to fit all analysis areas; projecting costs and benefits for practices included in the management prescriptions, predicting levels for the various scheduled outputs for each resource and prescription, and determining the linkage between the various outputs, commonly called "joint production functions."

An example of the "joint production function" or linkage between resource outputs is the relationships that exist as a result of chaining an acre of pinyon-juniper, which has an effect on available forage for livestock, deer, and elk. The activity will also affect firewood gathering and the visual quality of the area.

Major assumptions used in the above analysis include:

- a. Riparian areas will receive special emphasis and protection.
- b. Activities in conifer analysis areas for wildlife and livestock would not require vegetative removal except through commercial timber sales.
- c. Activities in aspen analysis areas for wildlife and livestock could require vegetation removal either through commercial sales or by specific removal activities.
- d. Coordination through interdisciplinary team analysis and action will be necessary to mitigate adverse effect for most activities that modify environmental conditions,
- e. 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.

2. FORPLAN Analysis

The FORPLAN model was used to determine the optimal management prescription and scheduling to each coordinated allocation zone (CAZ) within each alternative. A CAZ is a collection of analysis areas. A CAZ, for example, may receive the intensive grazing prescription. Not all of the area of the CAZ would undergo vegetative manipulation, since much of the CAZ may be steep sites not suitable for livestock production. The designation only allows so much vegetative manipulation. The budget may preclude the allowed area from being treated. If the CAZ receives a non-development prescription, no vegetative manipulation would be allowed. This process resulted in the selection of the most cost efficient prescriptions that meet a given set of limits (constraints).

3. Analysis Done Outside the FORPLAN Model

The final estimation of dispersed recreational outputs, developed recreation investments, visual quality effects, water yield and socio-economic effects were modeled outside of the FORPLAN model. In most cases, the FORPLAN results were used as an integral part of the final estimate. For example, FORPLAN contains estimates of acres by Recreational Opportunity Spectrum (ROS), and average coefficients of use per acre. The final estimated use contains adjustment factors to relate budget levels and cumulative impacts on use (such as the amount of developed recreational investment and its impact on dispersed use).

D. Analysis Area Delineation:

The process used to delineate the analysis areas was described above in II-A-1 and II-A-2. Rationale for the stratification follows:

Level 1 Criteria - The Human Resource Unit provides spatial resolution to provide differences in haul costs for timber harvest. Road costs also vary significantly by human resource area.

Level 2 - Not used.

Level 3 - Special areas. Provides for designation of special areas such as Research Natural Areas, big game winter range, etc.

Level 4 - Work Group. Provides vegetation grouping used to develop yield and cost coefficients. The response to vegetative manipulation of aspen differs from barren, sagebrush-grass, meadow, mountain brush and pinyon-juniper. The type of treatment to get vegetative manipulation varies by work group also. Chaining may be effective to increase pinyon-juniper livestock forage production but completely ineffective in increasing forage production from a meadow.

Level 5 - Slope Class. The key distinction of level 5 is the operability of the land by conventional logging systems.

Level 6 - Condition Class. This level contains the size class of timber. Combined with level 5 information, each size class was broken down into several categories. For example, the mature condition class of the conifer working group may contain acres that are noncommercial or unsuitable due to soils, landslides, or rocky soils. The areas were defined by refining the mapped capability areas to specifically remove areas that met unsuitability requirements.

The conifer working group remaining may fit into one of 4 other categories: Mature conifer areas assumed to be capable of harvest by tractor; Mat-A--mature conifer that may be harvested by a cable logging system; Mat-B--mature conifer that must be harvested by helicopter with a possible road site within one mile of the logging area; and Mat-C-- areas that require helicopter logging systems with the nearest possible road sites further than one mile from any probable logging sites. The areas identified by a mapping procedure provide major differences in timber harvest costs.

Coordinated Allocation Zones (CAZ) - there were 40 CAZ's used in the FORPLAN modeling. CAZ's are convenient mechanisms to group analysis areas together. Prescriptions may be applied to certain CAZ's that allow for CAZ-wide coefficients to be developed.

E. Identification of Prescription:

1. Overview

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 Fishlake 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 prescription as modeled in FORPLAN is based on two discreet factors, management emphasis and management intensity. Management emphasis could be defined as the objective or goal to be achieved by

the prescription. Management intensity is the amount of investment, skill, or concern (costs) that would be applied to achieve the objective. The Fishlake model commonly uses management intensity to differentiate between prescriptions with similar objectives but different projected output levels.

The various combinations of management emphasis and management intensities are designed to comply with direction in 36 CFR 219.27a-g by providing a number of options (prescriptions) that will fit each analysis area.

2. Prescription Summary, Discriptions, Goals and Assumptions are found on the following pages:

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be considered for application any place a utility corridor is proposed and must be applied where existing major utility corridors occur. It can not be applied in wilderness unless authorized by the president. Other areas where the prescription is not suitable include research natural areas and wild and scenic rivers.

The following management area should be avoided unless studies indicate that the impact of the corridor can be mitigated:

- Developed recreation sites (prescription 1A);
- Prescription 3B emphasizing semi-primitive recreation;
- Riparian areas (prescriptions 4A and 9A);
- Special interest areas, municipal water supplies, and municipal watersheds (prescriptions 10C and 10E).

d. **MANAGEMENT PRESCRIPTION 2A**
(Emphasis is on Semi-Primitive Motorized Recreation Opportunities)

1. General Description and Goals:

Management emphasis is for semi-primitive motorized recreation opportunities such as snowmobiling, four-wheel driving, and motorcycling both on and off roads and trails. Motorized travel may be restricted or seasonally prohibited to designated routes to protect physical and biological resources.

Visual resources are managed so that management activities are not evident or remain visually subordinate. Past management activities such as historical changes caused by early mining, logging, and ranching may be present which are not visually subordinate but appear to have evolved to their present state through natural processes. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.

The harvest method by forest cover type is clearcutting in aspen and shelterwood for all other forest cover types.

Mineral and energy resources activities are generally compatible with goals of this management area subject to appropriate stipulations provided in management activities G00 - G07 in Forest direction.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be considered for application on forested as well as nonforested areas other than wilderness currently having an ROS classification of semi-primitive motorized, semi-primitive nonmotorized, or primitive (if the prescription is applied to areas currently having an ROS classification of semiprimitive nonmotorized or primitive, the ROS classification becomes semiprimitive motorized).
-

e. **MANAGEMENT PRESCRIPTION 2B**
(Emphasis is on Rural and Roaded-Natural Recreation Opportunities)

1. General Description and Goals:

Management emphasis is for rural and roaded-natural recreation opportunities. Motorized and nonmotorized recreation activities such as driving for pleasure, viewing scenery, picnicking, fishing, snowmobiling, and cross-country skiing are possible. Conventional use of highway-type vehicles is provided for in design and construction of facilities. Motorized travel may be prohibited or restricted to designated routes to protect physical and biological resources. Visual resources are managed so that management activities maintain or improve the quality of recreation opportunities. Management activities are not evident, remain visually subordinate, or may be dominant, but harmonize and blend with the natural setting.

Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.

The harvest method by forest cover type is clearcutting in aspen, shelterwood in ponderosa pine, mixed conifer, and Engelmann spruce-subalpine fir.

2. Areas Where the Prescription Can Be Considered for Application:

This prescription can be considered for application in forested as well as nonforested areas other than wilderness and within one-half mile of federal and state highways and forest roads suitable for travel by highway vehicles.

f. **MANAGEMENT PRESCRIPTION 3A**
(Emphasis is on Nonmotorized Recreation with
Development of Other Resources)

1. General Description and Goals:

Management emphasis is for nonmotorized recreation outside of wilderness. Recreation opportunities such as hiking, horseback riding, hunting, cross-country skiing, etc., are available. Seasonal or permanent restrictions on human use may be applied to provide seclusion for wildlife such as nesting for raptorial birds, big game rearing areas, and mammals (mountain lion, elk, etc.) with large home ranges. Visual resources are managed so that management activities are not visually evident or remain visually subordinate.

Investments in compatible resource uses such as livestock grazing, mineral exploration and development, etc., occur; but roads are closed to public use. Commercial and noncommercial tree harvest occur. The harvest method by forest cover type is clearcutting in aspen, shelterwood in ponderosa pine, Engelmann spruce-subalpine fir, and mixed conifers.

2. Areas Where the Prescription Can Be Considered for Application:
The prescription can be considered for application in forested as well as nonforested areas outside of wilderness currently inventoried as having an ROS classification of primitive, semi-primitive nonmotorized, or semi-primitive motorized. If the prescription is applied to areas currently having an ROS classification of semi-primitive motorized or primitive, the ROS classification becomes semi-primitive nonmotorized.

g. **MANAGEMENT PRESCRIPTION 3B**
(Emphasis is on Providing NonMotorized Recreation
Opportunities Without Development of Most Other Resources)

1. General Description and Goals:

Management emphasis is for nonmotorized recreation outside of wilderness. Recreation opportunities such as hiking, horseback riding, hunting, cross-country skiing, etc., are available. Seasonal or permanent restrictions on human use may be applied to provide seclusion for wildlife such as nesting for raptorial birds, big game rearing areas, and mammals (mountain lion, elk, etc.) with large home ranges. Visual resources are managed so that management activities are not visually evident or remain visually subordinate.

Investments in mineral exploration and development occur, but roads are closed to public use. Prescribed fires are employed to manage vegetation. Timber harvest is not permitted. Permitted and recreational livestock grazing occurs, but new permanent structures other than corrals, fences, and water developments are not allowed.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be considered for application in forested as well as nonforested areas outside of wilderness currently inventoried as having an ROS classification of primitive, semi-primitive nonmotorized, or semi-primitive motorized. If the prescription is applied to areas currently having an ROS classification of semi-primitive or primitive, the ROS classification becomes semi-primitive nonmotorized.

h. **MANAGEMENT PRESCRIPTION 4A**
(Emphasis is on Fish Habitat Improvement)

1. General Description and Goals:

Emphasis is on fish habitat improvement where aquatic habitat is below productive potential. Habitat enhancement techniques may be used on lake, reservoir, river or stream habitats and their adjacent riparian ecosystems.

The goals of management are to maintain or improve aquatic habitat condition for fish at or above a good habitat condition rating; maintain stable stream channels, meet water quality standards for cold

water fisheries, provide healthy, self-perpetuating riparian plant communities and provide habitats for viable populations of wildlife.

Management techniques that may be used include fencing and planting in riparian ecosystems, drop structures, bank stabilization structures, boulder placement, pool blasting, removal of fish barriers, construction of fish barriers, selective tree removal, lake aeration, aquatic weed control, non-game fish control, dam rehabilitation and maintenance of instream flows and conservation pools.

Livestock grazing is at a level that will assure maintenance of the vigor and regenerative capacity of the riparian plant communities as well as maintenance of shade and bank stability along streams. Vehicular travel is limited on roads and trails at times when excessive stream sedimentation would result. New road construction is restricted within riparian areas unless no feasible alternative exists. Developed recreation facility construction for overnight use is prohibited within the 100-year floodplain. Forest riparian ecosystems are treated to improve wildlife and fish habitat diversity through specified silvicultural objectives.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be applied to any aquatic habitat and adjacent riparian area outside of wilderness and research natural areas.

1. **MANAGEMENT PRESCRIPTION 4B**
(Emphasis is on Habitat for Management Indicator Species)

1. General Description and Goals:

Management emphasis is on the habitat needs of one or more management indicator species. Species with compatible habitat needs are selected for an area. The goal is to optimize habitat capability, and thus numbers of the species. The prescription can be applied to emphasize groups of species, such as early succession dependent or late succession dependent, in order to increase species richness or diversity.

Vegetation characteristics and human activities are managed to provide optimum habitat for the selected species, or to meet population goals jointly agreed to with the Utah Division of Wildlife Resources. Tree stands are managed for specific size, shape, interspersion, crown closure, age, structure, and edge contrast. Grass, forb, and browse vegetation characteristics are regulated. Rangeland vegetation is managed to provide needed vegetation species composition and interspersed grass, forb, and shrub sites or variety in age of browse plants.

Fish habitat improvement treatments are applied to lakes and streams to enhance habitats and increase fish populations. Recreation and other human activities are regulated to favor the needs of the designated species. Roaded-natural recreation opportunities are provided along forest arterial and collector roads. Local roads and trails are either open or closed to public motorized travel.

Semi-primitive motorized recreation opportunities are provided on those local roads and trails that remain open, semi-primitive nonmotorized opportunities are provided on those that are closed.

A full range of tree harvest methods and rangeland vegetation treatment methods are available. Investments in other compatible resource uses may occur but will be secondary to habitat requirements. Management activities may dominate in foreground and middleground, but harmonize and blend with the natural setting.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be applied to any forested or nonforested areas outside of wilderness and research natural areas, except developed recreation sites.

j. **MANAGEMENT PRESCRIPTION 4C**
(Emphasis is on Wildlife Habitat in Woody Draws and Other Woody Vegetation Areas on Rangelands)

1. General Description and Goals:

Management emphasis is on wildlife habitat in hardwood and shrub-dominated draws and other areas of woody vegetation to sustain their inherent biological, physical, and visual values. Deciduous trees are regenerated. Diversity is achieved among individual sites of pinyon-juniper, gambel oak, cottonwood, mountain mahogany and other woody plant species. Vegetation characteristics on individual sites are diversified according to the wildlife goals for the site. Trees and shrubs are planted to supplement natural regeneration where needed. Woody cover in late seral stage is emphasized and is maintained adjacent to water. Direct habitat improvement projects occur. Investments in compatible resources are made. Livestock grazing may occur, but is secondary to maintenance of desired woody plant characteristics. Management activities may dominate in foreground or middleground but harmonize and blend in the natural setting. Recreational opportunities vary between semi-primitive nonmotorized and roaded natural.

2. Areas Where the Prescription Can Be Considered for Application: This prescription can be applied to all woody vegetation areas dominated by browse or tree species. It can not be applied to wilderness areas, developed recreation sites, and special areas such as research natural areas.
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k.

MANAGEMENT PRESCRIPTION 4D
(Emphasis is on Aspen Management)

1. General Description and Goals:

Management emphasis is on maintaining and improving aspen sites. Other tree species, if present, are de-emphasized. Aspen is managed to produce wildlife habitat, wood products, visual quality, and plant and animal diversity. Aspen clones are maintained. On larger areas, a variety of aspen stand ages, sizes, shapes, and interspersions are maintained. Both commercial and noncommercial treatments are applied. Even-aged management is practiced and is achieved by clearcutting. Diversity objectives are achieved by varying the size, age, shape, and interspersions of individual stands. Management activities in foreground and middleground are dominant, but harmonize and blend with the natural setting. Individual treatments generally are smaller than 40 acres.

Recreational opportunities available are semi-primitive non-motorized and motorized or roaded natural. Some temporary or seasonal road and area use restrictions are implemented to prevent disturbance of wildlife or improve hunting and fishing quality.

Investments in other compatible resources occur. Livestock grazing can occur, but is subordinate to wildlife habitat needs and required protection of young aspen needed for regeneration.

2. Areas Where the Prescription Can Be Considered for Application: This prescription can be applied to all areas capable of producing aspen that are outside of wilderness and are not classified as research natural areas.

1.

MANAGEMENT PRESCRIPTION 5A
(Emphasis is on Big Game Winter Range in Nonforested Areas)

1. General Description and Goals:

Management emphasis is on winter range for deer, elk, and bighorn sheep if introduced. Treatments are applied to increase forage production of existing grass, forb, and browse species or to alter plant species composition. Prescribed burning, seeding, spraying, planting, and mechanical treatments may occur. Browse stands are regenerated to maintain a variety of age classes and species.

Investments in compatible resource activities occur. With the exception of bighorn sheep range, livestock grazing is compatible but is managed to favor wildlife habitat.

Structural range improvements benefit wildlife. Management activities are not evident, remain visually subordinate, or are dominant in the foreground or middleground but harmonize or blend with the natural setting.

New roads other than short-term (temporary) roads are located outside of the management area. Short term roads are obliterated within one season after intended use. Selected local roads are closed and motorized recreation use is managed to prevent unacceptable stress on big game animals during the primary big game use season.

2. Areas Where the Prescription Can Be Considered for Application: This prescription can be applied to any important winter range areas, excluding wilderness, developed recreation sites, forested areas, and special areas such as research natural areas.

m. **MANAGEMENT PRESCRIPTION 5B**
(Emphasis is on Big Game Winter Range in Forested Areas)

1. General Description and Goals:

Management emphasis is on forage and cover on winter ranges for winter habitat for deer, elk, and bighorn sheep if introduced. Treatments to increase forage production or to create and maintain thermal and hiding cover for big game are applied. Tree stand treatments can be clearcut, shelterwood, single tree selection or group selection. Commercial and noncommercial stand treatments occur. Specific cover-opening ratios and stand designs are maintained. Treatments to grass, forb, browse, and noncommercial tree species include seeding, planting, chemical application, burning, falling, and mechanical treatment. A variety of browse age classes are maintained. Continuous forest cover is maintained on some sites.

Investments in compatible resources occur. Except for domestic sheep in bighorn sheep areas, livestock grazing is compatible but is managed to favor wildlife habitat. Structural range improvements benefit wildlife. Management activities are not evident, remain visually subordinate, or dominate in the foreground and middleground but harmonize and blend with the natural setting.

New roads other than short-term temporary roads are located outside of the management area. Short term roads are obliterated within one season after intended use. Selected local roads are closed and motorized recreation use is managed to prevent unacceptable stress on big game animals during the primary big game use season.

2. Areas Where the Prescription Can Be Considered for Application: This prescription can be applied to existing or potential winter range areas, excluding wilderness, developed recreation sites, nonforested areas and special areas such as research natural areas.
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2. Areas Where the Prescription Can Be Considered for Application: This prescription can be applied to all areas suitable for intensive grazing that are presently at or above satisfactory range condition. Wilderness areas, developed recreation sites, and special areas such as research natural areas are excluded.
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p. **MANAGEMENT PRESCRIPTION 7A**
(Emphasis is on Wood-Fiber Production and Utilization)

1. General Description and Goals:

Management emphasis is on wood-fiber production and utilization of large roundwood of a size and quality suitable for sawtimber. The harvest method by forest cover type is clearcutting in aspen, and Engelmann spruce-subalpine fir, and shelterwood in ponderosa pine and mixed conifers.

The area generally will have a mosaic of fully stocked stands that follow natural patterns and avoid straight lines and geometric shapes. Management activities are not evident or remain visually subordinate along forest arterial and collector roads and primary trails. In other portions of the area, management activities may dominate in foreground and middleground, but harmonize and blend with the natural setting.

Roaded-natural recreation opportunities are provided along forest arterial and collector roads. Semi-primitive motorized recreation opportunities are provided on those local roads and trails that remain open; semi-primitive nonmotorized opportunities are provided on those that are closed.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be applied to forest lands with slopes less than 40 percent that are capable and available for timber production. The prescription can not be applied to wilderness areas, developed recreation sites, and special areas such as existing and proposed research natural areas and the Fishlake-Johnson Valley Recreation area.
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q. **MANAGEMENT PRESCRIPTION 7B**
(Emphasis is on Wood-Fiber Production and Utilization
Through Selected Planting Stock)

1. General Description and Goals:

Management emphasis is on wood-fiber production and utilization of large roundwood of a size and quality suitable for sawtimber.

Artificial regeneration methods using selected planting stock rather than natural regeneration is used to achieve increased wood fiber production. The harvest method by forest cover type is clearcutting in Engelmann spruce-subalpine fir, and shelterwood in ponderosa pine and mixed conifers. Rapid restocking will permit rotations to be 5 to 8 percent shorter than rotations in other wood fiber emphasis prescriptions.

The area generally will have a mosaic of fully stocked stands that follow natural patterns and avoid straight lines and geometric shapes. Management activities are not evident or remain visually subordinate along forest arterial and collector roads and primary trails. In other portions of the area, management activities may dominate in foreground and middleground, but harmonize and blend with the natural setting.

Roaded-natural recreation opportunities are provided along forest arterial and collector roads. Semi-primitive motorized recreation opportunities are provided on those local roads and trails that remain open; semi-primitive nonmotorized opportunities are provided on those that are closed.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be applied to highly productive forest lands (sites where 50 or more cubic feet of annual growth can be applied) with slopes less than 40 percent that are capable and available for timber production. The prescription can not be applied to wilderness areas, developed recreation sites, and special areas such as research natural areas and the Fish Lake - Johnson Valley Recreation area.

r. **MANAGEMENT PRESCRIPTION 7C**
(Emphasis is on Management of Forested Areas on Steep Slopes)

1. General Description and Goals:

Management emphasis is to develop and maintain healthy tree cover on forested slopes greater than 40 percent. The harvest method by forest cover type is clearcut for ponderosa pine and mixed conifer; group or strip clearcut for aspen and spruce-fir; or group selection in spruce-fir; or shelterwood for ponderosa-pine and mixed conifer. Management activities, although visually dominant, harmonize and blend with the natural setting.

Roaded-natural recreation opportunities are provided along forest arterial and collector roads. Semi-primitive motorized recreation opportunities are provided on those local roads and trails that remain open, semiprimitive nonmotorized opportunities are provided on those that are closed.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be considered for application on any forested area with slopes greater than 40 percent, except in wilderness areas,

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be applied to all forest lands with slopes less than 40 percent that are capable and available for timber production. The prescription can not be applied to wilderness areas, developed recreation sites, and special areas such as research natural areas and the Fishlake-Johnson Valley Recreation area.
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u. **MANAGEMENT PRESCRIPTION 9A**
(Emphasis is on Riparian Area Management)

1. General Description and Goals:

Emphasis is on the management of all of the component ecosystems of riparian areas. These components include the aquatic ecosystem, the riparian ecosystem (characterized by distinct vegetation), and adjacent ecosystems that remain within approximately 100 ft. measured horizontally from both edges of all perennial streams and from the shores of lakes and other still water bodies. All of the components are managed together as a land unit comprizing an integrated riparian area, and not as separate components.

The goals of management are to provide healthy, self-perpetuating plant communities, meet water quality standards, provide habitats for viable populations of wildlife and fish, and provide stable stream channels and still water-body shorelines. The aquatic ecosystem may contain fisheries habitat improvement and channel stabilizing facilities that harmonize with the visual setting and maintain or improve wildlife or fish habitat requirements. The linear nature of streamside riparian areas permits programming of management activities which are not visually evident or are visually subordinate.

Forest riparian ecosystems are treated to improve wildlife and fish habitat diversity through specified silvicultural objectives. Both commercial and noncommercial vegetation treatments are used to achieve multi-resource benefits. Clearcutting is used to regenerate aspen clones. Other forest cover types are treated with either small-group or single-tree selection methods.

Livestock grazing is at a level that will assure maintenance of the vigor and regenerative capacity of the riparian plant communities. Vehicular travel is limited on roads and trails at times when the ecosystems would be unacceptably damaged. Developed recreation facility construction for overnight use is prohibited within the 100-year floodplain.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be applied to any riparian area outside of wilderness and research natural areas.
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v. MANAGEMENT PRESCRIPTION 9C
(Emphasis is on Increased Water Yield in Nonforested Areas)

1. General Description and Goals:

Management emphasis is on increased on-site water yield in non-forested areas through the use of structural facilities designed to manipulate available winter precipitation, i.e., snow. Snow deposition structures are placed so that deposition occurs in selected areas to minimize evaporation and sublimation. Evaporation or sublimation suppressants may be used to increase longevity of developed snow packs. Management activities in foreground, middleground and background may dominate, yet harmonize and blend with the natural setting. Livestock grazing occurs but not to the point that vegetation of non-forested areas or water yield objectives are impaired. Semi-primitive recreation is the predominate recreation use. Motorized travel may be prohibited.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be applied to any nonforested area where structural facilities are permitted.

w. MANAGEMENT PRESCRIPTION 9E
(Emphasis is on Water Impoundment Sites)

1. General Description and Goals:

Management emphasis is on needed water impoundments where beneficial effects are demonstrated and water rights have been obtained. These impoundments will provide for recreation developments and wildlife habitat.

2. Areas Where the Prescription can Be Considered for Application: This prescription can be applied to all areas of the forest except research natural areas and classified wild and scenic river areas. It may be applied to classified wilderness areas with presidential authorization. Suitability factors that must be considered included soil permeability, geologic stability, degree of rock fracturing, potential dust generation from mud flats, wildlife distribution and migration patterns, presence of threatened or endangered species, presence of cultural sites, and effects on proposed wild, scenic, or recreation river values.

x. MANAGEMENT PRESCRIPTION 9F
(Emphasis is Upon Improved Watershed Condition)

1. General Description and Goals:

Management emphasis is on improving watershed condition and thus eliminating the watershed improvement needs backlog. Emphasis is also on maintenance of projects already completed. This will be achieved by protection, seeding, cultural treatment or any combination of other

methods that will accomplish the objectives. Management activities in the foreground, middleground, and background may dominate, but should be designed to harmonize and blend with the natural setting to the extent possible.

Livestock grazing on the treated areas is eliminated for a period of time until the area can be grazed without causing decreased watershed condition or damage to cultural treatments. Motorized travel is prohibited except over-snow machines.

2. Areas Where the Prescription Can Be Considered for Application: The prescription can be applied to areas where watershed condition has been degraded below acceptable levels. The result is rapid run-off with accompanying sheet, hill, and gully erosion with loss of site productivity. The downstream result from this rapid runoff is flooding. It can be applied to areas that have been treated previously. It cannot be applied to wilderness or special areas such as research natural areas where treatment does not meet management objectives of the area.

y. MANAGEMENT PRESCRIPTION 10A
(Provides For Research Natural Areas)

1. General Description and Goals:

Emphasis is on research, study, observations, monitoring, and educational activities that are nondestructive and nonmanipulative, and that maintain unmodified conditions.

2. Areas Where the Prescription Can Be Considered for Application: The prescription is to be applied to all existing research natural areas (RNA), and proposed research natural areas.

z. MANAGEMENT PRESCRIPTION 10E
(Provides For Municipal Watershed and Municipal Water Supply Watershed)

1. General Description and Goals:

Management emphasis is to protect or improve the quality and quantity of municipal water supplies. Management practices vary from use restrictions to water resource improvement practices, with the primary objective of meeting water quality standards established for the individual watershed. A secondary objective is to manage the watersheds to improve the yield and timing of water flows, consistent with water quality requirements.

2. Areas Where the Prescription Can Be Considered for Application: The prescription is to be applied to all existing municipal watersheds and municipal supply watersheds.
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3. Cost Efficiency of Prescriptions:

The previous prescriptions were developed into FORPLAN prescriptions by developing scheduling and output tables to fit the standards and guidelines. Costs and benefits of producing the outputs were also based on the standards and guidelines for the prescription. The FORPLAN prescription was allowed to come into the solution against an objective function of maximum present net worth.

4. Tables

Table B-1 shows the percentage of potential structural and non-structural development allowed in each prescription modeled in FORPLAN.

Tables B-2 and B-3 show the timber harvest method assumed for each prescription modeled in FORPLAN.

TABLE B-1
PERCENT OF POTENTIAL RANGE IMPROVEMENT ALLOWABLE
MODELED IN FORPLAN

PRESCRIPTION	PERCENT DEVELOPMENT OF POTENTIAL	
	NON-STRUCTURAL	STRUCTURAL
1A DEVELOPED RECREATION	0	0
1D UTILITY CORRIDORS (NOTE 1)	100	100
2A SEMI-PRIM. MOTORIZED RECREATION	40	40
2B RURAL + ROADED NATURAL RECREATION	70	70
3A SEMI-PRIM. NON MOTORIZED RECREATION	10	10
3B SEMI-PRIM. NON MOTORIZED RECREATION	0	0
4A FISH HABITAT IMPROVEMENT	0	10
4B MANAGEMENT INDICATOR SPECIES	40	40
4C WILDLIFE HABITAT - WOODY AREAS	40	40
4D ASPEN MANAGEMENT	70	70
5A BIG GAME W.R. - NON FORESTED	70	10
5B BIG GAME W.R. - FORESTED	40	10
6A EXTENSIVE LIVESTOCK MANAGEMENT	40	100
6B INTENSIVE LIVESTOCK MANAGEMENT	100	100
7A WOOD FIBER PRODUCTS	0	40
7B WOOD FIBER PRODUCTS GENETICS	0	10
7C FORESTED AREAS - STEEP	0	0
7D WOOD FIBER - NON SAWTIMBER	0	40
7E WOOD FIBER PRODUCTS	0	40
9A RIPARIAN MANAGEMENT	0	10
9C INCREASED WATER YIELD	100	100
9E WATER IMPROVEMENT	0	0
9F IMPROVED WATERSHED	70	10
10A RESEARCH NATURAL AREA	0	0
10E MUNICIPAL WATERSHED	10	100
MIN LEVEL	0	0

1) Potential depends on vegetation type for non-structural treatment; for structural, potential equals 40% of suitable acres for maximum development.

TABLE B-2
 TIMBER HARVEST METHODS AS MODELED IN FORPLAN
 Mixed Conifer

Prescription	Non- Suitable	Clear Cut	Shelterwood		Selection
			2 Step	3 Step	
1A	X				
1D*	X	X	X	X	X
2A			X	X	X
2B			X	X	X
3A			X	X	X
3B	X				
4A					X
4B					X
4C					X
4D	X				
5A					X
5B					X
6A					X
6B					X
7A		X			
7B		X			
7C		X	X	X	
7D					X
7E			X	X	
9A					X
9C	X				
9E	X				
9F	X				
10A	X				
10E					X
Min. level	X				

* The utility corridor prescription depends upon the underlying land prescription. This practice is acceptable with this prescription.

TABLE B-3
TIMBER HARVEST METHODS AS MODELED IN FORPLAN
Ponderosa Pine

Prescription	Non- Suitable	Clear Cut	Shelterwood		Selection
			2 Step	3 Step	
1A	X				
1D*	X	X	X	X	X
2A			X	X	X
2B			X	X	X
3A			X	X	X
3B	X				
4A					X
4B					X
4C					X
4D	X				
5A					X
5B					X
6A					X
6B					X
7A			X		
7B		X			
7C		X	X	X	
7D					X
7E			X	X	
9A					X
9C	X				
9E	X				
9F	X				
10A	X				
10E					X
Min. level	X				

* The utility corridor harvest depends on the underlying land prescription. This practice is acceptable with this prescription.

5. Development of Recreation Coefficients

A "pure" system using FORPLAN to calculate outputs for recreation was not possible due to significant differences between analysis areas/co-ordinated allocation zones and mapped recreation opportunity spectrum (ROS) classes. Because it was believed desirable to have some kind of output value in FORPLAN, the following procedure was undertaken: The R.O.S. classes, by acres, for each alternative were calculated based on change of acres assigned to prescription 3B. This change was determined to be the most significant factor affecting recreation opportunities.

Coefficients were determined in terms of both acres and RUD's by ROS class. The acres of each ROS class within a given coordinated allocation zone were determined by the change from the current situation caused by the coordinated allocation. The RUD's were then computed by multiplying the acres in each ROS class by the use figures for each ROS class determined from each Ranger District's 1983 RIM Data.

Actual output for each alternative for the recreation element was determined by the budget for developed site use, dispersed areas use and nonconsumptive wildlife use. The wildlife and fish use (hunting and fishing recreation visitor days-RVDS) was based on habitat and was calculated by using each biologist's data.

Recreation and Wildlife/Fish and Calculation of Outputs

Calculation of outputs for Recreation and for Wildlife/Fish were based on the need to separate data for different benefit values. Also the most significant factor causing change in recreation is different than the factors affecting wildlife and fish numbers.

The recreation increase in demand was applied to dispersed use excluding hunting and fishing, but including nonconsumptive use and was also applied to developed site use. This was done by recreation opportunity classes.

WFUD's supplied by the fisheries biologist were used directly as RVD's of fishing. However the hunting WFUD's supplied by the wildlife biologist were adjusted. There were two reasons for this. One, the figures included nonconsumption use. Two, big game hunting RVD's have been calculated for the three year period 1980-1983 based on Big Game Harvest Book sample data (Utah Division of Wildlife Resources 1980-1983). Two different sets of data for hunting caused a need to select one. The data published in the Big Game Harvest Book was chosen over the formula for calculating numbers of hunting.

A special note: The hunting recreation visitor days figured from Utah's Big Game Harvest Book of 1980 data was compared to Recreation Information Management (RIM) use estimate for FY 1980. RIM figures were 2.06 times greater. Also, a comparison of fishing RVD's of use based on current capacity of streams, reservoirs, and lakes with RIM use estimates indicate the latter to be about double.

6. Development of Wildlife Coefficients

A. Big Game (Elk & Deer)

Using the assumption that the limiting factor for big game is winter range, outputs of WFUD's were determined in the following manner. A base number for deer & elk populations was established by determining carrying capacity or habitat capability of the winter range at the present time. Production of forage was calculated using standard range analysis procedures. Big game AUM's were derived by using 50 percent of the amount of available lbs. of forage in unsuitable range

over 40 percent slope and 10 percent of the available forage in suitable range (no values were given for unsuitable range with less than 40 percent slope). This forage was then split between deer and elk on an 80/20 basis respectively. Big game numbers were then calculated by the standard 2.1 elk per livestock AUM and 5.6 deer per livestock AUM. The figures thus derived were then divided by 5 to account for the time spent on winter range. From this point the number of animals was converted to WFUD's by using the formula found in the Forest Service manual (FSM 2634.21-7).

Increases by alternative were then derived by using the USFS manual formula for determining WFUD's from projects. The projects used for this evaluation were only those proposed in big game winter range.

B. Fisheries

Fish yields, calculated in pounds of game fish and fisherman user days were calculated outside of Forplan. Fish yields are based on amounts of sediment delivered to streams and impacts on riparian areas. Proposed aquatic habitat improvement projects are based on specific project proposals for particular streams and lakes. Outputs vary by productive potentials of given water bodies and present levels of fish stocking. Fisherman user days are a function of fish yields and vary by stocking systems. A detailed procedure can be found in the Forest LMP Documentation Files.

7. Development of Range Coefficients

A. Yield Table Procedure

Yield tables were developed for each of the vegetation types below:

- Conifer/Ponderosa Pine
- Pinyon/Juniper
- Aspen
- Mountain Brush
- Low Elevation Sagebrush
- Mid-High Elevation Sagebrush
- Meadow

Initially, each vegetation type was analyzed with regard to the major types of revegetation practices. The results of this analysis are shown in Table B-4. The table shows vegetative production (in Animal Unit Months) over time. The purpose of analyzing various treatments was to take into account the difference in vegetation response, depending on treatment type.

Vegetation response was analyzed by decade in AUM's per acre per year. The figures displayed in the decade columns are averages per year for the given decade. Vegetation response was tracked for both alternatives: (1) assuming retreatment (2) assuming no retreatment. Effective life-span of treatment was based on data from existing revegetation projects.

Due to modeling and time constraints, it became necessary to average the treatment responses and form one treatment response per vegetation type. Table B-5 shows the increase in AUM's per acre (yearly average for each decade). These values were used in the model to determine the change in the production as the result of non-structural improvement, and are specific to vegetation type.

The result is seven vegetation types with seven yield tables. Table B-5 also displays the average cost per acre for non-structural improvement. Cost figures were generated from data on proposed projects.

Table B-5 displays the number of decades the treatment lasts. This was generated by averaging the responses from vegetation types that had more than one treatment initially proposed. All yield tables have built in a 2 year rest period after treatment. The 2 years of no livestock use were modeled, and are necessary to provide for optimum vegetation response after treatment.

The yield tables were developed independently of any utilization figures. Utilization figures were applied in the modeling process.

For the final analysis the various types of treatments displayed in Table B-4 were combined for each given vegetation type. The result is a yield table per vegetation type with the treatment effect (production over time) developed from taking an average of the responses for each vegetation type.

The grouping of treatment types was done to simplify the analysis process. The values shown below were the figures used in the computer model to determine the effects of non-structural developments. For non-structural treated acres the production is equal to the Background Value plus the increase. For areas not treated with non-structural improvements the production is equal to the Background Value.

For structurally treated acreage the production is equal to the Background Value. For acreage needing structural development to facilitate full utilization of the forage resource, the production is equal to 1/2 of the Background Value.

In the analysis there was a percentage of the acreage identified as needing no further range development, due to full utilization of the forage with present level of development. The production value used in this case was equal to the Background Value.

TABLE B-4
INITIAL YIELD ANALYSIS

VEGETATION TYPE	TREATMENT	B.V. AUM/ ACRE	DECADE 1		DECADE 2		DECADE 3		DECADE 4		DECADE 5		COST ACRE \$
			N.C. AUM/ ACRE	TOT. AUM/ ACRE									
MEADOW	FENCE	2.41	-.27	2.14	.45	2.86	.45	2.86	.45	2.86	.45	2.86	76.
P/J	CHAIN & SEED	.31	.20	.51	.17	.48	.20	.51	.17	.48	.20	.51	43.
			WITHOUT RETREATMENT				0.0	.31	0.0	.31	0.0	.31	
CONIFER	HARVEST OR BURN	.51	.25	.76	.62	1.13	.60	1.11	.26	.87	.25	.86	33.
			WITHOUT RETREATMENT								0.0	.51	
ASPEN	HARVEST OR BURN	.91	.22	1.13	.25	1.16	.46	1.37	.51	1.42	.19	1.10	33.
			WITHOUT RETREATMENT								.22	1.13	
			WITHOUT RETREATMENT								0.0	.91	
MTN. BRUSH	CHEMICAL	.72	.27	.99	.22	.94	.19	.91	.19	.91	.19	.91	30.
			WITHOUT RETREATMENT		.46	1.18	0.0	.72	0.0	.72	0.0	.72	
LOW SAGE	MECHANICAL SEED	.48	.05	.53	.08	.56	.05	.53	.08	.56	.05	.53	55.
			WITHOUT RETREATMENT				0.0	.48	0.0	.48	0.0	.48	
LOW SAGE	CHEMICAL OR BURN	.48	.05	.53	.08	.56	.05	.53	.08	.56	.05	.53	55.
			WITHOUT RETREATMENT		.01	.49	0.0	.48	0.0	.48	0.0	.48	
HIGH SAGE	MECHANICAL & SEED	.99	.33	1.32	.30	1.29	.33	1.32	.30	1.29	.33	1.32	55.
			WITHOUT RETREATMENT				0.0	.99	0.0	.99	0.0	.99	
HIGH SAGE	CHEMICAL OR BURN	.99	.27	1.26	.19	1.18	.13	1.12	.29	1.28	.41	.99	31.
			WITHOUT RETREATMENT				.06	1.05	0.0	.99	0.0	.99	

N.C. = NET CHANGE IN PRODUCTION TOT. = TOTAL PRODUCTION BV = BACKGROUND VALUE
N.C. AND TOT. FIGURES BASED ON YEARLY AVERAGE

TABLE B-5
FINAL YIELD TABLE ANALYSIS

VEGETATION TYPE	BACKGROUND VALUE AUM/ACRE	*INCREASE IN AUMs/ACRE/(YEARLY AVE.)					COST/ ACRE \$	# OF DECADES TREAT. LASTS
		DECADE 1	DECADE 2	DECADE 3	DECADE 4	DECADE 5		
Meadow	2.41	-.27	.45	.45	.45	.45	76.00	3
P/J	0.31	.20	.17	.20	.17	.20	43.00	2
CONIFER	0.51	.25	.62	.60	.26	.25	33.00	6
ASPEN	0.91	.22	.25	.46	.51	.19	33.00	8
MOUNTAIN BRUSH	0.72	.27	.22	.19	.19	.19	30.00	2
LOW SAGE	0.48	.04	.05	.03	.07	.07	43.00	2
HIGH SAGE	0.99	.30	.25	.23	.30	.37	43.00	2
BARREN	0	0	0	0	0	0	0	0

* increase is based on the assumption that retreatment will occur when production reaches the Background Value.

B. Development of Utilization Data

Yield tables described above are distinct from utilization figures. Utilization data show the forage actually available for livestock grazing.

A procedure was developed to determine the effect of prescriptions on range yield available to livestock. The procedure was followed for each of the 10 choices loaded into FORPLAN, and each of the 39 coordinated allocation zones (CAZ's), resulting in 390 (10 choices x 39 CAZ's) sets of calculations. In addition, each vegetation type was "broken down" into acres per a given prescription. The result is an analysis by choice, by CAZ, by Prescription, by vegetation type, which was then loaded into the FORPLAN model.

First, each analysis area spread sheet was analyzed and for all suitable acres for each vegetation type, the acres by prescription were determined (see Figure B-1). This analysis was completed for each of the 10 choices, which contain 39 CAZ's, resulting in 390 sheets. This information was then used to complete the analysis described in paragraph 1.

To complete the analysis of coordinated allocations (paragraph 1) several analyses and assumptions were made and will be discussed as they arise. To describe the coordinated allocation analysis process, the generation of each value on the summary form will be tracked. Figure B-1 is a sample summary sheet.

FIGURE B-1

COORDINATED ALLOCATIONS - Summary Sheets

Alternative <u>1</u>						NON-STRUCTURAL (ACRES)						STRUCTURAL (ACRES)					NO. TREAT. REQ.	UNUSABLE ACRES
CAZ	R _x	VEG. TYPE	SYSTEM	TOTAL ACRE	SUIT. ACRE	TREAT. POTEN	TREAT. DONE	R _x IDEAL	RETREAT		NEW	TREAT. POTEN	TREAT. DONE	R _x IDEAL	MTC. ALLOW	NEW		
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s
	6B	12,32		124	124	6	0	6	0	0	6	50	10	50	10	40	68	0
	9F	22		226	66	0	0	0	0	0	0	26	21	3	21	0	40	0
	6B	22			160	0	0	0	0	0	0	64	51	64	51	13	96	
	9F	442		18681	3375	1688	338	1182	338	0	844	1350	810	135	810	0	338	518
	10E	442			438	219	44	22	22	22	0	175	105	18	105	0	44	
	6B	442			14469	7235	1447	7235	1447	0	5788	5788	3473	5788	3473	2315	1447	
U	9F	542	N	3129	1995	998	140	699	140	0	559	798	559	80	559	0	200	0
V	6B	542	N		1134	567	79	567	79	0	488	454	318	454	318	136	113	
	9F	52		42188	8142	814	90	570	90	0	480	3257	977	326	977	0	7328	3989
	6B	52			30057	3006	331	3006	331	0	2675	12023	3607	12023	3607	8416	15028	
	9F	62		1481	348	35	0	25	0	0	25	139	56	14	56	0	174	226
	6B	62			907	91	0	91	0	0	91	363	145	363	145	218	453	
	9F	72		40336	17742	8871	2306	6210	2306	0	3904	7097	3548	710	3548	0	1774	3971
	10E	72			247	124	32	12	12	20	0	99	50	10		0	25	
	6B	72			18376	9188	2389	9188	2389	0	6799	7350	3675	7350	3675	0	1838	

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Column A: enter CAZ #

Column B: enter as many prescriptions for a given vegetation type that show up on the Prescription Analysis Form (exhibit 1)

Column C: enter vegetation type by code - 12, 32 = Conifer
542 = High Elevation Sage
442 = Low Elevation Sage
72 = P/J
52 = Mountain Brush
22 = Meadow
62 = Aspen

Column D: enter grazing system; a forest wide analysis was made by overlapping CAZ boundaries with allotment boundaries and determining, for a given CAZ, what was the dominant grazing system. The results are provided below.

<u>Rest Rotation</u>					<u>Deferred Rotation</u>			
CAZ	1	14	28	44	CAZ	5	23	52
	2	16	29	46		6	26	
	3	22	30			7	31	
	4	24	40			8	43	
	10	25	41			9	45	
	13	27	42			11	47	
						12	48	
						15	49	
						21	51	

Column E: total acres are calculated by adding unsuitable acres and suitable acres for a given vegetation type.

Column F: suitable acres are determined from the prescription analysis form.

Column G: non-structural treatment potential is calculated by multiplying suitable acres x factor. The factor varies by vegetation type.

Conifer (12, 32)	= .05
High Elevation Sage (542)	= .50
Low Elevation Sage (442)	= .50
P/J (72)	= .50
Mountain Brush (52)	= .10
Meadow: not calculated because no revegetation was proposed for improving range management.	
Aspen (62)	= .10

These values were calculated from proposed projects in each vegetation type.

Column H: non-structural treatment done is a calculation to determine existing revegetation acres. A forest wide analysis was done to compare suitable acres with existing revegetation acres for each vegetation type.

Conifer	0	% of suitable acres revegetated
High Sage	20	
Low Sage	14	
P/J	26	
Mtn. Brush	11	
Meadow	0	
Aspen	0	

Column h was generated by multiplying treatment potential (Col. g) times revegetation factor for a given vegetation type.

Column I: prescription ideal is determined by the table B-1. For each prescription, the Interdisciplinary team determined what is the maximum allowable non-structural and structural development, expressed as a percent of potential.

$$\text{Col. i} = \text{Col g} \times \text{percent development} \\ \text{(treatment)} \\ \text{(potential)}$$

Column J: allow, means within that prescription, after comparing treatment done (col. h) to prescription, ideal (col. i), what is the allowable retreatment of existing non-structural treated acres.

- a) Col. j = col. i, if col. i is less than col. h.
- b) Col. j = col. h, if col. i is greater than col. h.
- c) Col. j = col. h, if col. i equals col. h.

Column K: not retreat, refers to acres that will not be retreated because treatment done is greater than prescription ideal (allowable).

$$\text{Col. k} = \text{col. h} - \text{col. j}$$

Column L: new refers to new non-structural treatment. When prescription ideal is greater than treatment done, new acreage can be development.

- a) if col. h is less than i, then col. l = col. i - col. h
- b) if col. h is greater than col. i, then col. l = 0
- c) if col. h = col. i, then col. l = 0

Column M: structural treatment potential, are the potential acres for structural development. Throughout the planning process, it was assumed that 1 mile of fence or 1 water development affected 100 acres.

A linear regression analysis was completed to determine a formula that would predict that given x suitable acres, in a maximum and reasonable development program, Y acres would be structurally developed. After lengthy analysis, a factor of .4 was developed. There was no differentiation made between vegetation types.

Therefore, col. m = .4 x col. f

Column N: structural treatment done (existing) was calculated based on assumptions concerning present level of development and other assumptions. A factor was developed for each col. n.

Conifer	.20
High Sage	.70
Low Sage	.60
P/J	.50
Mtn. Brush	.30
Meadow	.80
Aspen	.40

Col. n = factor x col. m (treatment potential)

Column O: prescription ideal, is similar to col. i description.

Col. o = col. m x percent development

Column P: allowable maintenance of structural developments is assumed to be equal to existing development. An assumption was made that all existing developments would be maintained.

Col p = col. n

Column Q: new structural development is based on whether the prescription allows for development beyond the present (existing) level.

- a) if col. o is less than col. n, then col. q = o
- b) if col. o is greater than col. n, then col. q = col. o - col.n
- c) if col. o = col. n, then col. q = o

Column R: no treatment required, are acres that are currently fully utilized and do not require further development.

Col. r = col. f - (col g + col. m)

Column S: unsuitable acres is the sum of unsuitable acres by vegetation type, as determined from analysis area spread sheets.

NOTE Some analysis area spread sheets required the balance to be allocation to prescription 6 or 7. In this case all 7's were assumed to be 7A, and the prescription 6 varied by choice.

6A = Choice 1, 3, 4, 7
6B = 2, 5, 6, 8, 9, 10

8. Development of Timber Harvest Coefficients

Options for timber management on the Fishlake National Forest were developed for existing (empirical) and managed stand conditions.

Empirical Yield Table for Mixed Conifer Type

The empirical yield table for mixed conifer is based on data from a 1978 Fishlake Forest inventory. This data provides limited information for analysis of 60 to 80 year old stands and stands over 200 years. Information for ponderosa pine, Douglas fir, and white fir is also limited.

Consideration was given to including applicable Manti-LaSal National Forest inventory data and use of Fishlake compartment exam data. The Manti-LaSal information was not yet compiled when the empirical yield table was developed and Fishlake inventory data was determined to be better than the compartment exam data.

A representative series of standard regression formulas did not directly fit compartment exam data. Since values for age classes above 200 appeared to be unacceptable, a curve was fit manually above that age, graphed, and the respective values read by age class. A regression was run to balance these values with the actual inventory data.

Due to limited information for ponderosa pine, Douglas fir, and white fir, specific yield tables were not developed for them.

Managed Stand Yield Tables

Yield tables for managed mixed conifer stands were developed as follows:

Spruce-fir (representing mixed conifer) managed stands except for selection are based on PROGNOSIS (Stage, Wyleff, Crookston, 1982), Utah variant, calibrated to Fishlake National Forest conditions by use of existing stand data and professional judgement. Well over a hundred prognosis runs were made to test the validity of the model for local conditions and to develop an applicable range of silvicultural options for timber production. The following managed stand yield tables were selected for use in FORPLAN analysis:

- Mix 11 - Artificial regeneration (Basis-Long Implantation)
- Mix 11 - Artificial regeneration with commercial thinning at 80 years
- Mix 30 - Natural regeneration (Basis-30 year ESAF stand)
- Mix 30 - Natural regeneration with precommercial thinning at 50 years and commercial thinning at 80 years
- Mix 30 - Two step shelterwood with precommercial thinning at 50 years and commercial thinning at 80 years
- Mix 30 - Three step shelterwood with precommercial thinning at 50 years and commercial thinning at 80 years

Yields were adjusted from gross to net and cumulation of mean annual increment based on cubic feet.

Presently, selection harvest can not be modeled by PROGNOSIS. Therefore, using a 30 year cutting cycle, a 3,500 net cubic feet entry value was selected based on professional judgment.

Aspen Yields

Within the FORPLAN model for aspen, only aspen acreage was determined by alternative. Using an 80 year rotation and an average net cubic foot yield of 1,840, an allowable long-term sustained yield capacity was calculated.

A. Development of Soil Loss Coefficients

For the planning process, analysis areas were established by stratifying the Forest by the major vegetative types and by two slope classes with the break at 40 percent.

Average current rates of soil loss were determined and expressed for each vegetative type and slope class. Current rates of soil loss were determined from representative soils and groundcover conditions and by use of nomographs from the reference "Estimating Soil Erosion Losses From Utah Watersheds" by Ronald K. Tew and expressing the results in $\text{yds}^3/\text{ac}/\text{yr}$. These average annual rates are referred to as background values. For use in FORPLAN, the values were expressed in cubic yards per acre per decade, which is approximately the same as tons/acre/year and may be used interchangeably in this document.

A list of activities affecting soil was developed. Some activities resulted in an increased rate of soil loss from the background values while others result in a decrease in the rate of soil loss from the background values. Those that relate directly to activities or treatments that will be identified in FORPLAN by measurable units such as miles or acres were entered as yield tables in the model. Any change in soil loss from the activities with yield tables will be able to be tracked directly in FORPLAN. Change in soil loss from activities that do not have a yield table in the model will be computed separately and summed with the results from the model.

Soil loss rates from activities were developed mainly from the reference given earlier by Tew and by personal observation and experience gained on the Forest.

A preliminary list of threshold rates was developed for each vegetative type. This list will be considered the acceptable rate of soil loss and as such will be the Forest standards. Monitoring will be the basis of validating these preliminary values and firm values will be determined as monitoring indicates a need for change.

Attached are the following tables:

Soil Loss Background Values by Vegetative Type
Activity Effects on Change in Soil Loss

SOIL LOSS BACKGROUND VALUES BY VEGETATIVE TYPE

<u>Vegetative Type</u>	<u>Slope</u>	<u>Yds³/ac/yr</u>	<u>Yds³/ac/yr</u>	<u>Preliminary Threshold Rates Yds³/ac/yr</u>
P Pine	All	2	20	2
Meadow	< 40%	3	30	2
Conifer	> 40%	1	10	2
	< 40%	.5	5	2
Sagebrush-Grass	> 40%	4	40	2
	< 40%	3	30	2
Mountain Brush	> 40%	3	30	2
	< 40%	2.5	25	2
Aspen	> 40%	1	10	2
	< 40%	.5	5	2
Pinyon-Juniper	> 40%	5	50	5
	< 40%	4	40	3
Barren	≥ 40%	4	40	4

ACTIVITY EFFECTS ON CHANGE IN SOIL LOSS

<u>Activity</u>	<u>Effects on Soil Loss Yds³/Ac/Year</u>	
Chaining and seeding of pinyon-juniper sites	1	decrease
Spraying sagebrush	1	decrease
Plowing and seeding	3	decrease
Contour trenching or furrowing	9	decrease
Gully stabilization	30	decrease
Streambank stabilization	3	decrease
Road closure and rehabilitation	30	decrease
Reduction in forage utilization	1	decrease
Prescribed burning	No Net Charge	
	<u>Increase in Soil Loss</u>	
	<u>Decade 1</u>	<u>Decade 2-5</u>
Road Construction	9	6
Timber harvest		
2 & 3 Step shelterwood	3	2
Clearcut	4	2
Selection harvest	2	1

IV. ECONOMIC EFFICIENCY ANALYSIS

A. Process and Procedures

In recent years, the Federal Government has become increasingly aware of and committed to the economic efficiency of federal actions. The NFMA regulations (36 CFR 219) and ensuing Department of Agriculture and Forest Service direction reflect that the Forest Service should consider economic efficiency in developing and choosing between Forest Plan alternatives.

The 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 present net value subject to achieving specified levels of outputs and inputs (36 CFR 219.3).

Present Net Value (PNV) is a means for measuring economic efficiency used in Forest planning. It represents the dollar difference between the discounted value of priced outputs and costs.

In complying with the above mentioned regulations, this Forest has used the following procedure:

Maximizing PNV in FORPLAN. This provided the levels of priced outputs in FORPLAN at an efficient point, given the objectives of the alternative as reflected in the model.

Using PNV is one criteria for choosing prescriptions or activities not incorporated in the FORPLAN model (but which have an established benefit value); e.g., campground development, wildlife and fish projects, etc. Using least cost is one criteria in choosing prescriptions or activities incorporated in the FORPLAN model which do not have an established benefit model.

It should be noted that the present net value (PNV) which is calculated by FORPLAN is but one of a variety of factors used to describe a benchmark or alternative. It is not possible to include all costs and benefits in the calculation of PNV for an alternative. The reason for this is due to uncertainty related 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 limited 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 with local values.

4. Quality differences between priced non-market 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.

Due to these uncertainties surrounding the calculation of PNV, it should be cautioned that this criteria shouldn't be weighted too heavily in the comparison of alternatives. Still, the discounted benefits and costs can be used to make comparisons between alternatives.

1. Pricing Estimated in FORPLAN

All priced benefits were estimated for all benchmarks and alternatives covering a 200 year time period. Resource benefit values in the FORPLAN model are expressed in first quarter 1982 dollars.

Resource prices used in the FORPLAN data base reflect onsite values for all resources, i.e., the value of the resource on the Forest. Benefit values are classified as market values (timber, range, and developed recreation) or non market values (dispersed recreation, increased water yield, fuelwood, and wildlife forage). All resource values are assumed to have a horizontal demand curve except for recreation. Below are the benefit values for resources incorporated into the FORPLAN model and a brief summary of their development.

Timber Benefits

Sawtimber Values

Sawtimber values were developed to reflect the market value for the final product minus the production costs from the stump on the Forest to the final product.

Historical sale data was used to estimate prices and cost. Sale data from the adjoining Dixie National Forest and this Forest were combined to enable more statistically consistent estimates to be made. A linear regression analysis was used to estimate stumpage value as a function of average diameter, haul time, selling price (lumber tally), harvest methods and other related variables.

Production costs varied by harvest method. Represented in Table B-6 are the timber economic tables for 100 percent tractor, 100 percent cable, 100 percent helicopter logging within one mile of a road, and helicopter logging with more than a mile between harvest site and a road.

TABLE B-6
TIMBER ECONOMICS TABLE (CONIFER)-FINAL HARVEST
1982 dollars per MCF

Diameter Group	Lumber Selling Price L.T.1/	Production Cost 100% Tractor < 40%	Production Cost 100% Cable A Lands 2/	Production Cost Helicopter B Lands 3/	Production Cost Helicopter C Lands 4/
8.0 to 10.9	1360	927	1038	1270	1665
11.0 to 13.9	1617	1044	1175	1452	1921
14.0 to 16.9	1712	1058	1197	1490	1987
17.0 to 19.9	1762	1048	1191	1492	2004
20.0 to 22.9	1827	1051	1199	1511	2042
23+	1865	1041	1192	1512	2053

1/ Based on historical average selling price for the species mix (selling values of all major sales on the Fishlake from 1977 to 1983).

2/ A-lands require cable logging systems since they are on 40%+ lands and are near possible road developments.

3/ B-lands require helicopter logging systems since they are over 40%+ lands within one mile of a possible road development but there appears to be no economic way to cable log.

4/ C-lands require helicopter logging systems since they are on 40%+ lands farther than one mile from a possible road development.

Level 6 identifiers used in the FORPLAN model stratified the forest into the various zones (and size classes). The conifer areas of less than 40 percent slope (from level 5) were broken down into plantation, seeds, poles, immature, and mature saw timber. It was assumed that these lands would be harvested by tractor logging systems. Level 6 also broke down the various size classes into access zones A, B and C. The A, B and C access zones refer to areas where cable (A), helicopter-B, and helicopter-C logging systems would be used to harvest timber.

Distance to the saw mill was also considered in the timber economics tables. The Level 1 identifiers were used to identify the haul cost difference. Additional haul costs were added to the timber sales in the Delta, Fillmore, Piute, and Richfield Human Resource Unit (level 1). The additional cost was not added to sales in the Fremont or Beaver Human Resource Unit (level 1). The additional haul cost amounts to \$100 per MCF in the Delta, Fillmore, Piute, and Richfield Human Resource Units.

The above economics information was applied to all conifer stands. Since there was no difference between output yield tables for the various working groups, the assumed species mix was 70 percent Engelmann spruce, 15 percent alpine fir, 10 percent Douglas fir and 5 percent ponderosa pine. Thinning revenues and production costs were based upon the same analysis as the final harvest table presented above. The assumption was made that the DBH of a commercially thinned stand would be lower than that of a final harvest. The resulting economics table follows (Table B-7).

TABLE B-7
TIMBER ECONOMICS TABLE
Commercial Thinning
(dollars per MCF)

Diameter Group	Lumber Selling Price L.T. ^{1/}	Production Cost 100% Tractor < 40	Production Cost 100% Cable A Lands ^{2/}	Production Cost Helicopter B Lands ^{3/}	Production Cost Helicopter C Lands ^{4/}
7 to 7.9	1163	850	945	1143	1481
8 to 8.9	1274	907	1011	1228	1598
9 to 9.9	1360	946	1057	1290	1648
10 to 10.9	1478	1007	1128	1380	1809
11 +	1580	1055	1184	1454	1913

^{1/} - ^{4/} See footnotes for Table B-6.

2. Range Benefits

Production of livestock forage on the Fishlake National Forest is assumed to have no significant effect on the price of a unit of grazing and it is also assumed that all grazing produced on the Fishlake will be purchased. The value of livestock forage per AUM is \$11.88 per AUM (1982 dollars.) This value is assumed to be constant over the planning horizon.

3. Recreation

The benefit values for recreation (in 1982) used in FORPLAN were \$4.17/RVD in dispersed recreation. The values were assumed to be constant throughout the planning horizon.

4. The benefit values used for wildlife in FORPLAN were (1978 adjusted to 1982):

	<u>Value</u>	<u>Unit</u>
Hunting	\$24.80	WUD
Fishing	\$32.10	WUD
Non-game wildlife	\$40.30	WUD

5. Other Benefit Values

Other benefit values are constant in table II-19.

B. Cost Estimates Used in FORPLAN

All costs were estimated for the 200 year planning period for all benchmarks and alternatives. This section discusses how costs were developed and used in the FORPLAN model.

1. Cost Development Process

Costs were developed by Forest personnel in conjunction with developing standards and guidelines for management prescriptions. The costs were based on historical data and professional judgement, and approximate the minimum funds needed to achieve the standards and guidelines in the management prescriptions. Cost data was used in developing feasible and cost-efficient prescriptions.

Costs dependent on land prescription assignment and timber harvest schedule were modeled in FORPLAN by entering them in the economic tables. By setting the FORPLAN objective function to maximize PNV, the cost-efficient level of agency expenditures for each prescription assignment was estimated for 200 years.

2. Cost Categories

Fixed Forest Service costs are the minimum expenditures necessary to ensure public safety, service, and environmental protection. These costs were developed from past budget data, discounted over 200 years using MIVEST program, and then added to the FORPLAN discounted costs using 4 percent and 7 percent rates. The fixed costs estimates do not significantly vary between alternatives and do not affect land management decisions.

Variable costs vary with the controlled output level specified in each benchmark or alternative. They include capital investments (the costs of creating or enhancing capital assets over time), planning and inventory, and operations costs (including annual costs of administration, management, and protection of existing resources and capital assets). Variable costs include the costs necessary to meet minimum management requirements which are in the standards and guidelines of planned activities.

3. Cost Increases

None of the basic unit costs are expected to increase above inflation over time. However, the average unit costs of many activities will increase through time as more expensive management activities are scheduled. For example, the average road construction cost may increase in the first few decades as the more rugged land classes are accessed.

4. FORPLAN Cost Data by Resource

a. Cost Summary - Structural and Non-Structural Range Improvements.

1. Non-Structural Range Improvement Costs

TABLE B-8
NON-STRUCTURAL RANGE IMPROVEMENT COSTS

<u>Level 13 (Vegetation Type)</u>	<u>Treatment</u>	<u>1982 Cost/Acre</u>
Pinyon/Juniper	Chain and Seed	\$43
Conifer	Harvest or Burn	\$33
Aspen	Harvest or Burn	\$33
Mountain Brush	Chemical	\$30
Low Sage	Mechanical and Seed	\$43
	or	
	Chemical (Burn)	
Mid-High Sage	Mechanical and Seed	\$43
	or	
	Chemical (Burn)	

2. Structural Range Improvements

The average fencing cost was \$6,500 a mile. The average water development cost was \$1,200 a development.

b. Cost Summary-Timber in FORPLAN

Table B-9 contains the cost data used in FORPLAN.

TABLE B-9
TIMBER COST DATA IN FORPLAN
1982 \$

Plantation Costs	\$255/Acre
Precommercial Thinning	\$105/Acres
Sale Preparation	\$ 30/MBF

In order to assure restocking, 100 percent of the clear cut acres are planted, and 10 percent of the selection harvest acres are planted.

c. Cost Summary Road Construction in FORPLAN.

Table B-10 shows the purchaser credit road construction costs used in FORPLAN as varied by analysis area stratification levels. The costs in B-8 are for construction. The assumed miles of road reconstruction per acre harvested are the same except the cost per mile decreases (see Table B-11).

TABLE B-10
PURCHASER CREDIT ROAD CONSTRUCTION IN FORPLAN

Level 1 Identifier	Level 5 - <40% Slope		Level 5 - 40%+ Slope	
	Miles of Road Construction		Miles of Road Construction	
	Per Ac. Harvest	Cost/Acre	Per Ac. Harvest	Cost/Acre
	(Miles)	(1982)	(Miles)	(1982)
Beaver	.0165	14,900	.0176	24,800
Delta	.0230	20,300	.0240	33,800
Fillmore	.0230	20,300	.0240	33,800
Fremont	.0165	14,800	.0176	24,800
Piute	.0200	17,600	.0210	29,200
Richfield	.0150	13,500	.0160	22,500

TABLE B-11
PURCHASER CREDIT ROAD RECONSTRUCTION IN FORPLAN

Level 1 Identifier	Level 5 - <40% Slope		Level 5 - 40% + Slope	
	Miles of Road Construction		Miles of Road Construction	
	Per Ac. Harvest	Cost/Acre	Per Ac. Harvest	Cost/Acre
	(Miles)	(1982)	(Miles)	(1982)
Beaver	.0165	4,620	.0176	7,690
Delta	.0230	6,290	.0240	10,500
Fillmore	.0230	6,290	.0240	10,500
Fremont	.0165	4,620	.0176	7,690
Piute	.0200	5,460	.0210	9,050
Richfield	.0150	4,180	.0160	6,970

5. Other Cost Data

Cost information in addition to the above is available in the Forest Supervisor's Office in Richfield, Utah.

6. Demand Assumptions

For Forest outputs, it is assumed that prices do not vary with the quantity of outputs produced at various levels. Methodology prescribed in planning guidelines was to assume recreation output values are constant up to the projected demand level and zero for all output levels in excess of demand.

However, recreation capacity coefficients are based on the project's demand curve for this output, so all RVD's generated are valued at a constant rate.

Trend Assumptions

It is assumed for this analysis that real prices and costs remain constant over the planning period. Inflation was not included in the discount rates, benefits, and costs due to the difficulty of estimating future inflation rates and because inflation would equally affect both costs and prices.

7. Interest Rate (Discounting) Assumptions

Two discount rates representing the cost of money over time were used in the FORPLAN model. For evaluation of long term investments in land and resource management, a 4 percent real discount rate was used. A 7-1/8 percent rate, which is consistent with the 1980 RPA Program, was also used on all benchmarks and alternatives. This was done to determine the sensitivity of alternatives, particularly the preferred alternative, to variations in the discount rate.

V. SOCIO-ECONOMIC AND SOCIAL IMPACT ANALYSIS METHODOLOGY

A. Introduction

Legislative and administrative laws have been interpreted to require consideration of the effects to human populations of land management actions.

A number of indices appear in the Forest Service Manual (FSM 1972, 1973) for tracking these effects. A list of these includes:

1. Employment
2. Income
3. Population
4. Lifestyles
5. Attitudes
6. Beliefs
7. Values

The first three of these are quantitative and easily defined. Items 4 through 7 are qualitative and not easily measured, described, or defined.

Population can change independently of employment and income. This might occur because family sizes change or because retirees or other nonworking families move in or out of an area. The Forest manager is only concerned with forecasting changes in population that occur because of land management actions. Moreover, land management effects to population are transmitted through land management effects to employment. Income changes are also led by employment changes. Employment is the most important of the seven variables to track.

B. An Approach to Social Impact Analysis

Forest outputs for the base year and for 10 years out were inventoried by alternative. These outputs were aggregated according to the following categories:

<u>Output</u>	<u>Units</u>
Timber	MMBF
Grazing	MAUM
Developed Recreation	MRVD
Dispersed Recreation	MRVD
Forest Budget	Million Dollars

The employment and income changes (income measured in 1977 dollars) associated with the alternatives and benchmarks were calculated by: (1) computing alternative output levels and budget levels as changed from the base year, and (2) multiplying the output changes by employment and income multipliers generated from the Forest Service input-output model called IMPLAN.

The Input-Output Technique in Forest Planning

The Input-Output (I/O) technique has a long tradition as a means of estimating economic impacts. The discussion here makes no pretense of being either original or comprehensive. It is intended as a brief but accurate description of the technique as it is utilized in Forest planning. An I/O model initially depicts the sales and purchase detail of an economy for a particular year (the base year). Because the sales of one sector are the purchases of other sectors, an accounting identity or equality exists for the base year. A sector may be an industry (sawmills, livestock etc.), a group of industries (manufacturing, services, etc.), or some economic category such as the households sector, the government sector, etc. The IMPLAN system permits construction of an economy composed of any collection of counties the user wishes to model. The IMPLAN base year is 1977.

Given the base year equality of sector sales and purchases, the I/O technique permits the analyst to address the following question: What would the various sector sales look like if some sectors had produced at levels other than they actually did? For example, what would the base year output of the logging sector have been if the sawmill sector had produced twice as much lumber as it actually did in the base year? An I/O model assembled

for the economy at issue would provide the sales response of the logging sector in the economy. This is the essence of the I/O technique for impact assessment. It estimates what the economy would have looked like in the base year if some outputs had been other than they actually were.

In the context of Forest planning, alternate land management actions and outputs are modeled to determine the corresponding impacts to local employment, income, and population. The first step is to describe the potential management action as a change from the situation that existed in 1977. This change is then translated from Forest Service outputs to a change in the sales of affected industries. The model considers these "direct" industry changes and calculates the all-industry indirect and induced sales changes. These are then converted by the model into employment, income, and population changes.

Strictly speaking, the foregoing exercise indicates the level of economic activity that would have been obtained in the multicounty economy in 1977 if the Forest Service had operated at levels equal to those of the modeled management action in 1977. In practice, the changes in economic activity indicated by the exercise are utilized as predictions of future economic impacts.

Population effects can be estimated by multiplying employment changes by the local population employment ratio. The population to employment ratio used on the Fishlake was 4.5 to 1.

C. SOCIAL IMPACT ANALYSIS

Social impact analysis estimates how Forest policies and actions affect the quality of life in the identified area. Future social conditions if current management were continued were compared with the potential impacts from other management alternatives.

Social impacts were measured by social variable such as lifestyles, attitudes, beliefs and values, social organizations, and population and land use.

Some social change could occur in the five counties comprising the zone of influence of Fishlake National Forest with any alternative implemented. This change relates to potential development of mineral resources underlying the Forest and the immigration of people seeking a rural life style. While the second factor has produced a slow, steady change, the effects of the first will be geared to the pace of mineral development. The alternatives affect the social descriptors of the Human Resource Units described in Chapter II to varying degrees, but most of the changes and effects are minimal.

SOCIAL EFFECTS OF ALTERNATIVES BY HUMAN RESOURCE UNIT

Richfield and Delta Human Resource Units None of the alternatives will have major effects on the lifestyles, social organization, attitudes or land uses in these HRU's. In the Delta HRU, this is due to the low rate of participation in activities affected by the alternatives. Recreation at Oak Creek is one of Delta's main uses of the Forest. Richfield HRU has a

high proportion of service industries and retail trade not tied to Forest outputs controlled by the alternatives. Alternatives 2, 4, 5, 6, 9, 10 and 11 would have a slight positive effect due to increased recreation and wildlife opportunities, while alternatives 1, 3, 4 and 7 would have a slight negative effect in this regard.

Beaver and Fillmore Human Resource Units These Human Resource Units could be moderately affected by the alternatives. Both have an intermediate mix of agricultural and nonagricultural employment. People in the Beaver HRU utilize the Forest for grazing, timber harvest and recreation. Those in the Fillmore HRU utilize it for grazing and recreation. Alternatives such as 1, 3 and 7, which reduce grazing capacity, will have a negative effect on the lifestyles of some residents of these two HRU's. Conversely, alternatives which increase outputs will have some beneficial effects. In either case the effects will be modulated by non-Forest related employment that has increased over the past 20 years.

Piute Human Resource Unit The economy of this HRU is highly dependent on the output of two Forest resources: minerals and range.

In the case of range, alternatives 1, 3, and 7 -- with grazing capacities lower than present -- will have an adverse effect on lifestyles, attitudes and land uses within the HRU. Alternatives 2, 6, 8, 9 and 11 will about maintain the current conditions, and alternatives 5 and 10 will have a beneficial effect.

The effects minerals will have on the HRU is assumed to be partially dependent on the land area available for minerals development. Designation of two small research natural areas in alternatives 5 and 11 might have a slight negative effect, but on the whole effects will depend on the rate minerals are developed.

Fremont Human Resource Unit This HRU is most sensitive to the effects of the alternatives of all the HRU's in the Forest's zone of influence. Individuals depend on several Forest outputs in order to maintain their economic base. Many have consciously chosen to forego material benefits in favor of the rural lifestyle available in the area. The economy is highly dependent on the outputs of goods and services from the Forest. Thus alternatives such as 1, 3 and 7, which decrease those outputs, will have strong adverse effects on the lifestyles, values, social organization, population and land use on the HRU. Implementation of alternatives 2, 5, and 10 will probably not lead to significant growth, but to a higher quality of life for present residents. While alternative 4 would lead to increased employment, it would require a significant change in the lifestyles, attitudes and land use of the HRU. Implementation of alternatives 6, 8, 9, and 11 would probably have the least impact on this HRU, with alternative 8 probably having a slightly better impact.

TABLE B-12

PROJECTED EMPLOYMENT, POPULATION, AND INCOME EFFECTS OF BENCHMARKS
(for Beaver, Garfield, Millard, Piute, Sevier and Wayne Counties, Expressed as
a Change From Alternative 8, the No-Action Alternative. Changes are for the
Period 1980 - 1990 Attributable to the Benchmarks.)

	Employment (Jobs)	Income (MM 1982 \$)	Population (Persons)
Base Year			
1980	12,700	259.0000	36,450
Max.PNB	259	5.4676	1,170
		3.7535	
Max.PNV	128	2.4616	579
		1.6899	
Max.Tmb.	283	6.1135	1,278
		4.1969	
Max.Range	316	7.5007	1,429
		5.1492	
Tmb.Seq.	526	12.1120	2,380
		8.3148	
Min.Level	-542	-13.2703	-2,452
		-9.1100	
Tmb.Depart.	59	1.4032	267
		0.9633	
		1982 dollars	
		1977 dollars	

VI. ANALYSIS PRIOR TO ALTERNATIVE DEVELOPMENT

A. Introduction

The Analysis of the Management Situation (AMS) was the major analysis step prior to beginning the development of management alternatives. In summary, the AMS provided the parameters for formulating a broad range of alternatives by:

1. Examining the Forest's capability of providing goods and services in a series of "Benchmarks", or minimum-maximum displays;
2. Projecting the demands for goods and services;
3. Analyzing the potential to resolve issues and concerns; and
4. Determining the need to change management direction.

The results of the AMS form the "sideboards" of framework within which viable alternatives can be formulated.

B. Minimum Management Requirements (MMR)

Minimum management requirements are defined in the NFMA Regulations (36 CFR 219.27). A summary listing of these MMR's follows:

1. Conserve soil and water resource productivity.
2. Minimize hazards from natural physical forces such as fire and flood.
3. Prevent or reduce hazards and damage from pest organisms.
4. Protect riparian areas.
5. Maintain or enhance plant and animal diversity.
6. Provide fish and wildlife habitat needed to maintain minimum viable populations.
7. Protect threatened and endangered species habitat.
8. Provide for transportation and utility corridors.
9. Develop road design and construction guidelines and standards.
10. Provide for revegetation of temporary roads.
11. Maintain air quality.
12. Assure that harvested lands can be adequately restocked within 5 years.
13. Limit harvest openings to 40 acres maximum.
14. Adhere to multiple use and environmental protection laws (Multiple-Use Sustained Yield Act of 1960 and the National Environmental Policy Act of 1969).

Several methods were used to meet the above listing of minimum management requirements (MMR). These include:

- Development of standards and guidelines for each prescription;
- Application of FORPLAN modeling constraints for individual analysis areas or zones to limit access;
- Set scheduled output levels or assign specific prescriptions.

1. Modeling Constraints

Very few modeling constraints were used by the Fishlake in meeting MMR. This low usage was partially due to the availability of a wide range of possible prescription assignments, but also was a result of the perceived desirability of allowing the model to freely reach optimal solutions for the objective function.

The constraints commonly used for meeting MMR's:

- a. Application of treatment limits. The Fishlake developed standards and guidelines that require the Forest to maintain plant diversity and good dispersion of the plant diversity throughout the Forest.

For example:

The Fishlake was divided up into 40 zones for analysis purposes. Each zone was simply a convenient aggregation of analysis areas. Prescription 6B (Intensive Livestock Management) is applied to a zone consisting of the following analysis areas:

TABLE B-13
HYPOTHETICAL ZONE ACRES

Zone A	<u>Suitable 1/</u>	<u>Not Suitable</u>	<u>Total</u>
Sagebrush	10,000	6,000	16,000
Pinyon-juniper	5,000	5,000	<u>10,000</u>
			26,000

1/ Refers to suitable/not suitable for livestock production.

The intensive range prescription would be designed to provide grass for livestock while still meeting the MMR. If the entire 26,000 acre area was converted to grass, the diversity MMR would not be met. The diversity MMR may be met by using two sources. First, the non-suitable acres would not be converted to grass under the 6B prescription since the forage on steep unsuitable acres would not be available to cattle. The second source of diversity is the suitable acres. The assumption was made that only 50% of the suitable acres on sagebrush and pinyon juniper would be available for non-structural treatment. (See Table B-14)

TABLE B-14
APPLICATION OF 6B PRESCRIPTION TO "ZONE A"

	<u>Available for</u>		<u>Not Available for</u>	
	<u>Non-Structural Improvement</u>	<u>Non-Structural Improvement</u>	<u>Non-Structural Improvement</u>	<u>Non-Structural Improvement</u>
	<u>Suitable 1/</u>	<u>Not Suitable</u>	<u>Suitable</u>	<u>Not Suitable</u>
	<u>(Acres)</u>	<u>(Acres)</u>	<u>(Acres)</u>	<u>(Acres)</u>
Sagebrush	5,000	0	5,000	6,000
Pinyon-juniper	2,500	0	2,500	5,000
Total	<u>7,500</u>	<u>0</u>	<u>7,500</u>	<u>11,000</u>

1/ Refers to suitable for livestock production.

For this example, only 7,500 acres out of the 26,000 total acres would be available for conversion to grass (non-structural improvement). Furthermore only 5,000 acres out of 16,000 acres of sagebrush would be available for conversion, and only 2,500 acres of the 10,000 acres of pinyon juniper.

If one looks at a different zone that was 100 percent suitable for livestock the most one can convert would be 50 percent. This factor combined with the special dispersion of zones around the Forest and the special dispersion of capability areas requires only proper project planning to accomplish the MMRs.

- b. Assigning specific prescriptions to analysis areas or groups of analysis areas (zones). This type of constraint was generally not directly responsive to MMR. It was used to lock in areas such as potential Research Natural Areas or non development areas. A third use of the management emphasis-management intensity constraints was to "lock out" or prevent prescriptions from being applied to particular analysis areas. Indirectly, the management emphasis-management intensity constraints were responsive to MMR 3, 5, 6, and 14.

Minimum Management Requirements 7, 8 and 12 were responded to by the development of the standards and guidelines and by the development of the wide range of prescriptions for each analysis area.

- c. Setting scheduled output yields equal to, greater than, or less than specified levels. While this set of constraints generally does not relate directly to MMR's, it does affect such factors as creating or maintaining wildlife habitat and visual diversity. It is considered to be indirectly responsive to MMR 1, 2, 3, 4, 5, 6, 11, and 14. Use of this type of constraint varied from alternative to alternative, based on the alternative objective.

C. Benchmarks

Eight "benchmarks" were developed to define the capability of the Fishlake Forest to produce goods and services, to provide some economic comparison control points for comparing various management philosophies or strategies (alternatives), and to determine the ability to be responsive to the major issues and concerns.

The benchmarks are:

- Minimum Level
- Maximum Present Net Value (all values)
- Maximum Present Net Value (only market values)
- Maximum Timber for the First Decade
- Maximum Range
- Sequential Upper and Lower Bounds
- Timber Departure Analysis
- Current level

1. Minimum Level

Objective:

This benchmark is intended to display the minimum cost to maintain the National Forest status of the Fishlake Forest. It is, in effect, a custodial or near custodial management philosophy.

Objective Function: Maximize for present net value for 20 decades.

Constraints and Assumptions:

No commodity outputs were derived except minerals and some firewood. Recreational use was limited and hunting and fishing severely restricted. The point is to create an analysis framework upon which to compare other benchmarks and alternatives.

Table B-15 shows a detailed list of the outputs, benefits and costs of minimum level.

TABLE B-15
MIN LEVEL

<u>Output/Activity</u>		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Recreation						
Dev. recreation Use						
Rural	MRVD	0	0	0	0	0
Rd. Nat.	MRVD	0	0	0	0	0
Disp. recreation Use						
Rural	MRVD	0.1	0.1	0.1	0.1	0.1
Rd. Nat	MRVD	10.2	10.2	10.2	10.2	10.2
S.P. Mot.	MRVD	20.7	20.7	20.7	20.7	20.7
S.P.N.Mot.	MRVD	4.0	4.0	4.0	4.0	4.0
Wildlife						
Struct.Hab.Imp.	Struc	0	0	0	0	0
N.Struct.Hab.Imp.	M AC	0	0	0	0	0
Wld.&Fish Use	MWFUD	14.5	14.5	14.5	14.5	14.5
Range						
Grazing Use	MAUM	0	0	0	0	0
Tmb. Sales Offered						
SawTmb.Softwood	MMCF	0	0	0	0	0
SawTmb.Hardwood	MMCF	0	0	0	0	0
Fuelwood	MCF	2,312	2,600	2,600	2,600	2,600
Reforestation	M AC	0	0	0	0	0
TSI	MMAC	0	0	0	0	0
Water						
Mtg.St.Standards	MACFT	611.0	611.0	611.0	611.0	611.0
Incr. Over.Nat.	MACFT	0	0	0	0	0
Protection						
Fuel B&S & Trt.	Acres	0	0	0	0	0
Minerals						
Leases & Permits	Cases	200	200	180	180	160

TABLE B-15 (cont)
MIN LEVEL

Output/Activity		1	2	3	4	5
HC&D						
Human Res. Prog.	ENRY's	0	0	0	0	0
Lands						
Pur. & Acq.	Acres	0	0	0	0	0
Soils						
S. & Wat. Res. Imp.	M AC	0	0	0	0	0
Facilities						
Trail Const./						
Reconst.	Miles	0	0	0	0	0
Road Const./						
Reconst.	Miles	0	0	0	0	0
(Art. & Collect)						
Rd. Betterment	Miles	0	0	0	0	0
Local Rd. Const.	Miles	0	0	0	0	0
Local Rd. R. Const.	Miles	0	0	0	0	0
T.M. Parch Rd.						
Const.	Miles	0	0	0	0	0
T.M. Purch. Rd.						
R. Const.	Miles	0	0	0	0	0
<u>Benefits M\$</u>						
Recreation						
Developed	M \$	0	0	0	0	0
Dispersed	M \$	43.8	43.8	43.8	43.8	43.8
Range	M \$	0	0	0	0	0
Timber	M \$	96.4	10.8	10.8	10.8	10.8
Wildlife (WFUDs)	M \$	438.7	438.7	438.7	438.7	438.7
Water Yield Incr.	M \$	0	0	0	0	0
Minerals	M \$	9,292.7	9,292.7	9,292.7	9,780.0	9,780.0
<u>Cost M\$</u>						
Total Frst. Budget	M \$	983.0	983.0	983.0	983.0	983.0
Fixed Costs						
Protection	M \$	576.0	576.0	576.0	576.0	576.0
Gen. Admin.	M \$	407.0	407.0	407.0	407.0	407.0
Variable Costs						
Investments	M \$	0	0	0	0	0
Tot. Rds.	M \$	0	0	0	0	0
App. Fund Rds.	M \$	0	0	0	0	0
Purch. Credit						
Rds.	M \$	0	0	0	0	0
Operational	M \$	0	0	0	0	0
Gen. Admin.	M \$	0	0	0	0	0
Non-F.S. Costs	M \$	0	0	0	0	0
Returns to Tres.	M \$	9,315.8	9,318.7	9,318.7	9,806.0	9,806.0

2. Maximum Present Net Value (all values)

Objective:

The objective of this benchmark is to show the maximum present net value of managing the Fishlake National Forest.

Objective Function:

Maximize present net value for 20 decades.

Constraints and Assumptions:

All prescriptions were allowed to come into the solution. The major constraint in place was a non-declining yield provision for timber harvest, and an ending inventory constraint. Non development prescriptions were allowed. There were no budget constraints.

Table B-16 shows the detailed list of the outputs, benefits and costs of this benchmark.

TABLE B - 16
APPENDIX B
MAX PNB (ALL VALUES) B M

LTSYC SOFTWOOD 8 30 MMBF
HARDWOOD 1 38 MMBF
TOTAL 9 68 MMBF

AVERAGE ANNUAL OUTPUT OR ACTIVITY		1	2	3	DECADE 4	5	10	15
PECREATION								
DEV REC USE								
RURAL	MRVD	345 2	418 4	483 7	560 8	634 3		
RD NAT	MRVD	230 1	278 9	322 5	373 8	422 8		
DISP REC USE								
RURAL	MRVD	84 2	102 1	118 0	133 9	149 9		
RD NAT	MRVD	737 3	896 0	1035 8	1175 6	1315 4		
S P MOT	MRVD	237 3	287 7	322 5	377 4	422 3		
S P N MOT	MRVD	21 2	25 6	32 9	33 5	37 5		
WILDLIFE								
STRUCT HAB IMP	STRUC	394	394	394	394	394		
NSTRUCT HAB IMP	M AC	026	0	0	0	0		
WLD & FISH USE	MWFUD	193 7	204 5	205 0	205 4	205 5		
RANGE								
GRAZING USE	M AUM	130 2	123 2	119 2	119 5	118 9		
TIMBER AVAILABLE SALE QUANTITY								
SAW T SOFTWOOD	MMCF	7 1	7 1	7 1	7 1	7 1	7 1	8 6
SAW T HARDWOOD	MMCF	1 37	1 37	1 37	1 37	1 37	1 37	1 66
ROUNDWOOD PRODUCTS	MCF	06	06	06	06	06	06	06
FUELWOOD	MCF	0	0	0	0	0	0	0
		3350	3850	3850	3850	3850	3975	4100
PEFORESTATION	M AC	606	317	278	155	. 276	262	127
TSI	M AC	0	44	. 184	327	64	330	220
WATER								
MST ST STANDARDS	M AC FT	611 0	611 0	611 0	611 0	611 0		
INCR OVER NAT	M AC FT	143	143	. 143	. 143	143		
PROTECTION								
FUEL BKS & TRT	ACRES	100	0	0	0	0		
MINERALS								
LEASES & PERMITS	CASES	200	200	180	180	160		
HC&D								
HUMAN RES PRDG	ENRY'S	13	11	11	11	11		

LANDS							
PUR & ACQ	ACRES	110	110	0	0	0	
SOILS							
S & WAT RES IMP	AC	61	137	151	151	151	
FACILITIES							
TRAIL CONST /RECONST	MILES	2 2	2 5	2 8	3 2	3 5	
ROAD CONST /RECONST (ART & COLLECT)	MILES	0	0	1		1	
RD BETTERMENT	MILES	13 0	13 0	13 0	13 0	13 0	
LOCAL RD CONST	MILES	0	1	.2	2	1	
LOCAL RD PCONST	MILES	3	2	1	1	2	
TM PURCH RD CONST	MILES	14 0	14 0	13 0	9 0	9 0	
TM PURCH RD RCONST	MILES	0	0	0	2 0	2 0	
AVERAGE ANNUAL BENEFITS							

PECREATION							
DEVELOPED	M \$	2399 0	2907 7	3361 8	3897 3	4408 1	
DISPERSED	M \$	4531 7	5491 0	6346 7	7204 1	8062 4	
PANGE	M \$	1546 7	1463 2	1415 9	1419 2	1413 1	
TIMBER	M \$	2364 9	2386 7	2428 7	2506 7	2506 7	
WILDLIFE (WFUDS)	M \$	4803 6	5178 2	5282 5	5375 3	5463 4	
WATER YIELD INCREASE	M \$	8 3	8 3	8 3	8 3	8 3	
MINERALS	M \$	9292 7	9292 7	9292 7	9780 0	9780 0	
AVERAGE ANNUAL COSTS							

TOTAL FOREST BUDGET	2/	M \$/YR	4287 4	4357 0	4466 3	4693 0	4691 6
FIXED COSTS							
PROTECTION		M \$/YR	576 0	576 0	576 0	576 0	576 0
GEN ADMIN		M \$/YR	407 0	407 0	407 0	407 0	407 0
VARIABLE COSTS							
INVESTMENTS	3/	M \$	692 3	636 8	663 2	196 8	705 5
TOT RDS		M \$	409 6	419 3	403 1	408 5	479 5
APP FUND RDS		M \$	72 6	82 3	95 1	109 5	123 5
PURCH CREDIT RDS	4/	M \$	337 0	337 0	308 0	371 0	356 0
OPERATIONAL		M \$	1989 5	2104 9	2175 0	3253 7	2329 6
GENERAL ADMIN		M \$	423 0	423 0	423 0	423 0	423 0
NON-F S COSTS		M \$	1438 0	1432 0	1481 0	2088 0	1462 0
RETURNS TO TRES		M \$	9733 4	9746 1	9755 1	10258 2	10272 3

- 1/ BOARD FOOT/CUBIC FOOT RATIOS SAWTIMBER 5 TO 1, FUELWOOD 4 TO 1
2/ DOES NOT INCLUDE NON-F S PURCHASER CREDIT ROADS NOR HUMAN RESOURCE PROGRAMS
3/ DOES NOT INCLUDE ROAD COSTS
4/ INCLUDES F S ENGINEERING COSTS

3. Maximum PNV (market values)

Objectives:

This benchmark is intended to display the maximum present net value of valuing only timber, range, minerals and developed recreation.

Objective Function:

Maximize present net value of market values for 20 decades.

Constraints and Assumptions:

Only market valued resources were valued. Non-declining harvest flow and the ending inventory constraint were in place for timber. There were no budget constraints. Aspen projected outside FORPLAN at an average annual output of 300 MBF, which approximates current and foreseeable markets.

Table B-17 shows the detailed list of the outputs, benefits and cost of this benchmark.

TABLE B - 17
 APPENDIX B
 MAX "PNV" MARKET VALUES B M

LTSYC SOFTWOOD 7 20 MMBF
 HARDWOOD 1 38 MMBF
 TOTAL 8 58 MMBF

ANNUAL AVERAGE OUTPUT OR ACTIVITY		1	2	3	DECADE 4	5	10	15
RECREATION								
DEV REC USE								
RURAL	MRVD	300 3	364 0	420 8	487 9	551 8		
RD. NAT	MRVD	200 2	242 6	280 6	325 2	367 8		
DISP REC USE								
RURAL	MRVD	27 8	33 7	38 9	44 2	49 5		
RD NAT	MRVD	244. 0	295 7	341 8	387 9	434 1		
S P MOT	MRVD	78. 3	94 9	109 7	124 5	139 4		
S P N MOT	MRVD	17. 0	19 9	22 9	26 3	29 8		
WILDLIFE								
STRUCT HAB IMP	STRUC	30	55	55	55	55		
NSTRUCT HAB IMP	M AC	013	0	0	0	0		
WLD & FISH USE	MWFUD	177 6	175 9	175 0	175 1	175. 0		
RANGE								
GRAZING USE	M AUM	113 1	113 1	113 1	113 1	113. 1		
TIMBER AVAILABLE SALE QUANTITY								
SAW T SOFTWOOD	MMCF	6 1	6 1	6 1	6 1	6 1	6 1	6 1
SAW T HARDWOOD	MMCF	1 16	1 16	1 16	1 16	1 16	1 16	1 16
ROUNDWOOD PRODUCTS	MCF	06	06	06	06	06	06	06
FUELWOOD	MCF	0	0	0	0	0	0	0
		3350	3850	3850	3850	3850	3975	4100
REFORESTATION								
	M AC	451	433	176	171	236	167	058
TSI								
	M AC	015	0	132	060	0	060	060
WATER								
MGT ST STANDARDS	M AC FT	611 0	611 0	611 0	611 0	611 0		
INCR OVER NAT	M AC FT	121	121	121	121	121		
PROTECTION								
FUEL BKS & TRT	ACRES	260	260	260	260	260		
MINERALS								
LEASES & PERMITS	CASES	200	200	180	180	160		
HC&D								
HUMAN RES PROG	ENRY'S	13	11	11	11	11		

LANDS							
PUR & ACQ	ACRES	110	110	0	0	0	
SOILS							
S & WAT RES IMP	AC	0	0	0	0	0	
FACILITIES							
TRAIL CONST /PECONST	MILES	0 7	0 8	0 9	1 0	1 2	
ROAD CONST /RECONST (ART & COLLECT)	MILES	0	0	0	0 1	0 1	
RD BETTERMENT	MILES	13 0	13 0	13 0	13 0	13 0	
LOCAL RD CONST	MILES	0	0 1	0 1	0 2	0 2	
LOCAL RD RCONST.	MILES	0 2	0 1	0 2	0 1	0 1	
TM PURCH RD CONST	MILES	12 0	11 9	10 8	7 7	8 8	
TM PURCH RD RCONST	MILES	0	0	0	0 8	0	
AVERAGE ANNUAL BENEFITS							

PECPREATION							
DEVELOPED	M \$	2087 1	2529 5	2924 8	3390 9	3834 7	
DISPERSED	M \$	1607 2	1939 9	2241 6	2547 2	2854 9	
RANGE	M \$	1343 9	1343 9	1343 9	1343 9	1343 9	
TIMBER	M \$	2040 9	2034 7	2073 7	2144 7	2144 7	
WILDLIFE (WFUDS)	M \$	4233 1	4226 0	4234 9	4263 4	4289 1	
WATER YIELD INCPEASE	M \$	7 1	7 1	7 1	7 1	7 1	
MINERALS	M \$	9292 7	9292 7	9292 7	9780 0	9780 0	
AVERAGE ANNUAL COSTS							

TOTAL FOREST BUDGET	2/ M \$/YR	3759 2	3836 9	3917 2	3998 3	4062 1	
FIXED COSTS							
PROTECTION	M \$/YR	576 0	576 0	576 0	576 0	576 0	
GEN ADMIN	M \$/YR	407 0	407 0	407 0	407 0	407 0	
VARIABLE COSTS							
INVESTMENTS	3/ M \$	421 9	411 7	425 3	456 5	447 7	
TOT RDS	M \$	352 5	456 6	347 6	406 8	336 3	
APP FUND RDS	M \$	47 5	57 6	66 6	72 8	82 3	
PURCH CREDIT RDS	4/ M \$	305 0	399 0	281 0	334 0	254 0	
OPERATIONAL	M \$	1756 8	1834 6	1892 3	1936 0	2002 1	
GENERAL ADMIN	M \$	423 0	423 0	423 0	423 0	423 0	
NON-F S COSTS	M \$	1219 0	1209 0	1251 0	1661 0	1254 0	
RETURNS TO TRES	M \$	9686 4	9704 1	9715 5	10216 2	10229 0	

- 1/ BOARD FOOT/CUBIC FOOT RATIOS SAWTIMBER 5 TO 1, FUELWOOD 4 TO 1
2/ DOES NOT INCLUDE NON-F S PURCHASER CREDIT ROADS NOR HUMAN RESOURCE PROGRAMS
3/ DOES NOT INCLUDE ROAD COSTS
4/ INCLUDES F S ENGINEERING COSTS

4. Maximum Timber for the First Decade

Objective:

This benchmark is designed to display the maximum timber production.

Objective Function:

Maximize Timber for one decade. After this objective value was frozen, the run used maximum present net value (all values).

Constraints and Assumptions:

The non-declining and ending inventory constraints were used. There were no budget constraints. There are a variety of means of determining the maximum timber production. The objective function may vary from maximum timber from 1 to 20 decades. Harvest flow constraints may be non-declining, sequential lower and upper bounds, or non-existent. The results may either be "rolled over" or not "rolled over" in a maximum present net value function after locking in the results of the original objective function. Each constraint and assumption used will yield a different pattern of outputs. Aspen is projected outside FORPLAN at an average annual output of 300 MBF, which approximates current and foreseeable markets.

Table B-18 shows the detailed list of the outputs, benefits and costs of this benchmark.

TABLE B - 1B
APPENDIX B
MAX TIMBER FOR 1 B M

LTSYC

SOFTWOOD 13 54 MMBF
HARDWOOD 1 38 MMBF
TOTAL 14 92 MMBF

AVERAGE ANNUAL OUTPUT OR ACTIVITY		1	2	3	DECADE 4	5	10	15
RECREATION								
DEV REC USE								
RURAL	MRVD	334 8	405 8	469 2	544 0	615 3		
RD NAT	MRVD	223 2	270 5	312 8	362 6	410 1		
DISP REC USE								
RURAL	MRVD	78 3	95 0	109 7	124 5	139 4		
RD NAT	MRVD	687 5	833 3	963 3	1093 3	1223 3		
S P MOT	MRVD	220 7	267 6	309 2	351 0	392 7		
S P N MOT	MRVD	17 4	21 0	24 3	22 6	30 8		
WILDLIFE								
STRUCT HAB IMP.	STRUC	357	357	357	357	357		
NSTRUCT HAB IMP	M AC	025	0	0	0	0		
WLD & FISH USE	MWFUD	184 5	192 2	191 4	191 4	191 3		
RANGE								
GRAZING USE	M AUM	126 9	118 8	113 6	113 8	113 4		
TIMBER AVAILABLE SALE QUANTITY								
SAW T SOFTWOOD	MMCF	2 114	2 114	2 114	2 114	2 114	2 114	2 114
SAW T HARDWOOD	MMCF	06 *	06	06	06	06	06	06
ROUNDWOOD PRODUCTS	MCF	0	0	0	0	0	0	0
FUELWOOD	MCF	3350	3850	3850	3850	3850	3975	4100
REFORESTATION	M AC	846	808	418	391	456	263	222
TSI	M AC	247	64	284	398	376	362	289
WATER								
MGT ST STANDARDS	M AC FT	611 0	611 0	611 0	611 0	611 0		
INCR OVER NAT	M AC FT	220	220	220	220	220		
PROTECTION								
FUEL BKS & TRT	ACRES	260	260	260	260	260		
MINERALS								
LEASES & PERMITS	CASES	200	200	180	180	160		
HC&D								
HUMAN RES PROG	ENRY'S	13	11	11	11	11		

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LANDS							
PUR & ACQ	ACRES	110	110	0	0	0	
SOILS							
S & WAT RES IMP	AC	119	239	239	239	239	
FACILITIES							
TRAIL CONST /RECONST	MILES	2 0	2 2	2 4	2 7	2 8	
ROAD CONST /RECONST (ART & COLLECT)	MILES	0	0 1	0 1	0 1	0 1	
RD BETTERMENT	MILES	13 0	13 0	13 0	13 0	13 0	
LOCAL RD CONST	MILES	0	0 1	0 2	0 2	0 1	
LOCAL RD RCONST	MILES	0 2	0 1	0 1	0 1	0 2	
TM PURCH RD CONST	MILES	29 8	19 7	35 2	16 6	19 3	
TM PURCH RD RCONST	MILES	0	0	0	13 5	4 1	
AVERAGE ANNUAL BENEFITS							

RECREATION							
DEVELOPED	M \$	2326 9	2820 2	3260 9	3780 5	4275 9	
DISPERSED	M \$	4188 9	5077 0	5868 6	6660 9	7452 9	
RANGE	M \$	1507 5	1410 9	1349 4	1352 4	1346 7	
TIMBER	M \$	3646 8	3597 7	3658 7	3781 7	3777 7	
WILDLIFE (WFUDS)	M \$	4670 2	4954 3	5016 6	5095 7	5174 5	
WATER YIELD INCREASE	M \$	12 8	12 8	12 8	12 8	12 8	
MINERALS	M \$	9292 7	9292 7	9292 7	9780 0	9780 0	
AVERAGE ANNUAL COSTS							

TOTAL FOREST BUDGET	2/	M \$/YR	4497 1	4697 1	4794 3	4903 9	5009 6
FIXED COSTS							
PROTECTION		M \$/YR	576 0	576 0	576 0	576 0	576 0
GEN ADMIN.		M \$/YR	407 0	407 0	407 0	407 0	407 0
VARIABLE COSTS							
INVESTMENTS	3/	M \$	787 3	891 6	909 9	930 6	950 6
TOT RDS		M \$	632 0	1225 0	791 0	723 7	826 2
APP FUND RDS		M \$	65 0	78 7	91 0	104 9	118 2
PURCH CREDIT RDS	4/	M \$	567 0	1147 0	700 0	619 0	108 0
OPERATIONAL		M \$	2006 8	2130 8	2197 4	2272 4	2344 8
GENERAL ADMIN		M \$	423 0	423 0	423 0	423 0	423 0
NON-F S COSTS		M \$	2272 0	2615 0	3359 0	3344 0	2464 0
RETURNS TO TRES		M \$	9802 5	9813 6	9821 0	10323 5	10337 3

- 1/ BOARD FOOT/CUBIC FOOT RATIOS SAWTIMBER 5 TO 1. FUELWOOD 4 TO 1
- 2/ DOES NOT INCLUDE NON-F S PURCHASER CREDIT ROADS NOR HUMAN RESOURCE PROGRAMS
- 3/ DOES NOT INCLUDE ROAD COSTS
- 4/ INCLUDES F S ENGINEERING COSTS

* AN ESTIMATE OF THE BIOLOGICAL POTENTIAL FOR HARDWOOD (ASPEN) IS 13 7 MMBF (OR 5 48 MMCF) FOR WHAT THERE IS NO CURRENT MARKET THE BUDGET ESTIMATE FOR THIS BENCHMARK DOES NOT REFLECT THE BIOLOGICAL POTENTIAL ASPEN HARVEST BOARD FOOT/CUBIC FOOT RATIO USED FOR ASPEN IS 2 5 TO 1.

5. Maximum Range

Objective:

This benchmark is intended to display the maximum range production on the Fishlake National Forest.

Objective Function:

Maximize range for 5 decades. After this objective value was frozen, the run used maximum present net value (all values).

Constraints and Assumptions:

There were no budget constraints. This benchmark shows the maximum development of this Forest for livestock production (subject to the MMR constraints). Conifer lands were not converted. Nondeclining yield and ending inventory constraints were applied.

Aspen projected outside FORPLAN at an average annual output of 300 MBF, which approximates current and foreseeable market. Table B-19 shows the detailed list of the outputs, benefits and costs of this benchmark.

TABLE B - 19
APPENDIX B
MAX RANGE B M

LTSYC SOFTWOOD 8 76 MMBF
 HARDWOOD 1 38 MMBF
 TOTAL 10 14 MMBF

AVERAGE ANNUAL OUTPUT OR ACTIVITY		1	2	3	DECADE 4	5	10	15
RECREATION								
DEV REC USE								
RURAL	MRVD	300 3	364 0	420 8	487 9	551 8		
RD NAT	MRVD	200 2	242 6	280 6	325 2	367 8		
DISP REC USE								
RURAL	MRVD	74 9	90 9	105 0	119 2	133 4		
RD NAT	MRVD	658 0	797 4	921 9	1046 3	1170 7		
S P MOT	MRVD	211 2	256 1	295 9	335 9	375 0		
S P N MOT	MRVD	17 7	21 4	24 7	28 1	31 4		
WILDLIFE								
STRUCT HAB IMP.	STRUC	340	340	340	340	340		
NSTRUCT. HAB IMP	M AC.	2 11	58	1 97	58	1 97		
WLD & FISH USE	MWFUD	179 0	186 5	186 1	184 9	184 7		
RANGE								
GRAZING USE	M AUM	163 0	161 7	162 3	163 5	163 6		
TIMBER AVAILABLE SALE QUANTITY								
SAW T SOFTWOOD	MMCF	7 8	7 8	7 8	7 8	7 8	8 6	9 1
SAW T HARDWOOD	MMCF	1 51	1 51	1 51	1 51	1 51	1 67	1 75
ROUNDWOOD PRODUCTS	MCF	06	06	06	06	06	06	06
FUELWOOD	MCF	0	0	0	0	0	0	0
		3350	3850	3850	3850	3850	3975	4100
REFORESTATION	M AC	517	.276	311	216	.236	.274	148
TSI	M AC	0	333	.333	557	355	561	444
WATER								
MGT ST STANDARDS	M AC FT	611 0	611 0	611 0	611 0	611 0		
INCR OVER NAT	M AC FT	157	157	.157	.157	157		
PROTECTION								
FUEL BKS & TRT	ACRES	100	100	100	100	100		
MINERALS								
LEASES & PERMITS	CASES	200	200	180	180	160		
HC&D								
HUMAN RES PROG	ENRY'S	13	11	11	11	11		

LANDS							
PUR & ACQ	ACRES	110	110	0	0	0	
SOILS							
S & WAT RES IMP.	AC	159	318	318	318	318	
FACILITIES							
TRAIL CONST /RECONST	MILES	1 9	2 1	2 3	2 5	2 7	
ROAD CONST /RECONST (ART. & COLLECT)	MILES	0	0	0 1	0 1	0 1	
RD BETTERMENT	MILES	13 0	13 0	13 0	13 0	13.0	
LOCAL RD CONST	MILES	0	0 1	0 2	0 2	0 1	
LOCAL RD RCONST.	MILES	0 2	0 1	0 1	0 1	0 2	
TM PURCH RD CONST	MILES	13 9	23 7	23 0	38 5	5 0	
TM PURCH RD RCONST	MILES	0	0	0	0	18 3	

AVERAGE ANNUAL BENEFITS

RECREATION

DEVELOPED	M \$	2087 1	2529 5	2924 8	3390 6	3834 7	
DISPERSED	M \$	4020 5	4872 5	5632 3	6393 3	7153 5	
RANGE	M \$	1935 9	1920 4	1927 8	1942 7	1943 0	
TIMBER	M \$	2594 9	2678 7	2684 7	2744 7	2744 7	
WILDLIFE (WFUDS)	M \$	4542 2	4793 7	4860.0	4906 7	4975 8	
WATER YIELD INCREASE	M \$	9 2	9.2	9 2	9 2	9 2	
MINERALS	M \$	9292 7	9292 7	9292.7	9780 0	9780 0	

AVERAGE ANNUAL COSTS

TOTAL FOREST BUDGET	2/	M \$/YR	6342 3	5252 8	5919 8	5925 8	5693 6
FIXED COSTS							
PROTECTION		M \$/YR	576 0	576.0	576 0	576 0	576 0
GEN. ADMIN.		M \$/YR	407 0	407.0	407 0	407 0	407 0
VARIABLE COSTS							
INVESTMENTS	3/	M \$	2500 0	1330 3	1924 7	1849 6	1539.8
TOT RDS		M \$	413 4	573 7	592 3	1355 9	408.2
APP FUND RDS.		M \$	59 5	71.7	83.3	95 9	108 2
PURCH. CREDIT RDS	4/	M \$	354 0	502 0	509 0	1260 0	300 0
OPERATIONAL		M \$	2228 8	2296 8	2357 8	2426 3	2491 6
GENERAL ADMIN		M \$	423 0	423 0	423 0	423 0	423 0
NON-F S COSTS		M \$	1581 0	1587 0	1710 0	2631 0	1665 0
RETURNS TO TRES.		M \$	9771 3	9787 7	9799.7	10301 6	10314.5

- 1/ BOARD FOOT/CUBIC FOOT RATIOS: SAWTIMBER 5 TO 1, FUELWOOD 4 TO 1
- 2/ DOES NOT INCLUDE NON-F S PURCHASER CREDIT ROADS NOR HUMAN RESOURCE PROGRAMS
- 3/ DOES NOT INCLUDE ROAD COSTS
- 4/ INCLUDES F S ENGINEERING COSTS.

6. Timber Sequential Upper and Lower Bounds

Objective:

This benchmark is designed to display the effects of relaxing the non-declining yield on present net value.

Objective Function:

Maximize present net value for 20 decades.

Constraints and Assumptions:

Lower and upper sequential harvest flow constraint of 25 percent was used. An ending inventory constraint was used. There were no budget constraints.

Aspen projected outside of FORPLAN at an average annual output of 300 MBF, which approximates current and foreseeable market. Table B-20 shows the detailed list of the outputs, benefits and costs of this benchmark.

TABLE B - 20
APPENDIX B
SEQUENTIAL LOWER AND UPPER BOUNDS B M

LTSYC SOFTWOOD 7 98 MMBF
HARDWOOD 1 38 MMBF
TOTAL 9 36 MMBF

AVERAGE ANNUAL OUTPUT OR ACTIVITY		1	2	3	DECADE 4	5	10	15
RECREATION								
DEV REC USE								
RURAL	MRVD	331 4	405 8	483 7	560 8	634 3		
RD NAT	MRVD	220 9	270 5	322 5	373 8	422 8		
DISP REC USE								
RURAL	MRVD	81 7	99 0	118 0	133 9	149 9		
PD NAT	MRVD	717 1	869 1	1035 8	1175 6	1315 4		
S P MOT	MRVD	230 2	279 1	332 5	377 4	422 3		
S P N MOT	MRVD	20 6	24.7	29 3	33 4	37 4		
WILDLIFE								
STRUCT HAB IMP	STRUC	405	405	405	405	405		
NSTRUCT HAB IMP	M AC	026	0	0	0	0		
WLD & FISH USE	MWFUD	185 4	194 5	194 1	194 3	194.3		
RANGE								
GRAZING USE	M AUM	130 2	123 2	119 2	119 5	118 9		
TIMBER AVAILABLE SALE QUANTITY								
SAW T SOFTWOOD	MMBF 1/	14 5	11.0	8 3	6 3	4 8	4 8	14 1
SAW T HARDWOOD	MMCF	2 84	2 13	1 60	1 20	90	90	2 76
ROUNDWOOD PRODUCTS	MCF	.06	.06	.06	.06	.06	.06	.06
FUELWOOD	MCF	0	0	0	0	0	0	0
	MCF	3350	3850	3850	3850	3850	3975	4100
REFORESTATION								
	M AC	881	700	289	185	123	.105	050
TSI								
	M AC	0	131	113	.310	151	.314	150
WATER								
MGT ST STANDARDS	M AC FT	611 0	611 0	611.0	611 0	611.0		
INCR OVER NAT	M AC FT	296	222	167	125	094		
PROTECTION								
FUEL BKS & TRT	ACRES	100	0	0	0	0		
MINERALS								
LEASES & PERMITS	CASES	200	200	180	180	160		
HC&D								
HUMAN RES PROG	ENRY'S	13	11	11	11	11		

LANDS							
PUR & ACQ	ACRES	110	110	0	0	0	
SOILS							
S & WAT RES IMP	AC	76	151	151	151	151	
FACILITIES							
TRAIL CONST /RECONST	MILES	2 0	2 2	2 6	3 0	3 4	
ROAD CONST /RECONST (ART & COLLECT)	MILES	0	0	0 1	0 1	0 1	
RD BETTERMENT	MILES	13 0	13 0	13 0	13 0	13 0	
LOCAL RD CONST	MILES	0	0 1	0 2	0 2	0 1	
LOCAL RD RCONST	MILES	0 3	0 2	0 1	0 1	0 2	
TM PURCH RD CONST	MILES	26 1	21 4	15 1	23 7	3 1	
TM PURCH RD RCONST	MILES	0	0	0	0	6 9	
AVERAGE ANNUAL BENEFITS							

RECREATION							
DEVELOPED	M \$	2303 1	2820 2	3361 9	3897 3	4408 1	
DISPERSED	M \$	4396 6	5326 5	6356 1	7203 3	8061 5	
RANGE	M \$	1546 6	1463 2	1415 9	1419 2	1413 1	
TIMBER	M \$	4772 9	3642 7	2786 7	2205 7	1699 7	
WILDLIFE (WFUDS)	M \$	4708 6	5030 8	5124 4	5210 0	5295 7	
WATER YIELD INCREASE	M \$	17 3	13 0	9 75	7 3	5 5	
MINERALS	M \$	9292 7	9292 7	9292 7	9780 0	9780 0	
AVERAGE ANNUAL COSTS							

TOTAL FOREST BUDGET	2/ M \$/YR	4832 0	4803 1	4839 7	4816 4	4828 0	
FIXED COSTS							
PROTECTION	M \$/YR	576 0	576 0	576 0	576 0	576 0	
GEN ADMIN	M \$/YR	407 0	407 0	407 0	407 0	407 0	
VARIABLE COSTS							
INVESTMENTS	3/ M \$	955 3	888 9	849 8	770 4	780 1	
TOT RDS	M \$	644 8	538 8	471 1	885 5	256 5	
APP FUND RDS	M \$	65 8	79 8	95 1	109 5	123 5	
PURCH CREDIT RDS	4/ M \$	579 0	459 0	376 0	776 0	133 0	
OPERATIONAL	M \$	2214 9	2280 4	2340 8	2382 5	2468 4	
GENERAL ADMIN	M \$	423 0	423 0	423 0	423 0	423 0	
NON-F S COSTS	M \$	2981 0	2278 0	1823 0	1918 0	1039 0	
RETURNS TO TRES	M \$	9877 7	9819 6	9778 1	10241 2	10225 3	

- 1/ BOARD FOOT/CUBIC FOOT RATIOS SAWTIMBER 5 TO 1, FUELWOOD 4 TO 1
2/ DOES NOT INCLUDE NON-F S PURCHASER CREDIT ROADS NOR HUMAN RESOURCE PROGRAMS
3/ DOES NOT INCLUDE ROAD COSTS
4/ INCLUDES F S ENGINEERING COSTS

7. Timber Departure Analysis

Objective:

The goal of the departure analysis is to maximize present net value and increase net public benefits by emphasizing a mixture of market and nonmarket opportunities in response to issues, concerns, demand, and the Forest's capabilities.

Specific objectives of the departure analysis include: examining the effects of a change in timber harvest when there is no non-declining, even flow constraint; constructing range improvements to obtain better management of livestock and to increase capacity above present but not up to currently permitted numbers; constructing developed recreation sites near local communities, managing existing sites at full service, and increasing maintenance; eliminating the soil and watershed backlog by 2020; rehabilitating orphan mines; increasing road and trail maintenance to prevent sediment production from these sources; shifting the emphasis of the wildlife program from projects to benefit big game to those that benefit fisheries and non-game animals.

Objective Function:

Maximize present net value for 20 periods.

Constraints and Assumptions:

Budget constraints were used in the first decade for all functions. The timber budget constraint is relaxed in the second decade. All other constraints were the same as alternative 11 below except for harvest flow constraints which were modified to produce a large increase in timber output for the second decade.

Aspen projected outside FORPLAN at an average annual output of 300 MBF, which approximates current and foreseeable market. Table B-21 shows the detailed list of the outputs, benefits and costs of the departure analysis.

TABLE B - 21
APPENDIX B
TIMBER DEPARTURE ANALYSIS

LTSYC SOFTWOOD 8 89 MMBF
 HARDWOOD 1 38 MMBF
 TOTAL 10 27 MMBF

AVERAGE ANNUAL OUTPUT OR ACTIVITY		1	2	3	DECADE 4	5	10	15
RECREATION								
DEV REC USE								
PURAL	MPVD	274 1	310 6	376 3	427 2	473 4		
PD NAT	MRVD	182 7	207 1	251 0	284 7	315 7		
DISP REC USE								
PURAL	MRVD	54 9	71 8	74 0	74 0	74 0		
RD NAT	MRVD	481 5	630 5	650 0	650 0	650 0		
S P MDT	MRVD	154 6	202 5	208 8	208 8	208 8		
S P N MDT	MRVD	11 9	15 6	16 1	16 1	16 1		
WILDLIFE								
STRUCT HAB IMP	STRUC	503	503	503	503	503		
NSTRUCT HAB IMP	M AC	291	390	418	390	418		
WLD & FISH USE	MWFUD	187 4	197 3	197 5	197 6	197 7		
RANGE								
GRAZING USE	M AUM	133 5	131 4	130 6	131 5	131 0		
TIMBER AVAILABLE SALE QUANTITY								
SAW T SOFTWOOD	MMCF	3 0	17 0	10 3	10 3	6 3	9 7	7 9
SAW T HARDWOOD	MMCF	54	3 35	2 01	2 00	1 20	1 87	1 52
ROUNDWOOD PRODUCTS	MCF	06	06	06	06	06	06	06
FUELWOOD	MCF	0	0	0	0	0	0	0
		2410	3200	3200	3200	3200	3397	3595
REFORESTATION								
	M AC	136	865	372	226	118	258	075
TSI								
	M AC	0	286	115	530	302	534	219
WATER								
MGT ST STANDARDS	M AC FT	611 0	611 0	611 0	611 0	611 0		
INCR OVER NAT	M AC FT	057	349	209	209	125		
PROTECTION								
FUEL BKS & TRT	ACRES	0	0	0	0	0		
MINERALS								
LEASES & PERMITS	CASES	200	200	180	180	160		
HC&D								
HUMAN RES PROG	ENRY'S	13	11	11	11	11		

LANDS							
PUR & ACQ	ACRES	110	110	0	0	0	
SOILS							
S & WAT RES IMP	AC	300	414	414	414	414	
FACILITIES							
TRAIL CONST /RECONST	MILES	2 2	2 2	2 5	2 9	3 2	
ROAD CONST /RECONST (ART & COLLECT)	MILES	0	0	0 1	0 1	0 1	
RD BETTERMENT	MILES	13 0	13 0	13 0	13 0	13 0	
LOCAL RD CONST	MILES	0	0 1	0 2	0 2	0 1	
LOCAL RD RCONST	MILES	0 3	0 2	0 1	0 1	0 2	
TM PURCH RD CONST	MILES	7 1	39 0	19 5	38 3	1 6	
TM PURCH RD RCONST	MILES	0	0	0	0	15 2	

AVERAGE ANNUAL BENEFITS

PECPEATION

DEVELOPED	M \$	1904 9	2158 8	2615 8	2968 6	3290 5	
DISPERSED	M \$	2931 1	3838 1	3956 9	3956 9	3956 9	
RANGE	M \$	1586 0	1561 0	1551 5	1562 2	1556 3	
TIMBER	M \$	1001 7	5611 6	3416 6	3558 6	2185 6	
WILDLIFE (WFUDS)	M \$	4737 1	5057 0	5139 6	5235 0	5318 7	
WATER YIELD INCREASE	M \$	3 3	20 4	12 2	12 2	7 3	
MINERALS	M \$	9292 7	9292 7	9292 7	9780 0	9780 0	

AVERAGE ANNUAL COSTS

TOTAL FOREST BUDGET	2/	M \$/YR	4766 6	6067 4	5913 8	5913 8	5161 8
FIXED COSTS							
PROTECTION		M \$/YR	576 0	576 0	576 0	576 0	576 0
GEN ADMIN		M \$/YR	407 0	407 0	407 0	407 0	407 0
VARIABLE COSTS							
INVESTMENTS	3/	M \$	856 5	1565 6	1480 4	1480 4	1286 4
TOT RDS		M \$	195 6	848 7	512 7	1343 7	224 7
APP FUND RDS		M \$	58 1	84 7	84 7	84 7	84 7
PURCH CREDIT RDS	4/	M \$	137 5	764 0	428 0	1259 0	140 0
OPERATIONAL		M \$	2352 4	2821 1	1794 7	2794 7	2334 7
GENERAL ADMIN		M \$	424 6	423 0	423 0	423 0	423 0
NON-F S COSTS		M \$	4766 6	3538 0	2245 0	3134 0	1342 0
RETURNS TO TRES		M \$	9630 1	9924 2	4802 6	10299 9	10308 7

- 1/ BOARD FOOT/CUBIC FOOT RATIOS SAWTIMBER 5 TO 1, FUELWOOD 4 TO 1
 2/ DOES NOT INCLUDE NON-F S PURCHASER CREDIT ROADS NOR HUMAN RESOURCE PROGRAMS
 3/ DOES NOT INCLUDE ROAD COSTS
 4/ INCLUDES F S ENGINEERING COSTS

10. Current Level (Alternative 8)

Objective:

The goal of current level is to maximize present net value and increase net public benefits. This would be done by providing the current level of goods and services and the most likely amount of goods and services forecast if current management direction continues. Current management direction is the existing direction in approved management plans and existing policies, standards, and guidelines. Management direction toward this goal is accomplished incrementally through the first decade.

Specific objectives of alternative 8 include: Maintaining a balanced program with the existing levels of outputs; emphasizing range management; meeting demands for developed and dispersed recreation and timber outputs; and continuing current output trends in other resource areas. Developed recreation sites would have the necessary maintenance to keep them open for both full and reduced service management. The soil and watershed backlog would be eliminated by the year 2000. Trail maintenance would be increased. Necessary trailheads would be constructed. Sawtimber would be harvested from suitable lands. Wood products (poles, firewood, and Christmas trees) could be removed from suitable and unsuitable lands.

Objective Function:

Maximize present net value for 20 periods.

Constraints and Assumptions:

The budget level necessary to maintain current outputs and projected output trends was used. Nondeclining even flow harvest constraint and ending inventory constraint were used.

Table II-10 (Alternative 8) contains a detailed list of outputs, costs and benefits for this alternative.

D. Constraint Analysis by Benchmark:

This discussion summarizes the impacts of applying the various "sets" of constraints used for each benchmark in terms of changes in PNW. Tables displaying the output results of each benchmark run are included in F below. These tables will provide the reviewer an easy comparison of the benchmarks which can then be directly related to changes in the benchmark objectives and the constraints applied to reach that objective.

The PNW figure for each benchmark in 1982 dollars discounted at 4 percent and 7.12 percent over the 200 year planning horizon are:

1. Minimum Level Benchmark - the present net value for this benchmark equals 187 million dollars at 4% and 117 million dollars at 7.1%.

2. Maximum Present Net Value (all values) Benchmark - the present net value for this benchmark equals 453 million dollars at 4% and 274 million dollars at 7.1%.
3. Maximum Present Net Value (market values) Benchmark - the present net value for this benchmark equals 340 million dollars at 4% and 215 million dollars at 7.1%.
4. Maximum Timber for the First Decade Benchmark - the present net value for this benchmark equals 417 million dollars at 4% and 258 million dollars at 7.1%.
5. Maximum Range Benchmark - the present net value for this benchmark equals 389 million dollars at 4% and 240 million dollars at 7.1%.
6. Timber Sequential Upper and Lower Bounds Benchmark - the present net value for this benchmark equals 483 million dollars at 4% and 269 million dollars at 7.1%.
7. Timber Departure Analysis Benchmark - the present net value for this benchmark equal 361 million dollars at 4% and 226 million dollars at 7.1%.
8. Current Level Benchmark - the present net value for this benchmark equals 350 million dollars at 4% and 220 million dollars at 7.1%.

The comparison above shows that unconstrained production of non-commodity output (not constrained by budget) and timber harvest patterns unfettered by strict non-declining yield can improve the net present value.

E. Comparison of PNV Market and PNV Assigned Benchmarks

The tables in F below display the output comparisons between the two PNV benchmarks.

F. Benchmark Results

The following tables display the various scheduled outputs for each benchmark as well as displaying costs, benefits, and prescription assignments:

TABLE B-22
ANNUAL TIMBER OUTPUT BY BENCHMARK LEVEL (MMBF)

Benchmark Level	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Min. Level	0.0	0.0	0.0	0.0	0.0
Current Level	3.0	3.0	3.0	3.0	3.0
Max. PNB-Assigned	7.1	7.1	7.1	7.1	7.1
Max. PNV-Market	6.1	6.1	6.1	6.1	6.1
Max. Timber	10.9	10.9	10.9	10.9	10.9
Max. Range	7.8	7.8	7.8	7.8	7.8
Seq.Upper&LowerBounds	14.5	11.0	8.3	6.3	4.8
Timber Departure	3.0	17.0	10.3	10.3	6.3

TABLE B-23
INCREASED WATER YIELD BY BENCHMARK LEVEL (M ACRE FT.)

Benchmark Level	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Min. Level	0	0	0	0	0
Current Level	.173	.173	.173	.173	.173
Max.PNB-Assigned	.143	.143	.143	.143	.143
Max.PNV-Market	.121	.121	.121	.121	.121
Max. Timber	.220	.220	.220	.220	.220
Max. Range	.157	.157	.157	.157	.157
Seq.Upper&LowerBounds	.296	.222	.167	.125	.094
Timber Departure	.057	.349	.209	.209	.125

TABLE B-24
ANNUAL RANGE OUTPUT BY BENCHMARK LEVEL (MAUM'S)

Benchmark Level	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Min. Level	0	0	0	0	0
Current Level	136.6	136.4	136.4	137.1	136.4
Max.PNB-Assigned	130.2	123.2	119.2	119.5	118.9
Max.PNV-Market	113.1	113.1	113.1	113.1	113.1
Max. Timber	126.9	118.8	113.6	113.8	113.4
Max. Range	163.0	161.7	162.3	163.5	163.6
Seq.Upper&LowerBounds	130.2	123.2	119.2	119.5	118.9
Timber Departure	133.5	131.4	130.6	131.5	131.0

TABLE B-25
ANNUAL FUELWOOD POTENTIAL BY BENCHMARK LEVEL (MCF)

Benchmark Level	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Min. Level	2312	2600	2600	2600	2600
Current Level	1970	1970	1970	1970	1970
Max. PNB-Assigned	3350	3850	3850	3850	3850
Max. PNV-Market	3350	3850	3850	3850	3850
Max. Timber	3350	3850	3850	3850	3850
Max. Range	3350	3850	3850	3850	3850
Seq. Upper&Lower Bounds	3350	3850	3850	3850	3850
Timber Departure	2410	3200	3200	3200	3200

TABLE B-26
ANNUAL DEVELOPED RECREATION BY BENCHMARK LEVEL (MRVD'S)

Benchmark Level	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Min. Level	0	0	0	0	0
Current Level	479.0	605.5	664.8	664.8	664.8
Max. PNB-Assigned	575.3	697.3	806.2	934.6	1057.1
Max. PNV-Market	500.5	606.6	701.4	813.1	919.6
Max. Timber	558.0	676.3	782.0	906.6	1025.4
Max. Range	500.5	606.6	701.4	813.1	919.6
Seq. Upper&Lower Bounds	552.3	676.3	806.2	934.6	1057.1
Timber Departure	456.8	517.7	627.3	711.9	789.1

TABLE B-27
ANNUAL DISPERSED RECREATION BY BENCHMARK LEVEL (MRVD'S)

Benchmark Level	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Min. Level	35.0	35.0	35.0	35.0	35.0
Current Level	761.4	740.8	740.9	741.0	741.1
Max.PNB-Assigned	1082.0	1311.4	1509.2	1720.4	1925.1
Max.PNV-Market	367.1	444.2	513.3	582.9	652.8
Max. Timber	1003.9	1216.9	1406.5	1591.4	1786.2
Max. Range	961.8	1165.8	1347.5	1529.5	1710.5
Seq.Upper&LowerBounds	1049.6	1271.9	1515.6	1720.3	1925.0
Timber Departure	702.9	920.4	948.9	948.9	948.9

TABLE B-28
ANNUAL WILDLIFE & FISH USE BY BENCHMARK LEVEL (MWFUD'S)

Benchmark Level	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Min. Level	14.5	14.5	14.5	14.5	14.5
Current Level	176.6	177.3	177.4	177.0	177.4
Max.PNB-Assigned	193.7	204.5	205.0	205.4	205.5
Max.PNV-Market	177.6	175.9	175.0	175.1	175.0
Max. Timber	184.5	192.2	191.4	191.4	191.3
Max. Range	179.0	186.5	186.1	184.9	184.7
SeqUpper&LowerBounds	185.4	194.5	194.1	194.3	194.3
Timber Departure	187.4	197.3	197.5	197.6	197.7

TABLE B-29
LONG TERM SUSTAINED YIELD BY BENCHMARK LEVEL

Benchmark Level	MMBF/Year
Min. Level	0.0
Current Level	9.5
Max. PNB-Assigned	8.3
Max. PNV-Market	7.2
Max. Timber	13.5
Max. Range	8.8
Seq. Upper & Lower Bounds	8.0
Timber Departure	8.9

TABLE B-30
PRESCRIPTION ASSIGNMENTS BY BENCHMARK (IN M ACRES)

Rx	BENCHMARK			
	(MIN. LVL)	MAX PNV (ALL)	MAX PNV (MARKET)	MAX TIMBER FOR 1
Min. Level	1424479	0	0	0
1. Devel. Rec.	0	1387	2314	1458
2. Mot. Rec.	0	47230	43744	43753
3. Mon-Mot. Rec.	0	212523	541424	111869
4. Wildlife	0	86849	58093	119911
5. Big Game Winter Range	0	161110	44432	97894
6. Range	0	655318	564680	765089
7. Timber	0	143499	157684	175525
9. Watershed	0	114184	10890	106601
10A Research. Nat. Area	0	1200	1200	1200
10E. Municipal Watershed	0	1179	18	1179
TOTAL ACRES	1424479	1424479	1424479	1424479

TABLE B-30 (CONTINUED)
 PRESCRIPTION ASSIGNMENTS BY BENCHMARK (IN M ACRES)

Rx	BENCHMARK			
	MAX RANGE	SEQUENTIAL BOUNDS	TIMBER DEPARTURE	CURRENT PROGRAM
MIN LEVEL	0	0	0	0
1. Devel. Rec.	261	1387	299	1110
2. Mot. Rec.	29886	47265	34223	42927
3. Non-Mot. Rec.	84660	189802	117377	129520
4. Wildlife	13433	86830	358583	194480
5. Big Game Winter Range	6942	164765	67106	146831
6. Range	1228711	655314	646541	674041
7. Timber	52676	162553	57758	144342
9. Watershed	6534	114184	135361	87655
10A. Res. Nat. Area	1200	1200	4797	1200
10E. Municipal Watershed	176	1179	1179	2373
<u>TOTAL ACRES</u>	1424479	1424479	1424479	1424479

G. Incremental Benchmark Results:

The following Table displays the various scheduled outputs for each benchmark as an incremental change from the first decade of the no action alternative (alternative 8). Costs and benefits are also shown.

TABLE B - 31
 CHANGES IN RESOURCE OUTPUTS, ACTIVITIES, COSTS, AND BENEFITS FROM CURRENT DIRECTION

		BENCHMARK							
		CUR	MIN	PNB	PNV	TIMBER	SEQUENTIAL		TIMBER
UNITS	DIR	DIR	LVL	ALL	MARKET	FOR	RANGE	LOWER AND	DEPARTURE
				VALUES	VALUES	1 B. M.		UPPER BOUNDS	ANALYSIS
OUTPUT/ACTIVITY									
RECREATION									
DEV. REC USE									
PURAL									
	MRVD								
DECADE	1	287 4	-287 4	57.8	12 9	47.4	12 9	44 0	-13 3
	2		-287.4	131 0	76 6	118 4	76 6	118 4	23 2
	3		-287 4	196 3	133 4	181 8	133 4	196 3	88 9
	4		-287 4	273.4	200 5	256 6	200 5	273 4	139 8
	5		-287 4	346 9	264.4	327 9	264 4	346 9	186 0
RD NAT									
	MRVD								
DECADE	1	191 6	-191 6	38 5	8 6	31 6	8 6	29 3	-8 9
	2		-191 6	87.3	51.0	78 9	51 0	78 9	15 5
	3		-191 6	130 9	89 0	121 2	89 0	130 9	59 4
	4		-191 6	182 2	133 6	171 0	133 6	182 2	93 1
	5		-191 6	231 2	176 2	218 8	176 2	231 2	124 1
DISP REC USE									
RURAL									
	MRVD								
DECADE	1	59 4	-59 3	24.8	-31.6	18 9	15 5	22 3	-4 5
	2		-59 3	42 7	-25.7	35.6	31 5	39 6	12 4
	3		-59 3	58 6	-20 5	50 3	45 6	58 6	14 6
	4		-59 3	74 5	-15 2	65 1	59 8	74 5	14 6
	5		-59 3	90 5	-9 9	80 0	74 0	90 5	14 6
RD NAT									
	MRVD								
DECADE	1	521 3	-511 1	0	-277 3	166 2	136 7	195 8	-39 8
	2		-511 1	0	-225.6	312.0	276 1	347 8	109 2
	3		-511 1	0	-179 5	442 0	400 6	514 5	128 7
	4		-511 1	654 3	-133 4	572 0	525 0	654 3	128 7
	5		-511 1	794.1	-87 2	702 0	649 4	794 1	128 7
S P MOT									
	MRVD								
DECADE	1	167 4	-146 7	69 9	-89.1	53 3	43 8	62 8	-12 8
	2		-146 7	120 3	-72.5	100 2	88 7	111 7	35 1
	3		-146 7	155 1	-57 7	141 8	128 5	165 1	41 4
	4		-146 7	210.0	-42 9	183 6	168 5	210 0	41 4
	5		-146 7	254 9	-28 0	225 3	207 6	254 9	41 4
S P. N MOT									
	MRVD								
DECADE	1	13 3	-9 3	7 9	3 7	4 1	4 4	7 3	-1 4
	2		-9.3	12 3	6.6	7 7	8 1	11 4	2 3
	3		-9.3	19 6	9 6	11 0	11 4	16.0	2 8
	4		-9 3	20 2	13 0	14 3	14 8	20 1	2 8
	5		-9 3	24 2	16 5	17.5	18 1	24.1	2 8

TABLE B - 31 CONTINUED
 CHANGES IN RESOURCE OUTPUTS, ACTIVITIES, COSTS, AND BENEFITS FROM CURRENT DIRECTION

WILDLIFE											
STRUCT	HAB	IMP	STRUCT								
DECADE	1			10 0	-10 0	384.0	20 0	347 0	330 0	395 0	493 0
	2				-10 0	384 0	45.0	347 0	330 0	395 0	493 0
	3				-10 0	384 0	45.0	347 0	330.0	395 0	493 0
	4				-10 0	384 0	45 0	347 0	330 0	395 0	493 0
	5				-10 0	384 0	45 0	347 0	330 0	395 0	493 0
NSTRUCT	HAB	IMP.	M AC								
DECADE	1			0	0	0 026	0.013	0 025	2 11	0 026	0 271
	2				0	0	0	0	0 58	0	0 390
	3				0	0	0	0	1 97	0	0 418
	4				0	0	0	0	0 58	0	0 390
	5				0	0	0	0	1 97	0	0 418
WLD & FISH USE			MWFUD								
DECADE	1			176 6	-162 1	17 1	1 0	7 9	2 4	8 8	10 8
	2				-162 1	27 9	-0 7	15 6	9 9	17 9	20 7
	3				-162 1	28 4	-1 6	14 8	9 5	17 5	20 9
	4				-162 1	28 8	-1 5	14 8	8 3	17 7	21 0
	5				-162 1	28 9	-1.6	14 7	8 1	17 7	21 1
RANGE											
GRAZING USE			M AUM								
DECADE	1			136 6	-136 6	-6 4	-23 5	-9 7	26 4	-6 4	-3 1
	2				-136.6	-13 4	-23 5	-17 8	25 1	-13 4	-5 2
	3				-136 6	-17 4	-23 5	-23 0	25 7	-17 4	-6 0
	4				-136 6	-17 1	-23 5	-22 8	26 9	-17 1	-5 1
	5				-136 6	-17 7	-23 5	-23 2	27 0	-17 7	-5 6
TIMBER SALES OFFERED MMBF											
DECADE	1			3 0	-3 0	4.1	3 1	7 9	4 8	11 5	0
	2				-3 0	4 1	3 1	7 9	4 8	8 0	14 0
	3				-3 0	4 1	3 1	7 9	4 8	5 3	7 3
	4				-3 0	4 1	3 1	7 9	4 8	3 3	7 3
	5				-3 0	4 1	3 1	7 9	4 8	1 8	3.3
	10				-3 0	4 1	3 1	7 9	5 6	1 8	6 7
	15				-3 0	5 6	3 1	7 9	6 1	11 1	4 9
SAW T SOFTWOOD			MMCF								
DECADE	1			0 54	-0 54	0 83	0 62	1 574	0 97	2 30	0
	2				-0 54	0.83	0 62	1 574	0 97	1 59	2 81
	3				-0 54	0.83	0 62	1 574	0 97	1 06	1 47
	4				-0 54	0 83	0 62	1 574	0 97	0 66	1 46
	5				-0 54	0 83	0 62	1 574	0 97	0 36	1 46
	10				-0 54	0 83	0 62	1 574	1 13	0 36	1 33
	15				-0 54	1 12	0 62	1 574	1 21	2 22	0.98

TABLE B - 31 CONTINUED
 CHANGES IN RESOURCE OUTPUTS, ACTIVITIES, COSTS, AND BENEFITS FROM CURRENT DIRECTION

SAW. T HARDWOOD		MMCF							
DECADE	1	0.06	-0.06	0	0	0	0	0	0
	2		-0.06	0	0	0	0	0	0
	3		-0.06	0	0	0	0	0	0
	4		-0.06	0	0	0	0	0	0
	5		-0.06	0	0	0	0	0	0
	10		-0.06	0	0	0	0	0	0
	15		-0.06	0	0	0	0	0	0
ROUNDWOOD PRODUCTS		MCF							
DECADE	1	0	0	0	0	0	0	0	0
	2		0	0	0	0	0	0	0
	3		0	0	0	0	0	0	0
	4		0	0	0	0	0	0	0
	5		0	0	0	0	0	0	0
	10		0	0	0	0	0	0	0
	15		0	0	0	0	0	0	0
FUELWOOD		MCF							
DECADE	1	1970	342	0	1380	1380	1380	1380	1380
	2		342	0	1880	1880	1880	1880	1880
	3		342	0	1880	1880	1880	1880	1880
	4		342	0	1880	1880	1880	1880	1880
	5		342	0	1880	1880	1880	1880	1880
	10		342	0	2005	2005	2005	2005	2005
	15		342	0	2130	2130	2130	2130	2130
REFORESTATION		M AC							
DECADE	1	0.182	-0.182	0.424	0.269	0.664	0.335	0.699	-0.046
	2		-0.182	0.135	0.251	0.626	0.094	0.518	0.683
	3		-0.182	0.096	-0.006	0.236	0.129	0.107	0.190
	4		-0.182	-0.027	-0.011	0.209	0.034	0.003	0.044
	5		-0.182	0.094	0.054	0.274	0.054	-0.059	-0.064
	10		-0.182	0.080	-0.015	0.081	0.092	-0.077	0.076
	15		-0.182	-0.055	-0.124	0.040	-0.034	-0.132	-0.087
TSI		M AC							
DECADE	1	0.005	-0.005	-0.005	0.010	0.242	-0.005	-0.005	-0.005
	2		-0.005	0.435	-0.005	0.635	0.328	0.126	0.281
	3		-0.005	0.179	0.127	0.279	0.328	0.108	0.110
	4		-0.005	0.322	0.055	0.393	0.552	0.305	0.525
	5		-0.005	0.635	-0.005	0.371	0.350	0.146	0.297
	10		-0.005	0.325	0.055	0.357	0.556	0.309	0.529
	15		-0.005	0.215	0.055	0.284	0.439	0.145	0.214

TABLE B - 31 CONTINUED
 CHANGES IN RESOURCE OUTPUTS BY ACTIVITIES, COSTS, AND BENEFITS FROM CURRENT DIRECTION

WATER																		
MGT	ST	STANDARDS	M	AC	FT													
	DECADE	1	611	0	0	0	0	0	0	0								
		2		0	0	0	0	0	0	0								
		3		0	0	0	0	0	0	0								
		4		0	0	0	0	0	0	0								
		5		0	0	0	0	0	0	0								
INCR	OVER	NAT	M	AC	FT													
	DECADE	1	0	173	-0	173	-0	030	-0	052	0	047	-0	016	0	123	-0	116
		2		-0	173	-0	030	-0	052	0	047	-0	016	0	049	0	176	
		3		-0	173	-0	030	-0	052	0	047	-0	016	-0	006	0	036	
		4		-0	173	-0	030	-0	052	0	047	-0	016	-0	048	0	036	
		5		-0	173	-0	030	-0	052	0	047	-0	016	-0	079	-0	048	
PROTECTION																		
FUEL	BKS	& TRT	ACRES															
	DECADE	1	100	-100	0	160	160	0	0	-100								
		2		-100	-100	160	160	0	-100	-100								
		3		-100	-100	160	160	0	-100	-100								
		4		-100	-100	160	160	0	-100	-100								
		5		-100	-100	160	160	0	-100	-100								
MINERALS																		
LEASES	& PERMITS	CASES																
	DECADE	1	200	0	0	0	0	0	0	0								
		2		0	0	0	0	0	0	0								
		3		0	-20	-20	-20	-20	-20	-20								
		4		0	-20	-20	-20	-20	-20	-20								
		5		0	-40	-40	-40	-40	-40	-40								
HC&D																		
HUMAN	RES	PRDG	ENRY'S															
	DECADE	1	13	-13	0	0	0	0	0	0								
		2		-13	-2	-2	-2	-2	-2	-2								
		3		-13	-2	-2	-2	-2	-2	-2								
		4		-13	-2	-2	-2	-2	-2	-2								
		5		-13	-2	-2	-2	-2	-2	-2								
LANDS																		
PUR	& ACQ.	ACRES																
	DECADE	1	0	0	110	110	110	110	110	110								
		2		0	110	110	110	110	110	110								
		3		0	0	0	0	0	0	0								
		4		0	0	0	0	0	0	0								
		5		0	0	0	0	0	0	0								

TABLE B - 31 CONTINUED
 CHANGES IN RESOURCE OUTPUTS, ACTIVITIES, COSTS, AND BENEFITS FROM CURRENT DIRECTION

SOILS										
S & WAT RES	IMP	AC								
DECADE 1			260	-260	-199	-260	-141	-101	-184	40
2				-260	-123	-260	-21	58	-109	154
3				-260	-123	-260	-21	58	-109	154
4				-260	-123	-260	-21	58	-109	154
5				-260	-123	-260	-21	58	-109	154
FACILITIES										
TRAIL CONST /RECON		MILES								
DECADE 1			3 8	-3 8	-1 6	-3.1	-1 8	-1 9	-1 8	-1 6
2				-3 8	-1 3	-3 0	-1 6	-1 7	-1 6	-1 6
3				-3 8	-1 0	-2 9	-1 4	-1 5	-1 2	-1 3
4				-3 8	-0 6	-2 8	-1 1	-1 3	-0 8	-0 9
5				-3 8	-0 3	-2 6	-1 0	-1 1	-0 4	-0 6
ROAD CONST /RECON		MILES								
(ART & COLLECT)										
DECADE 1			0	0	0	0	0 1	0	0	0
2				0	0	0	0 1	0	0	0
3				0	0 1	0	0 1	0 1	0 1	0 1
4				0	0 1	0 1	0 1	0 1	0 1	0 1
5				0	0 1	0 1	0 1	0 1	0 1	0 1
RD BETTERMENT		MILES								
DECADE 1			13 0	-13 0	0	0	0	0	0	0
2				-13 0	0	0	0	0	0	0
3				-13 0	0	0	0	0	0	0
4				-13 0	0	0	0	0	0	0
5				-13 0	0	0	0	0	0	0
LOCAL RD. CONST		MILES								
DECADE 1			0	0	0	0	0	0	0	0
2				0	0 1	0 1	0 1	0 1	0 1	0 1
3				0	0 2	0 1	0 2	0 2	0 2	0 2
4				0	0 2	0 2	0 2	0 2	0 2	0 2
5				0	0 1	0 2	0 1	0 1	0 1	0 1
LOCAL RD RECONST		MILES								
DECADE 1			0 1	-0 1	0 2	0 1	0 1	0 1	0 2	0 2
2				-0 1	0 1	0	0	0 1	0 1	0 1
3				-0 1	0	0 1	0	0	0	0
4				-0 1	0	0	0	0	0	0
5				-0 1	0 1	0	0 1	0 1	0 1	0 1
TM PURCH RD CONST		MILES								
DECADE 1			15 1	-15 1	-1 1	-3 1	14 7	-1 2	11 0	-8 0
2				-15 1	-1 1	-3 2	4 6	8 6	6 3	23 9
3				-15 1	-2 1	-4 3	20 1	7 9	0	4 4
4				-15 1	-6 1	-7 4	1 5	23 4	8 6	23 2
5				-15 1	-6 1	-6 3	4.2	-10 1	-12 0	-13 5

TABLE B - 31 CONTINUED
 CHANGES IN RESOURCE OUTPUTS, ACTIVITIES, COSTS, AND BENEFITS FROM CURRENT DIRECTION

TM PURCH	RD.	RECON	MILES								
DECADE	1			0	0	0	0	0	0	0	0
	2			0	0	0	0	0	0	0	0
	3			0	0	0	0	0	0	0	0
	4			0	2 0	0 8	13 5	0	0	0	0
	5			0	2 0	0	4. 1	18 3	6 9	15 2	
BENEFITS M \$											
RECREATION DEVELOPED											
DECADE	1	1997 4-	1997 4	401. 6	89. 7	329 5	89 7	305 7	-92 5		
	2	-1997 4	910 3	532 1	822 8	532 1	822 8	161 4			
	3	-1997 4	1364 4	927 4	1263 5	927 4	1364 5	618 4			
	4	-1997 4	1899 9	1393 5	1783 1	1393 2	1899 9	971 2			
	5	-1997 4	2410 7	1837 3	2278 5	1837 3	2410 7	1293 1			
DISPERSED											
DECADE	1	3178 1	3134 3	1353 6	-1570 9	1010 8	842 4	1218 5	-247 0		
	2		3134 3	2312 9	-1238 2	1898 9	1694 4	2148 4	660 0		
	3		3134 3	3168 6	-936 5	2690 5	2454 2	3178 0	778 8		
	4		3134 3	4026 0	-630 9	3482 8	3215 2	4025 2	778 8		
	5		3134 3	4884 3	-323 2	4274 8	3975 4	4883 4	778 8		
RANGE											
DECADE	1	1662 8-	1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	
	2	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	
	3	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	
	4	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	
	5	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	-1662 8	
TIMBER											
DECADE	1	967 3	-870 9	1397 6	1073 6	2679 5	1627 6	3805 6	34 4		
	2		-956 5	1419 4	1067 4	2630 4	1711 4	2675 4	4644 3		
	3		-956 5	1461 4	1106 4	2691 4	1717 4	1819 4	2449 3		
	4		-956 5	1539 4	1177 4	2814 4	1777 4	1238 4	2591 3		
	5		-956 5	1539 4	1177 4	2810 4	1777 4	732 4	1218 3		
WILDLIFE (WFUDS)											
DECADE	1	4339 2-	3900 5	464 4	-106 1	331 0	203 0	369 4	397 9		
	2	-3900 5	839 0	-113 2	615 1	454 5	691 6	717 8			
	3	-3900 5	943 3	-104 3	677 4	520 8	785 2	800 4			
	4	-3900 5	1036 1	-75 8	756 5	567 5	870 8	895 8			
	5	-3900 5	1124 2	-50 1	835 3	636 6	956 5	979 5			
WATER YIELD											
DECADE	1	3 7	-3 7	-0 7	-1 1	1 0	-0 4	2 6	-2 5		
	2		-3 7	-0 7	-1 1	1 0	-0 4	1 0	3 7		
	3		-3 7	-0 7	-1 1	1 0	-0 4	-0 2	0 7		
	4		-3 7	-0 7	-1 1	1 0	-0 4	-1 0	0 7		
	5		-3 7	-0 7	-1 1	1 0	-0 4	-1 7	-1 0		

TABLE B - 31 CONTINUED
 CHANGES IN RESOURCE OUTPUTS, ACTIVITIES, COSTS, AND BENEFITS FROM CURRENT DIRECTION

MINERALS									
	M \$								
DECADE 1	9292 7	0	0	0	0	0	0	0	0
2		0	0	0	0	0	0	0	0
3		0	0	0	0	0	0	0	0
4		0	487 3	487 3	487 3	487 3	487 3	487 3	487 3
5		0	487 3	487 3	487 3	487 3	487 3	487 3	487 3
COST M \$									

TOTAL FOREST BUDGET M \$/YR									
DECADE 1	4583 1	-3600 1	-295 7	-823 9	-86 0	1759 2	248 9	183 5	
2		-3600 1	-226 1	-746 2	114 0	669 7	220 0	1484 3	
3		-3600 1	-116 8	-665 9	211 2	1336 7	256 6	1330 7	
4		-3600 1	109 9	-584 8	320 8	1342 7	233 3	1330 7	
5		-3600 1	108 5	-521 0	426 5	1110 5	244 9	578 7	
FIXED COSTS									
PROTECTION M \$/YR									
DECADE 1	576 0	0	0	0	0	0	0	0	
2		0	0	0	0	0	0	0	
3		0	0	0	0	0	0	0	
4		0	0	0	0	0	0	0	
5		0	0	0	0	0	0	0	
GEN ADMIN M \$/YR									
DECADE 1	407 0	0	0	0	0	0	0	0	
2		0	0	0	0	0	0	0	
3		0	0	0	0	0	0	0	
4		0	0	0	0	0	0	0	
5		0	0	0	0	0	0	0	
VARIABLE COSTS									
INVESTMENTS M \$									
DECADE 1	852 4	-852 4	-160 1	-430 5	-65 1	1647 6	102 9	4 1	
2		-852 4	-215 6	-440 7	39 2	477 9	36 5	713 2	
3		-852 4	-189 2	-427 1	57 5	1072 3	-2 6	628 0	
4		-852 4	-655 6	-395 9	78 2	997 2	-82 0	628 0	
5		-852 4	-146 9	-404 7	98 2	687 4	-72 3	434 0	
TOTAL RDS M \$									
DECADE 1	150 8	-150 8	258 8	201 7	481 2	262 6	494 0	44 8	
2		-150 8	268 5	305 8	1074 2	422 9	388 0	697 9	
3		-150 8	252 3	196 8	640 2	441 5	320 3	361 9	
4		-150 8	257 7	256 0	572 9	1205 1	734 7	1192 9	
5		-150 8	328 7	185 5	675 4	257 4	105 7	73 9	
APP FUND RDS M \$									
DECADE 1	32 0	-32 0	40 6	15 5	33 0	27 5	33 8	26 1	
2		-32 0	50 3	25 6	46 7	39 7	47 8	52 7	
3		-32 0	63 1	34 6	59 0	51 3	63 1	52 7	
4		-32 0	77 5	40 8	72 9	63 9	77 5	52 7	
5		-32 0	91 5	50 3	86 2	76 2	91 5	52 7	

TABLE B - 31 CONTINUED
 CHANGES IN RESOURCE OUTPUTS, ACTIVITIES, COSTS, AND BENEFITS FROM CURRENT DIRECTION

PURCH CREDIT. RDS M \$								
DECADE 1	118 5	-118 5	218 5	186 5	448. 5	235 5	460 5	19 0
2		-118 5	218 5	280 5	1028 5	383 5	340 5	645 5
3		-118 5	189. 5	162 5	581. 5	390 5	257 5	309 5
4		-118 5	252 5	215 5	500 5	1141 5	657 5	1140 5
5		-118 5	237 5	135 5	-10 5	181 5	14 5	21 5
OPERATIONAL M \$								
DECADE 1	2252. 1	-2252 1	-262. 6	-495 3	-245 3	-23 3	-37 2	100 3
2		-2252 1	-147 2	-417 5	-121 3	44 7	28 3	569 0
3		-2252 1	-77 1	-359 8	-54 7	105 7	88 7	-457 4
4		-2252 1	1001 6	-316 1	20 3	174 2	130 4	542 6
5		-2252 1	77 5	-250 0	92 7	239 5	216 3	82 6
GENERAL ADMIN M \$								
DECADE 1	424 6	-424 6	-1 6	-1. 6	-1 6	-1 6	-1 6	-1 6
2		-424 6	-1 6	-1. 6	-1 6	-1 6	-1 6	-1 6
3		-424 6	-1 6	-1. 6	-1 6	-1 6	-1 6	-1 6
4		-424 6	-1 6	-1 6	-1 6	-1. 6	-1 6	-1 6
5		-424 6	-1 6	-1. 6	-1 6	-1. 6	-1 6	-1 6
NON-F S COSTS M \$								
DECADE 1	4583 1	-4583 1	-3145 1	-3364. 1	-2311 1	-3002 1	-1602 1	183 5
2		-4583 1	-3151 1	-3374 1	-1968 1	-2996 1	-2305 1	-1045 1
3		-4583 1	-3102 1	-3332 1	-1224. 1	-2873 1	-2760 1	-2338 1
4		-4583 1	-2495 1	-2922 1	-1239 1	-1952 1	-2665 1	-1449 1
5		-4583 1	-3121 1	-3329 1	-2119 1	-2918 1	-3544 1	-3241 1
RETURNS TO TREAS M \$								
DECADE 1	9631 5	-315 7	101 9	54. 9	171 0	139. 8	246 2	-1 4
2		-312 8	114 6	72 6	182 1	156 2	188 1	292 7
3		-312 8	123 6	84. 0	189 5	168 2	146 6	-4828 9
4		174. 5	626 7	584 7	682 0	670 1	609 7	668 4
5		174 5	640 8	597 5	705 8	683 0	593 8	677 2

VII. FORMULATION OF ALTERNATIVES

A. Introduction

A Forest Plan alternative can be defined as the mix of management activities and practices (prescriptions) needed to achieve a given set of management goals and objectives. It is specific as to amounts, time scheduling, and location within the limits of non-contiguous analysis areas.

As defined in 36 CFR 219.12 f, alternatives:

- Shall be within the land capability of the Forest to produce.
- Shall be formulated to facilitate the analysis of trade-offs in resource use, opportunity costs, and environmental effects between alternatives.
- Shall be formulated to facilitate the evaluation of the effects on benefits, costs and present net value.
- Shall provide a variety of responses to issues and concerns.
- Shall represent the most cost efficient combination of management prescriptions to meet the specific alternative's objectives.
- Shall state the condition, uses, goods and services produced, timing and flow of outputs, and associated costs and benefits.
- Shall state the alternative objective and the standards and guidelines proposed.
- At least one alternative shall reflect the current level of goods and services produced by the unit as projected over time. This alternative shall be considered the "No Action" Alternative pursuant to NEPA procedures.

The Fishlake Forest has supplemented the above direction by the addition of several alternative development criteria. These are:

To be viable, an alternative:

- Should meet budget limitations specified in the R-4 LMP Checklist dated 2/13/84, unless it is a departure.
- Must not violate water quality standards.

B. Constraints

The common constraints for all alternatives are the same as those outlined in section IV-B above, that is the application of treatment limits to meet MMRs.

Other constraints used for single alternatives are listed under the discussion for that alternative.

C. Alternatives

1. Alternative 1 (Fiscal Year 1982 Budget and Current Direction)

Objective: The goal of alternative 1 is to maximize present net value and increase net public benefits by providing the most likely amount of goods and services if the fiscal year 1982 budget level were continued into the future. Current management direction is the existing direction in approved management plans and existing policies, standards, and guidelines.

Specific objectives of alternative 1 include: maintaining a balanced program with moderate levels of outputs; emphasizing range management on acres suitable for livestock grazing while working toward fair to good range conditions; meeting the demand for dispersed recreation and timber outputs; continuing current output trends in other resources. A combination of full and reduced service management will be continued in developed recreation sites, with some sites closed if they fail to meet health standards. Sawtimber would be harvested from suitable land, but wood products (poles, firewood, and Christmas trees) would be allowed to come from both suitable and unsuitable land.

Objective Function: Maximize present net value for 20 decades.

Assumptions and Constraints: Non-declining harvest flow and ending inventory constraint were applied. The RARE II proposed wilderness assigned a non development type of prescription. A 3,000 MMBF timber flow was maintained. Budget was held at current level. Range structural and nonstructural investment was maintained at \$80,000 a year. Fisheries investments were limited to \$8,700 a year. Soil and water investments were limited to \$43,000.

Table II-3 shows the detailed list of the outputs, benefits, and costs of this alternative.

2. Alternative 2 (Market Opportunities)

Objectives: The goal of alternative 2 is to maximize present net value and increase net public benefits by emphasizing opportunities to increase timber, range, minerals and other outputs that have the potential to produce an income to the government. Management for other resources would be at levels economically and environmentally feasible, consistent with emphasis on market-oriented outputs.

Specific objectives of alternative 2 include meeting the demand projections for market-oriented outputs and maintaining current output levels of other resources. Range management would be emphasized on areas suitable for grazing, and the necessary range improvements would be constructed to permit a slight increase in obligated numbers and to achieve fair to good range conditions. Most developed recreation sites would have full service management. Increased maintenance at existing sites and construction of new sites at places such as Johnson Valley Reservoir, Gooseberry Reservoir, Oak Creek, Little Reservoir, and Manning Meadow would allow the Forest to meet anticipated

demands. Dispersed recreation would mainly be in roaded natural and semi-primitive motorized classes along with an increase in the semi-primitive non-motorized class. The road and trail system would be fully developed to meet the needs of resource management. Sawtimber would be harvested from suitable land, but wood products (poles, firewood, and Christmas trees) would be allowed to come from both suitable and unsuitable land.

Objective Function: Maximize PNV for 20 decades.

Assumptions and Constraints: Non-declining harvest flow and ending inventory constraint were applied. About 321,000 acres were assigned a non-development type of prescription. Budget was held at 50 % over "current" budget in first decade. Timber production was at 5 MMBF or greater. Range structural and nonstructural improvement was sustained at \$320,000 a year. Fisheries investment limited to \$8,700 the first decade, \$27,000 the second decade. Soil and water improvement investment limited to \$21,000 a year.

Table II-4 shows the detailed list of the outputs, benefits, and costs of this alternative.

3. Alternative 3 (Ten Percent Reduced Budget)

Objectives: The goal of alternative 3 is to maximize present net value and increase net public benefits. This will be done by emphasizing opportunities for timber, range, minerals, and other outputs that have the potential to produce an income to the government at a budget level that is reduced ten % below the fiscal year 1982 level.

Specific objectives of alternative 3 include maintaining range outputs close to current outputs and budget constraints, maintaining current levels of timber outputs, and reducing expenditures and outputs in nonmarket resources. A reduced level of management is planned for developed and dispersed recreation, with some developed sites closed. Sawtimber would be harvested from suitable land, but wood products (poles, firewood, and Christmas trees) would be allowed to come from both suitable and unsuitable land.

Objective Function: Maximize PNV for 20 decades.

Assumptions and Constraints: Non-declining harvest flow and ending inventory constraints were applied. About 168,000 acres were assigned a non-development type of prescription. Budget was ten % below current level. Timber harvest level was 3,000 MMBF. Range structural and non-structural improvements of \$200,000 a year were sustained. No new fisheries or soil and water investments were allowed due to emphasis on market outputs in a reduced budget.

Table II-5 shows a detailed list of the outputs, benefits, and costs of this alternative.

4. Alternative 4 (Nonmarket Opportunities)

Objectives: The goal of alternative 4 is to maximize present net value and increase net public benefits by emphasizing opportunities to improve water quality, fish and wildlife habitat, dispersed recreation, and other amenity values. Management of other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

Specific objectives of alternative 4 include closing and obliterating selected roads. At the end of the 50 year planning period, 20% of the Forest would be in the primitive and semi-primitive nonmotorized recreation opportunity classes. Existing developed recreation sites would be maintained at both full and reduced service levels. More dispersed recreation would be provided. Grazing will be at reduced levels. Fuelwood will be provided from range improvement projects, commercial timber sales, and timber stand improvement projects. Fisheries and water quality will be enhanced by improving watershed conditions and lessening impacts on riparian areas.

Objective Function: Maximize PNV for 20 decades.

Assumptions and Constraints: Non-declining even flow harvest constraint and ending inventory constraint were applied. About 527,000 acres were assigned a non-development type of prescription. Budget was held at 50% over current in first decade. Timber production was maintained at 3.0 MMBF or more. Range structural and nonstructural budget was held at \$230,000. Fisheries investments are sustained at \$210,000-\$220,000 a year. Watershed improvements are sustained at \$260,000 to \$350,000 a year.

Table II-6 shows a detailed list of the outputs, costs, and benefits of this alternative.

5. Alternative 5 (1980 RPA Program)

Objectives: The goal of alternative 5 is to maximize present net value and increase net public benefits by meeting Resource Planning Act (RPA) objectives assigned Fishlake National Forest through the draft Regional guide. This alternative is highly responsive to all 1980 assigned targets except range. Specific objectives of this alternative are to attain all 1980 RPA targets in the most cost efficient manner. Timber, range and minerals management are high emphasis outputs in this alternative. Targets for improved watershed condition and developed recreation do not appear to meet anticipated needs. Sawtimber would be harvested from suitable land, but wood products (poles, firewood, and Christmas trees) would be allowed to come from both suitable and unsuitable land.

Objective Function: Maximize PNV for 20 decades.

Assumptions and Constraints: Non-declining harvest flow and ending inventory constraint were applied. The RARE II proposed wilderness was assigned a non-development type of prescription. Budget was held

at 1980 RPA level. Specific timber and range targets were used as constraints. Fisheries investment was sustained at \$220,000 to \$268,000. Soil and water investment was held at \$220,000 to \$350,000 a year.

Table II-7 shows a detailed list of the outputs, benefits, and costs of this alternative.

6. Alternative 6 (Emphasis of Local Issues and Concerns)

Objectives: The goal of alternative 6 is to maximize present net value and increase net public benefits by emphasizing a mixture of market and nonmarket outputs in response to local issues. The social and economic condition of Sevier Social Resource Unit has shown a slight shift away from an agricultural base toward a service and industrial base over the past decade. This has brought new demands for amenity outputs, while the demand for market outputs has remained strong. This alternative strives to meet these demands within the Forest's capability.

Specific objectives for alternative 6 include: maintaining timber outputs at about current levels; maintaining range outputs at near current levels while constructing range improvements to restore range conditions; constructing developed recreation sites near local communities; managing existing developed recreation sites at full service while increasing maintenance so they can remain open; eliminating the soil and watershed backlog by the year 2000; rehabilitating orphan mines; increasing road and trail maintenance to prevent sediment production from these sources. Sawtimber would be harvested from suitable land, but wood products (poles, firewood, and Christmas trees) would be allowed to come from both suitable and unsuitable land.

Objective Function: Maximize PNV for 20 decades.

Assumptions and Constraints: Non-declining even flow harvest constraint and ending inventory constraint were applied. No non-development type prescriptions were required. Budget was held at 50% over current in the first decade. Timber production was maintained at 3.0 million board feet. Range structural and nonstructural investment was held at \$220,000 a year. Fisheries investment was held at \$101,000 to \$230,000. Soil and water improvement was maintained at \$250,000 to \$320,000 a year.

Table II-8 shows a detailed list of the outputs, benefits and costs of this alternative.

7. Alternative 7 (Twenty-five Percent Reduced Budget)

Objectives: The goal of alternative 7 is to maximize present net value and increase net public benefits. This would be done by emphasizing opportunities for timber, range, minerals, and other outputs that have the potential to produce an income to the government at a budget level reduced 25% below the fiscal year 1982 level.

Specific objectives for alternative 7 include: timber outputs of half a million board feet; only range betterment funds used for range improvement projects; reduced service level of management for developed and dispersed recreation; and reduced expenditures and outputs in nonmarket output resources. Developed recreation sites will be closed when they fail to meet health standards. Sawtimber would be harvested from suitable land, but wood products (poles, firewood, and Christmas trees) would be allowed to come from both suitable and unsuitable land.

Objective Function: Maximize PNV for 20 decades.

Assumptions and Constraints: Non-declining evenflow harvest constraint and ending inventory constraint were applied. About 735,000 acres were assigned a non-development type of prescription. Budget was held at 25% below current budget for all decades. Budget restricted timber harvest was held at 0.5 MMBF. Range structural and nonstructural budget was limited to \$80,000 a year. Fisheries investment was limited to \$7,600 a year. There was no soil and water investment.

Table II-9 shows a detailed list of the outputs, benefits, and cost of this alternative.

8. Alternative 8 (Current Program-No Action)

Objectives: The goal of alternative 8 is to maximize present net value and increase net public benefits. This would be done by providing the current level of goods and services and the most likely amount of goods and services forecast if current management direction continues. Current management direction is the existing direction in approved management plans and existing policies, standards, and guidelines. Management direction toward this goal is accomplished incrementally through the first decade, regulated by the budget constraint of slightly less than a 10% per year increase above fiscal 1982 level.

Specific objectives of alternative 8 include: maintaining a balanced program with the existing levels of outputs; emphasizing range management; meeting demands for developed and dispersed recreation and timber outputs; and continuing current output trends in other resource areas. Developed recreation sites would have the necessary maintenance to keep them open for both full and reduced service management. The soil and watershed backlog would be eliminated by the year 2000. Trail maintenance would be increased, and necessary trailheads would be constructed. Sawtimber would be harvested from suitable land, but wood products (poles, firewood, and Christmas trees) would be allowed to come from both suitable and unsuitable land.

Objective Function: Maximize PNV for 20 decades.

Assumptions and Constraints: Non-declining even flow harvest constraint and ending inventory constraint were applied. The RARE II proposed wilderness was assigned a non-development type of prescription. Current levels of timber and range were applied as a constraint. The budget was allowed to float to meet specific objectives. Fisheries investment was limited to \$8,000 a year. Soil and water investments were maintained at \$220,000 to \$440,000 a year.

Table II-10 shows a detailed list of the outputs, benefits, and costs of this alternative.

9. Alternative 9 (Revised Mix)

Objectives: The goal of alternative 9 is to maximize present net value and increase net public benefits by emphasizing a mixture of market and nonmarket opportunities in response to issues, concerns, demand and the Forest's capabilities. The more favorable aspects of alternatives 4, 6 and 8 were used in its construction.

Specific objectives of alternative 9 include: maintaining timber harvest at a level to meet projected demand; constructing range improvements to obtain better management of livestock and to increase capacity above present, but not up to currently permitted numbers; constructing developed recreation sites near local communities, managing existing sites at full service, and increasing maintenance; eliminating the soil and watershed backlog by 2020; rehabilitating orphan mines; increasing road and trail maintenance to prevent sediment production from these sources. The emphasis of the wildlife program is to increase fisheries projects. Sawtimber would be harvested from suitable land, but wood products (poles, firewood, and Christmas trees) would be allowed to come from both suitable and unsuitable land.

Objective Function: Maximize PNV for 20 decades.

Assumptions and Constraints: Non-declining even flow harvest constraint and ending inventory constraint were applied. The RARE II proposed wilderness was assigned a non-development type of prescription. The budget was held at 50% over current in the first decade. Timber harvest was sustained at 3.0 MMBF. Range structural and nonstructural investments were maintained at \$170,000 to \$240,000 a year. Fisheries investments were increased to \$230,000 a year. Soil and water investments were sustained at \$140,000 to \$200,000 a year.

Table II-11 shows a detailed list of the outputs, benefits, and costs of this alternative.

10. Alternative 10 (High Productivity from RPA 85 Update)

Objective: The goal of alternative 10 is to maximize present net value and to increase net public benefits by meeting Resource Planning Act (RPA) objectives assigned Fishlake National Forest from the draft

1985 RPA Program Update. Specific objectives of this alternative are to attain all assigned targets in the most cost efficient manner. Timber, range, developed recreation and mineral management would be emphasized in this alternative. Nonmarket outputs such as wildlife and dispersed recreation would be produced at economically efficient levels but would be subordinate to the high market resource emphasis. Constraints on the timber program, such as budget limits and visual quality standards, would be relaxed to produce lower cost timber outputs.

Objective Function: Maximize PNV for 20 decades.

Assumptions and Constraints: Non-declining timber harvest schedule and ending inventory constraint were applied. Specific timber and range output constraints were used. Budget was allowed to float to meet objectives. Fisheries investment of \$100,000 to \$230,000 and Soil and water investments of \$270,000 to \$340,000 a year were maintained.

Table II-12 shows a detailed list of the outputs, benefits, and costs of this alternative.

11. Alternative 11 (Spatially Modified Revised Mix)

Objectives: The goal of alternative 11 is to maximize present net value and increase net public benefits by emphasizing a mixture of market and nonmarket opportunities in response to issues, concerns, demand and the Forest's capabilities. The more favorable aspects of alternatives 4, 6 and 8 were used in its construction.

Specific objectives of alternative 11 include: maintaining timber harvest at a level to meet projected demand; constructing range improvements to obtain better management of livestock and to increase capacity slightly above present; constructing developed recreation sites near local communities, managing existing sites at full service, and increasing maintenance; eliminating the soil and watershed backlog by 2020; rehabilitating orphan mines; increasing road and trail maintenance to prevent sediment production from these sources. The emphasis of the wildlife program is that which benefits fisheries projects. Sawtimber would be harvested from suitable land, but wood products (poles, firewood, and Christmas tress) would be allowed to come from both suitable and unsuitable land.

Objective Function: Maximum PNV for 20 decades.

Assumptions and Constraints: Non-declining even flow harvest constraint and ending inventory constraint were applied. Budget was held at 50% over current in the first decade. Timber harvest of at least 3.0 MMBF was maintained. Range structural and nonstructural investments were kept at \$170,000 to \$240,000 a year. Fisheries investment of \$230,000 a year and soil and water investments of \$140,000 to \$200,000 a year were sustained. This alternative is the same as alternative 9, but prescription assignments on certain areas were fixed to accomodate certain management concerns.

Table II-13 shows a detailed list of the outputs, benefits, and costs of this alternative.

D. Alternatives Considered but Rejected

All of the benchmarks and the timber departure alternative or benchmark were considered but rejected. The benchmark runs are typically simple-resource oriented and the alternatives considered seem to have a wide array of outputs, costs and benefits.

E. Alternative Development Process:

The alternative development process used by the Fishlake was relatively simple in concept.

1. Benchmarks were used to establish PNW and resource output level parameters. No attempts were made to exceed the limits established by benchmark runs for any output.
2. Required alternatives were formulated based on Region 4 and Washington Office direction.
3. Several optional alternatives were formulated and run.
4. Output levels, costs, and benefits from the various required and optional alternative runs were compared to determine if a range of outputs was included and how responsive these alternatives were to issues and concerns.

VIII. COMPARISON OF EFFECTS FOR BENCHMARKS AND ALTERNATIVES

A. Introduction

The comparison of benchmarks and alternatives is intended to openly display the levels of outputs, costs, benefits, and environmental impacts. This open display will provide the general public and decision-makers the information needed to recommend and finally select a proposed action.

B. Constraint Evaluation

As discussed earlier in this appendix, few common constraints were used in the Fishlake's analysis of benchmarks and alternatives. These were designed to meet legal and 36 CFR 219 requirements and therefore were not considered optional. No "sensitivity" analysis was done for the common constraints.

Nearly all outputs from the Fishlake National Forest are highly sensitive to budget constraints. The land base is generally available to produce the outputs, but capital investments are required to bring it into production. In the case of timber, budget was used to constrain outputs in the first decade, then the biologic constraint was used in succeeding decades, and the timber budget was adjusted to

meet outputs. In the case of big game, there is currently enough habitat to meet Regionally assigned numbers of deer and elk on a Forest-wide basis.

On an average annual basis for the decade, the cost of producing selected outputs is shown below. Outputs from the preferred alternative will vary proportionally to these figures as functional area budgets vary from the decade averages listed in Alternative 11.

Sawtimber, below 3 MMBF	\$ 31.75 per MBF
Sawtimber, above 3 MMBF	\$ 21.00 per MBF
Developed Recreation	\$ 1.87 per RVD
Grazing	\$ 6.24 per AUM
Watershed treatment	\$490.00 per acre
Fisheries	\$ 10.00 per FUD
Fisheries	\$ 12.50 per lb. fish

For recreation, grazing, and fisheries the above cited costs include administration and operation, maintenance, rehabilitation, and replacement costs. The watershed cost is the average cost of treating an acre. The timber costs are for sale preparation and administration.

C. Trade-offs Between Alternatives

The tables below provide an easy means of comparing the quantifiable "trade-offs" between the various benchmarks and alternatives.

There are also "trade-offs" between alternatives in response to issues and concerns. Every alternative cannot be fully responsive to every issue and concern. In fact, most issues cannot be resolved satisfy to all of the public, since they are issues created by conflicting opinions and needs.

TABLE B-32
ANNUAL TIMBER YIELD IN MMBF

BENCHMARK OR ALTERNATIVE	DECADE 1	DECADE 2	DECADE 3	DECADE 4	DECADE 5
Min. Level	0.0	0.0	0.0	0.0	0.0
Current Level	3.0	3.0	3.0	3.0	3.0
Max.PNB-Assigned	7.1	7.1	7.1	7.1	7.1
Max.PNV-Market	6.1	6.1	6.1	6.1	6.1
Max.Timber	10.9	10.9	10.9	10.9	10.9
Max.Range	7.8	7.8	7.8	7.8	7.8
Seq.Upper&LowerBounds	14.5	11.0	8.3	6.3	4.8
Timber Departure	3.0	17.0	10.3	10.3	6.3
1-FY82 Budget-					
Current Direction	3.0	3.0	3.0	3.0	3.0
2-Market Opportunities	6.0	7.9	7.9	7.9	7.9
3-10% Reduced Budget	3.0	3.0	3.0	3.0	3.0
4-Nonmarket Oppor.	3.0	6.5	6.5	6.5	6.5
5-1980 RPA Program	7.4	9.6	9.6	9.6	9.6
6-Emphasis on Local Issues & Concerns	3.0	9.6	9.6	9.6	9.6
7-25% Reduced Budget	0.5	0.5	0.5	0.5	0.5
8-Current Program - No Action	3.0	3.0	3.0	3.0	3.0
9-Revised Mix	3.0	8.8	8.8	8.8	8.8
10-High Productivity from 85 RPA Update	9.6	9.6	10.4	12.0	13.5
11-Spatially Modified Revised Mix	3.0	8.3	8.3	8.3	8.3

TABLE B-33
INCREASED WATER YIELD IN M ACRE FT.

BENCHMARK OR ALTERNATIVE	DECADE 1	DECADE 2	DECADE 3	DECADE 4	DECADE 5
Min. Level	0	0	0	0	0
Current Level	.173	.173	.173	.173	.173
Max.PNB-Assigned	.143	.143	.143	.143	.143
Max.PNV-Market	.121	.121	.121	.121	.121
Max. Timber	.220	.220	.220	.220	.220
Max. Range	.157	.157	.157	.157	.157
Seq.Upper&LowerBounds	.296	.222	.167	.125	.094
Timber Departure	.057	.349	.209	.209	.125
1-FY82 Budget-					
Current Direction	.053	.169	.169	.169	.169
2-Market Opportunities	.159	.159	.159	.159	.159
3-10% Reduced Budget	.053	.099	.099	.099	.099
4-Nonmarket Oppor.	.032	.103	.103	.103	.103
5-1980 RPA Program	.190	.190	.190	.190	.190
6-Emphasis on Local Issues & Concerns	.194	.194	.194	.194	.194
7-25% Reduced Budget	.012	.071	.071	.071	.071
8-Current Program - No Action	.173	.173	.173	.173	.173
9-Revised Mix	.177	.177	.177	.177	.177
10-High Productivity from 85 RPA Update	.195	.195	.195	.249	.281
11-Spatially Modified Revised Mix	.177	.177	.177	.177	.177

TABLE B-34
ANNUAL RANGE OUTPUT IN MAUM'S

BENCHMARK OR ALTERNATIVE	DECADE 1	DECADE 2	DECADE 3	DECADE 4	DECADE 5
Min. Level	0	0	0	0	0
Current Level	136.6	136.4	136.4	137.1	136.4
Max.PNB-Assigned	130.2	123.2	119.2	119.5	118.9
Max.PNV-Market	113.1	113.1	113.1	113.1	113.1
Max. Timber	126.9	118.8	113.6	113.8	113.4
Max. Range	163.0	161.7	162.3	163.5	163.6
Seq.Upper&LowerBounds	130.2	123.2	119.2	119.5	118.9
Timber Departure	133.5	131.4	130.6	131.5	131.0
1-FY82 Budget-					
Current Direction	130.8	124.9	121.8	121.9	120.8
2-Market Opportunities	137.6	136.4	135.6	136.7	135.8
3-10% Reduced Budget	134.8	131.9	130.6	130.8	130.3
4-Nonmarket Oppor.	134.8	132.1	130.0	131.0	134.0
5-1980 RPA Program	155.1	157.6	159.6	161.6	162.6
6-Emphasis on Local Issues & Concerns	136.1	132.7	131.0	131.8	130.7
7-25% Reduced Budget	130.9	124.7	120.6	120.8	120.7
8-Current Program - No Action	136.6	136.4	136.4	137.1	136.4
9-Revised Mix	134.5	132.1	130.9	131.9	131.2
10-High Productivity from 85 RPA Update	137.6	140.6	140.6	140.9	143.6
11-Spatially Modified Revised Mix	133.5	131.4	130.6	131.5	131.0

TABLE B-35
ANNUAL FUELWOOD POTENTIAL IN MCF

BENCHMARK OR ALTERNATIVE	DECADE 1	DECADE 2	DECADE 3	DECADE 4	DECADE 5
Min. Level	2312	2600	2600	2600	2600
Current Level	1970	1970	1970	1970	1970
Max.PNB-Assigned	3350	3850	3850	3850	3850
Max.PNV-Market	3350	3850	3850	3850	3850
Max. Timber	3350	3850	3850	3850	3850
Max. Range	3350	3850	3850	3850	3850
Seq.Upper&LowerBounds	3350	3850	3850	3850	3850
Timber Departure	2410	3200	3200	3200	3200
1-FY82 Budget-					
Current Direction	1970	1970	1970	1970	1970
2-Market Opportunities	3350	3850	3850	3850	3850
3-10% Reduced Budget	2000	2000	2000	2000	2000
4-Nonmarket Oppor.	4040	4040	4040	4040	4040
5-1980 RPA Program	2060	2910	2910	2910	2910
6-Emphasis on Local Issues & Concerns	3030	2910	2910	2910	2910
7-25% Reduced Budget	2410	2410	2410	2410	2410
8-Current Program - No Action	1970	1970	1970	1970	1970
9-Revised Mix	2410	2910	2910	2910	2910
10-High Productivity from 85 RPA Update	2410	2410	2410	2410	2410
11-Spatially Modified Revised Mix	2410	3200	3200	3200	3200

TABLE B-36
ANNUAL DEVELOPED RECREATION IN MRVD'S

BENCHMARK OR ALTERNATIVE	DECADE 1	DECADE 2	DECADE 3	DECADE 4	DECADE 5
Min. Level	0	0	0	0	0
Current Level	479.0	605.5	664.8	664.8	664.8
Max. PNB-Assigned	575.3	697.3	806.2	934.6	1057.1
Max. PNV-Market	500.5	606.6	701.4	813.1	919.6
Max. Timber	558.0	676.3	782.0	906.6	1025.4
Max. Range	500.5	606.6	701.4	813.1	919.6
Seq. Upper&Lower Bounds	552.3	676.3	806.2	934.6	1057.1
Timber Departure	456.8	517.7	627.3	711.9	789.1
1-FY82 Budget--					
Current Direction	381.0	356.2	356.2	356.2	356.2
2-Market Opportunities	606.7	644.0	681.4	718.7	756.0
3-10% Reduced Budget	352.5	307.1	261.7	261.7	261.7
4-Nonmarket Oppor.	381.0	470.5	559.8	711.4	862.9
5-1980 RPA Program	521.1	689.6	812.1	934.6	1057.1
6-Emphasis on Local Issues & Concerns	443.3	534.1	669.7	805.2	805.2
7-25% Reduced Budget	227.5	292.1	292.1	292.1	292.1
8-Current Program - No Action	479.0	605.5	664.8	664.8	664.8
9-Revised Mix	448.7	544.9	675.1	805.2	805.2
10-High Productivity from 85 RPA Update	443.3	534.1	669.7	805.2	805.2
11-Spatially Modified Revised Mix	448.7	544.9	640.1	725.4	805.2

TABLE B-37
ANNUAL DISPERSED RECREATION IN MRVD'S

BENCHMARK OR ALTERNATIVE	DECADE 1	DECADE 2	DECADE 3	DECADE 4	DECADE 5
Min. Level	35.0	35.0	35.0	35.0	35.0
Current Level	761.4	740.8	740.9	741.0	741.1
Max.PNB-Assigned	1082.0	1311.4	1509.2	1720.4	1925.1
Max.PNV-Market	367.1	444.2	513.3	582.9	652.8
Max. Timber	1003.9	1216.9	1406.5	1596.4	1786.2
Max. Range	961.8	1165.8	1347.5	1529.5	1710.5
Seq.Upper&LowerBounds	1049.6	1271.9	1515.6	1720.3	1925.0
Timber Departure	702.9	920.4	948.9	948.9	948.9
1-FY82 Budget-					
Current Direction	661.5	557.6	557.7	557.8	557.9
2-Market Opportunities	598.3	611.1	623.9	636.9	650.1
3-10% Reduced Budget	664.1	530.9	397.7	398.3	399.0
4-Nonmarket Oppor.	512.7	806.3	1100.0	1394.1	1688.4
5-1980 RPA Program	733.2	927.4	1121.8	1316.0	1316.1
6-Emphasis on Local Issues & Concerns	666.1	765.3	864.3	864.3	864.3
7-25% Reduced Budget	44.7	47.2	50.1	53.3	57.1
8-Current Program - No Action	761.4	740.8	740.9	741.0	741.1
9-Revised Mix	607.0	865.4	865.6	865.8	866.0
10-High Productivity from 85 RPA Update	666.1	765.3	864.3	864.3	864.3
11-Spatially Modified Revised Mix	690.5	848.9	848.9	848.9	848.9

TABLE B-38
ANNUAL WILDLIFE & FISH USE IN MWFUD'S

BENCHMARK OR ALTERNATIVE	DECADE 1	DECADE 2	DECADE 3	DECADE 4	DECADE 5
Min. Level	14.5	14.5	14.5	14.5	14.5
Current Level	176.6	177.3	177.4	177.0	177.4
Max. PNB-Assigned	193.7	204.5	205.0	205.4	205.5
Max. PNV-Market	177.6	175.9	175.0	175.1	175.0
Max. Timber	184.5	192.2	191.4	191.4	191.3
Max. Range	179.0	186.5	186.1	184.9	184.7
Seq. Upper&Lower Bounds	185.4	194.5	194.1	194.3	194.3
Timber Departure	187.4	197.3	197.5	197.6	197.7
1-FY82 Budget-					
Current Direction	176.3	176J.3	175.2	175.2	175.2
2-Market Oppor.	177.2	177.9	178.2	178.5	178.3
3-10% Reduced Budget	176.6	176.3	176.0	176.0	176.0
4-Nonmarket Oppor.	188.2	197.8	198.2	198.3	195.2
5-1980 RPA Program	190.5	204.8	208.1	208.3	208.5
6-Emphasis on Local Issues & Concerns	181.8	192.7	198.9	199.1	199.0
7-25% Reduced Budget	176.2	172.1	174.7	174.6	174.6
8-Current Program - No Action	176.6	177.3	177.4	177.0	177.4
9-Revised Mix	188.0	199.0	199.0	199.2	199.1
10-High Productivity from 85 RPA Update	182.1	193.9	200.4	200.3	200.6
11-Specially Modified Revised Mix	187.9	198.9	199.0	199.1	199.0

TABLE B-39
LONG TERM SUSTAINED YIELD IN MMBF

BENCHMARK OR ALTERNATIVE	MMBF/YEAR
Min. Level	0.0
Current Level	9.5
Max. PNB-Assigned	8.3
Max. PNV-Market	7.2
Max. Timber	13.5
Max. Range	8.8
Seq. Upper & Lower Bounds	8.0
Timber Departure	8.9
1-FY82 Budget-Current Direction	9.0
2-Market Opportunities	9.3
3-10% Reducd Budget	5.9
4-Nonmarket Opportunities	6.0
5-1980 RPA Program	10.1
6-Emphasis on Local Issues & Concerns	10.5
7-25% Reduced Budget	4.1
8-Current Program-No Action	9.5
9-Revised Mix	9.4
10-High Productivity from 85 RPA Update	14.9
11-Spatially Modified Revised Mix	9.1

TABLE B-40
MANAGEMENT PRESCRIPTION ACRES

PRESCRIPTION	ALTERNATIVE				
	1	2	3	4	5
1. Developed Rec.	200	1,219	184	313	1,258
2. Motorized Rec.	43,737	38,766	46,973	44,933	33,028
3. Non-Motorized Rec.	169,385	341,745	257,380	546,846	64,746
4. Wildlife	77,477	129,447	65,350	219,578	24,620
5. Big Game Winter Range	80,812	114,195	81,765	53,146	39,153
6. Range	790,792	710,053	721,488	418,442	1,112,461
7. Timber	140,372	72,831	131,228	56,566	66,431
9. Watershed Mgmt.	117,141	14,243	116,852	83,437	78,464
10A. Research Natural Area	1,200	1,200	1,200	1,200	4,797
10E. Municipal Watershed	3,363	780	2,059	18	18
Min. Level	0	0	0	0	0
TOTAL ACRES	1,424,479	1,424,479	1,424,479	1,424,479	1,424,479

TABLE B-40 (CONTINUED)
MANAGEMENT PRESCRIPTION ACRES

PRESCRIPTION	ALTERNATIVE					
	6	7	8	9	10	11
1.	168	716	1,110	263	518	299
2.	50,582	44,085	42,927	45,303	51,733	35,506
3.	130,597	735,320	128,949	149,616	90,320	108,5301
4.	192,197	268	194,480	327,409	185,915	358,583
5.	182,048	34,285	146,105	167,531	95,541	66,743
6.	621,290	548,053	675,805	492,084	773,669	654,539
7.	143,198	47,062	144,342	137,280	147,637	58,729
9.	100,689	13,472	87,188	101,948	77,071	136,071
10A.	1,200	1,200	1,200	1,200	1,200	4,300
10E.	2,510	18	2,373	1,845	875	1,179
Min. Level	0	0	0	0	0	0
TOTAL ACRES	1,424,479	1,424,479	1,424,479	1,424,479	1,424,479	1,424,479

TABLE B-41
 BENEFITS, COSTS, AND PNW FOR 200 YEARS
 (in Thousands of Dollars for
 Alternatives and Benchmarks)

Benchmarks	<-----4%----->			<-----7.125%----->		
	Pres.Val. Benefits	Pres.Val. Costs	PNV	Pres.Val. Benefits	Pres.Val. Costs	PNV
Min. Level	207636.3	21117.0	186519.3	129995.7	13363.0	116632.7
Max. PNW, All Values	586224.1	133402.2	452821.9	357344.7	83467.2	273877.5
Max. PNW, Mkt.	467391.5	127711.9	339679.6	287355.4	72568.8	214786.6
Max. Tmb. for 1	601278.5	184754.1	416524.4	365490.3	107739.2	257751.1
Max. Range	572743.9	183336.9	389407.0	349289.2	109668.8	239620.4
Tmb. Sequential	602534.1	119868.1	482666.0	373974.5	105207.1	268767.4
Tmb. Depart. All	536606.6	175528.0	361078.6	327216.5	101305.3	225911.2
<u>Alternatives</u>						
1	436870.7	87129.3	349741.4	275309.2	53275.3	222033.9
2	500026.7	164872.9	335153.8	307562.8	94985.1	212577.7
3	426516.2	79152.1	347364.1	270585.0	48351.7	222233.3
4	501074.0	147786.2	353287.8	300269.7	86049.7	214220.0
5	567465.4	196256.2	371209.2	341254.4	111679.4	229575.0
6	520300.4	173112.9	347187.5	313616.3	96731.3	216885.0
7	355800.9	55459.2	300341.7	223693.3	34791.6	188901.7
8	473650.2	123840.2	349810.0	295957.2	75492.9	220464.3
9	518144.3	164455.8	353688.5	313034.4	92904.5	220129.9
10	550010.7	232113.0	317897.7	331997.8	132669.3	199328.5
11	516420.1	163567.9	352852.2	313635.8	92371.7	221264.1

For a discussion of costs, benefits and present net worth of the alternatives. (see Tables B-42 and B-43).

Alternative 7 has the lowest cost PVC (next to minimum) level. At a 4 percent discount rate the change in PVC of \$34.3 million yields a change in PNW of \$113.9 million as the Forest regains its production of commodity and noncommodity benefits in going from minimum level to alternative 7.

Alternative 3 has an emphasis on commodity outputs as the budget decreases 10% from current levels. Range investments improve from the current budget level. Fisheries and developed recreation investment decrease.

Alternative 1 is the current budget direction, that is the budget is spent according to how the current mix of budget is spent. Current outputs are not maintained however, since current budget levels do not allow that. Range investments are similar to alternative 7.

Alternative 8 is the current program-no action alternative. Additional investments were made to produce current outputs. The additional outputs (range in particular) measured as total of benefits, equalled the total value of costs. Part of the change in present value of costs were due to a large investment in soil and water improvement. These investments are done for environmental resources but result in little change in computed benefits.

Alternative 4, non-market opportunities, has large increases in fisheries, soil and water, and range investments. Recreation budgets are high, timber budgets are low compared to other high budget alternatives. Substantial acreage on the Forest has been assigned a non-development prescription. Benefit values for recreation and wildlife are high. Soil and water investments again suppress present net value. Range investments suppress present net worth as the goal of this alternative (as others) is to improve range condition.

Alternative 11, spatially modified revised mix, and alternative 9, revised mix, have a similar cost structure except for timber harvest that was allowed to float in decades after the first decade (due to relaxing timber budget constraints). Range investments are high, fisheries investments are high, but soil and water investments are lower due to a decision to slow the pace of soil and water improvement.

Alternative 2, market opportunities, emphasizes market opportunities and a high acreage of the non-development prescription. Timber output costs increase. Range investment is high, as is developed recreation investment. Fisheries investments are low as are soil and water improvements.

Alternative 6, emphasis on local issues and concerns, emphasizes range investment, soil and water improvement, fisheries investment and timber. The present value of cost is high due to increased timber production.

Alternative 5, 1980 RPA Program, achieves high outputs for range, timber, fisheries, recreation, and soil and water improvement, causing this alternative to be very expensive. The investment appears to pay off since the \$371.2 million net present value is the highest among the alternatives considered here.

Alternative 10, high productivity from the 1985 RPA update, achieves extremely high range and timber outputs along with a high level of soil and water improvement, causing this alternative to be by far the most expensive. The present net value decreases significantly since the productive limits of the Forest are pressed, causing more and more expensive unit costs to be applied to meet the constrained output targets.

TABLE B-42
DISCOUNTED (4%) COSTS, BENEFITS, AND PNV
For Alternatives Ranked According To Least Cost
Compared to Least Cost Benchmark
(Displayed in FY82--MM Dollars)

Benchmarks	PVC	^PVC	PVB	^PVB	PNV	^PNV
Min. Level	21.1	XXX	207.6	XXX	186.5	XXX
Max PNV(Assigned)	133.4	112.3	586.2	378.6	452.8	266.3
Alternatives						
7-25% Reduced Budget	55.5	34.4	355.8	148.2	300.3	113.8
3-10% Reduced Budget	79.2	58.1	426.5	218.9	347.4	160.9
1-FY82 Budget Current Direction	87.1	66.0	436.9	229.3	349.7	163.2
8-Current Program No Action	123.8	102.7	473.7	266.1	349.8	163.3
4-Nonmarket Opportunities	147.8	126.7	501.1	293.5	353.3	166.8
11-Spatially Modified Revised Mix	163.6	142.5	516.4	308.8	352.9	166.4
9-Revised Mix	164.5	143.4	518.1	310.5	353.7	167.2
2-Market Oppor.	164.9	143.8	500.0	292.4	335.2	148.7
6-Emphasis on Local Issues & Concerns	173.1	152.0	520.3	312.7	347.2	160.7
5-1980 RPA Program	196.3	175.2	567.5	359.9	371.2	184.7
10-Hi Prod. from 85 RPA Update	232.1	211.0	550.0	342.4	317.9	131.4

TABLE B-43
DISCOUNTED (4%) COSTS, BENEFITS, AND PNV
(for Alternatives Ranked According to PNV and compared to
Max PNV Benchmark)
(Displayed in FY82--MM Dollars)

Benchmarks	PVC	^PVC	PVB	^PVB	PNV	^PNV
Min. Level	21.1	-112.3	207.6	-378.6	186.5	-266.3
Max PNV(Assigned)	133.4	XXX	586.2	XXX	452.8	XXX
<hr/>						
Alternatives						
<hr/>						
5-1980 RPA Program	196.3	62.9	567.5	-18.7	371.2	-81.6
9-Revised Mix	164.5	31.1	518.1	-68.1	353.7	-99.1
4-Nonmarket Opportunities	147.8	14.4	501.1	-85.1	353.3	-99.5
11-Spatially Modified Revised Mix	163.6	30.2	516.4	-69.8	352.9	-99.9
8-Current Prog. No Action	123.8	-9.6	473.7	-112.5	349.8	-103.0
1-FY82 Budget-Current Dir.	87.1	-46.3	436.9	-149.3	349.7	-103.1
3-10% Reduced Budget	79.2	-54.2	426.5	-159.7	347.4	-105.4
6-Emphasis on Local Issues & Concerns	173.1	39.7	520.3	-65.9	347.2	-105.6
2-Market Oppor.	164.9	31.5	500.0	-86.2	335.2	-117.6
10-High Prod. from 85 RPA Update	232.1	98.7	550.0	-36.2	317.9	-134.9
7-25% Reduced Budget	55.5	-77.9	355.8	-230.4	300.3	-152.5

In Tables B-41, B-42, and B-43, the changes in costs and benefits are attributable to several factors. Examples of these factors are:

- Investment level variations between the alternatives.
- Output levels for targeted outputs.
- Timing of investment in such items as roads for timber harvest or wildlife habitat improvements.

APPENDIX C

GLOSSARY

Access - See Public access.

Acre equivalent - The index of acres affected by wildlife habitat improvements in contrast to actual acres treated.

Acre-foot - A measure of water or sediment volume equal to the amount which would cover an area of 1 acre to a depth of 1 foot (325,851 gallons).

Activity - Work processes or management practices.

Activity fuels - Debris fuels generated by such activity as timber harvesting.

Activity outputs - The quantifiable goods or services resulting from management actions.

Administrative headquarters site - A site which exists primarily for general administrative purposes.

Administrative unit - All the National Forest System lands for which one Forest Supervisor has responsibility.

Affected environment - The natural and physical environment under the administration of one line officer, such as District Ranger or Forest Supervisor.

Age class - An interval, usually 10 to 20 years, into which the age ranges of vegetation are divided for classification or use.

Agricultural base - Economy in which the base industry of a community is agriculture.

Airshed - A geographic area that, because of topography, meteorology, and climate, shares the same air.

Alignment - The specific surveyed location or route.

Allocation - The assignment of management prescriptions or combination of management practices to a particular land area to achieve the goals and objectives of the alternative.

Allocation model - See Resources allocation model.

Allotment - See Range allotment.

Allowable sale quantity - The quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for a time period specified by the Plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity."

Alternative - One of several policies, plans, or projects proposed.

Anadromous fish - Those species of fish that mature in the sea and migrate into streams to spawn; i.e., salmon, steelhead.

Analysis area - One or more capability areas grouped for purposes of analysis.

Analysis of the Management Situation (AMS) - A determination of the ability of the planning area to supply goods and services in response to society's demand for those goods and services.

Animal Unit Month (AUM) - The amount of feed or forage required by an animal unit for 1 month. Animal unit months are calculated by multiplying given animal months by the appropriate animal unit conversion factor. Not synonymous with animal month. Abbreviation: AUM.

Annual Forest Program - The summary or aggregation of all projects that make up an integrated (multifunctional) course of action.

Annual work planning process - The process used to translate the objectives from the Regional Guide into specific activities.

Appropriate costs - The sum of operational and capital investment costs.

Aquatic ecosystems - The physical environment of or pertaining to water--stream channel, lake or pond bed, wetland, water itself--and biotic communities that occur therein.

Arterial roads - See "Forest arterial road".

Assessment - The Forest and Rangeland Renewable Resource Assessment required by the Resources Planning Act (RPA).

Available, capable, and suitable - See "Available forest lands," "Capable lands," and "Suitable lands."

Available forest land - Land which has not been legislatively withdrawn or administratively withdrawn by the Secretary of Agriculture or Forest Service Chief from timber production.

Average annual cut - The volume of timber harvested in a decade divided by 10.

Avoidance areas - Areas having one or more physical, environmental, institutional, or statutory impediments to corridor designation.

Background - The visible terrain beyond the foreground and middleground where individual trees are not visible but are blended into the total fabric of the stand.

Basal area - The area of the cross-section of a tree stem near the base, generally at breast height and including bark.

Base area - The public or private land used to support a recreation operation that depends on use of National Forest System land. A ski area is an example.

Base sale schedule - A timber sale schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade, and this planned sale and harvest for any decade is not greater than the long-term sustained yield capacity. (This definition expresses the principle of nondeclining flow.)

Baseline - With respect to soils, the amount of erosion and sedimentation due to natural sources in the absence of human activity.

Benefit - The total value of an output or other effect.

Best Management Practices (BMP) - A practice or combination of practices that are the most effective and practical.

Big game - Those large mammals normally managed for sport hunting.

Big game winter range - The area used by big game in winter.

Biological capacity - The average net growth of wood attainable under intensive management.

Biological control - Control of insect populations or tree diseases through applied technology.

Biological growth-potential - The average net growth attainable in a fully stocked natural forest stand.

Biological potential - The max & its inherent physical and biological characteristics.

Board feet - One board foot is a piece of wood one foot by one foot by one inch thick.

Broadcut Burn - Allowing a prescribed fire to burn over a designated area.

British Thermal Unit - The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.

Browse - The part of shrubs, woody vines and trees available for animal consumption.

BTU - An abbreviation of British Thermal Unit.

Canopy - The more-or-less continuous cover of tree branches and foliage.

Capable lands - Those portions of the Forest that have an inherent ability to support trees for timber harvest and produce at least 20 cubic feet/acre/year of wood fiber.

Capability - The productive potential of land.

Capital investment costs - Those associated with construction or development of improvements.

Carrying capacity - The number of organisms of a given species and quality that can thrive in a given ecosystem.

Catastrophic Condition - A significant change in forest conditions that affects management objectives.

Cavity - A tree hollow of the sort used by birds and mammals.

CEQ - See "Council on Environmental Quality."

CFR - Code of Federal Regulations.

Chemical control - Use of chemicals to control insects or tree diseases.

Clearcutting - The cutting method that clears a considerable area at one time.

Climax - The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition.

Closure - The administrative order restricting use of a specific area.

Coliform bacteria - Any of several bacteria found in the large intestine of man and animals.

Collector roads - See "Forest collector road".

Commercial Forest Land (CPL) - See "Timber classification."

Community lifestyles - The routine conduct of residents associated with the National Forest.

Commodities - Outputs such as wood, livestock forage, minerals.

Concern - See "Management concern."

Confinement - To hold a fire within prescribed boundaries.

Congressionally classified and designated areas - See "Wilderness."

Conifer - Cone-bearing trees.

Consumptive use - A use of resources that reduces the supply, such as logging and mining.

Containment - To surround a fire, and any spot fires therefrom, with control line which can reasonably be expected to check the fire's spread under prevailing and predicted conditions.

Control - To complete control line around a fire.

Corridor - A linear strip of land identified for the present or future location of transportation or utility rights-of-way.

Cost effectiveness - Achieving specified outputs or objectives under given conditions for the least cost.

Cost-efficiency - The usefulness of specified inputs (costs) to produce specified outputs (benefits).

Council on Environmental Quality - An advisory council to the President established by the National Environmental Policy Act of 1969.

Cover/forage ratio - The ratio of cover (usually conifer types) to open foraging areas.

Created opening - See "Tree opening."

Critical habitat - Key land areas used by wildlife for forage and reproduction.

Critical minerals - Minerals essential to the National defense.

Crown closure - Percent of area occupied by crowns of all trees which can be estimated ocularly from aerial photographs to the nearest ten percent.

Crown height - Of a standing tree, the vertical distance from ground level to the base of the crown.

Cubic foot - The amount of timber equivalent to a piece of wood one foot by one foot by one foot.

Cubic yard - A measure of soil or sediment volume which would cover a square yard of area one yard deep (3 feet x 3 feet x 3 feet).

Culmination of mean annual increment - The point where the mean annual growth increment (the basal area of a stand of trees divided by their age) ceases to increase prior to decline.

Cultural resource - The remains of sites, structures, or objects used by humans in the past--historical or archaeological.

Cultural sensitivity - Refers to the likelihood of encountering significant cultural items.

Cutting cycle - The planned lapse of time between successive cuttings in a stand.

d.b.h. - Diameter at breast height. The diameter of a tree measured 4 feet 6 inches above the ground.

d.i.b. - Diameter inside bark.

Deficit timber sale - A timber sale where the costs associated with producing the primary product(s) plus profit margin are greater than the selling value of the same product(s).

Decking areas - Sites that are intermediate between stump and landing, used to collect logs.

Decision criteria - Essentially the rules or standards used to evaluate alternatives.

Demand - The quantity of goods or services called for at various prices, holding other factors constant.

Departure - The temporary deviation from the non-declining even-flow policy.

Dependent communities - Communities whose welfare is involved with the National Forests.

Design capacity - The maximum use a developed recreation site was built to accommodate.

Design standard - Approved design and construction specifications.

Designated corridor - A linear area of land with boundaries identified and designated by legal public notice.

Destination resort - A recreation resort designed for multi-day use.

Determinate stand - A group of trees of similar age and species that are clearly a separate group from surrounding stands.

Developed recreation - Recreation that requires facilities that, in result in concentrated use of an area.

Developed recreation site - A defined area where facilities are provided for concentrated public use.

Direct outputs - Resource outputs that are caused by the action and occur at the same time and place.

Direction - See "Management direction."

Discount rate - An interest rate that represents the cost or time value of money in determining the present value of future costs and benefits.

Discounting - An adjustment, using a discount rate, for the value of money over time so that costs and benefits occurring in the future are reduced to a common time, usually the present, for comparison.

Dispersed recreation - Recreation use outside the developed recreation site.

Distance zone - One of three categories used in the Visual Management System to divide a view into near and far components. The three categories are: (1) foreground, (2) middle ground, and (3) background.

District - See "Ranger District."

Diversity - The distribution and abundance of different plant and animal communities.

Draft Environmental Impact Statement - The statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act, and released to the public and other agencies for comment and review.

Early forest succession - The biotic community that develops immediately following the removal or destruction of the vegetation in an area.

Economic efficiency analysis - An analytical method in which incremental market and nonmarket benefits are compared with incremental economic costs.

Economic growth - Increased economic output in real terms over time.

Ecosystems - An interacting system of organisms considered together with their environment.

Edge - Where plant communities meet or where successional stages or vegetation conditions within the plant communities come together.

Edge contrast - A qualitative measure of the difference in structure of two adjacent vegetative areas.

Effects - Environmental consequences of a proposed action.

Electronic sites - Areas designated for equipment related to radio and other electronic devices.

Endangered species - Any species of animal or plant that is in danger of extinction.

Endemic plant - A plant with a comparatively restricted geographic distribution.

Environmental analysis - An analysis of alternative actions and their predictable environmental effects.

Environmental Assessment - The concise public document needed to meet the procedural requirements of NEPA (40 CFR 1508.9).

Environmental documents - A set of documents to include, as applicable, the Environmental Assessment, Environmental Impact Statement, Finding of No Significant Impact, or Notice of Intent.

Environmental Impact Statement (EIS) - A statement of the environmental effects of a proposed action and alternatives to it.

Escape areas - A place for deer, for example, to get away from danger.

Evaluation criteria - Standards developed for appraising alternatives.

Even-aged management - Actions that produce trees of essentially the same age.

Clearcutting - The removal, in a single cut, of all trees in stands larger than seedlings.

Seed tree cutting - Similar to clearcutting, except that a few of the better trees of the desired species are left scattered over the area to provide seed for regeneration.

Shelterwood cutting - The removal of all trees in a series of two or more cuts over a period of not more than 30 years.

Even-aged systems - Product stands in which all trees are of about the same age. (A spread of 10 to 20 years is generally considered one age class).

Even-flow - Maintaining a relatively constant supply of timber from decade to decade.

Exclusion areas - Areas ruled out for corridor allocation or facility siting.

Expanded suppression - The control or containment of wildfires at increased acreage within allowable limits.

Experience levels - The range of opportunities for satisfying basic recreation needs of people. A scale of five experience levels ranging from "primitive" to "modern" is planned for the National Forest System.

Extensive grazing - Management seeks full utilization of forage allocated to livestock.

Facilities - For example, administrative buildings, water and sanitation systems, sanitary landfills, dams, bridges, and communication systems.

Facility condition class - The rating system used in the Recreation Information Management System to classify the condition of repair of a specific facility.

Family unit - A developed site or picnic spot with table, fireplace, tent pad, and parking spot designed to handle a group of people.

Fee ownership - The maximum possible ownership in real estate under the system of property rights founded on English common law.

Fee purchase - Acquisition of fee ownership of property.

Fee site - A Forest Service recreation area where users must pay a fee.

Final cut - Removal of the last seed bearers or shelter trees after regeneration is considered to be established under a shelterwood system.

Fire hazard - The fuel in which a fire can ignite and burn.

Fire management - All activities required for protection of resources from fire and the use of fire to meet land management goals and objectives.

Fire risk - The potential cause of a fire.

Firewood - See "Fuelwood."

Fisheries habitat - Streams, lakes, and reservoirs that support fish.

Flood plains - The lowland and relatively flat area adjoining inland waters, including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

Forage - All browse and nonwoody plants available to grazing animals or harvested for feeding.

Forest and Rangeland Renewable Resources Planning Act of 1974 - An Act of Congress requiring the preparation of a program for the management of the National Forests' renewable resources and of land and resource management plans for units of the National Forest System. It also requires a continuing inventory of all National Forest System lands and renewable resources.

Foreground - A term used in visual management to describe the stand of trees immediately adjacent to the high-value scenic area, recreation facility, or forest highway.

Forest arterial road - Provides service to large land areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes.

Forest collector road - Serves smaller land areas than a Forest arterial road and is usually connected to a Forest arterial or public highway. Collects traffic from Forest local roads and/or terminal facilities.

Forest development roads and trails - A legal term for Forest Service roads or trails.

Forest land - See "Timber classification."

Forest local road - Connects terminal facilities with Forest collector or Forest arterial roads, or public highways.

Forest Supervisor - The official responsible for administering the National Forest System lands in a Forest Service administrative unit, which may consist of two or more National Forests or all the Forests within a state. He reports to the Regional Forester.

Forest system roads - Roads that are part of the Forest development transportation system.

Forest-wide standard - A performance criterion indicating acceptable norms, specifications, or quality.

FORPLAN - A linear programming system used for developing and analyzing Forest planning alternatives.

FSH - Forest Service Handbook.

FSM - Forest Service Manual.

FSM - Full Service Management is achieved in recreation when signing, cleanup, and other activities are accomplished according to standards and objectives established in approved management plans.

Fuel break - A zone in which fuel quantity has been reduced or altered to provide a position for suppression forces to make a stand against wild-fire. Fuel breaks are designated or constructed before the outbreak of a fire.

Fuel model - A simulated fuel complex for which all the fuel descriptions required by the mathematical fire spread model have been specified.

Fuel treatment - The rearrangement or disposal of natural or activity fuels to reduce the fire hazard.

Fuels - Include both living and dead trees and vegetative materials which will burn.

Fuels management - The practice of planning and executing treatment or control of fuels to meet management goals and objectives.

Fuelwood - Wood--round, split, or sawed, and generally otherwise refuse material--cut into short lengths for burning.

Full-service management - Management of developed recreation facilities to provide optimum maintenance.

Future scenarios - A word picture of a fixed sequence of future events in a defined environment.

Game species - Any species of wildlife or fish for which seasons and bag limits have been prescribed and which are normally harvested by hunters, trappers, and fishermen.

Goal - A concise statement that describes a desired future condition.

Goods and services - The various outputs, including on-site uses, produced from forest and rangeland resources.

Grass/forb - An early Forest successional stage where grasses and forbs are the dominant vegetation.

Grazing allotment - See "Range allotment."

Group selection cutting - The cutting method in which trees are removed periodically in small groups, resulting in openings that do not exceed an acre or two in size.

Growing season - The months of the year during which a species of vegetation grows.

Growing stock level - The number or volume of trees growing in a Forest or in a specified part of it.

Guideline - An indication of policy.

Habitat - The place where a plant or animal or normally lives or grows.

Habitat diversity - See "Wildlife habitat diversity."

Habitat diversity index - A measure of habitat diversity improvement expressed as a percentage of optimum size class distribution that is achieved over time.

Habitat effectiveness - See "Wildlife habitat effectiveness."

Habitat grouping - Grouping of habitat types in logical categories to facilitate resource planning.

Habitat type - The aggregate of all areas that support or can support the same primary vegetation at climax.

Hiding cover - Vegetation that will hide 90 percent of an elk from human view at a distance of 200 feet or less.

Horizontal diversity - The distribution and abundance of different plant and animal communities or successional stages across an area of land.

Implementation - Those activities necessary to respond to the approved Land and Resource Management Plan.

Incidental grazing - Grazing use that occurs on lands not normally managed for the production of domestic livestock.

Indeterminate stands - A group of trees of similar age and species composition that has been invaded by other tree species to the point where the original group has lost its identity as a distinct unit.

Indirect outputs - Outputs caused by the action but which are later in time or farther removed in distance.

Individual (single) tree selection - Trees are removed individually, here and there, each year over an entire forest or stand.

Induced outputs - Outputs in the private sector induced by the Forest's direct outputs.

Inherent edge - Naturally occurring breaks between two or more elements of the environment.

Improvement cutting - Removing trees of undesirable species, form, or condition.

Indicator species - A plant or animal species adapted to a particular kind of environment. Its presence is sufficient indication that specific habitat conditions are also present.

Individual tree selection cutting - Involves the removal of selected trees.

Input/output analysis - A quantitative study of the interdependence of a group of activities based on the relationship between inputs and outputs.

Insecticide - An agent used to control insect populations.

Instream flows - Those nonconsumptive in situ quantities of water necessary to meet seasonal stream flow requirements to accomplish the purposes of the National Forests, including, but not limited to, maintenance of favorable conditions of water flow, fisheries, visual quality, and recreational opportunities at acceptable levels.

Integrated pest management - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed.

Intensive grazing - Grazing management that controls distribution of cattle and duration of use on the range, usually by fences, so parts of the range are rested during the growing season.

Intensive management - A high investment level of timber management that includes use of precommercial thinnings, commercial thinnings, genetically improved stock, and control of competing vegetation.

Interdisciplinary approach - The utilization of individuals representing two or more areas of knowledge and skills focusing on the same task, problem, or subject.

Intermediate cutting - Any removal of trees from a stand between the time of its formation and the regeneration cut.

Intermittent streams - A stream which flows only at certain times of the year.

Intermountain Region - That part of the National Forest System which encompasses National Forests within the Intermountain Region (Utah, southern and central Idaho, western Wyoming, and Nevada).

Interpretive services - Visitor information services designed to enhance the visitors understanding, appreciation, and enjoyment of the Forest.

Inventory data and information collection - The process of obtaining, storing, and using current inventory data appropriate for planning and managing the Forest.

Irretrievable - Applies to losses of production, harvest, or commitment of renewable natural resources.

Irreversible - Applies primarily to the use of nonrenewable resources such as minerals.

Issue - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

Kuchler vegetation types - Potential natural vegetation as classified by Kuchler.

Key winter range - The portion of the year-long range where big game find food and/or cover during severe winter weather.

Land class - The topographic relief of a unit of land. Land classes are separated by slope, which coincides with the timber inventory process.

Land exchange - The conveyance of non-Federal land or interests in the United States in exchange for National Forest System land or interests in land.

Landing - Any place where round timber is assembled for further transport, commonly with a change of method.

Landline - For Forest Plan purposes, National Forest property boundaries.

Landline location - Legal identification and accurate location of National Forest property boundaries.

Late Forest succession - A stage of Forest succession where the majority of trees are mature or overmature.

Landownership pattern - The National Forest System resource land base in relation to other landownerships within given boundaries.

Linear programming - A mathematical method used to determine the cost-effective allocation of limited resources between competing demands when both the objective (profit or cost) and the restrictions on its attainment are expressible as a system of linear equalities or inequalities; e.g., $y=x+bx$.

Local dependent industries - Industries relying on National Forest outputs for economic activity.

Local road - See "Forest local road".

Logging residues - The unused portions of poletimber and sawtimber trees remaining after logging.

Long-term sustained yield timber capacity - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives.

M - Thousand

Management action - Any activity undertaken as part of the administration of the Forest.

Management area - An area of land with similar management goals and a common management prescription.

Management concern - An issue, problem, or a condition which constrains the range of management practices identified by the Forest Service in the planning process.

Management direction - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

Management intensity - A management practice or combination of management practices and associated costs designed to obtain different levels of goods and services.

Management indicator species - A species selected because its population changes indicate effects of management activities on the plant and animal community.

Management opportunity - A statement of general actions, measures, or treatments that address a public issue or management concern in a favorable way.

Management practice - A specific activity, measure, course of action, or treatment.

Management prescription - Management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives.

Management program - A set of activities designed to achieve a specific outcome.

Management standards and guidelines - See standards and guidelines.

Mature timber - Trees that have attained full development, particularly height, and are in full seed production.

Market-value outputs - Goods and services valued in terms of what people are willing to pay for them, as evidenced by market transactions.

Maximum modification - See "Visual quality objectives."

MAUM's - A symbol to indicate 1,000 animal unit months of range forage.

MBF - Thousand board feet, a measure of wood volume.

MCF - Thousand cubic feet, a measure of wood volume.

Mean annual increment of growth - The total increase in girth, diameter, basal area, height, or volume of individual trees, or a stand up to a given age divided by that age.

Middleground - The visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly from the stand.

Mineral development - The preparation of a proven deposit for mining.

Mineral entry - The filing of a mining claim for public land to obtain the right to any minerals it may contain.

Mineral entry withdrawal - The exclusion of the right of exclusive possession by the locator of locatable mineral deposits and mineral development work on areas required for administrative sites by the Forest Service and other areas highly valued by the public. Public lands withdrawn from entry under the general mining laws and/or the mineral leasing laws.

Mineral exploration - The search for valuable minerals on lands open to mineral entry.

Mineral fractions - Small, irregularly shaped parcels of National Forest lands created by the presence of a number of mining patents haphazardly located.

Mineral production - Extraction of mineral deposits.

Mineral soil - Weathered rock materials without any vegetative cover.

Minerals, common variety - Such deposits as sand, stone, gravel, pumicite, cinders, pumice, clay, and petrified wood.

Minerals, leasable - Coal, oil, gas, phosphate, sodium, potassium, oil shale, sulphur, and geothermal steam.

Minerals, locatable - Generally, those hardrock minerals which are mined and processed for the recovery of metals.

Minimum streamflows - A specified level of flow through a channel that must be maintained by the users of streams for biological, physical, or other purposes.

Mining claims - That portion of the public estate held for mining purposes in which the right of exclusive possession of locatable mineral deposits is vested in the locator of a deposit.

Mitigation - Actions to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice.

MM - Million.

MMBF - Million board feet.

MMCF - Million cubic feet.

Modification - See "Visual quality objectives."

Monitoring and evaluation - The periodic evaluation on a sample basis of Forest Plan management practices to determine how well objectives have been met and how closely management standards have been applied.

Mortality - Trees of commercial species, standing or down, that have died during a specified period and were not cull trees at the time of death.

Mosaic of forest and openings - Areas with trees and areas without trees occurring in interrupted sequence.

Mountain Pine Beetle - A tiny black insect, ranging in size from 1/8 to 3/4 inch, that bores into the tree's cambium and cuts off its supply of food, thus killing the tree.

Multiple Use - The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet public needs.

National Environmental Policy Act (NEPA) - An Act to declare a National policy which will encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

National Forest Land and Resource Management Plan - A Plan developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management.

National Forest landscape management system - The planning and design of the visual aspects of multiple-use land management.

National Forest Management Act (NFMA) - A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

National Forest System (NFS) lands - National Forests, National Grasslands, or purchase units, and other lands under the management of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

National Recreation Trails - Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the National system of trails authorized by the National Trails System Act.

National Register of Historic Places - A listing (maintained by the U.S. National Park Service) of areas which have been designated as being of historical significance.

National Wilderness Preservation System - All lands covered by the Wilderness Act and subsequent Wilderness designations.

Natural barrier - A natural feature that will restrict livestock movements.

Natural catastrophic condition - A significant change in Forest conditions on the area that affects Forest Plan resource management objectives and their projected and scheduled outputs, uses, costs, and impacts on local communities.

Net public benefits - An expression used to signify 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.

NFRS - Inventoried National Forest Recreation Sites.

No-action alternative - The most likely future condition if current management direction were to continue unchanged.

Noncommercial vegetative treatment - The removal of trees that cannot be bought and sold.

Nonconsumptive use - That use of a resource that does not reduce the supply. Fishing, for example, is a nonconsumptive use of water.

Nondeclining flow - The principle expressed by the definition of the base sale schedule.

Nonforest land - See "Timber classification."

Nongame - Species of animals which are not managed for sport hunting.

Nonpoint source pollution - Sources of pollution that are diffuse in origin.

Nonmarket valued outputs - Goods and services not generally traded in the marketplace, but valued in terms of what reasonable people would be willing to pay for them rather than go without.

Notice of Intent - Written notice of proposed activities.

Noxious weeds - A troublesome plant species of no known benefit to man.

Occupancy trespass - The illegal occupation or possession of National Forest land or property.

Off-road vehicle (ORV) - Such as motorcycles, all-terrain vehicles, four-wheel drives, and snowmobiles.

Old growth - A stand of trees that is past full maturity and showing decadence.

Old growth habitat - Habitat for certain wildlife that is characterized by overmature coniferous forest stands with large snags and decaying logs.

Oligotrophic - Lakes having low nutrient supplies which are poor producers of organic matter.

Operational Plan - A written document approved by the Forest Supervisor which provides specifically, at the project level, for implementation of the management direction established in the Forest Plan.

Opportunity - See management opportunity.

Optimum - A level of production that is consistent with other resource requirements as constrained by environmental, social, and economically sound conditions.

ORV-- An abbreviation for off-road vehicles.

Outputs - Describing any result, product, or service that a process or activity actually produces.

Overflow camping - Developed site camping that exceeds site capacity.

Overmature timber - Trees that have attained full development, particularly in height, and are declining in vigor, and soundness.

Overstory - That portion of the trees, in a Forest or more than one story, forming the uppermost canopy.

PAOT - See Persons-at-one-time.

PAOT Days - A measurement term indicating capacity (PAOT) multiplied by the number of days (24 hour period) which an area or sites are managed.

PARS - The burned acreage and fire occurrence guidelines which represent the annual average long-term fire loss.

Partial retention - See "Visual quality objectives."

Particulates - Small particles suspended in the air and generally considered pollutants.

Patented mining claim - A patent is a document which conveys title to land.

Payment in lieu of taxes - Payments to local or state governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing.

Personal use - Normally used to describe the type of permit issued for removal of wood products (firewood, post, poles, and Christmas trees) from National Forest land when the product is for home use and not to be resold for profit.

Persons-at-one-time (PAOT) - A recreation capacity measurement term indicating the number of people who can use a facility or area at one time.

Person-year - Approximately 2,080 working hours. May be filled by one person working year long or several people filling seasonal positions.

Physiographic surface - A land surface created by geological processes.

Planned ignitions - A fire started by a deliberate management action.

Planning area - The area of National Forest land covered by a Regional Guide or Forest Plan.

Planning corridor - A general broad linear area of land used to evaluate where a specific right-of-way could be placed.

Planning criteria - Standards, tests, rules, and guidelines by which the planning process is conducted and upon which judgments and decisions are based.

Planning period - The 50-year time frame (1980-2030) for which goods, services, and effects were projected in the development of the Forest Plan.

Planning questions - A major policy question of long-range significance, derived from the public issues and management concerns, to be decided when selecting among alternative Forest Plans.

Planning records - A system that records decisions and activities which result from the process of developing a Forest Plan, revision, or significant amendment.

Pole/sapling - A Forest successional stage in which trees between 5- and 7-inch diameter are the dominant vegetation.

Pole timber - Line trees at least 5 inches in diameter at breast height but smaller than the minimum utilization standard for sawtimber.

Policy - A guiding principle.

PNV - An abbreviation of present net value.

Practices - Those management activities that are proposed or expected to occur.

Precommercial thinning - The practice of removing some of the trees less than merchantable size from a stand so that the remaining trees will grow faster.

Predator - One that preys, destroys, or devours--usually an animal that lives by preying on other animals.

Preparatory cut - The removal of trees near the end of a rotation, which permanently opens the canopy and enables the crowns of seed bearers to enlarge and improve conditions for seed production and natural regeneration. Typically done in the shelterwood system.

Prescribed fire - A wildland fire burning under specified conditions which will accomplish certain planned objectives.

Prescription - A predesignated set of criteria established for the use of prescribed fire to accomplish specific land and resource management objectives.

Preservation - A visual quality objective that allows for only ecological changes.

Presuppression - Activities organized in advance of fire occurrence to assure effective suppression action.

Primitive recreation - Those recreation activities which occur in a natural environment of fairly large size.

Primitive roads - Roads constructed with no regard for grade control or designed drainage, sometimes by merely repeatedly driving over an area.

Productive Forest lands - Forest lands that are capable of producing crops of industrial wood and have not been reserved or deferred.

Production potential - The capability of the land or water to produce a given resource.

Program - When capitalized, the Renewable Resource Program required by the RPA. Generally, sets of activities or projects with specific objectives.

Program Budget - The fiscal planning document for estimating short- and long-range dollar needs by program area.

Program development and budgeting - The process by which activities for the Forest are proposed and funded.

Programed harvest - The part of the potential yield that is scheduled for harvesting. It is based on current demand, funding, and multiple use considerations.

Project administrative site - A site with facilities such as guard stations, project work cabins, and other facilities primarily existing for project purposes.

Project design - The process of developing specific information related to location, timing, activities, accountability, and control that result in the achievement of an objective or desired future condition.

Projects - Work schedule prescribed for a project area to accomplish management prescriptions.

Proponent interest - An individual or organization desiring to develop and operate a winter sports site.

Public access - Usually refers to a road or trail route over which a public agency claims a right-of-way for public use.

Proposed action - In terms of the National Environmental Policy Act, the project, activity, or decision that a Federal agency intends to undertake.

Public issue - A subject or question of widespread public interest relating to management of the National Forest System.

Public participation - Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning.

QRD - A decision aiding tool comprised of three separate parts: (1) Question analysis "Q," (2) rules "R," and (3) Data "D." Question analysis is the process of breaking a question into more detailed specific questions. Rules means the knowledge and assumptions whereby raw data is changed into information relating to the question. Once the question and rules are analyzed, then a determination (D) can be made of the data needed to answer the question.

Quad maps - Standard U.S. Geological Survey quadrangle maps.

Quality management (range) - Management of the range ecosystem where vegetation production is being maximized, soils disturbance is minimal, and animal production is high. Impacts to the environment are low.

Range - Land producing native forage for animal consumption and lands that are revegetated naturally or artificially to provide forage cover that is managed like native vegetation.

Range allotment - An area designated for use of a prescribed number and kind of livestock under one management plan.

Range condition - The state of health of the range based on what it is naturally capable of producing.

Ranger District - Administrative subdivisions of the Forest supervised by a District Ranger who reports to the Forest Supervisor.

Raptors - Bird of prey with a strong notched beak and sharp talons, such as the eagle, hawk, owl.

RARE II - See Roadless Area Review and Evaluation II.

Real dollar value - A monetary value that compensates for the effects of inflation.

Record of Decision - A document separate from but associated with an Environmental Impact Statement that publicly and officially discloses the responsible official's decision on which alternative assessed in the Environmental Impact Statement to implement.

Recreation capacity - The number of people that can take advantage of the

recreation opportunity at any one time without substantially diminishing the quality of the experience.

Recreation experience level - A classification (using a 1 to 5 scale) of the level of development in camp and picnic sites.

Recreation Information Management (RIM) - The Forest Service system for recording recreation facility condition and use.

Recreation management area - An area of several thousand acres where the management emphasis is on recreation and where there is direction given to establish a Recreation Area Management Plan.

Recreation opportunity - Availability of a real choice for a user to participate in a preferred activity within a preferred setting.

Recreation Opportunity Spectrum (ROS) - A method of measuring the ability of the Forest land to meet the various recreation demands.

Recreation (PAOT) - Refers to people at one time that occupy a given campground, picnic area, or any other developed recreation area.

Recreation residences - Houses or cabins on National Forest land that are not the primary residence of the owner.

Recreation types - A term used to indicate the type of recreation experience sought by Forest users.

Recreation visitor day (RVD) - Twelve visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

Recreational livestock - Animals used primarily in conjunction with recreation such as horses, mules, etc.

Reduced service management - Management of developed recreation facilities below optimum maintenance standards.

Reforestation - The natural or artificial restocking of an area with forest trees.

Regeneration - The renewal of a tree crop, whether by natural or artificial means. Also, the young crop itself.

Region - For Regional planning purposes, the standard administrative Region of the Forest Service administered by the official responsible for preparing a Regional Guide.

Regional analysis areas - Geographic areas within the Region that encompass several Forests or Grasslands.

Regional Forester - The official responsible for administering a single Region.

Regional Guide - The guide developed to meet the requirements of the Forest

and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands of a given Region.

Regulations - Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers management of the Forest Service.

Removal cut (final cut) - The removal of the last seed bearers or shelter trees after regeneration is established under a shelterwood method.

Research Natural Areas - An area in a natural condition which exemplifies typical or unique vegetation and associated biotic, soil, geologic, and aquatic features. The area is set aside to preserve a representative sample of an ecological community primarily for scientific and educational purposes.

Residual stand - The trees remaining standing after some event such as.

Residual utilization - Removal and use of forest residue such as slash for home heating or wood products.

Resource allocation model - A mathematical model using linear programming which will allocate land to prescriptions and schedule implementation of those prescriptions simultaneously.

Resource element - A major Forest Service mission-oriented endeavor which fulfills statutory or executive requirements and comprises a collection of activities from the various operating programs required to accomplish the mission. The eight resource elements are: Recreation, wilderness, wildlife and fish, range, timber, water, minerals, and human and community development.

Resource Management Plan - A Plan developed prior to the Forest Plan that outlines the activities and projects for a particular resource element independently of considerations for other resources. Such Plans are superseded by the Forest Plan.

Resource use and development opportunities - A possible action, measure, or treatment and corresponding goods and services identified and introduced during the scoping process which subsequently may be incorporated into and addressed by the Land and Resource Management Plan in terms of a management prescription.

Responsible official - The Forest Service employee who has been delegated the authority to carry out a specific planning action.

Retention - See "Visual quality objectives."

Retrogressive vegetative succession - A reversal of the usual ecological trend toward more complex and stable plant communities.

Right-of-way - An accurately located strip of land with defined width, point of beginning, and point of ending. It is the area within which the user

has authority to conduct operations approved or granted by the landowner in an authorizing document, such as a permit, easement, lease, license, or Memorandum of Understanding (MOU).

Riparian - Areas of land directly influenced by water. Examples are stream sides, lake borders, or marshes.

Riparian ecosystems - A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem.

Road - A general term denoting a travel route for vehicles greater than 40 inches in width.

Forest arterial road. Provides service to large land areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes.

Forest collector road. Serves smaller land areas than a Forest arterial road and is usually connected to a Forest arterial or public highway. Collects traffic from Forest local roads and/or terminal facilities.

Forest local road. Connects terminal facilities with Forest collector or Forest arterial roads, or public highways.

Road maintenance levels - Levels are described as follows:

Level 1. Road normally closed to vehicle traffic.

Level 2. Road open for limited passage of traffic but not normally suitable for passenger cars.

Level 3. Road open for public traffic including passenger cars, but may not be smooth or comfortable.

Level 4. Road suitable for all types of vehicles, generally smooth to travel, and dust may be controlled.

Level 5. Road is smooth and dust free, and the surface is skid resistant if paved.

Roaded natural - A classification of the recreation opportunity spectrum that characterizes a predominately natural environment with evidence of moderate permanent alternate resources and resource utilization.

Roadless Area Review and Evaluation II (RARE II) - The national inventory of roadless and undeveloped areas within the National Forest and Grasslands. This refers to the second such assessment, which was documented in the Final Environmental Impact Statement of the Roadless Area Review and Evaluation, January 1979.

Rotation - The planned number of years between the formation of a regeneration of trees and its final cutting at a specified stage of maturity.

Roundwood - Timber and fuelwood prepared in the round state--from felled trees to material trimmed, barked, and crosscut.

RPA Program - The Forest and Rangeland Renewable Resources Planning Act of

1974. Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of the Act. The most recent recommended program was done in 1980.

RSM - Reduced service management; refers to recreation administration, operation, and maintenance at a level below established standards and management objectives (due to inadequate funding).

Rural - A recreation opportunity spectrum classification for areas characterized by a substantially modified natural environment.

RVD's - An abbreviation of recreation visitor days.

Sale schedule - The quantity of timber planned for sale by time period from an area of suitable land covered by a Forest Plan.

Saleables - See "Minerals, common variety."

Salvage cutting - The exploitation of trees that are dead, dying, or deteriorating before their timber becomes worthless.

Sanitation cutting - The removal of dead, damaged, or susceptible trees, done primarily to prevent the spread of pests or pathogens

Sawtimber - Live trees that equal or exceed the minimum utilization standard for sawtimber.

Scenic areas - Places of outstanding or matchless beauty which require special management to preserve these qualities.

Scenic easement - An interest in the land of another which allows the easement holder specified uses or rights without actual ownership of the land.

Scoping process - The public land management activities used to determine the range of actions, alternatives, and impacts to be considered in an Environmental Impact Statement.

Second growth - Forest growth that has become established after some interference with the previous Forest crop.

Seed tree cutting - Removal in one cut of the mature timber crop from an area, except for a small number of seed bearers left singly or in small groups.

Seedlings and saplings - Live trees less than 5 inches in diameter at breast height.

Selected alternative - The alternative recommended for implementation as the Forest Plan based on the evaluation completed in the planning process.

Selection - See "Group selection" and "Individual (single) tree selection."

- Semiprimitive motorized - A classification of the recreation opportunity which present at least moderate challenge, risk, and a high degree of skill testing.
- Semiprimitive nonmotorized - A classification of the recreation opportunity spectrum characterized by a predominately unmodified natural environment of a size and location that provides a good to moderate opportunity for isolation from sights and sounds of man.
- Sensitive species - Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alternations.
- Sensitivity level - A particular degree of measure of viewer interest in scenic qualities of the landscape.
- Shade-intolerant plants - Plant species that do not germinate or grow well in the shade.
- Shade-tolerant plants - Plants that grow well in shade.
- Shelterwood - The cutting method that describes the silvicultural system in which, in order to provide a source of seed and/or protection for regeneration, the old crop (the shelterwood) is removed in two or more successive shelterwood cuttings.
- Seral condition - The unique characteristics of a biotic community which is a developmental, transitory stage in an orderly ecologic succession involving changes in species, structure, and community processes with time.
- Shrub/seedling - A Forest successional stage in which shrubs and seedling trees are the dominant vegetation.
- Sight distance - The distance at which 90 percent or more of a deer or elk is hidden from an observer.
- Silvicultural examination - The process used to gather the detailed in-place field data needed to determine management opportunities and direction for the timber resource within a small subdivision of a Forest area such as a stand.
- Silvicultural system - A management process whereby Forests are tended, harvested, and replaced, resulting in a Forest of distinctive form.
- Single-tree selection - See "Individual (single) tree selection."
- Site index - A numerical evaluation of the quality of land for plant productivity.
- Site preparation - A general term for removing unwanted vegetation, slash, roots and stones from a site before reforestation.
- Site productivity - Production capability of specific areas of land.

Size class - For the purposes of Forest planning, size class refers to the three intervals of tree stem diameter used for classification of timber in the Forest Plan data base.

- less than 5-inch diameter = seedling/sapling
- 5- to 7-inch diameter = pole timber
- greater than 7-inch diameter = sawtimber

Skidding - Moving logs by sliding from stump to roadside, deck, skidway, or other landing.

Skier day - Measure of downhill skiing use equivalent to one person skiing for 8 hours.

Slash - The residue left on the ground after timber cutting and/or accumulating there as a result of storm, fire, or other damage.

Slope slump - A slide or earthflow of a soil mass.

Small game - Birds and small mammals normally hunted or trapped.

Snag - A nonliving standing tree.

Social disruption - The disruption or breaking up of people's lives.

Society of American Foresters (SAF) forest and cover types - A forest type is a descriptive term used to group stands of similar character in regards to composition and development due to given ecological factors, by which they may be differentiated from other groups of stands.

Soil productivity - The capacity of a soil to produce a specific crop such as fiber or forage under defined levels of management.

Soil surveys - Systematic examinations of soils in the field and in laboratories.

Sound wood - Timber free from defect.

Special Use Permit - A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest land for some special purpose.

Spring break-up - The time of year when roads break up due to melting frost and ice.

Stand (tree stand) - An aggregation of trees or other vegetation occupying a specific area and sufficiently uniform in composition to be distinguishable.

Stand examination surveys - Procedures consisting of seven types of surveys used to collect data on Forest stands.

Stand size class - A classification of forest land based on the predominant size of trees present.

Standard and Guideline - A principle requiring a specific level of attainment.

State Air Quality Regulations - The legal base for control of air pollution sources in that state.

State Implementation Plan - A State Plan that covers implementation, maintenance, and enforcement of primary and secondary standards in each air quality control region, pursuant to Section 110 of the Clean Air Act.

Strategic minerals - Those minerals of which the U.S. imports 50 percent or more from foreign sources (based on 1978 U.S. Bureau of Mines figures).

Stream - A water course having a distinct natural bed and banks which provides water at least periodically.

Successional stage - A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax.

Suitability - The appropriateness of applying certain resource management practices to a particular area.

Suitability analysis - Process of identifying lands to be managed for timber production.

Suitable Forest land - Lands allocated to timber management as a result of suitability analysis.

Supply - A schedule of the quantity of a product or Forest output that will be produced at various prices.

Supply potential - The output production possible from the available resources.

Suppression - An act extinguishing or confining fire.

Surface resources - Renewable resources located on the earth's surface in contrast to ground water and mineral resources located below the earth's surface.

Sustained yield of products and services - The achievement of maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest without impairment of the productivity of the land.

Targets - A quantifiable output. Assignments made to the Forest by the Regional Forester.

Technically suitable Forest land - Land for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions.

Temporary road - A road that will be physically obliterated and seeded after its primary use is completed.

Thermal cover - Cover used by animals to ameliorate effects of weather.

Thinning - A felling made in an immature stand primarily to maintain or accelerate diameter increment and also to improve the average form of the remaining trees without permanently breaking the canopy.

Threatened species - Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future.

Tiering - Refers to additional coverage of general matters in broader Environmental Impact Statements.

Timber base - The lands within the Forest capable, available, and suitable for timber production.

Timber classification - Forested land is classified under each of the land management alternatives according to how it relates to the management of the timber resource.

1. Forest land - Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for nonforest use.
2. Suitable forest land - Land that is managed for timber production on a regulated basis.
3. Unsuitable forest land (not suited) - Forest land that for various reasons is not managed for timber production.
4. Tentatively suitable (commercial forest land) - Forest land which is producing or is capable of producing crops of industrial wood.

Timber harvest schedule - See "Sale schedule."

Timber production - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use.

Timber stand improvement (TSI) - Measures such as thinning, pruning, release cutting, prescribed fire, girdling, weeding, or poisoning of unwanted trees aimed at improving growing condition of the remaining trees.

Tractor logging - Any logging method which uses a tractor as the motive power for transporting logs from the stumps to a collecting point--whether by dragging or carrying the logs.

Tradeoff Evaluation Process (TEP) - A process whereby factors, issues, elements, etc., are evaluated with regard to the tradeoffs that would occur.

- Trail maintenance level - One of the categories outlined in the Management Information Handbook describing the type and intensity of maintenance for trails.
- Transitory range - Land that is suitable for grazing use of a nonenduring nature over a period of time.
- Travel management - The administrative decisions on the location and timing of road and trail closures.
- Treatment area - The site-specific location of a resource improvement activity.
- Tree opening - An opening in the forest cover created by the application of even-aged silvicultural practices.
- Type conversion - The conversion of the dominant vegetation in an area from forested to nonforested or from one tree species to another.
- Understory - The trees and other woody species growing under a more-or-less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.
- Uneven-aged management - The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products.
- Uneven-aged silviculture systems - The combination of action that results in the creation of forests or stands of trees, in which trees of several or many ages grow together.
- Individual tree selection cutting. The removal of selected trees of all size classes on an individual basis.
- Group selection cutting. The removal of selected trees of all size classes in groups of a fraction or an acre up to two or three acres in size.
- Unpatented mining claim - See "Mining claim."
- Unplanned ignition - A fire started at random by either natural or human causes, or a deliberate incendiary fire.
- Unregulated harvest - This harvest is not charged against the allowable sale quantity, and includes occasional volumes removed that were not recognized in calculations of the allowable sale quantity, such as cull or dead material and noncommercial species and products. It also includes all volume removed from nonsuitable areas. Harvests from nonsuitable areas will be programmed as needed for objectives such as research on experimental Forests, to meet multiple use objectives other than timber production, and for improvement of administrative sites.

Unsuitable lands - See "Timber classification."

Utilization standards - Standards guiding the projection of timber yields and the use and removal of timber. The standards are described in terms of minimum diameter at breast height, minimum length, and percent soundness of the wood, as appropriate.

Variety class - A classification system for establishing three visual landscape categories according to the relative importance of the visual features. This classification system is based on the premise that all landscapes have some visual values, but those with the most variety or diversity of visual features have the greatest potential for high scenic value.

Vegetative management - Activities designed primarily to promote the health of the Forest cover for multiple-use purposes.

Vertical diversity - The diversity in a stand that results from the complexity of the above-ground structure of the vegetation; the more tiers of vegetation.

Visual absorption capability - The ability of the landscape to conceal evidence of human modifications. Rated as high, moderate, and low.

Viable populations - A number of individuals of a species sufficient to ensure the long-term existence of the species in natural self-sustaining populations adequately distributed throughout their region.

Visitor Information Service (VIS) - Activities which interpret for visitors, in layman's language, Forest management, protection, utilization, and research.

Visual quality objective (VQO) - Categories of acceptable landscape alteration measured in degrees of deviation from the natural appearing landscape.

Preservation (P) - Ecological change only here.

Retention (R) - Human activities should not be evident to the casual Forest visitor.

Partial Retention (PR) - Human activities may be evident but must remain subordinate to the characteristic landscape.

Modification (M) - Human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

Maximum Modification (MM) - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Enhancement - A short-term management alternative which is done with the express purpose of increasing positive visual variety where little variety now exists.

Visual resource - The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

VQO - An abbreviation of visual quality objective.

Water rights - Rights to divert and use water or to use it in place.

Water yield - The measured output of the Forest's streams.

Water yield increase - Additional water released to the Forest streams as a result of Forest management activities.

Watershed - The entire area that contributes water to a drainage system or stream.

Wetlands - Areas that are inundated by surface or ground water with a frequency sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Wilderness - Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation.

Wildfire - Any wildland fire that is not a prescribed fire.

Wildlife habitat diversity - The distribution and abundance of different plant and animal communities and species within a specific area.

Wildlife habitat effectiveness - The character of locations where wildlife are not disturbed by human activities.

Window - A critical segment of terrain through which right-of-way could pass in traversing from point of origin to destination.

Winter range - See "Big game winter range."

Withdrawal - An order removing specific land areas from availability for certain uses.

Wood fiber production - The growing, tending, harvesting, and regeneration of harvestable trees.

Work center - A facility where crews assemble and are direct toward their various work assignments.

Year-round economies - Economies based on employees working year-round as opposed to seasonal employment.

Zone of influence (ZOI) - The area influenced by Forest Service management activities.

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