

CHAPTER 4.0 CASE STUDY: GEORGE WASHINGTON NATIONAL FOREST

This chapter focuses on the George Washington National Forest. In 1979, George Washington National Forest personnel published and distributed 3000 copies of an “Issues and Concerns” publication to initiate the forest plan development process. In 1986, a Final Environmental Impact Statement (EIS) and Land and Resource Management Plan (Forest Plan) were approved by the Regional Forester for the George Washington National Forest. During the Final EIS review period, before issuance of the Record of Decision (ROD), 18 appeals were filed. The Chief of the Forest Service concluded that the EIS and Forest Plan had not gained agency or public acceptance, and therefore, remanded the 1986 decision (USFS 1993a). The Chief Forester instructed the George Washington National Forest to start the NEPA planning process again. A Revised Final EIS and Revised Forest Plan were approved in 1993 as was the ROD.

The analytical case study of the George Washington National Forest involved a three-step process. First, the 1986 Final EIS and Forest Plan documents were analyzed using the NEPA questions, followed by the ecosystem management questions. Second, the 1993 Final EIS and Forest Plan documents were analyzed using the NEPA and ecosystem management questions. Third, a comparative evaluation was undertaken of the 1986 Final EIS and Forest Plan results to the 1993 Final EIS and Forest Plan results for both the NEPA and ecosystem management question evaluations. The third step is presented here. Appendices C and D contain the output of the first and second steps.

As detailed in Sections 2.4.2 and 3.4.2, the questions were formulated for their ability to contribute to the defined “ideal” sets of NEPA and ecosystem management criteria. The criterion indicators for each question range from satisfying the “ideal” NEPA or ecosystem management criteria to not satisfying the “ideal” NEPA or ecosystem management criteria.

4.1 Description of the George Washington National Forest

The following description of the George Washington National Forest was summarized from the account of the Forest environs found in the 1993 Final EIS.

The George Washington National Forest extends 140 miles along the Appalachian Mountains of northwestern Virginia and adjacent West Virginia. The boundary of the forest encompasses 1.8 million acres, of which 1.1 million acres are National Forest land. National Forest land is interspersed with land that remains in private ownership. Approximately 300,000 acres, located near the center of the Forest, form a relatively consolidated block of National Forest land. At least six additional areas have contiguous National Forest land in blocks of 10,000 acres or more. According to the Forest Service, the intermingled ownership pattern causes some Forest tracts to

be inaccessible to the public and difficult to manage. Approximately 30 to 35 percent of the total land area in and adjacent to the Forest is devoted to agriculture (USFS 1993a).

The Forest includes the Blue Ridge, Shenandoah, Massanutten and Allegheny ranges of the Appalachian Mountain system. The Forest lies within the James and Potomac river basins, and within the Blue Ridge and Ridge and Valley physiographic provinces. Generally, elevations range between 1000 to 3000 feet; however, several mountaintop elevations exceed 4000 feet (USFS 1993a).

The Forest is part of the Appalachian Hardwood Forest within the Eastern Deciduous Forest Province. There are over 40 tree species and over 2000 species of shrubs and herbaceous plants. Hardwood-dominated forest types comprise approximately 80 percent of the forested acreage and conifers comprise the remainder. The Forest is divided into four broad forest-type groups representing the Mixed Oak Forest of the Appalachian Hardwood Subregion: chestnut oak-scarlet oak, white oak-black oak, red oak-red maple, and yellow poplar-mixed hardwood. These four groups provide a general grouping of the physical and biological factors related to site productivity and soil moisture regime. Chestnut oak-scarlet oak is the least productive forest group and occurs on the driest sites, while yellow poplar-mixed hardwoods is the most productive forest group, occurring on sites with the most soil moisture (USFS 1993a).

Practically all 1.1 million acres of vegetation experienced drastic disturbance in the past from two events: (1) uncontrolled logging and burning between 1885 and 1925 and (2) disease infestation by the chestnut blight which peaked around 1920. To put these disturbances into perspective, only about 158,000 acres of vegetation (15 percent of the Forest) have been disturbed by timber harvest under Forest Service jurisdiction from 1914 to 1993. Regeneration of the Forest has occurred in two ways: (1) co-dominant species already present in the overstory filled in the available space and (2) more complex changes occurred, resulting in the emergence of species not previously dominant in the overstory. The Forest vegetation is again facing a major disturbance with the defoliation of 250,000 acres from 1986 to 1993 by the gypsy moth (USFS 1993a).

Old growth is a distinct condition that any forest type can reach if the site is not strongly disturbed for a long period. The 1986 Forest Statistics for the Northern Mountains of Virginia and for the State of Virginia indicated that since 1977 Forest cover declined almost 4 percent, but the area of timberland supporting stands more than 70 years old increased by 16 percent. Old forest conditions are uncommon statewide with less than 0.5 percent of all growing-stock trees greater than 19 inches in diameter and over 87 percent under 7 inches in diameter. In the region of the George Washington National Forest, while area of timberland is decreasing, the remaining forest is getting older. Based on current forest inventory data and information available in the development of descriptions and

definitions for old growth forests in the Eastern United States, the Forest now contains almost 180,000 acres in an old growth condition (USFS 1993a).

Over 55 species of mammals occur on the Forest. Of particular interest are the 8 species of shrews and 10 species of bats. Two shrews, rock and pigmy shrew, are rare in Virginia, but are relatively common on the Forest. The Forest provides Virginia's only known habitat for water shrew, rock vole, and snowshoe hare. Other rare mammals include the least weasel, fisher, northern flying squirrel, Keen's myotis (bat), eastern small-footed bat, Indiana bat, and Virginia big-eared bat (USFS 1993a).

The Forest also provides habitat for approximately 175 species of birds. Federal and state (Virginia) listed species include Peregrine Falcon, Bald Eagle, Loggerhead Shrike, and Appalachian Bewick's wren. Approximately 70 species of amphibians and reptiles inhabit the Forest. Particularly abundant are the salamander species (more than 20 species), including the endemic Cow Knob salamander and the rare eastern tiger salamander. The number of invertebrate species on the Forest is unknown. A few groups, such as butterflies, dragonflies, cave invertebrates, and freshwater mussels, are better known and more widely studied (USFS 1993a).

The Forest has approximately 1287 miles of perennial streams, with 660 miles classified as cold water and 627 miles classified as cool or warm water. The Forest also has 3190 acres of lakes, ponds, and reservoirs. The Forest's aquatic habitat supports 67 species of game and non-game fish. Three species are listed as threatened, endangered, or sensitive: Potomac sculpin, roughhead shiner, and orangefin madtom (USFS 1993a).

Insect and disease organisms are a significant component of forest ecosystems. Major insect pests in the George Washington National Forest include the gypsy moth and the southern pine beetle. Minor insect pests include the hemlock woolly adelgid, twolined chestnut borer, and a variety of defoliators. Major disease problems include oak decline, dogwood anthracnose, shoe-string root rot, and a variety of decay organisms affecting living trees (USFS 1993a).

The George Washington National Forest contains a variety of prehistoric and historic cultural resources. Ongoing archaeological surveys have yielded 1401 sites. These include 1121 prehistoric and 280 historic sites. Five sites are on the National Register of Historic Places. Prehistoric sites include hunting stations, quarries, quarry/reduction stations, transient camps, base camps, hamlets, villages, and stone burial mounds. No confirmed Paleo-Indian occupation has been discovered on the Forest. Historic sites include schools and churches, inns and taverns, cabins, house sites, farmsteads, iron mines, lookout towers, railroads, stagecoach roads, graves or graveyards, CCC camps, plantations, Civil War campsites, etc. (USFS 1993a).

Steeped in the American traditions of the Shenandoah Valley and the Allegheny and Blue Ridge mountains, the Forest has been a travel-way for Native Americans, a passageway for pioneers, and the setting of Civil War battles. Throughout historic times, and no doubt in prehistoric times as well, people have enjoyed the beauty of the Forest. The visual resources benefit from the four distinct seasons of a hardwood forest. In or near the Forest, 13 rivers have been studied to determine their eligibility for National Wild and Scenic River designation. Of the 13 rivers studied, 11 were found eligible. Until a final determination is made for suitability, the Forest Service is obligated to protect those qualities that made the rivers eligible (USFS 1993a).

The Forest accommodates a variety of dispersed recreation activities including backpacking, day hiking, mountain biking, hang gliding, horseback riding, cross-country skiing, boating, sailing, water skiing, hunting, fishing, driving for pleasure, off-highway vehicle and all-terrain vehicle riding, swimming, picnicking, canoeing, camping, and gathering of forest products. There are six major developed recreation complexes on the Forest, and all areas offer both day-use and camping facilities. There are also 21 minor developed recreation sites on the Forest that offer camping, picnicking, canoeing, hiking, and interpretation. The Forest has 27 inventoried roadless areas for a total of approximately 260,000 acres that could be recommended for wilderness study. Four wilderness areas containing a total of 32,269 acres are located on the Forest (USFS 1993a).

Based on 1985 information, 240,263 persons are employed in the Forest impact area.¹ The largest employers are manufacturing; services; special industries; transportation, communications and utilities; and wholesale and retail sales. Based on 1985 information, \$5,723,492,000 of total income is generated annually in the Forest impact area (USFS 1993a).

Demand for forest products is expected to grow for the next 30 years. The George Washington National Forest offers a variety of forest products including hardwood and pine sawtimber, hardwood and pine pole timber, fuelwood, and other products. No towns or communities are entirely dependent on the Forest for their livelihoods. However, a number of families derive at least a part of their incomes by harvesting forest products from the Forest (USFS 1993a).

4.2 Evaluation Results for the George Washington National Forest

This section presents the NEPA and ecosystem management question results used to evaluate the George Washington National Forest 1986 Final EIS and Forest Plan and the 1993 Final EIS and Forest Plan.

¹ The George Washington National Forest impact area includes the 14 Virginia counties, the 5 West Virginia counties, and the 10 Virginia cities within close proximity of the Forest.

4.2.1 NEPA Evaluation

This section presents the 13 NEPA questions and the resulting Forest Service responses gleaned from a thorough review of the 1986 and 1993 Final EIS and Forest Plan documents for the George Washington National Forest. Table 4.1 provides a visual comparison of the NEPA question results for the 1986 and 1993 Final EIS and Forest Plan documents. The NEPA question responses determined to represent most appropriately Forest Service actions and plans are highlighted. Following each question and range of responses are statements summarizing information taken from the Final EIS and Forest Plan documents that support the selected question response. Appendix C provides more detailed statements and direct quotations taken from the 1986 and 1993 Final EIS and Forest Plan documents.

1. When and by whom were critical environmental impacts identified in the EIS?

- 86/93** other federal agencies, local and state government agencies, citizens, and/or environmental groups identified critical environmental impacts during Draft EIS review.
- other federal agencies, local and state government agencies, citizens, and/or environmental groups identified critical environmental impacts during Scoping.
 - critical environmental impacts were identified during interdisciplinary planning and decisionmaking sessions or in programmatic EIS.

From an ideal NEPA process perspective, most critical environmental impacts, along with economic and technical considerations, would be identified during interdisciplinary policy, planning and decisionmaking sessions—long before the actual EIS document process would be initiated. In the 1986 EIS process, Draft, Supplemental and Final EISs were prepared. With each revision to the EIS documents, numerous critical environmental impacts were identified by reviewing agencies and the public. Although the Forest Service made many changes to the Supplemental and Final EIS documents, they were apparently not deemed sufficient as 18 appeals were filed against the Final EIS. No ROD was published and the EIS was formally withdrawn. Opposition from other federal, state and local agencies, private organizations, and the public centered on issues such as excessive timber harvests, clearcutting, harvesting on slopes greater than 55 percent, harvesting in riparian areas, conversion from hardwood to pine stands.

In the 1993 EIS process, the Forest Service received 4268 letters of comment from the public, organizations, local, state and other federal agencies in response to the Draft EIS. As a result of the comments, the Forest Service made substantive changes from the Draft to the Final EIS—all alternatives were refined and a new alternative was developed as the preferred alternative. The Forest Service identified critical impacts as those resulting from activities that contributed to

Table 4.1. Comparison of NEPA Evaluations for the George Washington National Forest 1986 and 1993 Final EISs and Forest Plans.

	<u>1. When and by whom were critical environmental impacts identified in the EIS?</u>
86/93	<p>other federal agencies, local and state government agencies, citizens, and/or environmental groups identified critical environmental impacts during Draft EIS review.</p> <ul style="list-style-type: none"> other federal agencies, local and state government agencies, citizens, and/or environmental groups identified critical environmental impacts during Scoping. critical environmental impacts were identified during interdisciplinary planning and decisionmaking sessions or in programmatic EIS.
	<u>2. How were identified critical environmental impacts dealt with in the EIS?</u>
86	<ul style="list-style-type: none"> identified critical impacts were not fully discussed; no critical impacts avoided, mitigated, etc.
93	all identified critical impacts were discussed; all identified critical impacts were avoided, mitigated, etc.
	<u>3. How was ecological information integrated into the document and into the alternative selection process?</u>
86	<ul style="list-style-type: none"> minimally or not at all.
93	integrated in some areas, but not in others.
	<u>4. How were the magnitude and significance of relevant impacts of alternatives identified and estimated (including indirect and cumulative effects)?</u>
93	magnitude and significance of relevant environmental impacts of alternatives not identified.
86	<p>partial identification and estimation of magnitude and significance of relevant impacts of alternatives.</p> <ul style="list-style-type: none"> thorough identification and estimation of magnitude and significance of relevant impacts of alternatives (including indirect and cumulative effects).
	<u>5. How were identified irreversible or irretrievable commitments of resources addressed?</u>
93	not addressed.
86	<p>marginally; from a narrow perspective.</p> <ul style="list-style-type: none"> substantially.
	<u>6. To what extent was an integrated, systematic, interdisciplinary approach used?</u>
86/93	<ul style="list-style-type: none"> project completed entirely using in-house personnel from same disciplinary background. project completed using in-house personnel from numerous disciplinary backgrounds; other agencies or specialists consulted on a needs basis (e.g., permit required). interdisciplinary committee, composed of Forest Service and non-Forest Service members, formed at outset of this planning effort. ongoing interdisciplinary committee, composed of Forest Service and non-Forest Service members, involved in policymaking and planning processes.
	<u>7. What provisions were made for monitoring and evaluation?</u>
	<ul style="list-style-type: none"> none. importance of monitoring and evaluation discussed; no monitoring or evaluation plan delineated in the EIS/ROD.
86	monitoring plan outlined as part of the Final EIS/ROD; no specific monitoring or evaluation techniques given.
93	monitoring and evaluation plan developed as part of the Final EIS/ROD; forest-wide and site-specific standards delineated.

Table 4.1. Comparison of NEPA Evaluations for the George Washington National Forest 1986 and 1993 Final EISs and Forest Plans (continued).

	<u>8. How did the Final EIS/ROD address the mitigation of unavoidable impacts?</u>
	<ul style="list-style-type: none"> • not addressed. • general mitigation measures discussed, but no detailed mitigation plan developed as part of the Final EIS/ROD.
86	mitigation plan developed as part of Final EIS/ROD; only general mitigation measures proposed (Guidelines or Standards).
93	mitigation plan developed as part of Final EIS/ROD; site-specific and detailed mitigation measures delineated.
	<u>9. How was input sought from citizens, local and state government agencies, and environmental groups?</u>
	<ul style="list-style-type: none"> • no input sought.
86/93	input through informational meetings, open houses, letters, public hearings.
	<ul style="list-style-type: none"> • representatives of the general public, local, state, and other federal agencies, and organizations involved in ongoing Forest Service planning committees.
	<u>10. Was the project changed to reflect comments/concerns of citizens, local and state government agencies, environmental groups? How were the comments/concerns addressed?</u>
	<ul style="list-style-type: none"> • not at all; no reason given or comments ignored. • acknowledged comments/concerns; no or minimal changes made to the project.
86	project moderately changed; but not to the level of concerns/comments.
93	project changed during Scoping or after Draft EIS review to reflect the extent of comments/concerns.
	<u>11. How has the environmental information influenced the selection of the final plan of action as evidenced in the Final EIS/ROD?</u>
	<ul style="list-style-type: none"> • not at all.
86	minimal evidence of influence of environmental information.
	<ul style="list-style-type: none"> • environmental information integrated in some parts of planning and decisionmaking more than others, as evidenced in the selection of the final plan of action.
93	environmental information integrated throughout the planning and decisionmaking process as evidenced through the selection of the final plan of action.
	<u>12. Were unquantifiable environmental values given appropriate consideration in decisionmaking along with economic and technical considerations?</u>
	<ul style="list-style-type: none"> • not at all.
86	unquantifiable environmental values were quantified (e.g., willingness to pay) and entered into a model as constraints.
93	unquantifiable environmental values were not quantified, as such, and were given appropriate consideration.
	<u>13. Did the EIS provide a decisionmaking framework for consideration of all effects of alternatives, including environmental, economic and social effects?</u>
86	no decisionmaking framework provided.
	<ul style="list-style-type: none"> • decisionmaking framework provided for effects that were quantified.
93	decisionmaking framework provided for consideration of all effects of alternatives, including environmental, economic and social effects.

further forest fragmentation; affected ecosystem, species and genetic diversity; degraded riparian and wetland areas; or altered visual or aesthetic resources. The Forest Service did express disagreement concerning the likely severity of some impacts raised during agency and public review.

2. How were identified critical environmental impacts dealt with in the EIS?

- identified critical impacts were not fully discussed; no critical impacts avoided; mitigated, etc.

86 some identified critical impacts were discussed; some critical impacts were avoided, mitigated, etc.

93 all identified critical impacts were discussed; all identified critical impacts were avoided, mitigated, etc.

NEPA specifies that all identified critical impacts are to be discussed in the Final EIS. Further, the ROD must state whether all practicable means have been adopted to avoid or minimize environmental harm from the selected alternative, and if not, why they were not. In the 1986 EIS process, from the Forest Service's response to public and other federal, state and local agency comments and concerns, it became clear that agency personnel did not view the comments and concerns raised during the EIS process to be "critical impacts" nor did they see any problem with managing the Forest as they had over the past several decades with a focus on timber harvesting as the means by which other forest management goals were to be achieved. The Environmental Protection Agency (EPA) criticized the Draft EIS because it lacked sufficient information to determine whether all adverse environmental impacts were adequately addressed.

Many changes were made to the Supplemental and Final EISs that reflected the comments of other agencies and the public. However, most changes were only in degree or number and were not substantive. That is, while total acres considered suitable for timber harvesting was reduced by 64 percent, 54 percent of steep sloped areas would still be harvested with "special equipment," such as cable logging. The Final EIS proposed harvesting 10 percent of the Forest through uneven-aged management in direct response to the multitude of comments received against clearcutting (over 500 letters). The Forest Service, however, continued to promote clearcutting as the best harvesting method and timber harvesting as the means by which other forest management goals were to be achieved, regardless of the ecological, biodiversity, and aesthetic arguments offered in the EIS review comments to the contrary.

In the 1993 EIS process, all critical impacts identified during scoping and Draft EIS review were addressed in the Final EIS. Some impacts were avoided through management decisions and/or design changes. Other critical impacts were to be mitigated. The ROD referenced Chapter 4 of the Final Plan for mitigation measures that will be applied. The ROD did not specifically state

that all means have been adopted to avoid or minimize environmental harm, but it was implied throughout the discussion of issues addressed in the selection of the preferred alternative.

3. How was ecological information integrated into the document and into the alternative selection process?

- minimally or not at all.

86 integrated in some areas, but not in others.

93 integrated throughout document and in the alternative selection process.

NEPA requires the integration of ecological information throughout the EIS document and in the alternative selection process. In the 1986 EIS process, there was evidence of limited integration of ecological information in some areas, but not in others. The EIS and Forest Plan preparers did not demonstrate an understanding of ecosystem processes and the various short- and long-term effects of timber harvesting on those processes. Based on reviewer comments, other federal agencies, private organizations, and members of the “public” demonstrated a higher level of understanding of and appreciation for the complexity of ecosystem processes. Management options in the EIS did include the identification, protection or enhancement of various habitat types based on management indicator species selected in response to National Forest Management Act (NFMA) regulations and the Endangered Species Act. Because of reviewer comments, the Final EIS stated that it came closer to providing habitat for optimum populations of featured species vs. minimal viable populations provided for in the Draft EIS. The Draft and Supplemental EISs were also criticized for their lack of appropriate integration of geological information to inform management decisions. The U.S. Department of the Interior urged the Forest Service to evaluate the impacts on forest resources of past management practices. The Final EIS did not reflect either criticism. Timber harvesting was the only tool considered by the Forest Service for ecosystem manipulations to increase or maintain biodiversity levels.

The 1993 Final EIS integrated ecological information throughout the document and used this ecological information in the alternative selection process and for selecting the preferred alternative. Other federal agencies, environmental organizations, and many members of the public also demonstrated knowledge of ecological information. Whereas, comments received from most Virginia and West Virginia state agencies and other members of the public suggested a limited or no awareness of ecological information. The preferred alternative provided for large, unfragmented blocks, early and late successional habitats, and 17 percent of the forest in old growth; prohibited any stand type conversion; established the goal of restoration, maintenance, and enhancement of riparian areas; and provided habitat for all populations of threatened, endangered and sensitive plant and animal species.

4. How were the magnitude and significance of relevant impacts of alternatives identified and estimated (including indirect and cumulative effects)?

93 magnitude and significance of relevant environmental impacts of alternatives not identified.

86 partial identification and estimation of magnitude and significance of relevant impacts of alternatives.

- thorough identification and estimation of magnitude and significance of relevant impacts of alternatives (including indirect and cumulative effects).

NEPA calls for the identification and estimation of the magnitude and significance of relevant impacts of alternatives, including indirect and cumulative effects. In the 1986 Final EIS, there was no substantive discussion of cumulative effects and only partial identification and estimation of indirect effects. Identified direct effects were cursorily addressed. However, most direct effects were not viewed as problematic as best management practices would be applied during all management operations, e.g., road construction and tree harvesting. The only acknowledged negative indirect effect from clearcutting was visual impacts—and that was considered “a short-term adverse effect” (USFS 1986:II-90). The only other indirect effect presented was economic impacts on local communities.

In the 1993 Final EIS, only direct effects were described along with suitable best management practices and other standards and guidelines referenced to ameliorate the impacts. There was no mention of detrimental indirect or cumulative effects because all impacts would be dealt with through the proposed management plan. The EPA and other reviewers were critical of the Draft EIS for a lack of sufficient information regarding direct, indirect, and cumulative effects to surface waters, riparian habitat, and overall biodiversity. All management decisions were presented in a positive light—all management decisions would increase biodiversity, improve habitat, etc. So from this perspective, indirect and cumulative effects were discussed.

5. How were identified irreversible or irretrievable commitments of resources addressed?

93 not addressed.

86 marginally; from a narrow perspective.

- substantially.

NEPA requires EISs to include a discussion of any irreversible and irretrievable commitments of resources involved in the proposed action. In the 1986 Final EIS, identified irreversible or irretrievable commitments of resources were addressed from a narrow perspective. Examples of irreversible commitments of resources included future production of developable minerals and energy required to implement the alternatives. The examples of irretrievable commitments of resources were the result of the Forest Service’s philosophy of “fully harvesting the suitable timber” and “to utilize the most productive timber species” (USFS 1986:x), and included land

removed from productivity because of the construction and reconstruction of local and collector roads, loss of timber production in Wilderness and Wilderness Study Areas, Special Management and Special Interest Areas, etc.

Irreversible or irretrievable commitments of resources were not addressed in the 1993 Final EIS because the Forest Service considered them outside the scope of a programmatic level Forest Plan. However, the 1993 Final EIS did define the terms and used the same narrow definitions used in the 1986 EIS process.

6. To what extent was an integrated, systematic, interdisciplinary approach used?

- project completed entirely using in-house personnel from same disciplinary background.

- 86/93** project completed using in-house personnel from numerous disciplinary backgrounds; other agencies or specialists consulted on a needs basis (e.g., permit required).
- interdisciplinary committee, composed of Forest Service and non-Forest Service members, formed at outset of this planning effort.
 - ongoing interdisciplinary committee, composed of Forest Service and non-Forest Service members, involved in policymaking and planning processes.

The Forest Service used its own personnel and two individual consultants in preparing the EIS and Forest Plan. According to Canter (1991), an integrated, systematic, interdisciplinary approach as envisioned by NEPA would involve an ongoing interdisciplinary committee, composed of Forest Service and non-Forest Service members, in policy, planning and decisionmaking processes. The 1986 EIS effort was prepared by Forest Service personnel of varied backgrounds and expertise. Other agencies were only consulted on a needs basis (e.g., permit requirements). There was no indication in the EIS documents as to how the Forest Service's multidisciplinary personnel developed the alternatives or selected the preferred alternative—i.e., did the Forest Service multidisciplinary personnel make decisions as a committee or did individuals with specific expertise contribute sections to the EIS documents with planning and management decisions made by a manager or management team? The EIS did list a “management team” as a separate entity from its “interdisciplinary team.”

The 1993 EIS effort was also prepared in-house by Forest Service personnel of varied backgrounds and expertise, with other agencies only consulted on a needs basis (e.g., permit requirements). Likewise, there was no indication in the EIS documents if or how the Forest Service's multidisciplinary personnel developed the alternatives or selected the preferred alternative.

7. What provisions were made for monitoring and evaluation?

- none.
 - importance of monitoring and evaluation discussed; no monitoring or evaluation plan delineated in the EIS/ROD.
- 86** monitoring plan outlined as part of the Final EIS/ROD; no specific monitoring or evaluation techniques given.
- 93** monitoring and evaluation plan developed as part of the Final EIS/ROD; forest-wide and site-specific standards delineated.

CEQ regulations require that provisions be made for monitoring and evaluation. The most effective procedure for assuring effective monitoring and evaluation is the development of a forest-wide, site-specific monitoring and evaluation plan as part of the Final EIS and ROD. The 1986 Forest Plan outlined a standardized monitoring and evaluation plan. No monitoring or evaluation techniques were developed in the Final EIS or Forest Plan specific to the actions proposed for the George Washington National Forest.

The 1993 Forest Plan and ROD met the ideal NEPA criterion as the documents developed a detailed, forest-wide and site-specific monitoring and evaluation plan. The plan was to determine whether or not the Forest Service produced desired resource values, uses, and products in ways that would sustain the diversity and productivity of ecosystems.

8. How did the Final EIS/ROD address the mitigation of unavoidable impacts?

- not addressed.
 - general mitigation measures discussed, but no detailed mitigation plan developed as part of the Final EIS/ROD.
- 86** mitigation plan developed as part of Final EIS/ROD; only general mitigation measures proposed (Guidelines or Standards).
- 93** mitigation plan developed as part of Final EIS/ROD; site-specific and detailed mitigation measures delineated.

NEPA sought to ensure that unavoidable impacts be mitigated as much as feasible. EIS regulations specify that mitigation for all reasonable alternatives be addressed in the Draft and Final EISs. Additionally, the ROD must contain “a concise summary identification of the mitigation measures which the agency has committed itself to adopt” (CEQ 1986:Question 34c). The 1986 Final EIS did not discuss mitigation; however, the Forest Plan provided mitigation measures by reference to Forest Service Standards and Guidelines. No site-specific or detailed mitigation measures were given for the management actions proposed for the George Washington National Forest.

The 1993 Final EIS and ROD fulfilled NEPA's intent because the documents considered mitigation measures as an essential part of the alternative selection process. Standard mitigation measures would be applied to the entire Forest, while other mitigation measures were designed for specific management areas or management needs.

9. How was input sought from citizens, local and state government agencies, and environmental groups?

- no input sought.

86/93 input through informational meetings, open houses, letters, public hearings.

- representatives of the general public, local, state, and other federal agencies, and organizations involved in ongoing Forest Service planning committees.

To meet NEPA's intent fully, representatives of the public, organizations, local, state and other federal agencies should be involved in ongoing Forest Service planning and policy committees. Input from the public, organizations, and local and state agencies during the 1986 EIS process was obtained through an "Issues and Concerns" publication, informational meetings, open houses, letters, a citizens' workshop, and public hearings. The form of input employed was to inform the public and to illicit comments from the public. However, the Forest Service made no effort to involve the public directly in the decisionmaking process.

In the 1993 EIS process, input from the public, organizations, and local and state agencies during this EIS process was obtained through public meetings, individual and group informational meetings, and letters. According to the Forest Service, "The public was very involved in the revision of the Forest Plan" (USFS 1993a:S-3). Although the stakeholders were not directly involved in the policy and decisionmaking process, their input greatly influenced the outcome of this EIS process. The Forest Service commented that the extensive public participation was extremely valuable in revising the 1986 EIS and Forest Plan. The Forest Service further recognized that public comments often create new approaches for the Forest Service in the alternative selection process. Several letters commended the Forest Service for the extent the public was involved in identifying the issues and concerns used for developing the range of alternatives.

10. Was the project changed to reflect comments/concerns of citizens, local and state government agencies, environmental groups? How were the comments/concerns addressed?

- not at all; no reason given or comments ignored.
- acknowledged comments/concerns; no or minimal changes made to the project. project moderately changed; but not to the level of concerns/comments.

86 project changed during Scoping or after Draft EIS review to reflect the extent
93 of comments/concerns.

The project scope should reflect the comments and concerns raised during formal scoping and Draft EIS review. In the 1986 EIS process, many issues and concerns raised by the public were partially reflected in the Supplemental EIS and then in the selection of the preferred alternative in the Final EIS. However, many substantive issues and concerns were not addressed in the Supplemental and Final EISs. Therefore, the Final EIS was subject to 18 appeals and the Forest Plan was withdrawn.

All of the project decision changes or amendments to the 1993 Final EIS reflected the comments and concerns of citizens, organizations, and local, state and other federal agencies raised during scoping and the Draft EIS review process. The Forest Service commented that extensive public participation had been extremely valuable in revising the 1986 EIS and Forest Plan. The agency further acknowledged that public comments often created new approaches for the Forest Service in the alternative selection process. The Final EIS provided for large, unfragmented blocks of late successional habitat, prohibited any stand type conversion, and established the goal of restoration, maintenance, and enhancement of riparian areas and their dependent resources—all issues raised during scoping or Draft EIS review.

11. How has the environmental information influenced the selection of the final plan of action as evidenced in the Final EIS/ROD?

- not at all.
- 86** minimal evidence of influence of environmental information.
- environmental information integrated in some parts of planning and decisionmaking more than others, as evidenced in the selection of the final plan of action.
- 93** environmental information integrated throughout the planning and decisionmaking process as evidenced through the selection of the final plan of action.

Environmental information, in keeping with NEPA's intent, should be integrated throughout the planning and decisionmaking process as evidenced through the selection of the final plan of action. The 1986 Final EIS reveals that the Forest Service made changes in direct response to the environmental concerns raised by reviewing agency and public comments rather than from an understanding of ecosystem processes or the need to integrate environmental considerations into planning and decisionmaking. It was the agency and public comments that provided insight into ecosystem processes. Therefore, environmental information per se had little influence on the selection of the final plan of action as presented by the Forest Service in the Final EIS (also see response to Question 3).

The 1993 Final EIS met the NEPA criterion. The selection of the final plan of action provides evidence of the integration of environmental information throughout the planning and decisionmaking process. Further, the Forest Service recognized the critical roles that new scientific information and public participation played in developing a viable, dynamic Forest Plan. The physical, biological, economic and social effects of implementing each alternative were considered in detail to respond to the issues and need for change. Critical environmental factors relevant to the Regional Forester's decision to select the preferred alternative included: biological diversity of the Forest; the health of the Forest; ecosystem management; and old growth. There was criticism, however, of the Forest Service's "non-use" of environmental information for addressing landscape level analyses. The Forest Service responded that such analyses were outside the scope of a programmatic EIS. Another criticism was that the Final EIS failed to discuss environmental risks or uncertainties. All management decisions were expressed as though there were not uncertainties or gaps in knowledge because all contingencies had been accounted for.

12. Were unquantifiable environmental values given appropriate consideration in decisionmaking along with economic and technical considerations?

- not at all.
- 86** unquantifiable environmental values were quantified (e.g., willingness to pay) and entered into a model as constraints.
- 93** unquantifiable environmental values were not quantified, as such, and were given appropriate consideration.

NEPA requires that unquantifiable environmental values be given appropriate consideration in the decisionmaking process along with economic and technical considerations. The 1986 Final EIS developed alternatives based on "benchmarks," which were essentially the maximization of the potential of the Forest to produce single resources within legal constraints. Alternatives that did not reach the upper level of timber production were developed to provide a range of management options. Qualitative, non-priced benefits, including scenic values, cultural resource values, visual quality, and increased plant and animal diversity were considered "constraints" and entered as such into the alternative selection model. Because the "unquantifiable" constraints were entered into the "quantitative" model, it was not possible to discern, let alone evaluate, what effects these constraints had on the decisionmaking process. All other resource protection management requirements were considered outside the model and were handled through the use of Standards and Guideline.

The 1993 Final EIS met this NEPA criterion. The physical, biological, economic and social effects of implementing each alternative were considered in detail to respond to the issues and need for change. The FORPLAN model estimated many, but not all, of the economic and physical effects. Other effects examined outside the model included ecological and social

considerations. To select the preferred alternative, the Forest Supervisor reviewed the alternative evaluations and the public issues and concerns.

13. Did the EIS provide a decisionmaking framework for consideration of all effects of alternatives, including environmental, economic and social effects?

- 86** no decisionmaking framework provided.
- decisionmaking framework provided for effects that were quantified.
- 93** decisionmaking framework provided for consideration of all effects of alternatives, including environmental, economic and social effects.

CEQ regulations specify that a decisionmaking framework for consideration of all effects of alternatives, including environmental, economic and social effects, be included in the EIS so that reviewers can easily understand and can thereby effectively evaluate the strengths and shortcomings of the alternatives. The 1986 EIS process did not provide such a decisionmaking framework. Several tables were provided that compared various economic indicators for each of the alternatives and another table summarized the alternatives responses to issues and concerns raised during scoping. The Environmental Consequences chapter included a discussion of the physical, biological, economic and social effects of implementing each alternative. No conclusions were reached or inferred in the discussions accompanying any of the tables. Because alternative comparison tables for specific management options were distributed throughout the Final EIS in separate sections of several chapters and numerous appendices, it was impossible to evaluate the merits or problems with any of the proposed alternatives. The ROD is required to present a summary decisionmaking framework, however, a ROD for the 1986 EIS process was never produced to accompany the Final EIS due to the filing of 18 appeals immediately after publication of the Final EIS.

The 1993 Final EIS and ROD provided a decisionmaking framework, and thereby, met the ideal NEPA criterion. A summary of the major environmental, economic, and physical differences among the preferred alternative and other alternatives, including the environmental alternative, was provided in both tabular and descriptive forms in both the Final EIS and ROD. The preferred alternative was selected based on critical factors such as biological diversity, the productive capacity of the forest, the health of the forest, the natural beauty of the forest, concerns about changes in socioeconomic conditions, national and regional issues, and sensitivity to striking a balance.

4.2.2 Ecosystem Management Evaluation

This section presents the 11 ecosystem management questions and the resulting Forest Service responses gleaned from a thorough review of the 1986 and 1993 Final EIS and Forest Plan documents for the George Washington National Forest. Table 4.2 provides a visual comparison

Table 4.2. Comparison of Ecosystem Management Evaluations for the George Washington National Forest 1986 and 1993 Final EISs and Forest Plans.

	<u>1. Did the agency propose management procedures to maintain viable populations of native species in situ? If so, how?</u>
	<ul style="list-style-type: none"> • no procedures proposed.
86	management procedures primarily focused on game species such as deer, bear, wild turkey, and endangered species.
93	agency proposed management procedures to maintain viable populations of native species in situ through preservation/enhancement of multiple habitat types and sizes.
	<u>2. Was it evident that the agency acknowledged ecological patterns and diversity in terms of the processes and constraints generating them?</u>
86	minimal or no evidence.
	<ul style="list-style-type: none"> • agency demonstrated some understanding of ecological patterns and diversity; however, this understanding did not affect the management decisionmaking process. • agency demonstrated some understanding of ecological patterns and diversity; this limited understanding was reflected in the decisionmaking process.
93	agency demonstrated understanding of ecological patterns and diversity in terms of processes and constraints; management decisions reflected this understanding.
	<u>3. What level of measures were proposed to sustain ecosystem diversity, health, and productivity?</u>
86	minimal or very narrowly focused measures proposed.
	<ul style="list-style-type: none"> • importance of sustainability discussed, but no management measures were proposed.
93	specific measures were proposed to sustain ecosystem diversity, health, and productivity, e.g., mandated BMPs, environmental restrictions on pesticides, etc.
	<u>4. Were ecosystem patterns and processes studied at different geographic and time scales?</u>
86	management decisions were only concerned with the prescribed management time frame within defined forest system boundaries.
93	acknowledged ecosystem patterns and processes at different geographic and time scales, but management decisions only affected prescribed time frame within defined forest system boundaries.
	<ul style="list-style-type: none"> • the historic range of ecosystem patterns and processes were defined across a range of spatial and temporal scales; the agency developed effective partnerships with other federal agencies, state and local agencies, and private landowners.
	<u>5. How were management boundaries delineated?</u>
86	only used political boundaries; no or limited discussion of what occurs beyond political boundaries.
93	acknowledged ecosystem concepts, but only looked at selected parts of ecosystems.
	<ul style="list-style-type: none"> • defined ecological boundaries at appropriate scales; managed within and across whole landscapes, watersheds, regions, etc.
	<u>6. To what extent was a broad, integrative, interdisciplinary approach used?</u>
	<ul style="list-style-type: none"> • project complete entirely using in-house personnel from same disciplinary background.
86/93	project completed using an in-house interdisciplinary team; other agencies or specialists consulted only on a needs basis (e.g., permit required).
	<ul style="list-style-type: none"> • interdisciplinary committee, composed of representatives of other federal agencies, state and local agencies, and the public, was formed at onset of this planning effort. • involved ongoing interdisciplinary committee that included other federal agencies, state and local agencies, and the public in policymaking and planning processes.

Table 4.2. Comparison of Ecosystem Management Evaluations for the George Washington National Forest 1986 and 1993 Final EISs and Forest Plans (continued).

	<u>7. How was the public involved in the planning and decisionmaking process?</u>
86/93	<ul style="list-style-type: none"> • not at all; framing goals were left to the "experts." input through informal meetings, open-houses, letters, and/or public hearings. • meaningful stakeholder and public involvement generated to facilitate collective decisionmaking.
	<u>8. How were results of recent scientific research and technology integrated into management and policy decisionmaking?</u>
86	<p>had no influence on final outcome.</p> <ul style="list-style-type: none"> • recent scientific research and technology considered in decisionmaking, but many "trade-offs" were made to accomplish social and economic goals that were contrary to scientific information.
93	<p>recent scientific research and technology considered in decisionmaking; some "trade-offs" were made to accomplish social and economic goals; the "trade-offs" were determined not to be contrary to the precepts of ecosystem management.</p> <ul style="list-style-type: none"> • best available scientific information was cornerstone for resource allocations and management decisions; scientific database increased as a result of this planning process.
	<u>9. Were adaptive management techniques (e.g., monitoring, evaluation) integrated into planning and management?</u>
86	<ul style="list-style-type: none"> • not at all. followed standardized monitoring and evaluation procedures.
93	<p>used adaptive management by monitoring and evaluating multiple attributes at all appropriate ecological scales; monitoring and evaluation outcomes to influence future planning and management decisions.</p>
	<u>10. How were educational programs integrated into the decisionmaking process?</u>
86/93	<p>no or minimal educational programs developed.</p> <ul style="list-style-type: none"> • in-house educational workshops or short courses held for agency personnel to prepare them for the decisionmaking process. • educational workshops or short courses held that include representatives from other federal agencies, state and local agencies, and the public.
	<u>11. Did the agency evaluate and set priorities based on societal demands within the constraints of ecosystem patterns and processes?</u>
86	<ul style="list-style-type: none"> • agency did not evaluate or set priorities based on societal demands; ecosystem patterns and processes were disregarded. agency evaluated and set priorities based on societal demands; ecosystem patterns and processes were generally disregarded. • agency evaluated and set priorities based on societal demands; ecosystem patterns and processes were given some consideration.
93	<p>agency evaluated and set priorities based on societal demands within the constraints of ecosystem patterns and processes.</p>

of the ecosystem management question results for the 1986 and 1993 Final EIS and Forest Plan documents. The ecosystem management question responses determined to represent most appropriately Forest Service actions and plans are highlighted. Following each question and range of responses, are statements summarizing information taken from the Final EIS and Forest Plan documents that support the selected question response. Appendix D provides more detailed statements and direct quotations taken from the 1986 and 1993 Final EIS and Forest Plan documents.

1. Did the agency propose management procedures to maintain viable populations of native species in situ? If so, how?

- no procedures proposed.
- 86** management procedures primarily focused on game species such as deer, bear, wild turkey, and endangered species.
- 93** agency proposed management procedures to maintain viable populations of native species in situ through preservation/enhancement of multiple habitat types and sizes.

Ideal ecosystem management procedures require the maintenance of viable populations of all native species in situ through the preservation and enhancement of multiple habitat types and sizes. The 1986 Final EIS management procedures primarily focused on game species such as deer, bear, and wild turkey and protected species (pileated woodpecker and common flicker). The Forest Plan preserved or enhanced areas known to contain endangered and threatened species habitats as required by the Endangered Species Act. Protection of unusual plants not on the threatened and endangered list was provided in the designation of Special Interest Areas. While the Draft EIS only provided for minimum viable habitats, the Final EIS contended that it came closer to providing habitat for optimum populations of featured species. Harvesting was the only method proposed for management of these varied habitat areas.

The 1993 Final EIS process met this criteria. It addressed biological diversity by concentrating on eight components of biological diversity: the natural values of the forest, forest type conversions, old growth, forest fragmentation, late successional habitat, riparian and wetland areas, management indicator species, and special biological areas. Management indicator species included: black bear, wild turkey, white-tailed deer, common flicker, pileated woodpecker, brown-headed cowbird, ovenbird, worm-eating warbler, cave dwelling bats, cow knob salamander, tiger salamander, yellow pines, old growth forest types, brook trout and sunfish, and all federally listed threatened or endangered species found in the area (northeastern bulrush, swamp pink, smooth rockcress, James spiny mussel, peregrine falcon, bald eagle, Virginia northern flying squirrel, Indiana bat). The Final EIS provided for large unfragmented blocks of late successional vegetation, smaller blocks of early successional habitat, and habitat

for the continued existence of all populations of threatened, endangered, and sensitive plant and animal species.

2. Was it evident that the agency acknowledged ecological patterns and diversity in terms of the processes and constraints generating them?

- 86** minimal or no evidence.
- agency demonstrated some understanding of ecological patterns and diversity; however, this understanding did not affect the management decisionmaking process.
 - agency demonstrated some understanding of ecological patterns and diversity; this limited understanding was reflected in the decisionmaking process.
- 93** agency demonstrated understanding of ecological patterns and diversity in terms of the processes and constraints generating them; management decisions reflected this understanding.

Ecosystem management specifies that agencies demonstrate an understanding of ecological patterns and diversity in terms of the processes and constraints generating them and that management decisions should reflect this understanding. In the 1986 EIS process, it was not evident that the Forest Service acknowledged ecological patterns and diversity in terms of the processes and constraints generating them. From the responses received to the Draft EIS, it was evident that other federal agencies and members of the public were more aware of ecological patterns and diversity issues than were the Forest Service personnel who prepared the Draft EIS. Several significant changes were made from the Draft EIS to the Supplemental EIS; and several substantive changes were made from the Supplemental EIS to the Final EIS. However, the changes appear to have been made primarily because of agency and public opposition rather than from a developed understanding of ecological patterns and diversity. The EIS focused on timber harvesting as the means by which other forest management goals were to be achieved. Furthermore, timber harvesting was the only tool considered by the Forest Service for ecosystem manipulations and to increase or maintain biodiversity levels.

In the 1993 EIS process, the Forest Service, for the most part, met the ideal ecosystem management criterion. The Final EIS discussed genetic variation, distinct species, native species, biological associations or communities, and the geographic scale of Forest landscapes. There were also discussions on fragmentation, patch size, edge effects on wildlife, and early and late successional habitats. However, ecosystem patterns and diversity were only discussed with regard to the ecosystem patterns within George Washington National Forest boundaries.

3. What level of measures were proposed to sustain ecosystem diversity, health, and productivity?

- 86** minimal or very narrowly focused measures proposed.
- importance of sustainability discussed, but no management measures were proposed.
- 93** specific measures were proposed to sustain ecosystem diversity, health, and productivity, e.g., mandated BMPs, environmental restrictions on pesticides, etc.

To meet ecosystem management criteria, specific measures should be proposed to sustain ecosystem diversity, health, and productivity, e.g., mandated best management practices (BMPs), restrictions on pesticide use, etc. The 1986 Final EIS proposed minimal or very narrowly focused measures for sustaining ecosystem diversity, health, and productivity. The EIS stated that all alternatives would provide sufficient diversity to maintain viable populations of all native vertebrate and plant species. Measures proposed included protection of unusual floral through designation of Special Interest Areas and provision of buffers around all caves capable of harboring bats. Other than these two specific measures, ecosystem diversity, health and productivity would be increased or maintained through even-aged timber harvesting methods (90 percent clearcutting).

The 1993 Final EIS meets the ecosystem management criterion. It included specific measures to sustain ecosystem diversity, health, and productivity. Proposed measures provided for large, unfragmented blocks of late successional vegetation; provided smaller blocks of early successional habitat; provided guidance on managing stands with a “high probability of now containing old growth characteristics” until a regional policy was completed; prohibited any stand type conversions; established the goal of restoration, maintenance, and enhancement of riparian areas; identified riparian areas on physical and biological characteristics rather than arbitrary distances from perennial streams; provided habitat for the continued existence of all populations of threatened, endangered and sensitive plant and animal species; when needed, required site-specific surveys to be conducted for undiscovered habitats and populations of threatened, endangered and sensitive species prior to a decision to implement any project; and established 38 Biological Special Interest Areas.

4. Were ecosystem patterns and processes studied at different geographic and time scales?

- 86** management decisions were only concerned with the prescribed management time frame within defined forest system boundaries.
- 93** acknowledged ecosystem patterns and processes at different geographic and time scales, but management decisions only affected prescribed time frame within defined forest system boundaries.
- the historic range of ecosystem patterns and processes were defined across a range of spatial and temporal scales; the agency developed effective partnerships with other federal agencies, state and local agencies, and private landowners.

Ecosystem management prescribes that the historic range of ecosystem patterns and processes be defined across a range of spatial and temporal scales and that the management agency should develop effective partnerships with other agencies and private landowners. For the 1986 EIS process, ecosystem patterns and processes were not studied at different geographic and time scales; there was no discussion of Forest Service management activities over time or how past management activities affected ecosystem patterns and processes of the Forest. There was also no discussion of how past, current and future demands would affect future ecosystem patterns and processes. Comments received from other agencies recommended that the Forest Service include such discussions for their value in predicting and evaluating potential resource impacts from the Forest Plan's proposed management practices. Other comments advised the Forest Service to take a longer range approach and to look beyond its borders so that it could complement its management decisions with what is occurring on private forested lands.

For the 1993 EIS process, ecosystem patterns and processes were acknowledged at different geographic and time scales, but management decisions were only concerned with traditional Forest Service planning time frames and were defined within Forest System boundaries. The EIS stated that the Forest Service recognized the need for regional landscape planning as it relates to biodiversity and that it would cooperate with agencies, groups, and managers of adjacent state and federal lands. However, the EIS and Forest Plan only dealt with ecosystems located within Forest boundaries. The EPA criticized the Forest Service for not undertaking landscape-level analyses as this was a programmatic document and very suitable for such analyses. The Forest Service responded that such analyses were outside the scope of a programmatic EIS. Other letters were critical of the Forest Service for not taking a broad ecosystem view of both short- and long-term environmental changes.

5. How were management boundaries delineated?

- 86** only used political boundaries; no or limited discussion of what occurs beyond political boundaries.
- 93** acknowledged ecosystem concepts, but only looked at selected parts of ecosystems.
- defined ecological boundaries at appropriate scales; managed within and across whole landscapes, watersheds, regions, etc.

Ecosystem management defines ecological boundaries at appropriate scales and manages within and across whole landscapes, watersheds, regions, etc. as deemed appropriate. The 1986 Forest Plan only covered lands that lay within the jurisdictional boundaries of the George Washington National Forest. The only discussion of areas outside the Forest's boundaries concerned possible impacts of forest management activities on the local economy and the availability of recreation, fuelwood, and hunting opportunities for local residents.

In the 1993 EIS process, even though the discussions on biodiversity, fragmentation, etc. dealt with ecosystems of different scales, the Final EIS only focused within the Forest's boundaries. The EIS stated that the Forest Service recognized the need for regional landscape planning as it relates to biodiversity and that it would cooperate with other agencies, groups, and managers of adjacent state and federal lands. The Final EIS did discuss employment and social opportunities (e.g., camping, hunting, hiking) and constraints (e.g., off-road vehicle use, wood gathering) of Forest activities on neighboring communities and the region.

6. To what extent was a broad, integrative, interdisciplinary approach used?

- project complete entirely using in-house personnel from same disciplinary background.
- 86/93** project completed using an in-house interdisciplinary team; other agencies or specialists consulted only on a needs basis (e.g., permit required).
- interdisciplinary committee, composed of representatives of other federal agencies, state and local agencies, and the public, was formed at onset of this planning effort.
 - involved ongoing interdisciplinary committee that included other federal agencies, state and local agencies, and the public in policymaking and planning processes.

Ecosystem management requires that a broad, integrative, interdisciplinary approach be used in decisionmaking. Ideally, this would involve developing an ongoing interdisciplinary committee that would include other federal agencies, state and local agencies, and the general public in policymaking and planning processes. The 1986 EIS effort was prepared by Forest Service personnel of varied backgrounds and expertise. Other agencies were only consulted on a needs

basis (e.g., permit requirements). There was no indication in the 1986 EIS documents as to how the Forest Service's multidisciplinary personnel developed the alternatives or selected the preferred alternative—i.e., did the Forest Service multidisciplinary personnel make decisions as a committee or did individuals with specific expertise contribute sections to the EIS documents with planning and management decisions made by a manager or management team?

The 1993 EIS effort was prepared by Forest Service personnel of varied backgrounds and expertise. The Final EIS stated that the Forest Service EIS team worked with various individuals, organizations and agencies to formulate the 14 alternatives. The EIS did not state how it worked with these various individuals, organizations and agencies other than through letters and public meetings. It became clear under the Forest Service's discussion of public involvement that no interdisciplinary committee was developed to formulate the alternatives or to make other management decisions. The EIS did state that as the Forest Service implemented ecosystem management, it would inventory, classify, and map ecosystems. The results of which would be used in regional planning and cooperation with other federal and state agencies.

7. How was the public involved in the planning and decisionmaking process?

- not at all; framing goals were left to the “experts.”

86/93 input through informal meetings, open-houses, letters, and/or public hearings.

- meaningful stakeholder and public involvement generated to facilitate collective decisionmaking.

Meaningful stakeholder and public involvement generation to facilitate collective decisionmaking is important to comply fully with ecosystem management criteria. The 1986 EIS process acquired public input through informational meetings, a scoping letter, a citizen workshop, and public hearings. Many of the issues and concerns raised by the public were partially reflected in the Supplemental and Final EISs. The Final EIS, however, was subject to 18 appeals and the Forest Plan was never implemented. The public was not directly involved in the Forest Service's management decisions as there was no collective decisionmaking process in place. In response to comments that the management of the National Forests should be left to the trained professionals, the agency stated that, “The management of National Forests are governed by a number of legal constraints. The National Environmental Policy Act (NEPA), requires that public input be part of the decisionmaking process” (USFS 1986:K-69).

The 1993 EIS process acquired public input through public meetings, informational meetings, and letters. According to the Forest Service, the public was very involved in the revision of the 1986 Forest Plan through letters, meetings, and comments received during the Draft EIS review. The public, however, was not directly involved in the policy and decisionmaking process, i.e., involved in a collective decisionmaking process. Their input, nevertheless, greatly influenced the outcome of this EIS process. The Forest Service also recognized that public comments often

pointed out new approaches for the agency in the alternative selection process. The project decision changes or amendments to the Draft EIS reflected the comments and concerns of citizens, organizations, and local, state and other federal agencies. However, the Forest Service stated that, “Although the Forest Service seeks public input in formulating alternatives, that input may or may not be reflected in the Revised Plan” (USFS 1993a:S-5).

8. How were results of recent scientific research and technology integrated into management and policy decisionmaking?

- 86** had no influence on final outcome.
- recent scientific research and technology considered in decisionmaking, but many “trade-offs” were made to accomplish social and economic goals that were contrary to scientific information.
- 93** recent scientific research and technology considered in decisionmaking; some “trade-offs” were made to accomplish social and economic goals; the “trade-offs” were determined not to be contrary to the precepts of ecosystem management.
- best available scientific information was cornerstone for resource allocations and management decisions; scientific database increased as a result of this planning process.

Ecosystem management requires that the best available scientific information form the cornerstone for resource allocations and management decisions. The scientific database should increase as a result of this planning process. The final outcome of management decisions in the 1986 EIS was primarily based on reviewing agency and public comments, that, in large part, supported the integration of ecology-based research and technology for making resource management decisions. The Forest Service’s resource management decisions were based on older science studies that supported clearcutting and other even-aged harvesting practices to provide opportunities for habitat improvement. Even though changes made in the Final EIS were in response to public and agency comments, they did not reflect an acquired understanding of ecosystem processes by Forest Service personnel or the incorporation of the best available scientific information. For example, public and agency comments were highly critical of clearcutting as the only harvesting method proposed by the Forest Service in the Draft EIS; the agency, therefore, reduced clearcutting by 10 percent in response to the criticism. The Forest Service personnel did not acknowledge that there may be valid reasons not to rely on clearcutting 100 percent of the time. They only agreed to a 10 percent reduction to appease reviewing agency and public criticism.

The 1993 Final EIS integrated the results of recent scientific research and technology in its decisionmaking process; however, some trade-offs were made to accomplish social and economic goals, which were determined not to be contrary to the precepts of ecosystem

management. The Final EIS stated that ecosystem management was to be the guiding principle in achieving the goals and objectives of the Forest Plan. However, the document also stated that, “The purpose of the Revised Plan is to provide for multiple use and sustained yield of goods and services in a way that maximizes net public benefits in an environmentally sound manner” (USFS 1993a:S-1). The “ideal” ecosystem management criterion relies on the best available scientific research and technology to inform management decisions; net public benefits become secondary to environmental considerations. The Final EIS documented numerous scientific studies to support its findings and a Biological Assessment and a Biological Evaluation were done as part of site-specific environmental analyses. Despite these efforts, the EPA was critical of the Forest Service for not making landscape level analyses using GIS and other tools for spatial and temporal assessments.

9. Were adaptive management techniques (e.g., monitoring, evaluation) integrated into planning and management?

- not at all.

86 followed standardized monitoring and evaluation procedures.

93 used adaptive management by monitoring and evaluating multiple attributes at all appropriate ecological scales; monitoring and evaluation outcomes to influence future planning and management decisions.

A critical ecosystem management criterion is that adaptive management techniques (e.g., monitoring, evaluation) be integrated into planning and management. One step in the adaptive management process that can be measured in the EIS and Forest Plan documents is the inclusion of a monitoring and evaluation plan. The plan should monitor and evaluate multiple attributes at all appropriate ecological scales. The 1986 Final EIS followed standardized monitoring and evaluation procedures based on regional Standards and Guidelines. No site-specific monitoring or evaluation plan was developed based on ecological scales or ecosystem attributes.

The 1993 Final EIS met the “ideal” ecosystem management criterion. The monitoring process proposed in the Final EIS recognized the critical roles of new scientific information and public participation in maintaining a viable, dynamic Forest Plan. A site-specific monitoring plan was developed to determine whether or not the Forest Service was producing desired resource values, uses and products in ways that sustained the diversity and productivity of ecosystems. Future evaluation of the monitoring information would provide useful and valid indicators of whether the Forest Plan remained sufficient to sustain a diverse, healthy, and productive Forest.

10. How were educational programs integrated into the decisionmaking process?

- 86/93** no or minimal educational programs developed.
- in-house educational workshops or short courses held for agency personnel to prepare them for the decisionmaking process.
 - educational workshops or short courses held that include representatives from other federal agencies, state and local agencies, and the public.

Ecosystem management criteria call for the integration of educational programs into the decisionmaking process. The 1986 EIS process provided one citizens' workshop to prepare citizens for participation in the new National Forest planning process. There was no other mention in the EIS documents of educational programs for federal agency personnel, state and local agencies, or the public.

The 1993 Final EIS did not reference any educational programs or short courses held for the benefit of state and local agency personnel or the public with regard to the NEPA process, the Forest Service management and planning process, or ecosystem management. A professional interpretation program was proposed as part of the Revised Forest Plan.

11. Did the agency evaluate and set priorities based on societal demands within the constraints of ecosystem patterns and processes?

- agency did not evaluate or set priorities based on societal demands; ecosystem patterns and processes were disregarded.
- 86** agency evaluated and set priorities based on societal demands; ecosystem patterns and processes were generally disregarded.
- agency evaluated and set priorities based on societal demands; ecosystem patterns and processes were given some consideration.
- 93** agency evaluated and set priorities based on societal demands within the constraints of ecosystem patterns and processes.

Ecosystem management requires that agencies evaluate and set priorities based on societal demands within the constraints of ecosystem patterns and processes. In the 1986 Final EIS, the Forest Service evaluated and set priorities based on societal demands. Ecosystem patterns and processes, however, were not acknowledged. The EIS process focused on timber harvesting as the only tool for ecosystem manipulations and to increase or maintain biodiversity levels. On the other hand, many of the societal demands were based on ecosystem patterns and processes. It was the public and other federal agency comments that advised the Forest Service to reevaluate its management plan and to operate within the constraints of ecosystem patterns and processes (as they were understood at the time). But, as stated earlier, the changes made in the Supplemental and Final EISs were made to appease the substantial public and federal agency

criticism, and were not based on an assimilation of the best available scientific research and technology.

In the 1993 Final EIS, the Forest Service met the “ideal” ecosystem management criterion. Critical factors relevant to the Regional Forester’s decision were: biological diversity of the Forest; productive capacity of the Forest to produce a variety of goods and services; health of the Forest; natural beauty of the Forest associated with its historical and cultural value; concerns about changes in socioeconomic conditions in the area; national and regional issues such as below-cost timber sales, ecosystem management; old growth; and sensitivity to striking a balance. The final decision emphasized late successional and remote wildlife habitat, watershed protection, and non-motorized recreation opportunities to a greater extent than in the past. The Forest Service also recognized that it needed to provide amenity values, such as aesthetics and remote, non-motorized recreation, as well as environmental conditions that promote healthy, diverse lands and water.