Record of Decision

for the

Fernow Experimental Forest

Final Environmental Impact Statement

USDA - FOREST SERVICE
FERNOW EXPERIMENTAL FOREST
MONONGAHELA NATIONAL FOREST
TUCKER COUNTY, WEST VIRGINIA

June 6, 2005

Introduction

This documents my decision as Responsible Official concerning the implementation of ongoing research studies and two new studies on the Fernow Experimental Forest (FEF). The 4615-acre FEF is located south of Parsons, West Virginia, and is administered by the Northeastern Research Station of the Forest Service, Parsons, West Virginia. This decision is based on the Final Environmental Impact Statement, Fernow Experimental Forest (FEIS) and public comment, as well as other available information. Vicinity and project maps are attached for reference.

The FEIS discloses the effects of research activities and mitigation measures. Various alternatives were considered including the "No Action" alternative. The EIS was prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, and has been distributed to individuals, state and Federal agencies for review and comment.

The actions are consistent with the Land and Resource Management Plan, Monongahela National Forest (Forest Plan), Management Prescription 8, Vegetation, and with the Revised Forest Plan under Prescription 8.5, The Fernow Experimental Forest. Projects are also consistent with the General Plan for the Fernow Experimental Forest, the Research Work Unit Description (RWUD), and individual Study Plans. The RWUD was prepared after consultation with a wide range of customers and is updated every 5 years. Study plans have been reviewed for experimental and statistical rigor by scientists within and outside of the RWU, and for appropriateness and compliance with Station direction by Northeastern Research Station personnel.

Decision

The decision by the Forest Service is whether the proposed activities are responsive to the issues, and meet the purpose and need as defined for the Fernow Experimental Forest activities. I have reviewed the FEIS and am confident that the analysis documented in the FEIS is responsive to the issues, addresses the purpose and need for the Fernow Experimental Forest research activities, and provides sufficient basis for evaluating alternatives and making a reasoned decision.

I have read the EIS for the Fernow Experimental Forest and fully understand the environmental effects it discloses. After careful consideration of the analyses, applicable laws and public comments, it is my decision to select Alternative C, as presented in the Final EIS. This alternative with its associated mitigation measures and monitoring best addresses the issues and opportunities as they pertain to the physical, biological, social and economic resources.

The following activities will be implemented under Alternative C:

Most of the projects are part of ongoing research initiated in the 1950s and later. The action involves application of the following silvicultural treatments to existing research studies: diameter-limiting cutting treatment on approximately 32.7 acres, single-tree selection on

approximately 169.8 acres, financial maturity harvesting (also known as financial rate of return method; see description below) method on approximately 189.9 acres, and approximately 23.2 acres of small clearcuts. In addition, prescribed fire would be used in combination with the shelterwood method to promote oak regeneration on approximately 77.1 acres; an 84.7-ac watershed would be treated with ammonium sulfate fertilizer to induce artificial watershed acidification; and in a new study, approximately 376.1 acres would be treated with a combination of prescribed fire and overstory mortality treatments (herbicides and/or girdling) to enhance Indiana bat summer habitat and oak retention, release and restoration.

The compartments assigned to the various studies are presented below. Study No. 4110-FS-NE-4101-02, in particular, integrates physiographic characteristics expressed as site index, as a factor in the experimental design. Moreover, all of the compartments contain numerous permanent plots. This permits the analysis of the results based on site characteristics at the patch level (i.e. ½ acre) such as slope shape, curvature, elevation, landform, and aspect. Understanding the ecology of regeneration in mixed mesophytic forests should be enhanced by this capability, which will incorporate geographic information systems and multivariate analyses of variance. Prior to installation of the permanent plots, analyses were limited to compartment wide results. Both smaller and large spatial scale variability could not be modeled. We believe that the incorporation of both smaller and larger spatial scale attributes will improve our understanding of post-disturbance species reorganization.

Research Studies

Large area comparisons of forest management practices (Study No. 4110-FS-NE-4101-2) was initiated in 1950. The objective of this study is to determine the effects of three uneven-aged silvicultural practices (single-tree selection, diameter-limit, patch clearcuts) on yield and stand growth in board feet, cubic feet, and basal area, replicated two times on three oak site index classes. Another objective is to determine the effects of the different silvicultural practices on species composition and timber quality across site quality classes. This research is important to understanding the effects of current harvesting practices; particularly those used on private land, on long-term sustainability and diversity of central Appalachian hardwood forests, and for developing management guidelines and recommendations for these forests. After 50 years, this research is beginning to come to fruition, and preliminary results indicate that some of these practices might not maintain desirable levels of species diversity in Appalachian forest stands. (Compartments 5B, 7A&B, WS5A, 17A, 19A,20A &C; 208.3 acres)

Compartments 5B, WS5A, and 20A (159.8 acres) would be treated with single-tree selection. Four parameters determine which trees are harvested or left in the stand: residual basal area (RBA) in square feet per acre for trees greater than 11 inches in diameter at breast height (dbh), the target distribution of stems in 2-inch diameter classes referred to as "Q", the largest diameter tree to retain in the stand, and cutting cycle. A Q of 1.3 (i.e., there are 1.3 times more stems in each successively smaller diameter class) is used for all sites. Compartments with site index 60 are assigned the parameter values 35 ft^2/ac RBA, largest retained tree is 20 inches dbh, and 15-yr cutting cycle. Compartments with site index 70 are assigned the parameter values 50 ft^2/ac RBA, largest retained tree is 26 inches dbh, and 10-yr cutting cycle. Compartments with site

index 80 are assigned the parameter values 65 ft^2/ac RBA, largest retained tree is 32 inches dbh, and 10-yr cutting cycle.

Compartment 20C (27.7 acres) would be harvested using the diameter-limit method, the most common harvesting method used on nonindustrial private forest land in the eastern United States. All trees with dbh greater than 17 inches will be removed at each cutting cycle. Stands with site index 60 have a 20-yr cutting cycle while site index 70 and 80 stands have a 15-yr cutting cycle.

Compartments 7A, 7B, 17A, and 19A would be treated with a total of 23.2 acres in patch clearcuts. Various numbers of 0.4-ac regeneration openings are created in each compartment to promote uneven-aged stands of even-aged patches. Total acres treated each cycle are determined by compartment size, rotation length, and number of harvests during rotation. Site index 60 stands have a rotation length of 90 years and a 15-yr cutting cycle; $1/6^{th}$ of the stand is treated each cycle. Site index 70 and 80 stands have a rotation length of 80 years and a 10-yr cutting cycle; $1/8^{th}$ of the stand is treated each cycle.

Financial rate of return areas on the Fernow Experimental Forest (Study No. 4110-FS-NE-1103-62) was initiated in 1971. The objective of this study is to determine the effects of financial rate of return cuttings on growth and yield of hardwood stands, species composition and hardwood stand quality. The financial rate of return method is a selection system, which incorporates economic guidelines for selecting trees to harvest. Two study areas are being utilized for each of the following estimated rates of return: 2, 3, 4 and 6%, as a test of the utility and accuracy of these criteria for selection, and to evaluate the effects on stand characteristics over time. (Compartments 20B, 26A&B; 189.9 acres).

Guidelines for applying marking guidelines were established by Trimble et al. (1974). The guidelines use silvicultural criteria such as leaving an adequately stocked stand of potentially valuable trees and removing poor quality or high risk trees. The minimum size of tree to cut varies with each species and is dependent on the desired rate of return. Generally speaking, as the desired rate of return increases, the minimum diameter decreases. This technique attempts to gain the advantages of an uneven-aged silvicultural system in conjunction with a practical method to apply in the field.

Evaluating prescribed fire as a silvicultural tool to promote oak regeneration in the central Appalachians. (4300-FS-NE-4353-12). The principle objective of this research is to determine the effectiveness of using prescribed fire and fencing in conjunction with a shelterwood regeneration method to regenerate oak. Secondary objectives include evaluating treatment effects on coarse woody debris, forest floor and litter characteristics, seedbank composition and abundance, spring ephemeral wildflowers, herpetofauna, and acorn predation by *Curculuinidae* (weevils). The study is intended to develop a silvicultural technique related to the use of prescribed fire, but also will examine changes in ecosystem properties than can be considered at the stand or subwatershed scale. (Compartment R1;77.1 acres)

Artificial acidification of several small watersheds at or near the Fernow Experimental Forest (4300-FS-NE-4301-59), and The effect of artificial watershed acidification on vegetation growth and nutrient status. (4300-FS-NE-4301-63).The objectives of this research (also known as the

Whole Watershed Acidification Study) are to determine changes in soil chemistry, soil leachate chemistry, and streamflow chemistry resulting from increased levels of nitrogen and sulfur deposition, and to evaluate the effects of these changes on vegetation growth and ecosystem nutrient status. Ammonium sulfate fertilizer would be applied to a watershed three times per year and the effects on ecosystem parameters would be determined. The study results would quantify the susceptibility of watersheds in the Central Appalachians to acidification by acid deposition. Also, the data would be used to test watershed acidification models. This whole system manipulation approach would quantify the integrated response of a watershed to elevated sulfur and nitrogen loadings. (Compartment WS3; 84.7 acres)

Proposed new research: Prescribed burning and variable intensity overstory mortality for enhanced wildlife habitat structure and long-term oak restoration (Study number yet to be assigned). The objectives of this research are to improve potential Indiana bat summer habitat, and in the longer term, to create a mosaic of sites to promote oak retention, release and restoration. Through a series of prescribed burning and periodic overstory mortality treatments (stem-injected herbicides and/or girdling), short term improvements in bat roosting and forage habitat would be made. Over the longer period, overstory mortality treatments would focus on non-oak removals to create an all-oak live overstory; and only oak seedlings/saplings (or other fire tolerant species) would be present for future accession into the overstory. Unlike previous oak-fire-light studies, timber management would not be an immediate management goal.

This study would include 7 compartments (7 replicates): John B. Hollow drainage (313.9 acres, 5 treatment areas), and compartments 13 and 21 (31.3 and 30.9 acres, respectively). Approximately 3.1 miles of fire break would be established as part of this study. A study plan would be prepared and peer-reviewed prior to any treatments being implemented.

The on-site burn plan for any studies involving prescribed burning will be developed by personnel of the Monongahela National Forest with expertise and experience in both fire suppression and the use of fire as a management tool. The burn plan will address the following considerations:

1) Moving heavy fuels away from fire lines. Fuel near a fire line should burn completely and cease burning relatively quickly, allowing a burn crew to proceed with a burn.
2) Gather adequate weather information the day before and the day of a burn. Fuel will not burn when wet and often will not burn adequately when relative humidity is too high. Fire control becomes difficult when relative humidity is too low. A burn will not be conducted when the wind is forecast to change direction or exceed 15-miles-per-hour from a consistent direction. Absence of wind makes fire unpredictable. Light and variable winds create poor burning conditions. Winds above 20 miles per hour make fire control difficult.
3) Local fire departments, neighbors, and some state agencies will be notified the day of a burn. The West Virginia Division of Forestry issues burning permits based on the adequacy of the burn plan and the experience and qualifications of the burn managers and crew.
4) The impact of smoke will be considered. The burn will not be conducted if atmospheric conditions will cause the smoke to envelop highways, schools in session, nursing homes or residential areas.

5) A conservative strip width will be used to gauge fire behavior and adjustments will be made accordingly to achieve desired fire behavior characteristics. In this case we will be trying to maintain 2-4' flame length that spreads about 1 to 5 feet per minute.
6) The burn manager and designated personnel will stay with a burn until it is completely safe. The crew will patrol the perimeter to monitor adjacent areas for signs of wildfire and move or extinguish burning fuels near the perimeter. The burn area will be monitored for at least one day after all smoke is absent.
7) The burn plan will include contingency plans that will guide a response to the unlikely event of a wildfire. Such plans will include the details for contacting area volunteer fire departments, obtaining additional resources, including both personnel and equipment, from the Monongahela National Forest and the West Virginia Division of Forestry.

Silvicultural treatments involve cutting individual trees, according to the silvicultural prescription, and removal of the boles from the stand. Ground-based and cable logging systems will be used to skid the trees to log landings. For the most part, existing skid trails and roads will be utilized. After completion of treatments, roads and decks will be closed. All management actions will comply with Forest Plan Standards and Guidelines or West Virginia's Best Management Practices (BMPs), whichever is most restrictive. For the burning studies, the burn plan and prescribed fires will be conducted according to state regulations administered by the West Virginia Division of Forestry. A slow-moving fire (1-5 ft/min) that produces high amounts of heat (2-4 ft flame lengths) conducted in the spring will be used in these two studies. All personnel supervising and working on the fire will have received training in use of prescribed fire and in fire suppression.

This decision also includes activities that are designed specifically to address the Issues described in Chapter 1 of the FEIS. Relative to the issue of Threatened and Endangered species, the U.S. Fish and Wildlife Service (USFWS) concurs with the "not likely to adversely affect" determination made in the Biological Assessment for Threatened, Endangered, and Sensitive Species on the Fernow Experimental Forest, Tucker County West Virginia (BA) for the Virginia big-eared bat, Corynorhinus townsendii virginianus; the West Virginia northern flying squirrel, Glaucomys sabrinus fuscus; and the Cheat Mountain salamander, Plethodon nettingi. Comments provided by the USFWS during review of the EIS and consultation were used to determined effects to Threatened and Endangered Species, and to develop mitigation and monitoring to reduce adverse effects. The endangered plant, Running Buffalo clover (Trifolium stoloniferum), also occurs on the FEF. Based on a review of our previous research efforts with Running Buffalo Clover, the Service recommends that the project should have a long-term beneficial effect on this species. A list of agreed-upon proposed measures will be incorporated into the project to ensure adverse effects do not occur.

A Priority III winter hibernaculum for Indiana bat (Myotis sodalis) exists on the FEF. The Fernow Experimental Forest initiated formal consultation on May 2, 2005 with the USFWS pursuant to section 7 of the Endangered Species Act of 1973 (ESA) as amended (16 U.S.C. 1531 *et seq.*) relative to the Indiana bat. Formal consultation was based on determinations in the Biological Assessment prepared for the FEIS and informal consultation with the USFWS. A Biological Opinion will be issued on or before September 14, 2005. To significantly reduce the chance of take occurring, reasonable and prudent measures will be implemented as part of this alternative. These measures will be documented in the Biological Opinion, and include intensive

monitoring of Indiana bat habitat use, including the use of Anabat detectors, and activities to improve bat habitat, among others.

To address issues related to sediment, Forest Plan standards and guidelines will be utilized to reduce impacts, and streamside management zones employed for identified perennial and nonperennial streams. A silt fence will be used on compartments 7A to control runoff, and landings replaced for WS5A. Gravel would be applied to road surfaces as needed. Culverts and ditches on all roads would be maintained as needed. Details are provided in Table 2-2 of the FEIS. The following mitigation measures are included in my decision:

1. Tree felling will be conducted only during the dormant season (October through April).
2. Tree species to be removed is dependent upon the specific silvicultural prescription. However, no butternut trees will be cut, and hickory trees will be left where possible without compromising the integrity of the research studies.
3. Trees will be felled and winched to the landing using a truck crane or tractor and cable, to minimize soil disturbance. Logs will be skidded using a rubber tired skidder or tractor with a logging arch.
4. Logging and skidding will not be done when conditions are excessively wet, so as to protect against unnecessary erosion and damage.
5. After logging is complete, skid roads will be closed, and water control devices such as water bars and dips constructed to control the movement of water.
6. All logging decks will be reclaimed, limed and seeded with a mixture of clover, rye, timothy, and various grasses to prevent erosion.
7. All Best Management Practices (BMPs), as defined by the West Virginia Logging Sediment Control Act of 1992 will be followed during and after logging.
8. Perennial streams will be protected with a 100 foot-wide vegetative strip. A minimum of 75% crown closure will be maintained. There will be no vehicular traffic or herbicide use in the strip.
9. Non-perennial streams will be protected with a 50 foot-wide vegetative strip. Within this strip, crown closure will generally be 60%. There will be no vehicular traffic or herbicide use in the strip.
10. Trees will not be cut from within the stream channel or off the stream banks. Logging equipment is restricted or excluded in this area except at designated stream crossing points.
11. Keeping with standard Forest Service practice, all unevaluated heritage resource sites will be avoided during project planning or implementation.

Monitoring activities

Because many of the actions are ongoing research studies, measurement and monitoring of these studies will continue. Forest species composition, stand development and productivity will continue to be monitored on a regular basis on the nearly 200 permanent growth plots located on the FEF.

The following monitoring activities are proposed to address issues raised in the FEIS. Details of monitoring and experimental design can be found in individual study and monitoring plans. This information will be put into monitoring reports, and published in scientific journals.

1. Channel cross-sectioning points will be established on selected stream channels including those formed in limestone to monitor changes in channel morphology. (Issue 2)

2. Substrate in perennial streams will be periodically measured to assess changes in quality. (Issue 2)

3. Surveys will be done annually for TES animals. (Issue 1)

4. Surveys for TES plants will be done again in three years. (Issue 1)

5. Monitoring of Indiana Bat activity at the mouth of Big Springs Cave, and across the landscape of the FEF, will be conducted annually during fall swarming periods and spring emergence periods, using Anabat II detectors. (Issue 1)

6. Effects to running buffalo clover (started in 1994) will continue to be evaluated per the study plan design. (Issue 1)

7. Effects of vegetation manipulation treatments, including changes in species composition, productivity, tree quality, and regeneration, will continue to be evaluated per the study plan design.

8. Air quality monitoring will continue as currently conducted.

9. Stream water quality and soil water quality monitoring in WS3 would continue as currently conducted.

10. Stream water quality monitoring in Camp Hollow Run below WS3 would continue as currently conducted.

Reasons for the Decision

I selected Alternative C because it best meets the purpose and need detailed in the FEIS (pgs 1-1 through 1-6), and the alternative also meets goals and objectives for this area as stated in the Land and Resource Management Plan, Monongahela National Forest, the General Plan for the Fernow Experimental Forest, and the Research Work Unit Description.

This alternative also addresses the issues raised during scoping and which are found in the FEIS.

My reasons for selecting Alternative C, as framed by significant issues are outlines below.

Threatened and Endangered Species
Alternative C includes mitigation activities and reasonable and prudent measures to protect threatened, endangered and sensitive species that may be found on the FEF, and to protect their habitat. The research that is being conducted on the ecology of the running buffalo clover is an

important part of the recovery plan for the species. No other such research on the running buffalo clover is being conducted anywhere. The planned research activities will benefit running buffalo clover populations throughout its range, and are necessary for understanding how to restore this species. Monitoring of Indiana bat populations in the hibernaculum has been ongoing since the 1950's. Further monitoring and research activities will improve our knowledge of Indiana bat life history and ecology in the central Appalachians and provide important information that may help with restoration of this species. Habitat restoration activities as part of the proposed study will provide important roost habitat for Indiana bats, and should provide a positive effect on the population. Other monitoring activities will continue to provide information about other species.

Sediment and Erosion

The significant mitigation activities proposed for Alternative C will achieve the purpose and need, while minimizing the effects of sediment and erosion. Monitoring activities will increase our understanding of the effectiveness of mitigation, and improve our long-term database on sediment and erosion within forested ecosystems.

Significance and Importance of FEF Research

Research conducted on the FEF and by FEF staff has been used to develop Best Management Practices for the State of West Virginia, and to provide input into management decisions of many landowners, including state, private and federal landowners. Over 900 publications have been published describing the Fernow research and distributed throughout the world (Godwin et al. 1993). The research at the FEF is a significant part of the Long-Term Ecosystem Monitoring research program of the U.S. Forest Service. The FEF is also part of other national research and monitoring programs, including the Long-Term Soil Productivity Program, the National Atmospheric Deposition Program, the National Dry Deposition Network, the Interagency Monitoring of Protected Visual Environments (IMPROVE) network, and international networks such as the Global Terrestrial Observing System/Terrestrial Ecosystem Monitoring Sites network.

Existing long-term studies on the FEF are unique. Research Study 2 (see Chapter 2 of the FEIS for a detailed description) was established in 1949 to evaluate the effects of various silvicultural techniques on forest productivity, species composition, log quality and regeneration. The treatments in this study have been applied consistently over time since 1949. No other such study exists in the central hardwood region. Such studies are a valuable national resource, which could not be replicated within the span of several generations.

The FEF also functions as an outdoor classroom, hosting 1,000 or more visitors per year for educational programs ranging from a few hours to several days. These visitors range from elementary school children to university students to professional foresters and land managers to scientists from the U.S. and around the world. Programs use research areas of the FEF to demonstrate basic ecological principles, sound forest management, and basic nature study.

Based on the analysis in the FEIS, I conclude that project activities will meet the purpose and need as defined in the FEIS, and protect the land's productivity, and promote long-term ecosystem health and diversity.

Other Alternatives Considered

No-Action (Alternative A)

The Council on Environmental Quality regulations implementing NEPA requires this alternative to be developed. I did not select the No-Action alternative because it would have prematurely ended important long-term research and impaired development of new knowledge, and thus would not meet the objectives and goals as described in the FEIS.

The No-Action Alternative would halt all manipulative research on the FEF, and effectively end several important long-term research studies. Monitoring of the vegetation, water flow and chemistry, atmosphere and wildlife would continue, but the results would not be applicable to most forestry operations in the Appalachians, as most forest land is managed on rotations of 80 years or so. Important research on effects of fire on hardwood forest ecosystems would not be conducted, and the research program at the FEF would not address this important gap in our knowledge.

Important long-term research would be discontinued, and would no longer be a resource, and a catalyst for other research. Scientists in West Virginia and the central Appalachians would find their research opportunities curtailed as a result of the change in the research program of the FEF. This would impair the ability to develop sound land management guidelines for a variety of landowners, and would also slow the growth of ecological knowledge.

Proposed Action (Alternative B)

The Proposed Action is similar to Alternative C, except without additional mitigation for issues identified during scoping and analysis. Although it will meet the purpose and need, as specified in the FEIS, I did not select Alternative B because it did not address the risk to threatened, endangered or sensitive species that may occur in the area, nor did it adequately deal with the problem of invasive exotic plant species threatening native diversity and indeed, the integrity of the Fernow Experimental Forest for research. It also did not address the risk of sediment impacts from existing skid roads/landings during logging.

Public Involvement

The scoping process was used to invite public participation and collect comments. The public was invited to participate in the project in the following ways:

Notice of Intent: A Notice of Intent to file and Environmental Impact Statement was published in the *Federal Register* on September 20, 2004.

Public Mailing: In early August 2004, a letter providing information and seeking public comment (scoping document) was mailed to 76 individuals and groups that had previously shown interest in Forest Service projects in West Virginia. The mailing included Federal agencies, State agencies, county offices and various non-governmental organizations and

individuals.

Local news Media: A legal announcement about the project was printed in the August 18 and 25, 2004 editions of the *Parsons Advocate,* the newspaper of record.

Public Meetings: A public meeting was held at the Timber and Watershed Laboratory in Parsons, WV, on August 25, 2004 to provide information and discuss potential areas of concern and or interest that should be addressed in this project.

A copy of the Draft EIS was mailed to agencies, organizations and interested individuals on January 24, 2005 for comment. The availability of the Draft EIS was also announced in the *Parsons Advocate* (January 26 and February 2, 2005; the newspaper of record) and the Elkins *Inter-Mountain* (January 27-29, 2005).

Comments from the Draft EIS were reviewed, analyzed, and evaluated and the response to comments is contained in the appendix of the FEIS. Comments received were both in support and in opposition to the proposal. The major comments focused on adverse impacts to threatened, endangered and sensitive species, hydrologic and sediment impacts to streams, and the importance of this type of research in the Appalachian region. The FEIS was published and released to the public on April 18, 2005. The availability of the FEIS was announced in the *Parsons Advocate* April 20 and 27, 2005), the Elkins *Inter-Mountain* (April 22 and 23, 2005), and the *Federal Register* (April 29, 2005).

Forest Plan and NFMA Findings

Forest Plan Consistency

Projects listed are consistent with direction for management of the Fernow Experimental Forest (contained in Chapter I, pages 1-3 through 1-5 of the FEIS). Management prescription 8 of the Land and Resource Management Plan, Monongahela National Forest, Vegetation, and Section 8.5 of the Revised Forest Plan, emphasize areas to conduct research activities. The Code of Federal Regulations, 36 CFR 219.28 identifies the role of Research.

Appropriateness of Even-aged Management

The even-aged harvest methods to be used are appropriate to achieve research objectives as designed and discussed on pages 1-4 through 1-5, and pages 3-93 through 3-99 of the FEIS. Even-aged management practices are commonly used throughout the region both on public and private land. Analysis of effects of even-aged management is therefore an appropriate research topic and consistent with the mission of the FEF. The Environmental Consequences section of the FEIS (pages 3-1 through 3-111) discloses the effects of even-aged management.

Vegetation Manipulation

Implementation of site specific mitigation measures and Forest Plan standards and guidelines will ensure that project activities comply with the requirements of 36 CFR 219.27(b).

According to these requirements project activities involving tree cover manipulation will:

1. Be best suited to the multiple-use goals established for the area (Purpose and Need for the Proposal, FEIS pages 1-1 through 1-6).

2. Occur on lands where adequate restocking can be assured. All research activity occurs on lands suitable for timber production. Monitoring activities as proposed in the EIS and included in the Record of Decision will evaluate vegetation response to the various silvicultural regimes.

3. Not be chosen primarily because they give the greatest economic return or the greatest output of timber, although these factors shall be considered (FEIS Chapter 3, pages 3-106 through 3-107). Alternative C was chosen because the additional mitigation measures better address the issues identified in the FEIS (pages 1-5 through 1-6). Alternative C does not harvest significantly more acres (FEIS page 2-11, Table 2-6) nor does it return the greatest benefit/cost ratio (FEIS page 2-10).

4. Be chosen after considering potential effects on residual trees and adjacent stands. Pages 3-87 through 3-99 of the FEIS discuss the effects of activities on forest vegetation. The research studies describe the type of residual trees that will be left in harvested units. Generally speaking, trees will be left to provide a future source of seed, aesthetic value, wildlife value, mast production, habitat for threatened, endangered, and sensitive species and to add vertical stand structure.

5. Avoid permanent impairment of site productivity and ensure conservation of soil and water resources (FEIS, pages 3-1 through 3-44 and 3-51 through 3-66).

6. Provide the desired effects on water quantity and quality, wildlife and fish habitat, regeneration of desired tree species...recreation uses, aesthetic values, and other resource yields (FEIS, Purpose and Need, pages 1-1 through 1-4 and Environmental Consequences pages 3-1 through 3-111).

7. Be practical in terms of transportation and harvesting requirements, and total costs of preparation, logging, and administration (Environmental Consequences section of FEIS, Economic Analysis pages 3-106 through 3-107, and the analysis file).

Clearcutting Optimality

Several methods of timber harvesting and forest regeneration are being studied on the FEF including the use of patch-clearcutting**.** In these studies, variants of clearcutting are being evaluated as optimal regeneration methods to regenerate shade-intolerant tree species and to maintain tree species diversity. Other methods also are being evaluated and include even-aged techniques such as shelterwood and seed tree regeneration, two-age management, and uneven-aged management such as individual and group selection methods. However, these methods

generally increase the relative amount of shade tolerants tree species and reduce woody species diversity (Smith 1981, Miller and Kochenderfer 1998, Schuler and Gillespie 2000).

Environmentally Preferable Alternative

Although Alternative A (No-Action Alternative) would have the least effect on the biological and physical environment, I am identifying the selected Alternative C as environmentally preferable based on the follow interpretation of the law and agency policy.

The specification of the environmentally preferable alternative is required by the regulations for implementing the procedural provisions of the National Environmental Policy Act [40 CFR 1505.2(b)]. Ordinarily this is the alternative that causes the least damage to the biological and physical environment. In some cases, there may be more than one environmentally preferable alternative (FSH 1909.15-5). Section 101 of the National Environmental Policy Act of 1969 calls on federal, state and local governments and the public to create and maintain conditions under which humans and nature can exist in productive harmony. This broad policy is further defined in six goals:

(1) to fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
(2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
(4) preserve important historic, cultural, and natural aspects of our national heritage and maintain wherever possible an environment which supports diversity and variety of individual choice;
(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
(6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Section 101 does not call for the exclusion of Americans from the use of their natural resources, but does demand that such uses avoid degradation of the environment. Alternative C best meets the goals of Section 101 of NEPA. The other two Alternatives have less desirable environmental and/or social outcomes when compared to this alternative.

Alternative C is similar to the Proposed Alternative (Alternative B), but with the addition of mitigation measures to reduce potentially adverse effects to threatened, endangered and sensitive species, to control invasive exotic plants that threaten the integrity of the Fernow Experimental Forest for research, and to reduce potential impacts on streams and watersheds. Alternative C will also provide for safer roads, and a healthy, diverse, productive forest that offers a variety of vegetation types of different structures and age classes. Mitigation measures adequately address any short-term adverse effects that may result from the proposed research activities. The No-Action alternative does not preserve important historical aspects of our national heritage, namely the unique long-term research studies, nor does it succeed in assuring the widest range of

beneficial uses of the environment. All practicable means to avoid or minimize environmental degradation from the Alternative C have been adopted and are described in the Decision. This includes mitigation and monitoring disclosed in the FEIS and in the Biological Opinion from the USFWS.

Appeal Opportunities

This decision is subject to the USDA Forest Service process for administrative review. A written Notice of Appeal must be submitted within 45 days after the date the notice of this decision is published in the Parsons Advocate, Parsons, WV to:

Mr. Michael Rains, Appeals Deciding Officer
USDA Forest Service
Northeastern Research Station
11 Campus Boulevard
Newtown Square, PA 19073

Appeals must meet content requirements of USDA Forest Service 36 CFR 215.14. Copies of this Record of Decision, the FEIS, and the file of public comments are available for public review at the Timber and Watershed Laboratory in Parsons, WV, or by writing: Dr. Mary Beth Adams, Project leader, PO Box 404, Parsons, WV 26287.

It is the appellant's responsibility to provide sufficient written evidence and rationale to show why the Responsible Official's decision should be remanded or reversed. An appeal submitted to the Appeal Deciding Officer becomes a part of the appeal record. An appeal must meet the content requirements of Forest Service 36 CFR part 215.

If no appeal is received, implementation of this decision may occur on, but not before, 5 business days from the close of the appeal filing period. If an appeal is received, implementation may not occur for 15 days following the date of appeal disposition.

/S/ *Mary Beth Adams* 6 June 2005
Mary Beth Adams Date
Fernow Project Leader