Environmental Assessment
Of the
Integrated Natural Resources Management Plan
For
Fort Benning Army Installation

Columbus, Georgia

July 2001

TABLE OF CONTENTS

1.0 Purpose and Need 4
1.1 Proposed Action 4
1.2 Purpose and Need for this Action 5
1.2.1 Goals 6
1.3 Scope of Environmental Analysis 6
1.4 Decision to be made: 6
1.5 Scoping 7
1.5.1 Relevant Issues 7
2.0 Alternatives 10
2.1 Selection Criteria 10
2.1.1 Expanded description of Selection Criteria 10
2.2 No Action Alternative (Traditional Forest Management) 11
2.2.1 Timber 11
2.2.2 Fire Management 12
2.2.3 Federally Threatened and Endangered Species 12
2.2.4 Soil Conservation and Water Quality 14
2.2.5 Game and Sport Fish Management 14
2.2.6 Non-game species 15
2.2.7 Pest Management 16
2.2.8 Cultural Resources 17
2.3 Proposed Action (Balanced Ecosystem Alternative - INRMP) 17
2.3.1 Timber Management 17
2.3.2 Fire Management 18
2.3.3 Federally Threatened and Endangered Species 19
2.3.4 Soil Conservation/Water Quality 20
2.3.5 Game and Sport Fish management 21
2.2.6 Non-Game Species 24
2.3.7 Pest management 26
2.3.8 Cultural Resources 27
2.4 Alternatives Considered but Eliminated from Detailed Study 27
2.4.1 Maximum RCW Recovery Alternative 27
2.4.2 Maximizing Military Mission Alternative 27
2.4.3 Recreation and wildlife emphasis management 27
3.0 Affected Environment 29
3.1 Natural Environment 29
3.1.1 Fort Benning's Ecological Groups 29
3.1.2 Species of Conservation Concern 33
3.1.3 Threatened and Endangered Species 33
3.1.4 Other Species of Conservation Concern 34
3.2 Physical Environment 36
3.2.1 Topography 36
3.2.2 Geology 36
3.2.3 Soils 37
3.2.4 Climate 39
3.2.5 Water 39
3.2.5.1 Wetlands 40
3.2.5.2 Groundwater 40
3.2.5.3 Fort Benning Hydrologic Unit 40
3.2.6 Air Quality 40
3.3 Human Environment 42
3.3.1 Noise 42

3.3.2 Land use 42
3.3.3 Environmental Justice 43
3.3.4 Roads 43
3.3.5 Socio-Economic 44
3.3.5.1 Population 44
3.3.5.2 Housing 44
3.3.5.3 Employment 45
3.3.5.4 Allocated Proceeds to Counties from Forest Products 45
3.3.5.5 Education 45
3.3.5.6 Taxes 46
3.3.5.7 Public services 46
3.3.6 Outdoor Recreation 46
3.3.6.1 Hunting 47
3.3.6.2 Fishing 47
3.3.7 Cultural and Historical Resources 48
3.3.8 Hazardous Materials 48
4.0 Environmental Consequences 50
4.1 Timber Management 50
4.2 Fire Management 53
4.3 Threatened and Endangered Species Management 56
4.4 Soil Conservation Management 60
4.5 Game and Sport Fish Management 60
4.6 Non-Game Species Management 64
4.7 Pest Management 64
4.8 Cultural Resource Management 66
4.9 Cumulative impacts 66
4.9.1 Region of Influence (ROI) 66
4.9.2 Past, Present, and Reasonably Foreseeable Projects Within the ROI 66
4.9.3 Reasonably Foreseeable Future Actions in the Fort Benning Community 67
4.9.4 Reasonably Foreseeable Future Actions in the Columbus-Phenix City Community 68
4.9.5 Tri-State Water Compact 69
4.9.6 Cumulative impacts from implementation of No-Action Alternative 69
4.9.7 Cumulative impacts from implementation of the Balanced Ecosystem Alternative 70
5.0 Persons Consulted / Preparers 71
6.0 References 72
Appendix A Technical Advisory Committee Members 73
Appendix B Steering Committee Members 74

List of Tables

Table 1. Alternatives Measured against Selection Criteria 10
Table 2. Thinning and Dollars Generated 12
Table 3. Highly Erodible Soil Series on Fort Benning 38
Table 4. Revenues Generated From Forest Operations 45
Table 5. Effects of Proposed Timber Management 50
Table 6. Effects of Proposed Fire Management 54
Table 7. Effects of Proposed Threatened and Endangered Species Management 57
Table 8. Effects of Proposed Game and Sport Fish Management 62
Table 9. Effects of Proposed Pest Management 65

1.0 Purpose and Need

This Environmental Assessment (EA) records the development process of Fort Benning's Integrated Natural Resource Management Plan (INRMP), and evaluates implementation of the INRMP. The INRMP will specify the sound land management practices and adaptive management strategies that will conserve ecological integrity and promote the health of Fort Benning's ecosystems.

Fort Benning's approach to natural resource management is embodied in the installation's vision of the relationships between its military mission and the natural resources upon which that mission depends.

Fort Benning is the primary initial training area for the U.S. Army Infantry soldier. Mission lands also support training for mechanized, engineering, Ranger, air assault and Airborne units (INRMP Chapter 7). Fort Benning's vision is to support the military mission while promoting the ecological integrity of the Fort Benning landscape. Fort Benning intends to manage its natural resources through a collaborative effort between natural resource professionals and military personnel. These groups will strive to promote the long-term ecological sustainability of Fort Benning's lands for multiple-use opportunities (INRMP Chapter 1).

The U.S. Fish and Wildlife Service, the Georgia Department of Natural Resources, and the Alabama Department of Conservation and Natural Resources, as well as nine affected and Federally recognized Native American Tribes all have been involved in the development of the INRMP. An INRMP Technical Advisory Committee composed of scientists and resource managers from universities, research centers, non-profit organizations, consulting firms, forest industry, and Federal and state natural resource agencies have also been involved (Listed in Appendix A). All of these groups identified natural resource management issues that the INRMP needed to address. Those issues are discussed in Section 1.5.1 of this EA.

The issues identified by the groups were used to develop a variety of approaches to integrating natural resource management with the military mission. These approaches became the alternatives to the proposed action (Section 1.2). The alternatives are described in detail in Section 2.0 of this EA.

- Section 1.0 (other than this introduction) briefly describes the proposed action and the purpose and need for this action; outlines the goals of the proposed action, the scope of environmental analysis, and the decision to be made; and describes the scoping process and identification of issues.
- Section 2.0 describes the proposed action (which is the preferred alternative), and describes the other alternatives that were developed.
- Section 3.0 describes the Fort Benning environment (Affected Environment)
- Section 4.0 evaluates the environmental consequences on a variety of resources including socioeconomic and environmental justice; and evaluates cumulative impacts.
- Section 5.0 lists the preparers and the agencies and person's consulted.
- Section 6.0 lists the references.
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1.1 Proposed Action

The Commander at Fort Benning Army installation proposes to integrate natural resources management with the military mission by developing and implementing an Integrated Natural Resources Management Plan (INRMP) that provides for the conservation and rehabilitation of the natural resources on Fort Benning. The INRMP would focus primarily on the management

of the natural resources on mission lands, but also would address natural resource management activities that occur within the cantonment area (urbanized/ developed portion of installation).
The INRMP is one component of Real Property Management, and would be developed in conjunction with the installation's Long Range Component of the Real Property Master Plan and The Range and Training Land Program Development Plan. It would also enhance Ft. Benning's ongoing compliance with environmental laws, Army regulations, and Department of Defense Instructions.

Implementation of the INRMP would be a gradual process with the initial INRMP identifying immediate projects, as well as future projects that may have data gaps, or funding needs. Since an INRMP is a dynamic document, it would continually be updated and modified as feedback is generated. Department of Defense and US Army policy require that an INRMP be reviewed at least annually, and updated if necessary. Otherwise, the INRMP must be updated every five years.

For a more detailed description of the proposed action, please see Section 2.1.2 Balanced Ecosystem Management Alternative (preferred alternative).

1.2 Purpose and Need for this Action

The purpose of developing and implementing the INRMP is to meet the requirements of the Sikes Act (Title 16, United States Code 670a et seq.) as amended through 1998, and Army Regulation 200-3 Natural Resources – Land, Forest and Wildlife Management (28 Feb 95). The Sikes Act provides the primary legal basis for the Secretary of Defense to carry out a program that provides for the conservation and rehabilitation of natural resources on military installations.

Developing and implementing an INRMP would ensure that natural resource conservation measures and military activities on mission land are integrated and are consistent with applicable Federal and state stewardship requirements. A realistic training environment is a prerequisite for effective training at Fort Benning. To ensure that Fort Benning can meet its mission needs now and into the future, the natural resources that provide the training environment must be managed such that they are ecologically sustainable over the long-term. Development of an INRMP would facilitate the sustainability of the natural resources and therefore assure the continuation of training.

As required by the Sikes Act amendment (SAIA 1997), the INRMP would provide:

- Fish and wildlife management, land management, forest management, fish and wildlife oriented recreation;
- Fish and wildlife habitat enhancement or modification;
- Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants;
- Integration of, and consistency among, the various activities conducted under the plan;
- Establishment of specific natural resource management goals and objectives and time frames for this proposed action;
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources;
- Public access to the military installation that is necessary or appropriate for the use described in the previous statement, subject to requirements necessary to ensure safety and military security;
- Enforcement of applicable natural resource laws (including regulations);

- No net loss in the capability of military installation lands to support the military mission of the installation;
- Such other activities as the Secretary of the Army determines appropriate.

Prior to the Sikes Act Improvement Act of 1997, Fort Benning recognized the need to integrate military training with natural resources management. Following the guidance in Army Regulation 200-3, the decision to develop an INRMP had been made. The desired focus of the INRMP was to be ecosystem based, rather than management for single-species.

1.2.1 Goals

Fort Benning assembled a Steering Committee to create the INRMP's management philosophy and to provide oversight during the development of the INRMP (Members listed in Appendix B). The committee members include military trainers, mission land managers (ITAM program personnel), natural resource managers (Conservation and Land Management Branch personnel), and one non-Fort Benning representative (an employee of The Nature Conservancy). The committee includes two senior line managers – Chief of Environmental Management Division and the Director of the Directorate of Operations and Training.

The Steering Committee identified three main goals the INRMP would achieve. They are to:

- Accomplish and sustain the military mission.
- Achieve environmental stewardship.
- Comply with the law; specifically, but not limited to, the Sikes Act.

1.3 Scope of Environmental Analysis

This Environmental Assessment (EA) is intended to assist Fort Benning's Commanding General with deciding what approach to take when integrating natural resource management and the military mission. The Commanding General at Fort Benning will sign the INRMP, and the Garrison Commander will sign the Finding of No Significant Impact associated with this EA. However, both Commanders will be involved in the decision-making process for the INRMP and EA.

This EA is required under the National Environmental Policy Act (NEPA) as set forth by the President's Council on Environmental Quality regulations (40 CFR Section 1508.18(b)(2)). Army Regulation 200-2 also requires preparation of an EA for the development of natural resource management plans (Chapter 5-2k). This EA is programmatic for this proposed action. The EA analyzes and describes the effects of implementing an INRMP and the reasonably foreseeable events that can be expected to result from this action. Because many details of the INRMP projects are not currently known, specific impacts cannot be analyzed.

It is anticipated that in the future, when project-level details become known, NEPA documentation will be based on this EA, with the appropriate level of subsequent analysis focusing on the details specific to each project.

1.4 Decision to be made

Fort Benning, through the findings of this EA, must select the alternative that ensures the best approach to integrating natural resource management actions and activities on Fort Benning. Although the Sikes Act as amended and Army Regulation 200-3 specify required components of an INRMP and specific criteria that must be met, the focus of the INRMP is left up to each installation.

The Sikes Act and AR 200-3 also require that the resulting INRMP reflect mutual agreement for the conservation, protection and management of natural resources among the U.S. Fish

and Wildlife Service, the Georgia Department of Natural Resources, the Alabama Department of Conservation and Natural Resources, and Fort Benning. However, the amendments to the Sikes Act do not bestow upon the preceding Federal and state resource agencies any additional legal authority beyond which existing laws already provide them.

1.5 Scoping

Scoping is a process used to identify the scope and significance of issues related to a proposed action. Those involved in the scoping process include Federal, state and local agencies, any affected Federally recognized Indian Tribes, and other interested persons. The issues identified during scoping are used to develop the proposed action and any feasible alternatives. Scoping is encouraged, although not required, during the development of an EA (AR 200-2 Chapters 5-6a, 7-1c, 7-7b).

The scoping for this INRMP took place with a broad spectrum of interested groups. The Federal and state natural resource agencies, the Federally recognized American Indian Tribes associated with Fort Benning, and the Fort Benning natural resource managers, legal advisors, military trainers, and mission land managers (Integrated Training Area Management [ITAM] program personnel) all were included in the initial, and ongoing, scoping process. An INRMP Technical Advisory Committee composed of scientists and resource managers from universities, research centers, non-profit organizations, consulting firms, forest industry, and Federal and state natural resource agencies also identified natural resource management issues.

Meetings of the Technical Advisory Committee, and appropriate subcommittees thereof, were convened specifically with the intent of assisting the installation with the identification of management issues. Fort Benning natural resource management, military training, and mission land management staff actively participated in these meetings. As a result, many of the issues identified in the INRMP were generated in large measure by installation staff and members of the Technical Advisory Committee.

As specified in the Sikes Act, the public will have an opportunity to comment on the INRMP. Any comments received will be considered in preparing and completing the final INRMP.

The scoping record can be found in the analysis file at Fort Benning Conservation Branch.

1.5.1 Relevant Issues

The issues brought forth during the scoping process were evaluated for relevance to development of the INRMP and alternatives. Each issue is addressed below, and potentially resolved, by the proposed action or alternatives considered but eliminated from further study (Section 2.0).

Issue 1. *Sustainability of mission lands (This issue was identified internally.)*
How would mission lands be managed to ensure sustainability?

The military mission depends on land being available on which to train soldiers. The current reactive model of a partial attempt to fix training impact-related problems when they arise will not be sufficient to sustain the natural resources, which, in turn, sustains training.

Issue 2. *Prescribed burning (This issue has two components. The general public identified the smoke management concern. The consequences of not burning was identified internally, by the U.S. Fish and Wildlife Service [USFWS], and by the Technical Advisory Committee)*
How will smoke be managed at Fort Benning?

What would be the impact of eliminating prescribed burning?

Prescribed burning on Fort Benning creates smoke management concerns in the local area. Drift smoke from previous prescribed fires has settled on occasion in the Columbus area causing potential road hazards and health concerns.
The elimination of prescribed burning, however, also would have adverse effects. Fort Benning's longleaf pine (*Pinus palustris*) ecosystem, and its associated plants and animals, is a fire-dependent system. The Federally endangered red-cockaded woodpecker (Picoides borealis) is part of this ecosystem, and fire maintains its habitat. If prescribed fire were eliminated due to smoke management concerns, a vital tool for ecosystem maintenance and endangered species management would be eliminated.

The accumulation of fuel may also result in catastrophic wildfires. These wildfires could negatively impact training, threaten people's lives and possessions, and increase air emissions. In the past wildfires have crossed the installation boundary and impacted private lands.

Issue 3. *Forest management (This issue was identified internally and by the technical advisory committee)*
What would be the impacts on the ecosystem depending on silvicultural approach used for forest management?

The overall goals of forestry management on Fort Benning are to restore the longleaf pine ecosystem, support a realistic training environment, maintain a diversity of plant community types, and provide an ecologically sustainable yield of forest products sufficient to maintain a viable forest management program. The two predominant options for the management and restoration of the longleaf pine ecosystem are even-aged and uneven-aged forest management. Each approach has different effects on the composition, structure, and ecological function of forest stands, and the ability to conduct military training.

Issue 4. *The recovery of the red-cockaded woodpecker population at Fort Benning (This issue was identified internally and by the USFWS)*
How would the recovery of the red-cockaded woodpecker be impacted by other natural resource management decisions?

In 1994 the USFWS issued a Biological Opinion in regard to the potential impacts to Federally listed species from Fort Benning's ongoing military activities. The USFWS determined that a jeopardy status existed for the red-cockaded woodpecker (RCW) as a result of such activities. Subsequently, the USFWS established a recovery goal of 450 active and inactive clusters (250 effective breeding pairs) for Fort Benning. Recovery of this species as specified in the Biological Opinion includes development of an Endangered Species Management Plan, increased surveying and monitoring, longleaf pine restoration, well-maintained nesting and foraging habitat, artificial cavity installation, control of pest species, soil conservation, and no "taking" of birds unless covered by an Incidental Take Permit through consultation with the USFWS.

The approaches to forest management and fire management would impact the rate of recovery for the RCW. The rate of restoration of the longleaf pine ecosystem would impact available RCW forage and nesting habitat. Growing season burns generally control midstory hardwoods better and would therefore create favorable RCW habitat. Decisions on how to implement each component of overall natural resource management on Fort Benning would enhance or interfere with RCW recovery.

Issue 5. *Increased accessibility of the installation to the general public (identified by the general public, Sikes Act, and Alabama Game and Fish Division -25 Feb 99 letter in response to request for comments)*

What would be the impacts on the ecosystem and military training by increasing the accessibility of the general public for hunting and fishing?

Currently only active duty and retired military, Department of Defense employees working on or retired from Fort Benning, National Guardsmen and Reservists residing around Fort Benning, and family members, and guests of the preceding, are authorized to engage in hunting and fishing activities on post.

2.0 Alternatives

2.1 Selection Criteria

After alternatives were developed based on the issues discussed above, each alternative was subjected to a filter of selection criteria (Table 2). The selection criteria was developed by Fort Benning and used to narrow down alternatives for further analysis. An alternative that did not meet at least four of the five selection criteria was eliminated from further analysis. A description of these alternatives is included in Section 2.4. The one exception is the No-Action alternative. It is retained despite it meeting only two of the five selection criteria, because the Council on Environmental Quality regulations require its inclusion (Section 1502.14(d)).

Table 1. Alternatives Measured against Selection Criteria

Selection criteria	Alternatives				
	No-Action	*Balanced ecosystem management*	*Recreation and wildlife emphasis management*	*Maximum RCW management*	*Maximizing military mission*
Meets the purpose and need		+	+		
Consistent with applicable Federal & state stewardship requirements	+	+	+	+	+
Causes no net loss to military training lands.		+			+
Causes no long-term reduction in RCW forage or nesting habitat	+	+	+	+	+
Results in an increase in the trend of RCW recovery		+		+	

+ denotes that the alternative does meet this selection criteria
blank space denotes alternative does NOT meet this selection criteria

2.1.1 Expanded description of Selection Criteria

- Meets the purpose and need as described in Section 1.2 of this Environmental Assessment.
- Consistent with applicable Federal and state stewardship requirements – Endangered Species Act, Clean Air Act, Clean Water Act, National Historic Preservation Act, Native American Grave Protection and Repatriation Act, Executive Orders, etc.
- Causes no net loss to military training lands that are currently available to accomplish the mission of Fort Benning.
- Results in an increase in the trend toward RCW recovery – increased number of older and bigger longleaf pine trees available for foraging and nesting, creation and maintenance of an open midstory.

2.2 No Action Alternative (Traditional Forest Management)

The No Action Alternative would not immediately change management direction or the level of management intensity. Under the No Action alternative, the Fort Benning Training Installation would continue to operate using existing programs and management practices. The installation would also continue to operate using existing plans that do not now meet the mandates set forth in the Sikes Act or the requirements in the current version of AR 200-3 or DoD Instruction 4715.3. The No Action Alternative would not provide an integrated approach in the immediate future and would minimally comply with applicable state and Federal laws. Natural resource management actions that would occur under the No Action Alternative are listed below:

2.2.1 Timber

Traditional forestry management on Fort Benning is even-aged management. Even-aged management produces stands of pine trees that are all approximately the same age. Each pine species is assigned a rotational age at which the stand is regenerated (i.e. harvested and planted). Loblolly's rotational age is 80. Longleaf pine's rotational age is 120. Even-aged management also restores longleaf pine rapidly by clearcutting the off-site pine species and planting longleaf pine. Off-site pine species are defined as those growing on a site that would have historically supported longleaf pine due to soil type, topography or fire regime of the site. Clearcutting utilizes high impact harvesting and site preparation methods. High impact methods involve the excessive removal of vegetation and extensive ground disturbance, along with the use of herbicides to reduce competition, and collateral damage to remaining trees.

Southern pine beetle and Little Leaf disease infestations comprise the majority of regeneration opportunities. On average, 300-500 southern pine beetle (SPB) spots, averaging 2 acres, are removed and planted to longleaf pine. Little leaf disease sites average less than 5 acres, and are also removed and planted to longleaf pine. Currently the 50-70 year old loblolly pine and short-leaf pine stands are not surviving long enough to provide RCW nesting and/or foraging habitat. These off-site pines are susceptible to SPB and little leaf disease, and do not withstand regular fire.

Thinning pine stands is also a silvicultural technique used at Fort Benning to maintain the health of the pine trees and their resistance to disease. Thinning removes the trees of lesser quality (i.e. disease or bug infested, or structural abnormalities and damage). A description of previous years levels of regeneration, thinning and the money generated from these timber harvests is provided in Table 2.

Each training compartment is entered once every 10 years and is evaluated for timber management. The compartments to be entered in any one year are scattered across the installation in a checkerboard pattern. The entry cycle is established, and is normally not altered. The main objective during the evaluation is the health of the stand. The trend is to remove the unhealthy pines, and favor the healthy ones, specifically longleaf. Although an interdisciplinary team evaluates each area proposed for timber management, the driving force behind management decisions is the Jeopardy Biological Opinion for the RCW.

Table 2. Timber Management and Dollars Generated

Fiscal Year	Acres regenerated to longleaf pine	Acres thinned	Dollars generated (millions)
2000	2000	3800	1.06
1999	1000	5300	1.06
1998	1600	3000	1.35

The current timber management program on Fort Benning is based on maintaining healthy even-aged pine forests with an emphasis on preserving and perpetuating the longleaf pine ecosystem while providing optimum training lands and other multiple use opportunities. The current timber management operations focus on: (1) continuing to update the forest inventory, emphasizing longleaf pine occurrence, (2) improving forest health by thinning to reduce basal area, an reduce hardwood competition, (3) reforesting areas with longleaf pine that are under-stocked, non-stocked, stocked with off-site species, or destroyed by insects or diseases. All recommended timber management activities are coordinated with other forest management activities, including prescribed burning, prior to implementation.

2.2.2 Fire Management

The fire management program consists of four major functions. These functions are *fire detection*, *fire suppression*, *trail maintenance,* and *prescribed burning*.

The fire detection function consists of locating wildfires from fire towers, coordinating fire suppression actions with natural resources personnel and other organizations, and dispatching personnel and equipment to the fire scene.

The fire suppression function is synonymous with fire fighting and consists of containing, controlling, and mopping up wildfires.

The trail maintenance function consists of maintaining unimproved roads or trails and firebreaks to ensure access for natural resource management activities, military training, and recreation.

The fourth function is prescribed burning, which consists of planning, coordinating, executing, and evaluating prescribed burns. The purposes for prescribed burning are to reduce levels of hazardous fuels, prepare sites for reforestation; improve and maintain threatened and endangered species habitat; improve other native species habitat, especially forage for game species; manage understory hardwoods; control disease; improve access; enhance visuals; and provide a safe training environment.

About 26,000 to 28,000 acres of pine and pine / hardwood are prescribed burned annually from 15 December through 1 September and is generally conducted on a two to three-year average rotation in burn units that average 300 acres. These burn units are distributed in a mosaic pattern over the installation. Prescribed burning is accomplished with hand crews and drip torches.

The prescribed burning program revolves around implementation of the Reasonable and Prudent Alternatives of the 1994 Biological Opinion. Although an attempt is made to burn all red-cockaded woodpecker clusters during the growing season, it is logistically impossible due to the number of clusters (75 to 80 annually), and scheduling conflicts with training. All burn planning is coordinated with game management, timber management, red-cockaded woodpecker management, threatened and endangered species management, soil conservation programs, Range Control Division, and the Directorate of Operations and Training. Each program manager is given an opportunity for comments.

2.2.3 Federally Threatened and Endangered Species

Fort Benning has five Federally listed threatened and endangered species – the red-cockaded woodpecker, wood stork, bald eagle, American alligator, and relict trillium. The red-cockaded woodpecker and relict trillium populations on Fort Benning have been deemed critical to the recovery of these species. The American alligator (*Alligator mississippiensis*) is listed as threatened due to similarity of appearance by the U.S. Fish and Wildlife Service. From a

rangewide perspective, the alligator is presently considered to be biologically secure, and is no longer protected under the Endangered Species Act. Federal regulations, however, such as hide-tagging requirements, are maintained on commercial trade to help control illegal taking of alligators,and to ensure that hides of other protected crocodilians are not illegally traded as alligators.

The U.S. Fish and Wildlife Service is conducting a four-year survey of Federally listed and candidate, terrestrial and aquatic species on the installation. It is possible that additional listed species will be found.

Red-cockaded Woodpecker Management

Fort Benning is currently conducting many management efforts to determine population trends and to improve habitat, and the availability of habitat, for the red-cockaded woodpecker. Currently, management for the RCW follows the 1994 Army RCW Management Guidelines. A draft Endangered Species Management Plan for the RCW is being coordinated with US Fish and Wildlife Service to implement the 1996 Army RCW Management Guidelines. This EA is intended to meet the National Environmental Policy Act requirements for the RCW ESMP.

Specific management actions for the RCW include the restoration of longleaf pine; growing season burning; cavity tree and cluster boundary marking; controlling hardwoods in the midstory within clusters; monitoring to determine population trends; artificial cavity installation; and the translocation of birds.

Bald eagle management

During January of each year, Fort Benning conducts a mid-winter survey of eagles in cooperation with the Georgia Department of Natural Resources Nongame Department. The most eagles observed at any one time have been five, which includes the two nesting adults, two fledglings, and one subadult.

Nest protection, annual surveys, and investigations into eagle sightings will continue to be the principal management activities in the future. Additionally, conservation measures recommended in the 1994 Biological Opinion are being addressed and will include a study of flight operations in and around Lawson Airfield in an effort to minimize an eagle / aircraft incident.

A draft Endangered Species Management Plan for the bald eagle was prepared in 1997 by Fort Benning. The ESMP is being coordinated with the U.S. Fish and Wildlife Service and the Georgia Department of Natural Resources. The draft plan is in the process of revision. This EA is intended to meet the National Environmental Policy Act requirements for the Bald Eagle ESMP.

Wood stork management

Sightings of wood storks are limited on Fort Benning due to their transient nature and dependence on available food supplies and proper water levels. Management efforts would be geared to summer surveys, roost surveys, and protection of habitats that were used by the wood stork.

A draft Endangered Species Management Plan for the wood stork was prepared in 1997 by Fort Benning. The ESMP is being coordinated with the U.S. Fish and Wildlife Service and the Georgia Department of Natural Resources. The draft plan is in the process of revision. This EA is intended to meet the National Environmental Policy Act requirements for the Wood Stork ESMP.

American alligator management

Management activities consist primarily of a periodic spotlight count of fish ponds and backwater areas and protection of alligators and their habitat. Signs are posted in fish ponds warning recreationists to be alert for alligators and prohibiting feeding of the animals. Complaints concerning alligators are investigated and documented.

A draft Endangered Species Management Plan for the alligator was prepared in 1997 by Fort Benning. The ESMP is being coordinated with the U.S. Fish and Wildlife Service and the Georgia Department of Natural Resources. This EA is intended to meet the National Environmental Policy Act requirements for the American Alligator ESMP.

Relict trillium management

Management activities consist of continuing surveys and ensuring that present populations are not disturbed by training, timber thinning, feral swine, or other activities. Three sites have been fenced to exclude feral swine from damaging the sites. Relict trillium populations are located in isolated sites that are not prone to disturbance.

A draft Endangered Species Management Plan for relict trillium was prepared in 1997 by Fort Benning. The ESMP is being coordinated with the U.S. Fish and Wildlife Service and the Georgia Department of Natural Resources. This EA is intended to meet the National Environmental Policy Act requirements for the Relict trillium ESMP.

2.2.4 Soil Conservation and Water Quality

A major function of the current program is to support the installation's mission and to meet the soil conservation-related requirements specified in the 1994 Biological Opinion. As a result, an inventory of eroded areas in active and inactive red-cockaded woodpecker foraging areas has been completed, as well as an inventory of eroded areas in potential foraging habitat. Currently the NRCS and the U.S. Army Corps of Engineers are implementing contracts for rehabilitation of McKenna Drop Zone and red-cockaded woodpecker foraging-area sites on the installation.

The program currently provides military units and Range, Roads and Grounds Branch, Directorate of Public Works, with conservation planning assistance through the NRCS.

The program provides technical assistance to proponents of projects, provides environmental review of projects as they relate to soil conservation activities, and manages soil conservation projects as they relate to red-cockaded woodpecker habitat restoration. The Soil Conservationist (Conservation Branch) serves as an installation point of contact for the NRCS. The Soil Conservationist also oversees borrow area management for compliance with soil conservation requirements, coordinates with the Integrated Training Area Management (ITAM) Program office for soil conservation related activities on mission lands, and assists in development of road closure plans.

2.2.5 Game and Sport Fish Management

At least 53 game and sport fish species are present on Fort Benning. These include 21 birds, 10 mammals, and 22 fish. Game and sport fish management emphasis on Fort Benning is focused on the white-tailed deer, wild turkey, northern bobwhite quail, mourning dove, largemouth bass, bluegill, redear sunfish, and channel catfish. A complete listing of all wildlife species is included in Appendix A of the INRMP.

The main activities of the Game and Sport Fish Program are habitat manipulation, protection, regulated harvest, and monitoring the status of those populations by census and survey methods.

Habitat manipulation / protection includes: developing and planting wildlife openings; mowing, burning, or disking to promote native food plants; liming, fertilizing, and controlling weeds in fish ponds; developing fish attracting structures in fish ponds; erecting and maintaining wood duck boxes and other nesting platforms; maintaining watersheds to reduce soil erosion; and controlling excessive beaver activity. Additionally, forest management prescriptions, to include timber harvest, reforestation, and prescribed burning activities, are reviewed and recommendations are made that will enhance wildlife habitats.

Approximately 50 wildlife openings (total of 60 acres) ranging in size from one-quarter acre to five acres are planted in the fall with clover, wheat, and rye. Seven dove fields still exist, but rotation occurs and only five (80 to 110 acres) are actually planted each spring with brown top millet by a contract or in-house. There are 14 ponds for a total of 253 acres of potentially manageable area for fishing. Nine ponds actually receive some type of management, but only three are routinely limed and fertilized. Over 100 wood duck boxes are present, but no maintenance has occurred in the last several years.

Various types of census and survey work are conducted to help monitor populations, determine trends, evaluate physical condition, and determine harvest goals. The following activities are currently being conducted:

White-tailed deer – The deer check station is run during regular business hours and hunters are requested to bring the harvested deer in, but mandatory check-in is only required one weekend in Georgia and one weekend in Alabama. Deer track counts are conducted about 24 hours after a rain along 10, one-mile routes. The observer walks or drives the route and records the number of deer crossings. The track counts are conducted twice a year, once in the late summer and once in the early spring.

Northern bobwhite quail – Roadside quail counts are from May through September during normal field activities. Quail numbers and adult / poult ratios are recorded when observed from the vehicle. A whistling cock count is conducted along the roadside during May or June during the peak of the breeding season. Three-minute stops are made every two tenths of a mile along 10, one-mile routes.

Eastern wild turkey – Roadside turkey counts are made at the same time as the quail roadside counts above and the same information is collected.

2.2.6 Non-game species

The major non-game species that are addressed on a regular basis by Fort Benning are bats, the gopher tortoise, the gopher frog (*Rana capito*), songbirds, bluebirds, and small mammals. In addition to bats, various species of snakes and armadillos (*Dasypus novemcictus*) produce numerous nuisance complaint calls. In general various staff members and volunteers handle management of non-game species on an as needed basis.

Implementation of specific management strategy for each species of nongame is not feasible due to the large number of species and in many cases lack of specific habitat management data. Therefore, the current strategy is two-fold. First, to monitor selected species and implement specific management practices when required. Second, to emphasize maintenance of a variety of habitats to meet a wide range of non-game requirements.

Several high profile species that require specific management focus include the gopher tortoise and the dusky gopher frog. The gopher tortoise and its habitat are monitored and

protected. The gopher frog population is being monitored and studied because its population, which is extremely isolated on the installation, may be the only sub-population in existence in the Upper Coastal Plain, and it is likely to be a Federal candidate species.

Other species, such as bats, are addressed primarily in response to complaints from Soldiers and their families residing on Fort Benning. Songbirds and rodents are monitored periodically by Land Condition Trend Analysis protocols. A summary of activities is provided below.

Bats – The main focus of bat management on Fort Benning is resolving nuisance bat complaints and erecting bat boxes when needed.

Gopher Tortoise – The gopher tortoise is listed as threatened in Georgia. Gopher tortoise management is normally in the form of protection of their burrows and habitat. Sensitive Area Signs (SAS) have been posted around eight gopher tortoise sites totaling 150 acres. These sites are located in heavily impacted mechanized training areas. Sensitive Area Signs prohibit digging and vehicle traffic off existing roads. Fort Benning is conducting habitat management that restores the longleaf pine system by planting trees, thinning stands, controlling hardwoods, controlling soil erosion, and conducting prescribed burns.

Gopher Frog – Management for the gopher frog is limited to protection of habitat and supporting continued research.

Songbirds – The only bird surveys that are conducted on Fort Benning are through the Land Condition Trend Analysis component.

Small Mammals – Surveys for small mammals is limited to Land Condition Trend Analysis field work.

Bluebirds – Bluebird houses are erected by installation staff and maintained by volunteers.

Coincidence of other resource management and Non-game species habitat management and protection – Management activities for other natural resources often provide management for non-game species also. Prescribed burning takes place in pine and pine -hardwood stands on a three year average rotation in burn units of about 300 acres. Timber harvest mainly takes the form of thinning in pine and pine/hardwood stands. Streamside management zones are often wider than recommended by the Forestry Commission. Control of soil erosion and protection of high quality hardwood areas, through passive management, are used to maintain nongame habitat.

2.2.7 Pest Management

The pest management program at Fort Benning focused on traditional pest management activities such as insect and rodent control in the housing areas. Pest Management activities at the Follow Me Golf Course also received some attention; however, with the exception of reporting on pesticide usage, the natural resource aspects of pest management generally received little attention insofar as a comprehensive integrated program, was concerned. The Environmental Programs Management Branch personnel handle traditional cantonment pest management activities. The Conservation Branch handles the nuisance vertebrate control actions in the cantonment area with the exception of dogs and cats, which are handled by Military Police. Because of funding shortages and staff reductions, the Pest Control Branch was eliminated in 1999. In the No-Action alternative, the traditional components of the pest management program are contracted out. The following activities within the Conservation Branch would continue to be implemented:

- A management strategy that attempts to eradicate, or contain to the extent attainable, kudzu.

- A management strategy for the aggressive containment of insects and disease organisms that adversely impact the timber resources of the installation, while accounting for the potentially adverse ecological impacts caused by specific containment methods.

- Conduct vertebrate animal nuisance control (for those animals which the Conservation Branch is the responsible organization) in the cantonment areas on a case-by-case basis to promote safety, human health, and an acceptable quality-of-life.

- Integrated Pest Management approach in the conduct of pest management operations on the Follow Me Golf Course that achieves a balance between acceptable playing conditions and the associated unavoidable use of pesticides and the conservation of plant and animal habitat.

2.2.8 Cultural Resources

Ft Benning has an active Cultural Resources management program. The Cultural Resources Management (CRM) Program assists the Commander of Fort Benning in meeting mission requirements of military training, power projection, and maintenance of a high quality of life for the military and civilian community. The CRM Program accomplishes its mission by conserving cultural resources through compliance with relevant Federal laws, regulations and guidelines.

All ground disturbing activities associated with natural resources management may trigger cultural resources compliance requirements. Such activities include, but are not limited to: forest management (harvesting, plowing and planting for regeneration), habitat management (physical soil preparation for food plots, cover plantings, pond and wetland construction), cantonment area management (historically appropriate landscaping may be an issue here where the cantonment area is in Fort Benning's historic district), soil surveys, land rehabilitation and maintenance (terrain modification for erosion control and restoration), and agricultural outleasing (plowing).

The use of best cultural resources management practices, such as avoiding ground disturbance on archeological sites, is a prerequisite for the protection of cultural resources. Cultural resources compliance requirements are considered in the conduct of natural resource management activities on Fort Benning. The project or "undertaking" is examined to determine if there will be an effect on a cultural resource that is subject to one or more Federal laws, regulations, or guidelines.

2.3 Proposed Action (Balanced Ecosystem Alternative - INRMP)

This alternative is the preferred alternative and is described in much more detail in the Integrated Natural Resources Management Plan.

2.3.1 Timber Management

A broad goal of the timber management program would be to reestablish the longleaf pine ecosystem where it naturally occurred on the installation, by promoting the natural regeneration of longleaf pine where applicable, and by artificially regenerating longleaf pine where seed trees are absent or inadequately stocked. Management practices would promote growth of remaining trees and forest sustainability. Maintaining and producing adequate red-cockaded woodpecker habitat would be a major focus in the development and implementation of the long-term management scheme.

Natural regeneration maintains a seed source in the stand by retaining mature, healthy, seed-producing pine trees. By maintaining a seed source, the necessary actions to grow new pine trees are greatly reduced. Using the natural regeneration method, a site would normally be thinned heavily, favoring existing pockets of young pine trees and mature seed trees, and would be burned to create a favorable seedbed. This eliminates intensive site preparation, follow-up treatments, and planting. In areas where artificial means are required to get longleaf back on site, site preparation would be intensive (as described in the No-Action alternative). The following specific actions would be taken to accomplish this overall shift in direction. For more details, please see Appendix B5 in the INRMP.

- Pine stands would be regulated over time through single tree selection on a regular basis reducing volume and basal area to an amount acceptable to the carrying capacity of the site and within guidelines for management of the red-cockaded woodpecker.

- Hardwood stands would be passively managed, rather than regulated for timber yield.

- Timber harvesting would be concentrated on thinning overstocked areas that are more susceptible to pine bark beetle attack and salvage of insect infested, diseased, dead and dying trees.

- Harvesting systems would shift to less impacting methods such as cut-to-length (CTL).

- Logging oversight would focus on timber harvest methods and would be evaluated for environmental sensitivity.

- A heavy emphasis would be put on the forest inventory program to maintain an accurate up-to-date inventory.

- Training would be conducted on uneven-aged forest management techniques. The training would help timber management personnel transition into the new management scheme, which requires more complex timber marking techniques.

- Documentation would occur over the next five years of the uneven-aged management techniques employed. The documentation of these marking techniques would allow the future workforce to be more easily educated on proper implementation of the management plan.

- An urban forestry program for the trees in the cantonment area would be developed and implemented during the next few years.

2.3.2 Fire Management

The prescribed burning program would continue to function in accordance with the applicable Reasonable and Prudent Alternatives of applicable Biological Opinions for the management of red-cockaded woodpeckers on Fort Benning, as well as incorporating the 1996 Army RCW Management Guidelines (Department of the Army 1996). The average burn area would remain about 250 to 300 acres. Prescribed burning would continue to be integrated with all natural resource management sections participating and supporting each other. Prescribed burning would continue to be coordinated with other program managers. The coordination process would facilitate the prioritization of burning. Post-burn monitoring would continue to be used as a management tool to determine whether burn objectives were met and to assist in determining the appropriate timing of future burns. For more details, please see Appendix B6 in the INRMP.

New approaches under this alternative would include:

- Emphasis would be placed on timing the frequency, season, and manner of burning that best perpetuates the longleaf pine and pine-bluestem ecosystems and promotes overall native biodiversity.

- New firebreaks would be limited. However, when new firebreaks would be required or existing ones maintained, Best Management Practices for forestry would be used.

- Similar stands occurring in adjacent compartments would be burned simultaneously when military training permits and management objectives dictate.

- One Forest Technician would be hired to complete staffing level requirements to perform the amount of prescribed burning identified in the 1994 Biological Opinion (assuming a three-year average burn rotation).

2.3.3 Federally Threatened and Endangered Species

The Threatened and Endangered Species Program would continue to be tightly integrated within other environmental programs and with other directorates on the installation. This includes coordination with the fire management section to determine prioritization of burn units and time of year to burn based primarily on red-cockaded woodpecker needs. Communication with the timber management section would continue to facilitate review and evaluation of proposed timber prescriptions. Long-term planning by the military would also be coordinated with Threatened and Endangered Species Program staff to minimize the training mission impact on threatened and endangered species.

Program initiatives for the *red-cockaded woodpecker* include: (1) implement the provisions of the Red-cockaded Woodpecker Endangered Species Management Plan, which includes implementing the 1996 Army RCW Management Guidelines (Appendix B8 in the INRMP), (2) hire one Threatened and Endangered Species (TES) Biologist and one TES Technician, (3) recover Fort Benning's red-cockaded woodpecker population, (3) create a forest stand model, and (4) evaluate and implement uneven-aged forest management techniques.

The 1996 Army RCW Management Guidelines predominantly changes allowable training activities, marking of clusters, and monitoring requirements. Timber and fire management are the same as specified in the 1994 Army RCW Management Guidelines. Training activities that would be allowed under the 1996 Guidelines and within 200 ft of RCW cavity trees include: hand digging for 2 hrs maximum; wheel/track vehicle transit (while maintaining a 50 ft distance from marked cavity trees unless on an existing road or trail); vehicle maintenance for 2 hour maximum; firing 7.62mm and smaller blanks, along with firing .50 caliber blanks; use of smoke generators or pots, grenades, and star clusters/parachute flares. Mitigations to minimize impacts from expanded training are specified in both the 1996 Guidelines (V.I.2 and 3) and the draft Fort Benning ESMP for RCW (IIIC, D and E). Rigorous monitoring will take place to ensure no impacts to RCW health and vigor as a result of expanded training activities.

Program initiatives for the *bald eagle* include: (1) implement the provisions of the Bald Eagle Endangered Species Management Plan (Appendix B of the INRMP), (2) develop a strategy for improved protection of nest site(s), (3) create large dominant pine trees within 1.5 kilometers of the Chattahoochee River for nesting by selectively thinning around individual trees outside of the primary and secondary zones of protection, (4) increase monitoring of nest site(s) to determine nesting season / period and bird use of the area, and (5) determine the predominate flight directions and flight altitudes of adult eagles.

Program initiatives for the *wood stork* include: (1) implement the provisions of the Wood Stork Endangered Species Management Plan (Appendix B of the INRMP), (2) investigate the possibility of developing a regional conservation strategy with the U.S. Fish and Wildlife Service's Eufaula National Wildlife Refuge, and (3) evaluate sites in Alabama for their potential to serve as impoundments that can then be used as feeding sites.

Program initiatives for *relict trillium* include: (1) implement the provisions of the Relict Trillium Endangered Species Management Plan (Appendix B of the INRMP), (2) increase population monitoring, (3) control feral swine population, (4) define the role of fire in maintaining relict trillium sites, (5) determine the effects of silvicultural and military training-related activities on the population, and (6) monitor the encroachment of Japanese honeysuckle and kudzu and initiate control efforts if needed.

Program initiatives for the *American alligator* include: (1) implement the provisions of the American Alligator Endangered Species Management Plan (Appendix B of the INRMP), (2) verify that nesting is occurring on Fort Benning, and (3) develop an improved protection strategy for the alligator (due to indiscriminate shooting), particularly within the Chattahoochee River corridor.

2.3.4 Soil Conservation/Water Quality

The Soil Conservation program would continue to support the installation's mission by providing technical support to military units and other project proponents. RCW management would continue to be supported by rehabilitating eroded areas in cluster sites and foraging stands. Coordination with, and support from, the Land Management Branch and Conservation Branch and ITAM would continue to implement the soil conservation program.

Under this alternative, the conservationist would function as a gatekeeper for requiring, when applicable, submission and approval of soil conservation plans. The new procedure would require that a soil conservation plan be submitted and approved before concurrence can be granted on a Record of Environmental Consideration. A soil conservation plan would also be required during major military exercises (such as Victory Focus and Marne Focus). For more details, please see Appendix B4 in the INRMP.

New initiatives would include:

- Development of a management program for borrow areas to include the development of appropriate guidelines for the siting, operation, and closure of any new borrow areas; to accommodate monitoring of the condition of borrow areas; and to facilitate the restoration and rehabilitation of inactive borrow areas.

- Develop a decision matrix that would assist with prioritizing restoration and rehabilitation projects on mission lands (see INRMP Chapter 11).

- Develop a methodology for watershed prioritization.

- Provide support to the Ecosystem Characterization and Monitoring Initiative (INRMP Chapter 13).

- Develop a comprehensive road closure plan to reduce erosion and sedimentation from abandoned or infrequently used trails and roads.

- Coordinate with the NRCS to develop a Comprehensive Soil Conservation Plan for Fort Benning to provide a characterization of soil erosion and sedimentation and a strategy for erosion control.

- Complete an erosion inventory in the Cantonment Areas and recently acquired land exchange parcels.

- Request recognition of the Soil Conservationist and Soil Conservation Technician as authorized positions, and hire an additional Soil Conservation Technician.

2.3.5 Game and Sport Fish management

The Game and Sport fish management program would become integrated into an ecosystem based concept on management, and would be increased to an appropriate size without becoming too large or conflicting with military training or threatened and endangered species management.

- Management ceilings would be determined and objectives set to ensure continuity in the program, staffing and funding requirements.

- A full time technician and at least one part-time technician dedicated to the Game and Sport Fish Program would be hired to develop and maintain the program.

- Utilizing the Game and Sport Fish Technician, coordinate the volunteer program to assist in planting wildlife openings, fertilizing sawtooth, apple, and persimmon trees, maintaining wood duck boxes, posting signs, conducting deer track counts, quail whistling cock counts, and other census work, fertilizing fish ponds, and conducting other activities as needed.

Other initiatives that are being proposed for the future are discussed below. For more details, please see Appendix B10 in the INRMP.

Fisheries

- Provide better access to the ponds with brush control along the edges of the pond, and more frequent grading of dirt roads or parking areas.

- More intensive pond management would include liming once every three years, fertilizing three to four times per year, aquatic weed control, and stocking as needed. Pond balance checks should be conducted periodically. Creel limits would be evaluated and changes made if necessary.

- Improved aesthetics would include periodic mowing and trash pickup. Mowing of King's and Twilight Ponds might be incorporated into Fort Benning's cantonment area mowing contract. Military units or volunteers may be willing to conduct policing of post ponds.

- Improved support facilities would include picnic tables, grills, boat ramps, and fishing piers. Funding might be obtained through Army Community of Excellence monies and work might be conducted by military units performing community service projects or volunteers.

- The Directorate of Community Activities plans to rehabilitate the Russ Pool area. Rehabilitation would include cleaning the pool of brush and debris, reinforcing the dam, and raising the water level. The pool would then be stocked with fish for use as a children's fishing area.

Hunting

- Surveys would be conducted every three years to determine what the Fort Benning community thinks about the hunting and fishing program. This information will be used to help guide management decisions.

- Articles about hunting and fishing in the Bayonet, Fort Benning television station, Dixie Road kiosk, and through other media would stimulate interest and promote greater participation.

- Hunting and fishing kiosks would be posted periodically with bulletins and notices to keep personnel informed of regulation changes, special hunts, and other items.

- The Commanding General's Advisory Council on Natural Resources would be revitalized.

- The hunting and fishing comment box would be maintained at the natural resources office complex (Building 5883) and other boxes would be setup at least at two other locations.

- Better coordination would be made with Land Management Branch road maintenance personnel and with the Range, Roads and Grounds Branch personnel to maintain the road network to provide reasonable access to hunting areas. In some cases, specific mudholes may be repaired with Game and Sport Fish Program funds to provide access to popular areas.

- Support for thinning and prescribed burning to improve movement through the woods and increase visibility.

- Conservation Branch would coordinate with the Directorate of Operations and Training to resolve conflicts concerning access into the training areas and resolve any gate closure problems.

- Future hunting opportunities would consider handicap hunts and other special type hunts.

- Consideration would be given to allowing all National Guardsman and Reservists and their dependents residing within Georgia and Alabama to hunt and fish on the installation.

- Extending the hunting season for feral swine and allowing bow hunting in some of the cantonment areas would be evaluated.

- Maps showing the location of wildlife openings would be printed and made available.

- The regulation booklet would be streamlined, reorganized, and made easier to understand.

- Development of a hunting and fishing brochure is a long-term goal. This brochure would describe each game and sport fish species found on Fort Benning, would contain information on where these species could be found, and would contain tips on hunting and fishing techniques.

- Hiking trails would be established in the area. Hiking trails also are planned at Uchee Creek Recreation Area.

- Consideration would be given to increase hunting and fishing permit fees. The goal would be to keep fees reasonable, but provide sufficient funds to make the program self-sufficient. Fees would most likely be scaled to account for the wide differential of military pay grades.

Wildlife Openings

- A reduction in dove field plantings and an increase in fall plantings of clover and wheat would occur to balance the amount of acreage in each.

- Planting approximately 300 acres of permanent wildlife opening acreage would occur with the objective of increasing the current acreage. Conflict would be avoided with threatened and endangered species requirements, military training, or landscape ecological integrity.

- Other wildlife openings, including temporary openings and multi-purpose openings, would be considered for planting when available in addition to the permanent openings.

- The future selection of permanent wildlife openings would consider historical usage by hunters, soil type, topography, strategic siting especially for deer and turkey, availability of the training compartment to hunters, and logistics of maintaining the site.

- To reduce the amount of area planted, naturally occurring foods such as persimmons, grasses, or legumes will be maintained in some openings.

- Disking strips in open pine stands may encourage legumes and other important native wildlife foods. Topography, cultural resource sites, and longleaf pine regeneration would be considered before disking occurs.

- Future plantings would focus on agricultural grains, such as wheat and millet, and other plants, such as chufa, that are non-invasive.

Use of Agricultural Best Management Practices

- Planting with low impact techniques such as no-till, mowing or burning, or using perennials will reduce soil disturbance and thus soil erosion. Other Best Management Practices (Georgia Soil and Water Conservation Commission 1994) will be evaluated, such as windbreaks, filter strips, timing and placement of fertilizer, and prudent herbicide use. These techniques fit in well with the ecosystem management theme.

Management Emphasis Areas

- Areas would be developed that focus game management efforts on selected species such as quail or deer. These areas might consist of 1000 to 5000 acre blocks with special hunting fees and regulations to help maintain them.

- Deer areas would follow Quality Deer Management Association guidelines.

- Quail management emphasis area may be burned every two years instead of three, which would be beneficial to longleaf pine and the red-cockaded woodpecker.

Monitoring / Census of Game Species

- Monitoring of game populations and hunter harvest will be increased in order to provide a means of gauging effects of ecosystem management implementation.

- In addition to deer, quail, and turkey surveys, a survey for fox squirrels will be initiated that will be conducted in conjunction with the quail / turkey poult surveys.

- Feral swine tracks will be counted during deer track count surveys to determine relative abundance and distribution.

Forest Management Prescriptions

- Hardwood removal would be carefully evaluated as to impacts on game management.

- Key or unique habitat areas, if present, would be recommended for special management consideration. These areas would be marked on planning maps and kept on file.

- Hardwood areas that are designated for maintenance would be called "Hardwoods for Conservation."

- Recommendations would be provided to the fire management section concerning prescribed burning of upland and slope hardwood sites, particularly oak-hickory areas. Some evidence suggests that upland oak-hickory areas may need some type of periodic burning to maintain them.

2.2.6 Non-Game Species

The emphasis of the non-game program would remain the same as in the No Action alternative. The focus would be on bats, gopher tortoise, gopher frog, songbirds with an emphasis on neotropicals, and bluebirds.

- Numerous outside assistance would be sought to maintain a viable program of monitoring, research, and management. These sources include volunteers, the Strategic Environmental Research and Development Program Ecosystem Management Project (SEMP; see INRMP Chapter 13), U.S. Fish and Wildlife Service, Land Condition Trend Analysis, Georgia Department of Natural Resources, and university research projects.

- The Conservation Branch would seek funding to expand current program needs and develop new ones.

- If funding is available, it is desirable to focus on other groups or species such as gopher tortoise commensals, southeastern pocket gopher (*Geomys pinetis*), mussels, and amphibians.

- Additional monitoring by Conservation Branch or by other organizations such as SEMP would be pursued to provide a means of gauging effects of ecosystem management implementation through the INRMP.

- Habitat management plans would be written for selected species.

Bats

- Develop a long term solution to the Bouton Heights housing area bat problem.

- A study of bat movements in the Bouton Heights and Quartels area would be helpful in refining bat exclusion techniques and timing.

- Continue responding to bat complaints due to the possible transmission of rabies.

- A protocol would be established with Preventive Medicine (MEDDAC) on handling of bats that may have exposed personnel to rabies, particularly children.

Gopher Tortoise

- A gopher tortoise management plan would be written that will address habitat management, options with isolated colonies including those marked with sensitive area signs, strategy for reconstituting colonies, procedures for handling injured gopher tortoises, procedures for translocating gopher tortoises including upper respiratory tract disease considerations, and research and monitoring projects.

- Additional research on impacts of military training to gopher tortoises and their habitat would be useful since the one year Auburn study was limited in scope.

- A biologist or technician would attend the annual Gopher Tortoise Council meetings.

Gopher Frog

- A gopher frog research project to track movements and determine their range and habitat use would be conducted over the next couple of years.

- Continuation of the USFWS herp-array study would occur to learn more about the demography and population dynamics of this species.

Songbirds

- Fort Benning would become an active player in the Georgia Partners in Flight program coordinated by the Georgia Department of Natural Resources.

- A biologist or technician would be assigned to participate in the Coastal Plain Physiographic Working Group and would represent the installation at meetings to the extent possible.

- High regional priority bird species would be identified, and a management strategy would be developed, for species that occur in southeastern physiographic areas, B1 (South Atlantic Coastal Plain), B2 (Southern Piedmont), and C1 (East Gulf Coastal Plain).

- A computer database and book would be developed that provides historic information, life history accounts, and maps for each bird species breeding in Georgia.

- Web sites would be monitored to include Partners in Flight, Cornell Lab of Ornithology, Audubon Links, and Bird Net — Ornithological Information Source.

Other Species

Other activities mentioned earlier such as Land Condition Trend Analysis small mammal surveys and bluebird nest box monitoring would be continued.

2.3.7 Pest management

The main initiative will be the implementation of a comprehensive pest management plan.

Under the Balanced Ecosystem management alternative, a comprehensive pest management program would begin to be developed that addresses all aspects of pest management as they relate to the management of natural resources. The natural resources component of Fort Benning's Pest Management Program would address those pests, and their management, that are of natural resources management concern, including any pest management activities associated with Fort Benning's Follow Me Golf Course. Additionally, general natural resource management considerations for all pest management activities across the installation would be provided. The operational plan for pest management is contained in Appendix B11.

The goal of Fort Benning's Pest Management Program, Natural Resources Component Operational Plan is to manage problematic species to eliminate or minimize adverse impacts to natural resources. This goal would be accomplished through the implementation of the following objectives:

- Implement a comprehensive and integrated pest management program (natural resources component) that conforms to the policy, procedures, and requirements specified in AR 200-5 and Department of Defense Instruction 4150.7 on pest management programs. Annually review the program strategy and revise as necessary.

- Emphasize the use of Integrated Pest Management (IPM) techniques as a means to reduce pesticide risk and prevent pollution.

- Ensure that the technical portions of contracts involving pest management reflect the methodology of Integrated Pest Management.

- Develop and implement a management strategy to contain, to the extent attainable, other undesirable plants with an emphasis on those invasive plant species that potentially impact listed species, undermine ecological integrity, or degrade military training activities. Use an appropriate ranking methodology, scientific literature, or expert opinion to identify those invasive species that should receive the priority for control measures.

- Develop and implement a management strategy that attempts to eradicate, or contain to the extent attainable, feral swine.

- Develop and implement a management strategy to contain, to the extent attainable throughout the Installation, other undesirable animals with an emphasis on those non-native animal species that potentially impact listed species, undermine ecological integrity, or degrade military training activities.

- Monitor the status of invasive plant and animal species and their impacts to natural resources. Establish protocols to enable early detection of previously unrecorded population locations or introductions of new invasive species.

- Identify those plant species, preferably native species when feasible, that can be planted for land rehabilitation and habitat (ecosystem) restoration projects, wildlife food and cover, agricultural outlease, and landscaping.

- Do not permit the purposeful introduction of non-native animal species with the exception of those animal species approved for use as biocontrol agents by appropriate Federal and / or state authorities.

2.3.8 Cultural Resources

Cultural resource management would continue as described under the No-Action alternative. The use of best cultural resources management practices, such as avoiding ground disturbance on archeological sites will continue to be followed. The provisions of the Integrated Cultural Resources Management Plan (*in draft*) that are relevant to natural resources will be incorporated into the INRMP as appropriate.

2.4 Alternatives Considered but Eliminated from Detailed Study

2.4.1 Maximum RCW Recovery Alternative

Maximizing RCW Recovery would involve heavier timber thinning to reduce basal areas; more growing season burns to eliminate hardwood species and maintain an open mid- and under-story; increased soil conservation efforts in specific areas supporting RCW clusters currently or in the future; and decreased management of other threatened and endangered species to the minimum required actions such as protection and monitoring.

This alternative was discussed but eliminated from further analysis because it is not only inconsistent with the purpose and need, but also because maximizing management for the RCW would involve skewing natural resource management towards one single species to the neglect of others. This is contrary to DoD Conservation Instruction 4715.3, and the Ecosystem Management memo from Undersecretary of Defense (Environmental Security) Goodman (Department of Defense 1994).

Additionally, a maximum population size/cluster number beyond the 450 clusters (250 effective breeding pairs) could not be quantified. Many unknowns exist as to how many acres are really needed per cluster, and whether Fort Benning can, in a balanced natural state of forest diversity, provide the necessary habitat even for 450 clusters (Swiderek 2000).

2.4.2 Maximizing Military Mission Alternative

Maximizing the military mission would involve using the land to support military training with little regard for sustainability and natural resource stewardship requirements. Actions to support training would be completed without considering long-term environmental consequences, ecosystem management, or other potential uses of the land. This would result in a short-term increase in land available for military training, but the long-term degradation of the land, and eventual inability to support any kind of use, including training.

This alternative was discussed but eliminated from further analysis because it is inconsistent with the vision and mission statement for Ft Benning (as described in Section 1.0). To maximize the military mission, would eventually prohibit Fort Benning's mission accomplishment. Additionally, this alternative is in direct conflict with DoD guidelines and the Sikes Act as amended, which essentially directs military installations to carry out an integrated ecosystem approach that provides for the conservation and rehabilitation of natural resources while supporting the overall military mission.

2.4.3 Recreation and wildlife emphasis management

Emphasizing recreation and wildlife management would involve several changes to natural resource management on Fort Benning. Timber and fire management would be used to create the forest conditions considered optimal for supporting wildlife, hunting, and other outdoor recreation such as bird watching and nature study. Hardwoods would be retained at the highest acceptable limit to RCWs, and designation of hardwood retention areas (Hardwoods for Conservation) would increase in acreage and quantity. New Management Emphasis Areas for quail and deer would be developed. Existing and new mission support

openings (drop zones, landing zones, firing points, gun positions etc.) would be utilized for wildlife openings and planted to species that favor certain game animals. Hiking trails would be developed, along with campgrounds and boat ramps on the Chattahoochee River and other waterways. Expanded access to the post would be considered for the interested general public to participate in outdoor recreation.

This alternative was discussed but eliminated from further analysis for several reasons. Dedicating additional land, funding and personnel to recreation and wildlife management, would potentially create a conflict with providing the resources and land needed to sustain military training. Ensuring the proper management and safety of additional recreationists would potentially cause already scarce resources to be drawn away from other priorities. Due to the scope and magnitude of military training that takes place on Fort Benning, the safety of the general public would be difficult to ensure. Additionally, military security could potentially be compromised with an increase in numbers of general public coming onto Fort Benning. Lastly, problems in the past with illegal dumping, and the resulting "orphan waste", by the general public also contribute to restricting access to outdoor recreation on Fort Benning.

3.0 Affected Environment

Since implementation of any of the alternatives would not result in potential impacts to utilities, radiation, and solid waste management on Fort Benning, these resources will not be discussed in the Affected Environment or Environmental Consequences sections.

3.1 Natural Environment

3.1.1 Fort Benning's Ecological Groups

The terrestrial and aquatic communities of Fort Benning can be classified into 13 ecological groups. These groups will be used to describe flora, fauna and water. Alan Weakley and Milo Pyne of The Nature Conservancy had previously developed general ecological group categories appropriate to the southeastern U.S. They adapted these categories with the assistance of Fort Benning natural resource managers to make them directly applicable to Fort Benning. Finally, they assisted with the assignment of vegetation alliances to each group and the preliminary identification of associated vegetation associations potentially present at Fort Benning (see tables in Chapter 4 INRMP for the Vegetation alliances and associations). A brief description of these groups follows, including common flora and fauna associated with them:

Impounded Water

Impounded water communities include beaver-created ponds and those ponds artificially constructed by humans. There are 14 named artificial ponds on Fort Benning. Several of these are managed for recreational use through fertilization and fish stocking, whereas several are abandoned and one (Victory Pond) is used for Ranger training. The number, size, and character of beaver ponds are changing constantly. Common plants found in impounded water communities include white water lily (*Nymphaea odorata*), watershield (*Brasenia schregeri*), pondlily (*Nuphar lutea*), buttonbush (*Cephalanthus occidentalis*), smooth alder (*Alnus serrulata*), and wax myrtle (*Myrica cerifera*). Common inhabitants of impounded water communities include American alligators (*Alligator mississippiensis*), beavers (*Castor canadensis*), waterfowl, game and nongame fish, and wading birds. Many other game and nongame species use these ponds for drinking water. Species of conservation concern that use impounded water sites include American alligator and lax water-milfoil (*Myriophyllum laxum).*

Flowing Water

Although aquatic (unvegetated, deepwater habitats) communities do not meet the strict definition for an ecological group (that is, they are not associated with particular plant associations), they are included here for completeness.

At Fort Benning flowing water pertains to streams of either Piedmont or Coastal Plain origin. Piedmont streams flow into the installation from the north and flow generally in a southerly direction. Large rocks, pebbles, and sand are characteristic of the substrate of these streams. Piedmont streams are higher in fish and mussel diversity than Coastal Plain streams. The flow rate, depth, and pH of these streams vary dramatically in response to climatic factors. Piedmont streams include Dozier, Cox, Randall, Kendall, Upatoi, Uchee, Tar and Baker Creeks, as well as the Chattahoochee River. Compared with Piedmont-origin streams, Coastal Plain streams have more stable water levels and lower pH (acidic), fish diversity, and mussel diversity. Pine Knot and Little Pine Knot Creeks are examples of Coastal Plain streams. The Pine Knot Creek system is designated as a Unique Ecological Area (see Chapter 5). Several streams are intermediate in character. Ochille and Oswichee creeks are examples of intermediate streams. Fish surveys conducted since the early 1980s within most

of Fort Benning rivers and streams have documented a total of 60 fish species. Recent aquatic surveys conducted by the U.S. Fish and Wildlife Service documented 53 of the historical species and five new species. Five fish species that occur on the installation are species of conservation concern.

Historically, a total of 27 species of mussels occurred in Chattahoochee and Muscogee Counties (Georgia) and Lee and Russell Counties (Alabama). Currently, 17 species are documented from these four counties. The U.S. Fish and Wildlife Service's recent aquatic resource survey documented six native and one introduced mussel species on Fort Benning. Three of these species are identified as species of special concern in Alabama. Comprehensive surveys for reptiles, amphibians, and aquatic plants have yet to be accomplished.

River Floodplains and Cypress / Tupelo Swamps

The Chattahoochee River floodplain, and its associated backwaters and tupelo swamps, is found in the southwestern portion of the installation. Plant communities here are dominated by flood tolerant species, such as swamp tupelo (*Nyssa biflora*), blackgum (*Nyssa sylvatica*), sweetgum (*Liquidambar styraciflua*), sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), and water oak (*Quercus nigra*). Loblolly pines (*Pinus taeda*) are scattered along the banks of the river. Common understory species include red maple (*Acer rubrum*), ash (*Fraxinus* spp.), elms (*Ulmus* spp.), flowering dogwood (*Cornus florida*), hackberry (*Celtis* spp.), ironwood (*Carpinus caroliniana*), and various oaks (*Quercus* spp.). Common shrubs include American holly (*Ilex opaca*), blueberry (*Vaccinium* spp.), dwarf pawpaw (*Asimina parviflora*), switch cane (*Arundinaria gigantia* ssp. *tecta*), viburnum (*Viburnum* spp.), and hawthorn (*Crataegus* spp.). Vines, understory grasses, and herbaceous plants are common and varied. Commonly encountered animals include American alligators, turtles, water snakes, wading birds, migratory waterfowl, beaver, white-tailed deer (*Odocoileus virginaina*), feral swine (*Sus scrofa*), and a wide variety of songbirds. Species of conservation concern include bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaeetus*), American alligator, alligator snapping turtle (*Macroclemys temminckii*), wood stork (*Mycteria americana*) (casual migrant), and several plant species of conservation concern

Stream Floodplains

Stream floodplains at Fort Benning are extensive and the associated plant communities change composition somewhat with geographic location on the installation. Oaks (*Quercus* spp.), hickories (*Carya* spp.), sycamore, beech (*Fagus grandifolia*), ash, and elms dominate the plant communities. Loblolly, shortleaf (*Pinus echinata*) and spruce pines (*Pinus glabra*) are scattered throughout these communities. Common understory species include red maple, flowering dogwood, hawthorn, sourwood (*Oxydendron arboreum*), silverbells (*Halesia* spp.), witchhazel (*Hamamelis virginiana*), redbud (*Cercis canadensis*), American holly, and black cherry (*Prunus serotina*). Shrubs include blueberry, gallberry (*Ilex glabra*), dwarf pawpaw, wax myrtle, beautyberry (*Callicarpa americana*), palmetto (*Sabal minor*), and sassafrass (*Sassafras albidum*). Herbaceous species include longleaf spanglegrass (*Chasmanthium sessiliflorum*), may-apple (*Podophyllum peltatum*), Atamasco lily (*Zephyranthes atamasco*), and trillium (*Trillium* spp.). Woody vines and understory plants include cane (*Arundinaria gigantia*), wild grape (*Vitis* spp.), greenbriar (*Smilax* spp.), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), and crossvine (*Bignonia capreolata*). Relict trillium (*Trillium reliquum*), a Federally endangered plant, occurs in five populations on the stream floodplains. Over 50 species of birds have been documented using these areas.

Small Stream Swamps

The braided streams that are characteristic of this group are found scattered across the northern half of the installation. Sweetgum, water oak, willow oak (*Quercus phellos*), and river birch are dominant in the canopy. American holly, redbay (*Persia borbonia*), and sweetbay (*Magnolia virginiana*) are common in the midstory. Understory shrubs include titi (*Cyrilla racemiflora*), bayberry (*Myrica heterophylla*), leucothoe (*Leucothoe axillaris*), and fetter-bush (*Lyonia lucida*). Understory herbaceous species are sparse due to the saturated substrate, but common species include sedges (*Carex* spp.), sphagnum moss (*Sphagnum* spp.), and netted chain fern (*Woodwardia areolata*). Characteristic fauna include white-tailed deer, swamp rabbits (*Sylvilagus aquaticus*), a variety of songbirds (42 species), and a few small mammals. Herpetological data are unavailable

Wooded Seepage Bogs

Wooded seepage bogs are depressional areas fed by side-slope seepage from the surrounding uplands. Standing water may be present during some parts of the year. The tree bases are usually buttressed, ground-cover diversity is low, and ferns are a common component. Dominant tree canopy species include sweetbay (*Magnolia virginiana*), blackgum, and willow oak. Sub-canopy species include holly, farkleberry (tree sparkleberry) (*Vaccinium arboreum*), poison sumac (*Toxicodendron vernix*), viburnum (*Viburnum* spp.), red maple, and sweetbay. Common ferns include netted chain fern (*Woodwardia areolata*), cinnamon fern (*Osmunda cinnamomea*), and southern lady fern (*Athyrium asplenioides*). Thirty five species of songbirds and 5 species of mammals have been documented using this ecological group.

Gum / Oak Ponds

Gum / oak ponds are usually small and isolated and usually are found in upland situations where small depressions hold water for long periods of time. They are not filled by running water or seepage; instead, they hold rainwater and the water levels change with the season. The dominant species can be sweetgum, blackgum, water tupelo (*Nyssa aquatica*), willow oak, laurel oak (*Quercus laurifolia*), or water oak. The midstory is variable and changes with the amount of water the ponds retain, but American holly, sweet-pepperbush (*Clethra alnifolia*), leucothoe, and dwarf palmetto (*Sabal minor*) commonly are present. Mesic species such as buttonbush and wax myrtle are common in more open areas of the ponds, and in some ponds sedges and ferns are the most common herbaceous species present. Mosses and orchids also may be present surrounding areas. Surveys for amphibians and songbirds are needed. Although wood storks have been sited occasionally using some of those ponds on the Alabama portion of the installation, confirmed occurrences of other species of conservation concern are lacking.

Herbaceous and Shrub Seepage Bogs

The switch cane and pitcher plant bogs within the Malone Impact Area are the best example of this ecological group on Fort Benning. These areas burn frequently. Fire is a necessary component for maintaining these bog systems. Because of their location these bogs are difficult to visit to conduct any intensive research. A smaller, lower quality bog is located in the military training compartment O14, but woody species have invaded the site due to fire suppression. Woody species common to these bogs include switch cane (*Arundinaria gigantia* ssp. *tecta*), inkberry (*Ilex glabra*), gallberry, wax-myrtle, sourwood, and green briars. Herbaceous species include sweet pitcherplant (*Sarracenia rubra*), sphagnum mosses, and various ferns. Many more, small isolated bogs probably still need to be mapped

Mesic Hardwood Forests

Mesic hardwood forests (typically non-oak dominated) are found often in the bottoms of cool, shady, steep ravines. Beech, ash, sweetgum, southern magnolia, (northern) red oak (*Quercus rubra*), white oak (*Quercus alba*), and bitternut hickory (*Carya cordiformis*) are common canopy species. Sub-canopy species include flowering dogwood, ironwood, witch hazel, and red bay. Shrub species include titi, mountain laurel (*Kalmia latifolia*), and fetterbush. Common woody vines include wild grape, partridge berry (*Mitchella repens*), wild sarsaparilla (*Smilax pumila),* Virginia creeper, and poison ivy. Indian cucumber-root (*Medeola virginiana*), cranefly orchid (*Tipularia discolor*), wide-leaf bunchflower (*Melanthium latifolium)*, croomia (*Croomia pauciflora*), and beech drops (*Epifagus virginiana*) are found in the herbaceous layer. Additionally, several drainage systems on the installation support plant species more often associated with more northern plant communities. For example, mountain laurel is an indicator of cool, mesic, north or east facing slope habitats that may contain plants that are rare in the Coastal Plain. Plants such as perfoliate bellflower (*Uvularia perfoliata*), American ginseng (*Panax quinquefolia*), and sanicle (snakeroot) (*Sanicula* spp.) are examples of these more northern plants that occur at Fort Benning. White-tailed deer, turkey, rabbits, and gray squirrels are common in these forests. About 25 species of songbirds are documented from this ecological group. Information on reptiles and amphibians is sparse. Species of conservation concern include croomia (*Croomia pauciflora*) and American ginseng.

Dry-mesic Hardwood and Dry-mesic Mixed Hardwood / Pine Forest

These forests are quite variable on the installation and occur in the ecotone between the dry ridge tops and the mesic bottoms. Common species found in these areas include white oak, red oak, water oak, sweetgum, loblolly pine, shortleaf pine, tuliptree (tulip poplar) (*Liriodendron tulipifera*), American holly, pignut hickory (*Carya glabra*), southern red oak (*Quercus falcata*), and post oak (*Quercus stellata*). Sourwood, farkleberry, red maple, flowering dogwood, chalk maple (*Acer leucoderme*), American holly, redbud (*Cercis canadensis*), and eastern hop-hornbeam (*Carpinus caroliniana*) are common mid-canopy species. Common shrubs include sassafrass (*Sassafrass albidum*),

Longleaf Pine Loamhills

Areas with loamy soils support some of the best remaining longleaf pine (*Pinus palustris*) stands on the installation. The stands are often a mix of loblolly, shortleaf, and longleaf pine. Depending on the mix of pine species in the stand, slope position, and size of the natural fire compartment, natural fire-return intervals varied. Today, fire-return intervals for some stands are frequent, in part because of the many ordnance-induced wildfires that occur within or adjacent to these stands. Common understory species include post oak, blackjack oak (*Quercus marilandica*), and flowering dogwood. Pine regeneration also is a common component of the understory. Shrubs include deerberry, inkberry, farkleberry, gallberry, wax myrtle, and sassafrass. Common herbaceous species typically include a variety of native legumes, native grasses, including little bluestem (*Schizachyrium scoparium*), and bracken fern (*Pteridium aquilinum*). More disturbed areas may contain broomsedge (*Andropogon virginicus*) and Japanese honeysuckle (*Lonicera japonica*). More information is needed on the typical herbaceous components of higher quality examples of this ecological group at Fort Benning. Common animals found include white-tailed deer, flying squirrels, fox squirrels, raccoon, and rabbits. The loamhill longleaf pine stands are vital to the recovery of the installation's population of Federally listed red-cockaded woodpeckers (*Picoides borealis*). Other species of conservation concern that use these stands include Bachman's sparrow (*Aimophila aestivalis*), short-leaved skeleton-grass (*Gymnopogon brevifolius*), wavy wildbean (*Phaseolus sinuatus*), and white four-o-clock (*Mirabilis albida).*

Longleaf Pine Sandhills

The longleaf pine stands in these dry sandy areas support red-cockaded woodpeckers, gopher tortoises, and dusky gopher frogs (*Rana capito sevosa*). These stands, typically more open when compared with the loamhill stands, are subject to intense mechanized training that through ground disturbance can damage susceptible plant and animal communities. Longleaf pine maintains dominance better here than in the loamhills. Because of the deep, dry, and sandy soils the other pines, primarily loblolly and shortleaf pine, are less able to compete successfully. The deep sandy and dry soils are better suited to longleaf pine. Scrub oaks that are a common component of these stands include bluejack (*Quercus incana*), sand post oak (*Quercus margarettiae*), and turkey oak (*Quercus laevis*). Sassafrass, farkleberry, and hawthorn are common shrub species. Grasses and legumes are diverse and common in the ground layer and, as a result, Sixteen species of conservation concern occur in the longleaf pine sandhills.

Plantations and Other Altered Areas

About 16,000 acres of loblolly and slash pine (*Pinus elliottii*) were planted from 1962 to 1994. In 1976 and 1977, 60 acres of longleaf pine were planted each year and from 1988 to 1999 a total of about 7,000 acres was planted in longleaf pine. Some of the acreage planted in longleaf in recent years has replaced some earlier loblolly and slash

Other altered areas include shrub and grassy areas that are a result of range construction and maintenance activities. The current shrub alliances are defined poorly and require further study and classification to determine which communities are present. Hawthorn and plum (*Prunus* spp.) dominated areas occur in the downrange areas of several of the major live-fire ranges in the northern part of the installation. Some unused grassy areas are currently scheduled for longleaf pine reforestation where appropriate

3.1.2 Species of Conservation Concern

There are 96 species (four amphibians, eight birds, seven fishes, four mammals, four mussels, nine reptiles, and 60 plants) of conservation concern found on Fort Benning (Table 5.2 Chapter 5 of INRMP). A species is listed as of conservation concern if it is listed by the U.S. Fish and Wildlife Service (Service) or by the states of Alabama or Georgia as threatened (T) or endangered (E) or is otherwise identified as a candidate (C) species, species of concern, state protected species, rare species, unusual species, or a watch-list species. Five Federally listed threatened and endangered species occur at Fort Benning. These include the red-cockaded woodpecker (E), wood stork (E), bald eagle (T), American alligator (T [S/A], in which S/A = due to similar appearance), and relict trillium (E).

3.1.3 Threatened and Endangered Species

Red Cockaded Woodpecker - Fort Benning has one of the largest red-cockaded woodpecker(RCW) populations in the southeastern United States with 226 active manageable clusters and 28 known, active unmanageable clusters (these clusters occur within impact areas) as of 2001. The population is well dispersed over the entire installation, except that no active clusters are located on the Alabama portion.

The other four listed species are present in small numbers (bald eagle and American alligator), occur as transients (wood stork), or are found in a few localized areas (relict trillium).

Wood stork - Wood storks are seen mainly on the Alabama portion of the installation during late summer. Usually one to 20 birds is seen each year. They use shallow water ponds or Chattahoochee backwater areas depending on available food supplies and appropriate water levels.

Bald Eagle - Two bald eagle nests (used by one pair of eagles) are located on the southern edge of the installation near the Chattahoochee River. The eagles have produced successfully at least one fledgling since the first nest was discovered in 1992.

American alligator - Fort Benning is located on the extreme northern limit of the American alligator's range. Large adults up to 13 feet have been observed. Habitat available to the alligator is limited and consists of fish ponds and beaver ponds on the Georgia portion of the installation and the backwaters of the Chattahoochee River in Alabama.

Relict trillium - Seven known populations of relict trillium are located in the northern-most areas of the installation. These areas range up to several acres in size and in some cases contain several thousand individuals. These areas are critical to the recovery of the relict trillium population.

For more information on these species refer to section 12.8 and Appendix B8 in the INRMP.

3.1.4 Other Species of Conservation Concern

Other notable species include: the gopher tortoise, gopher frog, osprey, sweet pitcherplant, Indian olive (*Nestronia umbellula*), croomia, Georgia rockcress (*Arabis georgiana*), and Pickering's morning glory. The gopher tortoise (Georgia Threatened, Alabama State Protected) occurs in sandy soil habitats found only in the northern two thirds and southeastern tip of the installation. Over 8200 gopher tortoise burrows have been documented to date. The gopher tortoise is a critical component of the longleaf pine — scrub oak community. (Refer to section 12.9 of INRMP for more information).

The *gopher frog* (*Rana capito*), listed in Georgia as a species of special concern and state protected in Alabama, is only found in a few shallow ponds in the K14 and K17 military training compartment of Fort Benning. It has been found in a few ephemeral ponds in the Hastings Relict Sandhills Community Unique Ecological Area. The gopher frog is a burrow commensal of the gopher tortoise. The gopher frog uses the gopher tortoise burrow primarily for shelter and in some cases for food. It often shelters in tortoise burrows during the day and breeds in winter after heavy rains. The preferred breeding habitat includes seasonally flooded grassy ponds within areas that support gopher tortoises. The gopher frog is of conservation concern primarily because of loss of suitable habitat. The Fort Benning population represents a disjunct population. This particular population is significant because it is the only one known to occur outside of the Lower Coastal Plain Physiographic Region. The gopher tortoise burrows that they inhabit are in decline due to the declining populations of gopher tortoises. The loss of habitat for both species is due primarily to urbanization and agriculture.

The *osprey* (Georgia Species of Special Concern) nest is found in a tupelo forest in the Chattahoochee Backwaters Unique Ecological Area. The adults have successfully fledged young for at least the last two years.

The *sweet pitcher plant* (Georgia Endangered, Alabama Species of Special Concern) is found within the cane brakes of M6 and O14 where clay pans under the soil surface have created favorable growing conditions. The species is found in high soil-moisture sites, such as seepage slopes, acidic swamps, wet savannas, or bogs. It is found usually in areas exposed to full sun or light shade, and it may be crowded or shaded out by invading shrub and tree species unless an opening is maintained by manually clearing brush, or periodic fire.

Indian olive (Georgia Threatened, Alabama Species of Special Concern) is found primarily in dry, open, upland forests of mixed hardwood and pine. The species is rare throughout its range and has sustained significant habitat loss due to the clearing of forest land. Many of the remaining populations are of only a single sex (dioecious) and thus are able to reproduce only

asexually (that is, via root sprouts). Dioecious species are especially vulnerable to fragmentation of their habitat.

Georgia rockcress (Georgia Threatened, Alabama Species of Special Concern) is found on rocky bluffs and slopes along watercourses, as well as along sandy, eroding stream banks. The species occurs from south-central Alabama to western Georgia. On Fort Benning it can be found along both banks of the Chattahoochee River.

Pickering's morning-glory (Georgia Threatened, Alabama Species of Special Concern) is found in areas of coarse, white sand near the Fall Line. These are scrub habitats with scant litter accumulation, sparse ground cover, and little canopy cover (the latter consisting mostly of scattered scrubby oaks and pines). On Fort Benning the species is found scattered throughout the sandhills in seven different populations. The species is in decline due to habitat destruction.

Croomia (Georgia Threatened, Alabama Species of Special Concern) is found in rich, moist, deciduous woodlands, ravines, and river bluffs. On Fort Benning the species is found on two sites. It is rare throughout its range and has sustained significant habitat loss due to the clearing of forests for conversion to agriculture or pine plantations.

Bats - Three species of bats are designated species of concern. The Southeastern myotis (Myotis austroriparius), is designated special concern in Georgia and state protected in Alabama; the Seminole bat (Lasiurus seminolus), is special concern in Alabama; and the Mexican free-tailed bat (Tadarida brasiliensis), is special protection in Alabama.

The *gopher tortoise* is listed as threatened in Georgia. Most gopher tortoises reside on the northern half of the installation in the Fall Line Sandhills areas, particularly in the D, F, K, and O military training compartments. There are approximately 8000 burrows that have been documented by the U.S. Fish and Wildlife Service's inventory (1994 through 1998). The most robust gopher tortoise population is centered in the K14 training compartment. A gopher tortoise population monitoring project was initiated in 1993 by Fort Benning personnel in the K23 training compartment. Burrows were marked with steel posts and tagged and the coordinates were determined by global positioning system. These burrows were inspected periodically for activity, however a report was never written. This project was terminated in 1996 due to resource limitations.

Other Birds - Eighty-seven species were recorded during the breeding season. The proportion of true neotropical migrants observed during the breeding season ranged from 37 to 45 percent of all birds observed, which is significant as many of the neotropical birds are declining. Sixty-five bird species were observed during the winter period.

Other Mammals - There are at least 350 wildlife species on Fort Benning (Appendix B9). Of these 297 are nongame species. Thirty-five of these are species of conservation concern. There are 8 species of bats known to exist on Fort Benning. These are the red bat (Lasiurus borealis), Mexican free-tailed bat (Tadarida brasiliensis), big brown bat (Eptesicus fuscus), Seminole bat (Lasiurus seminolus), Southeastern myotis (Myotis austroriparius), Eastern pipistrelle (Pipestrellus subflavus), little brown myotis (Myotis lucifugus), and the evening bat (Nycteceius humeralis). Land Condition Trend Analyses trapped fourteen species of small mammals during three trapping periods in 1991, 1993, and 1994 / 1995, 1997 / 1998, and 1999 / 2000. The most abundant small mammals were the cotton mouse (Peromyscus gossypinus), the oldfield mouse (Peromyscus poliontus), the hispid cotton rat (Sigmodon hispidus), the eastern harvest mouse (Reithrodontomys humulis), and the golden mouse (Ochrotomys nuttalli). The relative abundance and relative frequency of all five species varied for year to year, but fluctuations in small mammal populations are common.

3.2 Physical Environment

3.2.1 Topography

Fort Benning is located just south of the Fall Line, which forms the transition zone between the Piedmont physiographic region to the north and the Lower Coastal Plain physiographic region to the south. The Fall Line is identified by a series of rapids and falls in streams and rivers as they transit from one physiographic province to the other. This is also the area where the Piedmont basement rocks are first exposed in streams flowing to the Atlantic Ocean and the Gulf of Mexico.

The location of Fort Benning in relation to the Fall Line makes the installation unusual. The result is the overlapping diversity of Piedmont and Coastal Plain habitats and the associated occurrence of ecotonal plant and animal communities. The effect is not limited to terrestrial communities, but also is reflected in the physical features and biotic composition of the streams that pass through or arise within the installation. The predominately rolling terrain is highest in the east, rising approximately 740 feet above sea level, and lowest in the southwest along the Chattahoochee River, about 190 feet above sea level.

The Fall Line Sandhills District forms the interface between the Washington Slope District of the Piedmont Province and the Doughty Plain District of the Coastal Plain Province in the Fort Benning area (Holder and Streetcar 1986). Along the Fall Line Sandhills crystalline rocks of the Piedmont are overlain by marine sediments. The crystalline and sedimentary deposits may be exposed in relatively close proximity. For this reason Fort Benning contains a varied topography. Upland slopes range from steep to gently sloping and comprise most of the land on the installation. The remaining area consists of relatively flat uplands or terraces adjacent to or near the Chattahoochee River. The general physiological appearance of the Sandhills is gently to steeply rolling hills grading into the lower, flat floodplain of the Chattahoochee River.

3.2.2 Geology

Visual representation of the surface geology at Fort Benning can be seen on pages ___ of the INRMP.The sedimentary sequences of the Coastal Plain that overlie the crystalline basement rocks at Fort Benning consist of materials from the Cretaceous, Tertiary and Quaternary age. The Cretaceous age sediments form the uplands and consist of 5 geologic formations.

Kb - Blufftown Formation (Upper Cretaceous): Fine sand to sandy clay, calcareous, glauconitic, and micaceous, light brownish-gray to olive-gray, interfingers with medium to coarse sand, quartzose, pale yellow. Locally abundant carbonaceous debris, shell beds, and calcareous concretions. Formation thickness ranges from 200 to 433 feet.

Kc - Cusseta Sand (Upper Cretaceous): Medium to coarse quartz sand, pale yellow to light olive gray, thinly bedded to laminated clay, medium olive-gray to brownish-black, and micaceous fine sand, light olive-gray. Formation thickness ranges from 150 to 233 feet.

Ke - Eutaw Formation (Upper Cretaceous): Fine to very coarse sand, very pale orange to yellow, and clay, brownish -gray. Thickness of the unit ranges from 100 to 280 feet

Kr - Ripley Formation (Upper Cretaceous): Fine to very fine, calcareous quartz sand, massive burrowed to bioturbated, greenish-gray, weathers to dusky yellow, contains abundant muscovite, glauconite, and locally abundant carbonaceous debris; local clean quartz sand lenses. Ledge-forming, carbonate-cemented sand beds and calcareous concretions are common in upper part of unit. Thickness ranges from 133 to 250 feet. The Ripley Formation is only found along the southeastern boundary of Fort Benning. This area is also where the highest elevations on the installation are found.

Kt - Tuscaloosa Formation (Upper Cretaceous): Fine to very coarse sand, pale yellowish-green to pale orange, crossbedded, quartzose and containing abundant potassium feldspar, interbedded with massive sandy clay, pale olive to reddish-brown, locally mottled. Gravelly and poorly bedded deposits at base difficult to distinguish from residuum on underlying crystalline rocks. Thickness ranges from 165 to 500 feet.

From the more recent epochs are the alluvium and undifferentiated terrace deposits which occur along the Chattahoochee River and creeks of Fort Benning:

Qal - Alluvium (Holocene): Sand, gravel, silt, clay, and organic material, pale yellowish-gray to dark-gray, underlying the meandering and branching flood plains of the Chattahoochee River and second- and third-order streams, such as Upatoi Creek, Oswichee Creek, Ochille Creek, Randall Creek, Pine Knot Creek, and Sally Branch.

Qth - Deposits of high alluvial terraces (Pleistocene): Sand, gravel, clay, and silt, light to medium yellowish-orange, underlying flat, moderately dissected, upland areas adjacent to the Chattahoochee River on both the Alabama and Georgia side of the installation. These deposits
are generally 60 -110 feet above the flood plain. Clay is compact and commonly mottled; quartz and quartzite gravel fragments are iron stained. Thickness is generally less than 65 feet.
Qtl - Deposits of low alluvial terraces (Pleistocene and Holocene): Sand, gravel, clay, organic material, and silt, pale yellow to medium-gray, underlying broad, relatively undissected areas adjacent to and generally 20 to 50 feet higher than the flood plains of the Chattahoochee River; generally poorly exposed except in drainage channels or borrow pits. Thickness of the terrace deposits is variable; individual lenses of sand, gravel, and clay may be up to 33 feet thick; total thickness generally less than 50 feet. These deposits are also found along the flood plains of Upatoi Creek.

Ttr - Terrace remnant (Pliocene): Gravel, sand, and clay, medium to dark reddish-orange, mottled, capping isolated hillsides adjacent to the Chattahoochee River and Upatoi Creek. Generally 185 to 300 feet above the modern flood plain. Unit is deeply weathered; primary bedding features are generally obscured except for coarse cross-stratification of gravel deposits. Gravel fragments are deeply weathered and partly disintegrating; clay and sandy clay intervals are deeply mottled. Thickness is generally less than 33 feet.

These formations listed below are found in the quadrangle covered by the USGS Surface Geology Map and are listed in Figure 3.2, but are outside the Fort Benning boundary:

CZm - Macon Complex (Cambrian and Late Proterozoic)
Kp - Providence Sand (Upper Cretaceous)
Tb - Baker Hill and Nanafalia Formation (Upper Paleocene)
Tc - Clayton Formation (Lower Paleocene)
Sources (USDI, 1994).

3.2.3 Soils

There are 2 basic soil provinces on Fort Benning: the Georgia Sand Hills and the Southern Coastal Plains. The Georgia Sand Hills are a narrow belt of deep sandy soils with rolling to hilly topography. These soils are primarily derived from marine sands, loams and clays that were deposited on acid crystalline and metamorphic rocks. Below the Sand Hills are the Southern Coastal Plain soils, which are divided into 2 distinct areas. The first area is the nearly level to rolling valleys and the second is the gently sloping to steep uplands. The soils in this area have a loamy or sandy surface layer and loamy or clayey subsoil. Soils on Fort Benning consist of a mixture of eroding Piedmont soils and weathered Coastal Plain sands. Soils are predominantly of the Lakeland and Troup series (USDA 1928; Johnson 1983).

A combination of clay beds and weathered Coastal plain material and alluvial deposits from the piedmont characterize the soils of Fort Benning. Piedmont and Coastal Plain soils were described by Skeen et al. (1993). The majority of soils in the piedmont are classified as Ultisols; Alfisols and Entisols comprise most of the remaining soil types. Weathered minerals or a subsurface clay horizon, or both, characterize Utisols. Rivers in the Piedmont are known to exhibit Entisols, which are alluvial in nature. Kaolinite is the most common clay mineral but vermiculite and illite also occur. Sheet and gully erosion can result when soils are exposed.

The Coastal Plain soils are comprised of several orders including, Utilsols, Alfisols, Spodosols, Histosols, and Entisols. Silicate clays are the predominate component of these soils. Utisols and Alfisols are used for agricultural purposes.

Spodosols occur in the flatwood areas that are somewhat poorly drained. Histosols developed from decomposed plant material and as a result are highly organic in nature. Entisols are primarily undeveloped, deep sands where moisture availability has profound effects on the vegetation community. Erosion at the turn of the century altered productivity in the Piedmont. As a result of low levels of nitrogen and phosphorus and a low cat ion exchange capacity, the soils in the Piedmont are not highly productive.

Eight soil associations form the majority of soils on the installation (Elliott et al. 1955). Lakeland-Troup, Orangeburg-Dothan-Ailey, and Roanoke-leaf soil associations occupy higher elevations. Bibb-Chewacia-Rains, Ochlocknee, and Susquehanna-Dupin-Esto soils associations are located on alluvial flood plains and terraces. Undifferentiated rough gullied land is the classification for some of the soils occurring in the southeastern portion of the installation (Elliot et al, 1995) Thirteen soil series have been classified as highly erodible (Table 1 (USDA 1983, USDA 1993, USDA 1995, Department of the Army 1997).

Table 3. Highly Erodible Soil Series on Fort Benning

Soil Series name	Percent Slope	Extent on Fort Benning in hectares (% of installation)
Dothan loamy sand	2-5	295 (0.4)
Dothan loamy sand	5-8	121 (0.16)
Esto sandy loam	2-5	533 (0.72)
Esto/Fuqua/Aily loamy sands	5-12	472 (0.64)
Esto Troup loamy sands	12-25	562 (0.76)
Orangeburg loamy sand	2-5	372 (0.50)
Orangeburg loamy sand	5-8	230 (0.30)
Susquehanna loamy sand	2-5	-
Susquehanna loamy sand	5-8	200 (0.27)
Troup/Esto loamy sands	5-15	736 (1.00)
Troup/Vaucluse/Pelion loamy sands	8-15	3481 (4.72)
Vaucluse sandy loam	5-8	1251 (1.70)
Vaucluse sandy loam	8-15	683 (0.93)
TOTAL		8,936 ha (12.1%)= approx 22,000 acres

Generalized Surface Soil Textures

The USDA, NRCS Soil Surveys delineated the soil textures for Fort Benning. This represents the relative proportions of sand, silt, and clay in a soil. The impact areas (exclusion areas) of A20 and K15 are not mapped in the modern method of soil surveying. These areas have

restricted access; therefore the data from the 1928 survey was manually digitized to fill in the gaps within the impact areas.

Highly Erodible Soils
Based on the USDA, NRCS Soil Surveys consider most of Fort Benning soils as highly erodible (Figure 3.4). This was determined by soil classification that is defined by factors such as drainage, permeability, texture, structure and percent slope. The impact areas (exclusion areas) of A20 and K15 were not mapped because of access restrictions.

Borrow Areas
There are 8 active, 9 inactive, and 12 abandoned borrow areas on Fort Benning . They range in size from 0.5 acres to 10.4 acres, for a total of 100.7 acres. These borrow areas were created to supply fill dirt for range berm construction and maintenance, road construction and repair, and miscellaneous building and training projects.

3.2.4 Climate

Fort Benning is located approximately 170 miles north of the Gulf of Mexico and 225 miles west of the Atlantic Ocean, with a climate classified as humid temperate. The seasons are well defined, with hot, humid summers and mild winters. The coldest month is usually January and the warmest month is usually July. Most summer days have high temperatures over 90°F, with many reaching 95°F, but seldom going to 100°F. The highest recorded temperature is 107°F. The mean low temperature from November through February is 37°F, but seldom dropping below 20°F. The lowest recorded temperature is 0°F. Annual precipitation averages about 51 inches. Heaviest rainfall occurs in March, July and December and the lightest in September, October and November. Snow occurs occasionally, but usually quickly melts.

3.2.5 Water

The surface water regime at Fort Benning is dominated by the Chattahoochee River, which flows through approximately 12 miles of the installation. The Chattahoochee, along with the Flint River to the east, are major components of the Apalachicola River drainage basin of eastern Alabama, western Georgia and the Florida panhandle. The principal tributaries of the Chattahoochee at Fort Benning are Upatoi Creek on the Georgia side and Uchee Creek on the Alabama side.

The proximity of the Piedmont and Fall Line Hills to the maturing floodplain provides a diversity of streams within Fort Benning. Small springs and seeps originate at the interface of landforms. Permanent creeks originate in the hills outside the basin proper. These range up in size to that of Uchee Creek with a 2,600 foot wide floodplain.

Most streams found within the installation drain into the Chattahoochee River through the Upatoi and Uchee creeks. The most southern portion of Fort Benning drains directly into the Chattahoochee River and the northwest portion of the installation drains into Bull Creek. A very small area in the southeast corner of the installation drains into the Flint River Basin to the east. The Chattahoochee and the Flint rivers join to the south to form the Apalachicola River that flows into the Gulf of Mexico.

The streams at Fort Benning are referred to as either Piedmont or Coastal Plain in origin. Piedmont streams flow from the north and generally flow in a southerly direction. Major Piedmont streams include Baker, Cox, Dozier, Kendall, Randall, Uchee, Tar and Upatoi Creeks, as well as the Chattahoochee River. Pine Knot and Little Pine Knot Creeks are examples of Coastal Plain streams that generally flow from east to west. Sally Branch and Bonham Creeks are also Coastal Plain streams. The Ochille and Oswichee Creeks are examples of streams with intermediate characteristics when compared to both the Piedmont and the Coastal Plain streams.

The largest body of water associated with Fort Benning is the Chattahoochee River, which is a major perennial river that flows in a southerly direction and separates the installation into the two states it occupies. Several dams have been built on the Chattahoochee River upstream and downstream of Fort Benning to regulate river flow and produce hydroelectric energy. The northern portion of Lake Walter F. George, a 45,000-acre impoundment on the Chattahoochee River, extends into the southwest portion of the installation. The River Bend area, which is part of the Lake Walter F. George impoundment, constitutes the only lake on the Installation. Numerous oxbows, abandoned meander channels, isolated ponds, and wetland areas are found along the Chattahoochee.

There are 14 man-made ponds, ranging in size from 1 to 72 acres. In addition, there are numerous natural ponds such as beaver ponds and oxbows.

3.2.5.1 Wetlands

The National Wetlands Inventory conducted by the U. S. Fish and Wildlife Service in 1982 shows that Fort Benning has about 16,926 acres of wetlands (Figure 3.7). The inventory described lacustrine, riverine, and palustrine systems. On Fort Benning it includes impounded water, flowing water, river floodplains, stream floodplains, small stream swamps, wooded seepage bogs, herbaceous and shrub seepage bogs, and gum/oak ponds.

The wetland delineations were produced through stereoscopic interpretation of 1:58,000 scale color infrared photography. The majority of the photography was taken during the winters of 1980-1982. Field checks of the areas were made prior to the actual delineation. Distinctive characteristics seen in the photos were identified in the field using vegetation and soil types, as well as additional input from field personnel.

In Weakly et al. (1998) there is a vegetation classification system that describes vegetation that may be associated with wetland communities at Fort Benning.

3.2.5.2 Groundwater

The state of Georgia possesses some of the largest and purest ground water aquifers in the world. Fort Benning is in the Coastal Plain hydrologic province of Georgia and Alabama, whose principal ground water source is the Cretaceous aquifer system. The aquifer systems are directly related to the various geologic formations. The Georgia Geologic Survey identifies these Cretaceous aquifers in the Fort Benning area as the A-3 through A-6 aquifers. Aquifer A-6 is part of the upper Tuscaloosa and the overlying Lower Eutaw formations. Aquifer A-5 is part of the basal sedimentary sequence of the Blufftown Formation. Aquifer A-4 is in the upper sedimentary sequence of the Blufftown Formation. The A-3 aquifer correlates with the Cusseta Sand Formation. The recharge area for these aquifers is the Sand Hills area, which includes Fort Benning (Georgia DNR, 1986).

3.2.5.3 Fort Benning Hydrologic Unit

Fort Benning lies completely within the USGS Hydrologic Unit Code (HUC) 03130003 (Figure 3.8). This hydrologic unit is located in parts of both Alabama and Georgia. This is a level of classification known as a cataloging unit and it represents all or part of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature.

3.2.6 Air Quality

Fort Benning is located in both Muscogee and Chattahoochee Counties, and the Columbus-Phoenix City Interstate Air Quality Control Region. Fort Benning has sources of air pollution that require submission of a Title V air permit application which is currently pending with

Georgia (Veenstra 2001). The Governor of Georgia designated Muscogee County as nonattainment based on the U.S. Environmental Protection Agency (EPA) 8-hour standard. However, Fort Benning does not have large air emission sources within Muscogee County (Gustafson 2001). The counties surrounding Muscogee, which would include Chattahoochee, may also be considered nonattainment based on the EPA 8-hour standard. This could possibly impact Fort Benning since air emission sources from the installation exist within Chattahoochee County.

Currently no data is available for particulate matter produced when prescribed burning on Fort Benning. A Fall Line Air Quality Study, which was initiated by the state of Georgia and conducted by Georgia Technical Institute, collected baseline data in 2000 on air quality in the Columbus region (Gustafson 2001).

3.3 Human Environment

3.3.1 Noise

The nearest urban areas to Fort Benning are Columbus, Georgia, adjacent to the Installation's northwest corner, and Phenix City, Alabama, just west of Columbus. Noise sources in these population centers are typical of urban areas; e.g., vehicular, aircraft, construction, railroads, and other commercial and industrial activities. Areas to the east, west, and south are mainly rural with isolated residences and businesses, and a few small towns and incorporated areas. Noise sources from these areas are relatively minor and consist primarily of vehicles or agricultural equipment.

Some noise sources at Fort Benning are not drastically different from the surrounding communities; i.e., vehicular, aircraft, construction, and light industrial. However, some noise sources on the Installation differ sharply from those in the civilian community. These sources may include low flying rotary and fixed-wing tactical aircraft, small arms firing, mortar and artillery firing and impacts, heavy tracked vehicles and other specialized combat vehicles, and various small explosive devices. The U.S. Air Force also uses bombing ranges on Fort Benning, in support of Joint Army - Air Force Training.

The U.S. Army Installation Compatible Use Zone (ICUZ) program uses a computer generated model to determine the impact of major noise sources to the military and surrounding civilian communities. Noise contour lines surrounding, and emanating from, combined noise sources are produced on a map to show probable noise impacts to the Installation and surrounding communities. The
contours identify three different noise zones according to the noise intensity or level in each. They are:

Zone I: Areas where the noise level is below 65 decibels (dB), A-weighted, or 62 dB, C-weighted. This area is considered to have moderate to minimal noise exposure and is acceptable for noise sensitive land uses.

Zone II: Areas where the noise level is between 65 and 75 dB, A-weighted, or between 62 and 70 dB, C-weighted. This area is considered to have significant noise exposure and is normally unacceptable for noise sensitive land uses.

Zone III: Areas where the noise level is greater than 75 dB, A-weighted, or 70 dB, C-weighted. This zone is considered an area of severe noise exposure and is unacceptable for noise sensitive activities.

A-weighted contours are best used to evaluate blast or sudden noise. C-weighted contours are thought to be best for describing steady-state noise, such as from aircraft.

The U.S. Army Center for Health Promotion and Preventative Medicine, formerly Army Environmental Hygiene Agency (AEHA), prepared an Impulsive Noise Contour Map showing the relationship of the noise zones to the installation and adjacent areas. This information is also available as an environmental overlay map for use by the Fort Benning Master Planning Office. Fort Benning is updating the Environmental Noise Management Plan along with a newly adopted contour management system (Chauvey 2001).

3.3.2 Land use

The Fort Benning military installation is located in the western central portion of the State of Georgia. The installation is contiguous to the City of Columbus, Georgia occupying areas in

Muscogee and Chattahoochee Counties, Georgia and extending into Russell County Alabama. The main cantonment area of Fort Benning lies approximately eight miles south of the central business district of Columbus. Fort Benning occupies a total area of 183,979 acres. The Georgia portion is approximately 172,380 acres and the Alabama portion is 11,600 acres.

The cantonment, family housing, and other developed areas of Fort Benning occupy approximately 9,000 acres or five percent of the installation. Separate cantonment areas consist of the main cantonment area referred to in this document as "Main Post", a series of remote built-up sites--remnant sites from a World War II mobilization complex, referred to in this document as "Harmony Church", and fully developed areas referred to as "Sand Hill", "Kelly Hill" and Lawson Army Airfield. Other separate sites include the Shopping Mall, Martin Army Hospital, Custer Terrace Family Housing Area, the Uchee Creek Camp Site and Marina, as well as other isolated remote sites.

The remainder of the installation consists of recreation areas, training areas, drop zones, weapons firing ranges, impact zones, exclusion areas, and maneuver land. These areas are generally undeveloped with exception of field training support facilities such as stands, latrines, observation towers, etc. The maneuver land totals 128,317 acres or 71 percent of the installation. Most of this land is typical of the surrounding countryside, with low rolling, forest covered hills divided in 198 separate training compartments. These areas are operated, managed and maintained by various training organizations, including the Directorate of Operations and Training and the Directorate of Facilities, Environment and Logistics. These areas also comprise the bulk of the Fort Benning natural resources.

3.3.3 Environmental Justice

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority populations and Low-Income populations was issued on February 11, 1994. The EO requires Federal agencies to consider disproportionately high and adverse environmental effects on minority and low-income populations. A presidential memorandum that accompanied the EO specified that minority and low-income populations be given access to information and opportunities to provide input to decision-making on Federal actions.

There are fragments of population within the Columbus MSA which could be classified as "minority" or "low income" populations and which would be entitled protection under EO 12898. However, none of the proposed actions in any of the alternatives would cause disproportionately high and adverse effects on these minority and low income populations.

3.3.4 Roads

The Fort Benning area is served by several Federal, state, and county roads located in both Georgia and Alabama. There are nine major roads serving the Fort Benning area, some with multiple designations by Federal, state, or county systems.

Fort Benning is an open Installation accessible by several roads that are controlled to various degrees ranging from roads with closed, locked gates to unmonitored open roadways. Because of its juxtaposition to the Columbus and Phenix City areas, primary access to Fort Benning is predominantly from the north. In terms of average daily traffic (ADT) the four most utilized access roads are Fort Benning Boulevard, Lindsay Creek Parkway, Lumpkin Road, and Victory Drive.

The main gate to Fort Benning is located at the intersection of Fort Benning Boulevard and Lumpkin Road approximately 2.25 miles within the installation boundary. The interior road net consists of 359 miles of improved roads and 652 miles of unimproved roads and trails.

3.3.5 Socio-Economic

According to the 1990 census data, the Columbus, Georgia, Metropolitan Statistical Area (MSA), which consists of Muscogee, Harris, and Chattahoochee counties in Georgia and Russell County in Alabama, is the primary area socially and economically influenced by the operations of the U.S. Army Infantry Center and Fort Benning. The majority of the social and economic effects of Fort Benning are felt in the Columbus MSA, but some impacts are experienced in the secondary area of influence, which consists of Barbour, Lee, Macon and Russell, Alabama; and Marion, Stewart, Talbot, and Webster, Georgia. Certain pertinent data will be presented for the Columbus MSA, with broader data being presented for the entire 11 county area.

3.3.5.1 Population

The primary study area of the Columbus MSA that was used to derive statistics quoted in this discussion encompasses approximately 4125 square miles. The latest census data (1990) for the study area estimates population to be 275,800. In 1980, the Columbus Metropolitan Study Area (MSA) had a population of 254,660. The majority of these people reside in Columbus, Georgia (Muscogee County), the second largest city in the state. The major urban center in the Alabama portion of the study area is Phenix City (Russell County), located across the Chattahoochee River from Columbus. The latest 1992 Census estimate for the Columbus MSA is 270,159 (a 9,299 or a 3.56 percent increase from 1990).

The secondary study area, which encompasses 13,369 square miles, had a 1994 estimated population of 438,336. Like the Columbus MSA, the population of the secondary study area has also increased from 1980. In 1980 the population was 402,598 and increased to 418,382 in 1990, demonstrating a 3.92 percent increase from 1980 (RPMP *in draft* 1999).

The largest single racial group in the area is Caucasian, accounting for over 59.45 percent of the population, down from 64.4 percent in 1970. African Americans comprised 37.9 percent of the population in 1980, but they were the predominate race in four counties (Macon, Alabama; and Stewart, Talbot and Webster, Georgia) in the study area.

In 1990, 73.2 percent of the study area population resided in urban areas, an increase from 1980 when 72.8 percent of the population resided in urban areas. A majority of the population resides in urban areas because of the large population residing in the Columbus MSA; seven of the eleven secondary study area counties have a majority of their population living in rural settings.

3.3.5.2 Housing

Housing is predominantly concentrated in the Columbus MSA which has an inventory of 101,457 units. Of the occupied units (92,695), almost 40 percent are rentals. Although Columbus has a large inventory of rental housing units, generally in good condition, rents have been increasing at a fairly rapid pace, resulting in a lack of affordable rental housing for lower ranking enlisted personnel.

The majority of military personnel are housed on-base, although some 6,000 reside off-post in privately owned housing. Of the roughly 23,048 personnel housed on base, roughly 18,837 are housed in enlisted barracks. Approximately 3,530 enlisted personnel and 552 officers are housed in on-post family housing, and 103 officers and 26 enlisted personnel are housed on-post in unaccompanied personnel quarters.

3.3.5.3 Employment

Bureau of Economic Analysis (BEA) employment projections for the eleven county areas indicate very little growth is expected from 1990 to 2035 (only 12.33 percent over 45 years). The major increases in employment are expected to occur in the services; finances; insurance and real estate; and retail trade industries. Some growth may also be experienced in the transportation and public utilities industry as well as the construction industry. Overall, manufacturing employment is expected to decline, mainly because of deceases in the textile industry, although increases in employment in the durable good sector, specifically in the primary metals industry, are expected (RPMP *in draft* 1999).

3.3.5.4 Allocated Proceeds to Counties from Forest Products

A portion of the monies collected from selling forest products on Fort Benning is returned to Muscogee and Chattahoochee Counties in Georgia, and Russell County in Alabama to offset the loss of tax revenue. The money may only be used in that particular county and only for education and roads.

Table 4 describes the amount of money expended and received as a result of forestry operations in the last six years, and the amount of state entitlements. Since support of the military mission is the primary reason for all natural resource management on military installations, making a profit from forest products is not a strong driver. Ideally, operating costs and revenues will be equal, but this is not always the case. Operating costs exceed revenues in some fiscal years.

Table 4. Revenues Generated From Forest Operations

Fiscal Year	Forestry Revenue	Forestry Expenditures[1]	State Entitlements Alabama	Georgia
00	$1,065,000.00	$1,911,000.00	0	0
99	$1,065,000.00	$1,823,000.00	0	0
98	$1,354,000.00	$1,486,000.00	0	0
97	$2,190,000.00	$791,000.00	$36,000.00	$503,375.00
96	$1,765,000.00	$734,000.00	$18,500.00	$258,775.00
95	$2,044,000.00	$815,000.00	$32,900.00	$458,860.00

[1] Includes annual forestry operating costs and Corps of Engineers contract administration costs.

3.3.5.5 Education

The study area is primarily served by four school systems, Muscogee County School System, Chattahoochee County School District, Phenix City-Russell County School Systems and Fort Benning Dependent's Schools. Approximately 7,015 military dependents attend school, 3,815 of which attend school in one of the three off-post districts. The Muscogee County School System is the largest of the three off-post systems, with the Phenix City Educational System being the second largest. Chattahoochee County School System is the smallest of the three systems in the area. Chattahoochee County has no high school, but through an agreement with Muscogee County high school students are educated at one of the Muscogee County high schools. In addition to public education, there are 18 private and parochial schools in the Columbus MSA.

Dependents of military personnel that reside on Fort Benning are educated at Fort Benning Dependents Schools located on post. There are seven schools within the system, with an

enrollment of 3,200 students in grades pre-school to eight. High school students residing on post attend Muscogee County high schools.

3.3.5.6 Taxes

The major source of tax revenue for counties in the study area is school/property and sales taxes. Property tax assessments in the Columbus MSA range from $3.60 to $16.80 per $1,000 in value of property. Georgia and Alabama levy a four percent sales and use tax on the purchase of all goods and services (except for groceries in Georgia). In addition to these taxes, individual cities and counties within the study area levy a sales tax of one to three percent.

3.3.5.7 Public services

Columbus is governed by a city-county government, the Columbus Consolidated Government. A mayor, a 10 member elected council and an appointed city manager, runs the government. Like Columbus, a mayor, a council, and a city manager run Phenix City.

A police department, and the Columbus Fire Department serve the city of Columbus. The Fire Department has 11 fully equipped stations. Phenix City has a smaller police force and a three-station fire department. In Chattahoochee County, volunteer firemen supply fire protection, while sheriff provide police protection for the county.

There are ample medical and dental facilities serving the area and they are concentrated in the Columbus area. In addition to 911 emergency assistance service, the area also has emergency medical services available at five emergency medical locations. Fort Benning provides Med-Evac helicopter service and additional medical services to the community when needed.

3.3.6 Outdoor Recreation

Historically, the emphasis of outdoor recreational opportunities at Fort Benning and most other installations has been hunting and fishing which has emphasized the consumptive use of wildlife. The climax of that era occurred in the 1960's and 1970's. Although hunting and fishing are still popular, more recent decades have given rise to interest in non-consumptive type recreation. Such activities as hiking, camping, canoeing, bird watching, and nature study have increased in popularity.

Community Recreation Division has two major facilities that support outdoor recreation activities. These include Building 1707 and Uchee Creek Recreation Area. Hunting and fishing permits, hunting and fishing licenses, hunting and fishing maps, and hunting and fishing supplies can be purchased at Building 1707. Hunter Control also operates out of this building during the gun deer season and turkey season. Permits, licenses, and supplies also can be purchased at Uchee Creek Recreation Area. Additionally, a fishing pier, boat ramp, campground, and boat and canoe rentals are available at this facility. Primitive camping also is available at King's Pond.

A major hiking trail known as the River Walk extends onto Fort Benning from Columbus for 2.5 miles. This trail starts in downtown Columbus and enters the installation near the main gate on Benning Boulevard and ends near the Infantry Museum. Off-road vehicles such as four-wheelers are prohibited, except an exception to policy may be granted for handicapped hunters. Trapping is prohibited on Fort Benning without approval from Directorate of Facilities, Engineering and Logistics (DFEL).

Although Fort Benning is an "open" installation insofar as public roads are not gated, it remains an area of exclusive Federal jurisdiction and public activities are regulated. Access to Uchee Creek Recreation Area facilities is limited to active duty military, retirees, reservists, Department of Defense personnel, and guests. The boat ramp at Uchee Creek Recreation

Area, however, is available to anyone for access to the Chattahoochee River. Additionally, the portion of the River Walk that extends onto Fort Benning is open to the public. Hunting and fishing is available to the following:

- United States Armed Forces active duty personnel
- United States Armed Forces retired personnel
- Disabled American Veterans with 30% or more disability
- Department of Defense civilian employees working on the installation
- Federal civilian employees working on the installation, including U.S. Postal Service, U.S. Customs Service, and U.S. Army Corps of Engineers
- retired civilian employees employed at the installation prior to retirement
- active National Guardsman and Reservists residing in the six county surrounding area
- surviving spouses of military personnel who have not remarried
- primary dependents of those above.

Access to hunt and fish is not offered to the general public, except as guests of those listed above (other than dependents). The main concerns of public access are safety and security. These concerns were expressed in the 1983 Cooperative Agreement. More recently, other concerns such as liability and increased training requirements have developed.

At least 53 game and sport fish species are present on Fort Benning. These include 21 birds, 10 mammals, and 22 fish. Game and sport fish management emphasis on Fort Benning is focused on the white-tailed deer, wild turkey, northern bobwhite quail, mourning dove, largemouth bass, bluegill, redear sunfish, and channel catfish. (Chapter 12 INRMP Species List)

3.3.6.1 Hunting

Due to the large land base(182,000 acres) and variety of habitats, including hardwood bottomlands, open pine uplands, pine reforestation areas, upland oak-hickory areas, and wetlands, Fort Benning offers abundant hunting opportunities on about 130,000 acres. Hunting occurs on the entire installation approximately 215 days per year. Hunting on the installation is allowed for 10 species of resident game mammals. Nineteen species of migratory game birds are present, at least 16 species of which are waterfowl. There are two species of resident game birds: northern bobwhite quail and eastern wild turkey.

Additionally, hunting is allowed for three nongame animals: coyote (*Canis latrans*), feral swine (*Sus scrofa*), and crows (*Corvus* spp). Feral swine are considered a nuisance species and liberal hunting regulations are in effect. Deer and wild turkey are the most sought after species by hunters. Hunting privileges are restricted to military and civilian employees and their guests.

3.3.6.2 Fishing

Approximately 14,000 aces of wetlands exist on Fort Benning. Water in the form of ponds and streams is extensive. There are 14 man-made ponds (managed and unmanaged), numerous beaver ponds and oxbows, the Chattahoochee River, and six major creeks. The fish ponds are in fair to poor condition due to infrastructure problems and lack of resources to conduct management. The Chattahoochee River has 15 miles of shoreline on the Georgia side of Fort Benning and 12 miles of shoreline on the Alabama side, Upatoi Creek has 30 miles of shoreline in Georgia, and Uchee Creek has five miles of shoreline in Alabama. Other major creeks include Randall Creek, Pine Knot Creek, Oswichee Creek, and Ochillee Creek. Additionally, a 2000 acre backwater area is associated with the Chattahoochee River.

Fishing occurs throughout the installation within the Chattahoochee River and several major streams, including Upatoi, Ochillee, Oswichee, Randall, Big Pine Knot, and Uchee, numerous

oxbows off the Chattahoochee, Upatoi, and Uchee Creeks, beaver ponds, and 14 man-made ponds. . The most popular fish species sought by fishermen include: largemouth bass bluegill redear or shellcracker, white crappie, channel catfish, white bass, and hybrid white bass.

3.3.7 Cultural and Historical Resources

Cultural resources consist of archeological sites, standing historic structures, and / or historic landscapes, and may include Native American sacred sites and traditional cultural properties. Archeological sites are the material remains of past human activity, regardless of ethnic, racial, or otherwise culturally defined origin. Historic standing structures are those buildings and facilities that are over 50 years of age and / or those meeting the Secretary of Interior's Guidelines for eligibility for placement on the National Register of Historic Places (Register). Sacred sites and traditional cultural properties may be archeological sites or other locations that are recognized, especially by Native Americans, as having religious importance or importance in the cultural practices or history of a Federally recognized group.

It is estimated that about 4000 archeological sites will be found eventually on Fort Benning. These sites range in age from approximately 8000 or more years through the last 50 years. Similarly, the number of historic structures on Fort Benning — as of this writing numbering about 650 — will probably increase as time and events add meaning to newer buildings that today are taken for granted. No sacred sites or traditional cultural properties are currently recognized on Fort Benning, though this may change through continuation of consultation with Federally recognized American Indian Tribes that have historical ties to Fort Benning property.

3.3.8 Hazardous Materials

Fort Benning's Hazardous and Toxic Materials/Waste Management program has three major functions: (1) storage, handling, and disposal; (2) waste minimization; and (3) remediation. A detailed discussion of these programs is presented in the Installation Hazardous Waste Remedial Actions Program (HAZWRAP). This document is available for review at the Fort Benning DPW Environmental Management Division, Building 6, Room 310, telephone (706) 545-7570.

A PCB Inventory Report indicates that of the 2,157 transformers surveyed on the Installation, 1,166 are considered "PCB Transformers" (500 or greater ppm PCB's); however, based on this report, the exact numbers of PCB transformers was not quantified because extensive testing of di-electric fluids was not possible (Clarke, 1999). In July 1998, a PCB Management Plan was prepared for Fort Benning and is available for review at the Environmental Management Division. This plan provides details regarding the implementation of the laws and regulatory requirements listed above. Topics covered include transportation, storage, sampling, and disposal of PCBs. The management of most of the PCB electrical equipment on Fort Benning, GA, is currently under the control of Flint EMC; however, electrical systems at LAAF remain Federal property and are under the management of Interior Electric.

Fort Benning operates under Hazardous Waste Facility Permit (RCRA Part B) No. HW-021(S)-2 and Facility I.D. No. GA3210020084, which is available for review at the offices of the Environmental Management Division. Individual units manage their hazardous and non-hazardous materials and wastes in satellite accumulation points (SAP). Once the maximum amount allowable of materials/wastes in the SAP has been reached, the unit transports the hazardous wastes in each SAP to the Central Hazardous Material Control Center (CHMCC). The CHMCC then processes the paperwork and turns the hazardous wastes in to the Defense Reutilization Marketing Office (DRMO). The DRMO manages a permitted storage and utilizes a contractor for off-site hazardous waste disposal (Duffy, 1999).

The Installation includes numerous sites that are listed as Solid Waste Management Units (SWMU) in Fort Benning's "RCRA Part B" permit. Proper guidance and procedure for proper management of these sites, to include any disturbing activities such as construction, demolition, logging, etc. , in SMWUs are presented in RCRA Part B permit.

Use of hazardous materials related to natural resource management at Fort Benning is limited to herbicides for the containment and eradication of kudzu, the preparation of a site for planting longleaf pine seedlings, and the control of aquatic weeds and Japanese honeysuckle where it threatens relict trillium sites. For this reason, the following hazardous materials will not be described in this section or analyzed in Section 4.0: medical and bio-hazardous waste, low-level radioactive waste, radon, polychlorinated biphenyl, petroleum storage tanks, asbestos and lead-based paint. All use of pesticides and herbicides on Fort Benning is coordinated with the Installation Pest Manager and done in accordance with AR200-5, including the requirement that only DoD or State-certified individuals may apply pesticides and herbicides.

A survey for kudzu that covered about 167,000 acres of Fort Benning was conducted between May 1996 and June 1997. Periodic updates of the survey results occur when new information is collected. Currently the number of individual kudzu populations is 671 covering a total of 1430 acres. Of these, 42 populations affected RCW clusters and one population affected a gopher tortoise colony site. An additional 491 populations affected potential RCW habitat. The kudzu populations ranged in size from 0.01 to 73 acres, with an average size of two acres. The highest concentrations occurred in the cantonment areas.

Tordon K and Escort are the herbicides used for the containment and eradication of kudzu. Each population of kudzu is assessed and assigned a priority based on proximity RCW colonies, and other threatened and endangered species. Treatment involves several continuous, annual broadcast applications followed by spot treatments as necessary. Herbicide treatments are prescribed for each population based on age and vigor of the kudzu population, terrain, erosion concerns, existing forest type, and proximity to threatened or endangered species, private property, and water sources.

4.0 Environmental Consequences

Since implementation of any of the alternatives would not result in impacts to topography, geology, climate, utilities, radiation, and solid waste management on Fort Benning, these resources will not be discussed in the Environmental Consequences section.

This section analyzes the potential impacts of implementing the two alternatives on the resources of Fort Benning. Since the proposed action is to integrate natural resource management with Fort Benning's missions through the development and implementation of an Integrated Natural Resource Management Plan (INRMP), the alternatives describe each Program Area that is included in the INRMP (e.g. Timber management, Fire management, Soil and Water Conservation Program, etc.), and what actions would be conducted to manage that particular resource. For this reason, the environmental consequences section will follow the same organization structure and will be based on Program Area.

Each of the following tables is dedicated to a Program Area as described in Section 2.0 Alternatives. Within each table, potential impacts to resources (listed in the lefthand column of each table) are summarized. These resources are the same resources described in detail in Section 3.0 Affected Environment.

Since this EA is programmatic, and since site-specific details of projects proposed in the INRMP are unknown, the potential impacts described in each table for each resource are general. Once site-specific details are known for each project, the need for further environmental analysis will be determined and documented in a Record of Environmental Consideration (REC), Environmental Assessment (EA) or Environmental Impact Statement (EIS).

4.1 Timber Management

All proposed forest management would follow applicable laws, regulations and procedures as outlined in Chapter 10 and Appendix B5 of the INRMP. These measures were coordinated and developed in consultation with Federal, state and local entities utilizing best management practices and state of the art knowledge of the resource being addressed. Georgia Best Management Practices would be used to mitigate effects from timber harvesting, site preparation, planting, timber stand improvement and pre-commercial thinning.

The potential impacts to all the resources described in Section 3.0 from implementing the Timber Management Program will be described in Table 5.

Table 5. Effects of Proposed Timber Management

	Alternatives	
Resources	**No-Action**	**Balanced Ecosystem Mgmt**
Eco-Groups Vegetation Wildlife	Even aged management results in removing pine trees that have reached a certain rotation age. This creates moderate sized openings requiring intensive site preparation and artificial planting. Direct impacts to vegetation would include the midstory and understory being flattened and uprooted as a result of equipment used during harvesting, site preparing and planting. Often, depending	Uneven aged management would benefit the restoration of the longleaf pine community by allowing the longleaf to age beyond any predetermined rotation age. The vegetation associated with the longleaf pine community would indirectly benefit from this approach by lessening direct and indirect impacts from harvesting, site preparation and planting.

Table 5. Effects of Proposed Timber Management

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
Eco-Groups Vegetation Wildlife (continued)	on intensity and type of equipment, this may be a temporary impact. Based on proposed site preparation, undesirable vegetation would be indirectly impacted through the use of herbicides, and prescribed burning. Herbicides are selected and applied to ensure minimum impacts to non-target vegetation. Following the regulations in AR200-5 would ensure minimal indirect impacts. Thinning would enhance wildlife habitat by reducing stem density, creating open stand conditions, and providing optimum conditions for herbaceous vegetation.	Overall the shift to uneven aged management would result in less intense harvesting, site preparation, and planting of longleaf pine. Natural regeneration would result in little to no impact on vegetation communities. Less intense management would result in little collateral damage to trees remaining in stands, which would reduce susceptibility to southern pine beetle infestations. Following the mitigation measures as outlined in INRMP Appendix B11 would ensure minimal impacts from the use of herbicides for site preparation. Uneven aged management involves removal of single trees and the creation of smaller openings. This provides edge effect ecotones and increases in overall habitat diversity that indirectly benefits wildlife species. Thinning impacts would be the same as described in No-Action. Passive hardwood mgmt as proposed in this alternative would benefit wildlife species by providing hardmast producers and by improving habitat.
Species of concern	Proposed timber management would not affect the osprey, sweet pitcher plant and Georgia rockcress since their habitat is not managed for timber. The remaining species of concern are protected and monitored during timber management activities.	Same as No-Action. Additionally, the gopher tortoise and gopher frog habitat and populations would be less affected by reduced level of mechanical equipment and less use and/or construction of roads and trails.
Federally threatened and endangered species	Timber management would not affect the wood stork, bald eagle and American alligator since their habitat is not managed for timber. Known sites of the relict trillium are protected during timber harvesting. Adhering to the JBO and the 1994 Army Guidelines ensures that adequate forage and nesting habitat are provided prior to timber harvesting. For this reason there are no direct or indirect impacts to the RCW from timber management. Indirectly, timber management under this alternative may reduce the rate of RCW recovery in the long term because harvesting longleaf at rotational age	Same as No-Action for the wood stork, bald eagle, American alligator and relict trillium. The shift to uneven aged management would directly and indirectly benefit the RCW by providing higher quality habitat. Allowing longleaf pine to age indefinitely provides the optimal habitat for RCW. By maintaining a variety of ages of longleaf, nesting and foraging habitat would continually be in supply to sustain a growing RCW population. Since conversion to longleaf pine would also still occur under this alternative, the rate of RCW recovery would increase, or at the least remain steady, as additional longleaf

Table 5. Effects of Proposed Timber Management

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
Federally Threatened & Endangered Species (continued)	removes optimum RCW habitat (old longleaf pine). The intensive methods of harvesting and site preparation could have negative direct and indirect impacts on the longleaf pine community by eliminating seed sources and drastically altering the ecosystem. This potentially would also indirectly impact the RCW. Thinning, if combined with prescribed fire, would directly enhance RCW habitat by creating an open midstory and providing conditions favorable for an herbaceous understory.	was established and reached maturity. Thinning would occur under this alternative and would have the same impact as described in the No-Action alternative. The RCW populations would be best served by protecting existing off site pine habitat through judicious removal of single trees and thinning, and allowing for natural regeneration of longleaf. This would be a long term sustainable practice.
Water /Wetlands	Water quality may slightly, temporarily decrease as a result of sedimentation from intensive timber harvesting and site preparation activities that occur. See Soil Effects. Wetlands are avoided during timber management and would not be impacted by the proposed actions.	Less intense harvesting methods used in uneven age management would result in improved water quality since less soil would have the potential to move off-site. Relying on natural regeneration would also reduce possible sedimentation from artificial planting. Wetlands – Same as No-Action.
Soils	The use of high impact harvesting and site preparation methods would contribute to the potential short term soil movement off-site. Restocking of longleaf pine would require intensive site prep and more disturbance on site causing soil compaction and erosion.	Harvesting systems would shift to less impacting methods such as cut to length requiring less equipment, road construction, skid trails and landings. This would reduce soil erosion and compaction. Natural regeneration would minimize the ground disturbance associated with mechanical re-stocking efforts, thereby reducing soil impacts.
Air Quality	See Fire Effects table.	See Fire Effects table.
Noise	No effect	No effect
Land Use	Indirect, minor, negative impact to military mission from establishing pine plantations, which are off-limits to training.	Pine plantations may still be established, but in fewer numbers.
Roads	Potential for more direct impacts on existing roads from the increase in use to harvest timber. Additional roads/trails may be needed for access, log landings, and skid trails.	Fewer roads needed, use of less intense harvesting methods (cut-to-length) would result in decreases in compaction, erosion and loss of soil productivity associated with road construction, skid trails, maintenance and the use on these access routes.
Socio-economic	Timber volume would remain approximately the same as past years. Timber revenue would either remain steady, or slightly increase based on market trends.	The projection for state allocations is to increase due to the cost of running the timber program to decrease slightly. Employment will not be affected by the shift to single tree selection because

Table 5. Effects of Proposed Timber Management

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
	For the last three years, no proceeds have been available to give to the counties. Depending on market trends and volumes harvested, under this alternative some revenue may be generated to provide proceeds to the Counties.	marking stands is more labor intensive (Larrimore 2001). Timber volume may decrease over the long-term implementation of uneven-aged management. However, since the timber produced would be of a higher quality, revenue would remain approximately the same or potentially increase (Larrimore 2001).
Cultural Resources	Soil disturbance associated with timber management activities could directly impact archaeological resources. All potential impacts from proposed timber management activities to archaeological and cultural resources are mitigated by surveys prior to implementation and avoidance or consultation if any eligible sites are found.	Same as No Action.
Outdoor Recreation	The visual impacts resulting from clearcuts and intensive regeneration would dilute the recreation experience for hikers, hunters and others seeking a natural appearing environment in some areas. However, access to hunting areas would be more available as road and trails were developed in association with even aged timber management.	Improved visual environment through uneven age management, emphasis on natural regeneration. Fewer access routes but a higher quality of habitat diversity would tend to make not only greater number of game species available but also non-game species, for enjoyment of birdwatchers, and others seeking observation opportunities.
Hazardous material	May be more opportunity for increased release of oils or chemicals from intense mechanized harvesting and site preparation. This could potentially cause a negative, direct impact on natural resources.	Use of cut-to-length methods and natural regeneration would reduce mechanized equipment on the land, and create less potential for hazardous waste discharges.

4.2 Fire Management

All proposed fire management actions in both alternatives would follow applicable laws, regulations and procedures. These are outlined in the existing Fire Operational Plan and in Chapter 10 and Appendix B3, B6 and B7 of the INRMP, and are applicable to both alternatives. These measures were coordinated and developed in consultation with Federal, state and local entities utilizing best management practices and state of the art knowledge of the resource being addressed. Georgia Best Management Practices would be used to mitigate effects from soil disturbing actions such as establishing new firebreaks.

The potential impacts to all the resources described in Section 3.0 from implementing the Fire Management Program will be described in Table 6.

Table 6. Effects of Proposed Fire Management

Resources	Alternatives	
	No Action	**Balanced Ecosystem Mgmt**
Eco-Groups Vegetation Wildlife	Reduces levels of hazardous fuels. 250-300 acre size burn units with a total of 25000 acres burned each year Prescribed burning, when used to prepare sites for planting, directly and temporarily impacts vegetation that competes with pines. Burning also controls vegetative diseases such as brown spot and root rot. Increases park like appearance and early successional habitat for wildlife species. This is a short and long term benefit. Increases forage for game species such as deer, turkey, quail. This is a short and long term benefit. Maintains park like openings, favors plant community diversity, and increases numbers of flowering annuals and biennials.	Same as No Action, no significant difference in acreage burned. Prescribed burning effects are the same as No Action, but less opportunity for larger burns due to presence of smaller openings created through single tree selection. Same as No Action.
Species of Concern	The gopher tortoise, gopher frog, sweet pitcher plant and Indian olive are fire dependent species often associated with the long leaf pine wiregrass or the pine bluestem ecosystems. Prescribed burning on a regular basis enhances and maintains the habitat preferred by these species. Impacts to the osprey, Georgia rockcress, Croomia and Pickerings morning glory from prescribed burning, are minimal because fire is either not used in the habitat or a low intensity fire is backed into the habitat.	Same as No Action.
Federally Threatened &Endangered Species	Enhances and maintains habitat for fire dependent species such as the RCW. The other listed species such as the alligator, wood stork and relict trillium, are not noticeably affected since their habitat is not directly subjected to the burning program, or occurrences are mitigated by preventing fire from entering habitat or using a low intensity backing fire in the area of concern.	Achieves an increase in suitable RCW habitat by varying the season of burn to maintain the fire dependent ecosystem.
Soils	Prescribed burning exposes mineral soils allowing seedlings and other vegetation to become established. Minimal soil disturbance occurs from prescribe burning activities, which involves minor number of mechanical equipment to implement.	Same as No Action

Table 6. Effects of Proposed Fire Management

Resources	Alternatives	
	No Action	**Balanced Ecosystem Mgmt**
	Burns are timed to allow for maximum regeneration and stabilization of burned areas.	
Water/ Wetlands	Ponds and Streams may receive some runoff immediately after a burn and before re-growth is established, especially in any large clearcut areas. Following burn prescriptions as described in the existing Fire Operational Plan would minimize off-site soil movement resulting from prescribed fire.	Ponds, streams and ephemeral pools would see reduced amounts of sedimentation due to smaller areas being burned and the vegetation being more diverse. Following burn prescriptions as described in the INRMP Appendix B, would minimize off-site soil movement resulting from prescribed fire.
Air	Dormant season burning has minor, negative impacts on air quality. Growing season burns, however, occurring during the ozone season (May –Sept.) have potential to interfere with attainment status of the local region. Following parameters established in the existing Fire Operational Plan would ensure smoke dispersal, and minimize impacts to air quality.	Same as No Action, but improved coordination with local weather conditions and air quality objectives would decrease negative effects of burning. The increase in growing season burning could potentially have negative impacts on air quality. Following parameters established in the INRMP would ensure smoke dispersal, and minimize impacts to air quality. Fuel loads would also be kept down as 2-3 year prescribed burning rotation occurs producing less smoke.
Noise	Use of drip torches and other manual fire burning techniques would minimize noise usually associated with mechanical equipment such as helicopters. Noise associated with helicopters is a short-term, minor impact.	Same as No Action
Land Use	Burns can escape and damage nearby structures or other improvements and or result in more acreage burned than was originally planned. Creates a safer environment by reducing fuel loading, and increasing visibility in the forest.	Same as No Action. Dispersed burn units would tend to minimize proximity to private property and potential collateral damage.
Roads	More firebreaks may need to be constructed. Visibility on roads may be reduced due to smoke from fires.	Use of natural and existing boundaries for firebreaks would minimize construction of new firebreaks. Visibility on roads may be reduced due to smoke from fires.
Socio-Economics	No Effects	No Effects
Cultural Resources	Soil disturbance associated with firebreak construction may directly impact cultural resources. All potential impacts to cultural resources from proposed fire mgmt activities are mitigated by surveys prior to implementation, and avoidance or consultation if any eligible sites are found.	With fewer firebreaks being constructed, there would be less potential impacts to cultural resources. Mitigation is same as No Action alternative.

Table 6. Effects of Proposed Fire Management

Resources	Alternatives	
	No Action	**Balanced Ecosystem Mgmt**
Outdoor Recreation	Hunting opportunities would be increased since burning maintains and increases habitat for preferred game species as well as increasing forage for game species such as deer, turkey, quail. Improves accessibility to resources for hikers, hunters and birdwatchers. Temporary, negative impact to visual resources. Long term impact is favorable since fire maintains park like openings, favors plant community diversity and increases numbers and visibility of flowering annuals and biennials. These conditions are aesthetically pleasing to hikers, bird watchers and the general public. Visibility and ease of travel would be increased which provides easier access for hunters and hikers.	Same as No Action. Levels of burning would not significantly change. Same as No Action
Hazardous materials	Minimal short term, negative effects from small amounts of fuel associated with prescribed burning process.	Same as No Action. Use of prescribed fire during specific seasons to control undesirable species would result in less herbicide and chemicals introduced into the ecosystem.

4.3 Threatened and Endangered Species Management

The Threatened and Endangered Species Management Program focuses predominantly on surveying, monitoring, protecting, and studying these species. All of the proposed management for the Wood Stork and American Alligator in both alternatives is restricted to these types of actions and will therefore have no impact on the resources of Ft. Benning. Most of the proposed management for the Relict Trillium and Bald Eagle is also restricted to these types of actions. However, control of feral swine is proposed in the Balanced Ecosystem Alternative for the Relict Trillium. The potential impacts from this control are discussed in Table 9 (Pest Management). Proposed management in the Balanced Ecosystem Alternative for the Bald Eagle also includes within 1.5 kilometers of the Chattahoochee River creating large, dominant pine trees for nesting by selectively thinning around individual trees outside of the primary and secondary zones of protection. This thinning would be very selective and a limited number of trees would be removed to release existing pine trees, which creates exposure to more sunlight, and reduces competition for food and water. The potential impacts from similar proposed actions are discussed in Table 5 (Timber Management).

Implementing the 1996 Army RCW Management Guidelines as proposed in the Balanced Ecosystem Alternative would change what training activities are allowed within cluster sites, and how clusters are marked and monitored. Timber and fire management would remain the

same as described in the 1994 Guidelines, and as analyzed in Tables 5 (Timber) and 6 (Fire). Mitigations to minimize impacts from expanded training are specified in both the 1996 Guidelines (V.I.2 and 3) and the draft Fort Benning ESMP for RCW (IIIC, D and E). Studies and past experience have shown that expanded training has minimal impact on the RCW (Swiderek 2001). Rigorous monitoring will take place to ensure no impacts to RCW health and vigor occur as a result of expanded training activities. Potential impacts from expanded training are discussed in Table 7. The proposed changes to the marking and monitoring of cluster sites do not impact any of the resources analyzed in this EA. Adequate foraging for the RCW is still required and if a project causes available forage to go below the acceptable level, consultation with the US Fish and Wildlife Service would be initiated.

The impacts from management actions proposed for the RCW are discussed in Tables 5 (Timber), 6 (Fire), 9 (Pest Management) and in section 4.4 (Soil Conservation). Mitigations from these actions that are specific to the RCW are outlined in Section F. of the RCW Endangered Species Management Plan (Appendix B12 of the INRMP). Potential impacts from the proposed actions in the Balanced Ecosystem alternative of pinestraw raking and longleaf seed collection are mitigated as outlined in Section F. of the RCW Endangered Species Management Plan (Appendix B12 of the INRMP). Potential impacts from chemically controlling upland hardwoods are discussed in Table 9 (Pest Management). Potential impacts from the proposed mechanical control of upland hardwoods are discussed in Table 7. All of the sites proposed for hardwood control would undergo a site-specific, environmental review and documentation process.

If proposed management actions are implemented for threatened and endangered species management, the actions would follow applicable laws, regulations and procedures as outlined in either the existing operational plan or the RCW Endangered Species Management Plan (Appendix B12), and Chapter 10 of the INRMP. These measures were coordinated and developed in consultation with Federal, state and local entities utilizing state of the art knowledge of the resources being addressed.

Table 7. Effects of Proposed Threatened and Endangered Species Management

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
Eco-Groups Vegetation Wildlife	Vegetation management activities including controlling upland hardwoods would not have negative impacts on wildlife species. Decisions on controlling hardwoods are made on a site-by-site basis. Naturally occurring hardwood communities are retained (hillside seeps, transition zones, etc.). Some hardwoods are also retained (<10 basal area) in the upland sites. Enough hardwoods remain in other areas of Ft. Benning to provide the necessary wildlife support. Additionally, by removing hardwoods in the uplands and encouraging the herbaceous layer, a variety of food sources are supplied, not just hard and softmast. Controlling upland hardwoods restores the natural longleaf pine vegetation community. This is beneficial to many of the plants and animals that are components of the overall longleaf system.	Same as No Action. Enhancing bald eagle nesting opportunities by thinning around individual pine trees would have minimal impacts on vegetation and wildlife communities as a whole. The thinning would be limited in size and number of trees removed, and would potentially cause minor, short term, negative impacts at that specific site. The expanded training activities under the 1996 Army RCW Mgmt Guidelines would have minor, short and long term, negative impacts on vegetation and wildlife. The proposed hand digging within RCW clusters would directly and indirectly impact vegetation by removal, and by being buried under piles of removed dirt. The use of wheeled and tracked vehicles would also potentially directly impact vegetation in the short and

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
		long term by crushing and/or uprooting plants depending on the vehicle. Vehicle maintenance would also potentially cause similar impacts from crushing. Wildlife would be impacted by these three activities through a short-term, minor, reduction in forage.
Species of concern	Surveys for potential occurring species of concern would be conducted prior to forest management activities, and any sites found would be protected as feasible. The gopher frog occurs in a specific area on Ft. Benning, and all actions in the vicinity are evaluated for impacts on the gopher frog prior to implementation. The gopher tortoise would indirectly benefit from controlling upland hardwoods since controlling the hardwoods would open the stand and facilitate herbaceous ground cover growth. The gopher frog and gopher tortoise are species that are dependent on the longleaf pine community. Controlling upland hardwoods in longleaf pine stands contributes to restoring this ecosystem. Known Indian olive sites would be protected. Controlling upland hardwoods may directly impact individual species, but the population as a whole would not be threatened. No other species of concern would potentially be impacted by this action.	Same as No Action. Surveys for potential occurring species of concern would be conducted prior to selective thinning, and any sites found would be protected as feasible. The expanded training activities under the 1996 Army RCW Mgmt Guidelines would potentially impact the gopher tortoise and the Indian Olive. Hand digging, vehicle movement, and vehicle maintenance would potentially have direct, negative impacts to gopher tortoises if burrows were crushed or buried. If Indian Olive is present, these activities would also cause direct, negative impacts to the plants present. Any known burrows or populations of Indian Olive would be protected from expanded training activities. Other species of concern are not directly associated with RCW habitat and would therefore not be impacted. Noise associated with firing guns could potentially impact species of concern. None of the smoke generating activities would impact species of concern.
Federally threatened & endangered species	It is highly unlikely that any of the Federally listed species would be negatively impacted by hardwood control in upland areas. However, if a T&E species were thought to occur on the site, surveys would be conducted prior to hardwood control and any sites found would be protected. RCW clusters are off limits to vehicle traffic and many other kinds of training and are thus more protected than under the 1996 Army RCW management guidelines.	Same as No Action. It is highly unlikely that the selective thinning to create bald eagle nesting habitat would negatively impact any of the Federally listed species. The expanded training activities under the 1996 Army RCW Mgmt Guidelines would not directly impact any of the T&E species found on Fort Benning. Recent studies have shown that "measured levels of experimental noise from .50-caliber blank fire and artillery simulators did not affect RCW nesting success or productivity" (Delaney, et al 2000). However, there may be some impacts to the habitat within RCW clusters as some pine trees may be killed over time due to track vehicle operations and subsequent root/damage trunk. Rigorous monitoring would be conducted to ensure that the

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
		health of the RCW population was not impacted from expanded training activities.
Soils	The use of BMPs would prevent any impacts to soils during hardwood control and selective thinning.	Same as No Action. The use of BMPs would prevent any impacts to soils during selective thinning. The expanded training activities of hand digging and vehicle movement inside RCW clusters would potentially cause short and long term, negative impacts to soils through soil movement off-site. Areas should be filled as soon as possible which would also contribute to revegetation, both of which would reduce soil movement off site. The remaining training activities would have no impacts on soil.
Water Wetlands	The use of BMPs would prevent any sedimentation entering the streams and wetlands during forest management activities.	Same as No Action. The use of BMPs would prevent any sedimentation entering the streams and wetlands during selective thinning. As discussed above, soil movement off-site due to the expanded training activities under the 1996 Army RCW Mgmt Guidelines would potentially cause sedimentation into waterways and wetlands, causing short term, negative, indirect effects. If the mitigation measures are followed, these impacts should be minimized.
Air	No effect	No effect
Noise	No effect	The expanded firing allowed under the 1996 Army RCW Mgmt Guidelines would produce limited increases in noise. Use of vehicles should not cause an overall increase in noise, since the change in activity is proximity and not frequency of use.
Land Use	Limits training activities within RCW clusters, thus negatively impacting the military mission.	The expanded training activities under the 1996 Army RCW Mgmt Guidelines would provide additional training opportunities.
Roads	No effect	No effect
Socio-Economic	Controlling hardwoods provides opportunities for obtaining firewood for personal use (with a permit).	Same as No Action.
Cultural Resources	Soil disturbance associated with vegetation management activities could impact any cultural resources that are on-site. Protection measures that prevent impacts include surveys prior to implementation, and avoidance or consultation of any eligible sites found.	Same as No Action. Soil disturbance associated with selective thinning could impact any cultural resources that are on-site. Protection measures as described in the No Action alternative would be followed. The expanded training activities under the 1996 Army RCW Mgmt Guidelines

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
		would have similar potential to disturb cultural resource sites. Protection measures as described in the No Action alternative would be followed.
Outdoor Recreation	Controlling hardwoods creates an open stand that is easier to walk through, visually appealing, and conducive to longer distance shooting. The perception is that controlling hardwoods impacts wildlife populations, which in turn reduces hunting opportunities. This correlation has not been found to be true. On the contrary, game species population numbers are remaining steady, or increasing (Swiderek 2001).	Same as No Action. The expanded use of smoke generators under the 1996 Army RCW Mgmt Guidelines would potentially negatively impact the outdoor recreation experience from drifting smoke. However, this impact would be short in duration.
Hazardous materials	No effect	No effect

4.4 Soil Conservation Management

The Soil Conservation Program as proposed in both alternatives, is a preventative program – providing technical support, and ensuring compliance with laws and regulations – and a corrective program – restoring degraded sites within RCW clusters, and managing borrow areas for proper siting and restoration/rehabilitation. Actual on the ground actions associated with the Soil Conservation Program are limited. If these actions are implemented, all proposed soil conservation management actions would follow applicable laws, regulations and procedures as outlined in Chapter 10 and Appendix B4 of the INRMP. When sites are restored, Georgia Best Management Practices, as well as cultural resource best management practices, would be used to minimize additional impacts and mitigate any impacts that may occur.

Overall the Soil Conservation Program would have minor impacts to resources on Ft. Benning. Most impacts would be beneficial. By treating upland sites that are eroding, water quality is indirectly improved. By minimizing soil loss, restoring sites that are losing soil, and protecting areas that currently have no soil loss problems, the Program works to preserve the basic foundation of all the natural resources. This indirectly sustains the military mission by reducing hazards, improving water quality, and enhancing habitat.

4.5 Game and Sport Fish Management

All proposed game and sport fish management would follow applicable laws, regulations and procedures as outlined in Chapter 10 and Appendix B10 of the INRMP. These measures were coordinated and developed in consultation with Federal, state and local entities utilizing best management practices and state of the art knowledge of the resource being addressed. Georgia Best Management Practices would be used to mitigate effects from a large majority of the proposed actions, including but not limited to, establishing wildlife openings, maintaining existing openings by mowing and disking, disking strips through longleaf stands, road maintenance and repair, thinning, and establishing hiking trails.

Impacts from the proposed prescribed burning to benefit wildlife species are discussed in Table 6. Impacts from the proposed thinning are discussed in Table 5. Establishing Management Emphasis Areas would also involve unique burning and timber harvesting activities in specific areas.

The potential impacts to all the resources described in Section 3.0 from implementing the Game and Sport Fish Management Program will be described in Table 8.

Table 8. Effects of Proposed Game and Sport Fish Management

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
Eco-Groups Vegetation Wildlife	Wildlife openings would indirectly benefit additional species other than targeted game species. Proposed weed control would follow all applicable laws, regulations and guidelines as discussed in Section 4.7. Controlling undesirable weeds would indirectly benefit native vegetation communities. Since beaver control is limited in occurrence and only done in specific cases of severe damage, the overall population would not be impacted. Liming and fertilizing ponds increases the productivity of the pond, thereby increasing the amount of fish it can support. This not only directly benefits fish populations, but also provides increased food for wildlife that feed on fish. The pond water is also darker which reduces undesirable vegetation and reduces the amount of herbicide needed to control aquatic weeds. Developing fish structures directly benefits fish populations by improving spawning areas.	Game populations are not favored to the detriment of non- game species and native plant communities. Strip disking would indirectly benefit additional species other than just the targeted game species. Establishing Management Emphasis Areas for deer and quail would directly benefit associated plant and animal communities by more intensive burning and thinning. Proposed weed control – effects same as no-action. Beaver control – same as no-action. An increase in the number of ponds to be limed and fertilized would increase the beneficial direct impacts discussed in the no-action alternative. Since native fish are used to stock ponds, there will be no impact from this action. Deer and turkey populations would stay at current levels
Species of Concern	Some of the species may indirectly benefit from proposed prescribed fire and thinning. Indirectly, repairing and maintaining roads will decrease sedimentation and benefit these species. Liming and fertilizing ponds increases the productivity of the pond, thereby increasing the amount of fish it can support. This also directly benefits the Osprey since it feeds on fish. Since no wildlife openings will be established within the boundaries of Unique Ecological Areas, the species found within these areas will be protected.	Same as No Action. Additionally, implementation of game management with an ecosystem focus would increase populations of associated species.
Federally Threatened & Endangered Species	None of the proposed actions would negatively impact threatened and endangered species. The Bald eagle, wood stork and American alligator may indirectly benefit from increased fish populations in ponds that are	Same as No-Action. Relict trillium would indirectly benefit from the extended hunting season for feral swine. See Table 4.7 for more details on feral swine impacts to relict trillium.

Table 8. Effects of Proposed Game and Sport Fish Management

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
	limed and fertilized. This benefit may be low since eagles prefer larger water bodies, and wood storks are rare at Ft. Benning. Since no wildlife openings will be established within the boundaries of Unique Ecological Areas, the species found within these areas will not be impacted. RCW would directly benefit from careful thinning and prescribed burning.	
Water-Wetlands	Liming and fertilizing ponds increases the productivity. This has no lasting negative impacts on the water or wetlands. Controlling beavers is done on a limited, case-by-case basis and only where damage is being done. Since there are enough remaining beavers, and a plethora of wetlands, eliminating limited number of beaver has no impact on wetlands. Proposed weed control would follow all applicable laws, regulations and guidelines as discussed in Section 4.7, and would not have any undesirable effect on water or wetlands. Controlling the undesirable weeds would benefit wetland communities.	Liming and fertilizing additional ponds would still have the same effect as the no-action alternative. Weed control – Same as No-Action. Same as No-Action
Air	No effect.	No effect.
Noise	No effect.	No effect.
Land Use	No effect.	No effect.
Roads	Since no management is proposed, continued degradation of roads would occur. This may lead to sedimentation problems indirectly impacting adjacent wetlands and streams.	Road maintenance and repair is proposed, which would directly benefit the condition of roads and would indirectly minimize sedimentation problems.
Socio-Economic	No effect.	An increased consideration for hunting access by National Guardsman and Reservists residing in Georgia and Alabama would potentially bring in additional monies for the surrounding cities and counties, and an increase in total permit fees collected.
Cultural Resources	Soil disturbance associated with any habitat improvement could potentially indirectly impact cultural resources. All potential impacts would be mitigated by surveys prior to implementation and avoidance or consultation if any eligible sites are found.	Same as No Action
Outdoor Recreation	Existing hunting and fishing program would continue. Limited outdoor recreation opportunities, such as trails and bird watching, would	Increase in hunting opportunities of feral swine to reduce their impacts on relict trillium habitat and other species. Potential increase in hunting access by

Table 8. Effects of Proposed Game and Sport Fish Management

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
	continue. Liming and fertilizing ponds increases fish populations and also opportunities to catch fish.	National Guardsman and Reservists residing in Georgia and Alabama. Emphasis towards increasing number of hunting opportunities by providing for increased plantings, more diversity in habitats, potential for handicap hunts, and establishment of special Management Emphasis Areas. Potential expansion of support facilities such as picnic areas, grills, boat ramps and piers would expand outdoor recreation opportunities. Developing hiking trails and campgrounds would also provide increased opportunities for outdoor recreation.
Hazardous materials	No effect.	No effect.

4.6 Non-Game Species Management

The Non-Game species Management Program as proposed in both alternatives would focus around monitoring, protecting, studying, and developing plans for these species. By default, many of these species benefit from other management actions associated with the timber and fire programs. Ground impacting actions are limited to management for bluebirds and the gopher tortoise. Erecting bluebird boxes has minimal negative impacts on any other resource. Managing for gopher tortoises includes thinning, planting trees, controlling hardwoods and soil erosion, and prescribed burning. Impacts from these actions have been previously discussed in Tables 5 (Timber), 6 (Fire), 9 (Pest) and in section 4.4 (Soil Conservation). Since this Program has negligible impacts to resources on Ft. Benning, or any potential impacts are discussed in other sections, no table is needed to display effects.

4.7 Pest Management

All proposed pest management in both the No action and Balanced Ecosystem alternatives would follow applicable laws, regulations, and procedures, including DoDI 4715.3 and AR 200-5. These are specifically stated in INRMP Appendix B11. This includes the application, handling, storage and disposal procedures, as well as guidelines on how to handle spills, the human and safety aspect of using herbicides, and personnel training, certification and record keeping.

When insect and disease infested trees are removed, Best Management Practices would be followed.

Overall, developing and implementing a comprehensive integrated pest management plan, as proposed in the Balanced Ecosystem Management alternative, would be beneficial to all resources on Fort Benning.

Table 9. Effects of Proposed Pest Management

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
Eco-Groups Vegetation Wildlife	Targeted vegetation such as kudzu and other undesirable species are directly impacted by herbicide application. Herbicides used are target specific, or applied in such a way as to only eliminate the undesirable species. A certified applicator will follow all label specifications so that no wildlife, other than targeted species, will be impacted from pesticide application. Treatment of insect and disease tree infestations indirectly impacts some un-infested trees because they must be removed as buffer. However, in the long term, fewer trees are lost if buffers are established. Lack of a feral swine control program would result in competition for food with native wildlife species.	Same as No Action for vegetation. Proposed trapping to handle feral swine and other nuisance vertebrate species, may indirectly impact other wildlife that inadvertently get trapped. But the reduction in feral swine and associated competition is beneficial. Traps will be monitored to release animals other than the targeted species.
Species of Concern	Lack of control of feral swine may result in direct, negative impacts to immature gopher tortoises and other species of concern because the pigs diet would include them.	Same as No Action.
Federally Threatened and Endangered Species	Fencing out feral swine is directly beneficial to the relict trillium. Control of insect and disease infested pine trees is indirectly beneficial to RCW, bald eagle and wood stork to maintain and protect habitat.	Same as No Action
Soils	Lack of a concentrated, organized effort to control feral swine can indirectly impact soils due to the rooting behavior of these pigs, which can disturb soil and remove vegetation. When disease and bug infested timber is removed, all BMPs are followed, mitigating any potential impacts.	Control of feral swine will be indirectly beneficial to soil since the pigs are excessive rooters of soil.
Water-Wetlands	If all label directions and BMPs are followed, no impacts to water or wetlands would occur as a result of proposed herbicide use or harvesting disease and bug infested trees.	Same as No Action. Increasing aquatic weed control would indirectly benefit water and wetlands by restoring the system back to balance.
Air	No effect	No effect
Noise	No effect	No effect
Land Use	No effect	No effect
Roads	No effect	No effect
Socio-economic	No effect	No effect

Table 9. Effects of Proposed Pest Management

Resources	Alternatives	
	No-Action	**Balanced Ecosystem Mgmt**
Cultural Resources	When disease infested timber is removed all BMPs are followed, and surveys conducted to prevent and mitigate impacts to cultural resources.	Same as No Action. Control of feral swine would lessen impacts to archaeological sites from excessive rooting which causes soil disturbance.
Outdoor Recreation	Maintenance of the golf course through pest management is a positive benefit for outdoor recreation. Hunting feral swine would increase game opportunities for hunters.	Same as No Action.
Hazardous materials	Methods of handling, storing, applying, and cleaning up spills are all specified in AR 200-5. If these are followed, no impacts would result.	Methods of handling, storing, applying, and cleaning up spills are all specified in Appendix B11 in INRMP. If these are followed, no impacts would result.

4.8 Cultural Resource Management

The effects of Cultural Resource management on the resources of Fort Benning are addressed in other preceding tables. Cultural Resource management activities proposed in these alternatives would typically be associated with the preservation, protection, avoidance and sometimes excavation of discovered or known sites. Fort Benning consults with state, Federal and Tribal representatives to identify, protect when feasible, or mitigate negative impacts to cultural resources. All Best Management Practices associated with soil disturbing or other land use activities would be followed, along with the guidelines for soil conservation outlined in Chapter 10 and Appendix B4 of the INRMP, when surveys and excavations would be conducted. The potential impacts to other resources from cultural resource management are benficial. For this reason, an additional table is not needed to display effects.

4.9 Cumulative impacts

4.9.1 Region of Influence (ROI)

The overall ROI for the purposes of this EA consists of the cities of Fort Benning and Columbus, GA, and Phenix City, AL, as well as the counties immediately surrounding and adjacent to these cities.

4.9.2 Past, Present, and Reasonably Foreseeable Projects Within the ROI

The land comprising the ROI for this action has a rich and diverse history. Prior to the southwestern migration of European settlers in the early 19th century, the land now comprising Fort Benning and Columbus, GA, and Phenix City, AL, was home to the Muscogee peoples, often referred to as "Creeks" by the European settlers. Several major villages were located along the shores of the Chattahoochee River, with the major points of gathering occurring at Kasita Town on the Georgia side and Yuchi Town on the Alabama side (for more information,

refer to INRMP Chapter 2). Settlement of an agricultural and rural nature began in the 1790s, subsequently resulting in the urbanization of the area and the formation of the city of Columbus (Kane and Keeton, 1998). For a more detailed discussion of the history of Fort Benning, refer to INRMP Chapter 2 .

The city of Columbus, GA, was officially founded in 1828. At the conjunction of a series of waterfalls and shoals, it was a natural port and harbor for steamboats traveling along the Chattahoochee River and had been consistently growing as a viable community since the arrival of the European settlers and their agricultural practices a century earlier. For the same reasons, Phenix City, AL, began to simultaneously coalesce on the opposite side of the Chattahoochee River, with both cities attaining prosperity through the commerce provided through steamboat transportation of people and goods.

The adjacent cities of Columbus, GA, and Phenix City, AL, also experienced great growth during this time period and have continued to develop through to the present. Both are the sites of numerous residential developments, commercial/retail facilities, industrial activities, and recreational opportunities. Reasonably foreseeable future actions in the ROI are separated by city and are discussed below.

4.9.3 Reasonably Foreseeable Future Actions in the Fort Benning Community

There are several construction projects planned for implementation on Fort Benning proper during the five year planning period that is covered by the No-Action and Balanced Ecosystem Management alternatives. Some of the projects have been previously identified in the Installation's 2018 master plan and have been preliminarily assessed for environmental impacts via the REC process; however, each project is still pending final approval and subsequent compliance with NEPA. A copy of the 2018 plan and all applicable approved and/or pending RECS are available for review in the Real Property/Master Planning (RPMP) office of the Directorate Facilities, Engineering and Logistics (DFEL). The projects listed below are those determined to have the greatest potential to impact the ROI.

- Barracks Replacement, Kelley Hill, Phase III (scheduled for funding in FY01-02) – Work would consist of the demolition of existing buildings (9043, 9046, 9047, 9053, 9054, 9055, 9057, 9058, and 9074), the construction of new facilities, and landscaping around the new facilities in the Kelley Hill area of Fort Benning.

- Combined Club Facility (FY undetermined) – Work would consist of the demolition of the existing Follow Me Golf Course Clubhouse, construction of a new clubhouse to contain the combined functions of the Golf Course Club and Officer's Club, and the redevelopment of the existing Follow Me Golf Course.

- New Post Exchange (AAFES) (FY undetermined) – Work would consist of constructing a new AAFES on the land across the street from the existing AAFES on Custer Road, Main Post, Fort Benning. The old AAFES would be abandoned and reutilized in another format; it is not scheduled for demolition at this time. Work would additionally consist of landscaping and parking lot construction.

- Multi-Purpose Range Complex (MPRC) (scheduled for funding in FY03-04) – Work would consist of the reconstruction/redevelopment of several undetermined ranges in the Kilo compartments of Fort Benning in order to enhance training opportunities and mission efficiency for the 3rd Brigade/3rd Infantry.

- North/South Maneuver Corridors (FY undetermined) – Work would consist of the development of two corridors in the north and three corridors in the south for the maneuvering of tracked vehicles and training utilization by the 3rd Brigade/3rd Infantry

of Fort Benning. The areas proposed for this development are the Oscar compartments in the north and the Echo and Juliet compartments in the south.

- National Infantry Museum (FY undetermined) – Work would consist of constructing a new infantry museum on the land lying between South Lumpkin and Fort Benning roads on the Installation's border with the City of Columbus. The existing museum, located on Baltzell Avenue, Main Post, Fort Benning, would be reutilized in another manner, but would not be demolished.

- Privatization of the Wastewater Treatment System (FY undetermined) – The wastewater treatment system at Fort Benning, which consist of two facilities and a network of underground piping, would be privatized within the next one to two years. The contract for the system would include the day-to-day upkeep of the system and would require the contractor to abide by all Federal, state, and Installation policies and guidelines.

Other actions on Fort Benning, such as road and tank trail maintenance, range and building maintenance, building renovations, unit motor pool maintenance, troop training, and routine airfield activities, would continue in an ongoing manner on an annual basis. These projects/actions are assessed for potential environmental impacts on a case-by-case basis via the REC process.

4.9.4 Reasonably Foreseeable Future Actions in the Columbus-Phenix City Community

Interviews with Richard Bishop, Deputy City Manager for the City of Columbus and Greg Glass, City Planner for the City of Phenix City helped to document the pending construction and transportation system improvement projects proposed for the Columbus-Phenix City area during the same time frame as the alternatives analyzed in this EA. The projects listed below are those determined to have the greatest potential to impact the ROI. Other projects were identified through these interviews and the review of relevant city planning documentation; however, they were analyzed and determined to not have the potential to contribute to cumulative impacts in the ROI. The projects identified, but not included for study in this document, may be viewed in the Columbus-Phenix City Transportation Improvement Plan, which is available for review at the DPW. Reviews of the planning documents for these cities and for the Georgia Department of Transportation (DOT) resulted in a comprehensive projected vision for the area, which is defined in further detail below.

- Oxbow Meadows and Marina, Lumpkin Road, Columbus, GA (FY undetermined), – Work would consist of the further development of the Oxbow Meadows Environmental Learning Center by creating additional outdoor classrooms, a series of walking trails, a series of hiking trails, and pavilion, and the construction (to include dredge and fill) of a 350-slip capacity marina.

- Phenix City Riverwalk Phase II, Phenix City, AL (scheduled for funding in FY01) – Work would consist of the construction of a hiking/biking trail between the 13th and 14th Street bridges in Phenix City.

- Alternative Transportation System, Phase II, North Riverwalk, Columbus, GA (scheduled for funding in FY01) – Work would consist of continuing to construct the hiking/biking trail (Riverwalk) northward along the Chattahoochee River from 12th Street to 14th Street. This will link the two existing phases of the Riverwalk.

- Improvements to Interchange at I-185/US 280, Columbus, GA (scheduled for funding in FY01) – Work would consist of reconstructing the interchange at I-185 and US 280.

- Safety Improvements to US 280, Columbus, GA (scheduled for funding in FY02-03) – Work would consist of removing and replacing guard rails and possibly installing medians, for safety purposes, along 10.5 miles of US 280, which runs along the border of Fort Benning.

- Widening/Improvements to Buena Vista Road, Columbus, GA (scheduled for funding in FY01) – Work would consist of widening and reconstructing 1.15 miles of an existing two (2) and four (4) lane road to a four (4) through-lane system with turn lanes and medians, as required.

- Widening/Improvements to St. Mary's Road, Columbus, GA (FY01) – Work would consist of widening 0.71 miles of a two (2) lane road to a three (3) and four (4) lane system with intersection improvements as needed.

Several other road maintenance/transportation improvements projects are proposed for Columbus and Phenix City; however, these projects were deemed to be minor in both scale and impact and are therefore not discussed in detail in this document. These proposed transportation improvements might be reviewed in the 2001-2003 copy of the Columbus-Phenix City Transportation Improvement Plan, which is available for review at the DPW. In addition, it can be assumed that residential and commercial development would continue in the Columbus-Phenix City area.

4.9.5 Tri-State Water Compact

Another issue of concern with the potential to affect the ROI is the Tri-State Water Compact, a disagreement between Georgia, Alabama, and Florida concerning withdrawals of water for public usage from the Chattahoochee-Flint-Apalachicola river systems. Although the calculations, formulas, and terms for withdrawal are still being debated at this time, a Draft Environmental Impact Statement (DEIS) was published in 1998 and is available for review at http://www.sam.usace.army.mil/pd/actacfeis/acf-draft.htm.

The DEIS proposes that a Federal commissioner would review the proposals for water withdrawals and usages and all alternatives that have been developed via the study by the U.S. Army Corps of Engineers to reach a decision on whether to concur or not concur with each states' proposed water allocation. No decisions have been made as of this date. This action does possess the potential to affect the water resources available from and to the Chattahoochee River and its associated creeks and streams in the ROI.

4.9.6 Cumulative impacts from implementation of No-Action Alternative

Cumulative impacts may result from the ongoing training mission at Ft. Benning in combination with proposed timber harvesting and prescribed fire in the No-Action alternative. However, mitigation measures such as use of Best Management Practices during timber harvesting and other soil disturbing actions would ameliorate any impacts of these actions in combination with training. Additionally, the Integrated Training Area Management rehabilitates, restores and monitors the condition of training lands such that if land becomes degraded it is attended to.

The use of prescribed fire in this alternative would potentially contribute to the cumulative impacts on air quality in combination with prescribed fire used off the installation on commercial forestland, agriculture land and personal property. Dormant season burning has little impact on air quality. Growing season burns, however, occurring during the ozone season (May –Sept.) have potential to interfere with attainment status of the local region. Following parameters established in the INRMP would ensure smoke dispersal, and minimize impacts to air quality. Fuel loads would also be kept down as 2-3 year prescribed burning rotation occurs producing less smoke.

Even-aged management of the forest on Ft. Benning would potentially contribute to cumulative impacts when combined with commercial timber harvesting off-post. However, mitigation measures such as use of Best Management Practices during timber harvesting and other soil disturbing actions would ameliorate impacts from timber management on Ft. Benning. Additionally, commercial forestland must also adhere to BMPs.

4.9.7 Cumulative impacts from implementation of the Balanced Ecosystem Alternative

Generally, the cumulative impacts discussed in the No-Action alternative are applicable to this alternative also. The amount of acres burned would stay relatively the same, however, there would potentially be an increase in growing season burning, which would impact air quality when combined with off-post burning. With the increase in growing season burns, however, improved coordination with local weather conditions and air quality objectives of the region would be considered when planning the burns.

The long-term shift to uneven aged management of the forest would decrease any cumulative impacts from timber harvesting since the overall volume of timber would decrease. While this shift will take many years, the use of BMPs during the interim will minimize cumulative impacts to the resources.

5.0 Persons Consulted / Preparers

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Gary Davis, Outdoor Recreation Planner, White Mountain National Forest

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