RCS 99-144

EGLIN AIR FORCE BASE
Florida

RANGE ROADS

FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

DECEMBER 2002

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FINDING OF NO SIGNIFICANT IMPACT

FOR

Range Roads Maintenance and Closure Plans at Eglin AFB

RCS 99-144

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 Code of Federal Regulations 1500-1508), 32 Code of Federal Regulations 989 (Environmental Impact Analysis Process), and Department of Defense Directive 6050.1, the Department of the Air Force has conducted an Environmental Assessment (EA) of the probable environmental consequences associated with maintenance and/or closure of Range Roads at Eglin Air Force Base (AFB).

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The **Proposed Action,** which is also the **Preferred Alternative,** is for Eglin AFB to establish a formalized Range Road Management Program to guide the repair and maintenance of existing roads. Under the Preferred Alternative, Eglin AFB would also undertake the systematic closure of range roads deemed non-critical to the Military Test and Training, Emergency Response, and Natural Resources missions. The ultimate goal of this process would be to ensure that Eglin range roads are adequate to meet the multi-use mission requirements. It would further provide the forum wherein road-related issues are elevated for timely resolution. Finally, it would ensure that range roads are brought up to, and maintained to the necessary standard to support the diverse missions in a cost effective and environmentally sound manner.

No Action Alternative: The No Action Alternative is to continue to operate the current Range Road System "as is" (i.e., without a comprehensive oversight and planning process) and continue to apply current maintenance procedures. Maintenance activities would consist of ineffective "quick-fix" repairs, and include grading, resurfacing, filling holes, and repairing washouts. Systematic road closures would not be initiated under this alternative, although range road closures would continue to be initiated on an opportunistic basis, without analysis of the cumulative impacts to the range transportation system.

Alternative Action: Like the Preferred Alterative, this alternative would establish a formalized range road oversight process to ensure that issues related to the Range Road System are addressed at the highest possible organizational level. Like the No Action Alternative, this alternative would continue to initiate range road closures on an opportunistic basis, without analysis of the cumulative impacts to the range transportation system; however, this alternative would also implement specific design and maintenance standards and best management practices (BMPs) to use on range roads in order to minimize adverse environmental impacts.

SUMMARY OF THE ANTICIPATED ENVIRONMENTAL EFFECTS

The primary focus of the Environmental Assessment was to address subject areas with the greatest likelihood for potential environmental impacts. In each case, through analysis of available data and empirical and sampling/analysis experience, it was determined that selection of the Preferred Alternative would not result in significant impacts. The study areas included:

- ***Habitat Alteration*** caused by erosion/sedimentation from unpaved roads; invasion by non-native or exotic plant species that dominate and disperse along roadsides; habitat fragmentation resulting from the high levels of roads (i.e., road density); and degradation of air quality (from the generation of combustive emissions from internal combustion engines and fugitive emissions from vehicles traveling over unpaved roads).

- ***Noise*** from vehicle engines, generated during routine traffic on the Range or during road maintenance activities.

- ***Direct Physical Impacts*** as a result of collisions between vehicles and wildlife (i.e., roadkills); disturbance to cultural resource sites from maintenance/construction activities; from the accidental release of hazardous materials (primarily fuels) or from subsequent cleanup activities; and from illegal activities such as poaching or looting/vandalism at cultural sites easily accessed by roads.

The Preferred Alternative is designed to ensure that Eglin range roads are adequate to meet the multi-use test and training and natural resources mission requirements. This strategy emphasizes closing unneeded roads, reconstructing roads to environmental and safety standards, and building roads only where needed to meet management objectives or mission needs. The ultimate goal is to begin reversing adverse ecological impacts associated with current roads and providing reasonable access while protecting ecological resources. This management strategy would also provide the forum wherein road-related issues are elevated to the highest possible level for timely resolution.

Potential environmental benefits associated with the Preferred Alternative over the No Action Alternative include positive effects to water quality, sensitive habitats, threatened and endangered species, and cultural resources. These positive effects are tied primarily to improved maintenance practices that minimize erosion and sedimentation and increased closures of roads that pose ecological damage and facilitate human access. (Note: The Preferred Alternative would result in the closure of 58 to 85 percent of the approximately 2,270 miles of smaller roads and trails on Eglin in order to achieve more desirable road density levels on the Range.)

Effects on recreation use are more ambiguous. Higher rates of road closures would reduce some types of access (e.g., dog hunters) compared to the No Action Alternative; however, better maintenance practices could result in improving access to some areas of the Range. Additionally, both closures and better maintenance would be likely to improve the environmental quality of the recreational setting, providing benefits to users. Access for natural resources management, law enforcement, and safety would not be affected.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and the environmental analysis contained in the attached EA and as summarized above, I find the proposed action to establish a formalized Range Road Management Program to guide road repair and maintenance; will not have a significant impact on the human environment. Therefore, an environmental impact statement is not required and will not be prepared by the Air Force.

8 Apr 04
DATE

FRANCIS L. HENDRICKS, Col, USAF
Commander

RANGE ROADS

FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

Prepared for:

AAC
46 TW/XPE
Range Environmental Planning Office
Eglin Air Force Base, FL 32542-6808

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LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

46TW	46th Test Wing
46TW/TS	46th Test Wing, Technical Support
46TW/TSR	46th Test Wing, Technical Directorate
796CES	796th Civil Engineering Squadron
96ABW	96th Air Base Wing
96CEG	96th Civil Engineer Group
AAC	Air Armament Center
AAC/EM	Air Armament Center Environmental Management Directorate
AAC/EMH	Cultural Resources Division, Environmental Management Directorate
AAC/EMSN	Natural Resources Branch, Stewardship Division of Environmental Management Directorate
ADT	Average Daily Traffic
AFB	Air Force Base
BMP	Best Management Practices
CY	Calendar Year
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CWA	Clean Water Act
dBA	Decibels – A-Weighted
DoD	Department of Defense
DOT	Department of Transportation
EMU	Ecological Monitoring Units
FE	Federally Endangered
FFWCC	Florida Fish and Wildlife Conservation Commission
FGFWFC	Florida Game and Fresh Water Fish Commission (now the Florida Fish and Wildlife Conservation Commission)
FHWA	Federal Highway Administration
FNAI	Florida Natural Areas Inventories
FT	Federally Threatened
GIS	Geographic Information System
HC	Hydrocarbons
Hwy	Highway
JP-8	Jet Fuel
L_{dn}	Day-Night Average Sound levels
$L_{eq\ 1\text{-}HR}$	One-hour Equivalent Noise Level
MEA	Management Emphasis Area
mg/m^3	Milligrams per Cubic Meter
MGE	Modular GIS Environment
MRTFB	Major Range and Test Facility Base
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NTU	Nephelometric Turbidity Units
O_3	Ozone
Pb	Lead
PEA	Programmatic Environmental Assessments
PIT	Process Improvement Team
PM_{10}	Particulate Matter Less than 10 microns in Diameter
ppm	Parts per Million
RC3	Range Configuration Control Committee
RCW	Red-cockaded Woodpecker
RDESC	Range Development Executive Steering Committee
ROI	Region of Influence
RR	Range Road
RRWG	Range Road Working Group

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS CONT'D

SA	Species Federally Listed Due to Similarity of Appearance to the American Crocodile
SC	Federal Species of Concern
SE	State Endangered
SHPO	State Historic Preservation Office
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
SR	State Road
SSC	Species of Special Concern
ST	State Threatened
T&E	Threatened and Endangered Species
μ/m^3	Micrograms per Cubic Meter
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compounds

1. PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The Eglin Military Complex is a Department of Defense (DoD) Major Range Test Facility Base (MRTFB) that exists to support the DoD mission (Figure 1-1). Its primary function is to support research, development, tests, and evaluation of conventional weapons and electronic systems. Its secondary function is to support training of operational units. The range is composed of four components:

1) Test Areas/Sites (Figure 1-2)
2) Interstitial Areas (areas beyond and between the test areas)
3) The Eglin Gulf Test Range
4) Airspace (over land and water)

The Air Force Air Armament Center (AAC) has responsibility for the Eglin Military Complex and for all its users, which include DoD, other government agencies, foreign countries, and private companies. For all operations associated with the Eglin Range, AAC provides environmental analyses and necessary National Environmental Policy Act (NEPA) documentation to ensure compliance with Air Force policy and applicable federal, state, and local environmental laws and regulations.

AAC at Eglin includes two wings and four directorates that collectively operate, manage, and support all activities on the Eglin Military Complex. AAC accomplishes its range operations through the 46th Test Wing (46TW) with support from the 96th Air Base Wing (96ABW). The 46TW Commander is responsible for day-to-day scheduling, executing, and maintaining of this national asset. The continued DoD utilization of the Eglin Military Complex requires flexible and unencumbered access to land ranges and airspace, which support all of Eglin's operations. Eglin controls airspace overlying 127,868 square miles (mi^2), of which 2.5 percent (3,226 mi^2) is over land and 97.5 percent (124,642 mi^2) is over water as shown in Figure 1-1.

1.2 HISTORIC OVERVIEW

On 14 June 1935, Eglin AFB was established as the Valparaiso Bombing and Gunnery Range. The installation was re-designated as Eglin Field on 4 August 1937. On 20 June 1941, 340,890 acres of the Choctawhatchee National Forest were transferred to the War Department for the development of the Army Air Corps Proving Ground. During World War II, Eglin AFB grew to become a Major Command, responsible for testing aircraft, weapons, and equipment (U.S. Air Force, 2001). As the mission at Eglin shifted from that of a bombing range to that of a center for the development and testing of weapon systems, more of the forestland was cleared. By 1949, 32,000 acres of the forest had been cleared for range development, as well as for the construction of the main base and auxiliary fields. Another 3,550 acres were cleared for construction of roads and power lines.

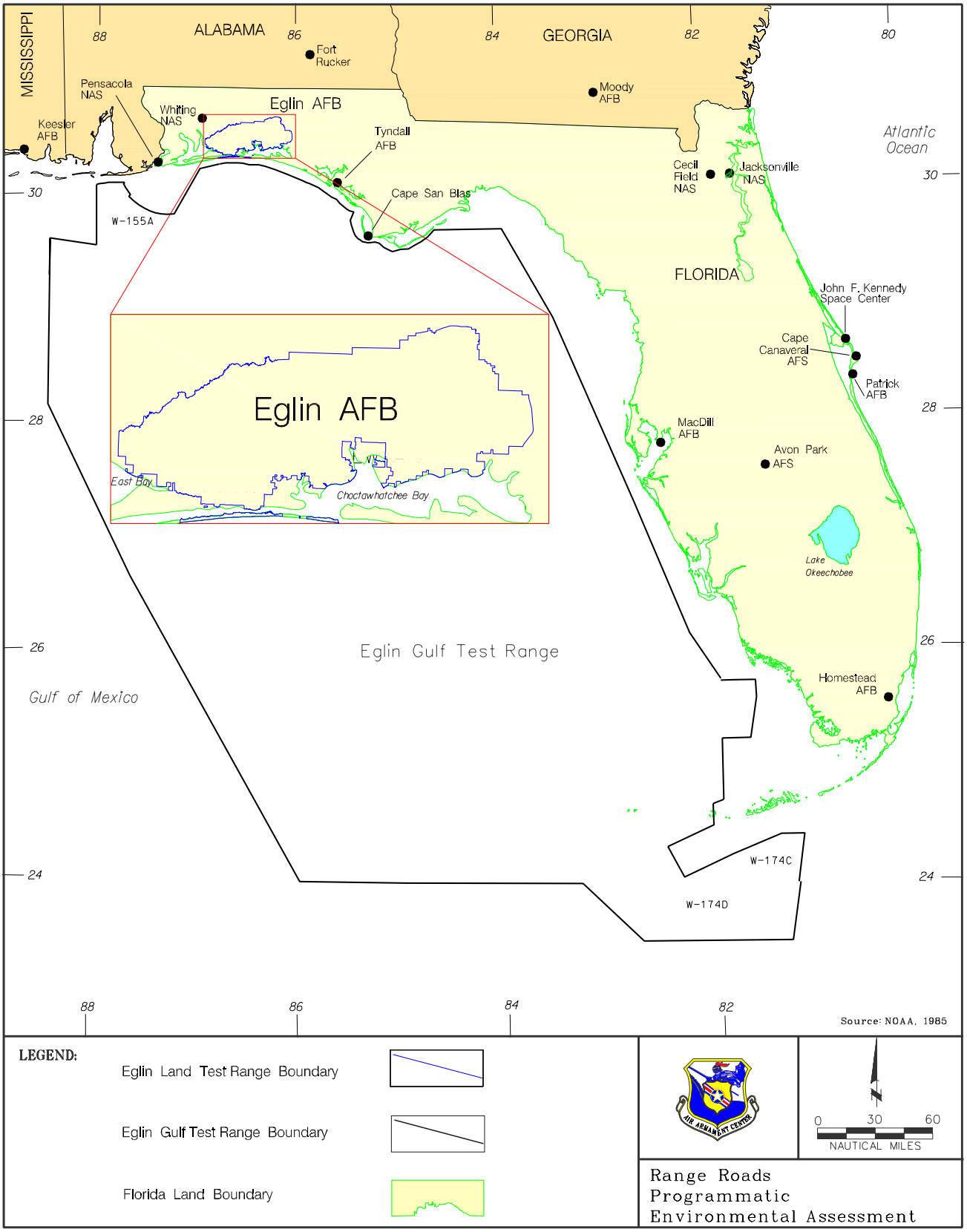

Figure 1-1. The Eglin Military Complex

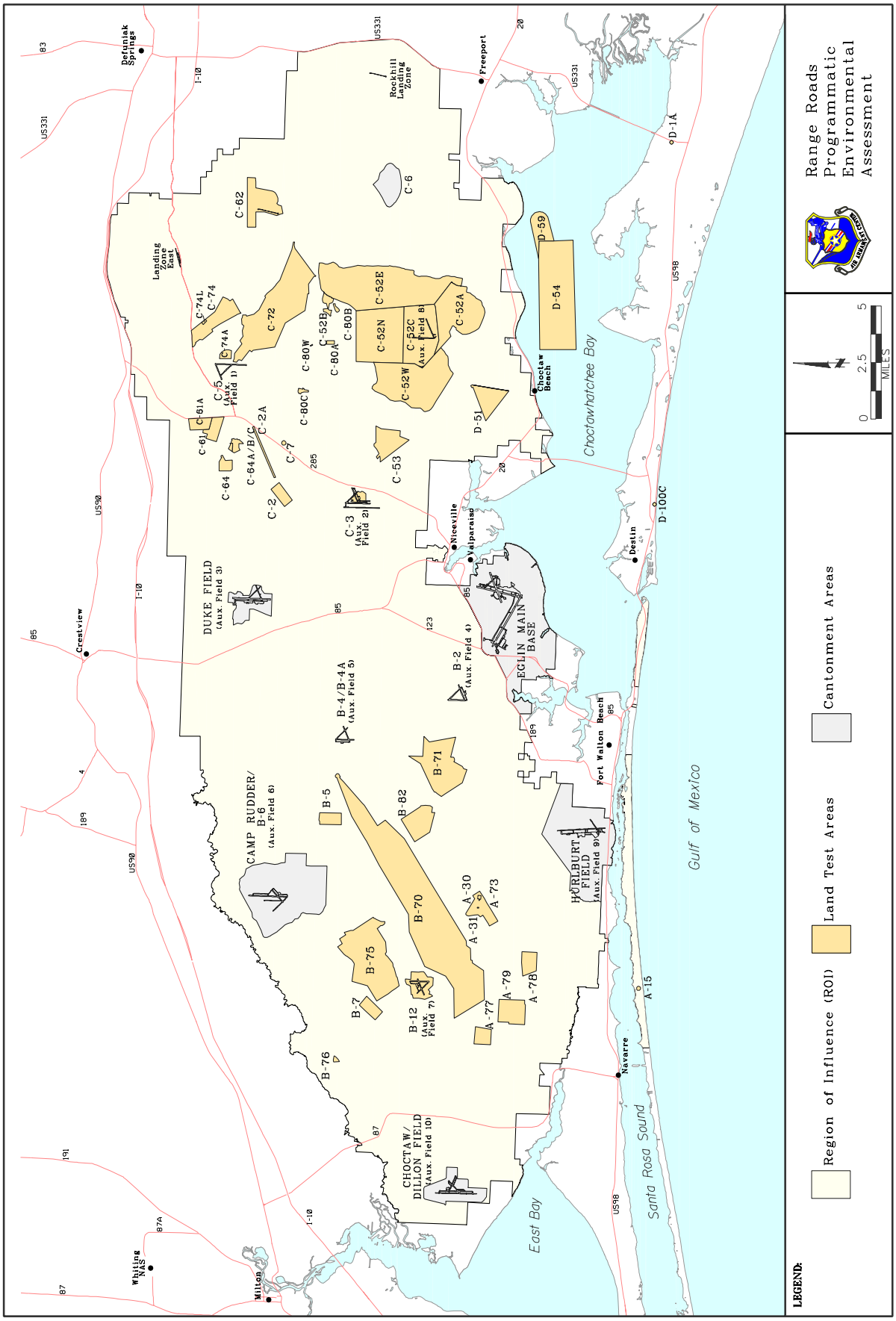

Figure 1-2. Eglin Land Test Areas

Increased testing activities led to increased range usage creating a need for more and better roads. Additionally, outdoor recreation and forest operations increasingly influenced road placement. For example, in order to facilitate the management of forest operations, Eglin's 400,641 acres of forested lands were divided into 10 separate compartments, which were further divided into sub-compartments. The sub-compartments were then further divided into individual timber stands. Gradually, a network of unpaved roads and paths developed to support the timber industry. This network of unpaved roads also came to be extensively used by hunters and other recreational users, as well as by law enforcement and natural resource management personnel. In a typical month, over 50 different organizations at Eglin AFB utilize the Range Road System. These users drive approximately half a million miles monthly, or 8.25 million miles per year on range roads (U.S. Air Force, 1997a). This intricate network of range roads extends for more than 2,700 miles across the Eglin Reservation (Figure 1-3).

As the land use and mission changed, so did the infrastructure necessary to support these diverse activities. However, due to limited resources, most of Eglin's roads could not be properly maintained. Additionally, as new roads were established, no plans were made to close older, seldom used roads. Today, the Range Road System has been described as one that "marginally meets -- with excessive maintenance -- the basic needs of range users" (U.S. Air Force, 2000). In addition to the high costs of maintenance, terrestrial and aquatic ecosystems have also been degraded. A primary source of ecosystem degradation has been the erosion of road surface materials and roadside areas. Current road maintenance procedures have created roads with surface configurations that in many instances are below natural ground elevations, forming roads that function as water channels feeding sediment directly into streams. Finally, the mere presence or proximity of Eglin roads has also been identified as having a potential impact on sensitive species

1.3 PROPOSED ACTION

The **Proposed Action** is for the 46TW Commander to establish a formalized Range Road Management Program to guide construction of new range roads or repair and maintenance of existing roads. Additionally, this action would undertake the systematic closure of range roads deemed non-critical to the Military Test and Training, Emergency Response, and Natural Resources missions. The process would consist of applying approved goals and guidelines for road closures, as well as dedicating the personnel and financial resources required to implement these closures. All construction, maintenance, and closure decisions would apply standards and Best Management Practices (BMP) described in the *Eglin Air Force Base Range Road Maintenance Handbook*, (U.S. Air Force, 2001a) (https://em.eglin.af.mil/roadbmp/). The ultimate goal of this process would be to ensure that Eglin range roads are adequate to meet the multi-use mission requirement of range roads, particularly the military test and training mission. It would further provide the forum wherein issues are elevated for timely resolution. Finally, it would ensure that range roads are brought up to and maintained to the necessary standard to support the diverse missions in a cost effective and environmentally sound manner.

This will be accomplished by demonstrating that the action does not have significant individual or cumulative environmental impacts. The environmental analysis is accomplished by evaluating the effect that the mission (i.e., road usage and maintenance activities) has on the Eglin natural and physical environment.

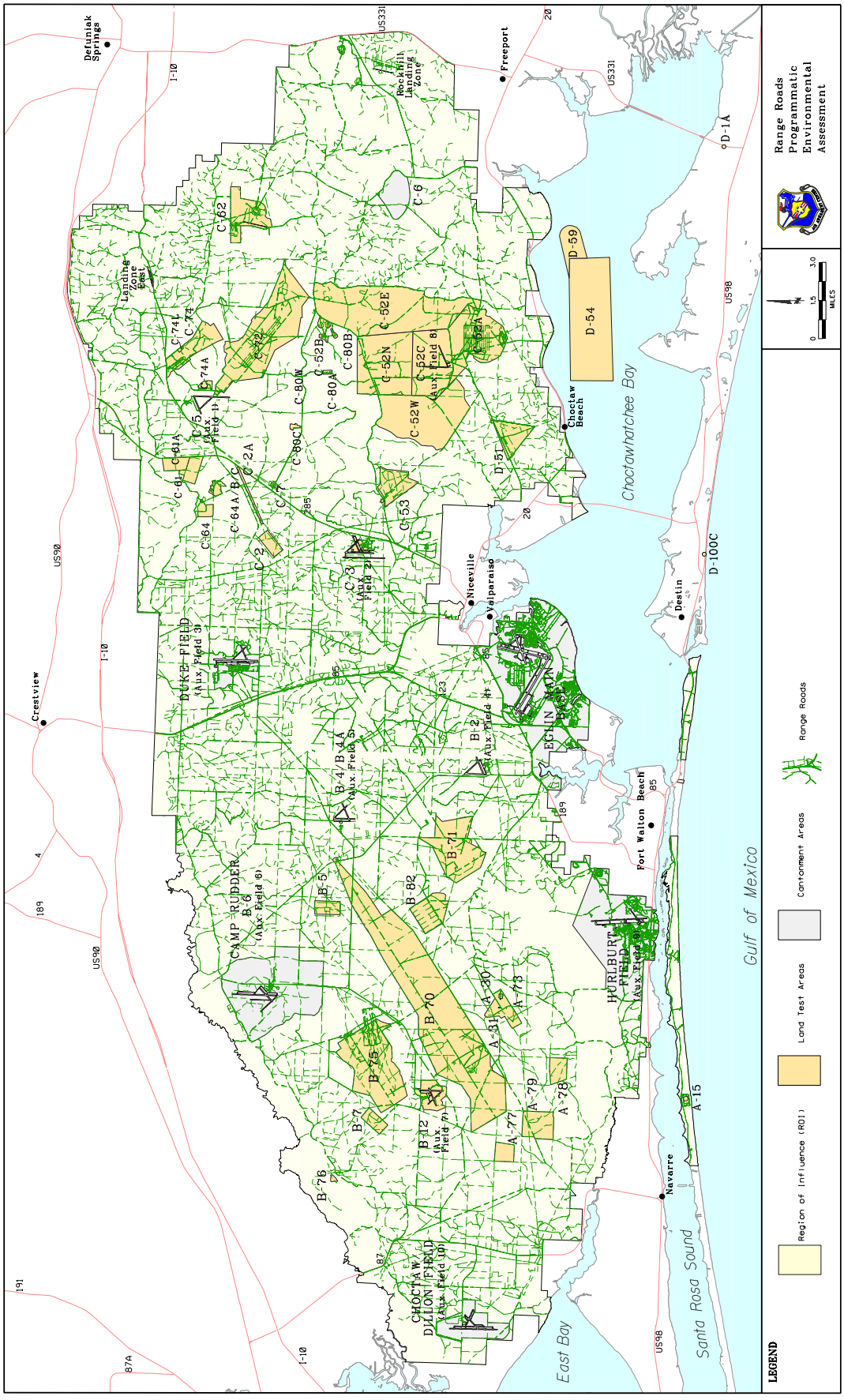

Figure 1-3. Range Road System

The mission has been broadly identified as the issue, and the Eglin environment identified as the receptor. Evaluation and quantification of this issue/receptor relationship is the scientific basis for the environmental analysis performed in this document.

1.4 SCOPE OF THE PROPOSED ACTION

This document addresses usage and maintenance activities associated with roads deemed critical to the test and training mission at Eglin Range. The Region of Influence (ROI) for these roads is defined as those roads located within the Eglin Military Complex, including those on Santa Rosa Island. They exclude roads in the cantonment areas (Eglin Main Base, Hurlburt Field, Duke Field, Choctaw Field), and leased lands (e.g., Okaloosa County Fair Grounds and the Okaloosa County Correctional Institution) (Table 1-1). Roads through test areas are also considered part of the ROI. The total area affected is approximately 435,000 acres of the Eglin Military Complex. The cantonment areas outside of the ROI comprise an additional 25,000 acres of the Eglin Military Complex.

Table 1-1. Regions of Eglin AFB Included and Excluded in this Document

INCLUDED	EXCLUDED*
Auxiliary Field 1	Eglin Main Base
Auxiliary Field 4	Hurlburt Field
Auxiliary Field 5	Duke Field
Auxiliary Field 6	Choctaw Field
Test Areas	Leased Lands
Santa Rosa Island	Camp Rudder
	Cape San Blas (D-3)

* Roads at these locations were either not considered part of the Range Road System or were not included in the Road Product Improvement Team (PIT) survey of range road users.

1.5 DECISION DESCRIPTION

The 46 TW/TS-Director of Technical Support (46TW), the Natural Resources Branch (AAC/EMSN), and the 96 Civil Engineering Group (796 Civil Engineering Squadron [796CES]) desire to implement a Range Road Management Program to support the closure of range roads. The anticipated result of this action would be to close roads that pose a significant adverse environmental impact, or are deemed non-essential to the test and training mission or natural resources mission. Additionally, this action would allow for a more efficient use of the limited road maintenance resources. By developing and following standardized design and maintenance practices, future road construction and maintenance activities/decisions can be streamlined and potential environmental impacts can be minimized.

The three organizations listed above play a key role in managing, maintaining, and operating the Range Road System. The 46 TW/TS is responsible for coordinating issues related to the Range Road System and ensures that these issues are addressed at the highest possible levels of management. The 46 TW/TS is also responsible for the Range Road Plan. This plan establishes clear organizational responsibilities and a process designed to ensure that range roads are maintained to the necessary standards to support the diverse Eglin mission. The Natural

Resources Branch is responsible for the stewardship of Eglin's natural resources and seeks to ensure the viability and biodiversity of the range ecosystem, while also providing compatible multiple uses. Finally, the 796CES is responsible for the maintenance, repair, and construction of range roads in accordance with the Range Road Plan.

1.5.1 Issues

The potential environmental consequences associated with the road system are characterized by the following broad issue categories: **Habitat Alteration, Noise, Direct Physical Impact**, and **Public Access**. Each of these issues is described below.

Habitat Alteration

Habitat alterations are described as damage to or disturbances in the terrestrial or aquatic environments. Degradation of unique and sensitive habitats will have an adverse impact on species within those habitats. The extensive Range Road System traverses many ecologically sensitive habitats on the range, including numerous streams, rivers, and wetland areas. Potential issues affecting these habitats include degradation of water quality and impacts to sensitive habitats and species.

Roads may alter the hydrology and water quality of an area in a variety of ways. Roads that transverse wetlands may function as a dam, impounding water on the up-flow side of the road and depriving water on the opposite side of the road. Roads also concentrate surface water flows, which can result in significant erosion from unpaved roads. Maintenance activities may also contribute to the erosion problem. The fill materials used for repair and maintenance of roads is extracted from borrow pits located near streams on the range. Many of these borrow pits have become sources of erosion, contributing sediments to the stream system on the installation. Siltation and/or drainage alteration resulting from the presence of roads is also anticipated to produce some level of impact on these habitats, with wetlands expected to be more susceptible to impacts than drier communities. In addition, natural communities and rare or sensitive plant species located in these habitats may be susceptible to invasion and eradication by non-native or exotic plant species that dominate and disperse along roadsides. In some cases, these exotic species spread from roadsides into adjacent native communities. Exotic plant species, cogongrass in particular, have been introduced through contaminated fill dirt and heavy equipment.

Another potential issue affecting sensitive animal species is habitat fragmentation. Roads split natural habitats such as forests, causing “fragmentation,” decreasing habitat size and reducing interaction with other communities. This fragmentation is known to produce declines in both the number of species (diversity) and their populations (abundance) (USEPA, 1996). Even a small, unpaved forest road closed to public traffic has been shown to constitute a barrier in some cases (Fahrig and Merriam, 1985).

Noise

Noise is defined as unwanted sound produced by vehicular traffic and/or by maintenance-related activities. Noise associated with the roads comes from vehicle engine operations, pavement/

wheel contact, aerodynamic effects, and vibrating structures during operations. Noise levels are directly related to traffic volumes, speed of traffic, proportion of heavy vehicles, population density near roads, existence, and effectiveness of noise barriers, and effectiveness of devices such as mufflers and quiet vehicles. Although the issue of noise is generally discussed in terms of the number or proportion of people affected, the impacts of noise on threatened and endangered species is the primary concern since these species represent the primary receptor.

Direct Physical Impact

Direct physical impact is the physical harm that can occur to an organism (plant or animal) as a result of mission and recreation activities. The primary example of direct physical impact of a road on wildlife occurs as a result of collisions between vehicles and wildlife, resulting in "roadkills." Road width and vehicle speed are contributing factors that increases the probability of accidental wildlife/vehicle collisions and intentional human-caused mortality. Slow-moving reptiles such as indigo snakes, rattlesnakes, pine snakes, and gopher tortoises are vulnerable to being struck by fast approaching vehicles. Road construction activities may also cause direct physical impacts by disturbing cultural resource sites on the range. Accidental release of hazardous materials (primarily fuels) also poses a potential for direct physical impacts, either directly or from subsequent cleanup activities, to water quality, sensitive habitats, threatened and endangered species, and cultural resources.

Public Access

Routine road-related maintenance activities (i.e. road resurfacing or culvert replacement) may result in temporary adverse impacts to public traffic. Additionally, permanent road closures may pose both negative and positive impacts to access for public/recreational users. This difference will depend greatly on the nature of the recreational use. Negative impacts will be primarily associated with areas of the range that are open to hunting with the aid of dogs. Dog hunters prefer a high road density in order to easily "stay ahead" of, or retrieve, free-running hunting dogs. This group of range users may view reduced access resulting from road closures as restrictive (AAC/EMSN, 2000a).

Reduced access does have a beneficial effect for many other types of hunters at Eglin. For example, stalk hunters are generally supportive of reduced access, since it results in an overall increase in stalk hunting quality and game population. Reduced access also deters potential illegal activities, such as poaching. Effects of reduced access to other forms of recreation users would be minimal, since most non-consumptive users can be satisfied when given reasonable vehicle access to areas of the range (AAC/EMSN 2000a). Finally, closing unneeded roads can increase both scenic quality and the quality of the experience in dispersed recreation settings; however, closures also affect access to dispersed recreation.

1.6 FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

No federal permits, licenses, and entitlements have been applied for the operation of the Range Road System. However, federal facilities conducting any activities with a potential to discharge dredged or fill material into waters of the United States may be subject to provisions of the Clean Water Act (CWA). Under these provisions, certain routine road maintenance activities (e.g.,

road resurfacing) may require a Nationwide Permit. This is a type of general permit that requires conditions to be met for activities that are substantially similar in nature and pose minimal environmental consequences.

In order for range road maintenance activities to comply with CWA statutes, Eglin AFB should apply for a Nationwide Permit. The permit would cover maintenance activities on roads with stream crossings, or with a potential to impact threatened and endangered species (i.e., Okaloosa darter). The permit requirements would consist of implementing Best Management Practices (BMPs) and keeping the U.S. Army Corps of Engineers (USACE) District Office apprised of such activities. Additionally, implementation of BMPs around streams classified as Okaloosa darter habitats may require consultation with the Fish and Wildlife Service (FWS). These activities would be considered mitigations to achieve a "no effect" and would only require an informal consultation (i.e., no "take permit" required). Consultation would consist of submittal to the FWS of a written report outlining the project and describing proper mitigation procedures.

1.7 ENVIRONMENTAL JUSTICE

Executive Order 12898 requires federal agencies to identify community issues of concern during the NEPA process, particularly those issues relating to decisions that might have a disproportionate effect on low-income or minority populations. There are no low-income or minority populations near the land test areas; consequently, no analysis was performed in this Programmatic Environmental Assessment (PEA).

The only Environmental Justice issue that could potentially be associated with the decision to be made regarding road closure activities is the proper protection of Native American archaeological artifacts. This issue, along with the associated public participation mechanisms, is fully addressed via Eglin's compliance with the following:

- The Antiquities Act of 1906
- The Sites Act of 1935
- The National Historic Preservation Act of 1974
- The Archaeological Resources Protection Act of 1979
- The Native American Graves and Repatriation Act of 1990
- The American Indian Religious Freedom Act

Procedures for compliance with the above laws are outlined in Eglin's Cultural Resources Management Plan.

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2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This section introduces the alternatives that will be evaluated for potential environmental impacts in the Programmatic Environmental Assessment (PEA) for the road system. The proposed alternatives that are analyzed in this document are:

- ***Alternative 1: No Action***

  ⇒ Continue as-needed maintenance of range roads on a case-by-case basis

  ⇒ Engage in range road closures on an opportunistic basis

- ***Alternative 2: Range Road Maintenance Program***

  ⇒ Establish a Range Roads Management Oversight Process

  ⇒ Establish Range Road System Hierarchy that Supports All Customer Needs

  ⇒ Establish Road Standards to Guide Construction, Repair and Maintenance

  ⇒ Establish a Five Year Range Road Plan

- ***Alternative 3: Alternative 2 + Range Road Closure Program***

  ⇒ Establish a Range Roads Closure Oversight Process

  ⇒ Establish Standard Criteria for Range Closure Analysis

  ⇒ Establish Best Management Practices (BMPs) for Range Road Closure

A brief description of each alternative is provided in the following section.

2.2 ALTERNATIVES CONSIDERED

2.2.1 Alternative 1: No Action Alternative

The No Action Alternative is to continue to operate the current Range Road System and practice current maintenance operations. No formalized maintenance or design requirements have been established for the Range Road System. The majority of range road maintenance activities performed by the 796CES are to ensure safety to personnel and minimize the wear and tear on vehicles. Maintenance activities are also conducted for the support of military or natural resources management missions. Maintenance activities typically consist of "quick-fix" repairs, and include grading, resurfacing, filling holes, and repairing washouts. Range road improvements are also initiated to allow access by timber harvesting or range support equipment into remote areas. Under this alternative, current practices would continue. Maintenance activities would also continue to undergo environmental review on a case-by-case basis. Finally,

systematic road closures would not be initiated under this alternative, although range road closures would continue to be initiated on an opportunistic basis, without analysis of the cumulative impacts to the range transportation system.

2.2.2 Alternative 2: Range Road Maintenance Program

This alternative would establish a formalized range road oversight process. Oversight of range roads is the responsibility of the range owner, the 46th Test Wing Commander, which is exercised through the Range Development Executive Steering Committee (RDESC) and its subcommittee, the Range Configuration Control Committee (RC3). This alternative establishes an interdisciplinary organization, the Range Roads Working Group (RRWG), under the leadership of the Test Wing's Technical Directorate (46TW/TSR) and with members from the Environmental Management Directorate (AAC/EM) and Civil Engineering (96CEG). The RRWG will be responsible for the establishment of road standards to guide construction, repair, and maintenance of the range road network, as well as establishment of a five-year Range Road Plan. The RRWC will make recommendations in all these matters to the RC3, which will approve or elevate issues to the RDESC for ultimate resolution. The RRWG will report to the RC3 quarterly on these issues, and the RC3 will provide an annual report to the RDESC on range roads. This process ensures that issues related to the Range Road System are addressed at the highest possible level

Eglin AFB has already implemented the administrative aspects of this alternative (i.e., establishment of a Road System Hierarchy and Road Plan). During 1997, a Range Road PIT, commissioned by the 46th Test Wing Commander, conducted a survey of over 50 organizations on the base in order to document road usage. Organizations were asked to list all primary roads (i.e. roads currently maintained by the 796CES) used. Organizations were also asked to identify other routinely used (non-primary) roads. These roads were designated as secondary roads. Other less commonly used roads were classified as "tertiary" or "other," depending on usage. As part of the survey, each organization was asked to provide estimates of road usage, including roads traveled, mileage logged on these roads, and type of vehicles utilized. Organizations were also asked to assign a priority level to each road section based on the importance of that section to the performance of an organization's specific mission.

Documenting usage and categorizing range roads is an essential step in identifying which roads are critical to the mission, as well as which merit the continued expenditure of maintenance funds. These data were used as the basis to develop the Road System Hierarchy. Additionally, the Eglin Range Road Plan, also developed by the Road PIT, established clear organizational responsibilities and a process for addressing road-related issues.

No formalized maintenance or design requirements have been established for the Range Road System. Road maintenance is done by work order based on customer requests. Except for the application of a fill layer six inches in depth over the width of the road, there are no specific standards for resurfacing existing roads. However, the 796CES does use general guidelines, as specified in the U.S. Army Corps of Engineer's (USACE) *Unsurfaced Road Maintenance Management Guide*, for performing required maintenance activities (796 CES/CEZHH, 1998). Most maintenance activities include grading, resurfacing, filling holes, and repairing washouts. Road improvements are also initiated to allow access by timber harvesting or range support

equipment into remote areas. Of the 267 miles of roads maintained, 177 miles received maintenance approximately every five to six weeks, while the remaining 90 miles are repaired/maintained every 6 to 12 months (U.S. Air Force, 1998).

Unpaved roads are constantly eroding as a result of many factors, including normal vehicle usage and natural weathering processes. Erosion may be further aggravated by several factors, including infrequent or inadequate road maintenance procedures. New roads require fill material to be compacted; however, during resurfacing activities, no effort is made to compact the freshly bladed surface by use of a vibratory steel-wheel roller or a rubber-tired traffic roller. This non-compacted surface is more prone to erosion from weather or other factors (AFDTC/EMSN, 1998). The use of heavy vehicles (e.g., target haulers, logging trucks, etc.) on these roads can increase erosion and significantly limit the life expectancy of the non-compacted surface. It is estimated that time between resurfacings could be increased two-fold or more, depending on weather conditions and traffic, if the surface is compacted immediately following blading (Albertson et al., 1995).

The erosion problem may also be exacerbated due to the inconsistent properties of the fill material used to resurface unpaved roads. The fill materials used for repair and maintenance of roads is typically extracted from borrow pits located within the Eglin Range. The occurrence of clay materials at or near the surface on the range is highly limited, and the available fill materials probably have low cohesion and may not be ideal for road surfacing applications (Albertson et al.; 1995). Another concern deals with the projected life expectancy of borrow pit sites on Eglin. Based on projected utilization rates, the Natural Resources Branch estimates that active borrow pit sites on the range will probably be depleted within 8 to 17 years.

This alternative would apply specific design and maintenance standards and BMPs, as described in the *Eglin Air Force Base Range Road Maintenance Handbook*, (U.S. Air Force, 2001a), located on the Eglin Intranet at https://em.eglin.af.mil/roadbmp. By following standardized design and maintenance practices, future range road maintenance activities and decisions will be streamlined and potential environmental impacts, including cumulative impacts, can be minimized.

The ultimate goal of this alternative would be to ensure issues related to the road system are addressed at the highest organizational level, and to also ensure that Eglin range roads are brought up to and maintained to the necessary standard to support the diverse missions in a cost effective and environmentally sound manner.

2.2.3 Alternative 3: Alternative 2 + Range Road Closure Program

In addition to the actions described as part of Alternative 2, this alternative would implement a formal Range Road Closure Program. This alternative will use the same organizational structure described in Alternative 2, with the RRWG be responsible for establishment and application of closure criteria for the systematic closure of range roads deemed non-critical to the test and training or natural resources missions. As part of this process, the multi-organizational RRWG would also be responsible for making range road closures recommendations. As a guide to making defensible decisions, the RRWG would consider several factors, including desirable road density values, limited public access points to control solid waste dumping and poaching, limited

stream crossings, etc. Specific road closure BMPs, also described in the *Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001a) would be applied as part of closure actions.

The RRWG will make specific road closure decisions that are consistent with meeting the goals set forth by the Range Road Plan, including evaluating current and future traffic requirements on the range, consolidating redundant roads, and modifying road designs as necessary. The RRWG will identify management opportunities, establish priorities, and formulate technical recommendations based on these goals. These recommendations will be made to the RC3, which will approve or elevate issues to the RDESC for ultimate resolution.

The RC3 would also address future needs in determining which roads to close. For example, some roads could be permanently closed and re-vegetated, while other roads could be closed to traffic to minimize environmental impacts, but would still be available to meet future mission needs. Closure recommendations with criteria scoring will be submitted to the RC3 quarterly with the quarterly Range Road Maintenance Report. The RC3 will approve all closures and elevate closure issues to the RDESC for ultimate resolution. This process would ensure that issues related to the Range Road System are addressed in a timely manner at the lowest level consistent with the issue's overall impact.

2.3 COMPARISON OF ALTERNATIVES

This is a Programmatic Environmental Assessment (PEA) designed to look at the overall impacts of policy changes associated with range road management. The PEA identifies a range of potential impacts of the proposed alternatives, but it does not attempt to quantitatively analyze these impacts. It will not be used as a decision-making document to support specific road construction, maintenance, and closure decisions; however, it is intended to support a policy change that will provide the framework for making those decisions.

The No Action Alternative negatively impacts water quality, sensitive habitats, and threatened and endangered species. This is primarily the result of erosion and sedimentation associated with the unpaved roads system, as well as the high density of roads on the range. These impacts are summarized as follow:

- There are potential negative impacts to water quality, sensitive habitats, and threatened and endangered species, resulting from sedimentation caused by erosion from unpaved roads.
- There are potential negative impacts (i.e., habitat fragmentation, road aversion behavior, or species migration disruption) to threatened and endangered species associated with the high road density in some areas of the range.
- There are potential negative impacts to native biodiversity resulting from invasion by non-native or exotic plant species that dominate and disperse along roadsides.
- There are potential negative impacts to sensitive habitats and threatened and endangered species from poaching, collisions of vehicles with wildlife, or illegal dumping activities.

- There are potential negative impacts to water quality, sensitive habitats, threatened and endangered species, and cultural resources resulting from hazardous material spills.

Impacts associated with noise or air emissions from traffic or maintenance activities are estimated to be the same and negligible under all alternatives considered. Average noise levels on the range are equivalent to background levels, while vehicle emissions can be considered negligible when compared to local non-Air Force traffic.

Erosion/sedimentation from unpaved roads results in large part from current, inadequate road design and maintenance procedures (i.e., lack of BMPs). Alternative 2 would mitigate erosion-caused impacts by implementing road standards to guide construction, repair, and maintenance activities. Alternative 3 would further mitigate other potential impacts associated with the No Action Alternative by implementing the closure of a large number of problematic (i.e., erosion causing) roads. It is anticipated that these actions will have a significant positive environmental impact. However, since the specific number or scope of BMP measures implemented or road closures initiated that will ultimately take place are not known, it is not possible to specifically quantify the impacts associated with implementation of the preferred alternative, although it is possible to describe a potential range of effects and/or trends by comparing the No Action Alternative (current program) with the other alternatives described (Table 2-1).

2.3.1 Preferred Alternative

Although a quantitative assessment of net benefits was not possible, the qualitative comparison of the alternatives suggests definite benefits associated with implementation of Alternative 3 as compared to the No Action Alternative (Table 2-2). Again, this alternative would undertake the systematic closure of range roads that pose a significant adverse environmental impact or were deemed non-essential to the test and training or natural resources missions. This alternative would also establish and implement standards to guide road construction, repair, maintenance, and closure activities.

Net benefits of this alternative would result through improving water quality, protection of threatened and endangered species or sensitive areas, and reducing the spread of invasive plants. More mixed effects are expected for recreation and cultural resources, with likely reductions in some types of roaded access and some improvements or maintenance of more wilderness-type environments. Access for natural resources management, law enforcement, and safety access would not be affected.

Table 2-1. Comparison of Alternatives

ALTERNATIVE	MANAGEMENT ACTIONS	CONSTRUCTION/ MAINTENANCE	ROAD CLOSURES
Alternative 1- No Action	Continue current management policies	Continue on a case-by-case basis	No systematic road closures
Alternative 2	Establish 5-year Road Plan to adequately address anticipated needs	Establish/apply standardized design practices and BMPs for road construction and maintenance activities	No systematic road closures
Alternative 3	Establish 5-year Road Plan to adequately address anticipated needs Establish a Range Roads Closure Oversight Process Establish standard criteria for range road closure activities	Establish/apply standardized design practices and BMPs for road construction and maintenance activities	Implement systematic closures of non-needed/ problematic roads Establish/apply BMPs for road closures Implement science/needs based closures decisions, with priority given to roads that are causing excessive environmental damage

Table 2-2. Summary of Effects

POTENTIAL ISSUES	ALTERNATIVES		
	NO ACTION - ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Habitat Alteration			
Air Quality	0	0	0
Water Quality	0	+	++
Sensitive Habitats	0	+	++
Threatened and Endangered Species	0	+	++
Noise			
Threatened and Endangered Species	0	0	0
Direct Physical Impact			
Water Quality	0	0	0
Sensitive Habitats	0	0	+
Threatened and Endangered Species	0	+	++
Cultural Resources	0	0	+
Public Access			
Recreation, Hunting, Wilderness	0	+	+/–

0: no change expected from implementing the final road management strategy
+: net effect of implementing the final road management strategy is positive
–: net effect of implementing the final road management strategy is negative
+/–: net effect is ambiguous from implementing Alternative 3

3. AFFECTED ENVIRONMENT

3.1 INTRODUCTION

The Affected Environment includes all areas potentially impacted by the road system or road maintenance activities on the Eglin Range, including test areas, interstitial areas (i.e., areas beyond and between the test areas), and Santa Rosa Island. The ROI does not include roads located at several locations, including Eglin Main Base, Duke Field, or Hurlburt Field (Table 1-1).

This chapter describes potential receptors associated with the Affected Environment. These receptors are described as Biological Resources, Physical Features, and Anthropogenic Resources. The Biological Resources section describes the types of ecological associations found within the Affected Environment. Flora and fauna found within these associations, including sensitive species, are discussed. The Physical Features Section includes a discussion of air quality, soil, and surface water, while the Anthropogenic Resources section addresses recreational activities, forestry activities, and cultural resources.

3.2 BIOLOGICAL RESOURCES

Biological resources include the native and introduced terrestrial plants and animals around Eglin AFB. The land areas at Eglin are home to unusually diverse biological resources including several sensitive species, habitats, and wetlands. Eglin uses a classification system based on ecological associations that were developed based on floral, faunal, and geophysical characteristics. These ecological associations are described in the Eglin Air Force Base Integrated Natural Resources Management Plan 2002-2006 (U.S. Air Force 2001b) and the *Environmental Baseline Study Resource Appendices* (U.S. Air Force, 1995). Five ecological associations occur on the Eglin Range. These associations are the Sandhills, Swamps, Flatwoods, Sand Pine, and Open Grassland/Shrubland. The land areas of these five ecological associations are depicted in Figure 3-1.

3.2.1 Ecological Associations

Sandhills Ecological Association

The majority of Eglin AFB is underlain by Lakeland soils, which support the Sandhills ecological association. These soils are deep, sandy, and well drained, creating a dry condition. The Sandhills association is characterized by rolling sandhill ridges divided by streams and includes pockets of habitat ranging from steeply sloped to flat and xeric (dry) to mesic (moist) (U.S. Air Force, 1995). Loamy sands, sandy loams, clay loams, and muck soils are found in lower-lying areas. Dominant trees include stands of longleaf pine and sand pine, along with oaks and magnolia. Low shrubs comprise an important group and include saw palmetto, persimmon, dwarf huckleberry, gopher apple, and various oaks (U.S. Air Force, 1995). Various grasses, herbs, lichens, and several rare plants comprise the understory (U.S. Air Force, 1995). Some of the dominant plant families include the sunflower (*Asteraceae*), milkweed (*Apocynaceae*),

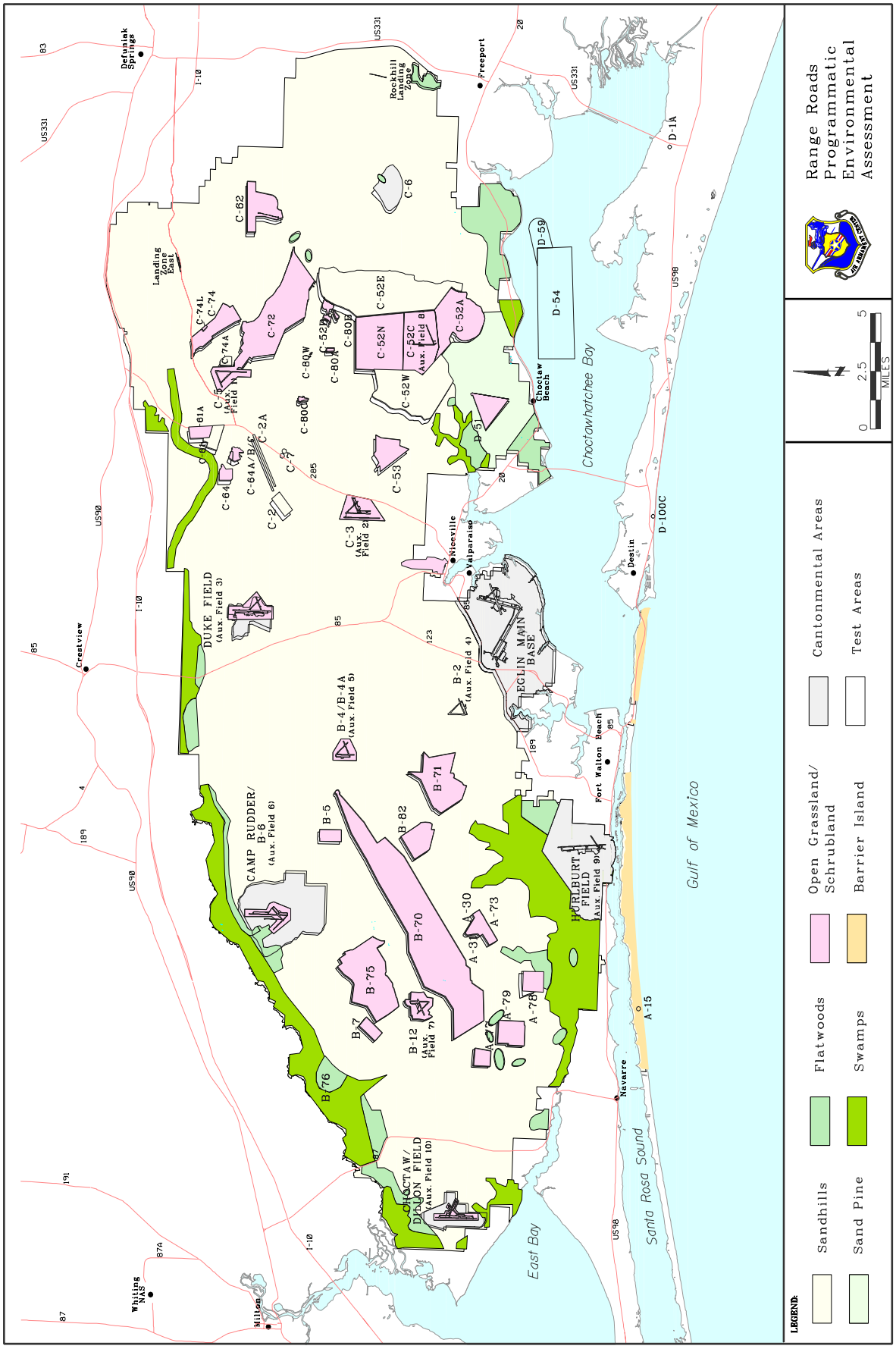

Figure 3-1. Ecological Associations within the Eglin Range

sedge (*Cyperaceae*), heath (*Ericaceae*), pea (*Fabaceae*), grass (*Poaceae*), buckwheat (*Polygonaceae*), and the yellow-eyed grass (*Xyridaceae*) families (U.S. Air Force, 1995). Vegetation surrounding ponds and the shoreline of creeks can include grasses and herbs or a dense shrub thicket. Typical plants include panicums, rushes, arrowheads, yellow-eyed grass, meadowbeauty, and spike-rush. Floating plants such as waterlilies can cover much of the water surface of quiet waters (U.S. Air Force, 1995).

The barking treefrog and central newt are representative amphibians to the Sandhills ecological association. Leopard frogs are found in swales containing wetlands. The gopher frogs utilize ephemeral ponds, including depression marshes, for breeding along with some sandhill upland lakes (provided there are no fish present). They also wander in the surrounding upland areas (U.S. Air Force, 1995). Reptiles include the gray rat snake, coral snake, six-lined racerunner, the eastern fence lizard, gopher tortoises, and box turtles. Several types of squirrels (the fox, gray, and flying), armadillo, and feral pig also live in the sandhills along with the white-tailed deer and raccoon. Characteristic predators include the gray fox and bobcat. On occasion the Florida black bear is found in the Sandhills ecological association. Poaching (i.e., illegal harvesting) of these animals has occurred (U.S. Air Force, 1995).

Raptors include the screech owl, red-shouldered hawk, and the great horned owl, which nest and hunt rodents in the woodlands of the sandhills (U.S. Air Force, 1995). The southeastern American kestrel preys on small rodents, reptiles, and insects in clearings or woodland edges. Game birds include wild turkeys, wood ducks, mourning doves, and ground doves. The sandhill upland lakes provide feeding areas for wading birds. Other indigenous birds include warblers, vireos, the red-cockaded woodpecker (RCW), the pileated woodpecker, white-breasted nuthatch, the Bachman's sparrow, and the pine siskin.

Many aquatic animals are found in the streams within the Sandhills ecological association. Burrowing worms, crustaceans, and other pelagic and benthic organisms are endemic to most freshwater bodies. Numerous species of fish have been found in all creek systems, including Live Oak, Rocky Creek, and Little Alaqua Creek. Some of these species are rock bass, pirate perch, mosquitofish, southern brook lamprey, spotted sunfish, largemouth bass, sailfin and flagfin shiners, black and speckled madtoms, pygmy sunfish, sharpfin chubsuckers, blackbanded and brown darters, and the Okaloosa darter.

Some birds winter in South and Central America and come to temperate regions, such as the continental United States, to breed in the summer. The high quality sandhills within the Sandhills ecological association are also a habitat for a few species of neotropical migrants (U.S. Air Force, 1995). Neotropical migrants occurring on Eglin include the ruby-throated hummingbird, summer tanager, common yellowthroat, blue grosbeak, and great crested flycatcher. The first year's report of a two-year study on neotropical migrants present at Eglin indicates that riparian areas and bottomland hardwood swamps associated with major drainages provide the most important habitat for these birds (U.S. Air Force, 1995).

Swamp Ecological Association

This association consists of flat, poorly drained areas and vegetation characteristic of wet environments and can include floodplain forest, floodplain swamp, bottomland forest, wet

prairie, hydric hammock, blackwater stream, marsh lake, and bogs (U.S. Air Force, 1995). This type of habitat is common along the Yellow River and in the southwestern portion of the Eglin Range.

There are many types of habitat found within this ecological association, and therefore many different types of wildlife. The gray squirrel, opossum, bear, raccoon, river otter, and beaver are typical mammal species. Other typical species include reptiles and amphibians such as the green anole, Alabama waterdog, dwarf salamander, cottonmouth, and American alligator (U.S. Air Force, 1995).

The riparian areas and bottomland hardwood swamps associated with major drainages also provide an important habitat for migrant species (U.S. Air Force, 1995). Belted kingfishers forage in shallow riparian habitats where fish are common and the rapidly flowing water produces small choppy waves. The marshes provide habitat for the great blue heron, black-crowned heron, and northern harrier (U.S. Air Force, 1995).

Flatwoods Ecological Association

There are several plant communities within this association that are found on gently sloping to flat topography (U.S. Air Force, 1995). On Eglin AFB, this association includes seven separate plant communities, ranging from those that are rarely inundated to those that are permanently flooded. One example of the wet flatwoods community exists along the Yellow River, adjacent to the Swamp ecological association. In this community, water may stand for one month or longer on the surface during the rainy season. Rare plants include southern milkweed, white-top pitcher plant, sweet pitcherplant, Chapman's butterwort, and Curtiss' sandgrass (U.S. Air Force, 1995).

The wet flatwoods community supports a wide variety of aquatic birds such as wood ducks, clapper rails, red-winged blackbirds, and neotropical migrants (U.S. Air Force, 1995). Amphibians include the Alabama waterdog, flatwoods salamander, and dwarf salamander. The black racer, corn snake, cottonmouth, and eastern diamondback rattlesnake are typical reptiles. Mammals include the river otter, beaver, Florida black bear, white-tailed deer, gray fox, bobcat, raccoon, gray and flying squirrels, and several species of bat. The creeks and ponds support several fish species that include the speckled madtom, weed shiner, and starhead topminnow (U.S. Air Force, 1995).

Sand Pine Ecological Association

The Sand Pine ecological association makes up a small portion of the Eglin Range. This habitat is found to the east of Niceville, on the north side of Choctawhatchee Bay. The topography includes gently sloping narrow ridges and steep side slopes with excessively drained thick sands of the Lakeland association. There is a dense, closed-canopy stand of sand pines with a low species diversity. The two main communities are the sand pine and xeric hammock (U.S. Air Force, 1995). The ground cover is generally sparse and includes lichens, grasses, and herbs.

This association is primarily a closed canopy forest with little habitat variety and similar but fewer wildlife species than occur in the sandhills. Observed species include the white-tailed

deer, raccoon, feral pig, gopher tortoise, eastern fence lizard, and eastern diamondback rattlesnake. Noted birds are the pileated woodpecker, white-breasted nuthatch, and pine siskin (U.S. Air Force, 1995).

Grasslands/Shrublands Ecological Association

The Grasslands/Shrublands ecological association occurs in areas of heavily disturbed sandhill ecological sites (U.S. Air Force, 1995). It is typically characterized by grasses and low shrubs. This habitat predominantly occurs within the test areas on Eglin AFB and is not as common within interstitial areas. However, there are some portions of the interstitial areas that have been cleared (i.e., Duke Field and auxiliary fields) and have consequently become grasslands/shrublands. This habitat is maintained with machinery or fire that removes or prevents future growth.

Representative reptiles present in the clearings and grasslands include the eastern diamondback rattlesnake, the eastern coachwhip and southern black racer snakes, the gopher tortoise, eastern box turtle, and the slender glass lizard. Gopher tortoise burrows create a habitat that supports the sensitive indigo snake and gopher frog as well as several other species. The southern pocket gopher, cotton mouse, oldfield mouse, and eastern cottontail rabbit are present in clearings and other similar habitats (U.S. Air Force, 1995).

Established burrows for the Florida burrowing owl have been found in the open grassland and shrublands (U.S. Air Force, 1995). Raptors include the screech owl, red-shouldered hawk, and the great horned owl that forage over the open areas (U.S. Air Force, 1995). The southeastern American kestrel preys on small rodents, reptiles, and insects in the clearings.

3.2.2 Sensitive Species

Table 3-1 presents federal- and state-listed plant and animal species that occur on the Eglin Range. An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species that is likely to become endangered within the future throughout all or a significant portion of its range due to factors such as loss of habitat and anthropogenic effects. A candidate species is one for which the U.S. Fish and Wildlife Service (USFWS) has on file sufficient information on biological vulnerability to warrant a listing, but the listing is precluded at the present time. Once legally protected, it is a federal offense to "take" (import, export, kill, harm, harass, possess, or remove) protected animals from the wild. Similar regulations are in place for state-listed species (endangered, threatened, or species of special concern) (Wood, 1996).

Table 3-1. Threatened, Endangered, and Special-Status Species on Eglin AFB

SPECIES	STATUS	AREAS OF OCCURRENCE
PLANTS		
Alabama spiny-pod *Matelea alabamensis*	SE, SC, G1	Found in gaps in hardwood forests. Largest population on Eglin is in upland hardwood forest in Piney Creek area.
Ashe's magnolia *Magnolia ashei*	SE, SC, G3	Found in steephead ravines along four creeks in the Sandhills environmental association (EA).
Baltzell's sedge *Carex baltzellii*	ST, SC, G2	Found in slope forests and upland hardwood forests on moist shaded locations throughout Eglin AFB
Bog buttons *Lachnocaulon digynum*	SC, G3	Found on seepage slopes as well as in bogs, baygalls, and wet flatwoods. Seen near Test Areas B-70 and B-76 and likely in other areas
Bog spicebush *Lindera subcoriacea*	SE, SC, G2	Only known from Mett's Creek seepage stream by the Army Ranger Camp.
Chapman's aster *Aster chapmanii*	SC, G2, G3	Found on seepage slopes and in wet prairies and margins of dome swamps. Found in wet flatwoods and around dome swamps at various locations on Eglin.
Chapman's butterwort *Pinguicula planifolia*	ST, SC, G3	Found in wet sparsely vegetated slopes and cypress domes in Brier Creek and Yellow River area. Also near Test Areas B-76 and A-78 and Hurlburt Field.
Curtiss' sandgrass *Calamovilfa curtissii*	ST, SC, G2	Found in wet prairie, wet flatwoods, and dome swamps. Found near three Test Areas, Hurlburt Field and Holly and Green ponds.
Drummond's yellow-eyed grass *Xyris drummondii*	SC, G3	Found in bogs, seepage slopes, and wet flatwoods in the Wetland and Riparian and Flatwoods EAs. Occurs in several locations on Eglin AFB
Florida anise *Illicium floridanum*	ST, G5	Found in steephead ravines in the Sandhill EA. Found at numerous locations on Eglin AFB.
Florida perforated cladonia *Cladonia perforata*	FE, SE, G1	Small ground lichen known from five areas in the beach dune scrub ecotone in the barrier Island EA[b]. Species was severely impacted by Hurricane Opal in 1995.
Greens adder's mouth *Malaxis unifolia*	SE, G5	Found in upland and floodplain forests. On Eglin, it is found in upland mixed forests along Buck Branch and near Oatie Creek.
Hairy-peduncled beak-rush *Rhynchospora crinipes*	SC, G1	Only known location along Metts Creek seepage stream near the Army Ranger Camp.
Harper's yellow-eyed grass *Xyris scabrifolia*	ST, SC, G2, G3	Found on fire maintained seepage slopes in Brier Creek area.
Heartleaf *Hexastylis arifolia*	ST, G5	Known from slope forests and upland and mixed forests. Several occurrences in forests on Eglin.
Hummingbird flower *Macranthera flammea*	SE, G3	Occurs in a variety of wetlands and on Eglin; this includes freshwater tidal swamps, a seepage slope, and in a wet roadside ditch.
Indian cucumber root *Medeola virginina*	SE, G5	Grows in moist, cool baygalls along streams. A few plants seen in a baygall along a tributary to Alaqua Creek on Eglin.
Karst pond yellow-eyed grass *Xyris longisepala*	SE, SC, G2	Found in depression marshes and Sandhill upland lakes. Occurs at several locations on Eglin AFB.
Naked-stemmed panicgrass *Panicum nudicaule*	SC, G3	Seepage slopes and bogs in the Brier Creek area.

SPECIES	STATUS	AREAS OF OCCURRENCE
PLANTS CONT'D		
Orange azalea *Rhododendron austrinum*	SE, G3, G4	This small shrub is found in the slope forests in the Sandhill EA.
Panhandle lily *Lilum iridollae*	SE, SC, G1, G2	Streamside baygalls throughout base.
Panhandle meadowbeauty *Rhexia salicifolia*	SC, G2,	Found in depression marshes and Sandhill upland lakes scattered over Eglin AFB.
Piedmont jointgrass *Coelorachis tuberculosa*	SC, G3	Occurs in depression marshes and sandhill lakes, and on Eglin it is found in these habitats in the Titi Creek Wilderness Area and near Kemmons Pond
Piedmont water-milfoil *Myriophyllum laxum*	SC, G2, G3	Aquatic perennial from a variety of wetlands. One population on Eglin in a blackwater stream.
Pineland hoary-pea *Tephrosia mohri*	SC, G2Q	Open canopy Sandhills and upland pine forest. Found near Test Areas A-77 and A-78 and could occur near others.
Pineland wild indigo *Baptisa calycosa* var*. villosa*	SC, G2T1T2	Found in open Sandhills and upland pine forests with sandy soil. Often along roadsides.
Pinesap *Monotropa hyopithys*	SE, G5	Found in sand pine scrub and other forest types. Found in upland hardwood and mixed forest on Eglin.
Pyramid magnolia *Magnolia pyramidata*	SE, G4	Found in slope forests in the Sandhills EA.
Silky camellia *Stewartia malacodendron*	SE, G4	Found in slope forests and steephead ravines in the Sandhills EA. Occurs in Indigo and little Boiling creeks.
Small-flowered meadowbeauty *Rehexia parviflora*	SE, G2	Colonial species found on seepage slopes, wet flatwoods, and other wetlands. On Eglin, it is found around ephemeral ponds and depression wetlands.
Southern milkweed *Asclepias viridula*	ST, SC, G2	Endemic to wet flatwoods and prairies. Occurs in wet flatwoods on Alaqua Point on Eglin.
Southern red lily *Lilium catesbaei*	ST, G4	Occurs in variety of wetlands, and on Eglin is found in seepage slopes and dome swamps, wet flatwoods, and wet prairies.
Spoon-leaved sundew *Drosera intermedia*	ST, G5	Found in wet prairies, wet flatwoods, and baygalls in the Flatwoods EA. Found near Test Sites A 20/21 and Test Areas A-73 and C-2.
Sweet pitcher plant *Sarracenia rubra*	SE, G3	Found in wet flatwoods and baygalls over much of Eglin AFB.
Sweet shrub *Calycanthus floridus*	SE, G5T4	Common forest species in SE U.S. Occurs in upland forests along creeks on Eglin.
Three-awn grass *Aristida simpliciflora*	SC, G3	In the Sandhills EA with sparse grass or shrub cover. Two populations on base near Test Area A-77
Trailing arbutus *Epigaea repens*	ST, G5	Found in slope forests and upland mixed and hardwood forests. Six occurrences on Eglin with the largest population along a tributary of Ninemile Creek.
West's flax *Linum westii*	SE, SC, G2	Found in wet flatwoods, dome swamps, and wiregrass dominated flats south of Test Area A-78 and near Test Sites A-20/21.
West Florida cowlily *Nuphar lutea* ssp*. ulvacea*	SC, G5T2	An aquatic plant found in floodplain swamps. Known from two locations, both south of Test Area A-78.

SPECIES	STATUS	AREAS OF OCCURRENCE
PLANTS CONT'D		
White-topped pitcher plant *Sarracenia leucophylla*	SE, SC, G3	Common in wet flatwoods in the Brier Creek area and near several Test Areas.
Yellow fringeless orchid *Platanthera integra*	SE, G3G4	Found on recently burned seepage slopes in the Flatwoods EA. Only found twice on Elgin AFB.
Yellow-root *Xanthorhiza simplicissima*	SE, G5	Occurs along shaded ravines and stream banks. Occurs in one location on Eglin bordering a small tributary of Blount Creek.
FISH		
Okaloosa darter *Etheostoma okaloosae*	FE, SE, G1	Found only on Eglin AFB in six small tributaries of Choctawhatchee Bay in the Sandhills EA. Found near nine Test Areas.
AMPHIBIANS		
Dusky gopher frog *Rana capito sevosa*	SSC, G4	Found in Sandhills, Sand Pine EAs and near seasonally flooded ponds lacking large predatory fish. Uses gopher tortoise burrows for cover. Eglin supports the largest known concentration of reproductive sites within range.
Flatwoods salamander *Ambystoma cingulatum*	FT, G2G3	Found in pine flatwoods wiregrass communities with adjoining dome swamps in the Flatwood EA. Eglin supports the largest known concentration of breeding sites west of the Apalachicola River.
Florida bog frog *Rana okaloosae*	SC, SSC, G2	Found in seeps and seepage streams in the Flatwoods and Wetland and Riparian EAs. Has been sighted near Test Areas B-12, B-70, and A-7.
REPTILES		
Eastern indigo snake *Drymarchon corais couperi*	FT, ST, G4T3	Occurs in upland and wetlands in Sandhills and Flatwoods EAs. Observed less then two dozen times in the last 20 years. Winters in gopher tortoise burrows.
Florida pine snake *Pituophis melanoleucus*	SC, SSC, G5T3	Found in dry Sandhills and Sand Pine EAs. Retreats to loosely packed sand, rodent burrows, and gopher tortoise burrows.
Gopher tortoise *Gopherus polyphemus*	SC, SSC, G3	Found in the Sandhills, Sand Pine, and Barrier Islands EAs over most of Eglin AFB. Many inactive and a few active burrows exist.
BIRDS		
Bachman's sparrow *Aimphila aestivalis*	SC, G3, G3	An uncommon resident species in high quality Sandhills EA habitat. May be found within or adjacent to any of the tests sites.
Bald eagle *Haliaeetus leucophalus*	FT, ST, G4	Nests at one location in the southern part of Eglin.
Florida burrowing owl *Speotytoaria*	SSC, G4T3	Nests in open grasslands near test sites.
Little blue heron *Egretta caerulea*	SSC, G5	Occasionally found in wetlands, along rivers and streams.
Red cockaded woodpecker *Picoides borealis*	FE, ST, G3	Occurs in many areas in the longleaf pine forests in the Sandhills EA. Five Management Emphasis Areas totaling 260,000 acres are located on Eglin AFB.
Reddish egret *Egretta rufescens*	SSC, G4	Occasionally found in wetlands.

SPECIES	STATUS	AREAS OF OCCURRENCE
BIRDS CONT'D		
Snowy egret *Egretta thula*	SSC, G5	Occasionally found in wetlands, along rivers and streams.
Southeastern American kestrel *Falco sparverius paulus*	ST, SC, G5T3T4	Is a common permanent resident in the Sandhills and Sand Pine EAs, as well as open grasslands around test areas.
Southeastern snowy plover *Charadrius alexandrinus tenuirostris*	ST, SC, G4	Nests along the eastern shore of Eglin AFB.
Tricolor heron *Egretta tricolor*	SSC, G5	Occasionally found in wetlands, along rivers and streams and Santa Rosa Island.
MAMMALS		
Florida black bear *Ursus americanus floridanus*	ST, SC, G5T2	Found in the Sandhills, Flatwoods, and Wetland and Riparian EAs. Has been sighted within Test Areas C-3 and B-71.
Santa Rosa beach mouse *Peromyscus polionotus leucocephalus*	SC, G5T1	Found in the interior portions of Santa Rosa Island.

Source: U. S. Air Force 1994, 1999; Chafin et al., 1995

EA = Ecological Association
FE = Federal Endangered
FT = Federal Threatened
SA = Species federally listed due to similarity of appearance to the American crocodile *(Crocodylus acutus)*
SE = State Endangered
ST = State Threatened
SC = Federal Species of Concern
SSC = State Species of Special Concern

Florida Natural Areas Inventory Ranks:
G1 = Critically Imperiled Globally
G2 = Imperiled Globally
G3 = Either Very Rare or Local Through Range
G4 = Apparently Secure Globally
G5 = Secure Globally
GH = Historical occurrence throughout range; may be rediscovered
G#Q = Rank or Questionable Species
G#T# = Rank of Subspecies Where G = Rank of Entire Species and T = Rank of Subspecies

Special incidental take permits and relocation permits may be granted from the state of Florida Fish and Wildlife Conservation Commission (FFWCC) for state-listed species. These permits are only granted if the "taking" does not prove detrimental to the survival potential of the species. If military mission activities are going to be performed that might lead to the incidental take of a species of special concern, a permit is required. The accidental killing of a species of special concern should be documented and reported to the FFFWCC. Incidental "takes," authorized by special permit, of threatened species are permitted only if the activity does not have a negative effect on the survival potential of the species. The pursuing, molesting, harming, harassing, capturing, or possession of any endangered species or parts of their nests or eggs except as authorized by special permit is allowed only when the activity clearly enhances the survival potential of the species. The killing or wounding of an endangered species is punishable as a second-degree misdemeanor under State of Florida Laws and Regulations, Wildlife Code (Chapter 39, Florida Administrative Code) (Wood, 1996).

Sensitive Animal Species

Okaloosa darter: The Okaloosa darter is found in six small Choctawhatchee Bay tributaries located in the Sandhills association (Figure 3-2). The species is both federally and state listed as endangered. Its range has been reduced by habitat modification and replacement by the brown darter. The species may be downlisted to threatened if the recovery criteria are achieved (Jelks

and Alam, 1998) (Note: The darter is eligible now for downlisting and is being considered for future delisting [AAC/EMSN, 2001]). In order to protect the Okaloosa darter, the quantity and quality of water in the streams must be protected. Erosion from borrow pits has increased siltation and may potentially imperil the darter's survival. Principal factors in the initial listing of the darter were the amount of its habitat degraded by road construction/maintenance activities, as well as siltation from land clearing (Jelks and Alam, 1998).

Red-cockaded Woodpecker: The red-cockaded woodpecker (RCW) inhabits the interstitial areas and some test areas of the Eglin Range (Figure 3-2). This woodpecker is federally listed as endangered and state listed as threatened (U.S. Air Force, 1995). These birds are non-migratory and territorial. They nest in the cavities of live, old longleaf pines usually infected by heart rot. Construction of the cavities generally occurs in trees that are greater than 80 years of age or older, and the construction can take several years of effort. The birds forage in intermediate-aged (30-years and older) pine stands, which also provide an important source of future trees for the construction of cavities (U.S. Air Force, 1995).

Bald Eagle: The bald eagle uses tall trees located near large lakes and bayous for perching and nesting. On Eglin, the bald eagle has suitable habitat in the Sandhills, Sand Pine, Flatwoods, and Swamp ecological associations (Figure 3-1). Bald eagle management consists mostly of protecting nests from harassment during the nesting season, which occurs from December to May. The species is considered threatened by the state (U.S. Air Force, 1995).

***American Alligator*:** The American alligator prefers fresh and brackish water within the Flatwoods, Swamp, and Salt Marsh ecological associations (Figure 3-1). Alligators are federally listed as threatened due to their close resemblance to the American crocodile (federally listed as endangered, and does not occur on Eglin). The species is listed as a Species of Special Concern by the state (U.S. Air Force, 1995).

North American Black Bear: The black bear is the best known and most widespread of the North American bears. It is of medium size among bears, averaging 135 to 350 pounds and standing slightly over three feet at the shoulders. They have a predominately black coat, which is smooth and shorthaired compared to the brown bears. The black bear is an agile climber, even in adulthood. It is typically found in the sandhills, flatwoods, and wetland and riparian areas of the Eglin Reservation. The black bear is listed as a threatened species by the state of Florida and as a federal Species of Concern (U.S. Air Force, 1995).

Eastern Indigo Snake: The eastern indigo snake is a species closely associated with the gopher tortoise (Figure 3-2). The species utilizes gopher tortoise burrows during wintertime, although it may also use rotten stump holes or any other temperature moderated environment. It forages wet habitats during the summer. The eastern indigo snake is found in the Sandhills, Flatwoods, and Swamp ecological associations (Figure 3-1). This threatened species has been spotted less than two dozen times over the last 20 years (U.S. Air Force, 1995).

Southeastern American Kestrel: The southeastern American kestrel is resident of the Sandhills and Open Grassland/Shrubland ecological associations of Eglin AFB (Figure 3-1). The southeastern American kestrel is a small raptor that preys upon small rodents, reptiles, and insects that are common in open grasslands. The State of Florida has listed this species as threatened.

***Burrowing Owls*:** Florida burrowing owls prefer grassland areas as a habitat (Figure 3-2). The population on Eglin may represent a western migration of the range of the subspecies (U.S. Air Force, 1995). The State of Florida has listed the burrowing owl as a Species of Special Concern.

Dusky Gopher Frog: Eglin AFB supports the largest known concentration of reproductive sites of the dusky gopher frog subspecies anywhere within its range (Figure 3-2). This species utilizes gopher tortoise burrows for cover, but will also use oldfield mouse burrows, hollow stumps, and other holes for cover. They have been found in Sandhills, Sand Pine, and Open Grassland/Shrubland ecological associations up to two kilometers from the breeding ponds (Figure 3-1). The species requires seasonally flooded grassy ponds, depression marshes, and some Sandhills upland lakes that lack fish populations (U.S. Air Force, 1995).

Gopher Tortoise: The gopher tortoise is found in pine and oak woodlands in the Sandhills ecological association, but can also be found in the Sand Pine and Open Grassland/Shrubland associations (Figure 3-1). Tortoise burrows provide habitat for approximately three dozen species. This critical habitat is used for cover by gopher frogs and indigo snakes (Figure 3-2). Many inactive burrows are found on Eglin AFB; however, active burrows are considerably less in number. The rising number of inactive burrows has led to concerns about a population decline of the species resulting from poaching and loss of fire-dependent habitat (U.S. Air Force, 1994).

Florida Pine Snake: The Florida pine snake inhabits dry areas characteristic of the open grassland areas (Figure 3-1), and has adapted itself to digging into loosely packed sand. It has been observed in rodent and gopher tortoise burrows. The state of Florida has listed this species as a Species of Special Concern.

3.2.3 Sensitive Habitats

Sensitive habitats found within the Eglin Military Complex include wetlands, Florida Natural Areas Inventory (FNAI) Tier I pristine vegetative communities, and FNAI Significant Botanical Sites (U.S. Air Force, 1995). The management of sensitive habitats is the responsibility of the Natural Resources Branch (AAC/EMSN).

Activities that may affect wetlands (protected by the CWA) go through a permit process with the state as well as with the USACE. Activities minimizing impacts to wetlands are preferred, and the planning process should reduce or minimize ground-disturbing projects or actions occurring in a wetland (U.S. Air Force, 1995). Wetlands are most prominent in the Swamp ecological association, although some wetlands are also found in the Flatwoods ecological association. The Swamp ecological association, which is predominantly wetlands, covers approximately 37,000 acres of Eglin AFB.

The FNAI works cooperatively with the Florida Department of Environmental Protection (FDEP). The mission of FNAI is to collect, interpret, and disseminate ecological information critical to the conservation of Florida's biological diversity (FNAI internet site, http://www.fnai.org). FNAI maintains a statewide database on the distribution, status, and

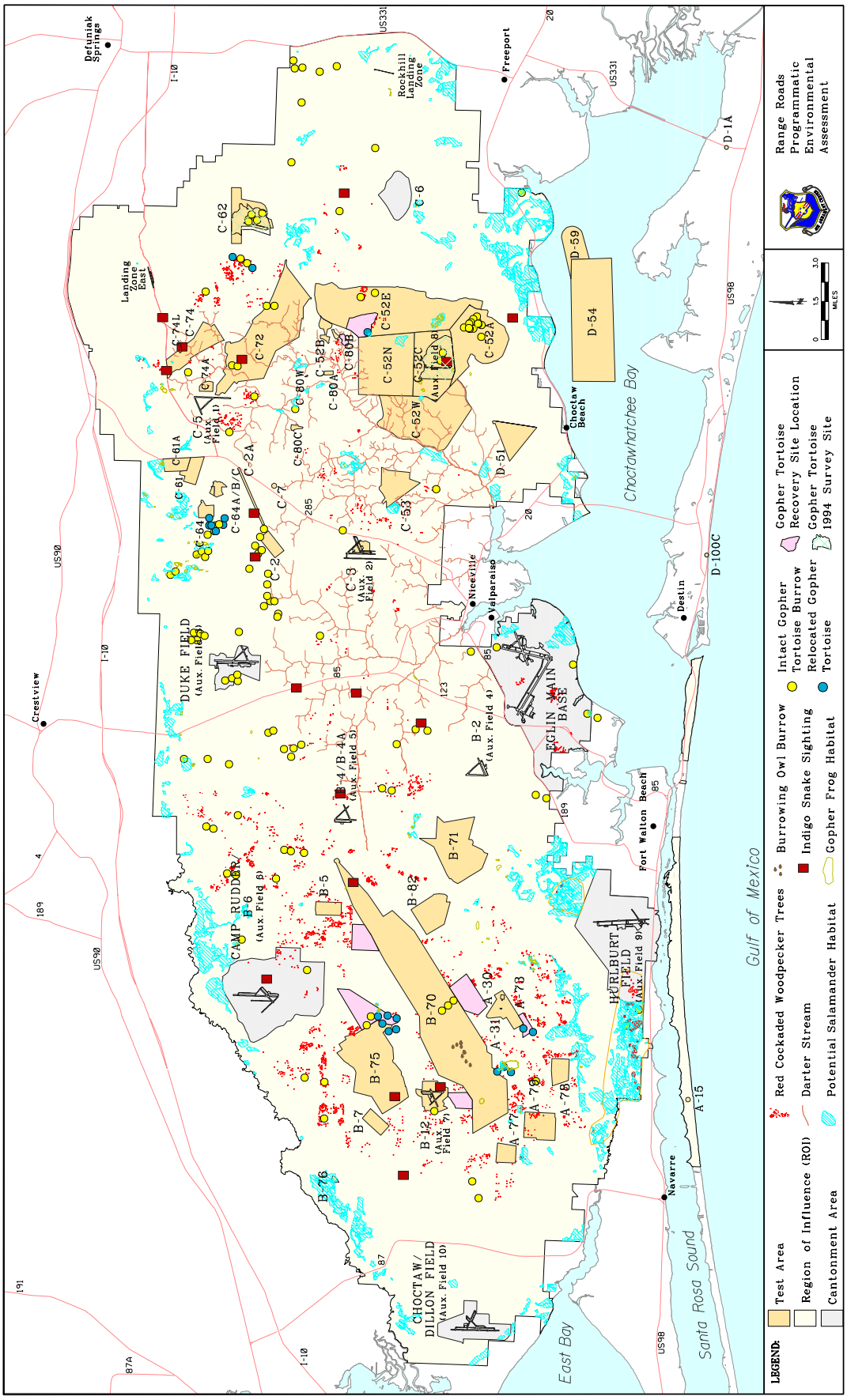

Figure 3-2. Known Locations of Sensitive Species within the Eglin Range

management of exemplary natural communities; endangered and rare plants and animal taxa; and managed areas in Florida. FNAI was contracted by AAC/EMSN to classify Eglin's land areas into the following categories:

- ***Tier I:*** Vegetative communities that are in or closely approximate their natural state. The goal of management is to maintain the natural community.
- ***Tier II:*** Vegetative communities that retain a good representation and distribution of associated species typical of the undisturbed state, but have been exposed to moderate amounts and intensities of disruptive events. Through careful management, the community may be restored or maintained.
- ***Tier III:*** Vegetative communities that do not retain good representation and distribution of associated species and have been exposed to severe amounts and intensities of disruptive events. Significant and intensive management over extended periods would be required to restore these communities (pine plantations, etc.).
- ***Tier IV:*** Areas on Eglin that have a designated land use, such as test areas, developed areas, sewage disposal areas, roads, power line rights-of-way, and other uses. The nature of the designated use determines the management goal.

This tier classification system was developed on Eglin AFB. Consequently, several Tier I communities have been identified (Figure 3-3). Tier I mesic communities are the most sensitive to degradation since many of these communities are classified as wetlands. There are approximately 2,000 acres on the Eglin Range that have been designated as Tier I mesic communities.

An FNAI survey was conducted at Eglin Air Force Base from 1992 through 1994 for populations of federally listed, endangered, threatened, and candidate plant species; state listed, endangered and threatened plant species; and other rare plant species (Chafin and Schotz, 1995). As a result of this survey, some areas on Eglin are considered to be Significant Botanical Sites due to their value as habitat for rare plant species or because of the high quality or rarity of their natural vegetative communities on Eglin. Special protection at these sites is required for two reasons: 1) high density of federal- and state-protected plant species, and 2) uniqueness of habitat that supports sensitive animals as well as plants.

The following 15 sites were identified as Significant Botanical Sites within the Eglin Range: East Bay Savannahs, Patterson Natural Area Expansion, Blue Spring Creek Lakes, Malone Creek, Titi Creek Wilderness Area, Live Oak Creek, Turkey Gobbler Creek Cypress Swamp, Turkey Hen Creek Swamp, Boiling Creek and Little Boiling Creek, Hick's Creek Prairie, Whitmier Island, Brier Creek, Underbrush, Hickory Branch Hardwood Forest, and Piney Creek.

No state-listed threatened and endangered plant species at these sites can be collected or disturbed unless a permit is authorized by the FFWCC. In addition, habitat that supports state or federal listed animal species must be conserved in accordance the Endangered Species Act (federal) and with the FWC. Sixteen areas on the Eglin Range were selected as Significant Botanical Sites based on one or more of the above-mentioned attributes. These sensitive sites constitute about 20,000 acres on Eglin AFB.

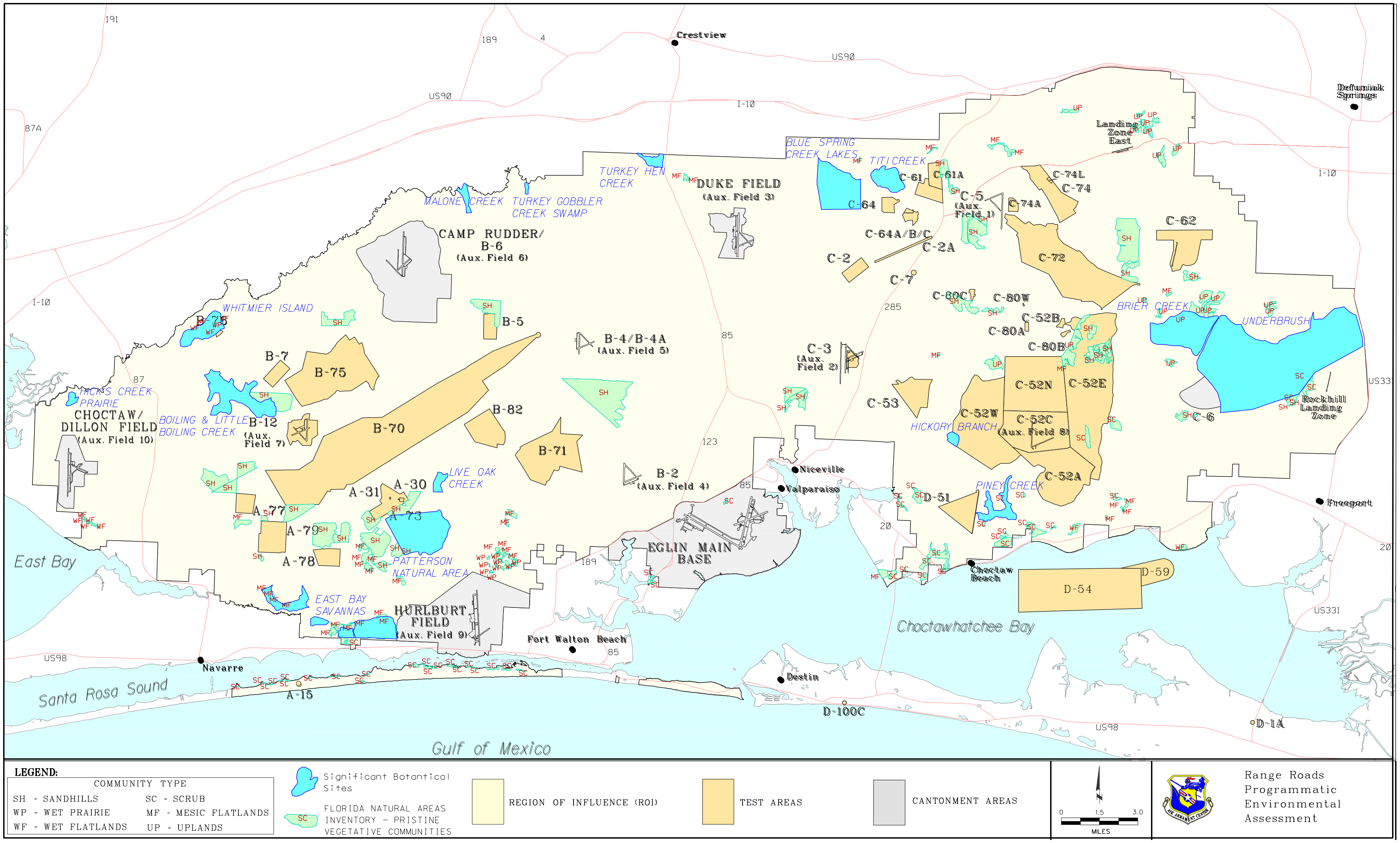

Figure 3-3. Sensitive Habitats on the Eglin Range

3.3 PHYSICAL FEATURES

The discussion of physical features in this section will focus on air quality, soils, water resources, and wetland areas of the Eglin Military Complex.

3.3.1 Air Quality

Air quality in a given location is generally determined based on the concentrations of various measurable substances known as "criteria pollutants." The concentrations of these pollutants are expressed in terms of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu g/m^3$). Factors affecting these pollutant concentrations include the size and topography of the air basin and local and/or regional meteorological conditions.

The magnitude and significance of a pollutant concentration is determined by comparison with National Ambient Air Quality Standards (NAAQS) or state standards. The NAAQS address six criteria pollutants and identify maximum allowable concentrations for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10}), and lead (Pb) (Clean Air Act, Title 40 CFR § 50-51). There are short-term standards (1-hour, 8-hour, or 24-hour periods) for pollutants with acute health effects and long-term standards (annual average) for pollutants with chronic health effects. The NAAQS are presented in Table 3-2.

Table 3-2. National Ambient Air Quality and Florida Standards

Pollutant	Averaging Time	Primary Standard[(a)]	Secondary Standard[(a)]	Florida Standards[(a)]
Total suspended particulate (PM_{10})	Annual	50 $\mu g/m^3$[(b)]	50 $\mu g/m^3$	50 $\mu g/m^3$
	24-hour	150 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
Sulfur Dioxide	Annual	80 $\mu g/m^3$ (0.03 ppm)	150 $\mu g/m^3$	160 $\mu g/m^3$
	24-hour	365 $\mu g/m^3$ (0.14 ppm)	260 $\mu g/m^3$	260 $\mu g/m^3$
	3-hour	--	1,300 $\mu g/m^3$ (0.5 ppm)	1300 $\mu g/m^3$
Carbon monoxide	8-hour	10 mg/m^3 (9 ppm)	10 mg/m^3	10 mg/m^3
	1-hour	40 mg/m^3 (35 ppm)	40 mg/m^3	40 mg/m^3
Nitrogen dioxide	Annual	100 $\mu g/m^3$ (0.053ppm)	100 $\mu g/m^3$	100 $\mu g/m^3$
Ozone	1-hour	235 $\mu g/m^3$	235 $\mu g/m^3$	235 $\mu g/m^3$
Lead	Quarterly	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$

Sources: Clean Air Act, 42 U.S.C. 7401 et seq.: Official Compilation of the Rules and Regulations of the State of Florida; Title 62 - Department of Environmental Protection, Chapter 62-272 - Air Pollution, Part III, Ambient Air Quality; Minerals Management Service, 1990; U.S. Air Force, 1995.

(a) Both state of Florida and national standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year, with maximum hourly average concentrations above the standard, is equal to or less than 1.

(b) Calculated as an arithmetic mean.

µg/m3 = micrograms per cubic meter
mg/m3 = milligrams per cubic meter
ppm = parts per million
PM10 = particulate matter equal to or less than 10 microns in diameter

The fundamental method by which USEPA tracks compliance with the NAAQS is the designation of a particular region as "attainment" or "nonattainment." Based on the NAAQS, each state is divided into three types of areas for each of the criteria pollutants:

- Attainment – any area that meets the national primary or secondary ambient air quality standard for the pollutant
- Nonattainment - any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant
- Unclassifiable - any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant (treated as attainment until proven otherwise)

Attainment areas must observe guidelines to ensure that their air quality does not deteriorate. An area may be in attainment for one pollutant and in nonattainment for another. Maintenance areas are areas where the air quality has improved enough to just meet the air quality standard and are under a continuing maintenance plan designed to maintain attainment.

Air quality within the boundaries of the range falls within the jurisdiction of the Florida Department of Environmental Protection (FDEP) and EPA Region IV, Air Quality Control Region 005. Again, air quality is measured against NAAQS, as amended, or state standards. Areas meeting or having better quality than the NAAQS are said to be in attainment.

No air quality monitoring stations are operated at Eglin AFB; air quality data for the base are collected by the FDEP at air monitoring stations located at Pensacola and Fort Walton Beach, Florida. Because the areas monitored by these stations are more urbanized than range areas, the recorded data provide a conservative representation of air quality in the Eglin AFB area. Air quality data collected at these stations in the past show that regional levels of air pollutants generally remain at or below their respective ambient air quality standards. Therefore, air quality over the land Ranges of Eglin AFB is in attainment of government standards (U.S. Air Force, 1997b).

3.3.2 Soils

Much of Eglin AFB is underlain by non-cohesive sandy sediments that were deposited by marine processes during Tertiary and Quaternary times. The materials occurring at the surface are relatively clean sands classified by the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service as Lakeland Series soils. Other surface soils found at Eglin include the Tifton and Troup Series (Albertson et al., 1995).

These soils belong to Hydrologic Group A, under the USDA's soil ranking system. They are characterized as having a high infiltration rate when thoroughly wetted. They consist chiefly of deep, well- to excessively-drained sands or gravels with a high rate of water transmission, which produces a low surface runoff potential. They also have a very low content of clay and typically include loose sands through loamy sandy soils (FLDACS, 1993). The principal engineering properties of these soils are described in Table 3-3.

Table 3-3. Classification and Physical Characteristics of Soil on Eglin AFB

Soil	Depth (feet)	USCS Class	Clay (%)	K-Factor
Lakeland	0-40	SP-SM	1-8	0.17
	40-80	SP, SP-SM	1-6	
Tifton	0-16	SM	10-20	0.20
	16-34	SM	13-22	
	34-60	SM	20-35	
	60-80	SC, CL	25-40	
Troup	0-60	SM, SP-SM	5-6	0.17
	60-80	SM-SC, CL-ML	15-19	

Source: Albertson et al., 1995 K-Factor = soil erodibility factor; USCS = Unified Soil Classification System; SP = Sand poorly graded; SP-SM = Sand with 5-12% fines; SM = Silty sand >12% fines; ML = Silt; CL-ML = Clayey silt; CL = Silty clay; SC = Sandy Clay; SM-SC = Silty Sand and Sandy Clay

3.3.3 Surface Water

Surface waters on Eglin occur within portions of three hydrologic basins: the Choctawhatchee Bay, Yellow River Basin, and Pensacola Bay. The basins are composed of more than 1,300 acres of natural lakes and man-made ponds, 1,209 miles of rivers, and a network of streams covering approximately 600 acres (AAC/EMSN, 1999a).

Flood-prone areas occur along the Yellow River drainage system and the East Bay Swamp. Flooding can occur within the drainage basins from rainfall or hurricanes; however, most of the Eglin Land Range is above the 100-year flood inundation zone (areas with a one percent probability of being inundated by flood water in a given year) (U.S. Air Force, 1995).

The Pensacola Bay Basin contains Live Oak Creek and Turtle Creek, which flow south to the East Bay River. The Choctawhatchee Bay Basin contains Rocky Creek, Turkey Creek, and Juniper Creek, which flow to the south and discharge into Choctawhatchee Bay (U.S. Air Force, 1995). Water quality is a measurement of the chemical and physical characteristics of a water mass that describes its suitability for specific uses. The major bodies of water on Eglin were classified as good (meets designated use) by the Florida Department of Environmental Quality. The National Biological Service has requested that all Okaloosa darter streams be included in the Outstanding Florida Waters Program (U.S. Air Force, 1995).

3.4 ANTHROPOGENIC RESOURCES

3.4.1 Recreation

There are various public recreational activities that take place on Eglin AFB (Figure 3-4), and there are 280,000 acres of land open for outdoor recreation. Outdoor activities include hunting, fishing, hiking, and camping, the most popular being hunting and fishing. During the baseline year, approximately 16,000 recreational permits were issued. Public recreation on Eglin is permitted during daylight hours only, with the exception of approved campsites after sunset.

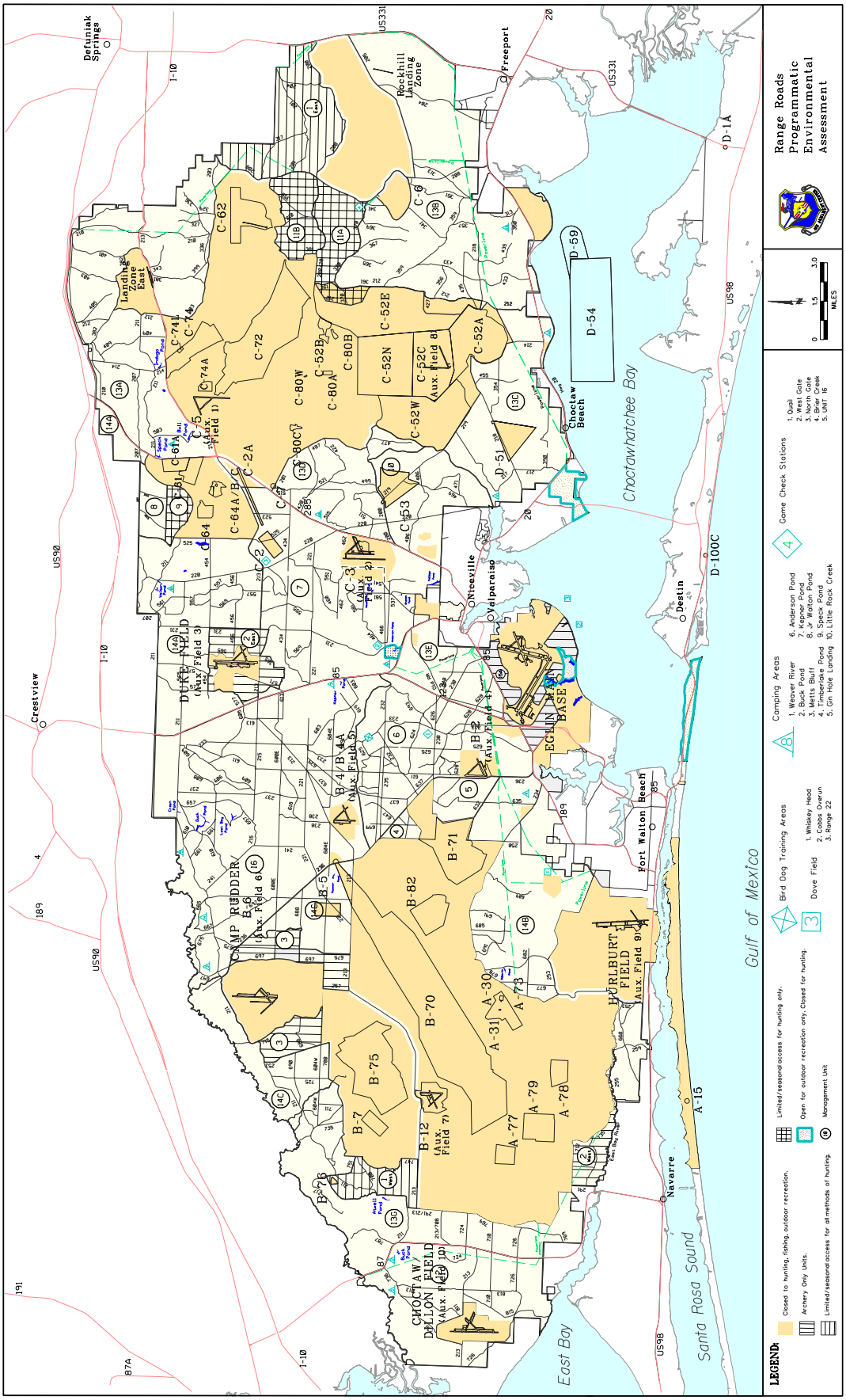

Figure 3-4. Outdoor Recreational Areas of Eglin AFB

Areas open to public recreation have been divided into 17 separate management units, each having its own regulations associated with seasons, mission activities, and access to the public and DoD-affiliated persons. All persons that engage in outdoor recreational activities are required to adhere to applicable Eglin AFB, federal, and state laws, rules, and regulations (Florida Game and Fresh Water Fish Commission, 1997). General regulations are in place that address prohibited actions; for example, disturbing or removing any government property from the Eglin Range. Entry into "closed" areas is prohibited unless special permission has been granted by the Commander, Eglin AFB. Areas designated as "seasonally closed" can be assessed only during specified hunting dates (holidays, weekends) or by special permission of the Commander, Eglin AFB. Areas designated as "open," such as the eastern end of Okaloosa Island, are available for all types of outdoor recreation with the exception of hunting. All rules and regulations for recreational activities can be obtained from the Natural Resources Branch (AAC/EMSN) at Eglin AFB (U.S. Air Force, 1996a).

Recreational, hunting, and fishing permits are required for anyone 16 years or older entering Eglin AFB and may be obtained from the Natural Resources Branch (AAC/EMSN). Those persons hunting, fishing, or in possession of equipment used for these activities must also have applicable state and federal licenses, stamps, and permits (U.S. Air Force, 1996a).

Forestry – The Natural Resources Branch manages forests on Eglin AFB. Principles of ecosystem management are utilized to ensure ecosystem viability and biodiversity while providing compatible multiple uses. Integrated Natural Resources Management includes forestry and fire management as tools for achieving desired stand structures and diversity over time and space as well as producing ecologically acceptable levels of goods and services such as timber commodities (U.S. Air Force, 2001b).

The longleaf pine Sandhills ecosystem, which exists on Eglin AFB, provides a very important habitat for the endangered RCW. The population of longleaf pine trees throughout the southeastern United States has been steadily decreasing since the mid-1800s. It is estimated that there were 60-90 million acres of longleaf pine throughout the southeastern United States during the mid-1800s. Today, there are less than two million longleaf pine acres left in the southeast.

Eglin has the largest contiguous coverage of longleaf pine remaining in the world (U.S. Air Force, 1997c). One goal of forestry operations at the Natural Resources Branch is to restore the longleaf pine Sandhills ecosystem that provides habitat to the federally endangered RCW. Management techniques such as prescribed burns, the removal of invading species and artificially planted species, the planting of longleaf pine seedlings, the monitoring of endangered species, and the surveying of endangered species, support this goal (U.S. Air Force, 1997c).

3.4.2 Cultural Resources

Of the 463,000 acres comprising the Eglin Military Complex, 100,000 acres have been surveyed and over 1,300 cultural sites identified. A total of 213,000 acres have been removed from consideration because of the low probability of finding prehistoric cultural resources.

Section 106 of the National Historic Preservation Act requires that federal agencies assess the effects of federal activities on historic properties. Any undertaking that has the potential to affect

such a property is subject to consultations with state and federal regulatory agencies, and American Indian tribes. Range road activities that occur on or near historic properties have the potential to cause effects and are subject to Section 106 review. Section 106 is initiated once the Cultural Resources Branch (AAC/EMH) has reviewed project details that the proponent has submitted on an AF Form 813, AF Form 103, or brings to the Cultural Resources Management Office, in Building 238. Once they have reviewed a specific activity, AAC/EMH makes the determination on whether consultations are required. AAC/EMH is also responsible for conducting the consultations, which must be completed prior to initiating any activity associated with the project. To assist in determining if a project will occur near a historic property, cultural resources zones can be viewed on Eglin's GIS as either 1) Areas of Constraint or 2) Constraint Free, as follows:

1. *Areas of Cultural Resources Constraint:* These are areas that may require cultural resources investigation and/or consultation between Eglin and the State Historic Preservation Office (SHPO) during the planning stages of a project. These areas are defined as one of the following:

    a. 100-acre (or greater if warranted by site size) area around sites eligible or potentially eligible for the National Register of Historic Places.

    b. Non-surveyed areas within high or indeterminate probability zones. High probability zones are defined as 1) areas within 200 meters of water and situated no more than 50 feet above the water source, and 2) areas located on old maps and/or documentation where historic activity may have occurred prior to military ownership.

2. *Constraint-Free Areas:* These areas do not require cultural resources consideration or consultation prior to conduct of mission activities, although Eglin's Cultural Resources Branch (AAC/EMH) must be notified promptly if any cultural material is discovered. AAC/EMH will work to ensure that discovery does not impede the mission. Constraint-free areas include two subsets*:*

    a. Surveyed areas (regardless of probability), with the exception of the buffer zones around eligible or potentially eligible sites (which fall into Category 1 above).

    b. Low probability areas, with the exception of buffer zones around eligible or potentially eligible sites (which fall into Category 1 above).

Figure 3-5 indicates Areas of Cultural Resource Constraint at Eglin AFB. Areas of constraint include, but are not limited to, previously unsurveyed property determined to have a high probability for the occurrence of cultural resources and significant historic properties. Constraint areas are systematically surveyed as part of Eglin's compliance requirements to inventory all of its cultural resources. As these are continuously being updated, consultation with AAC/EMH is required to obtain the latest information for any activities that might impact a constraint area. Areas not specifically indicated as constrained in Figure 3-5 are considered constraint-free.

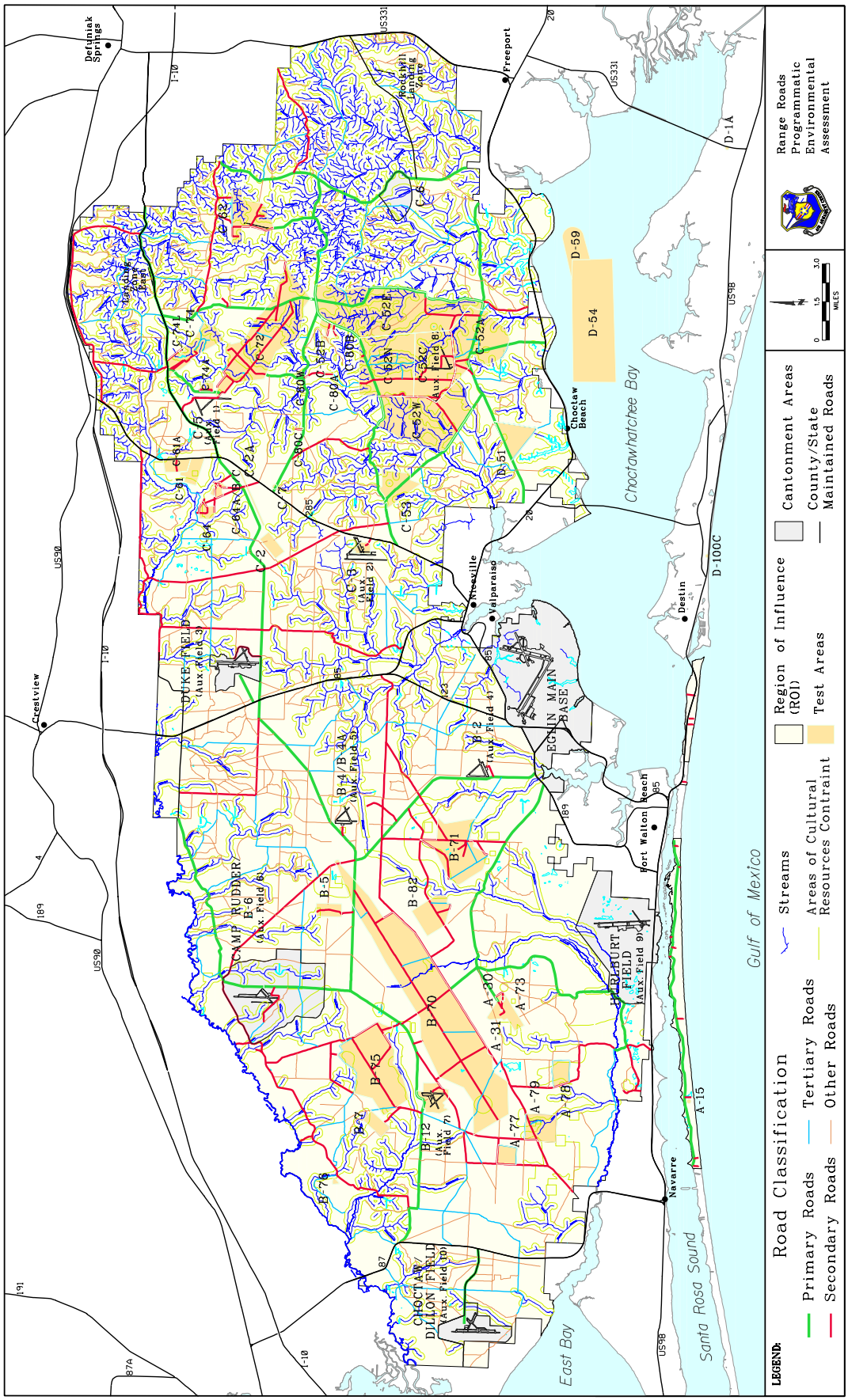

Figure 3-5. Areas of Cultural Resource Constraint at Eglin AFB

Activities planned in these constraint-free areas do not require consultation with AAC/EMH. In the event of unexpected discovery of cultural resources in areas shown to be constraint-free, all activity in the immediate vicinity will cease until the Base Historic Preservation Officer has been notified and a determination of significance has been rendered.

AAC/EMSN is currently integrating their maps into a Geographic Information System (GIS) database to better describe these definitive areas of cultural resources. A map of all of the constraint zones on Eglin is in production and upon completion will be placed in the GIS viewer and on the Eglin internal web site. More specific information is sensitive and AAC/EMH should be consulted on a need-to-know basis. Until a complete survey of the constraint areas has been accomplished, the danger of direct physical impact to unknown cultural resources is a possibility.

4. ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter analyzes the potential impacts of the ***issues*** associated with usage of the Range Road System at Eglin AFB, as described in Chapter 2, on the ***environmental receptors*** identified in Chapter 3. The following issue categories were evaluated in the analyses:

- Habitat Alteration
- Noise
- Direct Physical Impact
- Public Access

In this chapter, each issue category is first described, then potential impacts related to each issue category from each alternative are analyzed. The analyses produced a measure for each issue, which could be used for comparison when considering the alternatives. The discussion of the measures includes criteria to analyze the impact of the issue, if criteria were available. If criteria were not available, the discussion was based on what is known in the literature about impacts related to the issue. An example of this procedure is quantifying the level of noise (issue) associated with road usage and discussing resulting impacts on red-cockaded woodpeckers (receptor). Each receptor was chosen based on the likelihood that it would be impacted by a specific issue. Table 4-1 identifies the different receptors evaluated in the analyses. The table also identifies which receptors were potentially impacted by each of the issue categories discussed above.

Table 4-1. Issues and Potential Impacts on Receptors

Receptors	Issue			
	Habitat Alteration	Noise	Direct Physical Impact	Public Access
Physical Resources				
Air Quality	•	–	–	–
Water Quality	•	–	•	–
Biological Resources				
Sensitive Habitats	•	–	•	–
Threatened and Endangered Species	•	•	•	•
Anthropogenic Resources				
Recreation, Hunting, Wilderness	–	–	–	•
Cultural Resources	–	–	•	•

• Potential for impact(s)
– No Potential Impact(s)

4.2 ASSUMPTIONS

This Programmatic Environmental Assessment (PEA) is designed to look at the overall impacts of policy changes associated with range road management. The PEA identifies a range of potential impacts of the proposed alternatives, but it does not attempt to quantitatively analyze the specific impacts. It will not be used as a decision-making document to support specific road construction, maintenance, and decommissioning decisions; however, it is intended to support a policy change that will provide the framework for making those decisions. Although it is not possible to specifically quantify the impacts associated with implementation of the preferred alternative, it is possible to describe a potential range of effects and/or trends by comparing the No Action Alternative (current program) with the other alternatives described. Assumptions used in evaluating each of the alternatives are described below.

4.2.1 Alternative 1: No Action Alternative

Under the No Action Alternative, the vast majority of roads in the existing Range Road System would continue to be operated. Systematic road closures would not be undertaken, although road closures would be initiated on an opportunistic basis, without analysis of the cumulative impacts to the range transportation system. Additionally, current maintenance practices would continue, with maintenance activities undergoing environmental review on a case-by-case basis.

4.2.2 Alternative 2

This alternative would establish a formal Range Road Oversight Process for addressing road-related issues, as well as establish a set of criteria for categorizing range roads based on their perceived importance. Under this alternative, a multi-organizational team, the Range Road Working Group (RRWG) would be responsible for the application of road standards to guide construction, repair, and maintenance of the range road network in accordance with the goals set forth in the Range Road Plan. The RRWG would be under the leadership of the Test Wing's Technical Directorate (46TW/TSR) with members from the Environmental Management Directorate (AAC/EM) and Civil Engineering (96CEG).

Eglin AFB would apply road construction/maintenance standards described in *The Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001a) (https://em.eglin.af.mil/roadbmp/). These standards are designed to increase the durability and strength of the roadway to resist traffic abrasion and weathering. The handbook provides 796CES field personnel, engineers, supervisors, managers, and administrators with standards, guidance, and specific instruction for construction, reconstruction, and maintenance of Eglin's unpaved Range Road System. The goal is to provide planning and application tools that can be used to reduce the impacts of the Eglin road system on terrestrial and aquatic environments, reduce road maintenance costs, and increase the life and utility of the road system. The objective of this work is to reconstruct the roadway as an elevated road prism that readily sheds water, minimizes the erosive velocity of runoff, and reduces direct connections between road stormwater runoff and streams.

The overall approach in the development of the handbook was to investigate problematic segments of Eglin's unpaved road system, understand the nature and influencers of the

problem(s), determine what was missing, and develop a strategy to replace it. The discussion in the handbook focuses on the definition and description of issues, processes, and procedures, and components of the decision-making process, as well as the step-by-step procedures for implementing recommended solutions. The handbook is designed to foster the development of site-specific project plans that implement Best Management Practices (BMPs) that provide measurable results in reducing road maintenance requirements and sedimentation of streams.

Many of the BMPs presented, such as sediment basins, soft armor waterways, and grade stabilization structures require the collection and analysis of field data and engineering calculations, whereas BMPs such as water bars and deflectors can be designed and constructed in the field. It is crucial that the planning and design phase of any land treatment project precede the application of corrective BMPs. Otherwise, there is a high risk of failure and additional expense associated with reworking a site. Improperly designed BMPs frequently become sources of sediments rather than preventative measures. Under this alternative, Eglin would also develop a maintenance inspection schedule since BMPs must also receive regular maintenance to ensure that they are operating effectively and optimally. Routine maintenance of BMPs and quick response to problems can significantly reduce road-caused slumps and slides and prevent the creation of berms that could channelize runoff.

The ultimate goal of this alternative would be to ensure that Eglin range roads are brought up to and maintained to the necessary standard to support the diverse missions in a cost effective and environmentally sound manner. Additionally, by following standardized design and maintenance practices, future range road maintenance activities and decisions will be streamlined and potential environmental impacts, including cumulative impacts, can be minimized.

4.2.3 Alternative 3 (Preferred Alternative)

In addition to the actions described as part of Alternative 2, this alternative would implement a formal Range Road Closure Program using the same organizational structure described in Alternative 2, with the RRWG responsible for the establishment and application of criteria used in the systematic closure of range roads. As part of this process, the multi-organizational RRWG would also be responsible for making specific range road closures recommendations, with specific road closure BMPs, described in *The Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001a), applied as part of closure actions.

As a guide to making defensible decisions, the RRWG would apply standardized decision criteria that would be driven by mission requirements and environmental factors, including: a) the importance of the particular road to Eglin's test and training mission, b) the importance of the particular road to the Natural Resources or land management mission, c) the associated cost of maintenance, and d) the degree to which the road poses an adverse environmental impact.

In making these decisions, The RRWG will need to evaluate the negative impacts posed by current roads, as well as gauge potential impacts associated with maintenance of existing roads or construction of new roads. To better understand the issues and evaluate potential environmental impacts, the RRWG will use various environmental indicators. These indicators may include road density, stream crossings, resources overlap, soil slope, key road/resources intersections, etc.

Table 4-2 describes potential indicators and summarizes their utility in analyzing road related issues. (Note: These are some of the most common indicators available; however, there are a variety of other indicators, such as specific geographic information system (GIS) analyses, statistical summaries, environmental studies, etc., that may be used when making road related decisions.)

Table 4-2. Description of Decision Indicators

POTENTIAL INDICATOR	DESCRIPTION	UTILITY
Road Density	A measure (in road miles per square miles) of the density of the road system in a particular area. High road density is a potential factor in habitat degradation and fragmentation, and may also play a role in the limiting species migration.	Provides a simple indication of areas with relatively high concentrations of roads. Also useful in identifying roads that provide redundant access. Optimal density vales typically range between 0.5 and 2.0 road miles per square miles, depending on the particular habitat (U.S. AIR FORCE 1998).
Stream Crossings	Stream crossings are the points where roads and streams intersect. Stream crossings of unpaved roads are the primary source of sedimentation into Eglin surface waters due to road-generated erosion or ineffective or damage drainage structures.	Identifies candidate roads/areas on which erosion control treatments (e.g., revegetation, rip-rap, etc.) may be required. Identifies candidate roads for decommission.
Resources Overlap	Spatial analysis depicting overlap of roads with sensitive or pristine habitats. Road crossing of these areas increase the potential for degradation of water quality, degradation of habitats, and impacts to sensitive species.	Identifies candidate roads for decommission. Identifies candidate roads on which erosion control treatments may be desired.
Ground Slope	Ground slope gradient is one of the primary driving forces in soil mass-wasting failures.	Identifies candidate areas on which erosion control treatments (e.g., revegetation, water bars, broad based dips, etc.) may be required or desired.
Key Road/Resources Intersections	Spatial analysis depicting intersections of range roads with County-maintained or other non-Air Force roads. These access points may facilitate illegal activities on the range, including poaching and dumping.	Identifies candidate roads for decommission.

The use of an indicator implies the existence of certain environmental conditions. Usually, this association is based on correlative studies between some variable (the indicator) and the response variable of interest. The true set of environmental variables that produce the response are often complex, unmeasured, or unknown. Simply because there is a good correlation found between the indicator and the observed effect does not imply that the measured indicator is the causation of the effect; it may only be correlated to the response.

For example, there may be a good correlation between road density and stream sediment levels. The causative mechanism may not be the density of roads, but ineffective maintenance practices, unstable fills, or other sources of erosion. Simply reducing road density without paying close attention to reducing the sources of sediment will not produce the expected result of reducing

sediment. However, indicators can provide a starting point for evaluating potential impacts and identifying certain causative relationships. Appendix A presents examples of spatial analyses, based on these indicators, conducted for the current road system. These analyses were performed using the various coverages contained within the Eglin AFB Geographic Information System (GIS) database, as well as the range road data collected by the 1997 Road PIT.

Indicators may be used to answer a series of questions, which can further assist to measure the potential impacts of road construction, maintenance, and closure activities. Table 4-3 presents questions that may be used by the RRWG as a checklist to scan the range of possible issues. The questions are not intended to be prescriptive, but when used in conjunction with environmental indicators, they may assist the RRWG in developing approaches appropriate to each issue.

Effective mitigation of potential impacts associated with usage of the road system requires a combination of measures. The challenge is to reduce ecological costs of unnecessary roads while maintaining the capability to fulfill the Air Force mission. For this document, it was impossible to predict which roads would, or should, be closed, since those decisions will be made by a cooperative effort between the three key organizations. The final determination for closing a road would depend on a variety of factors, including the importance to the mission, environmental impacts, and maintenance costs. For example, closure of some secondary roads would not only have a positive environmental impact, but would also have a positive financial impact. There are approximately 50 miles of secondary roads that are classified as having a low to very low priority and poor to very poor condition. Maintenance funds are expended on these roads, unlike tertiary or "other" roads, which receive no routine maintenance. Funds saved by closure of these roads could be used to upgrade and maintain remaining secondary roads (AAC/EMSN, 2001).

Proper road closure is essential in preventing future erosion and sedimentation from roads. Proper closure may range from blocking access to a road to the removal of temporary structures in watercourses, returning stream crossing approaches to their original grades, and revegetating disturbed areas. Several different levels of road closures are described below:

- *Closure* involves physically blocking access to the road. A road may be closed either temporarily (seasonal closure) or permanently. This is typically done by means of a gate, a cable strung across two poles, or a fiberglass stake planted in the middle of the roadway with a sign advising motorists that the road is closed. Although use of a device (e.g., fiberglass stake) that prohibits motorized access may provide increased wildlife security, it may not completely address environmental concerns. Discontinuing maintenance and preventing motorized traffic may not prevent hydrologic problems, since the road may continue to disrupt drainage patterns or cause soil erosion. This is the type of road closure most commonly employed at Eglin AFB.

- However, this type of closure (i.e., blocking access) may also result in substantial manpower costs. At Eglin, road closures generally require persistent management for the first year. During this period, vandals may routinely damage or destroy the new barricades. However, with continued and timely maintenance, the frequency of these incidents greatly diminishes after the first year (AAC/EMSN, 2001).

Table 4-3. Evaluation Criteria for Road-Related Decisions

POTENTIAL ISSUE	DECISION CRITERIA	AFFECTED ACTIVITIES	POTENTIAL INDICATOR
ENVIRONMENTAL CONSIDERATIONS			
Habitat Alteration			
Water Quality, Sensitive Habitats, and T&E Species	• Does the road modify the surface and subsurface hydrology of the area?	C-M-D	SC
	• Do road-stream crossings influence local stream channels and water quality?	M-D	SC
	• Does the road undergo significant surface erosion?	M-D	SC, GS
	• Does the road contribute to soil mass wasting?	C-M-D	GS
	• Does the road overlap areas of sensitive aquatic resources (e.g., wetlands)?	C-M-D	RO
	• Does the road overlap areas with sensitive biological resources (e.g., FNAI Tier I areas)?	C-M-D	RO
Noise			
T&E Species	• Will activity cause unacceptable noise impacts to sensitive species?	C-M-D	–
Direct Physical Impact			
Water Quality, Sensitive Habitats, T&E Species, and Cultural Resources	• Does the road facilitate poaching, harassment, or illegal kill levels?	D	RD, KI
	• Does the road restrict the migration and/or movement of terrestrial organisms?	D	RD
	• Does the road restrict the migration and/or movement of aquatic organisms?	D	SC
	• Does the road facilitate illegal dumping?	D	KI
	• Does the road facilitate introduction of non-native invasive plants into sensitive habitats?	C-D	RD, RO
	• Does the road facilitate looting/vandalism of cultural resources sites?	D	KI, RO
	• Does the road overlap areas with unique cultural resources?	C	RO
	• Does the road create significant potential for fuels spills to enter surface waters?	C	SC, RO
Public Access			
Recreation, Hunting, Wilderness Resources	• Does the road connect to public roads and provide primary access to recreational users?	M-D	KI
	• Does the road provide primary access to recreational facilities on range?	D	–
	• Does the road provide primary access to hunters?	D	–
OTHER CONSIDERATIONS			
	• Does the road affect access needed to fulfill test and training missions?	C	–
	• Does the road affect access needed for natural resources tracking/management?	C-M-D	–
	• Does the road affect access to timber stands needing silvicultural treatment?	C-M-D	–
	• Does the road affect access to paleontological, archaeological, and historical sites?	D	RO
	• Does the road affect fire management capabilities?	D	–
	• Does the road affect safety/law enforcement activities?	D	–
	• Will decommissioning increase revenue by eliminating maintenance costs?	D	–

T&E = Threatened and Endangered; C = Construction; M = Maintenance; D = Decommission; SC = Stream Crossing; RD = Road Density; GS = Ground Slope; RO = Resources Overlap; KI = Key Intersections

- *Conversion* involves converting a road to a non-motorized access way (i.e. walking or riding trail) by narrowing the road width and stabilizing fill materials. Converting a road into a trail can be an effective approach to removing a road if all fill materials are stabilized before the trail is constructed. However, although trails are less intrusive and damaging than roads, they may cause similar impacts, such as stream sedimentation and facilitation of non-native species invasions. Also, conversion may be ineffective where unauthorized vehicle usage, bicycle, or horseback riding is allowed since impacts associated with recreational use may continue.
- *Decommissioning* is carried out to minimize short-term sediment production, while "storing" a road for future use. The goal of decommissioning is to leave much of the road prism[1] intact so that the road can be reconstructed in the future with only minimal effort. Major treatments may include stabilizing sidecast fill material, while leaving "stream crossings" (i.e., culvert pipe, box culvert, etc.) in-place. Decommissioning preserves most of the original construction investment, while reducing road-caused erosion and avoiding maintenance and/or repair costs.
- *Obliteration* involves removing a road with no plans for future reconstruction. The most effective obliteration restores the original landform to the greatest possible extent. Stream crossings are removed and slopes are recontoured. Road surfaces and fill sites are ripped to improve water infiltration. Revegetation is also actively carried out with native species. If implemented appropriately, obliteration is the most effective approach to road removal since it addresses both terrestrial and water quality impacts. However, obliteration is also the most expensive closure option. At Eglin AFB, obliteration is typically used only at sites posing serious erosion problems.

The RRWG would address future needs in determining which roads to close. For example, some roads could be permanently closed and re-vegetated (i.e., obliterated), while other roads could be closed to traffic to minimize environmental impacts (i.e., closed or decommissioned), but would still be available to meet future mission needs. The degree of closing depends on the type or roadway and the assigned use objectives for the designated road or road segment. In all cases, closing roads entails meticulous planning and application of applicable BMPs. *The Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001a) establishes procedures for effectively closing/decommissioning roadways on Eglin AFB. It presents a comprehensive suite of range road closure practices and standards that can be applied by end users to translate road management decisions into ground applications that produce the desired conditions.

4.3 SCOPE OF THE IMPACT ANALYSES

For this assessment, it was impossible to predict which roads would, or should, be closed since those decisions will be made by a cooperative effort between the three key organizations (i.e., 46 TW, AAC/EMSN, and 796CES) comprising the RRWG. However, it was necessary that an effort be made to quantify the impact of unpaved PIT roads on the environment. Therefore,

[1] The road prism is the area spanning from the top of the *cutslope* to the bottom of the *fillslope*. The *cutslope* is the soil and rock slope on the uphill side of the road, while the *fillslope* is the slope between the outside edge of the roadbed and the natural ground surface.

spatial analyses, evaluating a variety of potential environmental indicators (discussed in the previous section) were performed using the different data layers contained within the Eglin AFB GIS database. The GIS contains detailed spatial and descriptive data on a variety of physical features on the Eglin Range, as well as location and attribute data on threatened and endangered species. The GIS also contains the range road data collected by the 1997 Road PIT. This data includes descriptive information on each road segment, such as condition, surface type, and maintenance status. Information on usage is also available, including roads traveled by individual organizations, mileage logged on these roads, and types of vehicles utilized. The spatial analyses were performed utilizing Modular GIS Environment (MGE®) Analyst Module software, produced by Intergraph Corporation

The 1997 PIT classified a road as being primary, secondary, tertiary, or "other." Primary roads were those roads maintained by the 796CES and included paved roads such as range roads (RR) 213, 214, 236, 242, and 257, and unpaved roads such as RR 200, 201, and 208. These roads are the main thoroughfares into, and through, the range. Organizations were also asked to identify other routinely used (non-primary) roads currently not maintained by the 796CES. These roads were designated as secondary roads. Other less commonly utilized roads were classified as tertiary or "other," depending on usage. This classification system provides an initial indicator of the relative importance of each road, with primary roads being the most important and "other" roads being the least important.

The spatial analyses focused on roads categorized by the PIT as having a classification of tertiary or “other.” It would be expected that road closures would, at least initially, be targeted at these less important roads. This represents an oversimplification of the issues, but provides a means to develop a measure of impact. The final determination for closing or decommissioning a road will depend on a variety of factors, and would not necessarily be limited to these two classes of roads. For example, many tertiary roads on the range are in good condition because of their infrequent use, and pose little adverse environmental impacts because of their distance from sensitive ecosystems. Closing these roads would reduce road density, but would likely fail to increase overall ecosystem quality (AAC/EMSN 2000a). Conversely, a higher-class primary or secondary road may pose a greater environmental impact than a tertiary or "other" road because of its higher usage or proximity to sensitive habitats. Additionally, tertiary and "other" roads typically incur very little or no maintenance costs, while these costs may be significant for higher-class roads. The following discussions address the potential environmental impacts under each of the alternatives.

4.4 HABITAT ALTERATION – ISSUE DESCRIPTION

The approximately 2,700 miles of roads on Eglin dissect, connect, and disconnect many ecologically sensitive habitats, including numerous streams, rivers, and wetland areas. These sensitive habitats support a variety of threatened and endangered plant and animal species and may be vulnerable to environmental impacts associated with the presence and use of roads. Soil erosion of the road surface and roadside areas is a prevalent process associated with current road maintenance that has degraded all stream habitats across the Eglin Reservation, especially Okaloosa darter stream habitats. Current road maintenance procedures have created roads with surface configurations that in many instances are below natural ground elevations, forming roads

that function as water channels feeding sediment directly into streams. The mere presence or proximity of Eglin roads has also been identified as having a potential impact on sensitive species. Intensive road maintenance activity in close proximity to red-cockaded woodpecker (RCW) nests during the breeding season may also increase nest abandonment and predation.

Proper design, construction, and maintenance can minimize some of these effects but cannot completely eliminate them. Although most impacts occur during initial road construction, inadequate or ineffective maintenance activities also increases potential impacts, particularly on the road surface and associated ditches. Issues associated with Habitat Alteration are degradation to Air Quality, Water Quality, Sensitive Habitats, and Threatened and Endangered Species. Potential impacts of each of the alternatives with respect to these issues are discussed below.

4.4.1 Air Quality

The burning of fossil fuels by vehicles used on the range results in the emission of a variety of chemicals, including carbon dioxide (CO_2), carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_x), sulfur oxides (SO_x), and very fine particulates. These emissions have the potential to impact local air quality. Road construction and maintenance activities causes dust and increased exhaust emissions. Although this increased level of exhaust is usually insignificant in dispersed rural areas, it can affect visibility.

Alternative 1 - No Action

An assessment of the impact of emissions from vehicular traffic on regional air quality requires consideration of a wide range of variables, including vehicle type, speed, ambient temperature, and vehicle operating temperature. However, lacking these detailed data, the Air Force has developed a model that considers all of these factors, weights them according to national averages and standards, and provides a single value for pollutant emissions based on vehicle-miles driven. The Road PIT database contained numbers and types of vehicles traveling on each road segment, as well as the length of these segments. Resulting air emissions were calculated by multiplying annual vehicle-miles on each road segment by the appropriate emission factors. Table 4-4 presents air emissions for roads on the range for the No Action Alternative.

Table 4-4. Air Emissions on Range Roads

Annual Vehicle Miles[1]	Emissions (pounds/year)[2]				
	CO	HC	NO_x	SO_x	PM_{10}
8,309,167	207,035	34,811	36,643	3,481	7,329
Total Emissions (tons/year)	**103.5**	**17.4**	**18.3**	**1.7**	**3.7**

[1] Source: U.S. Air Force, 1997a (total number of miles logged per month)
[2] CO = carbon monoxide, HC = hydrocarbons, NO_x = nitrogen oxides, SO_x = sulfur oxides, PM_{10} = particulate matter (< than 10 micrometers)

In order to quantify the impact on air quality associated with traffic on range roads, vehicle emissions emanating from traffic on county-maintained roads adjacent to or crossing the Eglin Range were also calculated (Table 4-5). The analysis considered daily traffic on State Roads

(SR) 87, 85, 285, and 20, and U.S. Highway (Hwy) 331. As is evident from Table 4-5, emission levels on county-maintained roads are significantly higher than those calculated for range roads. Therefore, traffic on the range does not pose a negative impact on local air quality when compared to routine vehicle traffic on some of the local roads. The State of Florida also concurs with this finding; it has categorized emissions from vehicular traffic on Eglin AFB as being "insignificant" in the installation's Title V Air Permit (U.S. Air Force, 1996).

Table 4-5. Air Emissions on County-Maintained Roads

Road Segment	Miles Per Segment	Miles Per Year	Emissions (Pounds/Year)				
			CO	HC	NO_X	SO_X	PM_{10}
SR 87 S. of I-10	5.5	11,442,750	285,113	47,939	50,463	4,794	10,093
SR 87 N. of Hwy 98	5.5	20,476,500	510,203	85,786	90,301	8,579	18,060
SR 85 and Hwy 190	6.9	28,710,900	715,375	120,284	126,615	12,028	25,323
SR 85 S. of I-10	6.9	62,962,500	1,568,805	263,781	277,665	26,378	55,533
SR 285 S. of I-10	8.8	10,920,800	272,108	45,753	48,161	4,575	9,632
SR 285 and Hwy 190	8.8	13,811,600	344,137	57,864	60,909	5,786	12,182
Hwy 331 N. of Freeport	3.8	7,073,700	176,252	29,635	31,195	2,964	6,239
Hwy 331 S. of DeFuniak	3.8	9,986,400	248,826	41,838	44,040	4,184	8,808
Hwy 20 W. of Freeport	13.3	17,476,200	435,446	73,217	77,070	7,322	15,414
Total Emissions (lb/year)			**4,556,265**	**766,098**	**806,419**	**76,610**	**161,284**
Total Emissions (tons/year)			**2,278**	**383**	**403**	**38**	**81**

Source: U.S. Air Force, 1998
CO = carbon monoxide, HC = hydrocarbons, NO_x = nitrogen oxides, SO_x = sulfur oxides, PM_{10} = particulate matter (< than 10 micrometers)

Fugitive dusts or vehicle emissions generated during road maintenance activities would also cause a decrease in local air quality, resulting from increased dust and vehicle emission levels. The scope and duration of these activities are typically limited. Additionally, regional air circulation would quickly dissipate any pollutants generated. Therefore, impacts to overall air quality from these activities are anticipated to be negligible.

Alternative 2

The number and types of vehicles operating on range roads, as well as the types of maintenance activities performed, would be the same as those under Alternative 1. Therefore, there are no specific aspects of this alternative that would create any impacts to air quality not already addressed under Alternative 1.

Alternative 3

The number and types of vehicles operating on range roads would be the same as those under Alternative 1. However, activities associated with the systematic closure of roads, such as removing fills and culverts, reestablishing drainage-ways, removing unstable road shoulders, or full obliteration can increase local dust and vehicle exhaust emission levels. These impacts would be of a short duration, lasting only as long as the closure activity and would not pose any long-term negative impacts.

4.4.2 Water Quality

Roads concentrate surface water flows during storm events that can lead to significant erosion from unpaved roads. Natural erosion usually occurs gradually because vegetation protects the ground. When land is cleared or disturbed by the presence of a road, however, the rate of erosion increases. Even the best-designed roads produce sediment, and unpaved roads continue to produce sediment for as long as they remain unvegetated. This sedimentation has the potential to adversely impact water quality in streams or lakes.

Roads also affect hydrology by intercepting, concentrating, and diverting runoff. They also increase the density of streams on the landscape. For example, a road can intercept rainfall and groundwater and promote the concentration and movement of runoff to the stream channel. Interception of groundwater by a road can reduce the flow of a spring or may cause a spring to become a flowing stream. Roads also indirectly affect hydrology because they replace trees that use water through evapotranspiration (loss of water from the soil through evaporation and from plants through transpiration). Water otherwise used by trees becomes available for runoff rather than returned to the atmosphere, which may increase streamflow and possibly flood peaks. Some increased flood frequency and higher flood levels occur due to existing roads (USFS, 2001).

Decades of road construction and maintenance on Eglin have had a profound negative impact on aquatic habitat, increasing levels of stream sedimentation and altering natural streamflow patterns, water temperature, and channel configuration. Impacts have ranged from unabated long-term sedimentation to catastrophic failures of bridges and culverts that have occurred as a result of hurricanes (U.S. Air Force, 2001b). This has resulted in increased turbidity levels in streams throughout the Eglin Reservation. For example, turbidity sampling conducted on 23 March 2001 on Middle Creek and an unnamed stream crossing on Range Road 211 identified each location to be in violation of EPA turbidity standards (29 Nephelometric Turbidity Units (NTU) over background readings). Middle Creek turbidity was measured at 68.4 NTU and the unnamed stream crossing turbidity was 135.1 NTU (U.S. Air Force, 2000).

Stream crossings are the points where a road comes in contact with a water body, and are typically the primary source of sedimentation into surface waters. Additionally, at these crossings the stream is usually channelized by means of culverts or bridges. These structures can also pose problems because they can alter flow patterns and restrict the passage of fish. Channelization may also remove natural diverse substrate materials, increase sediment loads, simplify current patterns, lower the stream channel, reduce the stability of banks, and exacerbate downstream flooding (Noss, 1990). Culverts often become blocked, causing streams or storm water to wash out the roadways, depositing this material into nearby streams. Culverts can function and appear to be in good working order even if the top half of the culvert is rusted through. These same culverts will ultimately fail during storm events that fill the culverts, causing the road above the culvert to become undermined (U.S. Air Force, 2001a).

Roads may also degrade water quality through pollutant runoff. Contaminants are deposited on roadway surfaces, median areas, and rights-of-way from vehicular traffic and activities associated with road construction and maintenance. During storm events, rainwater first washes out atmospheric pollutants and, upon surface impact, picks up roadway deposits and runs off into

receiving water bodies. This runoff can be highly polluted and may include contaminants such as rubber from tire wear, antifreeze and engine oil that has dripped onto the pavement, pesticides and fertilizers, and other debris. Other pollutants, such as heavy metals from tire wear, adhere to sediment and are transported with it by wind and water. These pollutants may degrade water quality and can harm aquatic life by interfering with photosynthesis, respiration, growth, and reproduction.

Research by the Federal Highway Administration (FHWA) on the impacts on water quality from highway pollutant runoff found that runoff had significant effects only from highways with traffic volumes greater than 30,000 vehicles per day (major freeways and urban arterials) (USEPA, 1996). Average daily traffic (ADT) has a strong influence on the quality of stormwater because pollutant levels are directly proportional to ADT levels. The quantity of pollutants originating from highways and motor vehicles, however, is not well understood, as pollutants are hard to measure and vary by location (USEPA, 1996). ADT levels on the most heavily used range road on Eglin AFB (RR 211) are on the order of 650 vehicles per day. The next most heavily used road (RR 213) recorded ADT levels of approximately 400 vehicles per day (U.S. Air Force, 1997a). These levels are considerably lower than the 30,000 vehicles per day threshold established by the FHWA as being significant. Additionally, the majority of Eglin range roads are unpaved, limiting their potential for contaminant transport. Therefore, vehicular traffic is not expected to adversely impact water quality in area surface waters.

Finally, the use of certain materials commonly used as road aggregate may also impact water quality. For example, limestone aggregate or milled asphalt has been used as stabilizer materials on stream crossings on the range. There is a potential for runoff from these materials to change the pH of receiving waters. This would be of particular concern if the receiving waters were classified as Okaloosa darter habitats.

Alternative 1 – No Action

Improper/inadequate road construction and maintenance practices have had an adverse impact on water quality at Eglin AFB. Natural Resources Branch personnel estimate that sediment loss from non-point sources, comprising unpaved roads and borrow pits, amounted to over 20,000 tons in the Okaloosa darter Basin during 1999 (ACC/EMSN, 1999a). (Note: the Okaloosa darter Basin is an area on the range encompassing streams characterized as darter habitats.)

The primary source of sedimentation occurs where a road comes in contact with that water body (i.e., at stream crossings). These crossings pose the most serious impacts to water quality on the range. A spatial analysis of range roads and stream intersections identified a total of 192 crossings, with 118 (61.5 percent) of these crossings associated with roads classified as tertiary or "other." Most of the roads in these two categories were described as being in poor to very poor (i.e., erodible) condition. Appendix B presents a complete listing of unpaved roads crossing streams. (Note: The actual number of stream crossings may be much higher than the number calculated in this assessment, since the Road PIT database, used in the analyses, did not include many of the smaller roads or trails on the range.) Under this alternative, roads in the existing Range Road System would continue to be operated, while current problematic maintenance practices would also continue.

Alternative 2

This alternative would establish a formalized Range Road Management Process, with participation from the RRWG, the RC3, and the RDESC. This process would ensure that road related issues are addressed at the highest level. Although the number of unpaved roads operating would be the same as those under Alternative 1, this alternative would apply specific standards and BMPs to road construction and maintenance activities, as described in *The Eglin Air Force Base Range Road Maintenance Handbook* (https://em.eglin.af.mil/roadbmp) (U.S. Air Force, 2001a).

The Handbook presents a range of soil erosion control BMPs, selection of which, are based on the specific site geologic/hydrologic conditions. BMPs are structural, vegetative, or managerial measures, typically applied to roadways, stream crossings, and special management zones (e.g., areas on either side of streams/rivers) in order to achieve erosion and sedimentation control objectives. BMPs described in the Handbook include:

- *Waterbars* are mounds of soil (over 12 inches in height) built across a light duty road for the purpose of diverting surface water flow.
- *Broad-based Dips* are a periodic reversal in the grade of a permanent access road for the purpose of diverting surface water flow.
- *Sediment Basins*, also known as silt basins, are engineered impoundment structures that allow sediment to settle out of the runoff. They are generally located at the low point of areas, where they will be able to trap sediment-laden runoff.
- *Water Turnouts* are channels that drain water away from roads into vegetated areas for dispersion. These outlet structures help reduce the velocity of water carried by drainage ditches and limit sedimentation.
- *Revegetation* involves applying vegetation to road shoulder slopes or around stream crossings to reduce soil erosion, improve the structures of the soil, and enhance slope stability. Vegetation may also reduce the need for grading the road surface, reducing maintenance costs (U.S. Air Force, 1999). Grass seeding is a cost-effective means to achieve revegetation.

BMPs have been successfully applied in national parks and forests throughout the country. For example, when the Conecuh National Forest in Alabama started implementing BMPs, such as vegetation and waterbars, the idea initially met with resistance. However, later complaints diminished when it was found that installation of waterbars made bad-weather roads passable. Waterbars on several roadways have been in place for several years without the need for grading. When maintenance is needed, only spot repairs are made, significantly lowering traditional maintenance costs (U.S. Air Force, 1999).

Many of the BMPs presented in the Handbook, such as sediment basins, soft armor waterways, and grade stabilization structures require the collection and analysis of field data and engineering calculations, whereas BMPs such as waterbars and deflectors can be designed and constructed in the field. It is crucial that the planning and design phase of any land treatment project precede the application of corrective BMPs. Otherwise, there is a high risk of failure and additional

expense associated with reworking a site. Improperly designed/implemented BMPs frequently become sources of sediments rather than preventative measures.

Numerous studies have shown that properly implemented BMPs are very effective in reducing erosion/sedimentation from unpaved roads (Table 4-6). BMPs have been successfully applied to unpaved roads at Eglin AFB. For example, BMPs were applied to a 0.5-mile section of RR 211 following the reconstruction of a bridge in 1996. The application design called for the building of 17 berms as sediment traps on the road shoulder. Waterbars were also built into the road surface and two percolation basins were built near a stream. The area was mulched, limed, fertilized, seeded, and covered with erosion blankets. The total project costs were $6,000. An evaluation of the site six months after implementation of the BMPs indicated that previous erosion/sedimentation problems were no longer in evidence (AAC/EMSN, 1999).

Table 4-6. Effectiveness of Erosion Control Measures on Forests Roads

Stabilization Measure	Portion of Road Treated	Percent Decrease in Erosion
Tree planting	Fill Slope	50
Grass seeding	Road Cuts	71
Straw mulch	Road Fills	72
Gravel Surface	Road Tread	70
Dust Oil	Road Tread	85
Terracing	Cut Slope	86

Source: USEPA, 1993

It would be anticipated that implementation of road maintenance standards and erosion BMPs would have a positive impact on water quality, since road-caused erosion/sedimentation would be reduced. However, this potential positive impact cannot be accurately gauged, since quantitative erosion data in most areas of the range are not available. Additionally, the effectiveness of BMPs would be greatly dependent on various factors (i.e., application, installation, and maintenance).

Alternative 3

Under this alternative, Eglin AFB would undertake the systematic closure of a large number of problematic range roads that were deemed non-essential to the test and training or natural resources mission. Closure would involve blocking the entrance to a road, revegetating, removing unstable road shoulders, or full obliteration by recontouring and restoring natural slopes. In the case of stream crossings, these activities would also consist of removing fills and culverts and/or bridges and reestablishing drainage-ways. Such activities can increase erosion/sedimentation; however, these impacts are of a short duration, lasting only as long as the closure activity. Closing roads would reduce erosion/sedimentation into Eglin waters and would return an area to a more natural hydrologic condition, improving overall water quality. Long-term benefits of improved hydrologic conditions and water quality would be greater than under the No Action Alternative and Alternative 2, and they would increase as the number of road miles closed increased. (Note: The Natural Resources Branch has ongoing/planned studies designed to monitor and document long-term water quality in Eglin streams [AAC/EMSN, 2000]).

4.4.3 Sensitive Habitats

Sensitive habitats found within the Eglin Range include wetlands, FNAI Tier I pristine vegetative communities, and FNAI Significant Botanical Sites (U.S. Air Force, 1995). Wetlands are also critical habitats since many of the sensitive vegetative species at Eglin depend on the hydrology of soils in these areas. Disturbance in these habitats is related to decreases in diversity and cover of vegetation. The level of habitat alteration is dependent on the type of community and the vegetation that is supported. Wetlands in particular are expected to be more susceptible to impacts associated with roads than dryer communities (i.e., Sandhills ecological association), since the presence of roads may cause significant loss and degradation of wetlands.

In addition to the direct losses, roads often alter the hydrologic regime. Culvert placement, for example, usually alters water flows on both the uphill and downhill sides of a road, while roads constructed through seepage slopes are altering the structure and hydrology of sensitive wetland habitats. Roads also isolate wetland areas, and activities during construction or maintenance can cause erosion and the silting of streams.

Uncontrolled access into the range by unauthorized personnel may also pose adverse impacts to sensitive habitats resulting from an increased frequency of fire ignitions. Humans are suspected to cause at least 90 percent of wildfires in the United States, over half of which begin along roads. Shaw and co-workers reported 78 percent of all anthropogenic fires occurred within 265 feet of a road (Noss, 1990).

Alternative 1 – No Action

The current Range Road System traverses numerous sensitive habitats and the Eglin Range. Spatial analyses indicated that under the No Action Alternative, a total of 106 individual road segments crossed FNAI Tier I areas, with 68 of these (64 percent) associated with roads classified as tertiary or "other." Significant Botanical Sites were crossed by a total of 41 road segments, with 30 of these segments (73 percent) associated with roads classified as tertiary or "other." Most of these tertiary and "other" roads were categorized as being unpaved, in poor to very poor condition. Appendix C presents a complete listing of unpaved roads crossing sensitive habitats.

Palustrine-type wetlands are the most common type found on Eglin and, consequently, the most frequently crossed by roads. The analyses indicated that a total of 166 individual road segments crossed Palustrine-type wetlands, with 102 (61 percent) of these associated with roads classified as tertiary or "other." Riverine, Estuarine, and Lacustrine-type wetlands were crossed much less often, with 13, 1, and 0 crossings, respectively, associated with these types. Again, most of these tertiary and "other" roads were categorized as being unpaved, in poor to very poor condition. The resulting road density in FNAI Tier I areas is estimated to be approximately 2.5 road-miles per square mile, while densities in Significant Botanical Sites and wetland areas are 0.98 and 0.75 road-miles per square mile, respectively (Table 4-7). The analyses indicate that there were approximately 47 miles of roads crossing FNAI Tier I areas, 31 miles of roads crossing Significant Botanical Sites, and 25 miles crossing wetland communities. (Note: The actual number of road crossings of sensitive habitats may be much higher than the number calculated in this assessment, since the Road PIT database did not include many of the smaller roads or trails

on the range.) Disturbance in these areas is directly related to road density, therefore, it would be anticipated that implementation of Alternative 1 would have no net positive impact on existing conditions.

Table 4-7. Road Density in Sensitive Habitats

Area Crossed	Road Length within Area (road-miles)	Area (square mile)	Road Density (road-miles/square mile)
FNAI Tier I	47.07	18.66	2.52
Significant Botanical Sites	30.91	31.65	0.98
Palustrine Type Wetlands	25.40	33.94	0.75
Riverine Type Wetlands	0.091	0.247	0.37
Estuarine Type Wetlands	0.022	0.0016	13.35
Lacustrine Type Wetlands	0.000	0.000	0.000
All Wetlands	**25.52**	**34.19**	**0.75**

Note: Appendix C presents a complete list of roads crossing sensitive habitats identified in the assessment.

Results of a spatial analysis also showed 95 intersections of roads categorized as tertiary or "other" with county roads (access points), posing a significant potential for uncontrolled access into the range. The analysis utilized the data contained within the Road PIT database; therefore, the actual number of access points is probably higher. Chains, gates, or other barricade devices block many of these access points; however, access around most of these barriers is generally not difficult. These uncontrolled access points pose a negative potential for fire ignition. The number of access points, as well as resulting potential impacts, would not change under Alternative 1.

Alternative 2

Under this alternative, the number of unpaved roads crossing sensitive habitats would be the same as those under Alternative 1. It would be anticipated that implementation of this alternative, however, would have an overall positive impact on sensitive habitats, since application of effective construction/maintenance procedures would reduce the amount of environmental damage caused by substandard roads. Well maintained roads would reduce erosion and landslides, protect riparian and wetland habitat, and enhance fish and wildlife passages. This positive impact would be more pronounced in wetland communities, since these are more susceptible to impacts from siltation than dryer communities (e.g., Sandhills ecological association).

The number of access points into the Eglin Range would be the same as those under Alternative 1, consequently, potential impacts resulting from uncontrolled access into the range would also be the same.

Alternative 3 (Preferred Alternative)

Under Alternative 3, it would be expected that road density through sensitive habitats would be reduced as a result of the systematic closure of non-essential problematic roads. Disturbance in these areas is directly related to road density; therefore, it would be anticipated that

implementation of this alternative would have a greater positive impact on sensitive habitats than would be achieved by implementation of the other two alternatives. Additionally, application of effective road maintenance procedures would reduce the amount of environmental damage caused by substandard roads.

It would also be expected that the number of access points into the range would decrease as some smaller roads and trails with access to exterior roads are closed. Therefore, potential impacts resulting from uncontrolled access into the range (e.g., illegal fire ignitions) would be reduced from those of the other two alternatives

4.4.4 Threatened and Endangered Species

Most of Eglin AFB land is covered by sandy material, which is quite erodible; thus, the unpaved road system has become a source of erosion. Sediments are eroded from and along the roads and transported to nearby streams. This sedimentation has the potential of adversely impacting riparian fish habitats including those of the protected Okaloosa darter.

Numerous studies have examined the effect that excess sediment has on aquatic ecosystems. For example, sediment from road construction activity in Northern Virginia reduced aquatic insect and fish communities by up to 85 percent and 40 percent respectively (Reed, 1997). Other studies have shown that fine sediment (fine sand or smaller) adversely affects aquatic ecosystems by reducing light penetration, impeding sight-feeding, smothering benthic organisms, abrading gills and other sensitive structures, and reducing habitat by clogging interstitial spaces within a streambed. Increases in fine sediments also reduce the availability of oxygen to eggs and increase embryo mortality. Stowell and others reported that deposition of 25 percent fine sediments in spawning rubble or gravel reduces fry emergence by 50 percent. Sedimentation also has negative effects on the invertebrate food supply of many fish. Furthermore, destruction of riparian vegetation by road construction results in higher water temperatures, which reduces dissolved oxygen concentrations and increases fish oxygen demands (Noss, 1990).

Okaloosa darters are sensitive to water quality fluctuations, and require clear flowing water. Extreme changes in temperature and water clarity may interfere with the reproductive ability of this species (Jelks and Alam, 1998). The extremely limited range of the darter and the amount of its habitat degraded by road and dam construction, as well as siltation from the unpaved road system and land clearing operations, were primary factors in the initial listing as an endangered species (Jelks and Alam, 1998).

Although fewer than 10,000 Okaloosa darters are thought to exist, the current population levels have been assessed as stable. However, stability of desired aquatic habitat components is dynamic at best and susceptible to alteration in form and function by improper natural resource maintenance/management practices (U.S. Fish and Wildlife Service, 1998). Habitat conservation measures such as implementation of road erosion reduction practices, and closure of nonessential roads have improved darter habitat by reducing stream sediment loading. Figure 4-1 clearly demonstrates the correlation between reduced soil loss and darter populations.

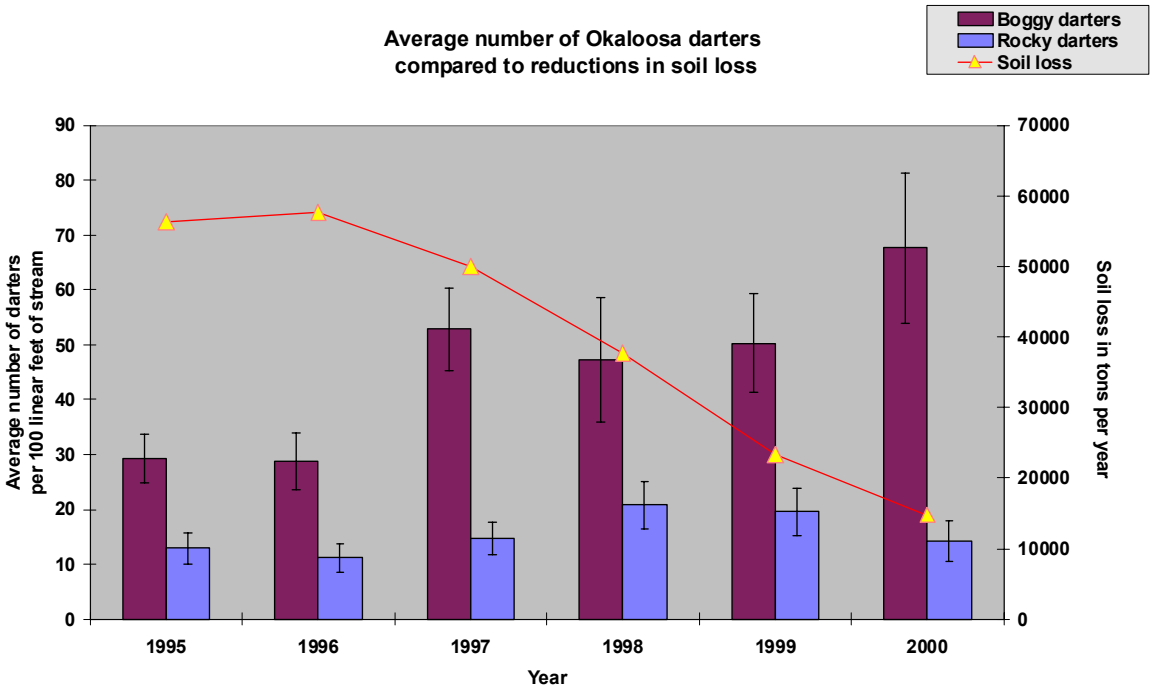

Figure 4-1. Estimated Correlation Between Reduced Soil Loss and Darter Populations
Source: U.S. Air Force, 2001b

The presence of roads may also impact threatened and endangered plant species. There are 18 known threatened and endangered plant species that occur throughout the range. Significant Botanical Sites and Tier I natural communities have demonstrated a high richness and/or high densities of these sensitive vegetation species. These plant species may be susceptible to invasion and eradication by non-native or exotic plant species that dominate and disperse along roadsides, such as cogongrass. This invasive species is spread primarily by road construction or maintenance related activities through the use of road building materials (i.e., soils and/or clays) contaminated with seeds. A secondary means of dispersal is through vehicular traffic. The rhizoms (roots) or seeds become entrained in the undercarriage or tire treads of vehicles as they travel through infested areas, and are then deposited in new areas along the roadway (AFDTC/EMSN, 1998b). Once established, cogongrass can quickly spread into the surrounding countryside.

Although not as serious a problem as cogongrass, the Tallow-tree or Popcorn-tree (*Sapium sebiferum*) also poses a challenge to Eglin AFB personnel. It grows and spreads rapidly, is difficult to kill, and tends to take over large areas by out-competing native plants. At Eglin, birds primarily spread the Tallow-tree; the seeds are readily eaten and then dispersed. These plants are also concentrated along road rights-of-way since many bird species use roads as travel ways. Vehicles may also transport the seeds or they may be carried by rivers, streams, and stormwater run-off to new destinations (AFDTC/EMSN, 1998b).

Another potential issue affecting threatened and endangered species is habitat fragmentation. Fragmentation generally refers to the breaking up of forest into many smaller tracts separated by different landscape elements. As fragmentation increases, the amount of unaltered central or

core habitat decreases, and ecosystems are increasingly subject to adverse edge effects from human activity, changes in microclimate, increases in human-caused fires, and invasion of nonnative species. Habitat in roadless areas is generally less fragmented and better connected than in roaded areas of similar size (USFS, 2001). Roads split natural habitats such as forests, decreasing habitat size and reducing interaction with other communities. This fragmentation may produce declines in both the number of species (diversity) and their populations (abundance) (USEPA, 1996). Various studies report that white-tailed deer, mule deer, elk, mountain lions, grizzly bear, black bear, and a variety of other species tend to avoid roads.

Habitat fragmentation is directly related to road density, expressed as road miles per square miles of area. The U.S. Forest Service has not prescribed formal standards for road density in National Parks or Forests; however, several individual National Forests have established road density limits to protect habitats supporting specific sensitive species (Sowa, R., 1998). These limits typically range between 0.5 and 2 miles of road per square mile (Bader, 1991). For example, the Gallatin National Forest in Montana has implemented a road density standard of 0.5 miles of road per square mile in critical Grizzly Bear and big game habitat. The 0.5 road density standard is assumed to maintain a habitat effectiveness of at least 70 percent, an accepted minimum for population viability of grizzlies and elk (Bader 1991). According to research in the Northwest and northern Rockies, “a road density of one mile per square mile of habitat can decrease habitat effectiveness for elk by 40 percent, compared to roadless watersheds. As road density increases to six miles per square mile, elk habitat use falls to zero." (Noss and Cooperrider, 1994).

Alternative 1 - No Action Alternative

The primary reasons for reductions in darter populations and home range are the alteration and loss of suitable habitat caused by poor management practices. Over decades of land use on Eglin, man-induced soil erosion has introduced numerous tons of sediment into darter streams, which has had a profound impact on the form and function of streams. Natural Resources Branch personnel have performed extensive surveys of erosion sites in the Okaloosa darter Basin, and have identified approximately 90 erosion sites associated with road crossings of darter streams (AAC/EMSN, 1999). No Okaloosa darters now occur in Mill Creek at and just above its mouth below the State Road 20 crossing in Niceville because of heavy siltation in the stream (with deposits up to three feet deep) and beaver activity. The presence of road culverts has encouraged beavers to construct dams on the upstream side of culverts, further impeding darter movements (U.S. Air Force, 2001b). Of particular importance to maintaining Okaloosa darter populations on Eglin AFB is the management of watershed terrestrial components in a manner that minimizes potentials for aquatic habitat degradation related to road induced stream sedimentation. Under this alternative, current problematic road construction/maintenance practices would continue, as would the potential for adverse impacts to Okaloosa darter habitats.

The degree of impact on sensitive plant species resulting from invasive, exotic plants has not been measured, although cogongrass has become established in approximately 50 sites around the Eglin Reservation. However, according to Natural Resources personnel, cogongrass poses a serious invasive problem at Eglin AFB. This potential problem would continue under Alternative 1.

There is also a potential for habitat fragmentation associated with the extensive road system. The Road PIT inventoried approximately 1,600 miles of roads on the Eglin Range. Using these data, the average road density on the Eglin Range was calculated to be 1.71 road-miles per square mile. Densities Ranged from 0.6 to 2.53 road-miles/square mile in different sections of the range. The actual number of roads on the Eglin Range is actually much higher than that categorized by the Road PIT Database. An inventory of roads conducted for Eglin in 1994 by Woolpert, Inc. documented the presence of many smaller roads and trails not included in the Road PIT Database. This inventory utilized high-resolution aerial photographs to identify range roads. The Woolpert inventory categorized approximately 2,700 miles of roads, or more than twice the number captured in the Road PIT Database. (Note: The Road PIT did not catalog many of these smaller roads because they were not identified as critical to the test and training mission by organizations on the base.) Natural Resources Branch personnel utilized the Woolpert data to estimate road density on the range. Using this data, the road density was calculated to be approximately 3.85 road-miles/square mile on the Eglin Range. Densities ranged from a high of 5.36 to a low of 3.16 road-miles/square mile in the various Ecological Monitoring Units (EMU) (AAC/EMSN, 1999). (Note: An EMU is a subdivision of the range based on watershed and subwatershed boundaries as delineated by the Florida Department of Environmental Protection.)

There is no clear documentation of habitat fragmentation or road aversion behavior by wildlife on Eglin range roads. However, due to the probable high road density in areas of the Reservation that support sensitive species and clear evidence of impact in the available literature, there is a potential for adverse impacts from habitat fragmentation under the No Action Alternative.

Alternative 2

Under this alternative, the number of unpaved roads operating at Eglin AFB would be the same as those under Alternative 1. However, it would be anticipated that implementation of this alternative would have a positive impact on streams populated by the Okaloosa darter, since road-caused erosion/sedimentation would be reduced through application of road maintenance standards and erosion control BMPs. This potential positive impact cannot be accurately gauged, since quantitative erosion data in most areas of the range are not available. Additionally, the effectiveness of BMPs would be greatly dependent on various factors, including proper application, installation, and maintenance.

Potential adverse impacts regarding invasive plants and habitat fragmentation would be the same as those under Alternative 1 since the number of roads operating on the range would also be the same.

Alternative 3 (Preferred Alternative)

Under Alternative 3, Eglin AFB would undertake the systematic closure of a large number of problematic range roads that were deemed non-essential to the test and training or natural resources mission. Construction of erosion control structures during road closure activities would increase short-term sedimentation; potentially affecting streams classified as Okaloosa darter habitats. However, the long-term positive impact on threatened and endangered species

associated with the removal of these roads would offset any negative short-term impact. Long-term positive impacts would increase as the number of road miles and stream crossings were reduced.

There would be an expected decrease in the likelihood of introduction of non-native invasive plants or weeds under this alternative, as roads through or adjacent to sensitive plant habitats (e.g., Significant Botanical Sites) were closed. It would also be expected that road density throughout areas of the range would be reduced as a result of the systematic closure of non-essential problematic roads. Habitat fragmentation is directly related to road density; therefore, it would be anticipated that implementation of this alternative would have a greater positive impact on habitat fragmentation than would be achieved by implementation of the other two alternatives.

4.4.5 Summary - Habitat Alteration

The No Action Alternative (Alternative 1) negatively impacts water quality on Eglin AFB. Sensitive habitats and threatened and endangered species are also impacted by this alternative. This is the result of erosion/sedimentation associated with the unpaved roads system, as well as the high density of roads on the range. These impacts are summarized as follow:

- There are potential negative impacts to water quality, as well as threatened and endangered species, resulting from sedimentation caused by erosion from unpaved roads.
- There are potential negative impacts (i.e., habitat fragmentation and/or road aversion behavior) to threatened and endangered species associated with the high road density in some areas of the range.
- There are potential negative impacts to sensitive plant species resulting from invasion by non-native or exotic plant species that dominate and disperse along roadsides.
- There are potential negative impacts to sensitive habitats resulting from illegal fire ignition activities.

Erosion/sedimentation from unpaved roads results in large part from current, inadequate road design and maintenance procedures (i.e., lack of BMPs). Alternative 2 would mitigate erosion-caused impacts by implementing road standards to guide construction, repair, and maintenance activities. Alternative 3 would further mitigate other potential impacts associated with the No Action Alternative by implementing the systematic closure of roads deemed nonessential to the test and training or natural resources mission. Impacts associated with air emissions from traffic or maintenance activities are estimated to be negligible under all alternatives considered. Vehicle emissions can be considered negligible when compared to local non-Air Force traffic. Table 4-8 compares the three alternatives discussed.

Table 4-8. Comparison of Alternatives – Habitat Alteration

POTENTIAL ISSUE	OVERALL IMPACT	NO ACTION - ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Air Quality	**Negative**	Temporary effects due to traffic or construction and maintenance activities	Same as No Action	Same as No Action
	Positive	–	–	–
Water Quality	**Negative**	Continued degradation of water quality due to sediment loading (i.e., erosion and sedimentation) from roads maintained below standards Temporary impacts from water runoff and erosion associated with new road construction	Temporary impacts from water runoff and erosion associated with new road construction activities	Short-term erosion/ sedimentation effects resulting from road obliteration activities
	Positive	–	Increased water quality and reduced environmental damage due to erosion from substandard roads	Further improvement in hydrologic conditions and water quality from closure of problematic roads
Sensitive Habitats	**Negative**	Adverse impacts to hydrologic conditions and structure of sensitive habitats, such as wetland, due to high road density and erosion from substandard roads Adverse impacts form uncontrolled access, specifically, fire ignition activities	Adverse impacts to hydrologic conditions and structure of sensitive habitats, such as wetlands, due to high road density Adverse impacts form uncontrolled access, specifically, fire ignition activities	–
	Positive	–	Reduced environmental damage due to erosion from substandard roads	Reduced environmental damage due to erosion from substandard roads Further improvement in hydrologic conditions from closure of problematic roads Decrease likelihood of uncontrolled access resulting from road closures

Continued

Table 4-8. Comparison of Alternatives – Habitat Alteration Cont'd

POTENTIAL ISSUE	OVERALL IMPACT	NO ACTION - ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Threatened and Endangered Species	**Negative**	Continued degradation of water quality in Okaloosa darter streams due to sediment loading (i.e., erosion and sedimentation) from roads maintained below standards Potential impacts associated with habitat fragmentation and/or road aversion due to high road density Adverse impacts to T&E plant species resulting from introduction of nonnative invasive plants/weeds	Potential impacts associated with habitat fragmentation and/or road aversion due to high road density Adverse impacts to T&E plant species resulting from introduction of nonnative invasive plants/weeds	–
	Positive	–	Increased water quality and reduced environmental damage due to erosion from substandard roads	Further improvement in water quality from closure of problematic roads Decrease likelihood of impacts from habitat fragmentation due to lower road density values Decrease likelihood of introduction of non-native invasive plants/weeds

T&E – Threatened and Endangered

4.5 NOISE – ISSUE DESCRIPTION

Noise levels are directly related to traffic volumes, speed of traffic, proportion of heavy vehicles (one truck emits the equivalent noise of 28 to 60 cars), population density near roads, existence and effectiveness of noise barriers, and effectiveness of devices such as mufflers and quiet vehicles. The issue of noise is generally discussed in terms of the number or proportion of people affected; however, the impacts of noise on wildlife, particularly threatened and endangered species, is also a primary concern.

The findings of numerous research projects on the effects of noise and its wider repercussions indicate that an outdoor sound level of 65 decibels (dBA) (A-weighted metric) is "unacceptable," and an outdoor level of less than 55 dBA is desirable. Potential impacts of each of the alternatives with respect to noise issues are discussed below.

4.5.1 Threatened and Endangered Species

Some avian species are sensitive to noise harassment that may be generated by road traffic or maintenance operations. At Eglin AFB, the primary consideration from noise is disturbance to

red-cockaded woodpecker (RCW) nesting activities. Noise generated by road maintenance equipment (dozer, dump truck, grader, etc.) during site intensive repairs, structure installation, and/or road reconstruction could impact RCWs during the nesting season, with potential reductions in productivity and/or increases in energy expenditures (due to startling/flight response).

Some findings suggest that avian nesting and reproduction success may be more heavily dependent on factors associated with location, climate, and provisions of habitat than noise (Black et al,. 1984; Galdwin et al., 1988). In addition, research by Busnel (1978) suggests that animals react with startle behaviors to noise, but over time, this reaction may subside. Avian species have also been documented to exhibit resilience and adaptation in becoming accustomed to various types and frequencies of aerial and ground-based noise events with only slight or insignificant decreases in nesting success and productivity (Platt, 1977; Anderson et al., 1989; Ellis et al., 1991). Potential issues from noise associated with each of the alternatives are discussed below.

Alternative 1 - No Action Alternative

The data contained in the Road PIT database was used to evaluate potential impacts of vehicular noise on the range. This data includes total monthly mileage on range roads, traffic counts on each road segment, and vehicle types. The data was analyzed using the U.S. Department of Transportation's (DOT) STAMINA traffic noise model. The STAMINA model uses one-hour traffic volumes and considers a mix of cars, light to medium trucks, and heavy trucks. The model outputs several noise metrics, including a one-hour equivalent noise level ($L_{eq\ 1\text{-}HR}$) experienced at specific receptor locations identified through the location geometry input to the model. By controlling the inputs to the model, this metric can then be used to calculate Day-Night Average Sound Levels (L_{dn}) at specific locations or distances from the roadway.

Noise levels at receptor locations 100, 300, and 500 feet from the roadway were calculated using STAMINA to model the $L_{eq\ 1\text{-}HR}$ associated with one car, one medium truck, and one heavy truck in each travel lane of the road. These levels were then scaled up to estimate noise levels associated with additional traffic volumes for each vehicle class. This process provided the $L_{eq\ 1\text{-}HR}$ for each segment of road at distances of 100, 300, and 500 feet from the roadway. Using $L_{eq\ 1\text{-}HR}$, L_{dn} were estimated for the 15 "noisiest" road segments on the range (Table 4-9). Noise levels presented in the table are for a receptor located at a distance of 100 feet from the noise source since this was the most conservative scenario. The table presents the total number of vehicles in each vehicle class that traversed each road segment during a one-month period. To simplify the analyses, Class 2 and Class 3 vehicles were combined into one group. Noise levels were calculated for each vehicle type and the resulting day, night, and cumulative levels for each vehicle type are presented.

Table 4-9. Noise Levels (L_{dn}) on Selected Range Road Segments

Road Number[1]	Sum of Class 1 Vehicles[2]	Sum of Class 2 & 3 Vehicles[2]	Sum of Class 4 Vehicles[2]	Cumulative L_{dn}[3]
211	17,493	1,383	90	**52.4**
213	10,893	1,441	99	**51.8**
257	13,643	1,221	92	**51.7**
257	13,631	1,143	92	**51.6**
236	10,521	1,103	80	**51.0**
236	10,481	797	94	**50.4**
213	10,475	792	94	**50.4**
218	839	1,370	81	**50.0**
218	790	1,324	90	**50.0**
214	1,239	1,222	99	**49.8**
214	1,239	1,222	99	**49.8**
214	1,239	1,222	99	**49.8**
222	796	1,284	80	**49.8**
200	596	1,067	92	**49.2**
213	450	1,095	85	**49.2**

[1] Represents individual road segments on these roads
[2] Source: U.S. Air Force, 1997a (total number of vehicles per month)
[3] Cumulative value for all vehicle classes (i.e., Class 1 through 4)

As Table 4-9 indicates, the highest noise levels were calculated for segments of RR 211, RR 213, RR 257, and RR 236. Average noise levels from vehicular traffic on the range can be considered extremely low, with no levels exceeding L_{dn} 53. These noise levels are consistent with background or ambient levels. Ambient noise levels around Eglin AFB are typically in the range of L_{dn} 60 to L_{dn} 65 (U.S. Air Force, 1996b). As a point of reference, a conversation between two people would typically measure about L_{dn} 60.

For comparative purposes, the noise levels emanating from county-maintained roads adjacent to or crossing the Eglin Range were also calculated. For these roads, the same basic procedures were used to calculate noise levels; however, there were two minor variations. First, the data set contained information for specific travel lanes for each road segment; therefore, this information was used to develop the input to the STAMINA model. Receptor locations on both sides of the road were also considered in order to accommodate this varied traffic flow. Second, although the data set provided information on total traffic volume, it did not discriminate by vehicle type. Therefore, vehicles were grouped as follows: 80.4 percent cars (Class 1); 11.8 percent light to medium trucks (Class 2 and 3); and 7.8 percent heavy trucks (Class 4). This distribution conforms to the distribution used by the Air Force in developing the summary emission standards used in the Air Quality assessment presented earlier. Again, noise levels at receptor locations 100, 300, and 500 feet from the roadway were calculated using STAMINA to model the $L_{eq\ 1\text{-}HR}$. The resulting noise levels are presented in Table 4-10.

Table 4-10. Noise Levels (L_{dn}) on County-Maintained Roads

Location	Avg. Daily Traffic[1]	Noise Levels for all Vehicle Classes[2]		
		Day L_{eq}	Night L_{eq}[3]	Cumulative L_{dn}
SR 87, South of I-10	5,700	61.2	68.9	**65.7**
SR 87, North of 98	10,200	63.8	71.2	**68.1**
SR 85 and Hwy 190	11,400	65.1	72.5	**69.4**
SR 85, South of I 10	24,500	68.5	75.9	**72.8**
SR 285, South of I-10	3,400	59.0	66.3	**63.2**
SR 285 and Hwy 190	4,300	60.1	67.4	**64.3**
SR 331, North of Freeport	6,100	60.8	68.2	**65.1**
Hwy 331, South of DeFuniak Springs	7,200	62.3	69.8	**66.7**
SR 20, West of Freeport	3,600	59.3	66.8	**63.7**

[1] Number of vehicles (Source: Florida Department of Transportation, 1998)
[2] Source: STAMINA (predicted noise levels at a distance of 100 feet from noise source)
[3] Night values include 10 dB penalty.

As is evident from the table, noise levels on county-maintained roads are significantly higher than those calculated for range roads, with most cumulative levels exceeding L_{dn} 65.

The primary consideration from noise is disturbance to red-cockaded woodpecker (RCW) nesting activities. A study of an RCW cluster located adjacent to a bombing range showed that sound levels associated with activities on the range reached levels of up to 95 dB in the RCW colony. Despite this level of noise, the clan was active, performed successful nesting, and exhibited no behavior modifications (Jackson, 1980). In fact, the number of active RCW clusters at Eglin AFB has grown from 217 in CY 1994 to 301 in CY 2000 (SAIC 2001). Another exposure to high noise levels occurs in RCW clusters located along interstate highways. Along these highways, a trailer truck can produce noise levels above 90 dB, and a line of trucks can produce noise levels of 100 dB or more. Observations of one RCW cluster located in the median of an interstate revealed that the cluster was nesting successfully (Jackson, 1980). These studies suggest that RCWs can tolerate noise up to at least 95 dB without disruption of nesting and breeding activities.

The low noise levels resulting from routine traffic on the range are not expected to pose any adverse impacts to RCW populations. Although the presence of heavy equipment during road construction/maintenance activities may cause a temporary increase in local noise, the scope and duration of these activities would be limited. Therefore, overall impacts from noise to RCW populations are anticipated to be negligible under Alternative 1.

Alternative 2

The number and types of vehicles operating on range roads would be the same as those under Alternative 1 (No Action). Therefore, there are no specific aspects of this alternative that would create any impacts from noise to threatened and endangered species not already addressed under Alternative 1.

Alternative 3

The number and types of vehicles operating on range roads would be the same as those under Alternative 1; therefore, potential impacts associated with noise would not differ from those

described in the No Action Alternative. The presence of heavy equipment during road obliteration activities may cause a temporary increase in noise local levels; however, the scope and duration of these activities would be limited. Therefore, impacts from noise associated with these activities are anticipated to be negligible.

4.5.2 Summary – Noise

Average noise levels from vehicular traffic on the range are estimated to be extremely low, and are consistent with background or ambient levels (i.e., L_{dn} 60 to L_{dn} 65). Noise levels on county-maintained roads are significantly higher, with most cumulative levels exceeding L_{dn} 65. The number and types of vehicles operating on range roads would be the same for all alternatives considered; consequently, potential impacts associated with noise would not differ. Although the presence of heavy equipment during road construction, maintenance, or obliteration activities would cause a temporary increase in noise levels, overall impacts to threatened and endangered species (i.e., RCW populations) on the range are anticipated to be negligible. Potential issues associated with noise are summarized in Table 4-11.

Table 4-11. Comparison of Alternatives – Noise

POTENTIAL ISSUE	OVERALL IMPACT	NO ACTION - ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Threatened and Endangered Species	**Negative**	Temporary disturbances due to traffic or construction and maintenance activities	Same as No Action	Same as No Action
	Positive	–	–	–

4.6 DIRECT PHYSICAL IMPACTS – ISSUE DESCRIPTION

Direct physical impact may be defined as the physical harm that can occur to an organism (plant or animal) or specific resource as a result of mission activities. A common example of a direct physical impact is that of a collision between a motor vehicle and wildlife, resulting in a "roadkill." An accidental release of hazardous materials (e.g., fuels) can also have a direct physical impact on water quality, sensitive habitats, threatened and endangered species, or cultural resources. This impact can occur either through the initial release/contamination of the site or as a result of disturbances caused by subsequent cleanup activities. Road construction and/or maintenance activities may also have direct physical impacts on cultural resources (i.e., damage or disturb). Finally, illegal activities, such as solid waste dumping, poaching, harassment, looting, or vandalism, can pose direct physical impacts to sensitive habitats, threatened and endangered species, or cultural resources. Potential impacts of each of the alternatives with respect to these issues are discussed below.

Note: A fuel spill would also release a variety of volatile organic compounds and hazardous air pollutants into the atmosphere, negatively impacting local air quality. Vapors released during a spill would be quickly diluted and dissipated by the regional air circulation. Based on the quantity of fuel typically transported on range roads, the anticipated adverse impacts to air quality from a spill would be expected to be negligible. There is also a potential for combustion by-products from an accidental explosive detonation to impact local air quality; however, these

by-products are comparatively less toxic than fuel vapors, consisting largely of carbon dioxide, carbon monoxide, nitrogen oxides and carbon (U.S. Air Force, 1997), again posing negligible impacts. Explosives, though toxic to fish and wildlife, are typically contained and in solid form, reducing the likelihood of transport to the environment. The potential for a mishap from the accidental detonation of explosives is remote since most explosives transported on range roads are relatively stable (Briganti, 1998).

4.6.1 Water Quality

The transportation of hazardous materials/hazardous wastes (including fuels) is a common, if not daily, occurrence over range roads. Bulk fuels transported along these roads include jet fuel (JP-8), gasoline, and diesel. There are numerous storage tanks located throughout Eglin that are used to store fuel for generators or other equipment. Both military and commercial tanker trucks are utilized to refuel these tanks. Other materials transported across range roads include paints, solvents, antifreeze, hydraulic fluids, waste fuel or oils, fuel/oil soaked rags, and miscellaneous chemicals or explosive materials (U.S. Air Force/EC, 1998). The quantities of these non-bulk fuel materials transported are typically on the order of tens of gallons or less (Prier, 1998).

Fuel spills present the most likely scenario for impacts to water quality. Water quality could be affected directly as a result of fuel spills or leaks, or indirectly from spill remediation activities if dirt and silt were allowed to enter streams or ponds. Large spills have the potential to impact groundwater.

Alternative 1 (No Action)

A spatial analysis of current hazardous materials transportation routes identified a total of 10 of these routes that currently cross over streams or other water bodies on Eglin AFB (Table 4-12). As the table indicates, many of these routes account for multiple crossings. Five of the roads are used for the transport of fuels, and these accounted for a total of 20 crossings. Three of these fuel-transport roads (SR 20, SR 85, and RR 201) were categorized as paved in very good to excellent condition, while the other two fuel roads were categorized as secondary roads in good condition. These latter roads accounted for only a total of four crossings.

Table 4-12. Hazardous Material Routes Crossing Streams or Other Water Bodies

ROAD NUMBER	CLASSIFICATION*	SURFACE TYPE*	CONDITION*	STREAM CROSSINGS
200	Tertiary	Unpaved- clay/sand	Good	5
234	Primary	Paved- mix surface	Poor	3
213	Primary	Paved- meets DOT specs	Excellent	6
208	Primary	Paved- meets DOT specs	Excellent	4
214	Secondary	Unpaved- clay/sand	Good	3
SR20	County Road	Paved- meets DOT specs	Excellent	8
SR85	County Road	Paved- meets DOT specs	Excellent	5
201	Primary	Paved- mix surface	Very good	2
205	Secondary	Unpaved- sand	Good	4
345	Secondary	Paved- mix surface	Good	1
			Total	**41**

* Based on Road PIT data
Note: Roads highlighted in bold are utilized for the transport of fuels.

Spills may occur at any time as a result of leaks or accidents. Since 1989, there have been two significant diesel fuel spills on Eglin range roads (RR 213 and 236) as a result of accidents. Both of these spills involved the release of approximately 500 gallons of fuel; however, the resulting impact of these two spills is unknown (AAC/EMSN, 1999).

Under this alternative, there is a limited potential for adverse impacts to water quality resulting from a major fuel spill. This potential could be slightly reduced by avoiding the use of the two secondary roads identified in Table 4-12. However, it is unlikely that alternate routes could be found for the other three fuel-transport roads. Two of those, SR 20 and SR 85, are major county thoroughfares that provide direct access to fuel storage locations on Eglin and Duke Field. Eglin AFB has a strong spill response program in place that would minimize the potential for impacts to water quality. A spill involving hazardous waste or other non-fuel materials is not a major concern, since these materials are typically transported in small quantities.

Alternative 2

Transportation routes would be the same as those utilized under Alternative 1. Therefore, potential impacts to water quality, resulting from releases of hazardous materials (primarily fuels) would not differ from those described in the No Action Alternative.

Alternative 3 (Preferred Alternative)

Transportation routes would be the same as those utilized under Alternative 1. Therefore, potential impacts to water quality, resulting from releases of hazardous materials (primarily fuels) would not differ from those described in the No Action Alternative.

4.6.2 Sensitive Habitats

Fuel spills present the most likely scenario for impacts to the surrounding environment. Habitat alteration can result from fuel entering into a body of water, affecting large areas of vegetation, or from remediation activities as contaminated dirt is excavated. Habitats potentially affected include FNAI Tier I areas and Significant Botanical Sites, etc. Habitat alteration could also occur in the event that a fuel spill starts a fire. A spill involving non-bulk fuel related hazardous materials (e.g., cleaning solvents, waste paint, etc.) is not a major concern since these materials are typically transported across the range in small quantities.

There is also a potential for direct physical impacts to sensitive habitats as a result of illegal dumping activities. Dumping of solid waste has been routinely been documented on the Eglin Range, particularly in areas that connect to exterior roads (e.g., county maintained roads). These activities may physically damage native flora or may degrade sensitive habitats through contamination if hazardous materials such as paints or other petroleum-containing products are dumped. Illegal dumping also reduces aesthetic values and contributes directly to Eglin's solid waste problems (46TW/TS, 2001).

Alternative 1 (No Action)

A spatial analysis identified a total of 10 hazardous materials transportation routes crossing, or located adjacent to FNAI Tier I areas and Significant Botanical Sites (Table 4-13). Three of the roads are used for the transport of fuels, RRs 236, 201, and 205. These roads potentially impact a total of six FNAI Tier I areas and one Significant Botanical Site. The three fuel-transport roads were categorized by the Road PIT as being in good to very good condition. (Note: A spill involving hazardous waste or other non-fuel materials is not a major concern since these materials are typically transported in small quantities.)

The potential environmental impacts of any fuel spill are highly site-specific. These impacts depend on the quantity of material spilled, amount recovered in cleanup, and characteristics of the affected area (such as climatic conditions, flora and fauna density, etc.). Since three of the fuel transportation routes traverse sensitive habitats, there is a small potential for adverse impacts that could be reduced by using roads that avoid these areas. There are also potential adverse impacts to sensitive habitats from illegal dumping activities under Alternative 1.

Table 4-13. Hazardous Material Routes Crossing Sensitive Habitats

ROAD NUMBER	CLASSIFICATION*	SURFACE TYPE*	CONDITION*	TIER I CROSSINGS	SBS CROSSINGS
234	Primary	Paved- mix surface	Poor		1**
213	Primary	Paved- meets DOT specs	Excellent		1**
200/201	Primary	Unpaved- clay	Very good		1
208	Primary	Paved- meets DOT specs	Excellent		2
735	Secondary	Unpaved- sand	Poor	1**	
729	Secondary	Unpaved- sand	Poor	1**	
710	Secondary	Unpaved- sand	Poor	1**	
201	Primary	Paved- mix surface	Very good	3	
236	Primary	Paved- meets DOT specs	Good	1**	
205	Secondary	Unpaved- sand	Good	2	1
			Total	9	6

*** Based on Road PIT data; ** Road runs adjacent to area**
Note: Roads highlighted in bold are utilized for the transport of fuels.
SBS = Significant Botanical Site

Alternative 2

Transportation routes would be the same as those utilized under Alternative 1. Therefore, potential impacts to sensitive habitats resulting from releases of hazardous materials (primarily fuels) would not differ from those previously described. Potential impacts associated with illegal dumping activities would also continue under this alternative.

Alternative 3 (Preferred Alternative)

Transportation routes would be the same as those utilized under Alternative 1. Therefore, potential impacts to water quality resulting from releases of hazardous materials (primarily fuels) would not differ from those described in the No Action Alternative.

It would be expected that the number of access points into the range would decrease as some smaller roads and trails with access to exterior roads are closed. Therefore, the potential likelihood for illegal dumping activities would also be slightly reduced from those of the other two alternatives

4.6.3 Threatened and Endangered Species

Statewide, roadkills of threatened and endangered species have been steadily increasing and are the leading cause of death for all mammals except white-tailed deer (Noss, 1990). Threatened and endangered species have suffered serious losses: 59 black bears were killed in 1996 on Florida roads, with at least 463 bears documented to have been killed by vehicles since 1976. Many of the bears are killed on roads running through public lands. Additionally, 17 Florida panthers, one of the most endangered subspecies of mammals in the world, have been killed on roads since 1972. Since 1981, 65 percent of documented Florida panther deaths have been roadkills (Noss, 1990).

At Eglin AFB, detailed information on roadkills is lacking since vehicle collisions with wildlife are seldom reported. Additionally, since most range roads are not designed for high-speed travel, direct mortality of wildlife species on these roads is not usually an important factor for large mammals. However, slow-moving reptiles such as indigo snakes, rattlesnakes, pine snakes and gopher tortoises are vulnerable to being struck by approaching vehicles, and are also vulnerable to intentional collection and indiscriminate killing. There have been a few reported incidents involving the protected gopher tortoise over the last few years. Several tortoises have been brought to the Natural Resources Branch injured or dead as a result of a vehicle collision (AFDTC/EMSN, 1998a).

Most roadkills of large species in the Eglin area occur along high-speed county roads (e.g., SR 85, SR 285, etc.), and to a lesser extent on paved roads on the range, where higher rates of speed are legal (e.g., RR 236, RR 213, etc.). Over 20 bear mortalities have been reported since 1984 on county-maintained roads adjacent to or crossing the Eglin Range (pers. Comm., Hagadorn, 2002). According to the Natural Resources Branch personnel, roadkills of white-tailed deer are also not uncommon along these same high-speed roads (AFDTC/EMSN, 1998a). There is a potential for roadkill incidents to increase as roads in the region are expanded to cope with increased regional development and population growth.

There is also a potential for direct physical impacts to threatened and endangered species resulting from species migration disruption, specifically in the case of Flatwoods salamander. The barrier effect of roads on amphibians has been documented by several studies (Gibbs, 1998; deMaynadier and Hunter, 1995, 1998, and 1999) and recognized by the USDA Forest Service (USDA Forest Service, 1998). As previously discussed, roads displace sensitive species; home ranges are modified as road density increases, and roads may be avoided during daily movements or during migrations to breeding sites. The sometimes-impermeable physical and physiological barriers to movements and migration created by roads can modify animal behavior, resulting in potential changes to animal populations.

A study in central Maine evaluated the impacts of primary and secondary logging roads on the movements of eight species of amphibians. In the study, the effects of 39-foot wide heavily used roads were compared to less used roads 16-feet wide. Generally, habitat use and movements were unaffected by either type of road; however, the abundance of salamanders *(Ambystoma* spp, *Plethodon cinereu*s and *Notopthalmus viridescen*s) was 2.3 times higher at control sites than at roadside sites (deMaynadier and Hunter, 2000). A similar study by Bruce Means spanning over 22 years indicated that the alteration of the landscape by road corridors was believed to have interfered with the orientation of the salamanders, preventing them from reaching their breeding grounds (Ray, 1999).

Eglin supports the largest known concentration of Flatwoods salamander breeding sites west of the Apalachicola River. Twenty-one known breeding sites are within the East Bay Flatwoods delineated by the East Bay River to the north, Eglin AFB boundary to the west, Highway 98 to the south, and a developed portion of Hurlburt Field to the east (Palis, 1997). Successful salamander reproduction is highly dependent on the timing and frequency of rainfall during fall and winter and unimpeded access to breeding sites. Considering the long distances that may be traveled during breeding, desiccation may be a limiting factor in their migration to and from breeding ponds. It then becomes important to protect the cover and moisture regimes of buffer areas between terrestrial and wetland habitats used during migrations. At Eglin, the presence of roads located between living and breeding territories could physically inhibit movement or interfere with the orientation of salamanders causing some individuals to wander endlessly in search of breeding sites or home ground (U.S. Air Force, 2001).

The Okaloosa darter could also potentially be affected by accidental fuel spills occurring near darter streams, either from the toxic effects of fuel deposited into the stream or from siltation associated with cleanup activities. This potential threat has been specifically addressed in the *Draft Okaloosa Darter Revised Recovery Plan* (Jelks and Shawn, 1998).

Finally, there is a potential to threatened and endangered species from poaching or harassment events. During the last ten years, there have been five documented poaching events on black bears on the Eglin Range. Although not a serious a concern as roadkills, poaching still poses significant adverse impacts to threatened and endangered species (Hagadorn, 2002).

Alternative 1 (No Action)

It is not possible to establish a measure of impact in the case of roadkills since data regarding the specific numbers (or location) of these incidents on Eglin roads are not readily available. However, there is a potential for adverse impacts to threatened and endangered species resulting from roadkills. This potential is especially relevant in the case of slow-moving reptiles, as has been documented in the case of gopher tortoises. There is little consensus regarding the most effective means of preventing roadkills. Wildlife often manages to circumvent protective fencing by jumping over, going around, or going through open gates and holes. Reflectors, lighting, mirrors, signage, and underpasses dedicated to wildlife have also been shown by some studies to be relatively ineffective at changing the behavior of both drivers and wildlife (USEPA, 1996).

There is no clear documentation of species migration disruption on the Eglin Range. However, based on documented cases of roads acting as barriers to amphibian movements and the observed capability of the East Bay Flatwoods salamander population to migrate along familiar routes between habitats, it is probable that the network of roads in the area has impacted the migrations of some individuals (SAIC 2001). Therefore, there is a potential for adverse impacts to species migration disruption under the No Action Alternative.

A total of four fuel-transport roads were identified in the spatial analysis as crossing darter streams (Table 4-14). These roads are paved and categorized as being in good to excellent condition. Two of the roads, SR 20 and SR 85, are major county thoroughfares that provide direct access to fuel storage locations on Eglin and Duke Field. There is a limited potential for release of fuel into darter streams as a result of leaks or spills. However, due to the nature of the roads currently used, it is unlikely that alternate routes could be found that would avoid these crossings altogether.

Table 4-14. Fuel Transportation Routes Crossing Darter Streams

ROAD NUMBER	CLASSIFICATION*	SURFACE TYPE*	CONDITION*	STREAM CROSSINGS
SR20	County Road	Paved- meets DOT specs	Excellent	1
SR85	County Road	Paved- meets DOT specs	Excellent	2
201	Primary	Paved- mix surface	Very good	2
345	Secondary	Paved- mix surface	Good	1

* Based on Road PIT data

Adverse impacts to threatened and endangered species from poaching or harassment events would continue under this alternative.

Alternative 2

Under this alternative, the number of unpaved roads/road crossings at Eglin AFB would be the same as those under Alternative 1; therefore, the potential for direct physical impacts to threatened and endangered species from roadkills, species migration disruption, and poaching would not differ from those described in the No Action Alternative.

Alternative 3 (Preferred Alternative)

There would be a slight decrease in the likelihood of roadkills and poaching as a result of the systematic closure of non-essential roads. The resulting decrease in road density, especially in areas designated as Flatwoods salamander habitats, would also slightly reduce the potential for poaching or species migration disruption. The net positive effect would be slightly higher for this alternative than from implementation of the other two alternatives.

4.6.4 Cultural Resources

Many paved and unpaved roads on the Eglin Reservation traverse archaeological sites. As a result, cultural resources are subject to potential direct physical impacts from several sources, including hazardous material spills, illegal looting and vandalism activities, and construction/maintenance activities outside the existing roadway (e.g., modified culvert replacement, construction of new roads in roadless areas, etc.).
Hazardous material spills (primarily fuels) can pose adverse impacts to cultural resource sites on the range, either through direct contamination or as a result of cleanup activities, when contaminated dirt is excavated. Although the possibility of an explosion is remote, if an explosion did occur on an archaeological site or in the vicinity of historic buildings, there is potential for resulting impacts to cultural artifacts (U.S. Air Force 2001b). Finally, cultural resource sites are also subject to illegal looting or vandalism or to impacts from illegal fire ignitions (or firefighting activities) that can result from the large number of unrestricted entry points into the range.

Alternative 1

To minimize the potential for disturbance to cultural resources in roadless areas, the Cultural Resources Branch reviews all proposed projects in order to determine potential impacts to these areas. If construction/maintenance activities occur in areas known to contain cultural resources, the State Historic Preservation Officer, and possibly the Advisory Council on Historic Preservation, review the proposed activities (e.g., dredging, reshaping, stabilization plans, etc.) in order to comply with the National Historic Preservation Act (U.S. Air Force 2001b).

Routine road maintenance activities, such as road resurfacing, are not expected to impact cultural resources since most of these activities are typically limited to the road itself or immediately adjacent areas. Many of the culverts on the reservation are in areas that have been identified as having a high probability for the occurrence of cultural resources. Direct replacement of an existing culvert would also not be expected to impact cultural resources since the area was previously disturbed when the existing culvert was installed. Buried cultural resources could be disturbed during clay pit excavation. In this case, a cultural resource survey is also conducted prior to new pit construction, reducing this possibility (U.S. Air Force, 1994).

There are also potential adverse impacts to cultural resources associated with an accidental release of hazardous materials; however, transport of these materials is limited to only a few roads on the range. Additionally, the area impacted by an accidental spill would likely be restricted to the roadway surface or adjacent areas, limiting potential impacts to cultural resources sites. Eglin AFB also has a strong spill response program in place that would further minimize potential impacts resulting from a large spill.

Under this alternative there would also be potential impacts to cultural resources sites resulting from illegal looting or vandalism activities as a result of the large number of unrestricted entry points into the range.

Alternative 2

Application of road construction standards or erosion control BMPs could improve unauthorized access to some areas of the range, making protection of cultural resource artifacts more difficult. Other impacts associated with Alternative 1 would remain the same for this alternative.

Alternative 3 (Preferred Alternative)

Application of road construction standards or erosion control BMPs could improve unauthorized access to some areas of the range, making protection of cultural resources more difficult. However, limiting public access, as a result of the closing of roads, to areas where cultural resource artifacts may be found and looted would have a beneficial effect on the preservation of these artifacts. This issue is further analyzed in Eglin's Cultural Resources Management Plan (U.S. Air Force 2001b). Educating public users of Eglin recreational areas on measures to avoid impacts to cultural resources could further reduce looting and/or vandalism of cultural resources. The public should also be made aware of state and federal penalties and fines associated with destruction of historic properties.

4.6.5 Summary – Direct Physical Impact

There is a potential for direct physical impacts to water quality, sensitive habitats, threatened and endangered species, or cultural resources resulting from an accidental release of hazardous materials (primarily fuels). There are also potential adverse impacts to threatened and endangered species as a result of roadkills, poaching, or species migration disruption. Finally, illegal activities, such as solid waste dumping, looting, or vandalism, can pose direct physical impacts to sensitive habitats or cultural resources.

None of the alternatives would have a major impact on potential issues associated with hazardous material spills. Implementation of Alternative 3 would reduce the likelihood for impacts to threatened and endangered species from roadkills, poaching, or species migration disruption, by implementing the systematic closure of roads deemed non-essential to the test and training or natural resources mission. Impacts to cultural resources would likewise be slightly reduced. Potential impacts associated with each of the alternatives are summarized in Table 4-15.

Table 4-15. Comparison of Alternatives – Direct Physical Impacts

POTENTIAL ISSUE	OVERALL IMPACT	NO ACTION - ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Water Quality	**Negative**	Potential for degradation of water quality due to fuel spills or leaks, or from spill remediation activities if dirt and silt were allowed to enter streams or ponds	Same as No Action	Same as No Action
	Positive	–	–	–
Sensitive Habitats	**Negative**	Potential impacts from fuel spills and subsequent cleanup activities Potential for illegal dumping	Same as No Action	Potential impacts from fuel spills and subsequent cleanup activities
	Positive	–	–	Reduced potential for illegal dumping
Threatened and Endangered Species	**Negative**	Potential impacts resulting from collisions of vehicles with wildlife (e.g., Black bear) Potential for species migration disruption (e.g., Flatwoods salamander) Potential impacts to darter streams from accidental fuel spills Potential for poaching, harassment, or illegal kill levels	Potential impacts resulting from collisions of vehicles with wildlife (e.g., Black bear) Potential for species migration disruption (e.g., Flatwoods salamander) Potential impacts to darter streams from accidental fuel spills Potential for poaching, harassment, or illegal kill levels	Potential impacts to darter streams from accidental fuel spills
	Positive	–	–	Reduced potential for road kills Reduced potential for species migration disruption Reduced potential for poaching
Cultural Resources	**Negative**	Potential for some road maintenance activities (e.g., modified culvert replacement) to impact cultural resources Potential for disturbance of cultural resources sites from road construction activities in unroaded areas Potential for contamination/ damage caused by fuel spills and subsequent cleanup activities Potential for illegal looting/ vandalism of cultural sites	Potential for some road maintenance activities (e.g., modified culvert replacement) to impact cultural resources Potential for disturbance of cultural resources sites from road construction activities in unroaded areas Potential for illegal looting/ vandalism of cultural sites	Potential for some road maintenance activities (e.g., modified culvert replacement) to impact cultural resources Potential for disturbance of cultural resources sites from road construction activities in unroaded areas
	Positive	–	Would improve condition of some roads used to access cultural resources sites	Would improve condition of some roads used to access cultural resources sites Reduced potential for looting/ vandalism of cultural resources

4.7 PUBLIC ACCESS – ISSUE DESCRIPTION

It is estimated that public users make up approximately 75 to 80 percent (or between 102,000 and 109, 000 miles) of the total monthly mileage reported by the Natural Resources Branch (U.S. Air Force, 1997a). There are 280,000 acres of Eglin land open for outdoor recreation. Outdoor activities on the range vary from hunting, fishing, and trapping, to hiking, camping, biking, horseback riding, and collection of forest products (e.g., deer moss, palmetto, pine straw, wood mulch, etc.). Based on the number of permits sold, hunting, fishing, and general recreational activities are the most popular activities. Access to areas of the range for these activities is achieved via major range roads or through numerous smaller roads leading from county roads.

Public access relates to the ability of the general public to have access to the recreation, hunting, and wilderness resources at Eglin AFB. Many of these smaller roads are used for a variety of other functions, such as natural resources management and recreation. An important component of the overall Eglin mission is providing access to the public for recreation. Eglin AFB is public land available for military use; however, Air Force regulations also promote public use. Specifically, Air Force Instruction (AFI) 32-7063, Section 13.2.1 reads, "Allow the public to use installation areas to enjoy natural resources, to the extent such use is not inconsistent with the military mission." Additionally, 10.4 reads, "Promote public use of outdoor recreation resources when compatible with the military mission." Finally, 13.1 reads, "The public plays an essential role in installation natural resources management. The public ultimately owns the resources, …" (U.S. Air Force 2001b).

Routine road-related maintenance activities (i.e. road resurfacing or culvert replacement) may result in temporary adverse impacts to public access. Additionally, permanent road closures may pose both negative and positive impacts to access for public/recreational users. This difference will depend greatly on the nature of the recreational use. Negative impacts will be primarily associated with areas of the range that are open to hunting with the aid of dogs. Dog hunters prefer a high road density in order to easily "stay ahead" of, or retrieve, free-running hunting dogs. This group of range users may view reduced access resulting from road closures as restrictive (AAC/EMSN, 2000a).

Reduced access, as a result of the closure of smaller roads and trails, does have a beneficial effect for many other types of hunters at Eglin. For example, stalk hunters are generally supportive of reduced access since it results in an overall increase in stalk hunting quality and game population. Reduced access also deters potential illegal activities, such as poaching. Effects of reduced access to other forms of recreation users would be minimal, since most non-consumptive users can be satisfied when given reasonable vehicle access to areas of the range (AAC/EMSN 2000a). Finally, reduced access would provide improvements in both scenic quality and the quality of the experience in dispersed recreation settings.

Alternative 1 - No Action Alternative

Road closures associated with road maintenance or culvert replacement activities could result in temporary impacts to public traffic. Most maintenance activities are conducted during normal working hours, minimizing the impact to weekend recreational users. Additionally, due to the extensive road systems, alternate routes are typically available that bypass construction activities.

Therefore, the potential impacts to public access from temporary road closures associated with these activities are anticipated to be negligible.

Alternative 2

Application of BMPs and enhanced maintenance practices would improve the condition of some roads used to access recreational facilities, thereby improving public access.

Alternative 3 (Preferred Alternative)

The potential impact from road closures on public access is difficult to quantify, but can be somewhat assessed from work already undertaken by the Natural Resources Branch. Natural Resources personnel have already implemented the closure of a large number of roads in the White-tailed Deer Management Emphasis Area (MEA). This area is 25,075 acres in size and is bounded in the west by SR 85, to the north by RR 213 and northeast by RR 416, to the east by SR 285, and to the south by private property. This area contains many of the streams identified as habitats for the Okaloosa darter.

Natural Resources personnel evaluated access into this area and deemed that 99 out of the total 135 road segments present could be categorized as redundant (i.e., another route was available to provide access to a particular watershed). Closure of these segments was then undertaken. This was accomplished by placing a sign, mounted on a fiberglass stake, in the road centerline. A total of 195 signs were placed in this area to prevent access to these 99 road segments. After two years of monitoring, Natural Resources personnel found that in this area, most signs have remained in-place and intact and that most road segments have not incurred any damage. This suggests that, for the most part, recreational users are respecting these road closures.

Overall feedback from hunters (primarily stalk hunters) has been favorable since most hunters feel that closure of these redundant roads actually enhances the hunting experience. Stalk hunters are generally supportive of reduced access since it results in an overall increase in stalk hunting quality and game population. Reduced access also deters potential illegal activities, such as poaching (AAC/EMSN, 2000). (Note: Unlike stalk hunters, dog hunters prefer a high road density to facilitate hunting and would likely view road closures as restrictive.)

Effects of reduced access from road closures to other forms of recreational users should be minimal, since most non-consumptive users can be satisfied when given reasonable vehicle access to areas of the range (AAC/EMSN, 2000a). Due to the extensive road system, alternate routes into the range would be available. Closing unneeded roads can also increase both scenic quality and the quality of the experience in dispersed recreation settings. Eglin AFB is committed to ensuring that adequate access is provided for all authorized recreational activities on the range (U.S. Air Force, 1999a); therefore, the overall potential impacts to public access from road closures are anticipated to be minimal.

4.7.1 Summary - Public Access

Road closures associated with road maintenance activities could result in temporary impacts to public traffic; however, this impact would be of a temporary nature. Permanent closure of roads

would pose both positive and negative impacts to public access. This impact would be more than offset by the positive environmental impact of these closures. Table 4-16 presents a summary of potential impacts associated with public access.

Table 4-16. Comparison of Alternatives – Public Access

POTENTIAL ISSUE	OVERALL IMPACT	NO ACTION - ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Recreation, Hunting, Wilderness Resources	**Negative**	Temporary impacts to access from road construction or maintenance activities	Same as No Action	Temporary impacts to access from road construction or maintenance activities Decrease access for dog hunters or other recreational users
	Positive	–	Would improve condition of some roads used to access recreational facilities	Would improve condition of some roads used to access recreational facilities Additional improvements in scenic quality and dispersed recreation setting

4.8 SUMMARY OF ALTERNATIVES

The Range Road Management Strategy described in Alternative 3 is designed to ensure that Eglin range roads are adequate to meet the multi-use test and training and natural resources mission requirements. This strategy emphasizes closing unneeded roads, reconstructing roads to environmental and safety standards, and building roads only where needed to meet management objectives or mission needs. The ultimate goal is to begin reversing adverse ecological impacts associated with current roads and providing reasonable access while protecting ecological resources. This management strategy would also provide the forum wherein road-related issues are elevated to the highest possible level for timely resolution.

Alternative 3 provides a specific framework for making road-related decisions, but does not dictate specific construction, maintenance, or closure actions. Therefore, the effects described in this analysis serve only to illustrate the potential benefits gained from implementing this alternative. Costs are not expected to vary significantly as a result of implementing Alternative 3. Available resources would be allocated according to the priorities set by the RRWG, which would affect the distribution of resources across road management activities.

The differences between the No Action Alternative and Alternative 3 (Preferred Alternative) are negligible with regards to paved primary or secondary roads since these roads are typically not a major source of erosion/sedimentation and would not be subject to closure. However, with regards to unpaved tertiary and "other" (i.e., unclassified or unnumbered) roads, potential positive effects are expected for water quality, sensitive habitats, threatened and endangered species, and cultural resources.

These positive effects are tied primarily to improved maintenance practices and increased closures of roads that pose ecological damage and facilitate human access. Effects on recreation use are more ambiguous. Higher rates of closures would reduce some types of access (e.g., dog hunters) compared to the No Action Alternative; however, better maintenance practices could result in improving access to some areas of the range. Additionally, both closures and better maintenance would be likely to improve the environmental quality of the recreation setting, providing benefits to users. Access for natural resources management, law enforcement, and safety would not be affected. Table 4-17 compares the expected impact of implementing of each of the three alternatives.

Table 4-17. Summary of Effects

POTENTIAL ISSUES	ALTERNATIVES		
	NO ACTION - ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Habitat Alteration			
Air Quality	0	0	0
Water Quality	0	+	++
Sensitive Habitats	0	+	++
Threatened and Endangered Species	0	+	++
Noise			
Threatened and Endangered Species	0	0	0
Direct Physical Impact			
Water Quality	0	0	0
Sensitive Habitats	0	0	+
Threatened and Endangered Species	0	+	++
Cultural Resources	0	0	+
Public Access			
Recreation, Hunting, Wilderness	0	+	+/–

0: no change expected from implementing the final road management strategy.
+: net effect of implementing the final road management strategy is positive.
–: net effect of implementing the final road management strategy is negative.
+/–: net effect is ambiguous from implementing Alternative 3.

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Bill Brown	Environmental Engineer/GIS Specialist	B.S. Civil Engineering M.S. Civil and Environmental Engineering	10 years as environmental professional Computer modeling, statistical analysis
Brent McBroom	GIS Specialist	Certificate of Telecommunication Engineering	5 years in the Information Technology Field Computer modeling, statistical analysis, GIS

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6. REFERENCES

46TW/TS, 2001. Comments to Range Roads Preliminary Draft Programmatic Environmental Assessment, received from 46TW/TS. July 2000.

796 CES/CEZHH, 1998. Personal communication with SAIC regarding road maintenance procedures on Eglin AFB. April 1998.

AAC/EMSN, 1999. Best Management Practices, Take AIM-Application, Installation, Maintenance. PowerPoint presentation provided to SAIC. July 1999.

————, 1999a. Comments to Range Roads Preliminary Draft Programmatic Environmental Assessment, received from ACC/EMSN. November 1999.

————, 2000. Comments to Range Roads Preliminary Draft Programmatic Environmental Assessment, received from ACC/EMSN. July 2000.

————, 2000a. Comments to Range Roads Draft Programmatic Environmental Assessment, received from ACC/EMSN. April 2000.

————, 2001. Comments to Range Roads Preliminary Draft Programmatic Environmental Assessment, received from ACC/EMSN. March 2001.

AFDTC/EMSN, 1998. Personnel communication with SAIC regarding road maintenance and borrow pit management activities. November 1997.

————, 1998a. Personal conversation with SAIC regarding roadkills and habitat fragmentation on Eglin AFB. January 1998.

————, 1998b. Personnel communication between SAIC and Mr. Dennis Teague (AFDTC/EMSN) regarding invasive plant species at Eglin AFB. March 1998.

Albertson, P. E. et al., 1995. Miscellaneous paper GL-95-113: Road Management Plan and Workshop, Eglin Air Force Base Florida. US Army Corps of Engineers, Waterways Experiment Station, December 1995.

Anderson, D. E., O. J. Rongstad, and W. R. Mutton, 1989. Response of Nesting Red-Tailed Hawks to Helicopter Flights. Condor, 91: 296-299. National Institute for Agricultural Research, Jouy-en-Josas, 78, France.

Bader, M., 1991. Biological geography: *Think Big for Northern Rockies Wildlife*. The Networker, June 1991: 3-10.

Black, B. B., M. W. Collopy, H. F. Percival, A. A. Tiller, and P. G. Bohall, 1984. Effects of low-level military training on wading bird colonies in Florida. University of Florida, *Florida Cooperative Fish and Wildlife Research Unit, Technical Report No. 7*, 190 pp.

Briganti, J., 1998. Personal communication with J. McKee, SAIC, regarding transportation of explosives on range roads.

Busnel, R. G., 1978. *Effects of Noise on Wildlife*. Academic Press, Inc.

Chafin, L. G. and A. R. Schotz, 1995. *Rare Plant Survey of Eglin AFB, 1992-1994*. Florida Natural Areas Inventory and the Nature Conservancy.

Clean Air Act, Title 40 CFR § 50-51.

References

Clean Air Act, 42 U.S.C. 7401 et seq.: Official Compilation of the Rules and Regulations of the State of Florida; Title 62 - Department of Environmental Protection, Chapter 62-272 - Air Pollution, Part III, Ambient Air Quality

deMaynadier, P. G. and M. L. Hunter, 1995. The relationship between forest management and amphibian ecology: A review of the North American literature. *Environmental Reviews*, 3: 230-261.

————, 1998. Effects of silviculture edges on the distribution and abundance of amphibians in Maine. *Conservation Biology*, 12: 340-352.

————, 1999. Forest canopy closure and juvenile emigration by pool-breeding amphibians in Maine. *Journal of Wildlife Management*, 63: 441-450.

————, 2000. Road effects on amphibian movements in a forested landscape. *Natural Areas Journal,* 20(1): 56-65.

Ellis, D. H., C. H. Ellis, and D. P. Mindell, 1991. Raptor responses to low-level jet aircraft and sonic booms. *Environmental Pollution*, 74, 53-83.

Fahrig, L. and G. Merriam, 1985. *Habitat Patch Connectivity and Population Survival*. Ecology, Vol. 66: pages 1762-1768. 1985.

FLDACS, 1993. *Silviculture Best Management Practices*. Florida Department of Agriculture and Consumer Services (Division of Forestry). Tallahassee, FL., 1993.

Florida Department of Transportation, 1998. Communications between SAIC and personnel from the Florida Department of Transportation (DOT) regarding traffic counts for roads in the Eglin AFB area, February 1998.

Florida Game and Fresh Water Fish Commission, 1997. Personal communication with SAIC. Bureau of Nongame Wildlife - Endangered Species. Tallahassee, Florida. April 1997.

Galdwin, D. N., K. M. Manci, and R. Villella, 1988. Effects of aircraft noise and sonic booms on domestic animals and wildlife: Bibliographic abstracts. U.S. Fish and Wildlife Service, National Ecology Research Center. NERC-88/29, AFESC TR 88-14, 78 pp.

Gibbs, J. P., 1998. Amphibian Movements in Response to Forest Edges, Roads, and Streambeds in Southern New England. *Journal of Wildlife Management*, 62: 584-589.

Hagadorn, B., 2002. Personal communication with Mr. Bruce Hagadorn (AAC/EMSN) regarding roadkills/poaching related issues on the Eglin Range. January 2002.

Jackson, J. A., 1980. Possible effects of excessive noise on red-cockaded woodpeckers. In: Proceedings of the 2nd Red-Cockaded Woodpecker Symposium. Department of Biological Sciences, Mississippi State University.

Jelks, H. L. and S. K. Alam, 1998. *Okaloosa Darter (Etheostoma okaloosae) Revised Recovery Plan*. U.S. Fish and Wildlife Service, Region 4, Atlanta, GA. April 1998.

Jelks, H. L. and K. A. Shawn, 1998. *Draft Okaloosa Darter (Etheostoma okaloosae) Revised Recovery Plan*. U.S. Fish and Wildlife Service, Region 4, Atlanta, GA. April 1998.

Minerals Management Service (MMS), 1990. *Gulf of Mexico Sales 121, 135, and 137: Final Environmental Impact Statement.* Vol. II. U.S. Department of the Interior, Minerals Management Service Gulf of Mexico OCS Regional Office, New Orleans, LA.

Noss, R. F., 1990. *Ecological Effects of Roads*. Pages 1-5 in J. Davis, ed. Killing Roads: A Citizens' Primer on the Effects and Removal of Roads. Biodiversity Project Special Publication. Tucson, AZ. 1990.

Noss, R. F. and Cooperrider, A. Y., 1994. Saving Natures' Legacy: Protecting and Restoring Biodiversity. Island Press, 1994.

Palis, J. G., 1997. *Species Profile: Flatwoods Salamander (Ambystoma cingulatum) on Military Installations in the Southeastern United States*. Technical Report SERDP-97-6, U.S. Army Engineer Waterways Experiment Station, Vicksbury, Mississippi.

Platt, J. B., 1977. The breeding behavior of wild and captive gyrfalcons in relation to their environment and human disturbance. PhD. Dissertation, Cornell University, Ithaca, New York.

Prier, T., 1998. Personal communication with Luis Diaz, SAIC, regarding hazardous material transported on range roads.

Ray, J., 1999. Maps Inside Flatwoods Salamanders. The Road-RIPorter March/April 1999; 6-7.

Reed, J. R., 1997. *Stream Community Responses to Road Construction Sediments*. Bulletin No.97. Virginia Water Resources Research Center, Virginia Polytechnic Institute, Blacksburg, Virginia, 1990.

Sowa, R., 1998. Personal conversation between SAIC and Mr. Richard Sowa, U.S. Department of Agriculture (USDA) Forest Service (202-205-1437), regarding road density criteria in National Forests. March 1998.

U.S. Air Force, 1994. *Programmatic Environmental Assessment (EA) for Culvert Repairs on Range Roads at Eglin AFB, FL, Report #93-205.* Eglin AFB, FL. 27 April 1994.

————, 1995. *Final Eglin AFB Environmental Baseline Study Resource Appendices.* AFDTC/XPE, Eglin AFB, FL, March 1995.

————, 1996. State of Florida Department of Environmental Protection Division of Air Resource Management - *Application for Title V Permit*. AFMC/EMC, Eglin AFB, FL. May 1996.

————, 1996a. *Outdoor Recreation, Hunting and Fresh Water Fishing Map and Regulations 1996-1997*. Jackson Guard, Eglin Air Force Base.

————, 1996b. *Eglin Noise Study Report.* AFDTC/XPE, Eglin, AFB, FL. September 1996.

————, 1997. AFDTC Plan 32-6, *Eglin AFB Oil and Hazardous Substance Pollution Contingency Plan*, Eglin AFB, FL, May 1997.

————, 1997a. Road Product Improvement Team (PIT) Access database, *roads.mdb*, AFDTC/XPE, Eglin AFB, FL, July 1997.

————, 1997b. *Overland Air Operations Environmental Baseline Document.* AFDTC 46 TW/XPE, Eglin Air Force Base, Florida, July 1997.

————, 1997c. Interstitial Areas Environmental Baseline Document. AFDTC (Air Force Test Development Center), 46 TW/XPE, Range Environmental Planning Office, Eglin Air Force Base, Florida. 32542-6808.

————, 1998. Personal communication between SAIC and personnel from the Fuel Distribution Branch regarding fuel export routes. 96 CEG, 1998.

————, 1999. Best Management Practices, Take AIM-Application, Installation, Maintenance. PowerPoint presentation provided to SAIC. July 1999.

————, 1999a. Personal communications with Mr. Tom Heffernan (46 TW/XPE, Eglin AFB, FL) regarding public access to the Eglin Reservation (comments to the Range Roads PDEA). November 1999.

————, 2001. Eglin Air Force Base Range Road Maintenance - Biological Assessment To Determine Effects To Federally Listed Species Resulting From Current And Proposed Range Road Maintenance Programs. 96CEG, Eglin AFB, FL. October 2001

————, 2001a. *Eglin Air Force Base Range Road Maintenance Handbook.* Eglin Air Force Base, Florida. https://em.eglin.af.mil/roadbmp/.

————, 2001b. Eglin Air Force Base Integrated Natural Resources Management Plan 2002-2006. Eglin Air Force Base, FL. 2001.

U.S. Air Force/EC, 1998. Personal communication with SAIC regarding storage areas and hazardous waste accumulation points located on Eglin AFB.

U.S. Department of Agriculture, Forest Service, 1998. Forest Service Roads: A Synthesis of Scientific Information.

USEPA, 1993. *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. EPA-840-B-93-001c. U.S. Environmental Protection Agency (USEPA). January 1993.

————, 1996. *Indicators of the Environmental Impacts of Transportation; Highway, Rail, Aviation, and Maritime Transport (EPA 230-R-96-009).* United States Environmental Protection Agency, October 1996.

USFS, 2001. National Forest System Road Management Strategy Environmental Assessment And Civil Rights Impact Analysis. U.S. Department Of Agriculture, Forest Service. January 2001.

Wood, D. A., 1996. *Florida's Endangered Species, Threatened Species, and Species of Special Concern, Official Lists*. Published by Bureau of Nongame Wildlife, Division of Wildlife, Florida Game and Fresh Water Fish Commission.

APPENDIX A

SPATIAL ANALYSES OF ENVIRONMENTAL INDICATORS FOR RANGE ROAD SYSTEM

INTRODUCTION

This appendix presents examples of spatial analyses conducted for the current road system, based on the potential decision indicators discussed in Section 4, under Alternative 3. These analyses were performed using the various coverages contained within the Eglin AFB Geographic Information System (GIS) database, as well as the range road data collected by the 1997 Road PIT. The GIS contains detailed spatial and descriptive data on a variety of physical features on the Eglin Range, as well as location and attribute data on threatened and endangered species. The GIS also contains the range road data collected by the 1997 Road PIT. This data includes descriptive information on each road segment, such as condition, surface type, and maintenance status. Information on usage is also available, including roads traveled by individual organizations, mileage logged on these roads, and type of vehicles utilized.

These analyses were not meant to identify which roads would, or should, be closed, since those decisions will be made by the cooperative effort of the RRWG. However, these indicators may be used as an aid to identify potential environmental issues associated with the road system or to assist with making specific construction/maintenance/closure decisions. This type of analyses can be used to identify and rank which road segments are potential candidates for specific maintenance and/or closure actions. For example, a score of "one" may be assigned for each environmental indicator affecting a specific road segment; if a road segment crossed an FNAI Tier I area and had no other environmental indicators associated with it, it would receive a total score of "one." A road which crossed a stream and was situated on higher sloped soils would similarly receive a score of "two." The higher the score, the more potential environmental issues would be associated with that particular segment. Table A-1 describes each of these indicators and summarizes their utility in analyzing road related issues.

SPATIAL ANALYSIS RESULTS

Stream crossings – Analyses of the Road PIT data indicated that there are 192 stream crossings by unpaved roads on the range (Figure A-1), although the actual number of crossings may be much higher since the Road PIT database did not include many of the smaller roads or trails on the range. Of these crossings, 118 (61.5 percent) were on roads classified as tertiary or "other." Most of the roads in these two categories were described as being in poor to very poor (i.e., erodible) condition. Figure A-2 presents crossings of streams by unpaved roads within the darter Basin. Stream crossings pose the most serious impacts to the habitat quality of Okaloosa darter streams due to the amounts of sediments entering the streams from unpaved roads. There were 50 of these crossings identified in the analyses. Of these, 39 were by roads classified as tertiary or "other," and in poor to very poor (i.e., erodible) condition.

Soil Slope – Figure A-3 presents the results of a spatial analysis depicting unpaved road segments situated on areas of the range with soil slopes greater than 5 percent. There are a total of 364 unpaved road segments situated on these soils, accounting for a total of 94 miles of roads. Most of these segments (approximately 88 percent) were categorized as being comprised of a sand surface, and being in poor to very poor condition. These segments accounted for 76.6 of the total 94 miles.

Table A-1. Description of Decision Indicators

POTENTIAL INDICATOR	DESCRIPTION	UTILITY
Stream Crossings	Stream crossings are the points where roads and streams intersect. Stream crossings of unpaved roads are the primary source of sedimentation into Eglin surface waters due to road-generated erosion or ineffective or damage drainage structures.	Identifies candidate roads/areas on which erosion control treatments (e.g., revegetation, rip-rap, etc.) may be required. Identifies candidate roads for decommission.
Resources Overlap	Spatial analysis depicting overlap of roads with sensitive or pristine habitats. Road crossing of these areas increase the potential for degradation of water quality, degradation of habitats, and impacts to sensitive species.	Identifies candidate roads for decommission. Identifies candidate roads on which erosion control treatments may be desired.
Ground Slope	Ground slope gradient is one of the primary driving forces in soil mass-wasting failures.	Identifies candidate areas on which erosion control treatments (e.g., revegetation, water bars, broad based dips, etc.) may be required or desired.
Key Intersections	Spatial analysis depicting intersections of range roads with County-maintained or other non-Air Force roads. These access points may facilitate illegal activities on the range, including poaching and dumping.	Identifies candidate roads for decommission.

Resources Overlap – A total of 106 individual road segments crossed FNAI Tier I areas on the range, with 68 of these (64 percent) associated with roads classified as tertiary or "other" (Figure A-4). Significant Botanical Sites were crossed by a total of 41 road segments, with 30 of these segments (73 percent) associated with roads classified as tertiary or "other" (Figure A-5). Most of these tertiary and "other" roads were categorized as being unpaved, in poor to very poor condition. Wetlands, including Palustrine, Riverine, Estuarine, and Lacustrine-type, were crossed by 180 individual road segments, with approximately 61 percent of these associated with roads classified as tertiary or "other" (Figure A-6). Most of these tertiary and "other" roads were categorized as being unpaved, in poor to very poor condition.

Key Intersections – Figure A-7 presents the results of a spatial analysis depicting intersections of roads categorized as tertiary or "other" with county roads (access points). The analysis indicates that there are 95 of these access points scattered across the range. The analysis utilized the data contained within the Road PIT database; therefore, the actual number of access points is significantly higher.

Figure A-8 depicts road segments identified in the analyses. In that figure, road segments are color-coded, depending on their total score. Roads without any environmental issues affecting them (i.e., a score of "zero") are colored in black. Roads with a score of "one" to "two" are colored blue, "three" to "four" are colored green, "five" to "six" are colored yellow, and road segments with a score of greater than "six" are colored red. The table presented as Appendix D contains detailed data pertaining to each of the road segments depicted in Figure A-8, including the segment length (in miles), the road surface type and condition, and the assigned priority

level. (Note: For comparison, Appendix E contains this exact data for roads categorized as primary or secondary.)

For this assessment, it was assumed that all tertiary or "other" roads with a score higher than "one" would be potential candidates for closure. Further, it was assumed that these roads would be permanently obliterated to minimize environmental impacts. This represents a conservative scenario, since which roads would actually be closed, and at what level of closure, would be determined by the RRWG. For example, closure of some secondary roads could also be accomplished. There are approximately 50 miles of secondary roads, which are classified as having a low to very low priority, and poor to very poor condition. Closure of some of these roads would not only have a positive environmental impact, but would also have a positive financial impact. Maintenance funds are expended on these roads, unlike tertiary or "other" roads, which receive no routine maintenance. Funds saved by closure of these roads could be used to upgrade and maintain remaining secondary roads (AAC/EMH, 2000).

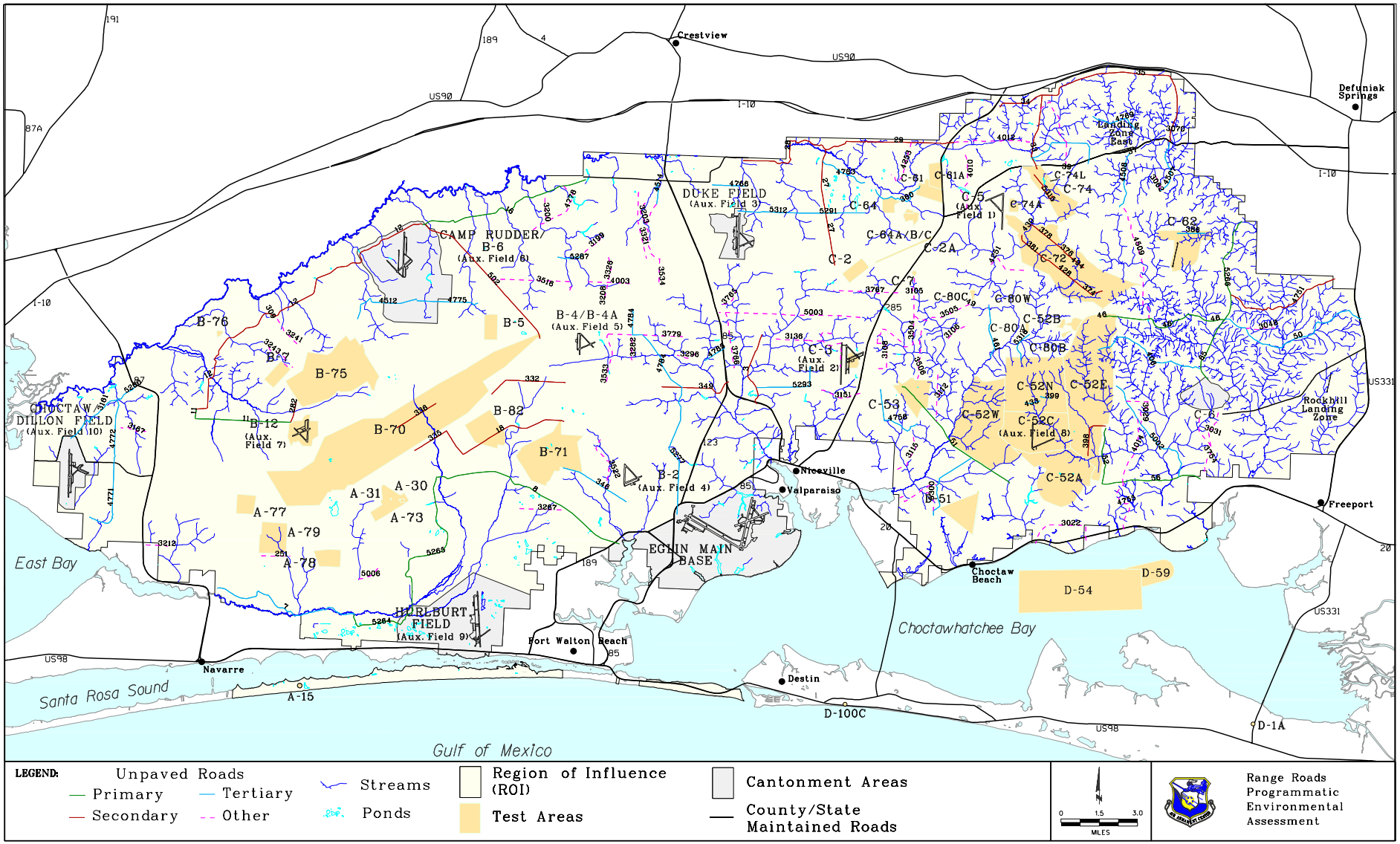

Figure A-1. Stream Crossing by Unpaved Road Segments

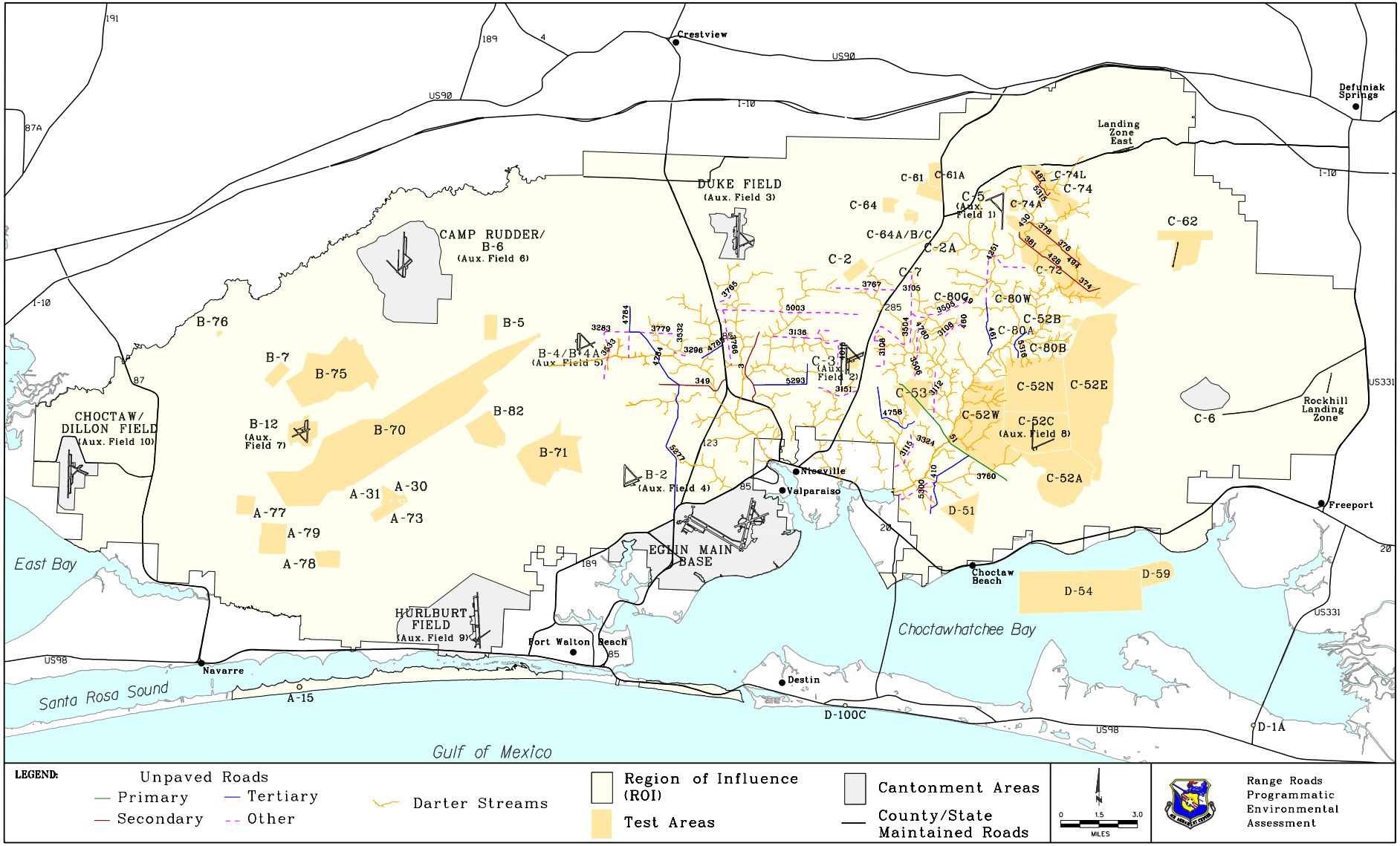

Figure A-2. Unpaved Road Segments Crossing Darter Streams

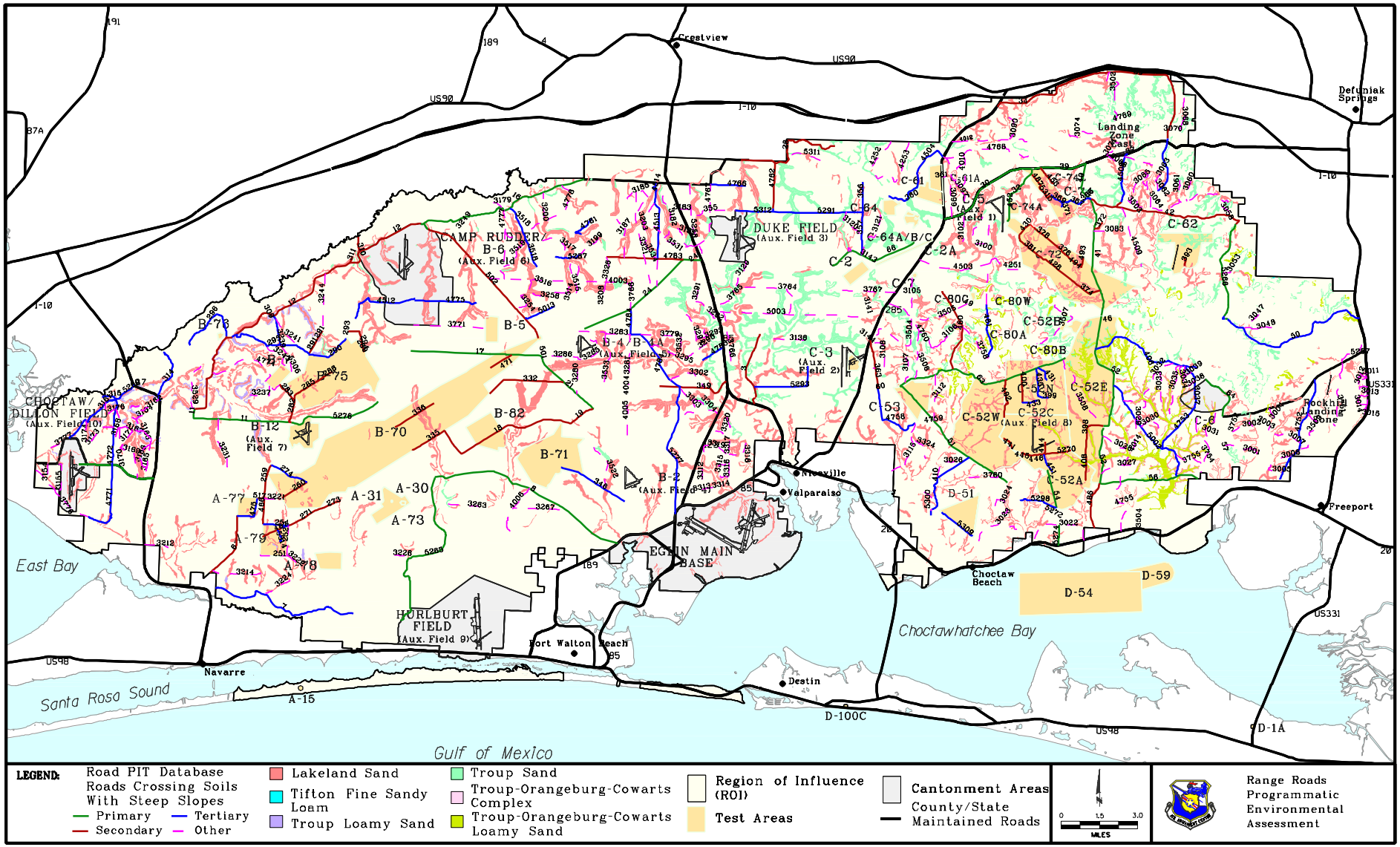

Figure A-3. Road Segments Located on Higher Sloped (> 5 Percent) Soils

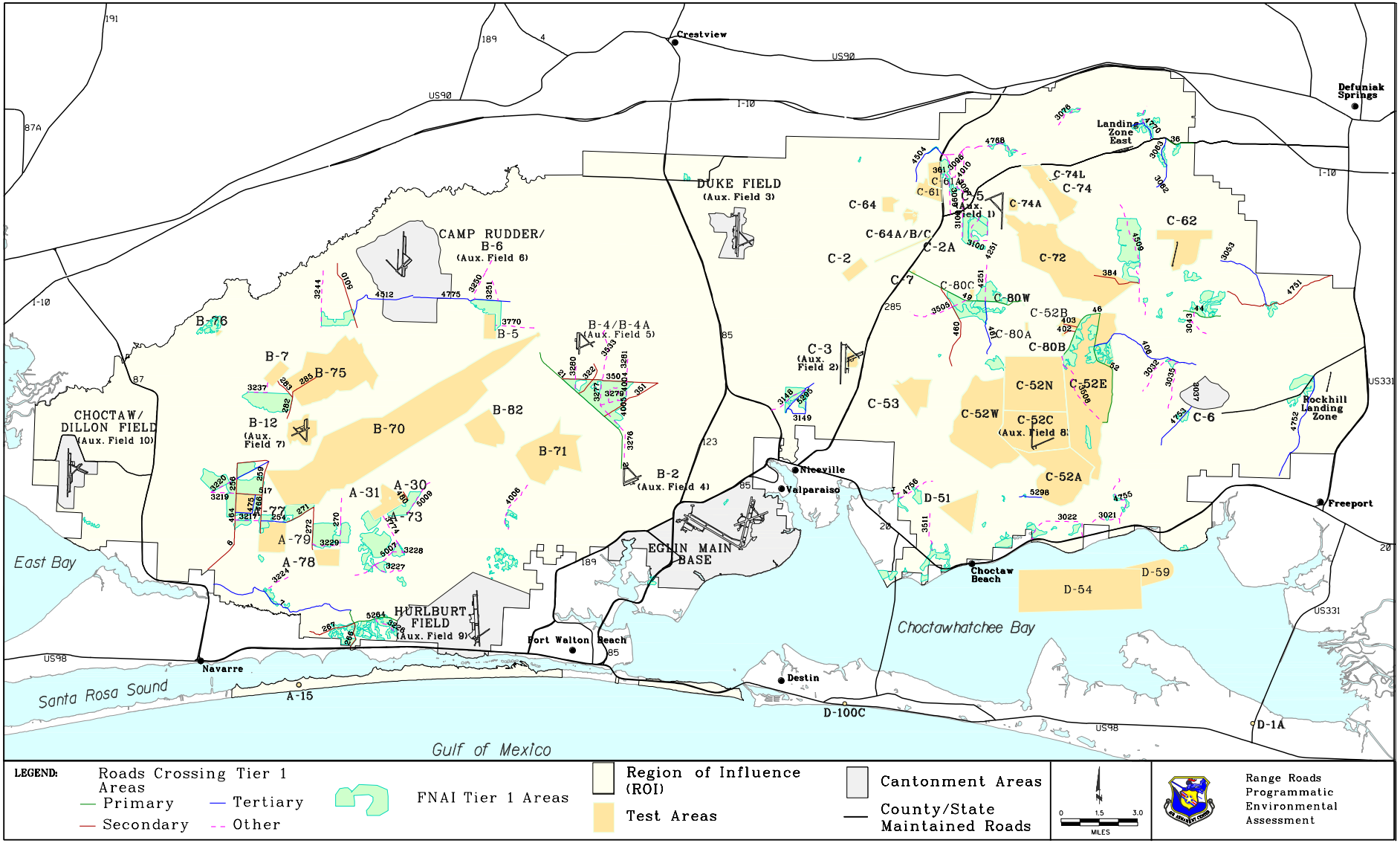

Figure A-4. Road Segments Crossing FNAI Tier I Areas

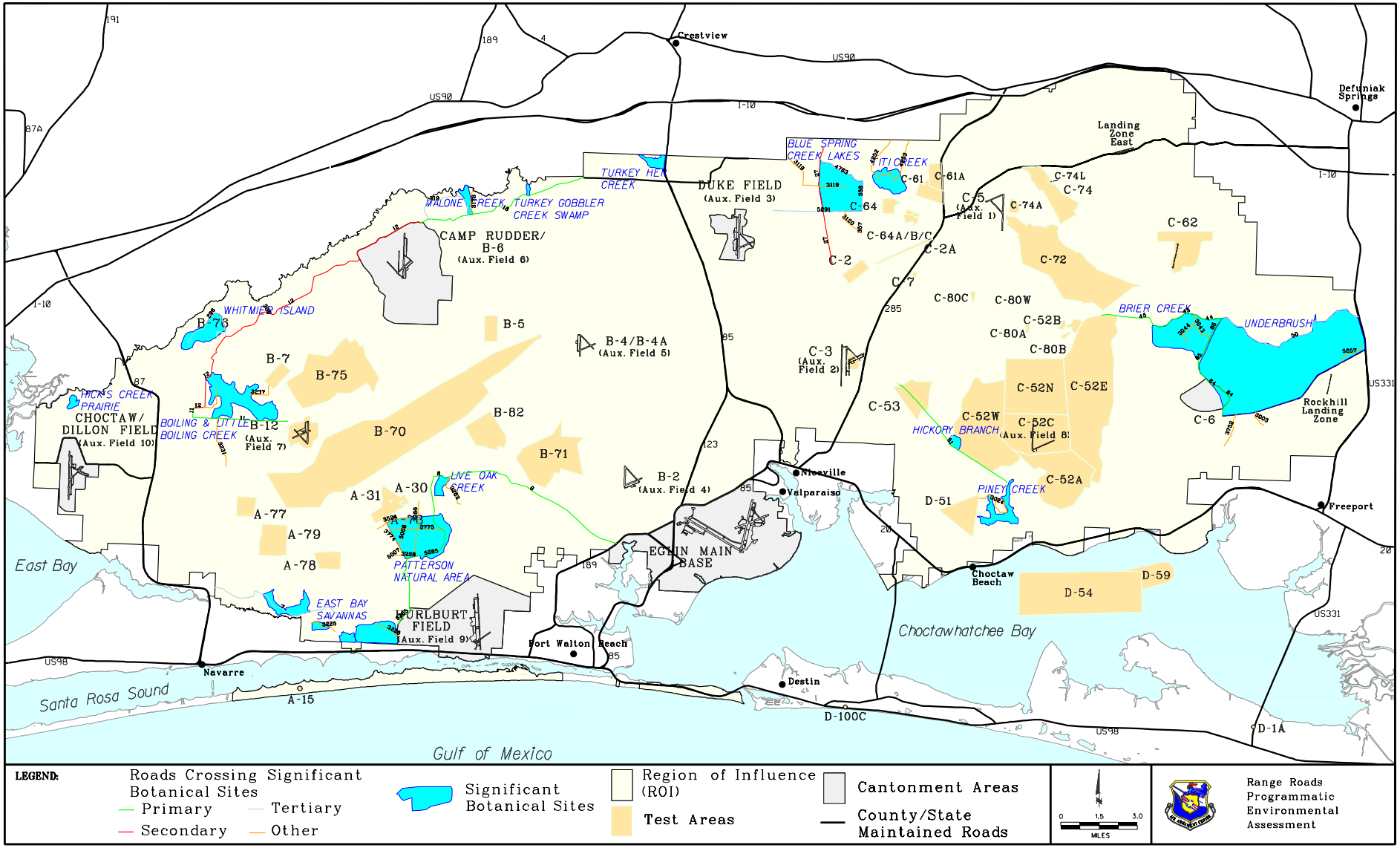

Figure A-5. Road Segments Crossing Significant Botanical Sites

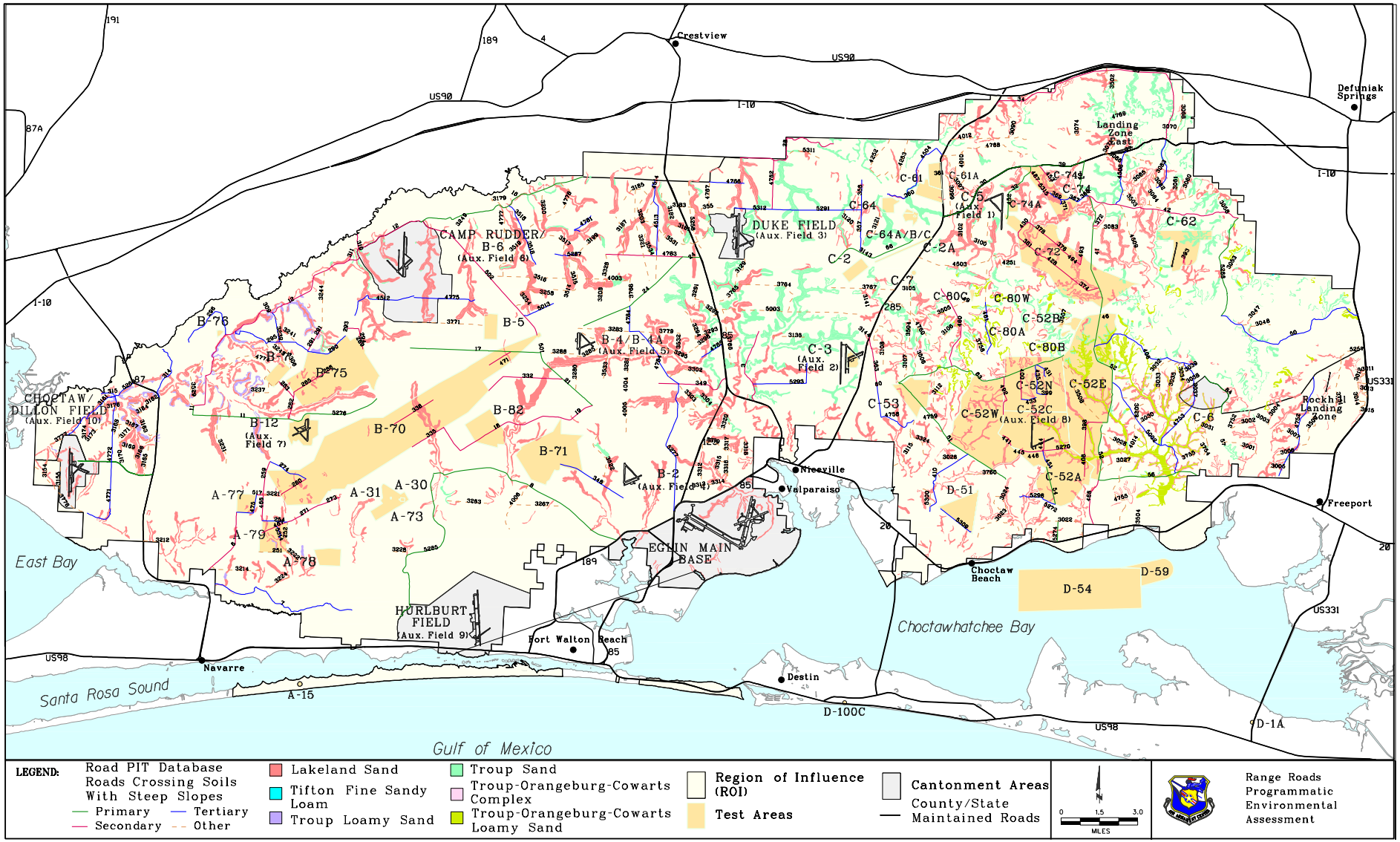

Figure A-6. Road Segments Crossing Wetland Areas

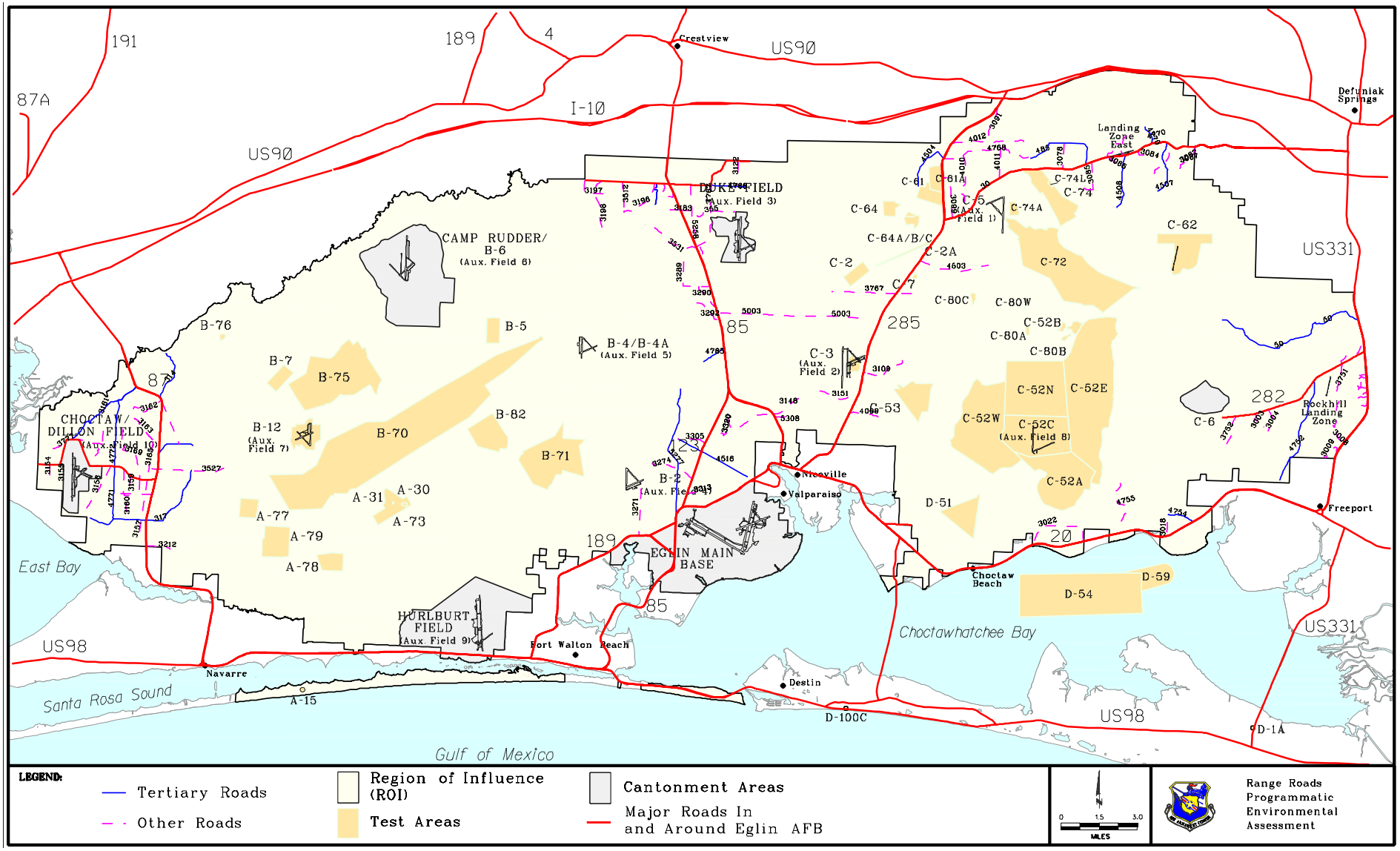

Figure A-7. Access Points (Open and Closed) into the Eglin Reservation from County Roads

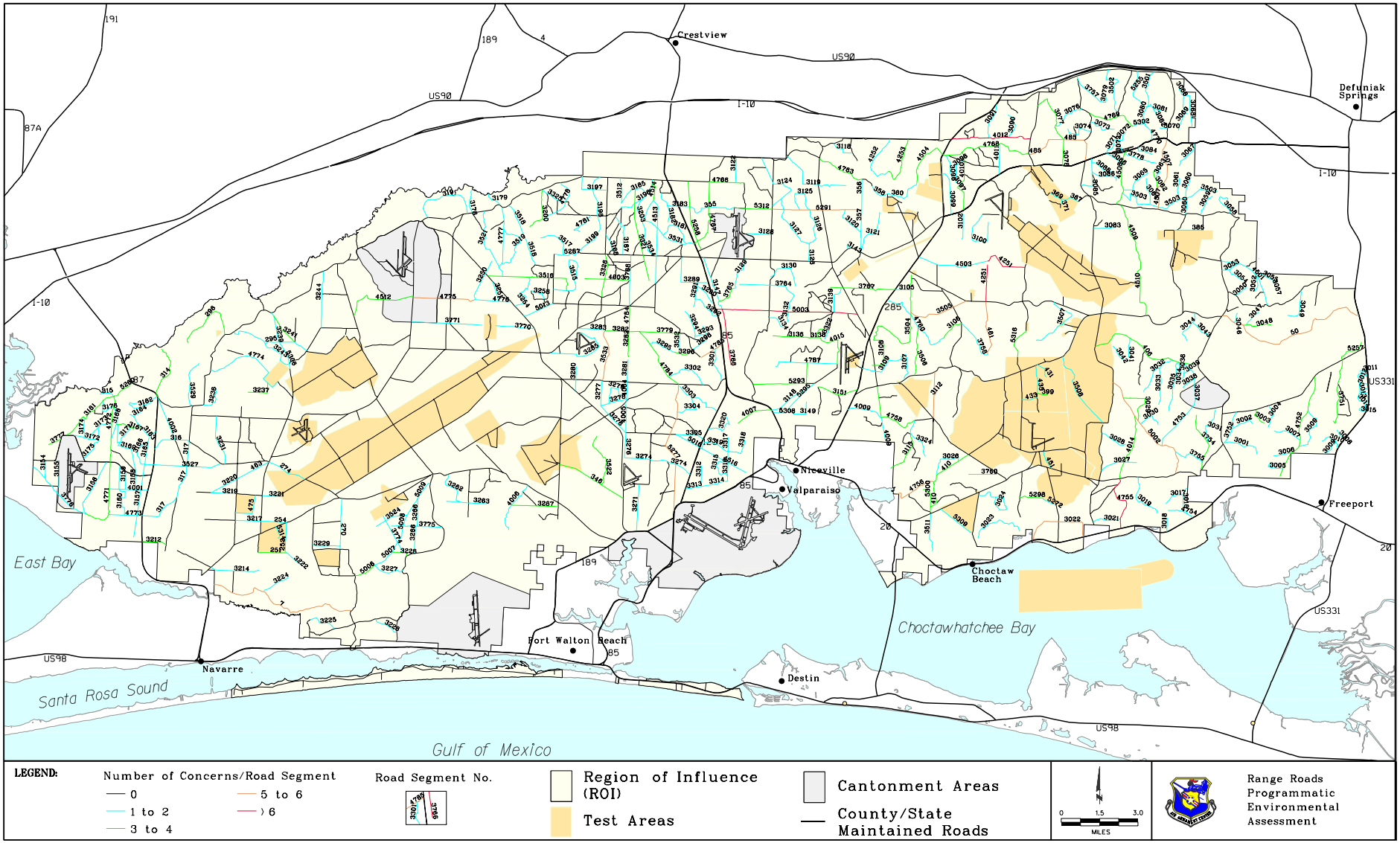

Figure A-8. Example Impact Scoring of Range Road Segments on Eglin AFB

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APPENDIX B

UNPAVED ROADS CROSSING STREAMS

Unpaved Roads Crossing Streams

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Length (mi)	No. of Crossings
3	231	36-37	Secondary	unpaved-clay/sand	good	medium to high priority	3.0381	1
7	255	3-4	Tertiary	unpaved-sand	poor	medium to high priority	6.2929	1
8	234	4-7	Primary	unpaved-clay	very good	very high priority	8.1195	2
11	213	15-16	Primary	unpaved-clay	very good	high priority	4.1135	2
12	211	17-18	Secondary	unpaved-clay/sand	good	medium to high priority	13.2624	10
16	211	18-25	Primary	unpaved-clay/sand	good	very high priority	7.0104	6
18	239	10-12	Secondary	unpaved-clay/sand	poor	low to medium priority	5.5037	1
27	220	29-30	Secondary	unpaved-clay/sand	poor	low to medium priority	4.6366	1
28	207	30-31	Secondary	unpaved-clay/sand	poor	low to medium priority	4.8302	6
29	207	30-32	Secondary	unpaved-clay/sand	poor	low to medium priority	4.7022	4
33	214	39-41	Secondary	unpaved-clay/sand	good	medium to high priority	3.0307	2
34	210	41-42	Secondary	unpaved-sand	poor	low to medium priority	1.8322	2
35	210	41-43	Secondary	unpaved-sand	poor	low to medium priority	8.0587	3
44	200/201	48-50	Primary	unpaved-clay	very good	medium to high priority	1.5492	2
45	200/201	47-48	Primary	unpaved-clay	very good	high priority	3.6189	1
50	200	50-51	Tertiary	unpaved-clay/sand	good	low to medium priority	6.5903	2
51	219	57-66	Primary	unpaved-clay/sand	good	medium to high priority	5.7861	2
52	212	47-63	Primary	unpaved-clay/sand	good	medium to high priority	7.1699	1
56	218	62-63	Primary	unpaved-clay/sand	good	medium to high priority	3.9599	2
65	208	50-59	Primary	unpaved-clay	good	medium to high priority	2.7120	2
251	678	EA-EB	Other	unpaved-sand	poor	low priority	1.1197	1
282	735	AQ-DC	Secondary	unpaved-sand	poor	very low priority	0.8324	1
332	235	DP-FT	Secondary	unpaved-sand	poor	low priority	3.1292	1
335	235	G-M	Secondary	unpaved-sand	poor	low priority	1.4735	1
336	660	DJ-DK	Secondary	unpaved-sand	poor	low priority	1.8189	1
346	632	FK-FY	Tertiary	unpaved-sand	poor	low priority	2.8491	1
349	232	FP-FP1	Secondary	unpaved-clay/sand	good	low priority	2.9410	1
358	211	GH-GH1	Tertiary	unpaved-sand	poor	very low priority	0.8081	1
360	211	GH1-GI	Tertiary	unpaved-sand	poor	very low priority	1.6025	1
374	374	JT-JW	Secondary	unpaved-clay/sand	poor	low priority	1.7609	1
376	376	JQ-JS	Secondary	unpaved-clay/sand	poor	low priority	1.1571	1
378	376	JM-JQ	Secondary	unpaved-sand	poor	low priority	1.0070	1
381	374/214	JN-JP	Secondary	unpaved-clay/sand	poor	low priority	0.8962	1
386	380	KP-KR	Tertiary	unpaved-sand	poor	low priority	1.1240	1
398	427	MV-MW	Secondary	unpaved-clay/sand	good	low priority	1.7718	1

Unpaved Roads Crossing Streams Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Length (mi)	No. of Crossings
399	Not Known	NU-OA	Tertiary	unpaved-sand	poor	very low priority	0.4238	1
406	370	MM-MN	Tertiary	unpaved-sand	poor	very low priority	4.7205	1
410	217	NI-NJ	Tertiary	unpaved-sand	poor	very low priority	3.1914	1
428	374	JP-JT	Secondary	unpaved-clay/sand	poor	low priority	1.4624	1
433	388	NT-NV	Tertiary	unpaved-sand	poor	very low priority	0.6183	1
461	485	JD-ME	Tertiary	unpaved-sand	poor	very low priority	2.1846	1
485	211/212	KK-KL	Tertiary	unpaved-clay/sand	poor	low priority	3.2611	3
494	376	JS-JU1	Secondary	unpaved-clay/sand	poor	low priority	0.6344	1
502	236	M-N2	Secondary	unpaved-sand	poor	very low priority	6.5047	2
3022	Not Known	3022	Other	unpaved-sand	very poor	very low priority	3.0016	1
3029	Not Known	3029	Other	unpaved-sand	very poor	very low priority	1.8979	1
3031	Not Known	3031	Other	unpaved-sand	very poor	very low priority	1.6469	1
3048	Not Known	3048	Other	unpaved-sand	very poor	very low priority	1.1535	1
3062	Not Known	3062	Other	unpaved-sand	very poor	very low priority	0.7030	1
3077	Not Known	3077	Other	unpaved-sand	very poor	very low priority	2.3707	2
3078	Not Known	3078	Other	unpaved-sand	very poor	very low priority	1.0193	1
3106	Not Known	3106	Other	unpaved-sand	very poor	very low priority	1.0258	1
3108	Not Known	3108	Other	unpaved-sand	very poor	very low priority	1.7729	1
3112	Not Known	3112	Other	unpaved-sand	very poor	very low priority	1.8762	2
3115	Not Known	3115	Other	unpaved-sand	very poor	very low priority	1.7925	1
3136	Not Known	3136	Other	unpaved-sand	very poor	very low priority	1.2655	1
3138	Not Known	3138	Other	unpaved-sand	very poor	very low priority	0.4835	1
3151	Not Known	3151	Other	unpaved-sand	very poor	very low priority	1.6448	1
3161	Not Known	3161	Tertiary	unpaved-sand	very poor	very low priority	2.6558	2
3167	Not Known	3167	Other	unpaved-sand	very poor	very low priority	1.1259	1
3199	Not Known	3199	Other	unpaved-sand	very poor	very low priority	1.0360	1
3200	Not Known	3200	Other	unpaved-sand	very poor	very low priority	1.7982	1
3203	Not Known	3203	Other	unpaved-sand	very poor	very low priority	0.9483	1
3212	Not Known	3212	Other	unpaved-sand	very poor	very low priority	1.0123	1
3241	Not Known	3241	Other	unpaved-sand	very poor	very low priority	1.3500	1

Unpaved Roads Crossing Streams Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Length (mi)	No. of Crossings
3243	Not Known	3243	Other	unpaved-sand	very poor	very low priority	1.4856	1
3267	Not Known	3267	Other	unpaved-sand	very poor	very low priority	1.8257	1
3282	Not Known	3282	Other	unpaved-sand	very poor	very low priority	1.9526	1
3296	Not Known	3296	Other	unpaved-sand	very poor	very low priority	0.8166	1
3321	Not Known	3321	Other	unpaved-sand	very poor	very low priority	3.6767	2
3326	Not Known	3326	Other	unpaved-sand	very poor	very low priority	1.7374	1
3504	Not Known	3504	Other	unpaved-sand	very poor	very low priority	4.9308	1
3505	Not Known	3505	Other	unpaved-sand	very poor	very low priority	2.4072	1
3506	Not Known	3506	Other	unpaved-sand	very poor	very low priority	1.9464	1
3516	Not Known	3516	Other	unpaved-sand	very poor	very low priority	3.6205	1
3522	Not Known	3522	Other	unpaved-sand	very poor	very low priority	2.3243	2
3533	Not Known	3533	Other	unpaved-sand	very poor	very low priority	2.0864	1
3534	Not Known	3534	Other	unpaved-sand	very poor	very low priority	3.6597	1
3754	Not Known	3754	Other	unpaved-sand	very poor	very low priority	2.4057	2
3765	Not Known	3765	Other	unpaved-sand	very poor	very low priority	0.8356	1
3766	Not Known	3766	Other	unpaved-sand	very poor	very low priority	2.2522	3
3767	Not Known	3767	Other	unpaved-sand	very poor	very low priority	2.5821	1
3779	Not Known	3779	Other	unpaved-sand	very poor	very low priority	1.5646	1
4003	Not Known	4003	Other	unpaved-sand	very poor	very low priority	1.7719	1
4010	Not Known	4010	Other	unpaved-sand	very poor	very low priority	2.5352	1
4012	Not Known	4012	Other	unpaved-sand	very poor	very low priority	3.2204	5
4014	Not Known	4014	Other	unpaved-sand	very poor	very low priority	2.6529	1
4015	Not Known	4015	Other	unpaved-sand	very poor	very low priority	2.6168	1
4251	Not Known	4251	Other	unpaved-sand	very poor	very low priority	3.4172	4
4253	Not Known	4253	Other	unpaved-sand	very poor	very low priority	2.1767	1
4507	Not Known	4507	Tertiary	unpaved-sand	very poor	very low priority	3.0946	1

Unpaved Roads Crossing Streams Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Length (mi)	No. of Crossings
4508	Not Known	4508	Tertiary	unpaved-sand	very poor	very low priority	2.2737	1
4509	Not Known	4509	Other	unpaved-sand	very poor	very low priority	2.5251	1
4510	Not Known	4510	Other	unpaved-sand	very poor	very low priority	2.3300	1
4512	Not Known	4512	Tertiary	unpaved-sand	very poor	very low priority	2.9782	1
4514	Not Known	4514	Tertiary	unpaved-sand	very poor	very low priority	0.9982	1
4751	Not Known	4751	Secondary	unpaved-sand	very poor	very low priority	4.8117	3
4755	Not Known	4755	Other	unpaved-sand	very poor	very low priority	2.4327	3
4756	Not Known	4756	Other	unpaved-sand	very poor	very low priority	1.8846	2
4758	Not Known	4758	Tertiary	unpaved-sand	very poor	very low priority	2.8274	1
4763	Not Known	4763	Tertiary	unpaved-sand	very poor	very low priority	1.9737	1
4766	Not Known	4766	Tertiary	unpaved-sand	very poor	very low priority	1.3853	1
4769	Not Known	4769	Tertiary	unpaved-sand	very poor	very low priority	2.0068	2
4771	Not Known	4771	Tertiary	unpaved-sand	very poor	very low priority	3.1643	1
4772	Not Known	4772	Tertiary	unpaved-sand	very poor	very low priority	2.6183	1
4775	Not Known	4775	Tertiary	unpaved-sand	very poor	very low priority	2.4529	2
4778	Not Known	4778	Other	unpaved-sand	very poor	very low priority	2.1842	1
4784	Not Known	4784	Tertiary	unpaved-sand	very poor	very low priority	4.0794	1
4785	Not Known	4785	Tertiary	unpaved-sand	very poor	very low priority	0.9586	1
5002	Not Known	5002	Tertiary	unpaved-sand	very poor	very low priority	4.8046	3
5003	Not Known	5003	Other	unpaved-sand	very poor	very low priority	5.5471	3
5006	Not Known	5006	Other	unpaved-sand	fair	very low priority	0.9323	1
5260	Not Known	5260	Tertiary	unpaved-sand	poor	low priority	0.9344	1
5264	259/688	70-71	Primary	unpaved-clay/sand	fair	very low priority	2.2941	1
5265	253	71-72	Primary	unpaved-clay/sand	fair	high priority	7.5210	4
5266	208	72-73	Primary	unpaved-clay	good	medium to high priority	4.2322	1
5277	Not Known	FP2-FP3	Tertiary	unpaved-sand	poor	low priority	5.2848	1
5287	Not Known	5287	Tertiary	unpaved-sand	very poor	very low priority	1.0646	1

Unpaved Roads Crossing Streams Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Length (mi)	No. of Crossings
5291	454	GA2-GB2	Tertiary	unpaved-clay/sand	fair	low priority	3.5025	3
5293	Not Known	JA1-JA3	Tertiary	unpaved-sand	poor	very low priority	2.8978	1
5300	Not Known	5300	Other	unpaved-sand	very poor	very low priority	0.8759	1
5312	454	GA3-GB3	Tertiary	unpaved-clay/sand	fair	low priority	1.4905	2
5315	395	KD2-KG2	Secondary	unpaved-clay/sand	good	low to medium priority	1.4024	1
5316	214	5316	Tertiary	unpaved-clay/sand	fair	low to medium priority	1.2894	1
							Total:	192

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APPENDIX C

UNPAVED ROADS CROSSING OR ADJACENT TO SENSITIVE HABITATS

UNPAVED ROADS CROSSING OR ADJACENT TO SENSITIVE HABITATS

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
Palustrine Wetlands								
3	231	36-37	Secondary	unpaved- clay/sand	good	medium to high priority	3.0381	0.2380
5	242	1-2	Primary	paved- meets DOT specs	excellent	very high priority	13.1838	0.0422
6	234/747	22-23	Secondary	unpaved- clay/sand	poor	medium to high priority	2.6920	0.0085
7	255	3-4	Tertiary	unpaved- sand	poor	medium to high priority	6.2929	2.7504
8	234	4-7	Primary	unpaved- clay	very good	very high priority	8.1195	0.2709
12	211	17-18	Secondary	unpaved- clay/sand	good	medium to high priority	13.2624	0.4824
16	211	18-25	Primary	unpaved- clay/sand	good	very high priority	7.0104	1.1171
19	239	9-10	Secondary	unpaved- clay/sand	poor	low to medium priority	1.4198	0.1062
27	220	29-30	Secondary	unpaved- clay/sand	poor	low to medium priority	4.6366	0.3219
28	207	30-31	Secondary	unpaved- clay/sand	poor	low to medium priority	4.8302	0.6700
29	207	30-32	Secondary	unpaved- clay/sand	poor	low to medium priority	4.7022	0.0811
34	210	41-42	Secondary	unpaved- sand	poor	low to medium priority	1.8322	0.0539
39	213	39-45	Primary	paved- meets some DOT specs	very good	very high priority	2.0782	0.0530
44	200/201	48-50	Primary	unpaved- clay	very good	medium to high priority	1.5492	0.0402
45	200/201	47-48	Primary	unpaved- clay	very good	high priority	3.6189	0.0188
48	201	52-53	Primary	paved- mix & place/slag/crushed stone	very good	high priority	2.8442	0.0384
49	201	53-55	Primary	paved- mix & place/slag/crushed stone	very good	high priority	4.8081	0.0304
50	200	50-51	Tertiary	unpaved- clay/sand	good	low to medium priority	6.5903	0.2817
51	219	57-66	Primary	unpaved- clay/sand	good	medium to high priority	5.7861	0.5535
52	212	47-63	Primary	unpaved- clay/sand	good	medium to high priority	7.1699	0.1665
56	218	62-63	Primary	unpaved- clay/sand	good	medium to high priority	3.9599	0.0076
63	200	57-58	Primary	paved- meets some DOT specs	very good	high priority	7.1106	0.0686
65	208	50-59	Primary	unpaved- clay	good	medium to high priority	2.7120	0.0678
251	678	EA-EB	Other	unpaved- sand	poor	low priority	1.1197	0.1179
265	255/259	EH-EM	Secondary	unpaved- sand	poor	very low priority	1.4779	1.4217
267	668	EM-EP	Secondary	unpaved- sand	poor	very low priority	1.2998	0.0167
273	234	DU-DV	Secondary	unpaved- sand	poor	low priority	1.0585	0.0448
282	735	AQ-DC	Secondary	unpaved- sand	poor	very low priority	0.8324	0.0894
291	700	AJ-AK	Secondary	paved- mix & place/slag/crushed stone	fair	very low priority	1.0815	0.0253
296	717	AD-L1	Tertiary	unpaved- sand	poor	low priority	2.8426	0.2304
309	731	AE-L2	Secondary	unpaved- sand	poor	very low priority	0.5272	0.4512
310	717	AG-L3	Secondary	unpaved- sand	poor	low priority	0.5991	0.5029
314	787	A-AC	Tertiary	unpaved- sand	poor	low priority	2.3487	0.1670
315	734	AA-AB	Tertiary	unpaved- sand	poor	low priority	0.6130	0.1609

Unpaved Roads Crossing or Adjacent to Sensitive Habitats Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
319	697/675	AG2-G	Tertiary	unpaved- sand	poor	very low priority	2.9822	2.4458
324	250	FT-K1	Secondary	unpaved- sand	good	low priority	1.5379	0.1901
335	235	G-M	Secondary	unpaved- sand	poor	low priority	1.4735	0.0244
346	632	FK-FY	Tertiary	unpaved- sand	poor	low priority	2.8491	0.0190
349	232	FP-FP1	Secondary	unpaved- clay/sand	good	low priority	2.9410	0.1358
374	374	JT-JW	Secondary	unpaved- clay/sand	poor	low priority	1.7609	0.0073
398	427	MV-MW	Secondary	unpaved- clay/sand	good	low priority	1.7718	0.0741
399	Not Known	NU-OA	Tertiary	unpaved- sand	poor	very low priority	0.4238	0.0074
406	370	MM-MN	Tertiary	unpaved- sand	poor	very low priority	4.7205	0.0096
408	222	MU-MW	Secondary	paved- mix & place/slag/crushed stone	poor	low priority	0.9739	0.1358
410	217	NI-NJ	Tertiary	unpaved- sand	poor	very low priority	3.1914	0.0822
414	A18A	ER-Q	Secondary	paved- mix & place/slag/crushed stone	very poor	very low priority	0.2081	0.0042
415	A17A	ES-ES1	Secondary	paved- mix & place/slag/crushed stone	good	low priority	0.1822	0.0218
417	A13A	EU-EU1	Secondary	paved- mix & place/slag/crushed stone	good	low priority	0.2523	0.0464
418	A11	EW-EW1	Secondary	paved- mix & place/slag/crushed stone	good	low priority	0.1785	0.0094
419	A11A	EV-EV1	Secondary	paved- mix & place/slag/crushed stone	very poor	low priority	0.0896	0.0201
421	A6	EZ-EZ1	Secondary	paved- mix & place/slag/crushed stone	very good	low priority	0.1561	0.0311
422	A7	EY-EY1	Secondary	paved- mix & place/slag/crushed stone	NK	very low priority	0.0697	0.0251
424	A3	FC-FD	Secondary	paved- mix & place/slag/crushed stone	good	low priority	0.2290	0.0533
425	A2	FE-FF	Secondary	paved- mix & place/slag/crushed stone	poor	very low priority	0.2092	0.0797
426	A2	FG-FH	Secondary	paved- mix & place/slag/crushed stone	poor	very low priority	0.3413	0.1697
461	485	JD-ME	Tertiary	unpaved- sand	poor	very low priority	2.1854	0.0645
485	211/212	KK-KL	Tertiary	unpaved- clay/sand	poor	low priority	3.2611	0.1384
494	376	JS-JU1	Secondary	unpaved- clay/sand	poor	low priority	0.6344	0.0175
502	236	M-N2	Secondary	unpaved- sand	poor	very low priority	6.5047	0.1126
503	C52W	NL-NM	Secondary	unpaved- sand	poor	very low priority	0.4627	0.0404
514	678/737	EE-EH	Secondary	unpaved- sand	poor	very low priority	0.6218	0.0569
3003	Not Known	3003	Other	unpaved- sand	very poor	very low priority	0.7681	0.1538
3008	Not Known	3008	Other	unpaved- sand	very poor	very low priority	0.4792	0.3360
3009	Not Known	3009	Other	unpaved- sand	very poor	very low priority	0.9844	0.3577
3010	Not Known	3010	Other	unpaved- sand	very poor	very low priority	0.7460	0.5309
3016	Not Known	3016	Other	unpaved- sand	very poor	very low priority	1.1168	0.6147
3017	Not Known	3017	Other	unpaved- sand	very poor	very low priority	0.8362	0.2713
3021	Not Known	3021	Other	unpaved- sand	very poor	very low priority	1.1356	0.1244
3022	Not Known	3022	Other	unpaved- sand	very poor	very low priority	3.0016	0.0639
3026	Not Known	3026	Other	unpaved- sand	very poor	very low priority	1.5284	0.0345

Unpaved Roads Crossing or Adjacent to Sensitive Habitats Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
3027	Not Known	3027	Other	unpaved- sand	very poor	very low priority	1.5058	0.0063
3029	Not Known	3029	Other	unpaved- sand	very poor	very low priority	1.8979	0.0034
3033	Not Known	3033	Other	unpaved- sand	very poor	very low priority	1.4604	0.0191
3048	Not Known	3048	Other	unpaved- sand	very poor	very low priority	1.1535	0.0144
3062	Not Known	3062	Other	unpaved- sand	very poor	very low priority	0.7030	0.0053
3063	Not Known	3063	Other	unpaved- sand	very poor	very low priority	0.6148	0.0026
3077	Not Known	3077	Other	unpaved- sand	very poor	very low priority	2.3707	0.1389
3078	Not Known	3078	Other	unpaved- sand	very poor	very low priority	1.0193	0.0647
3090	Not Known	3090	Other	unpaved- sand	very poor	very low priority	1.1403	0.0110
3106	Not Known	3106	Other	unpaved- sand	very poor	very low priority	1.0258	0.0139
3112	Not Known	3112	Other	unpaved- sand	very poor	very low priority	1.8762	0.0202
3115	Not Known	3115	Other	unpaved- sand	very poor	very low priority	1.7925	0.1361
3134	Not Known	3134	Other	unpaved- sand	very poor	very low priority	0.8475	0.0261
3136	Not Known	3136	Other	unpaved- sand	very poor	very low priority	1.2655	0.0502
3138	Not Known	3138	Other	unpaved- sand	very poor	very low priority	0.4835	0.0147
3167	Not Known	3167	Other	unpaved- sand	very poor	very low priority	1.1259	0.0200
3178	Not Known	3178	Other	unpaved- sand	very poor	very low priority	0.9838	0.6427
3179	Not Known	3179	Other	unpaved- sand	very poor	very low priority	0.7439	0.2800
3181	Not Known	3181	Other	unpaved- sand	very poor	very low priority	1.6700	0.0128
3188	Not Known	3188	Other	unpaved- sand	very poor	very low priority	0.6996	0.1001
3200	Not Known	3200	Other	unpaved- sand	very poor	very low priority	1.7982	0.0219
3241	Not Known	3241	Other	unpaved- sand	very poor	very low priority	1.3500	0.0296
3267	Not Known	3267	Other	unpaved- sand	very poor	very low priority	1.8257	0.0179
3282	Not Known	3282	Other	unpaved- sand	very poor	very low priority	1.9526	0.0178
3295	Not Known	3295	Other	unpaved- sand	very poor	very low priority	1.1206	0.0135
3296	Not Known	3296	Other	unpaved- sand	very poor	very low priority	0.8166	0.0109
3321	Not Known	3321	Other	unpaved- sand	very poor	very low priority	3.6767	0.0324
3326	Not Known	3326	Other	unpaved- sand	very poor	very low priority	1.7374	0.0256
3504	Not Known	3504	Other	unpaved- sand	very poor	very low priority	4.9308	0.0439
3505	Not Known	3505	Other	unpaved- sand	very poor	very low priority	2.4072	0.0768
3506	Not Known	3506	Other	unpaved- sand	very poor	very low priority	1.9464	0.0441
3509	Not Known	3509	Other	unpaved- sand	very poor	very low priority	2.1363	0.4066
3516	Not Known	3516	Other	unpaved- sand	very poor	very low priority	3.6205	0.0181
3521	Not Known	3521	Other	unpaved- sand	very poor	very low priority	2.5930	0.0884
3522	Not Known	3522	Other	unpaved- sand	very poor	very low priority	2.3243	0.0175
3533	Not Known	3533	Other	unpaved- sand	very poor	very low priority	2.0864	0.0585

Unpaved Roads Crossing or Adjacent to Sensitive Habitats Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
3751	Not Known	3751	Other	unpaved- sand	very poor	very low priority	2.7517	0.0438
3754	Not Known	3754	Other	unpaved- sand	very poor	very low priority	2.4057	0.0483
3758	Not Known	3758	Other	unpaved- sand	very poor	very low priority	1.7314	0.0496
3766	Not Known	3766	Other	unpaved- sand	very poor	very low priority	2.2522	0.0138
3770	Not Known	3770	Other	unpaved- sand	very poor	very low priority	1.5190	0.3015
3775	Not Known	3775	Other	unpaved- sand	very poor	very low priority	1.9931	0.0170
3777	Not Known	3777	Other	unpaved- sand	very poor	very low priority	0.5370	0.0113
3779	Not Known	3779	Other	unpaved- sand	very poor	very low priority	1.5646	0.0252
4003	Not Known	4003	Other	unpaved- sand	very poor	very low priority	1.7719	0.0179
4012	Not Known	4012	Other	unpaved- sand	very poor	very low priority	3.2204	0.4061
4014	Not Known	4014	Other	unpaved- sand	very poor	very low priority	2.6529	0.1211
4015	Not Known	4015	Other	unpaved- sand	very poor	very low priority	2.6168	0.0065
4251	Not Known	4251	Other	unpaved- sand	very poor	very low priority	3.4172	0.0363
4508	Not Known	4508	Tertiary	unpaved- sand	very poor	very low priority	2.2737	0.0867
4509	Not Known	4509	Other	unpaved- sand	very poor	very low priority	2.5251	0.0499
4512	Not Known	4512	Tertiary	unpaved- sand	very poor	very low priority	2.9782	0.0200
4751	Not Known	4751	Secondary	unpaved- sand	very poor	very low priority	4.8117	0.1831
4752	Not Known	4752	Tertiary	unpaved- sand	very poor	very low priority	4.3516	0.0535
4754	Not Known	4754	Tertiary	unpaved- sand	very poor	very low priority	1.0653	0.0391
4755	Not Known	4755	Other	unpaved- sand	very poor	very low priority	2.4327	0.1551
4756	Not Known	4756	Other	unpaved- sand	very poor	very low priority	1.8846	0.3730
4758	Not Known	4758	Tertiary	unpaved- sand	very poor	very low priority	2.8274	0.0435
4760	Not Known	4760	Other	unpaved- sand	very poor	very low priority	3.3318	0.0231
4762	Not Known	4762	Secondary	unpaved- sand	very poor	very low priority	1.9364	0.0058
4763	Not Known	4763	Tertiary	unpaved- sand	very poor	very low priority	1.9737	0.0506
4767	Not Known	4767	Other	unpaved- sand	very poor	very low priority	2.7411	0.0197
4768	Not Known	4768	Other	unpaved- sand	very poor	very low priority	3.7391	0.0432
4769	Not Known	4769	Tertiary	unpaved- sand	very poor	very low priority	2.0068	0.0732
4772	Not Known	4772	Tertiary	unpaved- sand	very poor	very low priority	2.6183	0.0247
4775	Not Known	4775	Tertiary	unpaved- sand	very poor	very low priority	2.4529	0.0128
4776	Not Known	4776	Tertiary	unpaved- sand	very poor	very low priority	1.4150	0.0103
4777	Not Known	4777	Other	unpaved- sand	very poor	very low priority	2.8214	0.0108
4784	Not Known	4784	Tertiary	unpaved- sand	very poor	very low priority	4.0794	0.0365
4785	Not Known	4785	Tertiary	unpaved- sand	very poor	very low priority	0.9586	0.0412
5002	Not Known	5002	Tertiary	unpaved- sand	very poor	very low priority	4.8046	0.1193
5003	Not Known	5003	Other	unpaved- sand	very poor	very low priority	5.5471	0.0608

Unpaved Roads Crossing or Adjacent to Sensitive Habitats Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
5006	Not Known	5006	Other	unpaved- sand	fair	very low priority	0.9323	0.4183
5258	Not Known	5258	Other	unpaved- sand	very poor	very low priority	2.8007	0.0084
5260	Not Known	5260	Tertiary	unpaved- sand	poor	low priority	0.9344	0.0775
5264	259/688	70-71	Primary	unpaved- clay/sand	fair	very low priority	2.2941	0.4759
5265	253	71-72	Primary	unpaved- clay/sand	fair	high priority	7.5210	1.8755
5277	Not Known	FP2-FP3	Tertiary	unpaved- sand	poor	low priority	5.2848	0.0499
5291	454	GA2-GB2	Tertiary	unpaved- clay/sand	fair	low priority	3.5025	0.0447
5298	340/354	NE-NF	Tertiary	unpaved- sand	very poor	very low priority	0.9114	0.0252
5312	454	GA3-GB3	Tertiary	unpaved- clay/sand	fair	low priority	1.4905	0.0248
5315	395	KD2-KG2	Secondary	unpaved- clay/sand	good	low to medium priority	1.4024	0.0054
5316	214	5316	Tertiary	unpaved- clay/sand	fair	low to medium priority	1.2894	0.0504
							Total:	25.4037
Riverine Wetlands								
8	234	4-7	Primary	unpaved- clay	very good	very high priority	8.1195	0.0093
11	213	15-16	Primary	unpaved- clay	very good	high priority	4.1135	0.0073
12	211	17-18	Secondary	unpaved- clay/sand	good	medium to high priority	13.2624	0.0110
27	220	29-30	Secondary	unpaved- clay/sand	poor	low to medium priority	4.6366	0.0074
28	207	30-31	Secondary	unpaved- clay/sand	poor	low to medium priority	4.8302	0.0103
29	207	30-32	Secondary	unpaved- clay/sand	poor	low to medium priority	4.7022	0.0085
56	218	62-63	Primary	unpaved- clay/sand	good	medium to high priority	3.9599	0.0076
336	660	DJ-DK	Secondary	unpaved- sand	poor	low priority	1.8189	0.0023
4007	Not Known	4007	Other	unpaved- sand	very poor	very low priority	1.4943	0.0021
4507	Not Known	4507	Tertiary	unpaved- sand	very poor	very low priority	3.0946	0.0053
5264	259/688	70-71	Primary	unpaved- clay/sand	fair	very low priority	2.2941	0.0073
5265	253	71-72	Primary	unpaved- clay/sand	fair	high priority	7.5210	0.0107
5315	395	KD2-KG2	Secondary	unpaved- clay/sand	good	low to medium priority	1.4024	0.0023
							Total:	0.0914
Estuarine Wetlands								
419	A11A	EV-EV1	Secondary	paved- mix & place/slag/crushed stone	very poor	low priority	0.0896	0.0216
							Total:	0.0216
FNAI Tier I Areas								
6	234/747	22-23	Secondary	unpaved- clay/sand	poor	medium to high priority	2.6920	0.3832

Unpaved Roads Crossing or Adjacent to Sensitive Habitats Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
7	255	3-4	Tertiary	unpaved- sand	poor	medium to high priority	6.2929	0.6776
21	236	9-13	Primary	paved- meets DOT specs	good	very high priority	2.9609	0.6696
22	236	8-9	Primary	paved- meets DOT specs	good	very high priority	3.0006	0.3370
36	213	43-44	Primary	paved- meets some DOT specs	very good	very high priority	1.1634	0.0442
44	200/201	48-50	Primary	unpaved- clay	very good	medium to high priority	1.5492	0.6092
46	200/201	47-52	Primary	unpaved- clay	very good	high priority	0.4547	0.0569
49	201	53-55	Primary	paved- mix & place/slag/crushed stone	very good	high priority	4.8081	1.4761
52	212	47-63	Primary	unpaved- clay/sand	good	medium to high priority	7.1699	0.7843
58	200	52-58	Primary	unpaved- clay/sand	good	high priority	1.8750	0.8747
253	735	DY-DZ	Secondary	unpaved- sand	poor	very low priority	0.4847	0.4554
254	682	DX-DY	Tertiary	unpaved- sand	poor	very low priority	0.9944	0.4444
255	747	AY-AZ	Secondary	unpaved- sand	poor	low priority	0.6060	0.2697
256	747	AZ-BA	Secondary	unpaved- sand	poor	low priority	0.5817	0.5817
257	708	AY-DA	Secondary	unpaved- sand	poor	low priority	1.2507	0.6369
259	735	BA1-DA	Secondary	unpaved- sand	poor	very low priority	1.3623	0.4131
266	259/668	EM-EN	Secondary	paved- mix & place/slag/crushed stone	good	medium to high priority	1.6810	1.0690
267	668	EM-EP	Secondary	unpaved- sand	poor	very low priority	1.2998	0.2663
270	737	DU-EF	Other	unpaved- sand	poor	very low priority	1.9966	0.3496
271	234	DV-DX	Secondary	unpaved- sand	poor	low priority	1.2380	0.1540
272	729	DV-EC	Secondary	unpaved- sand	poor	very low priority	1.6839	0.6446
282	735	AQ-DC	Secondary	unpaved- sand	poor	very low priority	0.8324	0.0786
283	751	AP-AQ	Secondary	unpaved- sand	poor	very low priority	0.9096	0.0375
285	704	AN-AQ	Secondary	unpaved- sand	poor	low priority	1.3323	0.0014
321	647	FQ-FS	Secondary	paved- mix & place/slag/crushed stone	good	very low priority	0.7930	0.7930
322	647	FQ-FR	Secondary	paved- mix & place/slag/crushed stone	good	very low priority	0.7064	0.0136
323	235	FQ-FT	Secondary	unpaved- sand	good	low priority	1.2090	1.2002
350	235	FP-FQ	Secondary	unpaved- sand	good	low priority	2.5578	1.3116
351	232	FO-FP	Secondary	unpaved- sand	good	low priority	2.4989	0.8534
384	72Hell-2/3	JX-JY	Secondary	unpaved- clay/sand	poor	low priority	1.9290	0.0169
402	372	MI-ML	Secondary	unpaved- clay/sand	poor	low priority	0.4682	0.0001
403	413	MJ-MK	Secondary	unpaved- clay/sand	poor	low priority	0.5536	0.0078
406	370	MM-MN	Tertiary	unpaved- sand	poor	very low priority	4.7205	0.5078
460	487	JB-MC	Secondary	unpaved- sand	good	low priority	3.4257	0.5201
461	485	JD-ME	Tertiary	unpaved- sand	poor	very low priority	2.1854	0.4014
463	728	AZ-DA	Tertiary	unpaved- sand	very poor	very low priority	1.4207	0.0117
464	747	BA-K	Secondary	unpaved- sand	poor	low priority	0.7494	0.5544

Unpaved Roads Crossing or Adjacent to Sensitive Habitats Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
466	735	BA1-DY	Secondary	unpaved- sand	poor	very low priority	1.0076	0.2461
475	710	BB-K	Tertiary	unpaved- sand	poor	low priority	1.3979	0.3298
480	A30/BL	EJ-F	Secondary	paved- mix & place/slag/crushed stone	good	low priority	0.3540	0.0593
516	710	BA-BB	Secondary	unpaved- sand	poor	low priority	0.7504	0.4909
517	710	BA1-BB	Secondary	unpaved- sand	poor	low priority	0.2650	0.2647
3021	Not Known	3021	Other	unpaved- sand	very poor	very low priority	1.1356	0.0638
3022	Not Known	3022	Other	unpaved- sand	very poor	very low priority	3.0016	0.4098
3032	Not Known	3032	Other	unpaved- sand	very poor	very low priority	1.8412	0.1762
3035	Not Known	3035	Other	unpaved- sand	very poor	very low priority	2.0456	0.1154
3043	Not Known	3043	Other	unpaved- sand	very poor	very low priority	1.3401	0.0027
3076	Not Known	3076	Other	unpaved- sand	very poor	very low priority	1.3836	0.4102
3080	Not Known	3080	Other	unpaved- sand	very poor	very low priority	0.7189	0.2563
3096	Not Known	3096	Other	unpaved- sand	very poor	very low priority	1.9057	0.0347
3099	Not Known	3099	Other	unpaved- sand	very poor	very low priority	1.8204	0.3379
3100	Not Known	3100	Other	unpaved- sand	very poor	very low priority	2.5448	1.4997
3102	Not Known	3102	Other	unpaved- sand	very poor	very low priority	1.0164	0.0275
3148	Not Known	3148	Other	unpaved- sand	very poor	very low priority	1.5844	0.8393
3149	Not Known	3149	Tertiary	unpaved- sand	very poor	very low priority	1.2954	0.1529
3217	Not Known	3217	Other	unpaved- sand	very poor	very low priority	1.0086	0.7066
3219	Not Known	3219	Other	unpaved- sand	very poor	very low priority	0.9927	0.3699
3220	Not Known	3220	Other	unpaved- sand	very poor	very low priority	1.1554	0.5474
3224	Not Known	3224	Other	unpaved- sand	very poor	very low priority	1.1101	0.1348
3226	Not Known	3226	Other	unpaved- sand	very poor	very low priority	1.0357	1.0167
3227	Not Known	3227	Other	unpaved- sand	very poor	very low priority	1.2422	0.3553
3228	Not Known	3228	Other	unpaved- sand	very poor	very low priority	0.6614	0.4596
3229	Not Known	3229	Other	unpaved- sand	very poor	very low priority	1.1108	0.7305
3237	Not Known	3237	Other	unpaved- sand	very poor	very low priority	1.1632	0.6915
3244	Not Known	3244	Other	unpaved- sand	very poor	very low priority	2.2384	0.1660
3250	Not Known	3250	Other	unpaved- sand	very poor	very low priority	1.7218	0.0080
3251	Not Known	3251	Other	unpaved- sand	very poor	very low priority	0.8236	0.0059
3276	Not Known	3276	Other	unpaved- sand	very poor	very low priority	1.9820	0.6656
3277	Not Known	3277	Other	unpaved- sand	very poor	very low priority	1.4514	1.4514
3278	Not Known	3278	Other	unpaved- sand	very poor	very low priority	1.0618	0.9595
3279	Not Known	3279	Other	unpaved- sand	very poor	very low priority	1.5288	1.5288
3280	Not Known	3280	Other	unpaved- sand	very poor	very low priority	0.9584	0.4462
3281	Not Known	3281	Other	unpaved- sand	very poor	very low priority	0.8945	0.0011

Unpaved Roads Crossing or Adjacent to Sensitive Habitats Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
3505	Not Known	3505	Other	unpaved- sand	very poor	very low priority	2.4072	0.5846
3508	Not Known	3508	Other	unpaved- sand	very poor	very low priority	3.2754	0.2466
3511	Not Known	3511	Other	unpaved- sand	very poor	very low priority	1.5196	0.1656
3533	Not Known	3533	Other	unpaved- sand	very poor	very low priority	2.0864	0.0099
3770	Not Known	3770	Other	unpaved- sand	very poor	very low priority	1.5190	0.1713
3774	Not Known	3774	Other	unpaved- sand	very poor	very low priority	1.6398	0.4566
4004	Not Known	4004	Other	unpaved- sand	very poor	very low priority	0.7453	0.3075
4006	Not Known	4006	Other	unpaved- sand	very poor	very low priority	2.1947	0.0991
4010	Not Known	4010	Other	unpaved- sand	very poor	very low priority	2.5352	0.0770
4251	Not Known	4251	Other	unpaved- sand	very poor	very low priority	3.4172	0.7071
4501	Not Known	4501	Tertiary	unpaved- sand	very poor	very low priority	2.8357	0.0070
4504	Not Known	4504	Tertiary	unpaved- sand	very poor	very low priority	2.0614	0.3787
4507	Not Known	4507	Tertiary	unpaved- sand	very poor	very low priority	3.0946	0.8514
4509	Not Known	4509	Other	unpaved- sand	very poor	very low priority	2.5251	1.8358
4510	Not Known	4510	Other	unpaved- sand	very poor	very low priority	2.3300	0.0526
4512	Not Known	4512	Tertiary	unpaved- sand	very poor	very low priority	2.9782	0.1004
4751	Not Known	4751	Secondary	unpaved- sand	very poor	very low priority	4.8117	0.4510
4752	Not Known	4752	Tertiary	unpaved- sand	very poor	very low priority	4.3516	0.4007
4753	Not Known	4753	Tertiary	unpaved- sand	very poor	very low priority	1.9974	0.4558
4755	Not Known	4755	Other	unpaved- sand	very poor	very low priority	2.4327	0.4898
4756	Not Known	4756	Other	unpaved- sand	very poor	very low priority	1.8846	0.1765
4768	Not Known	4768	Other	unpaved- sand	very poor	very low priority	3.7391	0.9782
4770	Not Known	4770	Tertiary	unpaved- sand	very poor	very low priority	0.7668	0.6374
4775	Not Known	4775	Tertiary	unpaved- sand	very poor	very low priority	2.4529	0.1090
4776	Not Known	4776	Tertiary	unpaved- sand	very poor	very low priority	1.4150	1.0323
5006	Not Known	5006	Other	unpaved- sand	fair	very low priority	0.9323	0.2701
5007	Not Known	5007	Other	unpaved- sand	fair	very low priority	1.3121	0.3859
5009	Not Known	5009	Other	unpaved- sand	fair	very low priority	1.5713	0.2357
5010	Not Known	5010	Secondary	unpaved- sand	very poor	very low priority	2.7130	0.2658
5264	259/688	70-71	Primary	unpaved- clay/sand	fair	very low priority	2.2941	0.7375
5295	Not Known	5295	Tertiary	unpaved- sand	very poor	very low priority	1.6535	0.7619
5298	340/354	NE-NF	Tertiary	unpaved- sand	very poor	very low priority	0.9114	0.0914
5302	Not Known	5302	Tertiary	unpaved- sand	very poor	very low priority	0.4871	0.0685
							Total:	47.0678

Unpaved Roads Crossing or Adjacent to Sensitive Habitats Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
Significant Botanical Sites								
7	255	3-4	Tertiary	unpaved- sand	poor	medium to high priority	6.2929	2.0715
8	234	4-7	Primary	unpaved- clay	very good	very high priority	8.1195	0.2006
11	213	15-16	Primary	unpaved- clay	very good	high priority	4.1135	0.4544
12	211	17-18	Secondary	unpaved- clay/sand	good	medium to high priority	13.2624	0.0745
16	211	18-25	Primary	unpaved- clay/sand	good	very high priority	7.0104	0.2896
27	220	29-30	Secondary	unpaved- clay/sand	poor	low to medium priority	4.6366	0.0212
44	200/201	48-50	Primary	unpaved- clay	very good	medium to high priority	1.5492	0.0730
45	200/201	47-48	Primary	unpaved- clay	very good	high priority	3.6189	0.2362
50	200	50-51	Tertiary	unpaved- clay/sand	good	low to medium priority	6.5903	2.2315
51	219	57-66	Primary	unpaved- clay/sand	good	medium to high priority	5.7861	0.1935
64	208	59-60	Primary	paved- meets DOT specs	excellent	high priority	2.0502	1.6096
65	208	50-59	Primary	unpaved- clay	good	medium to high priority	2.7120	1.0321
296	717	AD-L1	Tertiary	unpaved- sand	poor	low priority	2.8426	2.0522
319	697/675	AG2-G	Tertiary	unpaved- sand	poor	very low priority	2.9822	0.1663
356	525	GB-GC	Tertiary	unpaved- sand	poor	low priority	1.1980	1.0636
3003	Not Known	3003	Other	unpaved- sand	very poor	very low priority	0.7681	0.0067
3024	Not Known	3024	Other	unpaved- sand	very poor	very low priority	2.6711	0.3308
3043	Not Known	3043	Other	unpaved- sand	very poor	very low priority	1.3401	1.3381
3044	Not Known	3044	Other	unpaved- sand	very poor	very low priority	0.9560	0.9560
3119	Not Known	3119	Other	unpaved- sand	very poor	very low priority	3.1381	1.1612
3120	Not Known	3120	Other	unpaved- sand	very poor	very low priority	1.2593	0.0031
3178	Not Known	3178	Other	unpaved- sand	very poor	very low priority	0.9838	0.2005
3225	Not Known	3225	Other	unpaved- sand	very poor	very low priority	1.1787	0.6529
3226	Not Known	3226	Other	unpaved- sand	very poor	very low priority	1.0357	1.0286
3228	Not Known	3228	Other	unpaved- sand	very poor	very low priority	0.6614	0.2443
3231	Not Known	3231	Other	unpaved- sand	very poor	very low priority	2.0076	0.0007
3236	Not Known	3236	Other	unpaved- sand	very poor	very low priority	1.2301	0.3242
3237	Not Known	3237	Other	unpaved- sand	very poor	very low priority	1.1632	0.1095
3262	Not Known	3262	Other	unpaved- sand	very poor	very low priority	1.5234	0.2800
3266	Not Known	3266	Other	unpaved- sand	very poor	very low priority	2.1642	1.5441
3524	Not Known	3524	Other	unpaved- sand	very poor	very low priority	1.3402	0.1301
3752	Not Known	3752	Other	unpaved- sand	very poor	very low priority	1.3708	0.0048
3774	Not Known	3774	Other	unpaved- sand	very poor	very low priority	1.6398	0.0707
3775	Not Known	3775	Other	unpaved- sand	very poor	very low priority	1.9931	1.9931
4252	Not Known	4252	Other	unpaved- sand	very poor	very low priority	2.3279	0.7196

Unpaved Roads Crossing or Adjacent to Sensitive Habitats Cont'd

Mslink	Road Number	Road Id	Classification	Surface Type	Condition	Priority	Total Length (mi)	Length Within Areas (mi)
4253	Not Known	4253	Other	unpaved- sand	very poor	very low priority	2.1767	0.8051
4763	Not Known	4763	Tertiary	unpaved- sand	very poor	very low priority	1.9737	0.8062
5008	Not Known	5008	Other	unpaved- sand	fair	very low priority	1.1613	1.1581
5257	Not Known	5257	Other	unpaved- sand	very poor	very low priority	1.1906	1.1906
5265	253	71-72	Primary	unpaved- clay/sand	fair	high priority	7.5210	2.8743
5291	454	GA2-GB2	Tertiary	unpaved- clay/sand	fair	low priority	3.5025	1.2047
							Total:	30.9077

APPENDIX D

IMPACT SCORING OF TERTIARY AND "OTHER" RANGE ROADS SEGMENTS ON EGLIN AFB

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
7	T	255	6.29	sand	P	med to high	1		1	1			1		1	**5**		
50	T	200	6.59	clay/sand	good	low to med	2			1			1	1	1	**6**	5	1
251	O	678	1.12	sand	P	low	1						1		1	**3**		
252	O	733	1.20	sand	P	very low									1	**1**		
254	T	682	0.99	sand	P	very low			1						1	**2**		
270	O	737	2.00	sand	P	very low			1							**1**		
274	T	716	1.60	sand	P	very low									1	**1**		
295	T	771	3.34	sand	P	very low									1	**1**		
296	T	717	2.84	sand	P	low				1			1		1	**3**		
314	T	787	2.35	sand	P	low							1	1	1	**3**		
315	T	734	0.61	sand	P	low							1		1	**2**		
316	T	213/708	1.55	sand	P	low								1		**1**		
317	T	291/769	4.05	sand	P	low								1		**1**		
319	T	697/675	2.98	sand	P	very low				1			1			**2**		
346	T	632	2.85	sand	P	low	1						1		1	**3**		
355	O	454	2.50	sand	P	very low								1	1	**2**		
356	T	525	1.20	sand	P	low				1					1	**2**		
357	T	525	1.68	sand	P	low									1	**1**		
358	T	211	0.81	sand	P	very low	1								1	**2**		
360	T	211	1.60	sand	P	very low	1								1	**2**		
367	T	395	0.34	sand	P	low									1	**1**		
369	T	395	0.90	clay/sand	good	low to med									1	**1**		
371	T	407	0.24	sand	P	very low									1	**1**		
386	T	380	1.12	sand	P	low	1								1	**2**	1	
399	T	NA	0.42	sand	P	very low	1						1		1	**3**		
406	T	370	4.72	sand	P	very low	1		1				1		1	**4**		
410	T	217	3.19	sand	P	very low	1	1					1		1	**4**	1	
431	T	429	0.68	sand	P	very low									1	**1**		
433	T	388	0.62	sand	P	very low	1								1	**2**		
435	T	388	1.11	sand	P	low									1	**1**		
451	T	C52A	0.77	sand	P	very low									1	**1**		
461	T	485	2.18	sand	P	very low	1	1	1				1		1	**5**		
463	T	728	1.42	sand	VP	very low			1							**1**		
475	T	710	1.40	sand	P	low			1						1	**2**		
485	T	211/212	3.26	clay/sand	P	low	3						1	1	1	**6**	1	
3001	O	NA	1.60	sand	VP	very low									1	**1**		
3002	O	NA	0.98	sand	VP	very low									1	**1**		
3003	O	NA	0.77	sand	VP	very low				1			1	1	1	**4**		
3004	O	NA	0.99	sand	VP	very low								1	1	**2**		

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
3005	O	NA	0.80	sand	VP	very low									1	**1**		
3006	O	NA	0.69	sand	VP	very low									1	**1**		
3007	O	NA	1.16	sand	VP	very low									1	**1**		
3008	O	NA	0.48	sand	VP	very low							1	1		**2**		
3009	O	NA	0.98	sand	VP	very low							1	1		**2**		
3010	O	NA	0.75	sand	VP	very low							1			**1**		
3011	O	NA	0.30	sand	VP	very low								1	1	**2**		
3012	O	NA	1.29	sand	VP	very low								1	1	**2**		
3013	O	NA	0.99	sand	VP	very low								1	1	**2**		
3014	O	NA	1.25	sand	VP	very low								1	1	**2**		
3015	O	NA	0.94	sand	VP	very low									1	**1**		
3016	O	NA	1.12	sand	VP	very low							1		1	**2**		
3017	O	NA	0.84	sand	VP	very low							1			**1**		
3018	O	NA	0.55	sand	VP	very low								1		**1**		
3019	T	NA	2.02	sand	VP	very low									1	**1**		
3021	O	NA	1.14	sand	VP	very low			1				1			**2**		
3022	O	NA	3.00	sand	VP	very low	1		1				1	1	1	**5**		
3023	O	NA	2.33	sand	VP	very low									1	**1**		
3024	O	NA	2.67	sand	VP	very low				1					1	**2**		
3026	O	NA	1.53	sand	VP	very low							1		1	**2**		
3027	O	NA	1.51	sand	VP	very low							1		1	**2**		
3028	O	NA	1.09	sand	VP	very low									1	**1**		
3029	O	NA	1.90	sand	VP	very low	1						1		1	**3**		
3030	O	NA	1.04	sand	VP	very low									1	**1**		
3031	O	NA	1.65	sand	VP	very low	1								1	**2**		
3032	O	NA	1.84	sand	VP	very low			1						1	**2**		
3033	O	NA	1.46	sand	VP	very low							1		1	**2**		
3034	O	NA	0.43	sand	VP	very low									1	**1**		
3035	O	NA	2.05	sand	VP	very low			1						1	**2**		
3036	O	NA	0.64	sand	VP	very low									1	**1**		
3037	T	NA	1.93	sand	VP	very low									1	**1**		
3038	O	NA	0.61	sand	VP	very low									1	**1**		
3039	O	NA	0.29	sand	VP	very low									1	**1**		
3041	O	NA	0.78	sand	VP	very low									1	**1**		
3042	O	NA	0.69	sand	VP	very low									1	**1**		
3043	O	NA	1.34	sand	VP	very low			1	1						**2**		
3044	O	NA	0.96	sand	VP	very low				1						**1**		
3046	O	NA	0.44	sand	VP	very low									1	**1**		
3047	O	NA	0.73	sand	VP	very low									1	**1**		

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
3048	O	NA	1.15	sand	VP	very low	1						1		1	**3**		
3049	O	NA	1.43	sand	VP	very low									1	**1**		
3050	O	NA	0.53	sand	VP	very low									1	**1**		
3052	O	NA	0.80	sand	VP	very low									1	**1**		
3053	O	NA	0.73	sand	VP	very low									1	**1**		
3054	O	NA	0.71	sand	VP	very low									1	**1**		
3055	O	NA	0.58	sand	VP	very low									1	**1**		
3057	O	NA	0.20	sand	VP	very low									1	**1**		
3058	O	NA	1.23	sand	VP	very low									1	**1**		
3059	O	NA	0.97	sand	VP	very low									1	**1**		
3060	O	NA	1.50	sand	VP	very low									1	**1**		
3061	O	NA	0.90	sand	VP	very low									1	**1**		
3062	O	NA	0.70	sand	VP	very low	1						1		1	**3**		
3063	O	NA	0.61	sand	VP	very low							1		1	**2**		
3064	O	NA	1.12	sand	VP	very low									1	**1**		
3065	O	NA	1.52	sand	VP	very low									1	**1**		
3066	O	NA	0.76	sand	VP	very low								1	1	**2**		
3067	O	NA	1.15	sand	VP	very low								1	1	**2**		
3068	O	NA	1.83	sand	VP	very low									1	**1**		
3069	O	NA	1.54	sand	VP	very low									1	**1**		
3070	O	NA	0.52	sand	VP	very low									1	**1**		
3071	O	NA	0.92	sand	VP	very low								1	1	**2**		
3072	O	NA	1.05	sand	VP	very low								1	1	**2**		
3073	O	NA	1.17	sand	VP	very low									1	**1**		
3074	O	NA	1.35	sand	VP	very low									1	**1**		
3076	O	NA	1.38	sand	VP	very low			1							**1**		
3077	O	NA	2.37	sand	VP	very low	2						1			**3**		
3078	O	NA	1.02	sand	VP	very low	1						1	1		**3**		
3079	O	NA	0.53	sand	VP	very low									1	**1**		
3080	O	NA	0.72	sand	VP	very low			1						1	**2**		
3081	O	NA	0.73	sand	VP	very low									1	**1**		
3082	O	NA	0.31	sand	VP	very low									1	**1**		
3083	O	NA	0.89	sand	VP	very low									1	**1**	2	
3084	O	NA	0.75	sand	VP	very low								1	1	**2**		
3085	O	NA	1.62	sand	VP	very low								1		**1**		
3086	O	NA	1.18	sand	VP	very low									1	**1**		
3088	O	NA	1.07	sand	VP	very low									1	**1**		
3090	O	NA	1.14	sand	VP	very low							1		1	**2**		
3091	O	NA	1.43	sand	VP	very low								1		**1**		

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
3096	O	NA	1.91	sand	VP	very low			1						1	**2**		
3097	O	NA	0.42	sand	VP	very low									1	**1**		
3099	O	NA	1.82	sand	VP	very low			1						1	**2**		
3100	O	NA	2.54	sand	VP	very low			1						1	**2**		
3102	O	NA	1.02	sand	VP	very low			1						1	**2**		
3105	O	NA	0.63	sand	VP	very low								1		**1**		
3106	O	NA	1.03	sand	VP	very low	1	1					1		1	**4**		
3107	O	NA	1.11	sand	VP	very low									1	**1**		
3108	O	NA	1.77	sand	VP	very low	1	1							1	**3**		
3109	O	NA	1.98	sand	VP	very low								1		**1**		
3112	O	NA	1.88	sand	VP	very low	2	2					1		1	**6**		
3115	O	NA	1.79	sand	VP	very low	1	1					1		1	**4**		
3118	O	NA	1.00	sand	VP	very low									1	**1**		
3119	O	NA	3.14	sand	VP	very low				1						**1**		
3120	O	NA	1.26	sand	VP	very low				1					1	**2**		
3121	O	NA	1.96	sand	VP	very low									1	**1**		
3122	O	NA	0.95	sand	VP	very low								1		**1**		
3124	O	NA	2.93	sand	VP	very low									1	**1**		
3125	O	NA	1.84	sand	VP	very low									1	**1**		
3126	O	NA	2.31	sand	VP	very low									1	**1**		
3127	O	NA	2.40	sand	VP	very low									1	**1**		
3128	O	NA	0.97	sand	VP	very low									1	**1**		
3129	O	NA	1.40	sand	VP	very low									1	**1**		
3130	O	NA	1.72	sand	VP	very low									1	**1**		
3132	O	NA	0.42	sand	VP	very low									1	**1**		
3134	O	NA	0.85	sand	VP	very low							1		1	**2**		
3136	O	NA	1.27	sand	VP	very low	1	1					1		1	**4**		
3138	O	NA	0.48	sand	VP	very low	1	1					1		1	**4**		
3139	O	NA	1.14	sand	VP	very low									1	**1**		
3143	O	NA	0.35	sand	VP	very low									1	**1**		
3147	O	NA	2.27	sand	VP	very low									1	**1**		
3148	O	NA	1.58	sand	VP	very low			1					1		**2**		
3149	T	NA	1.30	sand	VP	very low			1							**1**		
3151	O	NA	1.64	sand	VP	very low	1	1						1	1	**4**		
3154	O	NA	0.69	sand	VP	very low								1	1	**2**		
3155	O	NA	1.42	sand	VP	very low									1	**1**		
3156	O	NA	2.33	sand	VP	very low								1		**1**		
3157	O	NA	2.45	sand	VP	very low								1		**1**		
3158	O	NA	0.58	sand	VP	very low								1		**1**		

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
3159	O	NA	0.71	sand	VP	very low								1		**1**		
3160	O	NA	2.45	sand	VP	very low								1		**1**		
3161	T	NA	2.66	sand	VP	very low	2							1	1	**4**		
3162	O	NA	1.73	sand	VP	very low								1	1	**2**		
3163	O	NA	1.51	sand	VP	very low								1	1	**2**		
3164	O	NA	0.34	sand	VP	very low									1	**1**		
3165	O	NA	1.52	sand	VP	very low								1	1	**2**		
3166	O	NA	1.28	sand	VP	very low									1	**1**		
3167	O	NA	1.13	sand	VP	very low	1						1		1	**3**		
3168	O	NA	1.37	sand	VP	very low									1	**1**		
3169	O	NA	2.61	sand	VP	very low								1	1	**2**		
3171	O	NA	0.73	sand	VP	very low									1	**1**		
3172	O	NA	0.96	sand	VP	very low								1		**1**		
3173	O	NA	1.20	sand	VP	very low									1	**1**		
3174	O	NA	0.82	sand	VP	very low									1	**1**		
3175	O	NA	1.59	sand	VP	very low								1		**1**		
3176	O	NA	0.98	sand	VP	very low									1	**1**		
3178	O	NA	0.98	sand	VP	very low				1			1			**2**		
3179	O	NA	0.74	sand	VP	very low							1		1	**2**		
3181	O	NA	1.67	sand	VP	very low							1		1	**2**		
3182	O	NA	1.32	sand	VP	very low									1	**1**		
3183	O	NA	0.41	sand	VP	very low								1		**1**		
3185	O	NA	1.39	sand	VP	very low									1	**1**		
3187	O	NA	1.88	sand	VP	very low									1	**1**		
3188	O	NA	0.70	sand	VP	very low							1			**1**		
3196	O	NA	1.90	sand	VP	very low								1		**1**		
3197	O	NA	1.51	sand	VP	very low								1		**1**		
3198	O	NA	2.37	sand	VP	very low								1		**1**		
3199	O	NA	1.04	sand	VP	very low	1								1	**2**		
3200	O	NA	1.80	sand	VP	very low	1						1		1	**3**	1	
3203	O	NA	0.95	sand	VP	very low	1								1	**2**	1	
3212	O	NA	1.01	sand	VP	very low	1							1	1	**3**		
3214	O	NA	1.93	sand	VP	very low									1	**1**		
3217	O	NA	1.01	sand	VP	very low			1							**1**		
3219	O	NA	0.99	sand	VP	very low			1							**1**		
3220	O	NA	1.16	sand	VP	very low			1							**1**		
3221	O	NA	0.80	sand	VP	very low									1	**1**		
3222	O	NA	0.74	sand	VP	very low									1	**1**		
3224	O	NA	1.11	sand	VP	very low			1						1	**2**		

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
3225	O	NA	1.18	sand	VP	very low				1						**1**		
3226	O	NA	1.04	sand	VP	very low			1	1						**2**		
3227	O	NA	1.24	sand	VP	very low			1							**1**		
3228	O	NA	0.66	sand	VP	very low			1	1					1	**3**		
3229	O	NA	1.11	sand	VP	very low			1							**1**		
3231	O	NA	2.01	sand	VP	very low				1					1	**2**		
3236	O	NA	1.23	sand	VP	very low				1					1	**2**		
3237	O	NA	1.16	sand	VP	very low			1	1					1	**3**		
3239	T	NA	1.21	sand	VP	very low									1	**1**		
3241	O	NA	1.35	sand	VP	very low	1						1		1	**3**		
3243	O	NA	1.49	sand	VP	very low	1								1	**2**		
3244	O	NA	2.24	sand	VP	very low			1						1	**2**		
3250	O	NA	1.72	sand	VP	very low			1							**1**		
3251	O	NA	0.82	sand	VP	very low			1							**1**		
3254	O	NA	1.98	sand	VP	very low									1	**1**		
3258	O	NA	0.72	sand	VP	very low									1	**1**		
3262	O	NA	1.52	sand	VP	very low				1						**1**		
3263	O	NA	1.58	sand	VP	very low									1	**1**		
3266	O	NA	2.16	sand	VP	very low				1						**1**		
3267	O	NA	1.83	sand	VP	very low	1						1		1	**3**		
3271	O	NA	1.82	sand	VP	very low								1		**1**		
3274	O	NA	2.74	sand	VP	very low								1		**1**		
3276	O	NA	1.98	sand	VP	very low			1							**1**		
3277	O	NA	1.45	sand	VP	very low			1							**1**		
3278	O	NA	1.06	sand	VP	very low			1							**1**		
3279	O	NA	1.53	sand	VP	very low			1							**1**		
3280	O	NA	0.96	sand	VP	very low			1						1	**2**		
3281	O	NA	0.89	sand	VP	very low			1						1	**2**		
3282	O	NA	1.95	sand	VP	very low	1	1					1		1	**4**		
3283	O	NA	1.10	sand	VP	very low									1	**1**		
3285	O	NA	3.15	sand	VP	very low									1	**1**		
3289	O	NA	2.00	sand	VP	very low								1		**1**		
3290	O	NA	1.07	sand	VP	very low								1		**1**		
3291	O	NA	0.85	sand	VP	very low									1	**1**		
3292	O	NA	1.21	sand	VP	very low								1	1	**2**		
3293	O	NA	0.84	sand	VP	very low									1	**1**		
3294	O	NA	1.23	sand	VP	very low									1	**1**		
3295	O	NA	1.12	sand	VP	very low							1		1	**2**		
3296	O	NA	0.82	sand	VP	very low	1	1					1		1	**4**	2	

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
3298	O	NA	0.66	sand	VP	very low									1	**1**		
3301	O	NA	1.54	sand	VP	very low									1	**1**		
3302	O	NA	1.80	sand	VP	very low									1	**1**		
3303	O	NA	0.62	sand	VP	very low									1	**1**		
3304	O	NA	2.69	sand	VP	very low									1	**1**		
3305	O	NA	1.12	sand	VP	very low								1		**1**		
3312	O	NA	0.82	sand	VP	very low									1	**1**		
3313	O	NA	0.63	sand	VP	very low								1		**1**		
3314	O	NA	0.88	sand	VP	very low									1	**1**		
3315	O	NA	1.24	sand	VP	very low									1	**1**		
3316	O	NA	0.83	sand	VP	very low									1	**1**		
3317	O	NA	1.00	sand	VP	very low									1	**1**		
3318	O	NA	1.09	sand	VP	very low									1	**1**		
3319	O	NA	1.32	sand	VP	very low									1	**1**		
3320	O	NA	1.55	sand	VP	very low								1	1	**2**		
3321	O	NA	3.68	sand	VP	very low	2						1		1	**4**		
3322	O	NA	0.39	sand	VP	very low									1	**1**		
3324	O	NA	1.69	sand	VP	very low									1	**1**		
3325	T	NA	1.09	sand	VP	very low									1	**1**		
3326	O	NA	1.74	sand	VP	very low	1						1		1	**3**	2	
3501	O	NA	1.51	sand	VP	very low									1	**1**		
3502	O	NA	2.54	sand	VP	very low									1	**1**		
3503	O	NA	4.82	sand	VP	very low									1	**1**		
3504	O	NA	4.93	sand	VP	very low	1	1					1		1	**4**		
3505	O	NA	2.41	sand	VP	very low	1	1	1				1		1	**5**		
3506	O	NA	1.95	sand	VP	very low	1	1					1		1	**4**		
3507	O	NA	2.80	sand	VP	very low									1	**1**		
3508	O	NA	3.28	sand	VP	very low			1						1	**2**		
3509	O	NA	2.14	sand	VP	very low							1		1	**2**		
3511	O	NA	1.52	sand	VP	very low			1							**1**		
3512	O	NA	1.01	sand	VP	very low								1		**1**		
3515	O	NA	3.20	sand	VP	very low									1	**1**		
3516	O	NA	3.62	sand	VP	very low	1						1		1	**3**		
3517	O	NA	1.50	sand	VP	very low									1	**1**		
3518	T	NA	2.64	sand	VP	very low									1	**1**		
3519	O	NA	2.31	sand	VP	very low									1	**1**		
3521	O	NA	2.59	sand	VP	very low							1			**1**		
3522	O	NA	2.32	sand	VP	very low	2						1		1	**4**		
3524	O	NA	1.34	sand	VP	very low				1						**1**		

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
3527	O	NA	3.00	sand	VP	very low								1		**1**		
3529	O	NA	1.93	sand	VP	very low									1	**1**		
3531	O	NA	2.36	sand	VP	very low									1	**1**		
3532	O	NA	0.61	sand	VP	very low									1	**1**		
3533	O	NA	2.09	sand	VP	very low	1	1	1				1		1	**5**		1
3534	O	NA	3.66	sand	VP	very low	1								1	**2**	1	
3751	O	NA	2.75	sand	VP	very low							1	1	1	**3**		
3752	O	NA	1.37	sand	VP	very low				1				1		**2**		
3754	O	NA	2.41	sand	VP	very low	2						1		1	**4**		
3755	O	NA	1.30	sand	VP	very low									1	**1**		
3757	O	NA	1.39	sand	VP	very low									1	**1**		
3758	O	NA	1.73	sand	VP	very low							1		1	**2**		
3760	O	NA	1.17	sand	VP	very low									1	**1**		
3764	O	NA	2.99	sand	VP	very low									1	**1**		
3765	O	NA	0.84	sand	VP	very low	1	1							1	**3**		
3766	O	NA	2.25	sand	VP	very low	3	3					1		1	**8**		
3767	O	NA	2.58	sand	VP	very low	1	1						1	1	**4**		
3768	O	NA	2.01	sand	VP	very low									1	**1**		
3770	O	NA	1.52	sand	VP	very low			1				1			**2**		
3771	O	NA	2.77	sand	VP	very low									1	**1**		
3774	O	NA	1.64	sand	VP	very low			1	1						**2**		
3775	O	NA	1.99	sand	VP	very low				1			1			**2**		
3776	O	NA	2.86	sand	VP	very low									1	**1**		
3777	O	NA	0.54	sand	VP	very low							1	1	1	**3**		
3778	O	NA	1.37	sand	VP	very low									1	**1**		
3779	O	NA	1.56	sand	VP	very low	1	1					1		1	**4**		
4001	O	NA	1.51	sand	VP	very low								1		**1**		
4002	O	NA	1.78	sand	VP	very low								1		**1**		
4003	O	NA	1.77	sand	VP	very low	1						1		1	**3**		
4004	O	NA	0.75	sand	VP	very low			1							**1**		
4005	O	NA	1.28	sand	VP	very low									1	**1**		
4006	O	NA	2.19	sand	VP	very low			1						1	**2**		
4007	O	NA	1.49	sand	VP	very low					1		1	1		**3**		
4009	O	NA	2.44	sand	VP	very low								1		**1**		
4010	O	NA	2.54	sand	VP	very low	1		1					1	1	**4**		
4011	O	NA	1.21	sand	VP	very low								1		**1**		
4012	O	NA	3.22	sand	VP	very low	5						1	1	1	**8**	8	
4014	O	NA	2.65	sand	VP	very low	1						1		1	**3**		
4015	O	NA	2.62	sand	VP	very low	1	1					1		1	**4**		

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
4251	O	NA	3.28	sand	VP	very low	4	4	1				1		1	**11**		
4252	O	NA	2.33	sand	VP	very low				1					1	**2**		
4253	O	NA	2.18	sand	VP	very low	1			1					1	**3**		
4501	T	NA	2.84	sand	VP	very low			1						1	**2**		
4503	O	NA	2.81	sand	VP	very low								1	1	**2**		
4504	T	NA	2.06	sand	VP	very low			1					1	1	**3**		
4507	T	NA	3.09	sand	VP	very low	1		1		1		1	1	1	**6**		1
4508	T	NA	2.27	sand	VP	very low	1						1	1	1	**4**	1	
4509	O	NA	2.53	sand	VP	very low	1		1				1		1	**4**	2	
4510	O	NA	2.33	sand	VP	very low	1		1						1	**3**	2	
4512	T	NA	2.98	sand	VP	very low	1		1				1		1	**4**	1	
4513	T	NA	2.24	sand	VP	very low									1	**1**		
4514	T	NA	1.00	sand	VP	very low	1							1	1	**3**	1	
4516	T	NA	2.09	sand	VP	very low								1		**1**		
4752	T	NA	4.35	sand	VP	very low			1				1	1	1	**4**		
4753	T	NA	2.00	sand	VP	very low			1						1	**2**		
4754	T	NA	1.07	sand	VP	very low							1	1		**2**		
4755	O	NA	2.43	sand	VP	very low	3		1				1	1	1	**7**		
4756	O	NA	1.88	sand	VP	very low	2	2	1				1			**6**	1	
4758	T	NA	2.83	sand	VP	very low	1	1					1		1	**4**		
4760	O	NA	3.33	sand	VP	very low							1		1	**2**		
4763	T	NA	1.97	sand	VP	very low	1			1			1			**3**	3	
4766	T	NA	1.39	sand	VP	very low	1							1	1	**3**		
4767	O	NA	2.74	sand	VP	very low							1	1	1	**3**		
4768	O	NA	3.74	sand	VP	very low			1				1	1	1	**4**	6	
4769	T	NA	2.01	sand	VP	very low	2						1		1	**4**		2
4770	T	NA	0.77	sand	VP	very low			1					1		**2**		
4771	T	NA	3.16	sand	VP	very low	1							1	1	**3**	1	
4772	T	NA	2.62	sand	VP	very low	1						1	1	1	**4**		
4773	T	NA	1.30	sand	VP	very low								1		**1**		
4774	O	NA	3.85	sand	VP	very low									1	**1**		
4775	T	NA	2.45	sand	VP	very low	2		1				1		1	**5**	3	
4776	T	NA	1.42	sand	VP	very low			1				1			**2**		
4777	O	NA	2.82	sand	VP	very low							1		1	**2**		
4778	O	NA	2.18	sand	VP	very low	1								1	**2**		
4781	T	NA	1.17	sand	VP	very low									1	**1**	1	
4784	T	NA	4.08	sand	VP	very low	1	1					1		1	**4**		1
4785	T	NA	0.96	sand	VP	very low	1	1					1	1	1	**5**	1	
4787	O	NA	2.57	sand	VP	very low									1	**1**		

Impact Scoring of Tertiary and "Other" Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossing	FNAI Tier I Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Crossing	Range Access	> 5 Percent Slope	Total Score	Culverts	Bridges
5002	T	NA	4.80	sand	VP	very low	3						1		1	**5**		
5003	O	NA	5.55	sand	VP	very low	3	3					1	1	1	**9**	4	
5006	O	NA	0.93	sand	fair	very low	1		1				1			**3**	3	
5007	O	NA	1.31	sand	fair	very low			1							**1**		
5008	O	NA	1.16	sand	fair	very low				1						**1**		
5009	O	NA	1.57	sand	fair	very low			1							**1**		
5013	T	NA	1.27	sand	VP	very low									1	**1**		
5016	T	NA	1.04	sand	VP	very low								1		**1**		
5255	O	NA	1.98	sand	VP	very low									1	**1**		
5257	O	NA	1.19	sand	VP	very low				1				1	1	**3**		
5258	O	NA	2.80	sand	VP	very low							1	1	1	**3**		
5260	T	NA	0.93	sand	P	low	1						1	1	1	**4**		
5272	T	340/454	0.62	sand	VP	very low									1	**1**		
5277	T		5.28	sand	P	low	1	1					1	1	1	**5**	2	
5287	T	NA	1.06	sand	VP	very low	1								1	**2**	1	
5291	T	454	3.50	clay/sand	fair	low	3			1			1		1	**6**	2	
5293	T	NA	2.90	sand	P	very low	1	1							1	**3**	1	
5295	T	NA	1.65	sand	VP	very low			1							**1**		
5298	T	340/354	0.91	sand	VP	very low			1				1		1	**3**		
5300	O	NA	0.88	sand	VP	very low	1	1							1	**3**		
5302	T	NA	0.49	sand	VP	very low			1						1	**2**		
5306	O	NA	1.15	sand	VP	very low									1	**1**		
5308	O	NA	0.52	sand	VP	very low								1		**1**		
5309	T	NA	1.54	sand	VP	very low									1	**1**		
5312	T	454	1.49	clay/sand	fair	low	2						1		1	**4**	2	
5314	T		0.54	sand	P	very low									1	**1**		
5316	T	214	1.29	clay/sand	fair	low to med	1	1					1			**3**		

Definitions:
NA: Not Known
T: Tertiary
O: Other
P: Poor
VP: Very Poor

APPENDIX E

IMPACT SCORING OF PRIMARY AND SECONDARY RANGE ROADS SEGMENTS ON EGLIN AFB

Impact Scoring of Primary and Secondary Range Roads Segments on Eglin AFB

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossings	FNAI Tier 1 Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Estuarine	> 5 Percent Slope	Total Score	Culverts	Bridges
3	S	231	3.0381	clay/sand	G	med to high	1	1					1	1	4	2	1
5	P	242	13.1838	paved	E	very high							1		1		
6	S	234	2.692	clay/sand	P	med to high			1				1	1	3		
8	P	234	8.1195	clay	VG	very high	2			1	1		1	1	6	1	1
10	P	211	1.5112	clay	VG	high								1	1		
11	P	213	4.1135	clay	VG	high	2			1	1			1	5	2	
12	S	211	13.2624	clay/sand	G	med to high	10			1	1		1	1	14	9	3
16	P	211	7.0104	clay/sand	G	very high	6			1			1	1	9	4	4
18	S	239	5.5037	clay/sand	P	low to med	1							1	2	1	
19	S	239	1.4198	clay/sand	P	low to med							1	1	2		
21	P	236	2.9609	paved	G	very high			1						1		
22	P	236	3.0006	paved	G	very high			1						1		
24	P	213	5.5095	clay	G	very high								1	1		
27	S	220	4.6366	clay/sand	P	low to med	1			1	1		1	1	5		
28	S	207	4.8302	clay/sand	P	low to med	6				1		1	1	9	4	
29	S	207	4.7022	clay/sand	P	low to med	4				1		1	1	7	6	
33	S	214	3.0307	clay/sand	G	med to high	2								2	3	
34	S	210	1.8322	sand	P	low to med	2						1	1	4	2	
35	S	210	8.0587	sand	P	low to med	3							1	4	1	
36	P	213	1.1634	paved	VG	very high			1						1		
39	P	213	2.0782	paved	VG	very high							1		1		
40	P	212	1.5016	clay	VG	med to high								1	1		
41	P	212	4.8013	clay/sand	G	med to high								1	1		
42	S	203	6.195	sand	G	med to high								1	1		
44	P	200	1.5492	clay	VG	med to high	2		1	1			1		5	1	
45	P	200	3.6189	clay	VG	high	1			1			1	1	4		1
46	P	200	0.4547	clay	VG	high			1						1		
48	P	201	2.8442	paved	VG	high							1		1	3	
49	P	201	4.8081	paved	VG	high			1				1		2	4	
51	P	219	5.7861	clay/sand	G	med to high	2	2		1			1	1	7		3
52	P	212	7.1699	clay/sand	G	med to high	1		1				1	1	4		2
54	P	214	1.5309	clay/sand	G	med to high								1	1		
56	P	218	3.9599	clay/sand	G	med to high	2				1		1	1	5	1	1
58	P	200	1.875	clay/sand	G	high			1					1	2	1	
63	P	200	7.1106	paved	VG	high							1		1		2
64	P	208	2.0502	paved	E	high				1					1		
65	P	208	2.712	clay	G	med to high	2			1			1		4	1	1
66	P	213	3.6659	clay/sand	G	high								1	1		
253	S	735	0.4847	sand	P	very low			1						1		
255	S	747	0.606	sand	P	low			1						1		
256	S	747	0.5817	sand	P	low			1						1		
257	S	708	1.2507	sand	P	low			1						1		
259	S	735	1.3623	sand	P	very low			1					1	2		
260	S	660	1.1561	sand	P	very low								1	1		
265	S	255	1.4779	sand	P	very low							1		1	1	
266	S	259	1.681	paved	G	med to high			1						1	1	
267	S	668	1.2998	sand	P	very low			1				1		2		

Impact Scoring of Primary and Secondary Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossings	FNAI Tier 1 Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Estuarine	> 5 Percent Slope	Total Score	Culverts	Bridges
271	S	234	1.238	sand	P	low			1					1	2		
272	S	729	1.6839	sand	P	very low			1						1		
273	S	234	1.0585	sand	P	low							1	1	2		
282	S	735	0.8324	sand	P	very low	1		1				1	1	4		
283	S	751	0.9096	sand	P	very low			1					1	2		
285	S	704	1.3323	sand	P	low			1					1	2		
286	S	704	0.6592	sand	P	low								1	1		
291	S	700	1.0815	paved	F	very low							1		1		
294	S	253	1.2836	sand	F	very low								1	1		
309	S	731	0.5272	sand	P	very low							1		1		
310	S	717	0.5991	sand	P	low							1	1	2		
311	S	723	0.2916	sand	VP	very low								1	1		
321	S	647	0.793	paved	G	very low			1						1		
322	S	647	0.7064	paved	G	very low			1						1		
323	S	235	1.209	sand	G	low			1						1		
324	S	250	1.5379	sand	G	low							1		1	1	
332	S	235	3.1292	sand	P	low	1							1	2		
335	S	235	1.4735	sand	P	low	1						1	1	3	2	
336	S	660	1.8189	sand	P	low	1				1			1	3	2	
349	S	232	2.941	clay/sand	G	low	1	1					1	1	4		1
350	S	235	2.5578	sand	G	low			1						1		
351	S	232	2.4989	sand	G	low			1						1		
363	S	220	1.961	sand	G	low								1	1		
372	S	San	0.4496	sand	P	very low								1	1		
374	S	374	1.7609	clay/sand	P	low	1	1					1	1	4	3	
376	S	376	1.1571	clay/sand	P	low	1	1						1	3	1	
378	S	376	1.007	sand	P	low	1	1						1	3	2	
381	S	374	0.8962	clay/sand	P	low	1	1						1	3	1	
384	S	72H	1.929	clay/sand	P	low			1						1		
385	S	333	0.5739	sand	P	low								1	1		
393	S	C62	0.3464	sand	P	low								1	1		
394	S	210	0.7224	sand	P	low								1	1		
397	S	214	1.2188	clay/sand	G	low								1	1		
398	S	427	1.7718	clay/sand	G	low	1						1	1	3	2	
400	S	214	1.1328	clay/sand	P	low								1	1		
402	S	372	0.4682	clay/sand	P	low			1						1		
403	S	413	0.5536	clay/sand	P	low			1						1		
408	S	222	0.9739	paved	P	low							1		1		1
414	S	A18	0.2081	paved	VP	very low							1		1		
415	S	A17	0.1822	paved	G	low							1		1		
417	S	A13	0.2523	paved	G	low							1		1		
418	S	A11	0.1785	paved	G	low							1		1		
419	S	A11	0.0896	paved	VP	low						1	1		2		
421	S	A6	0.1561	paved	VG	low							1		1		
422	S	A7	0.0697	paved	NA	very low							1		1		
424	S	A3	0.229	paved	G	low							1		1		
425	S	A2	0.2092	paved	P	very low							1		1		

Impact Scoring of Primary and Secondary Range Roads Segments on Eglin AFB Cont'd

Mslink	Class.	Road Number	Road Len. (mi.)	Surface Type	Condition	Road Priority	Stream Crossings	Darter Stream Crossings	FNAI Tier 1 Crossing	SBS Crossing	Riverine Crossing	Estuarine Crossing	Palustrine Estuarine	> 5 Percent Slope	Total Score	Culverts	Bridges
426	S	A2	0.3413	paved	P	very low							1		1		
428	S	374	1.4624	clay/sand	P	low	1	1						1	3	2	
430	S	C72	0.3977	sand	P	very low								1	1		
444	S	C-5	0.5032	sand	VP	very low								1	1		
460	S	487	3.4257	sand	G	low			1					1	2		
464	S	747	0.7494	sand	P	low			1						1		
466	S	735	1.0076	sand	P	very low			1					1	2		
467	S	234	1.0996	sand	P	low								1	1		
471	S	660	1.0029	sand	P	low								1	1		
480	S	A30	0.354	paved	G	low			1						1		
486	S	212	1.8674	sand	G	low								1	1		
492	S	217	1.6015	sand	P	low								1	1		
493	S	411	0.4074	sand	P	low								1	1		
494	S	376	0.6344	clay/sand	P	low	1	1					1	1	4	1	
502	S	236	6.5047	sand	P	very low	2						1	1	4		2
503	S	C52	0.4627	sand	P	very low							1		1		
506	S	C64	0.2865	clay/sand	G	low								1	1		
514	S	678	0.6218	sand	P	very low							1		1	1	
516	S	710	0.7504	sand	P	low			1						1		
517	S	710	0.265	sand	P	low			1					1	2		
3133	S	NA	1.2219	sand	VP	very low								1	1		
4751	S	NA	4.8117	sand	VP	very low	3		1				1	1	6	3	1
4762	S	NA	1.9364	sand	VP	very low							1	1	2		
4783	S	NA	3.0264	sand	VP	very low								1	1		
5010	S	NA	2.713	sand	VP	very low			1						1		
5264	P	259	2.2941	clay/sand	F	very low	1		1		1		1		4	3	1
5265	P	253	7.521	clay/sand	F	high	4			1	1		1	1	8	4	2
5266	P	208	4.2322	clay	G	med to high	1							1	2	1	
5274	P	214	0.8113	clay/sand	G	med to high								1	1		
5315	S	395	1.4024	clay/sand	G	low to med	1	1			1		1	1	5		

Definitions:
NA: Not Known
P: Primary
S: Secondary
E: Excellent
VG: Very Good
G: Good
P: Poor
VP: Very Poor
F: Fair

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APPENDIX F

PUBLIC REVIEW PROCESS

SATURDAY, JUNE 14, 2003 Daily News **PAGE B9**

Public Notification

In compliance with the National Environmental Policy Act, Eglin Air Force Base announces the availability of the draft Environmental Assessment and draft Finding of No Significant Impact (FONSI) for RCS 02-444, Okaloosa County Wastewater Treatment Facility, and the following Programmatic Environmental Assessments (PEA) and their draft Findings of No Significant Impacts (FONSI) for RCS 99-148, Test Areas B-71 and B-82, RCS 99-145, Electromagnetic Radiation, and RCS 99-144, Range Roads, at Eglin Air Force Base, Florida for public review and comment.

The proposed action of RCS 02-444, Okaloosa County Wastewater Treatment Facility draft Environmental Assessment, is to provide a 25-year lease to the existing county sprayfield site located on Roberts Road. The county has requested the use of 255 presently-leased acres for the construction, operation, and maintenance of a wastewater treatment facility and associated Rapid Infiltration Basin System.

The proposed action of RCS 99-148. Test Areas B-71 and B-82 draft Programmatic Environmental Assessment, is for the 46th Test Wing commander to establish an authorized level of mission activity based on an anticipated maximum usage. The preferred alternative includes authorizing levels or air to surface missions up to 2,400% (from approximately 1 mission per year to 2 missions per month) of the baseline, and increasing static ground testing 900% (from approximately 4 missions per year to 36 missions per year), and surface-to-surface testing 300% from 25 missions per year to 75 missions per year.

The proposed action of RCS 99-145, Electromagnetic Radiation draft Programmatic Environmental Assessment, is for the 46th Test Wing commander to establish an authorized level of mission activity based on an anticipated maximum usage. The preferred alternative includes authorizing the current levels of activity, plus the relocation, addition or upgrade of EMR emitter systems.

The proposed action of RCS 99-144, Range Roads draft Programmatic Environmental Assessment, is for the 46th Test Wing commander to establish a formalized Range Road Management Program to guide the repair and maintenance of existing roads. The preferred alternative would include the systematic closure of range roads deemed non-critical to the Military Test and Training, Emergency Response, and Natural Resources missions.

Your comments on this draft EA and draft PEAs are requested. Letters or other written or oral comments provided may be published in the final documents. As required by law, comments will be addressed in the final documents and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the documents. However, only the names and respective comments of respondent individuals will be disclosed. Personal home addresses and phone numbers will not be published in the final documents.

Copies of the draft Environmental Assessment and draft Programmatic Environmental Assessments and their respective draft Findings of No Significant Impact (FONSI) may be reviewed at the following locations:

RCS 02-444, Okaloosa County Wastewater Treatment Facility draft Environmental Assessment - Fort Walton Beach Public Library, 185 SE Miracle Strip Parkway, Fort Walton Beach.

RCS 99-148, Test Areas B-71 and B-82 draft Programmatic Environmental Assessment - Fort Walton Beach Public Library, 185 SE Miracle Strip Parkway, Fort Walton Beach.

RCS 99-145, Electromagnetic Radiation draft Programmatic Environmental Assessment - Fort Walton Beach Public Library, 185 SE Miracle Strip Parkway, Fort Walton Beach; Navarre Library, 185 SE Miracle Strip Parkway, Fort Walton Beach; Navarre Library, 8484 James M. Harvell Rd., Navarre.

RCS 99-144, Range Roads draft Programmatic Environmental Assessment - Fort Walton Beach Public Library, 185 SE Miracle Strip Parkway, Fort Walton Beach; Navarre Library, 8484 James M. Harvell Rd., Navarre; Niceville Library, 206 Partin Dr., Niceville; Robert L. F. Sikes Library, 1445 Commerce Drive, Crestview.

All copies will be available for review from June 14 through June 28, 2003. Comments must be received by July 1, 2003.

For more information or to comment on these proposed actions, contact: Mr. Mike Spaits, AAC/EM-PAV, 501 De Leon St., Suite 101, Eglin AFB, Florida 32542-5133 or email: spaitsm@eglin.af.mil. Tel: (850) 882-2878, Fax: (850) 882-3761.

525034

MEMO

16 July 2003

FROM: AAC/EM-PAV

TO: EMSP

SUBJECT: **PUBLIC NOTICE for the following Programmatic Environmental Assessments (PEA) and their draft Findings of No Significant Impacts (FONSI): RCS 99-148, Test Areas B-71 and B-82, RCS 99-145, Electromagnetic Radiation, and RCS 99-144, Range Roads," Eglin AFB, Florida**

A public notice was published in the *Northwest Florida Daily News* on Jun. 14th, 2003 to disclose completion of the Draft PEAs, selection of the preferred alternatives, and request comments during the 15-day pre-decisional comment period.

The 15-day comment period ended on Jun. 28th, with the comments required to this office not later than Jul. 1st, 2003.

No comments were received during this period.

//signed//
Mike Spaits
Environmental Public Affairs

APPENDIX G

FLORIDA STATE CLEARINGHOUSE/ AGENCY COORDINATION

Jeb Bush
Governor

Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard, MS 47
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

January 6, 2004

Ms. Marisol Reina
Department of the Air Force
Environmental Analysis Branch
501 DeLeon Street, Suite 101
Eglin AFB, Florida 32542-5133

RE: U.S. Department of Defense – Department of the Air Force - Draft Programmatic Environmental Assessment Range Roads Management Program, December 2002, Eglin Air Force Base – Santa Rosa, Okaloosa, and Walton Counties, Florida
SAI # FL200311104521C

Dear Ms. Reina:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated the review of the above-referenced Draft Programmatic Environmental Assessment (EA).

The Department of Environmental Protection (DEP) indicates that the proposed activities may require permits from DEP's Northwest District for wetland impacts and stormwater management. Additional information will be needed during permit application reviews. The Air Force is advised to continue close coordination with the NW District. Please refer to DEP's enclosed comments for details.

Based on the information contained in the above-referenced draft EA and the comments provided by our reviewing agencies, as summarized above and enclosed, the state has determined that, at this stage, the proposed project is consistent with the Florida Coastal Management Program (FCMP). All subsequent environmental documents prepared for the project must be reviewed to determine the project's continued consistency with the FCMP. The state's consistency concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting stage.

Ms. Marisol Reina
SAI FL200311104521C
Page 2

Thank you for the opportunity to review the project. Should you have any questions regarding this letter, please contact Ms. Lindy McDowell at (850) 245-2163.

Sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lbm

Enclosures

cc: Dick Fancher, DEP, Northwest District

Florida
Department of Environmental Protection
"More Protection, Less Process"

Categories

DEP Home | Contact DEP | Search | DEP Site Map

Project Information	
Project:	FL200311104521C
Comments Due:	December 09, 2003
Letter Due:	January 04, 2004
Description:	DEPARTMENT OF THE AIR FORCE - DRAFT PROGRAMMATIC ENVIRONMENTAL ASSESSMENT, RANGE ROADS MANAGEMENT PROGRAM, DECEMBER 2002 - EGLIN AIR FORCE BASE - SANTA ROSA, OKALOOSA, AND WALTON COUNTIES, FLORIDA. ON CD-ROM.
Keywords:	USAF - PEA, RANGE ROADS MANAGEMENT PROGRAM - EGLIN AIR FORCE BASE
CFDA #:	12.200

Agency Comments:
WALTON -
No Comment
WEST FLORIDA RPC - WEST FLORIDA REGIONAL PLANNING COUNCIL
No Comment
OKALOOSA - OKALOOSA COUNTY
No Comment
SANTA ROSA - SANTA ROSA COUNTY
No Comment
ENVIRONMENTAL POLICY UNIT - OFFICE OF POLICY AND BUDGET, ENVIRONMENTAL POLICY UNIT
No Comment
COMMUNITY AFFAIRS - FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS
Released Without Comment
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
STATE - FLORIDA DEPARTMENT OF STATE
No Comment
TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION
NC
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
See DEP Memo to the Clearinghouse.
NORTHWEST FLORIDA WMD - NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT
No Comment

For more information please contact the Clearinghouse Office at:

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

COUNTY: ALL
SAI-USAF-EGI
2003-1929

DATE: 11/5/2003
COMMENTS DUE DATE: 12/9/2003
CLEARANCE DUE DATE: 1/4/2004
SAI#: FL200311104521C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
X STATE			
TRANSPORTATION			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

_ Federal Assistance to State or Local Government (15 CFR 930, Subpart F).
Agencies are required to evaluate the consistency of the activity.

X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

_ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

_ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE AIR FORCE - DRAFT PROGRAMMATIC ENVIRONMENTAL ASSESSMENT, RANGE ROADS MANAGEMENT PROGRAM, DECEMBER 2002 - EGLIN AIR FORCE BASE - SANTA ROSA, OKALOOSA, AND WALTON COUNTIES, FLORIDA. ON CD-ROM.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA Federal Consistency

☑ No Comment
☐ Comment Attached
☐ Not Applicable

☑ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:
Division/Bureau: Division of Historical Resources / Bureau of Historic Preservation
Reviewer: S. Edwards
Date: 11-24-03 11/24/03
Frederick P. Gaske, Deputy SHPO 11/26/03

RECEIVED
03 NOV 17 PM 3:25
BUREAU OF HISTORIC PRESERVATION

RECEIVED
DEC 0 2 2003
OIP/OLGA

COUNTY: ALL

DATE: 11/5/2003
COMMENTS DUE DATE: 12/9/2003
CLEARANCE DUE DATE: 1/4/2004
SAI#: FL200311104521C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	X NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
STATE			
TRANSPORTATION			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

- _ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.
- X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.
- _ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.
- _ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE AIR FORCE - DRAFT PROGRAMMATIC ENVIRONMENTAL ASSESSMENT, RANGE ROADS MANAGEMENT PROGRAM, DECEMBER 2002 - EGLIN AIR FORCE BASE - SANTA ROSA, OKALOOSA, AND WALTON COUNTIES, FLORIDA. ON CD-ROM.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA Federal Consistency

- ☑ No Comment
- ☐ Comment Attached
- ☐ Not Applicable
- ☐ No Comment/Consistent
- ☐ Consistent/Comments Attached
- ☐ Inconsistent/Comments Attached
- ☐ Not Applicable

NO COMMENTS

From:

Division/Bureau: NWFWMD
Reviewer: Resource Management Div.
Date: Duncan J. Cairns
Date 19 NOVEMBER 2003

Memorandum

Florida Department of
Environmental Protection

TO: **Florida State Clearinghouse**

FROM: **Lindy McDowell, Environmental Manager**
Office of Intergovernmental Programs

DATE: **January 6, 2004**

SUBJECT: **USAF – Draft Programmatic Environmental Assessment, Range Roads Management Program, December 2002, Eglin Air Force Base – Santa Rosa, Okaloosa, and Walton Counties, Florida**
SAI # FL200311104521C

The Department has reviewed the above referenced Draft Programmatic Environmental Assessment (PEA). Based on the information contained in the above-referenced draft PEA, the Department has determined that, at this stage, the proposed project is consistent with the Florida Coastal Management Program (FCMP). Further evaluation(s) of the project will be conducted during the environmental documentation and/or permitting stages. Future consistency will be based in part on adequate consideration of comments offered in this and subsequent reviews. Department staff offer the following comments and recommendations:

- Any impacts to Department jurisdictional wetlands would require proper permit authorizations.
- Associated drawings to any permit applications would need to include adequate drawings illustrating location of each stream crossing and delineation of any potentially impacted wetlands. Existing and proposed changes would also need to be illustrated.
- Any areas deemed to be sovereignty submerged lands would require subsequent authorization for impacts under Chapter 18-21 Florida Statutes.
- There is a potential that all impacts could be encompassed under one application and separated out within any subsequent issued permit.
- -Some restoration areas may qualify for the newly instituted restoration permit, but pre-application consultation is recommended prior to application submittal to ensure qualification.
- Any increase in stormwater discharge or pollutant load (including that associated with placement of gravel or similar road material) will require treatment pursuant to Rule 62-25, F.A.C., including possible use of swale exemptions where appropriate. The Air Force is advised to continue close coordination with the NW District regarding necessary permit authorizations.

WFRPC
WEST FLORIDA REGIONAL PLANNING COUNCIL

WEST FLORIDA REGIONAL PLANNING COUNCIL
Post Office Box 9759 • 3435 North 12th Avenue • Pensacola, Florida 32513-9759
Phone (850) 595-8910 • S/C 695-8910 • (800) 226-8914 • Fax (850) 595-8967

Lol Czeck
Executive Director

Cody Taylor
Chairman

Sydney Joel Pate
Vice-Chairman

FAX TRANSMITTAL (S) Total # of Pages (including cover) 1

TO: **STATE CLEARINGHOUSE ▪ FAX: (850) 245-2190/(850) 245-2189**
Phone: 850-245-2161

DATE: November 18, 2003

FROM: Terry Joseph, Intergovernmental Review Coordinator
Extension 206
joseph@wfrpc.dst.fl.us

SUBJECT: State Clearinghouse Review(s) Fax Transmittals:

SAI #	Project Description	RPC #
FL200311134549C	EPA-State Revolving Funds, North Springfield Water System Project – Springfield, Bay County, Florida.	B531-11-15-2003
FL200311104521C	Department of the AF-Draft Programmatic Environmental Assessment, Range Roads Management Program, December 2003.	MJ699-11-15-2003

X	No Comments – Generally consistent with the WFSRPP
	Comments Attached

If you have any questions, please call.

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APPENDIX H

FEDERAL AGENCY COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION

FEDERAL AGENCY COASTAL ZONE MANAGEMENT ACT (CZMA) CONSISTENCY DETERMINATION

INTRODUCTION

This document provides the State of Florida with the U.S. Air Force's Consistency Determination under CZMA Section 307 and 15 C.F.R. Part 930 sub-part C. The information in this Consistency Determination is provided pursuant to 15 C.F.R. Section 930.39.

Pursuant to Section 307 of the Coastal Zone Management Act, 16 U.S.C. § 1456, as amended, its implementing regulations at 15 C.F.R. Part 930, this is a Federal Consistency Determination for proposed range road management activities described within the Range Roads Programmatic Environmental Assessment (PEA) (Chapter 2).

Proposed Federal agency action:

The proposed action, which is the preferred alternative in the PEA, is to establish a Range Road Management Plan. Execution of this alternative will achieve the dual goals of enhanced environmental stewardship and substantial reduction in the range road network.

The preferred alternative will establish:

- **Range Road Process to address road issues in a timely and efficient manner**
- **Range Road System hierarchy that supports all customer needs**
- **Range Road standards and Best Management Practices to guide construction, repair and maintenance**
- **Road Closure Management Plan (closure criteria) to address future needs**

Greater details are provided in Chapter 2 of the PEA.

The U.S. Air Force, Air Armament Center, has evaluated the proposed actions described in the Range Road PEA for potential effects to the land or water uses or natural resources of the State of Florida's coastal zone within the context of the statutes listed in the Florida Coastal Zone Management Plan (below).

Federal Consistency Review

Statutes addressed as part of the Florida Coastal Zone Management Program consistency review and considered in the analysis of the proposed action are discussed in the following table.

Pursuant to 15 C.F.R. § 930.41, the Florida State Clearinghouse has 60 days from receipt of this document in which to concur with or object to this Consistency Determination, or to request an extension, in writing, under 15 C.F.R. § 930.41(b). Florida's concurrence will be presumed if Eglin AFB does not receive its response on the 60th day from receipt of this determination.

Florida Coastal Management Program Consistency Review

Statute	Consistency	Scope
Chapter 161 *Beach and Shore Preservation*	The proposed project will not adversely affect beach and shore management, specifically as pertains to: - The Coastal Construction Permit Program. No activity would occur seaward of the mean high water line. - The Coastal Construction Control Line (CCCL) Permit Program. No activity would occur seaward of the CCCL, where wind and wave forces would potentially cause significant fluctuations in the beach/dune system. Further, all land activities occur on federal property. - The Coastal Zone Protection Program. The proposed work does not involve activity on the beach or any coastal shoreline.	Authorizes the Bureau of Beaches and Coastal Systems within DEP to regulate construction on or seaward of the states' beaches.
Chapter 163, Part II *Growth Policy; County and Municipal Planning; Land Development Regulation*	The proposed action, which occurs on federal property, conforms to local government comprehensive development plans. Transitions from federal property into state waters primarily occur within restricted and prohibited areas controlled by the U.S. Air Force and would not interfere with development.	Requires local governments to prepare, adopt, and implement comprehensive plans that encourage the most appropriate use of land and natural resources in a manner consistent with the public interest.
Chapter 186 *State and Regional Planning*	State and regional agencies were provided the opportunity to review the environmental assessment. The proposed project is being coordinated with state agencies. The project would provide for ecosystem restoration and improvement of water quality. The proposed action, which occurs on federal property, conforms to the State Comprehensive Plan and associated translational plans, including the State Land Development Plan, Florida Water Plan, Florida Transportation Plan, and strategic regional policy plans.	Details state-level planning requirements. Requires the development of special statewide plans governing water use, land development, and transportation.
Chapter 252 *Emergency Management*	The proposed action would not increase the state's vulnerability to natural disasters. Emergency response and evacuation procedures would not be impacted by the proposed action. The results of this project would have a substantial positive impact on disaster preparation, response, or mitigation by developing and maintaining a robust, logical range road network.	Provides for planning and implementation of the state's response to, efforts to recover from, and the mitigation of natural and manmade disasters.

Florida Coastal Management Program Consistency Review Cont'd

Chapter 253 *State Lands*	The project is being coordinated through the State Clearinghouse and would provide for ecosystem restoration and associated benefits to wetlands within and adjacent to the Eglin Reservation. SHPO-approved cultural resource protective procedures are in place and will be complied during project execution. The proposed action would not involve the use of state submerged lands. An Environmental Resource Permit (ERP) or Joint Coastal Permit (JCP) is not necessary given that the proposed action would not result in impacts to submerged resources.	Addresses the state's administration of public lands and property of this state and provides direction regarding the acquisition, disposal, and management of all state lands.
Chapter 259 *Land Acquisition for Conservation or Recreation* Chapter 260 *Recreational Trails System* Chapter 375 *Multipurpose Outdoor Recreation; Land Acquisition, Management, and Conservation*	Since the affected property already is in public ownership, these chapters would not apply.	Authorizes acquisition of environmentally endangered lands and outdoor recreation lands (Chapter 259). Authorizes acquisition of land to create a recreational trails system and to facilitate management of the system (Chapter 260). Develops comprehensive multipurpose outdoor recreation plan to document recreational supply and demand, describe current recreational opportunities, estimate need for additional recreational opportunities, and propose means to meet the identified needs (Chapter 375).
Chapter 258 State Parks and Preserves	State parks, recreational areas, and aquatic preserves would not be affected by the proposed action. Actions would not occur within any aquatic preserves. Tourism and outdoor recreation would not be significantly affected. Opportunities for recreation on state lands would not be affected. The results of the project will enhance water quality in all state waters on federal land adjacent to the current range road network, including the Yellow River and Rocky Bayou Aquatic Preserves and Fred Gannon State Park.	Addresses administration and management of state parks and preserves (Chapter 258).
Chapter 267 *Historical Resources*	This project is being coordinated with the State Historic Preservation Office (SHPO) through the State Clearinghouse. The results of that consultation will be included in project execution and monitored by the Eglin AFB Historic Preservation Officer. Therefore, this project will be consistent with the goals of this chapter. Potential impacts to cultural resources are discussed in Chapter 4, of the EA.	Addresses management and preservation of the state's archaeological and historical resources.

Florida Coastal Management Program Consistency Review Cont'd

Chapter 288 *Commercial Development and Capital Improvements*	The proposed action occurs on federal property. This project would not adversely impact beneficial development, economic diversification, or tourism.	Provides the framework for promoting and developing the general business, trade, and tourism components of the state economy.
Chapter 334 *Transportation Administration* Chapter 339 *Transportation Finance and Planning*	No public transportation systems would be impacted by this project. The project is limited to AF-owned range roads on the Eglin Reservation.	Addresses the state's policy concerning transportation administration (Chapter 334). Addresses the finance and planning needs of the state's transportation system (Chapter 339).
Chapter 370 *Saltwater Fisheries*	The proposed action would not affect saltwater fisheries. The project is consistent with the goals of this chapter.	Addresses management and protection of the state's saltwater fisheries.
Chapter 372 *Wildlife*	The proposed action will have no adverse effect on freshwater aquatic life or wild animal life. The project is expected to benefit wildlife through improvements in water quality. The proposed action would not affect threatened and/or endangered species.	Addresses the management of the wildlife resources of the state.
Chapter 373 *Water Resources*	The proposed action would not affect water resources. Consumptive water use will not interfere with any presently existing legal use of water, and use of water resources is consistent with the public interest.	Addresses the state's policy concerning water resources.
Chapter 376 *Pollutant Discharge Prevention and Removal*	The proposed action does not involve the storage, transportation, or discharging of pollutants.	Regulates transfer, storage, and transportation of pollutants, and cleanup of pollutant discharges.
Chapter 377 *Energy Resources*	Energy resource production, including oil and gas, and the transportation of oil and gas, would not be affected by the proposed action.	Addresses regulation, planning, and development of energy resources of the state.
Chapter 380 *Land and Water Management*	Areas of Critical State Concern or areas with approved state resource management plans such as the Northwest Florida Coast would not be affected. Changes to coastal infrastructure such as bridge construction, capacity increases of existing coastal infrastructure, or use of state funds for infrastructure planning, designing or construction would not occur. The proposed project would not have any regional impact on resources in the area, other than improvement to water quality in the immediate area of the Eglin Reservation. Therefore, the project is consistent with the goals of this chapter.	Establishes land and water management policies to guide and coordinate local decisions relating to growth and development.
Chapter 381 *Public Health, General Provisions*	A permit is not applicable for the proposed action.	Establishes public policy concerning the state's public health system.

Florida Coastal Management Program Consistency Review Cont'd

Chapter 388 *Mosquito Control*	The proposed action would not affect mosquito control.	Addresses mosquito control effort in the state.
Chapter 403 *Environmental Control*	An environmental assessment of project impacts has been prepared and will be reviewed through the State Clearinghouse by the appropriate resource agencies including FDEP; therefore, the project is complying with the intent of this chapter. No aspects of the proposed action occur in state waters and would not affect ecological systems and water quality of state waters. No dredge and fill operations, discharges into groundwater or effects to public drinking water supplies would occur. Impacts to air quality are not expected.	Establishes public policy concerning environmental control in the state.
Chapter 582 *Soil and Water Conservation*	Best management practices for preventing and controlling erosion would be necessary and are described in Chapter 4 of the EA. Additionally, the proposed action is not located near or on agricultural lands.	Provides for the control and prevention of soil erosion.