

**INTEGRATED NATURAL RESOURCE MANAGEMENT PLAN
COLUMBUS AIR FORCE BASE, MS**



**Updated Nov 2015
14 CES/CEIE**

TABLE OF CONTENTS

		Page
1.0	EXECUTIVE SUMMARY	ES-1
2.0	GENERAL INFORMATION	2-1
2.1	Purpose of the Plan	2-1
2.2	Scope and Authority	2-1
2.3	Management Philosophy	2-2
2.4	Conditions for Implementation and Revisions	2-2
2.5	Responsibilities	2-3
2.6	National Environmental Policy Act Documentation	2-4
3.0	INSTALLATION OVERVIEW	3-1
3.1	Location and Area	3-1
3.2	Installation History	3-1
3.3	Military Mission	3-4
3.4	Surrounding Communities	3-4
3.5	Regional Land Use	3-5
3.6	Local and Regional Natural Areas Profile	3-5
4.0	GENERAL PHYSICAL ENVIRONMENT	4-1
4.1	Climate	4-1
4.2	Landforms	4-3
4.3	Soils and Geology	4-3
4.4	Hydrology	4-4
5.0	GENERAL BIOTIC ENVIRONMENT	5-1
5.1	Ecosystem Classification	5-1
5.2	Vegetation	5-1
5.3	Fish and Wildlife	5-2
5.4	Protected Species	5-3
5.5	Wetlands	5-9
5.6	Other Natural Resource Information	5-10
6.0	MISSION IMPACTS ON NATURAL RESOURCES	6-1
6.1	Land Use	6-1
6.2	Current Major Impacts	6-4
6.3	Potential Future Impacts	6-12
6.4	Natural Resources Needed to Support the Military Mission	6-12
6.5	Natural Resource Constraints to Mission and Mission Planning	6-12
7.0	NATURAL RESOURCES PROGRAM MANAGEMENT	7-1
7.1	Natural Resource Program Management	7-1
7.2	Geographic Information System	7-1
7.3	Fish and Wildlife Management	7-2
7.4	Management of Threatened and Endangered Species and Critical Habitats	7-3
7.5	Water Resource Protection	7-4

7.6	Wetland Protection	7-5
7.7	Grounds Maintenance	7-6
7.8	Forest Management	7-6
7.9	Wildland Fire Management	7-8
7.10	Integrated Pest Management.....	7-8
7.11	Bird/Aircraft Strike Hazard.....	7-9
7.12	Outdoor Recreation	7-9
7.13	Cultural Resources	7-10
7.14	Soils and Land Use	7-10
7.15	Enforcement	7-11
7.16	Public Outreach	7-11
8.0	MANAGEMENT GOALS AND OBJECTIVES	8-1
9.0	WORK PLANS.....	9-1

APPENDICES

APPENDIX A	Common Wildlife; Threatened and Endangered Species Lists; and Agency Correspondence
APPENDIX B	Common Plants and Threatened and Endangered Species Lists
APPENDIX C	Columbus Air Force Base Urban Tree Inventory
APPENDIX D	Photographs of CAFB and SAA
APPENDIX E	Bird Aircraft Strike Hazard Plan and State Depredation Permits
APPENDIX F	Permit and Air Emission Sources
APPENDIX G	References and List of Preparers
APPENDIX H	Shuqualak INRMP
APPENDIX I	Environmental Assessment
APPENDIX J	Pest Management Plan
APPENDIX K	Threatened and Endangered Species Survey
APPENDIX L	Golf Course Environmental Management Plan
APPENDIX M	Wildland Fire Management Plan

TABLES

Table 2.5-1	Air Force Natural Resource Management Responsibilities.....	2-3
Table 3.4-1	Demographic Profiles	3-4
Table 4.1-1	Climate Summary for CAFB	4-1
Table 4.3-1	Soils at CAFB	4-4
Table 5.4.1-1	Federally Threatened and Endangered Species in Mississippi.....	5-7
Table 5.4.2-1	Mississippi State-Listed Threatened and Endangered Species within Two miles of Columbus Air Force Base.....	5-9
Table 5.5-1	Plant Species in Wetlands at CAFB.....	5-10
Table 6.1-1	Summary of Land Use Classification at CAFB	6-7
Table 6.2-1	Summary of 2003 Air Emissions from CAFB by Pollutant Type	6-7
Table 6.5-1	Natural Resource Opportunities and Constraints Upon the Mission at CAFB.....	6-17

FIGURES

Figure 3.1-1	Vicinity Map.....	3-2
Figure 3.1-2	Installation Map.....	3-3
Figure 3.6-1	Local and Regional Natural Areas.....	3-6
Figure 4.3-1	Ecoregions of Mississippi.....	4-5
Figure 4.3-2	Soils.....	4-6
Figure 4.3-3	Surface Geology at CAFB.....	4-8
Figure 4.4-1	River Basins in Mississippi.....	4-10
Figure 4.4-2	Rivers, Streams, and Floodplains.....	4-11
Figure 5.2-1	Vegetation Map.....	5-3
Figure 5.5-1	Wetlands.....	5-11
Figure 6.1-1	Existing Land Use.....	6-3
Figure 6.2-1	Water Wells.....	6-5
Figure 6.2-2	Locations of Air Emissions Sources.....	6-8
Figure 6.2-3	Noise Map.....	6-10
Figure 6.2-4	Locations of Hazardous Waste.....	6-11
Figure 6.2-5	Locations of IRP Sites.....	6-13
Figure 6.2-6	Locations of Monitoring Wells.....	6-14
Figure 6.3-1	Future Land Use.....	6-16

TERMS AND DEFINITIONS

Agricultural Outleasing: The use of DoD lands under a lease to an agency, organization, or person for growing crops or grazing animals.

Agricultural Land Improvements: Improvements that add potential value to an agricultural outgrant such as irrigation features, fences, cattle guards, water developments, livestock enclosures and other structural improvements, as well as non-structural improvements such as seeding, fertilizing and vegetation management.

Airfield: The area comprised of runways, taxiways, aprons and other adjacent land areas of an airport which are dedicated to aircraft operations.

Alien Species: Any species, including its seeds, eggs, spores or other biological material capable of propagating that species that is not native to a respective ecosystem.

Biodiversity: Also stated as 'Biological Diversity.' The variety of life forms, the ecological roles they perform the genetic variability among them, and their interactions in the communities and ecosystems in which they live. Biodiversity Conservation is a land management practice whereby maintaining and establishing viable populations of all native species is a primary goal.

Commercial Forest Land: Land under management capable of producing at least 20 cubic feet of merchantable timber per acre a year. It must be accessible and programmed for silvicultural prescriptions. The smallest area for this classification is 5 acres. Roadside, streamside and shelterbelt strips of timber must have or be capable of producing a crown width of at least 120 cubic feet to be classified as a commercial forest.

Cooperative Agreement: A written agreement between an AF organization and one or more outside agencies (federal, state, or local), conservation organizations or individual for the planning and implementation of natural resources program requirements.

Critical Habitat: Any air, land or water area and constituents thereof that the USFWS has designated as essential to the survival and recovery of an endangered or threatened species or a distinct segment of its population.

Cropland: Land primarily suitable for producing farm crops, including grain, hay and truck crops.

Ecosystem Management: An approach to natural resources management that focuses on the interrelationships of ecological processes linking soils, plants, animals, minerals, climate, water and topography.

Endangered Species: Any species, which is in danger of extinction throughout all or a significant portion of its range, and has been designated for special protection and management by the Federal government pursuant to the Endangered Species Act.

Exotic Species: Any plant or animal not native or indigenous to a region, state or country.

Floodplains: Lowland or flat areas adjoining inland and coastal waters, including areas on offshore islands, that are prone to flooding.

Forest Land: Land on which forest trees of various sizes constitute at least 10 percent of the area. This category includes open land that is capable of supporting trees and is planned for forest regeneration and management.

Forest Products: Plant materials in wooded areas that have commercial value, such as sawlogs, veneer (peeler) logs, poles, pilings, pine needles, cordwood (for pulp, paper or firewood), fence posts, mine timber, Christmas trees (from unshered trees cut during intermediate harvests) and similar wood or chemical products.

Fossils: Fossils are the hardened remains or traces of plant or animal life of some previous geological period, preserved in rock formations in the earth's crust.

Game: Any species of fish or wildlife for which state or federal laws and regulations prescribe hunting seasons and bag or creel limits.

Habitat: An area that provides the environmental elements of air, water, food, cover and space necessary for a given species to survive and reproduce.

Improved Grounds: A grounds maintenance land use category used to indicate scope and intensity of land management (see Chapter 11). Includes land occupied by buildings and other permanent structures as well as lawns and landscape plantings on which personnel annually plan and perform intensive maintenance activities. Improved Grounds include the cantonment area, parade grounds, drill fields, athletic areas, golf courses (excluding roughs), cemeteries and housing areas. Grass in these areas is normally maintained at a height of 2-4 inches during the growing season.

Integrated Natural Resources Management Plan (INRMP): A plan based on ecosystem management that describes and delineates the interrelationships of the individual natural resources elements in concert with the mission and land use activities affecting the basic land management plans. Defines the natural resources elements and the activities required to implement stated goals and objectives for those resources.

Integrated Pest Management (IPM): A planned program incorporating continuous monitoring, education, record keeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, materiel, or the environment. IPM includes methods such as habitat modification, biological control, genetic control, cultural methods, mechanical control, physical control, regulatory control and the judicious use of least-hazardous pesticides.

Invasive Species: An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Land Management Unit: The smallest land management division that planners use in developing specific strategies to accomplish natural resources management goals. Land management units may correspond to grazing units on agricultural outleased lands, stands or compartments on commercial forest lands, various types of improved grounds (for example, athletic fields, parks, yards in family housing or

landscaped areas around administrative buildings) or identifiable semi-improved grounds (for example, airfield areas, utility rights-of-way or roadside areas).

Land-Use Regulation: A document that prescribes the specific technical actions or land use and restrictions with which lessees, permittees or contractors must comply. It derives from the grazing or cropland management plan and forms a part of all outleases, land use permits and other contracts.

Livestock: Domestic animals kept or rose for food, by-products, work, transportation or recreation.

Natural Resources Management Professional: A person with a degree in the natural sciences who manages natural resources on a regular basis and receives periodic training to maintain proficiency in that job.

Noxious Weed: Any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health or the environment.

Outdoor Recreation: Recreation that relates directly to and occurs in natural, outdoor environments.

Outdoor Recreation Resources: Land and water areas and associated natural resources that provide, or have the potential to provide, opportunities for outdoor recreation for present and future generations.

Rangeland: Land on which the native vegetation is predominantly grasses, grass-like plants, herbs or shrubs suitable for grazing or browsing use. It includes lands revegetated naturally or artificially to provide a forage cover that is managed like native vegetation. It also includes natural grasslands, savannas, shrubland, most deserts, tundra, alpine communities, coastal marshes and wet meadows.

Reforestation: The renewal or regeneration of a forest by natural or artificial means.

Semi-Improved Grounds: A grounds maintenance land use category used to indicate scope and intensity of land management (see Chapter 11). Grounds where periodic maintenance is performed primarily for operational reasons (such as erosion and dust control, bird control and visual clear zones). This land use classification includes areas adjacent to runways, taxiways and aprons; runway clear zones; lateral safety zones; rifle and pistol ranges; picnic areas; ammunition storage areas; antenna facilities; and golf course roughs. Semi-improved grounds areas are mowed less often to maintain grass height between 7-14 inches.

Stewardship: The management of a resources base with the goal of maintaining or increasing the resources' value indefinitely into the future.

Threatened Species: Any species, which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and has been designated for special protection and management by the federal government pursuant to the Endangered Species Act.

Unimproved Grounds: A grounds maintenance land use category used to indicate scope and intensity of land management (see Chapter 11). Unimproved grounds are areas not classified as 'improved' or 'semi-improved.' Unimproved grounds include weapons firing and bombing ranges; forestlands; croplands and

grazing lands; grasslands or ranges; lakes, ponds and wetlands; and any areas where natural vegetation is allowed to grow unimpeded by maintenance activities.

Urban Forests: Planted or remnant native tree species existing within urbanized areas such as parks, tree-lined residential streets, scattered tracts of undisturbed woodlands and cantonment areas.

Watchable Wildlife Areas: Areas identified under the Watchable Wildlife Program as suitable for passive recreational uses such as bird watching, nature study and other nonconsumptive uses of wildlife resources.

Wetlands: Areas inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Also stated as 'Biological Diversity.' The variety of life forms, the ecological roles they perform the genetic variability among them and their interactions in the communities and ecosystems in which they live. Biodiversity Conservation is a land management practice whereby maintaining and establishing viable populations of all native species is a primary goal.

List of Acronyms

AA	Auxiliary Airfield
ABS	Air Base Squadron
AETC	Air Education and Training Command
AFB	Air Force Base
AFCEE	Air Force Center for Engineering & the Environment
AFI	Air Force Instruction
AFPD	Air Force Policy Directive
AGE	Aerospace Ground Equipment
AQCR	Air Quality Control Region
AWS	Air Weather Service
BASH	Bird-Aircraft Strike Hazard
BCE	Base Civil Engineer
BGS	Below Ground Surface
BHWG	Bird Hazard Working Group
BMP	Best Management Practice
CAAA	Clean Air Act Amendments of 1990
CADD	Computer Aided Design and Drafting
CEO	Civil Engineering Operations
CES	Civil Engineering Squadron
CEIE	Environmental Element
CO	Carbon Monoxide
dBA	A-Weighted Sound Level
DERP	Defense Environmental Restoration Program
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
ESA	Endangered Species Act
ESOHC	Environmental Safety and Occupational Health Council
°F	Degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FONPA	Finding of No Practical Alternative
FONSI	Finding of No Significant Impact
FRF	Forestry Reserve Funds
Ft	Foot/Feet
FTW	Flying Training Wing
FY	Fiscal Year
GATR	Ground to Air Transmitter Radar
GP	General Plan
GIS	Geographical Information System
GPS	Global Positioning System
HAP	Hazardous Air Pollutant
HQ	Headquarters
Hr	Hour(s)
HWMP	Hazardous Waste Management Plan
I	Improved
In.	Inch(es)
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
IRP	Installation Restoration Program
LHM	Landscaped-High Maintenance

LLM	Landscaped–Low Maintenance
MAJCOM	Major Command
MDAH	Mississippi Department of Archives and History
MDEQ	Mississippi Department of Environmental Quality
MFC	Mississippi Forestry Commission
Mg/m ³	Micrograms per Cubic Meter
MMNS	Mississippi Museum of Natural Science
MPH	Military Public Health
Mph	Miles per Hour
MSL	Mean Sea Level
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1970
NHP	National Heritage Program
NO ₂	Nitrogen Dioxide
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWR	Noxubee National Wildlife Refuge
O ₃	Ozone
O&M	Operations and Maintenance
O&S	Operations and Services
OCP	Operational Component Plans
Pb	Lead
PCi/L	Picocuries per Liter
pm ¹⁰	Particulate matter less than or equal to 10 microns in aerodynamic diameter
POC	Point of Contact
ppm	Parts Per Million
RBZ	Resource Conservation and Recovery Act
RTE	Rare, Threatened, and Endangered Species
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Office
SI	Semi-Improved
SO ₂	Sulfur Dioxide
SUPT	Specialized Undergraduate Pilot Training
TNC	the Nature Conservancy
Tpy	Tons per Year
TSP	Total Suspended Particulates
UI	Unimproved
USACE	United States Army Corps of Engineers
USAF	United States Air Force
U.S.C	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
W	Watercourse
Yr	Year(s)

2015 UPDATE FOR
INTEGRATED NATURAL RESOURCES MANAGEMENT
PLAN COLUMBUS AIR FORCE BASE, MISSISSIPPI

APPROVAL PAGE

"Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out the program required by this subsection to provide for

- The conservation and rehabilitation of natural resources on military installations;
- The sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and nonconsumptive uses; and
- Subject to safety requirements and military security, public access to military installations to facilitate the use"

Sikes Act (16 USC 670a)

This Updated Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 U.S.C. 670 et seq.) as amended and the Air Force Instruction 32-7064.

Signed on next page


DFNNIS RIECKE, CFP, CPM
MS Dept. of Wildlife, Fisheries, & Parks
1505 Eastover Drive
Jackson, MS 39211



DAVID FELDER
Supervisory Fish & Wildlife Biologist
US Fish and Wildlife Service
MS Ecological Services Field Office
6578 Dogwood View Parkway
Jackson, MS 39213

Signed on next page

Dr. Sam Polles, Executive Director
Mississippi Department of Wildlife, Fisheries, and Parks
P.O. Box 451
1505 Eastover Drive
Jackson, MS 39211



STEPHEN M. RICKS, Field Supervisor
Mississippi Field Office
US Fish and Wildlife Service
6578 Dogwood View Parkway
Jackson, Mississippi 39213

GOSNEY.DOUGLAS.
C.1159832585

Digitally signed by
GOSNEY.DOUGLAS.C.1159832585
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI,
ou=USAF, cn=GOSNEY.DOUGLAS.C.1159832585
Date: 2017.06.12 22:02:22 -0600

DOUGLAS C GOSNEY, Colonel, USAF
Commander, 14 Flying Training Wing
Columbus Air Force Base, Mississippi

2015 UPDATE FOR
INTEGRATED NATURAL RESOURCES MANAGEMENT
PLAN COLUMBUS AIR FORCE BASE, MISSISSIPPI

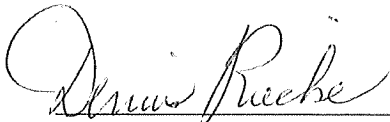
APPROVAL PAGE

"Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out the program required by this subsection to provide for

- The conservation and rehabilitation of natural resources on military installations;
- The sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and nonconsumptive uses; and
- Subject to safety requirements and military security, public access to military installations to facilitate the use"

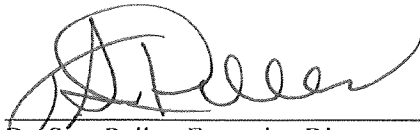
Sikes Act (16 USC 670a)

This Updated Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 U.S.C. 670 *et seq.*) as amended and the Air Force Instruction 32-7064.



DENNIS RIECKE, CFP, CPM
MS Dept. of Wildlife, Fisheries, & Parks
1505 Eastover Drive
Jackson, MS 39211

DAVID FELDER
Supervisory Fish & Wildlife Biologists
US Fish and Wildlife Service
MS Ecological Services Field Office
6578 Dogwood View Parkway
Jackson, MS 39213



Dr. Sam Polles, Executive Director
Mississippi Department of Wildlife, Fisheries, and Parks
P.O. Box 451
1505 Eastover Drive
Jackson, MS 39211

Mr. Sam Hamilton, Regional Director
US Fish and Wildlife Service
1875 Century Blvd., Suite 400
Atlanta, GA 30345

GOSNEY.DOUGLAS.
C.1159832585

Digitally signed by
GOSNEY.DOUGLAS.C.1159832585
DN: c=US, o=U.S. Government, ou=DoD, ou=PA,
ou=USAF, cn=GOSNEY.DOUGLAS.C.1159832585
Date: 2017.06.12 22:02:22 -0600

DOUGLAS C GOSNEY, Colonel, USAF
Commander, 14 Flying Training Wing
Columbus Air Force Base, Mississippi



United States Department of the Interior

FISH AND WILDLIFE SERVICE

1875 Century Boulevard
Atlanta, Georgia 30345

AUG 19 2009

In Reply Refer To:
FWS/R4/F

Memorandum

To: Assistant Regional Director, Fisheries, Region 4
Assistant Regional Director, Ecological Services, Region 4
Ecological Services Project Leaders, Region 4

From: Acting Regional Director, Southeast Region *Jacquelyn Barris*

Subject: Delegation of Military Integrated Natural Resources Management Plan (INRMP)
Concurrence Authority

Per the Acting Deputy Director's June 12, 2009, memorandum (see attached), concurrence authority is hereby delegated through the Assistant Regional Director for Fisheries and the Assistant Regional Director for Ecological Services (ARD-ES) to all Ecological Services Field Supervisors in Region 4 for most military INRMPs. In cases where there are significant management disagreements between Field Offices with shared INRMP responsibilities, concurrence authority will be retained by the Regional Director.

Aside from the before mentioned exceptions, further review of an installation's INRMP will no longer be necessary at the Regional Office level, nor will a letter from the Regional Director acknowledging the Service's mutual agreement with the plan. Instead, the letter acknowledging mutual agreement will be signed and transmitted by the appropriate Ecological Services Field Supervisor after conferring with other Field Stations and/or Programs with management responsibilities for that installation.

If you require any additional information, please contact Patrick Leonard, Assistant Regional Director, Ecological Services, at 404/679-7085 or Tom Sinclair, Regional Sikes Act Coordinator, at 404/679-7324.

Attachment

TAKE PRIDE
IN AMERICA 

LOCKHART, FRANK D GS-12 USAF AETC 14 CES/CEIE

From: Dennis Riecke <DennisR@mdwfp.state.ms.us>
Sent: Wednesday, May 31, 2017 8:49 AM
To: LOCKHART, FRANK D GS-12 USAF AETC 14 CES/CEIE
Subject: [Non-DoD Source] MDWFP 2017 Signature page for - Integrated Natural Resources Management Plan for Columbus AFB, MS
Attachments: MDWFP Approval page signed 2017.pdf
Categories: Yellow Category, Purple Category, Orange Category, Green Category, Blue Category

Frank,

Attached is a signed approval page. Let me know if you need anything else. I saved the INRMP document for future use in the event Dr. Polles wants to see it next year before he signs it.

Thanks for your cooperation.

Dennis Riecke
Fisheries/Environmental Coordinator
Certified Fisheries Professional
Certified Public Manager
Mississippi Dept. of Wildlife, Fisheries, & Parks
1505 Eastover Drive
Jackson, MS 39211-6374
v. 601-432-2207
f. 601-432-2203
dennisr@mdwfp.state.ms.us

-----Original Message-----

From: LOCKHART, FRANK D GS-12 USAF AETC 14 CES/CEIE [mailto:frank.lockhart@us.af.mil]
Sent: Tuesday, May 16, 2017 3:31 PM
To: Dennis Riecke
Subject: RE: USFS & MDWFP Review - Integrated Natural Resources Management Plan for Columbus AFB, MS

Dennis,

I was informed today that not only did the INRMP review needed to be signed but also the INRMP signature sheet. Do you foresee any problems if I sent the page via email and for you and Dr Pollard to sign??

Frank Lockhart

Confidentiality Notice: The information contained in this email and/or document(s) attached is for the exclusive use of the individual named above and may contain confidential, privileged and non-disclosable information. If you are not the

LOCKHART, FRANK D GS-12 USAF AETC 14 CES/CEIE

From: David Felder <david_felder@fws.gov>
Sent: Friday, May 26, 2017 10:25 AM
To: LOCKHART, FRANK D GS-12 USAF AETC 14 CES/CEIE
Subject: [Non-DoD Source] RE: INRMP Signature Page 2015
Attachments: 20090819_R4 delegation for INRMP signature.pdf; columbusairforce_inrmp2015.pdf

Frank,

Updated signature page. I changed regional office director to our field supervisor, as he has signature authority for INMPs. I'm included our regional office delegated signature guidance as well for your records.

Let me know if have additional questions.

Thanks
David

David Felder
Supervisory Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Mississippi Ecological Services Field Office
6578 Dogwood View Parkway
Jackson, MS 39213
Office: (601) 321-1131
Email: david_felder@fws.gov

NOTE: This email correspondence and any attachments to and from this sender is subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties.-----Original Message-----

From: LOCKHART, FRANK D GS-12 USAF AETC 14 CES/CEIE [mailto:frank.lockhart@us.af.mil]
Sent: Wednesday, May 17, 2017 5:10 PM
To: Dennis Riecke (DennisR@mdwfp.state.ms.us); David Felder
Subject: INRMP Signature Page 2015

I need signatures for the attached. This will go in the 2015 INRMP as I mentioned in my earlier email.

Frank Lockhart

1.0 EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) is a comprehensive guide for natural resource management for the 14th Flying Training Wing (FTW) at Columbus Air Force Base (AFB) in Mississippi. The Plan is to be implemented over the 5-year period of 2005 through 2009. This INRMP represents a commitment by the U.S. Air Force (AF) to protect the integrity and value of the natural resources for Columbus AFB. The purpose of the INRMP is to integrate the Air Force mission with an interdisciplinary approach to ecosystem management of natural resources at Columbus AFB. The comprehensive goal of ecosystem management for installations under the command of the 14 FTW is to maintain and improve the sustainability and biological diversity of native ecosystems while supporting the military mission. Implementation of the INRMP will help ensure that Columbus AFB continues to support present and future mission requirements while preserving, improving and enhancing ecosystem integrity. A separate INRMP for Shuqualak Auxiliary Airfield (SAA) is found in Appendix H.

This INRMP is focused on the achievement of seven natural resource management goals:

- Goal 1:** Provide a natural resource management program within 14 CES/CEIE that supports the 14 FTW mission while protecting ecosystem diversity to the maximum extent possible;
- Goal 2:** Sustain the Columbus AFB Airfield and surrounding Air Force property in a manner that reduces natural resource impacts to the 14 FTW flying mission;
- Goal 3:** Protect and improve the health and condition of the forest ecosystems at Columbus AFB;
- Goal 4:** Maintain appropriate populations of game or non-game species that are consistent with the 14 FTW mission and Department of Defense (DoD) guidelines of ecosystem management;
- Goal 5:** Protect, maintain and improve water quality in streams and other surface waters of Columbus AFB compatible with the 14 FTW mission;
- Goal 6:** Manage Columbus AFB grounds and landscape trees to provide an aesthetically attractive landscape and optimize their value for energy conservation and reduction of storm water runoff;
- Goal 7:** Provide outdoor recreation opportunities that promote the mental, physical and social well being of installation personnel, both military and civilian.

The INRMP goals were formulated from a comprehensive analysis of regulatory requirements, the current condition of the natural resources on Columbus AFB and a consideration of the value of these resources to the people who live and work on the installations. Chapter 8 identifies the specific objectives and projects that will be implemented annually to achieve each goal. Chapter 9 contains the annual projects work plan.

This INRMP is prepared according to Air Force Instruction (AFI) AFI 32-7064, *Integrated Natural Resources Management*. The INRMP is prepared by the 14 CEIE Environmental Element (CES/CEIE), endorsed by the 14 FTW Energy, Environmental, Safety and Occupational Health Council (EESOHC) and approved by the Wing Commander. The INRMP will be implemented under the direction of the 14 CES/CEIE conservation manager. Over the long term, implementation of this INRMP and future revisions of the INRMP will support 14 FTW military operations by ensuring the sustainability of the land and its ecosystems. Only certain projects will require separate environmental assessments (EAs) for their implementation due to their size.

2.0 GENERAL INFORMATION

2.1 Purpose of the Plan

This *Installation Natural Resource Management Plan* (INRMP) was prepared to assist in the conservation of natural resources on Columbus AFB. The INRMP provides the means for the 14 FTW to achieve the goals of conservation and management of installation natural resources. The INRMP integrates an interdisciplinary approach to ecosystem management with planning for the military mission. The INRMP enables managers to accomplish the following:

- Be aware of the past, present and projected future condition of installation natural resources;
- Realize management issues and concerns for natural resource conservation;
- Understand the installation goals and objectives for the protection and enhancement of these resources;
- Ensure that management activities are consistent with laws to protect natural resources; and
- Ensure integration of the natural resource conservation program with the Air Force mission.

The INRMP is a component of the Base Comprehensive Planning Process for the 14 FTW and supports other component plans, such as the *General Plan*, *Pest Management Plan*, *Bird/Wildlife Aircraft Strike Hazard (BASH) Plan*, *Cultural Resources Management Plan* and other essential plans by ensuring that natural resource conservation is integrated into all phases of installation planning and operations.

The 14 FTW is a dynamic organization that must frequently adjust operations to accommodate a constantly changing Air Force mission. Any mission changes or future development that is implemented through the base comprehensive planning process will impact the land in one way or another. This INRMP will be used as a tool for determining the environmental constraints to new development and for assessing the impacts that any new development may have on natural resources.

2.2 Scope and Authority

The Sikes Act of 1960, (P.L. 86-779) provides for cooperation between the Departments of Defense and the Interior for the protection of natural resources on military lands. On 18 November 1997, as part of the FY98 DoD Authorization Act (P.L. 105-85), Congress passed the *Sikes Act Improvement Amendment* (SAIA), which required the preparation and implementation of an INRMP to support the sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources. Title 16, U.S.C. § 670 *et. seq.*, implements the Sikes Act and states:

“...the Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary, unless the Secretary determines that the absence of significant natural resources on a particular installation makes preparation of such a plan inappropriate.”

As stated previously, the SAIA also requires the INRMP be prepared in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the fish and wildlife agency for the state in which the military installation is located. The cooperation with the USFWS and the state fish and wildlife agency is intended to "reflect the mutual agreement of the parties concerning conservation, protection and management of fish and wildlife resources."

This INRMP for Columbus AFB will focus on the land and its associated land uses within the boundaries of each installation. Air Force Policy Directive (AFPD) 32-70, *Environmental Quality* (20 July 1994) and DoD

Instruction (DoDI) 4715.3, *Environmental Conservation Program* state that natural resources at military installations will be managed through effective planning. In AFPD 32-70, the Deputy Undersecretary of Defense (Environmental Security) states "ecosystem management of natural resources draws on a collaboratively developed vision of desired future ecosystem conditions that integrates ecological, economic and social factors." To effectively integrate ecological, economic and social factors along with the military mission into an effective ecosystem management program, the policy directive further states: "On DoD installations, ecosystem management will be achieved by developing and implementing *Integrated Natural Resources Management Plans* [INRMPs] and insuring that they remain current."

Air Force Instruction AFI 32-7064, *Integrated Natural Resources Management* implements the Sikes Act and the DOD directives by establishing the INRMP as the primary planning document for natural resources at Air Force installations. AFI 32-7064 establishes the installation or wing commander as the signatory authority for approval of the INRMP. The commander's signature on the INRMP commits the Air Force to the goals and objectives of the Plan. Once signed by the cooperating agencies (USFWS and state), the INRMP takes on the status of an interagency compliance agreement.

2.3 Management Philosophy

The guiding principle behind the development of this INRMP is ecosystem management. The comprehensive goal of ecosystem management on 14 FTW installations is to maintain and improve the sustainability and biological diversity of native ecosystems while supporting the Air Force mission, legal requirements and the needs of the military community. Managing ecosystems will involve addressing the environment as a complex system of interrelated components rather than a collection of isolated units. Military operations, for example, are essential components of the installation's environment. Successful ecosystem management on 14 FTW installations will therefore require environmental managers to consider the military mission, environmental laws, base and surrounding community values, economics and adjacent land uses in addition to the biological environment.

The INRMP was developed using an interdisciplinary team of planners, scientists and other specialists. Air Force personnel included individuals from the 14 CES/CEIE, Environmental Element and the Headquarters Air Force Center for Engineering & the Environmental/Environmental Conservation (HQ AFCEE/EC) Forester. Assistance was obtained from operations personnel at the installation both in obtaining resource information and in reviewing the INRMP document. The Mississippi Department of Wildlife, Fisheries and Parks (MDWFP), the Mississippi Museum of Natural Science (MMNS), the Mississippi Department of Environmental Quality (MDEQ) and federal agencies were consulted during preparation of resource inventories and other parts of the plan.

2.4 Conditions for Plan Implementation and Revision

2.4.1 Implementation

The 14 FTW Wing Commander will implement this INRMP upon review and approval. The INRMP, when approved by the Commander, will serve as the overall guide to management of natural resources at Columbus AFB. The 14 CES/CEIE will implement the plan with oversight from the Energy, Environmental, Safety and Occupational Health Council (EESOHC).

2.4.2 Revisions

The INRMP will be reviewed annually and updated every five years. Updates will also be required in the event of a major mission change or in the event that a significant new resource is identified, such as the discovery of a protected species. Interim requests for plan revision may be submitted at any time to the

EESOHC through the 14 CES/CEIE. The 14 CES/CEIE will review proposed revisions to the INRMP and, when necessary, recommend changes to the EESOHC. The EESOHC will approve most interim INRMP revisions. The 14 FTW Wing Commander must approve major revisions, i.e., a revision to a stated goal or objective of the INRMP. Further, by way of the EESOHC, decisions related to land use that would not normally be evaluated for environmental impact will be brought to the attention of all key organizations on the installation.

2.5 Responsibilities

Responsibilities associated with INRMP implementation and compliance is as follows:

- The 14 FTW Wing Commander is responsible for ensuring that base-assigned and tenant units comply with the laws and requirements associated with the management of natural resources and that funding and staffing are sufficient to accomplish the projects and objectives of the INRMP,
- The 14 FTW Wing Commander approves the INRMP along with its annual updates and revisions. In addition, the EESOHC ensures that 14 FTW organizations comply with the plan,
- The Base Civil Engineer (BCE) is responsible for the preparation, maintenance and day-to-day implementation of the INRMP and is the focal point for all plan actions and issues. The BCE also establishes mechanisms to review and analyze the impacts using the Air Force Environmental Impact Analysis Process (EIAP) for all proposed actions of the INRMP and makes recommendations based on the analysis to the EESOHC for approval or disapproval,
- The 14 CES/CEIE Conservation Manager have primary responsibility for natural resources management. The Conservation Manager is the principal point-of-contact for determining consistency of proposed actions and projects with the INRMP. Table 2.5-1 below summarizes Air Force Natural Resource Management Responsibilities at Columbus AFB.

Table 2.5-1 Air Force Natural Resource Management Responsibilities

Group	Squadron	Flight/Staff	Responsibilities
Wing Staff	14 FTW/CC	Wing Commander	Chairman, EESOHC
	14 FTW/JA	Judge Advocate	Regulatory Interpretation Off-Base Disputes/Complaint Resolution Legal Representation
	14 FTW/SE (Flying Training Wing)	Wing Safety	BASH Monitoring and Minimization (on and off base) Deer Removal From Airfield
	14 MDOS/OAM	Military Public Health	Zoonosis Monitoring Mosquito Population Monitoring

Table 2.5-1 Air Force Natural Resource Management Responsibilities, Continued

Group	Squadron	Flight/Staff	Responsibilities
Operations Support Squadron	Airfield Operations 14 OSS/OSAA	Airfield Management	BASH Monitoring and Minimization
Mission Support Group	14CES/CEC (CEC)	Engineering	Storm Water/Erosion Control and Landscaping Specifications for New Construction
	CE 14 CES/CEO	Operations	Oil/Water Separator Maintenance General Grounds Maintenance Environmental Controls Airfields Grounds Maintenance (mowing)
	14 CES/CEIE	Environmental	Conservation Management Cultural Resources Management Hazmat/Hazwaste Management Installation Restoration Program Air Quality Monitoring/Compliance Environmental Impact Assessment Process Storm Water Management Pollution Prevention Clear Zone Tree Removal
	14 MSG/FSS Services	Golf Course	Golf Course Grounds Maintenance
Outdoor Recreation		Outdoor Recreation Equipment Rental/Check Out	

*National Pollutant Discharge Elimination System

2.6 National Environmental Policy Act Documentation

The INRMP may require review according to AFI 32-7061, EIAP, which provides guidelines for meeting the requirements of the National Environmental Policy Act (NEPA) of 1969 (USAF 1995a). Although an Environmental Assessment (EA) is generally not necessary for most INRMP projects due to their small scope (i.e. construction of watchable wildlife decks, etc.), to facilitate environmental documentation for a limited number of specific projects, an EA may be required for certain large-scale projects. Any subsequent actions at Columbus AFB involving specific sites or mission changes may be subject to separate review under NEPA. A NEPA review would be performed by 14 CES/CEIE.

3.0 INSTALLATION OVERVIEW

3.1 Location and Area

CAFB is located in Lowndes County, northeastern Mississippi, approximately nine miles north of Columbus, Mississippi, 60 miles west of Tuscaloosa, Alabama, 125 miles northeast of Jackson, Mississippi, and 125 miles southeast of Memphis, Tennessee (Figure 3.1-1). The installation is accessible by a state highway and local road systems, the Golden Triangle Regional Airport and interstate bus service. Figure 3.1-2 provides a map of CAFB.

3.2 Installation History

For nearly five decades, CAFB has played a major role in the challenges facing our nation and the Air Force. The base trained pilots for World War II and the Korean War. The base was also active during the Cold War era and during the Vietnam War.

On 26 June 1941, the War Department approved an Army airfield for the Columbus area. Soon thereafter (12 August), a tract of land for the airfield was leased to the United States. This approval and arrangement culminated months of concerted efforts by local citizens. Lt Col Louie Mallory, commandant of the new facility, arrived with the Army engineers to begin construction on 8 September. Support troops arrived the following month to set up billeting.

In January 1942, shortly after the attack on Pearl Harbor, 100 enlisted men arrived to man the first skeleton organizations of the base. On 22 January 1942, the War Department's adjutant general announced that the installation's name would be Kaye (pronounced "coy") Field in honor of the Columbus-born World War I Captain Sam Kaye, who flew with Eddie Rickenbacker and was credited with shooting down eight German planes. Due to confusion with Key Field, a training center in Meridian, Mississippi, the field's name was changed to Columbus Army Flying School in April 1942.

On 9 February 1942, instruction began for 25 cadets who had already completed most of their training at Barksdale Field, Louisiana. The first graduates received their silver wings on 6 March 1942. During World War II, a total of 7,766 students came to Columbus for pilot training; 7,412 of these received their wings and commissions. The school experienced 181,000 hours of continuous flying without a fatal accident, earning the "Wings for Victory" safety award in 1943 and 1944. Aircraft types AT-8s, AT-9s, AT 10s, Lockheed Hudson's and later, B-25s, were all used at different times at the training facility throughout the World War II period. When the war ended in 1945, the base's strength had peaked at 300 officers, 2,300 enlisted men and an average of 250 pilot cadets per class.

With the end of World War II, training activities slowed significantly. In 1946, the base was designated a primary pilot school. However, later that year, the field was deactivated and remained so until fighting broke out in Korea in 1950. In March of that year, the field, now called Columbus Air Force Base, was reopened as a contract flying school operated by California Eastern Airways, Inc. During the Korean conflict, CAFB provided both primary and basic flight training under the supervision of the U.S. Air Force Air Training Command (USAF ATC). In 1954, California Eastern Airways began to phase out its operations in Columbus and moved to Moore AFB in Mission, Texas. The Air Training Command relinquished CAFB to Strategic Air Command's (SAC's) Second Air Force on 1 April 1955 and the 4228th Air Base Squadron (ABS) was organized.

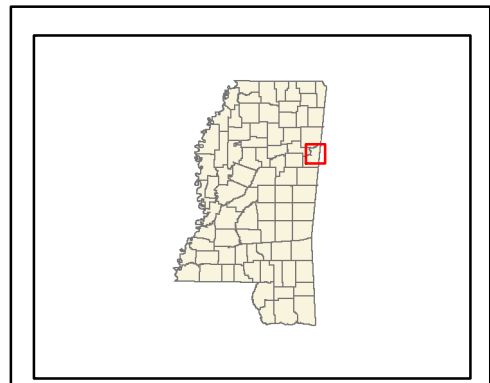
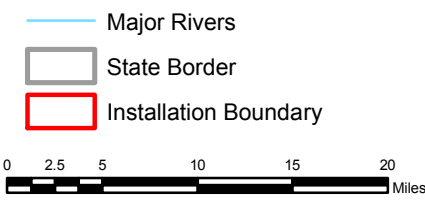


Figure 3.1-1
Vicinity Map



FINAL

INRMP
Columbus AFB, MS

J.M. WOLLER
ASSOCIATES
MANAGING THE VISION

DATE: JUNE 2005

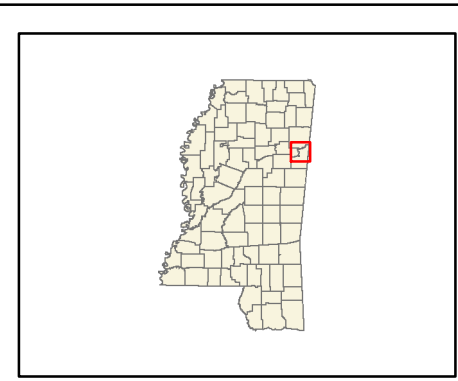
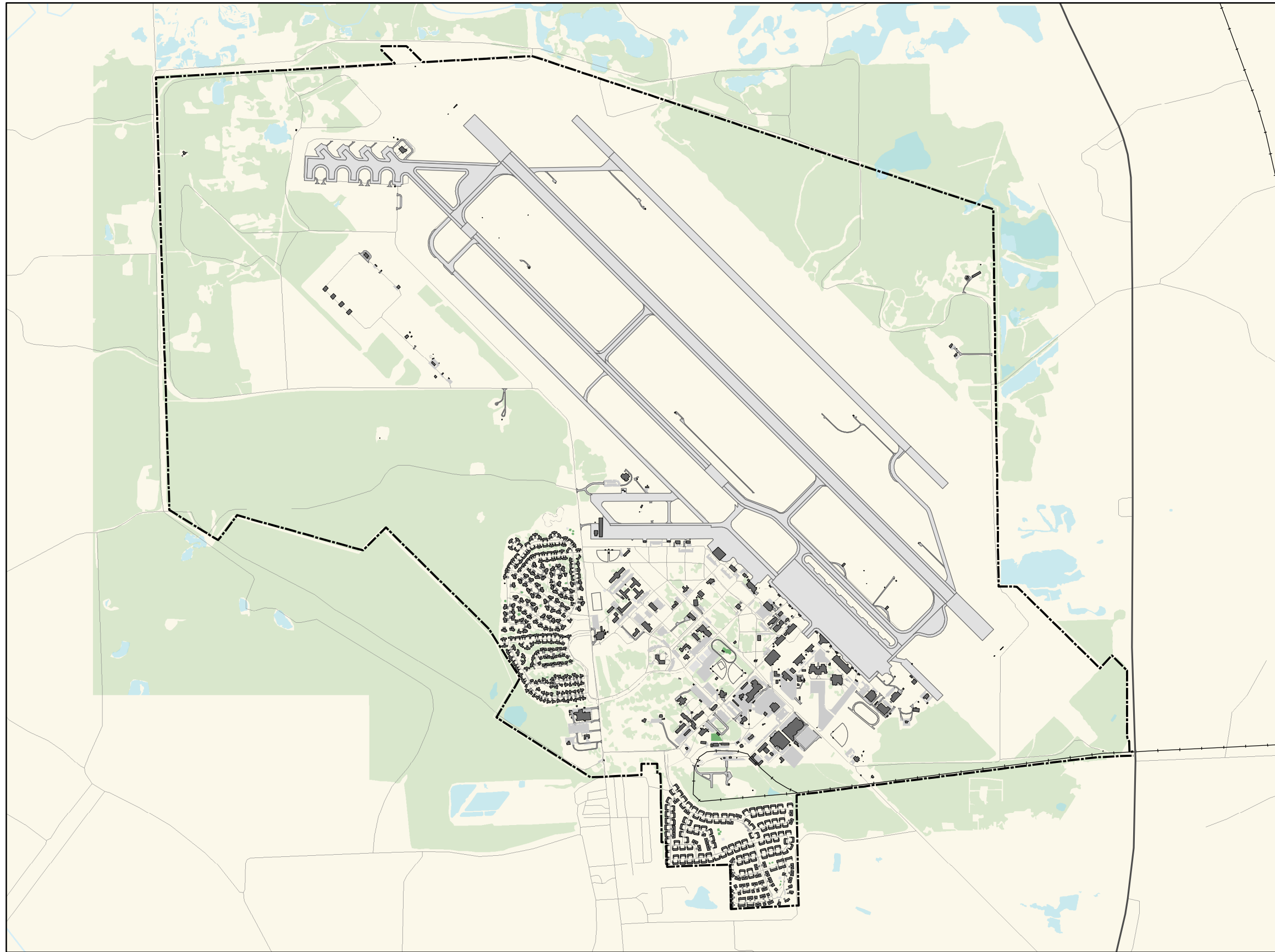
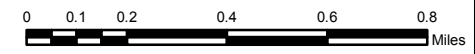


Figure 3.1-2
Installation Map



- Primary Roads
- Secondary Roads
- +— Railroads
- Water Bodies
- Vegetation
- Buildings
- Airfield
- - - Installation Boundary



FINAL

INRMP
Columbus AFB, MS



In December 1957, SAC announced that CAFB would become the home of a B-52 squadron and a KC-135 jet refueling tanker squadron. The 4228th ABS was reorganized into the 4228th Strategic Wing, later to become the 454th Bombardment Wing. The first KC-135 of the 901st Air Refueling Squadron, piloted by the wing commander, touched down on the refurbished two-mile center runway on 7 January 1959. It was followed on 28 May 1959 by the first B-52s from the 492nd Bombardment Squadron at Carswell AFB, Texas. From 1965 to 1968, CAFB aircraft and personnel deployed to the western Pacific in support of U.S. military operations in Vietnam. After 14 years as a SAC base, the wing began phasing down for deactivation in May 1969. With deactivation of the 454th Bombardment Wing on 1 July 1969, jurisdiction of CAFB was returned to the ATC.

When the 3650th Pilot Training Wing (PTW) assumed command in 1969, CAFB returned to its original mission of training pilots. The 3650th PTW was deactivated 1 June 1972, and the 14th Flying Training Wing (FTW) was activated in its place.

3.3 Military Mission

The primary mission of CAFB is to train American and allied officers to fly jet-powered aircraft. The current mission at CAFB is to provide Specialized Undergraduate Pilot Training (SUPT) for USAF personnel, as well as students from foreign countries. Aircraft used in training are T-1A Jayhawk, T-6 and T-38 Talon. The 14 FTW provides support for administrative, transportation and supply, civil engineering, communications, security, financial, religious, educational, legal, social and medical services, as well as morale, welfare and recreational facilities and activities. Officers and Airmen, throughout the base, perform primary and support roles that are of vital importance to mission accomplishment.

3.4 Surrounding Communities

Communities in the area surrounding CAFB include Starkville and West Point. Starkville is a college town, home of Mississippi State University, 20 miles to the west of the City of Columbus. This community has evolved into a technological and research center for the state. West Point is located in the rolling black prairie hills of northeast Mississippi, approximately 20 miles northwest of CAFB. This community is currently a balance of business, industry, education, and agriculture. Other nearby communities includes Amory (30 miles north of the city of Columbus), Aberdeen (20 miles north of the city of Columbus) and Tupelo (60 miles north of the city of Columbus). Table 3.4-1 below provides a summary of selected demographic information for cities and towns in the surrounding area (U.S. Census Bureau 2000 Demographic Profiles).

Table 3.4-1 Demographic Profiles

City	Population	Median Family Income	Percent of Families Below Poverty Level	Percent of Persons Holding Bachelor's Degree or Higher
Aberdeen	6,415	\$27,611	26.3	14.7
Amory	6,956	\$37,891	17.1	15.7
Columbus	25,944	\$32,596	21.0	22.9
Columbus AFB	2,060	\$40,602	7.2	49.9
Shuqualak	562	\$26,607	30.7	9.5
Starkville	21,869	\$39,557	18.1	45.8
West Point	12,145	\$32,943	21.5	17.0

Source: U.S. Census Bureau 2000 Demographic Profiles

CAFB has relationships with several community organizations, including (but not limited to) the CAFB Community Council, the Columbus-Lowndes, Military Affairs Committee, the Columbus-Lowndes Economic

Development Association, the City of Columbus, the Lowndes County Board of Supervisors and the Mississippi Department of Economic and Community Development.

3.5 Regional Land Use

According to the Mississippi Department of Environmental Quality (2004), land uses in the Tombigbee River Basin are urban, forest, agriculture, pasture, disturbed (gravel and strip mining), wetlands and water. In addition, there is transportation by rail and the Tennessee-Tombigbee Waterway, manufacturing and industry. In addition, wetlands comprise about seven percent of the Tombigbee River Basin land area.

3.6 Local and Regional Natural Areas Profile

Natural areas in the vicinity are Tombigbee National Forest, Noxubee National Wildlife Refuge and Legion State Park. The 66,000-acre Tombigbee National Forest is made up of two units and offers campgrounds, swimming and fishing lakes and trails for biking, hiking and horseback riding. About 40,000 acres are on the Ackerman Unit and the other 26,000 acres are on the Trace Unit. The Ackerman Unit is closest to CAFB, is located in Winston, Choctaw and Oktibbeha counties, and is bounded by a triangle of towns: Ackerman, Starkville and Louisville. The Trace Unit is located east of Houston, Mississippi, in Chickasaw and Pontotoc counties. It skirts the Natchez Trace Parkway, which is located about 27 miles west of Columbus (www.fs.fed.us/r8/tombigbee). Figure 3.6-1 shows the location of local and regional natural areas.

Adjacent to the national forest is the Noxubee National Wildlife Refuge (NWR). The office for the 48,000-acre NWR is located in Brooksville, Mississippi. The refuge serves as a resting and feeding area for migratory birds and as an example of proper land stewardship. The refuge is managed intensively for the endangered red-cockaded woodpecker. The woodpecker is a colonial nester living in social units called clusters. The number of clusters at Noxubee National Wildlife Refuge has doubled in the last ten years and the refuge staff is very proud of this fact (<http://noxubee.fws.gov/>).

The Tombigbee National Forest (Ackerman Unit) is approximately 43 miles ("as the crow flies") southwest of CAFB and can be reached by traveling west on U.S. Highway 82 to Starkville and traveling southwest on State Highway 25 that runs between Starkville and Louisville. The National Forest, the NWR and Legion State Park are all located in the same general area.

In addition, there is the 150-acre Lake Lowndes Park in Columbus, which offers opportunities for fishing, camping and sports. Cabins, picnic facilities, nature, bike and equestrian trails are also available. Lake Lowndes also features a nature trail with a brochure outlining the plants, trees and wildlife along the trail.

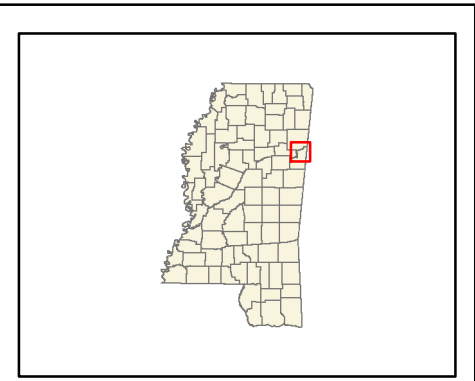
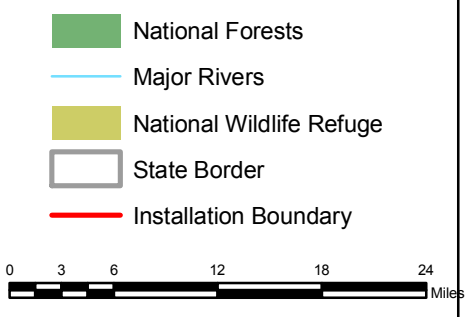


Figure 3.6-1
Local and Regional Natural Areas



FINAL

INRMP
Columbus AFB, MS



DATE: JUNE 2005

4.0 GENERAL PHYSICAL ENVIRONMENTS

4.1 Climate

The climate is roughly uniform throughout the Southern Mixed Forest Province, which includes Columbus AFB. Mild winters and hot, humid summers are the rule; the average annual temperature is 60° to 70°F (15° to 21°C). The growing season is long (200 to 300 days) but frost occurs nearly every winter. Precipitation, which averages from 40 to 60 inches (1,020 to 1,530 mm) annually, is rather evenly distributed throughout the year but peaks slightly in midsummer or early spring, when it falls mostly during thunderstorms. Precipitation exceeds evaporation but summer droughts occur. Snow rarely falls and melts almost immediately.

The climate in the region of Columbus AFB is similar to the rest of the province. The U.S. Weather Bureau Station in the city of Columbus has recorded over 70 years of precipitation, temperatures and frost data. The highest recorded temperature occurred in July 1930 (113° Fahrenheit [F]); the lowest in January 1940 (-7° F). Severely cold weather seldom occurs; subfreezing temperatures are of short duration. January is the coldest month having an average temperature of 42° F and an average high of 52° F. The average date of the first "killing" frost is 15 November; the last in spring is 7 March. The earliest recorded killing frost occurred on 11 October, the latest on 26 April. The summer's high temperatures reach the upper 80s and lower 90s. The average growing season in the Columbus AFB area is 235 days or eight months.

Columbus, Mississippi has an average annual precipitation of 57 inches with spring being the wettest period and fall the driest. The average annual relative humidity is 56 percent. The area frequently receives heavy thundershowers, occasionally accompanied by heavy winds and/or tornadoes. Snowfall is generally light, averaging about 1.8 inches per year. See Table 4.1-1 for Columbus AFB precipitation data for the years 2003 and 2004.

Table 4.1-1 Climate Summary for Columbus AFB

2004	Month	Jan	Feb	Mar	Apr	May
Temp. (°F)	Extreme Maximum	70	70	79	86	91
	Average Maximum	50	51	67	75	79
	Extreme Minimum	16	25	30	34	52
	Average Minimum	30	36	46	54	64
	Mean Temp.	40	44	56	64	71
Precip.	Monthly Total	2.11	7.43	4.46	7.42	7.04
	24-Hr Maximum	0.73	3.91	2.51	3.31	1.48
	No. Funnel Clouds	0	0	0	1	0
	No. of Thunderstorm Days	0	1	2	3	7
	No. of Hail Days	0	0	0	0	0
	No. Of Precipitation Days	6	10	11	8	12
	No. of Snow Days	0	0	0	0	0
Wind (Knots/M/Hr)	Maximum Speed	28/32.28	27/31.1	30/34.5	25/28.8	24/27.6
	Average Peak Wind	16/18.4	18/20.7	19/21.8	18/20.7	17/19.6
	Average Direction	250	170	230	230	203

Temp. - Temperature

M/Hr - Miles per hour

Source of Weather Data - Columbus AFB

No. - Number

Precip. - Precipitation

(°F) - Degrees Fahrenheit

Table 4.1-1 Climate Summary for Columbus AFB, Continued

2003	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp. (°F)	Extreme Maximum	86	72	81	86	91	93	93	93	91	86	91	66
	Average Maximum	49	55	67	75	79	85	87	89	85	75	68	54
	Extreme Minimum	10	27	30	34	52	52	63	66	48	36	25	27
	Average Minimum	32	40	49	54	64	67	71	72	63	49	48	35
	Mean Temp.	40	47	58	64	71	76	79	81	74	62	58	45
Precip.	Monthly Total	3.97	10.90	3.69	7.42	7.04	10.30	6.87	8.47	1.77	2.14	4.68	5.58
	24-Hr Maximum	2.38	2.40	1.09	3.31	1.48	4.32	1.53	2.64	0.85	1.02	1.41	2.30
	No. Funnel Clouds /Tornados	0	0	0	1	0	0	0	0	0	0	0	0
	No. of Thunderstorm Days	0	2	5	3	7	6	12	9	2	1	1	0
	No. of Hail Days	0	1	0	0	0	0	0	0	0	0	0	0
	No. Of Precipitation Days	9	14	9	8	12	12	13	11	3	6	5	7
	No. of Snow Days	3	0	0	0	0	0	0	0	0	0	0	0
Wind (Knots/M/Hr)	Maximum Speed	25/28.8	43/39.1	34/39.1	35/40.3	31/35.7	28/32.2	38/43.7	43/49.5	28/32.2	28/32.2	43/49.5	29/33.4
	Average Peak Wind	18/20.7	19/21.8	18/20.7	19/21.9	31/35.7	28/32.2	38/43.7	17/19.6	14/16.1	14/16.1	16/18.4	19/21.9
	Average Direction	250	170	200	190	360	250	320	190	210	220	240	200

Temp. - Temperature

No. - Number

Precip. - Precipitation

M/Hr - Miles per hour

(°F) - Degrees Fahrenheit

Source of Weather Data - Columbus AFB

4.2 Landforms

Columbus AFB is located just to the east of the Tennessee-Tombigbee Waterway in the Black Plains area of northeast Mississippi. Soils in the area have very poor internal drainage. The installation lies on the western edge of the Tombigbee Hills physiographic belt of the Upper Coastal Plain. The Buttahatchee River is located to the north of Columbus AFB. Columbus AFB is at an elevation of 219 feet above MSL. Low, smoothly rounded hills up to 50 feet above base elevations and larger hills and ridges with a relief up to 200 feet characterize the region. Surface elevations above MSL on Columbus AFB range from approximately 178 feet in the northwest corner of the installation to 223 feet in the southeast section of the base. Depositional and erosion processes in recent geologic periods have altered the natural surface in the Columbus AFB vicinity and are modified by the hydraulic actions of the nearby Tombigbee River and its tributaries.

4.3 Soils and Geology

According to Bailey's 1995 Ecoregions classification, which includes Columbus AFB, ultisols dominate throughout the Southern Mixed Forest Province, with locally conspicuous vertisols formed from marls or soft limestone. Ultisols are deeply weathered yellow or red soils associated with old soils in humid tropical or humid temperate climates. Vertisols are clayey soils that form wide deep cracks when dry. Inceptisols on floodplains of the major streams are among the better soils for crops.

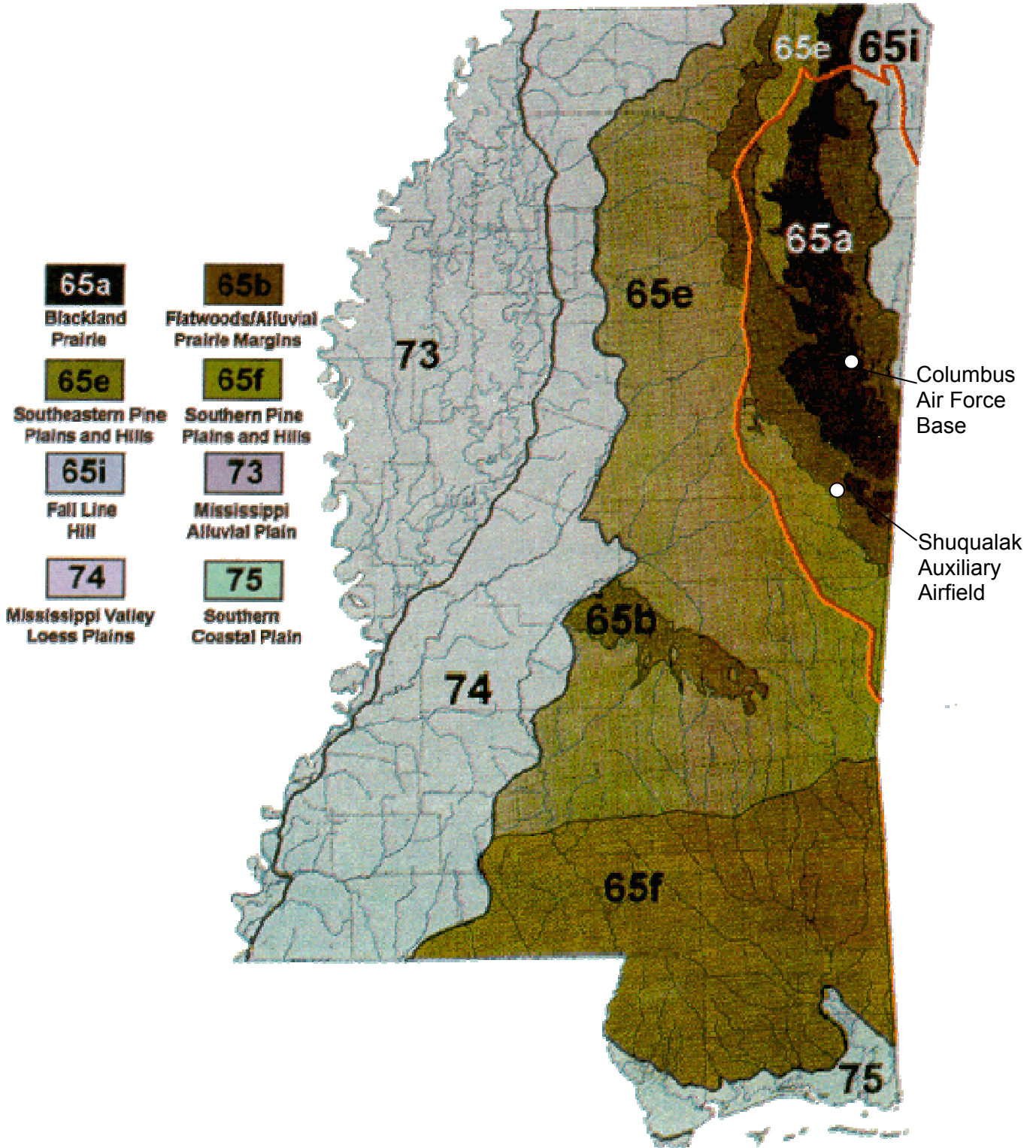
The MDEQ has identified eight ecological regions in Mississippi: Blackland Prairie, Flatwoods/Alluvial Prairie Margins, Southeastern Pine Plains and Hills, Southern Pine Plains and Hills, Fall Line Hill, Mississippi Alluvial Plain, Mississippi Valley Loess Plains and Southern Coastal Plains. Figure 4.3-1 is provided by the MDEQ and shows the different Ecoregions in Mississippi. Columbus AFB is located in the Flatwoods/Alluvial Prairie Margins region (MDEQ 1998).

Wide, flat ridges consist of upland and terrace soils, with level to gently sloping areas surrounded by pan soils with very poor internal drainage. The major upland and terrace soils are primarily Prentiss-Rosella-Steens. Surface layers are made up of fine sandy and silt loams. Subsoil's are usually slightly heavier loams or clays. Some of these soils are underlain at various depths by loamy sands and gravel that begin at depths from 2 to 8 feet, while other soils have fragipans (restrictions) at depths from 12 to 25 inches. These fragipans restrict the vertical movement of water and air in the soils, and thus restrict root growth of many plants. These restrictions tend to cause the soils to be extremely saturated in wet weather and extremely dry in dry weather. The degree of erosion on these soils ranges from none in the lowlands to severe on the uplands. Organic matter content and natural fertility are low, but the soil responds well with fertilizer and is suitable for crops, pasture, and timber. Most soil on Columbus AFB is acidic with a pH of 5.1 to 5.4; exceptions include areas in State Village (pH 7.2) and wooded areas on unimproved grounds (pH 4.8). See Table 4.3-1 and Figure 4.3-2 for information on the different types of soil at Columbus AFB.

Table 4.3-1 Soils at Columbus AFB

Symbol	Description
CaA	Cahaba fine sandy loam, 0-2 percent slopes
CaB	Cahaba fine sandy loam, 2-5 percent slopes
CbA	Cahaba fine sandy loam, 0-2 percent slopes, occasionally flooded
CbB	Cahaba fine sandy loam, 2-5 percent slopes, occasionally flooded
CL	Cahaba-Latonia association, occasionally flooded
Cu	Columbus silt loam
Gy	Guyton silt loam, low terrace
Kn	Kinston loam
Lb	Latonia loamy sand, occasionally flooded
Ld	Latonia -Urban land complex
Ma	Mantachie Loam
PkC2	Pikeville sandy loam, 5-8 percent slopes, eroded
PsD2	Pikeville-Smithdale complex
Pt	Pits
PuA	Prentiss loam 0 to 2 percent slopes
PuB	Prentiss loam 2 to 5 percent slopes
Pw	Prentiss-Urban land complex
Ro	Rosella silt loam
St	Steens fine sandy loam
Ur	Urban land
W	Low inundated areas/wetlands

Figure 4.3-1 Ecoregions of Mississippi. (Tombigbee River Basin highlighted in red.)



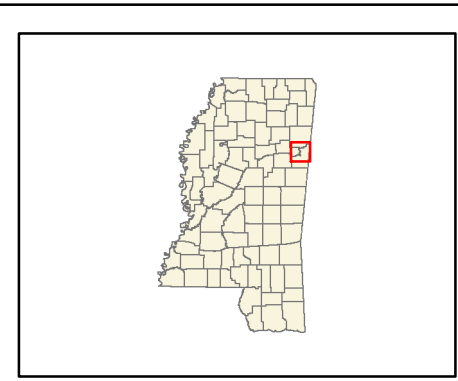
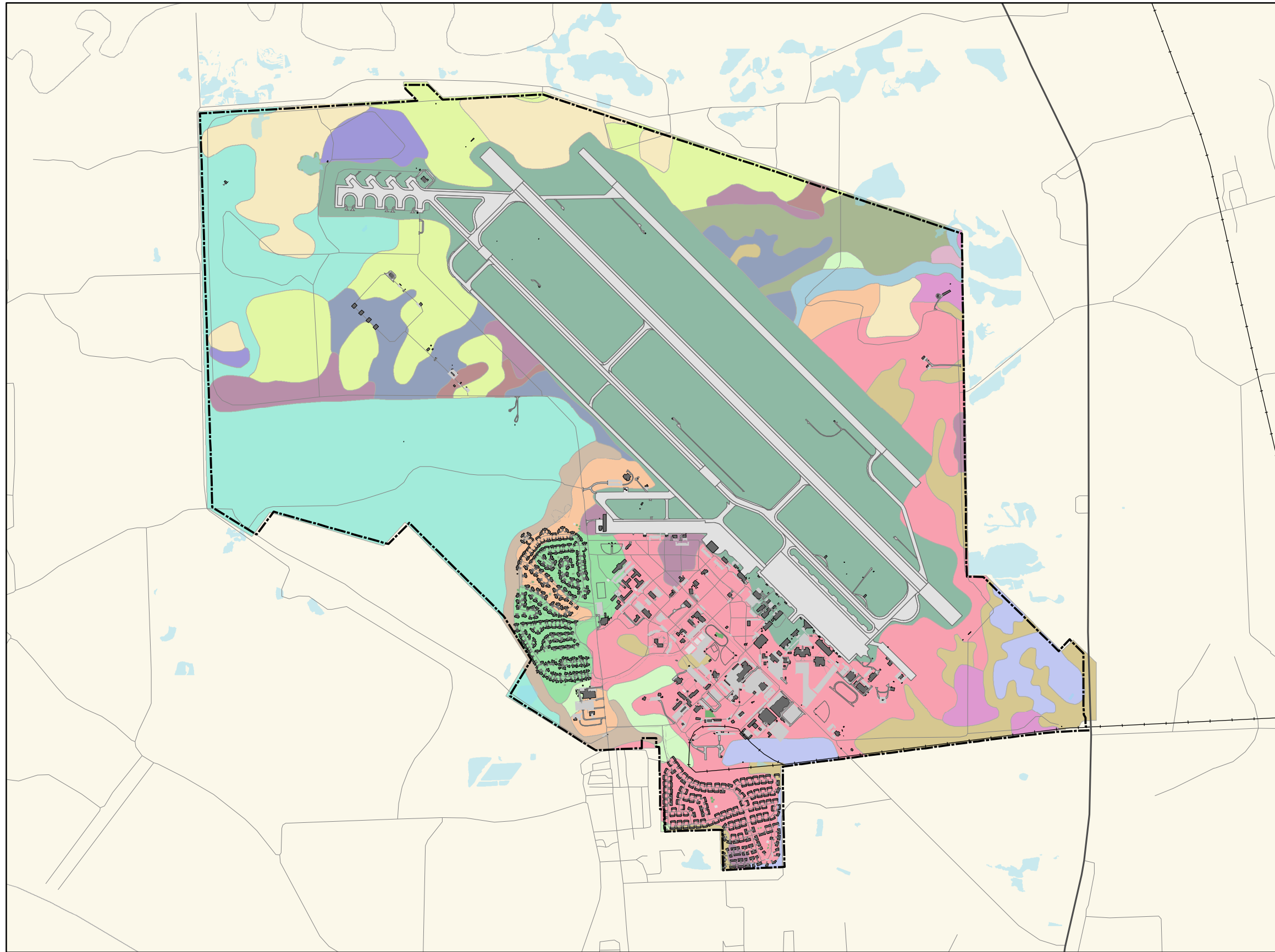
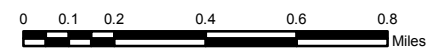


Figure 4.3-1
Soils



- Soils**
- CL
 - CaA
 - CaB
 - CbA
 - Cu
 - Gy
 - Kn
 - Lb
 - Ld
 - Ma
 - PkC2
 - PsD2
 - Pt
 - PuA
 - PuB
 - Pw
 - Ro
 - St
 - Ur
 - W
- Primary Roads
 — Secondary Roads
 — Railroads
 Water Bodies
 Buildings
 Airfield
 Installation Boundary



FINAL

INRMP
Columbus AFB, MS



DATE: JUNE 2005

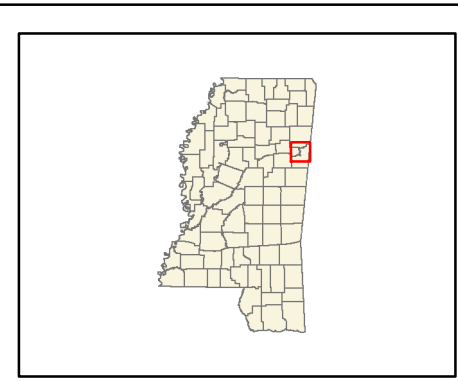
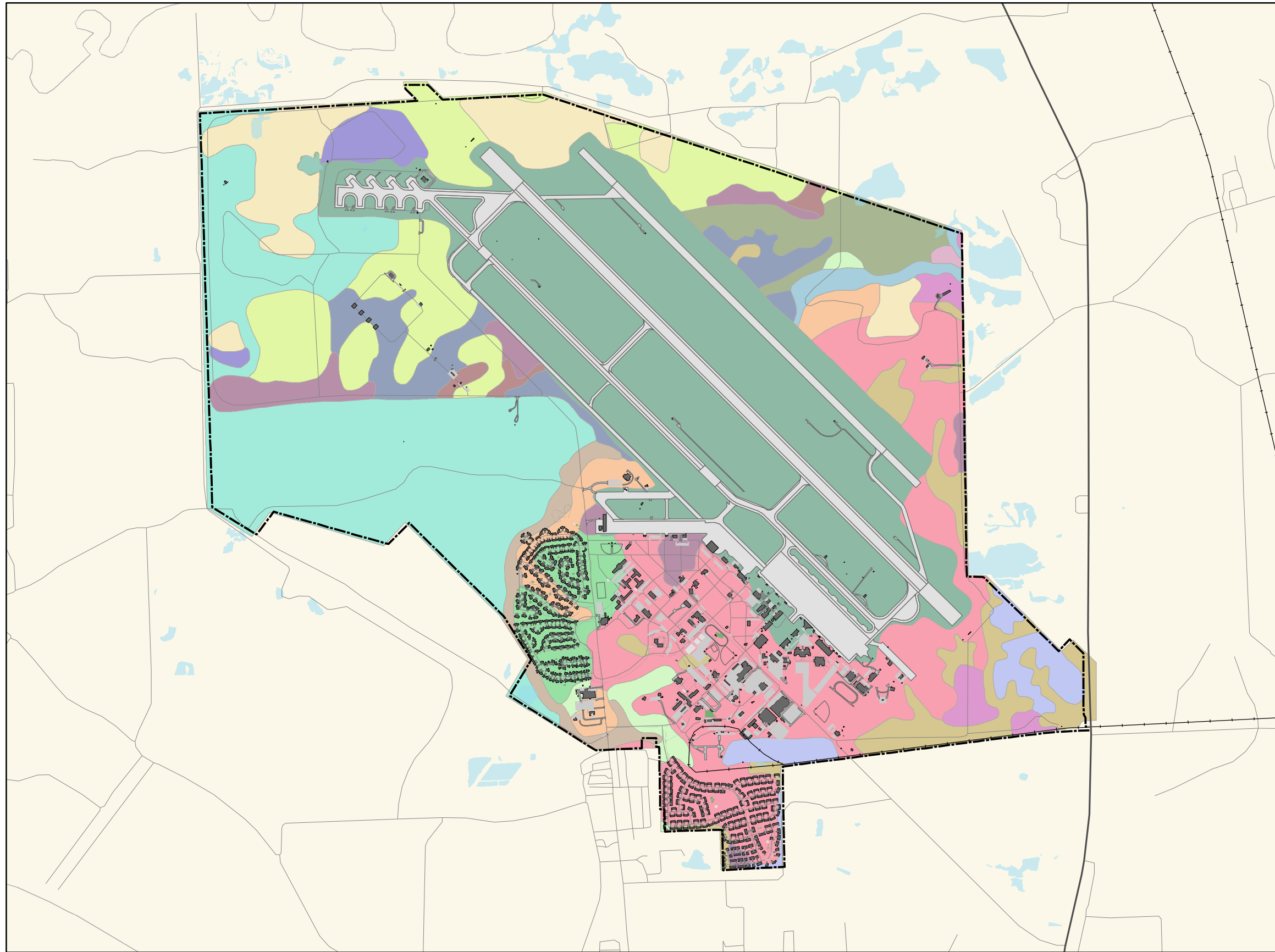
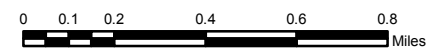


Figure 4.3-2
Soils



- Soils**
- CL
 - CaA
 - CaB
 - CbA
 - Cu
 - Gy
 - Kn
 - Lb
 - Ld
 - Ma
 - PkC2
 - PsD2
 - Pt
 - PuA
 - PuB
 - Pw
 - Ro
 - St
 - Ur
 - W
- Primary Roads
 Secondary Roads
 Railroads
 Water Bodies
 Buildings
 Airfield
 Installation Boundary



FINAL

INRMP
Columbus AFB, MS



DATE: JUNE 2005

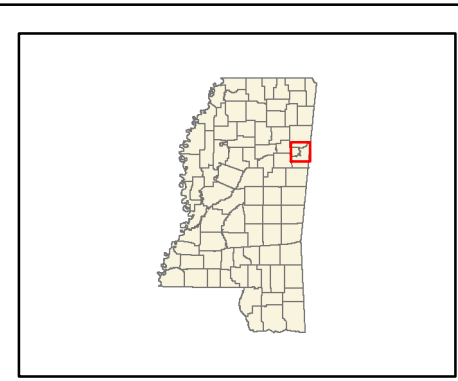
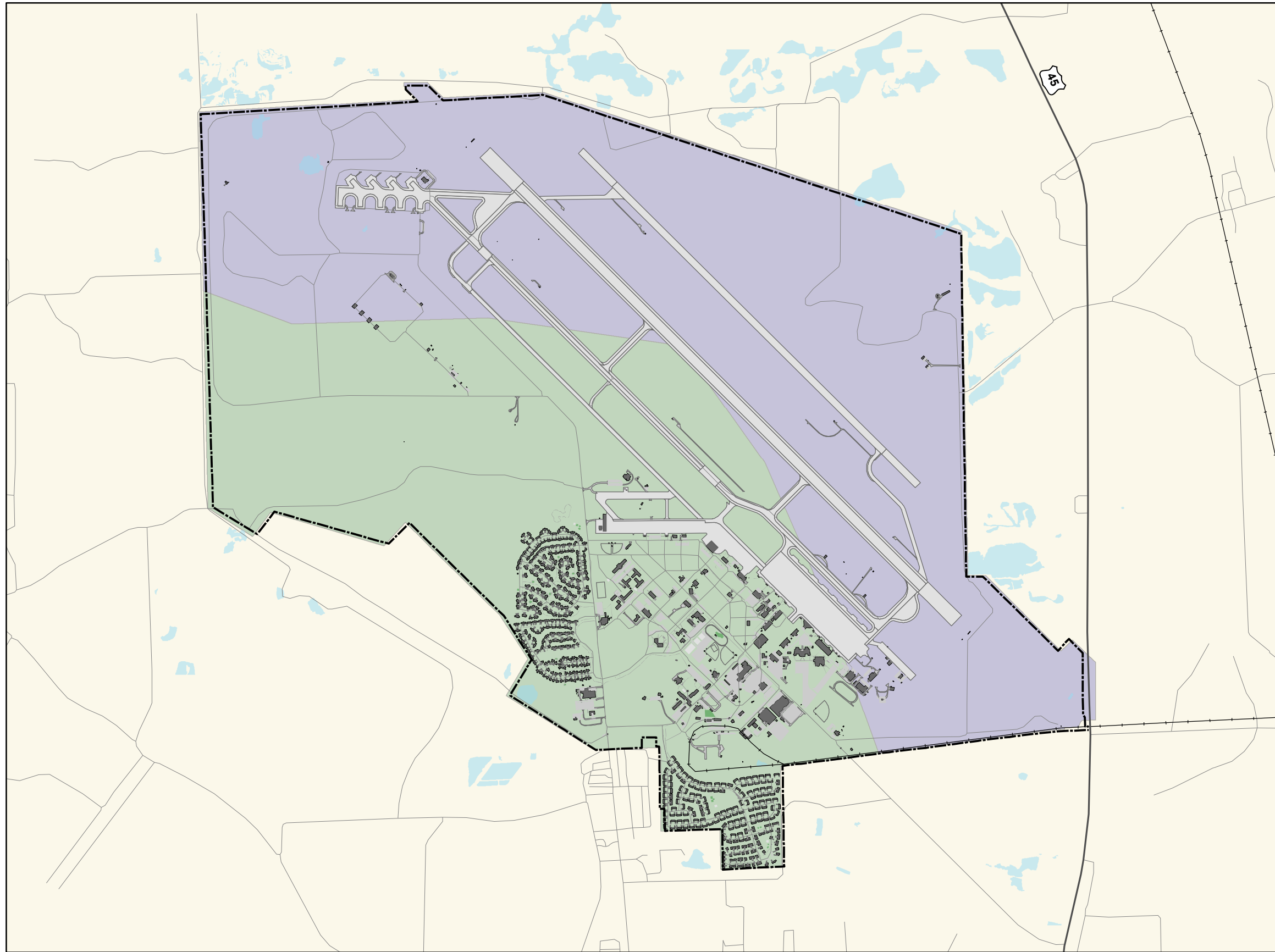
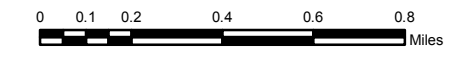


Figure 4.3-2
Surface Geology at CAFB



- Surface Geology**
- Formation**
- Eutaw
 - Eutaw (Tombigbee Sand)
 - Primary Roads
 - Secondary Roads
 - Railroads
 - Water Bodies
 - Buildings
 - Airfield
 - Installation Boundary



FINAL

INRMP
Columbus AFB, MS



Surface geology in the Columbus AFB area consists of shallow Cretaceous-aged Gulf Coast Plains sediment overlain by Quaternary alluvial sediments. The Eutaw Formation, according to the Auburn University website, consists of reddish-tan sand and clay and has two members, the Tombigbee Sand and "Typical" Eutaw. The upper member, the Tombigbee Sand, has fine to medium grained, glauconite, and calcareous sands. Glauconites are iron-rich minerals found in sandstones, limestones, and siltstones that are common in Cretaceous-aged rock. The "Typical" Eutaw member has less glauconite and has a slightly coarser texture than the Tombigbee member has and is associated with clay layers. The Eutaw formation is an aquifer and is used as a source of water for domestic wells near the Base (Parson, 2001).

Figure 4.3-3 shows surface geology at Columbus AFB.

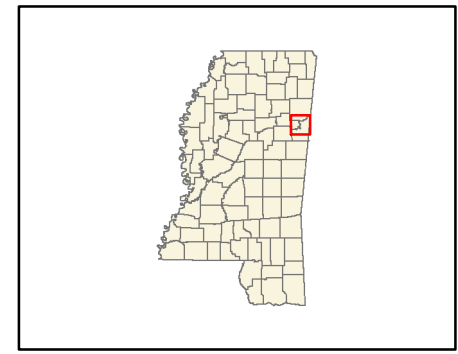
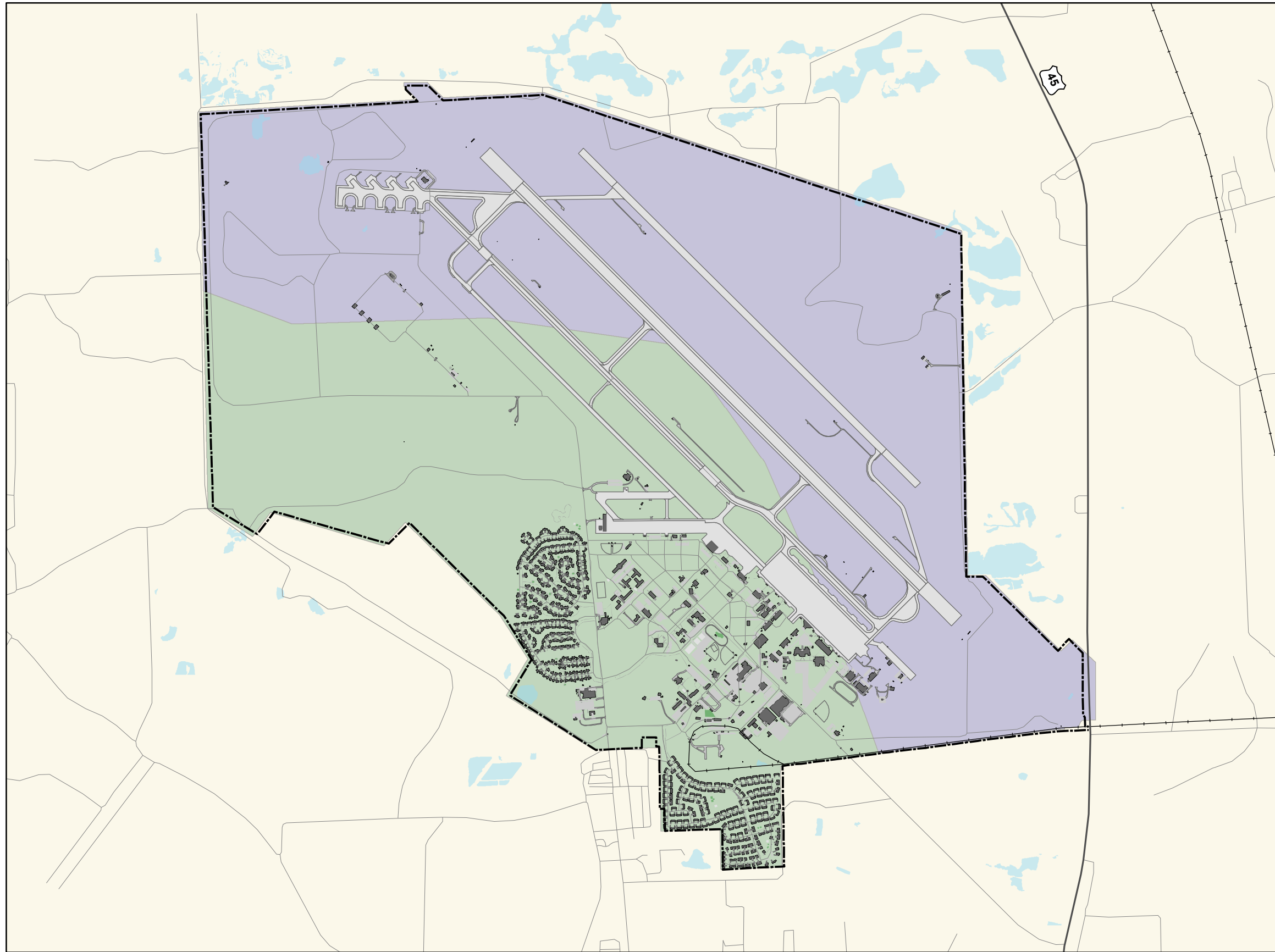
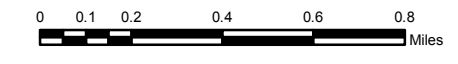


Figure 4.3-3
Surface Geology at CAFB



- Surface Geology**
- Formation**
- Eutaw
 - Eutaw (Tombigbee Sand)
 - Primary Roads
 - Secondary Roads
 - Railroads
 - Water Bodies
 - Buildings
 - Airfield
 - Installation Boundary



FINAL

INRMP
Columbus AFB, MS



4.4 Hydrology

Columbus AFB is part of the Tombigbee River Basin (Figures 4.4-1 and 4.4-2). The basin covers an area of approximately 6,100 square miles in northeastern Mississippi and approximately 7,600 square miles in northwestern Alabama. The Tennessee-Tombigbee Waterway (TTW), a series of dams and man-made canals along with the natural drainages of the original Tombigbee River, connects the waterway to the Mobile River. The waterway is primarily used for commercial and recreational purposes (MDEQ 1998). Major tributaries to the Tombigbee River and the TTW include Town, Chuquatonchee, Chipwapa, and Luxapallila Creeks; and the Sucarnochie, Noxubee and the Buttahatchee Rivers. The Buttahatchee River flows near the northern border of Columbus AFB before joining the Tombigbee River a few miles west of Columbus AFB.

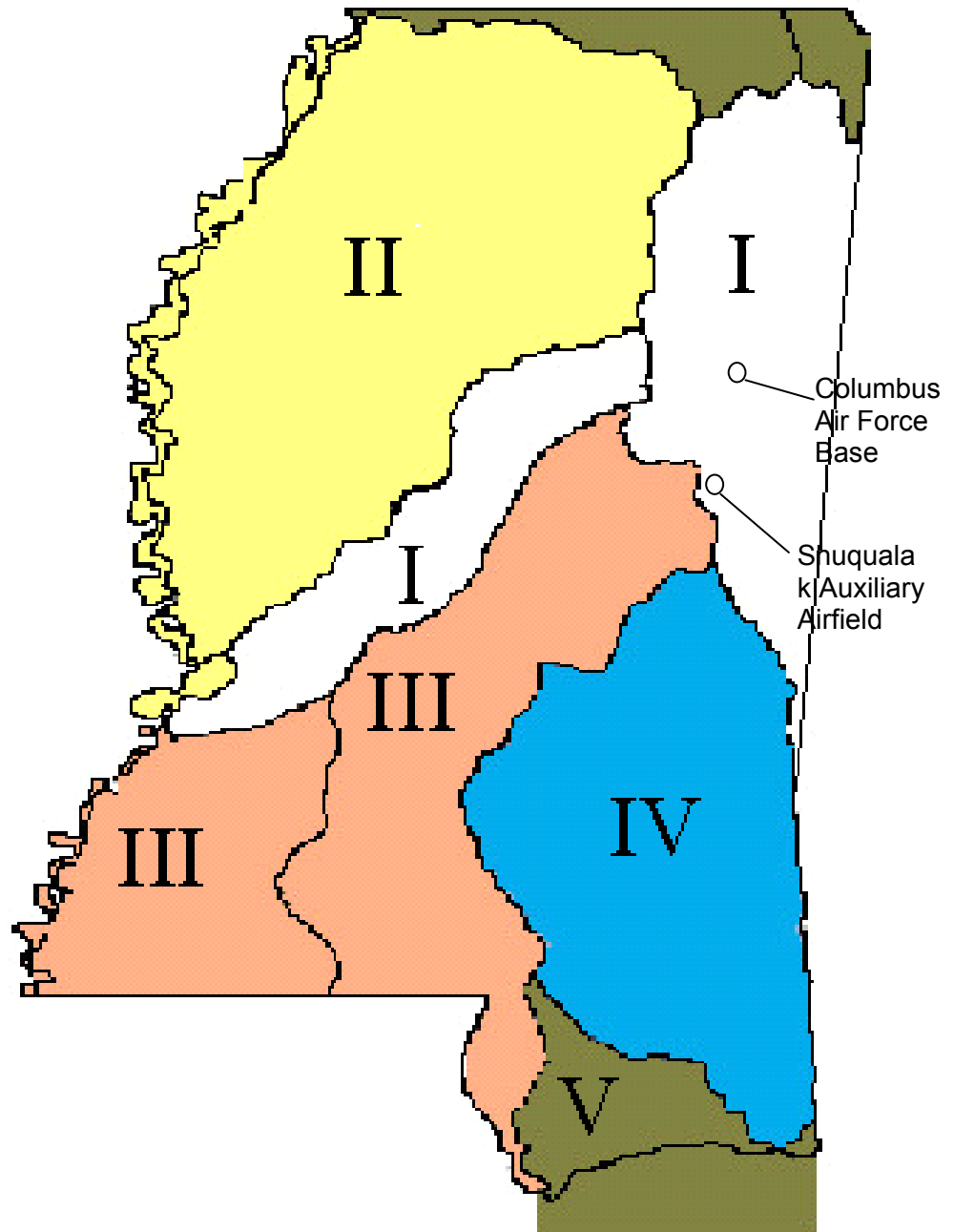
Surface water drainage from Columbus AFB is primarily to the Tombigbee River, with the northeast portion of the installation draining into the Buttahatchee River. Drainage ditches at the southwest corner of the Base drain into Stinson Creek, which feeds into the TTW.

According to MDEQ, impaired water bodies in the Tombigbee River Basin in the vicinity of Columbus AFB (with regard to supporting aquatic life) include the Buttahatchee River, McCrary Creek, Stinson Creek, Town Creek, Spring Creek, Unnamed Tributary of the TTW, segment 1, Unnamed Tributary of the TTW, segment 2, Yellow Creek and Luxapallila Creek.

SAC Lake was created within a former 2-acre borrow pit on Columbus AFB and the water level is maintained by groundwater through a sand and gravel formation. Seasonal impacts to the lake include extended hot summers and occasional drought years that reduce the recharge due to the lowering of the water table. Winter and spring rains cause frequent flooding of this low area by the backwaters of both the Tombigbee and Buttahatchee Rivers.

The land below the 185 feet MSL 100-year flood plain elevation composes approximately 1,500 acres or one third of Columbus AFB acreage. The highest recorded high-water level reached 196 feet MSL in March 1973. It has been estimated that the high-water level near Columbus AFB has exceeded the 185-foot mark six times in the past 66 years. The northwestern third of the installation is generally within the 100-year flood plain of both the Tombigbee and Buttahatchee Rivers. However, TTW improvements are thought to have effectively reduced the 100-year flood plain by providing a more direct route for water to travel to the south.

Figure 4.4-1 River Basins in Mississippi



- I - Big Black River and Tombigbee River Basins
- II- Yazoo River Basin
- III - Pearl River Basin and South Independent Streams
- IV - Pascagoula River Basin
- V - North Independent Streams, Tennessee River Basin and Coastal Streams

Source: Mississippi Department of Environmental Quality

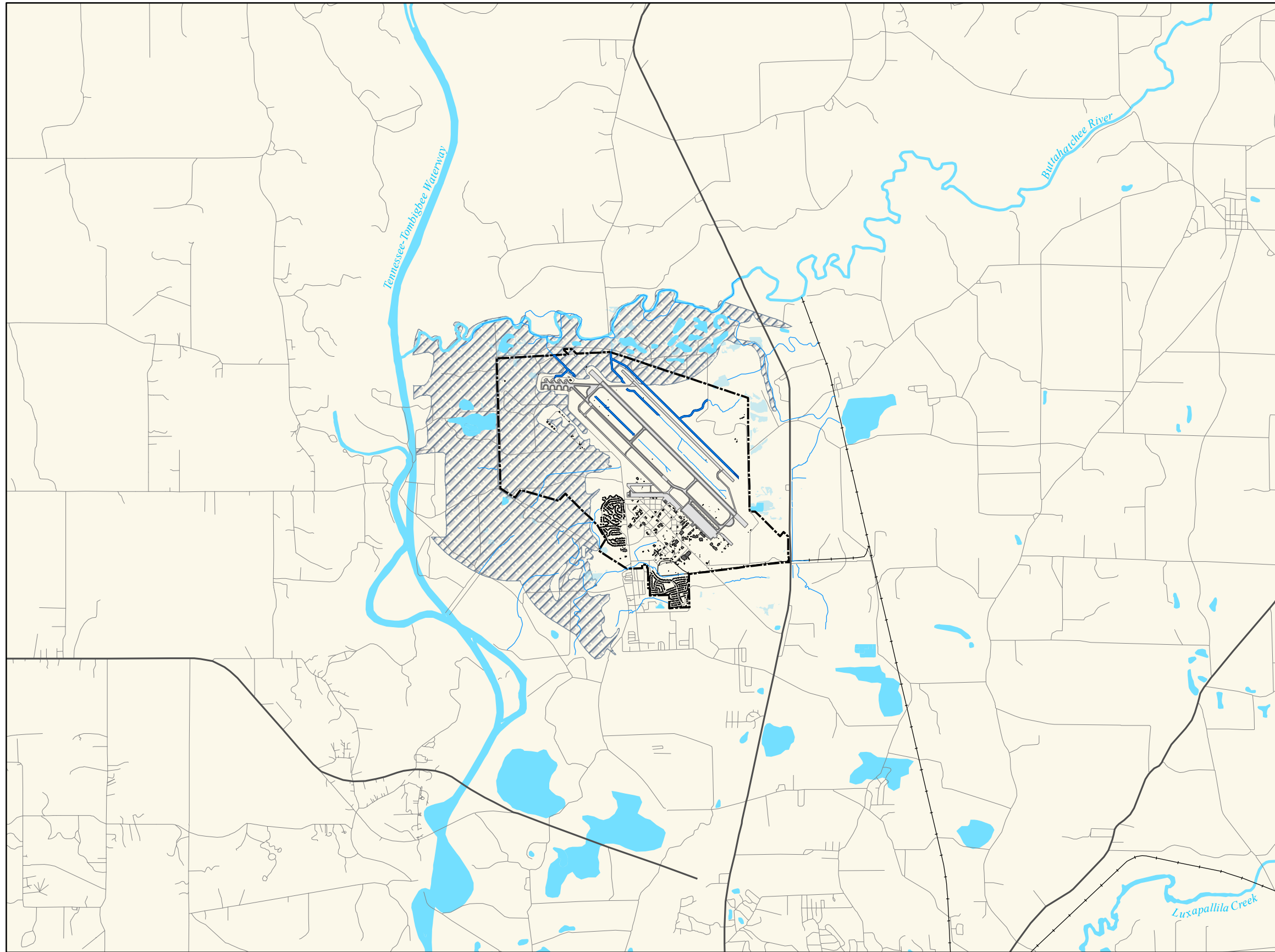
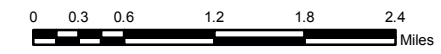


Figure 4.4-1
Rivers, Streams and Floodplains



- Drainage Ditches and Streams
- Stormwater
- 100 Year Floodplain
- Primary Roads
- Secondary Roads
- Railroads
- Major Rivers
- Water Bodies
- Buildings
- Installation Boundary
- Airfield



FINAL

INRMP
Columbus AFB, MS



DATE: JUNE 2005

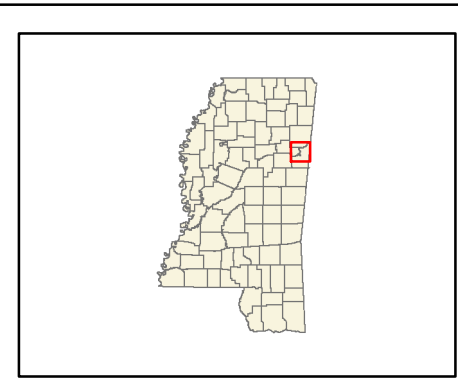
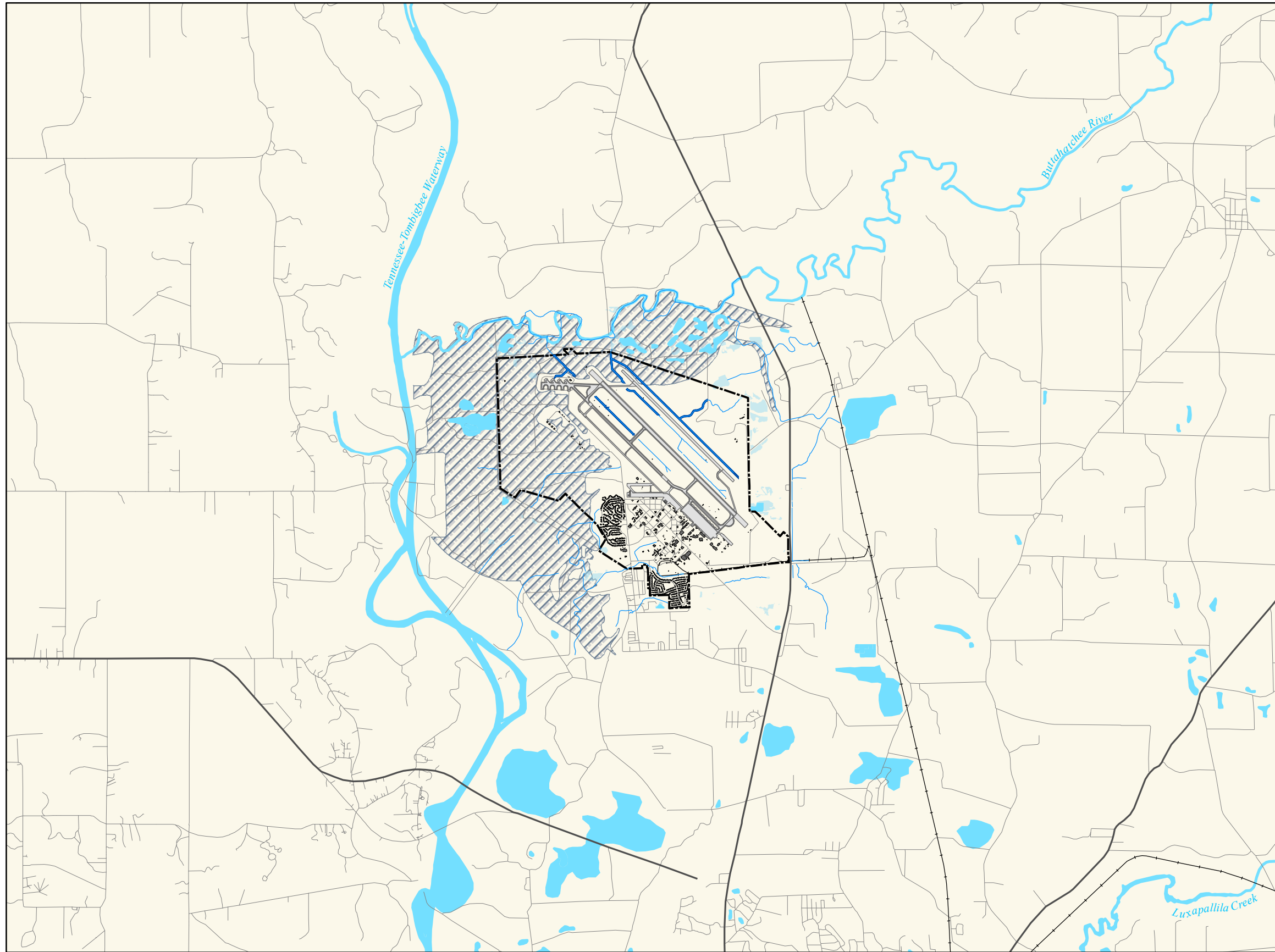
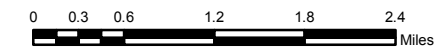


Figure 4.4-2
Rivers, Streams and Floodplains



- Drainage Ditches and Streams
- Stormwater
- 100 Year Floodplain
- Primary Roads
- Secondary Roads
- Railroads
- Major Rivers
- Water Bodies
- Buildings
- Installation Boundary
- Airfield



FINAL

INRMP
Columbus AFB, MS

J.M. WOLLER
ASSOCIATES
MANAGING THE VISION

Page 4-10

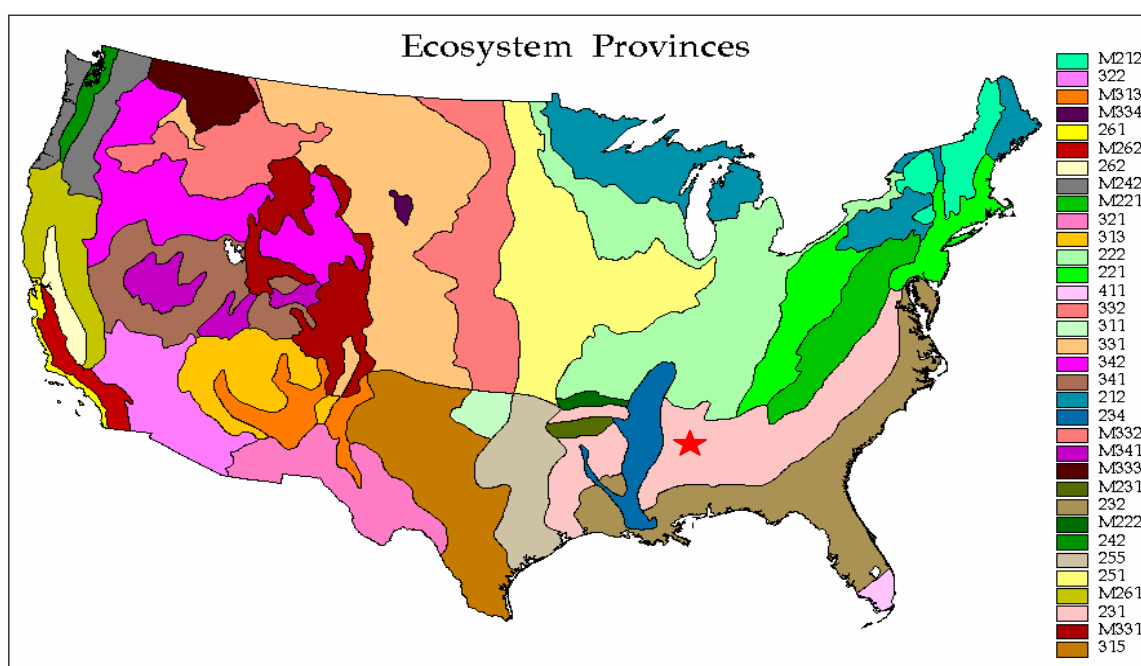
DATE: JUNE 2005

5.0 GENERAL BIOTIC ENVIRONMENT

5.1 Ecosystem Classification

The following natural resource information was adapted from Bailey's 1995 Ecoregion classification and is located on the Internet at: http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html. The approximate location of Columbus AFB is indicated on the map below with a star.

The Southern Mixed Forest Province (shown in light pink) comprises the Piedmont and the irregular Gulf Coastal Plains, where 50 to 80 percent of the area slopes gently toward the sea. Relief in the region varies from 100 to 600 ft (30 to 180 m) on the Gulf Coastal Plains to 300 to 1,000 ft (90 to 300 m) on the Piedmont. The flat coastal plains have gentle slopes and local relief of less than 100 ft (30 m). Most of the numerous streams in the region are sluggish with numerous marshes, lakes and swamps.



5.2 Vegetation

Historic Vegetative Cover: Columbus AFB lies within the vast Southern Mixed Forest Province. Climax vegetation in the Southern Mixed Forest Province is characterized by medium-tall to tall forests of broadleaf deciduous and needleleaf evergreen trees. At least 50 percent of the stands are made up of loblolly pine (*Pinus taeda*), shortleaf pine (*P. echinata*) and other southern yellow pine species, singly or in combination. Common associates include oak (*Quercus*), hickory (*Carya*), sweetgum (*Liquidambar styraciflua*), blackgum (*Nyssa sylvatica*), red maple (*Acer rubrum*), and winged elm (*Ulmus alata*). The main grasses are bluestem (*Andropogon* spp), panicums and longleaf uniola. Dogwood (*Cornus florida*), viburnum, hawthorne (*Crataegus* spp), blueberry (*Vaccinium* spp), American beautyberry (*Callicarpa americana*), yaupon (*Ilex* spp) and numerous woody vines are common understory species. See Appendix B for trees and other vegetation at Columbus AFB.

Current Vegetative Cover: Remnants of native vegetation on Columbus AFB are characteristic of the Southern Mixed Forest Province, which includes the southern Flatwoods region (MDEQ 1998). Trees native to the southern Flatwoods region occurring on base include water oak (*Quercus nigra*), willow oak

(*Q. phellos*), cherry-bark oak (*Q. falcata* var. *leucophylla*), hickory, elm, American beech (*Fagus grandifolia*), loblolly pine, short-leaf pine, red cedar (*Juniperus virginiana*) and yellow poplar (*Lireodendron tulipifera*). Native grasses and forbs include broomsedge bluestem (*Andropogon virginicus*), Indian grass (*Sorghastrum nutans*), plume grass (*Saccharum giganteum*), switchgrass (*Panicum virgatum*), carpet grass (*Axonopus affinis*), wiregrass (*Aristida stricta*), goosegrass (*Eleusine indica*), tickclovers (*Desmodium sessilifolium*), and beggartick (*Bidens* spp.). Although native vegetation is present at Columbus AFB, the majority of the installation is covered with turf and landscape tree and shrub species and forestry stands. Important native trees such as the shortleaf pine and cherry-bark oak do not occur on Columbus AFB as frequently as they would in natural stands.

Turf and Landscaped Areas:

Turf grasses include centipede grass (*Eremochloa ophiuroides*), Bermuda grass (*Cynodon dactylon*) and annual ryegrass (*Lolium multiflorum*). Landscape trees and shrubs consist of 23% loblolly pine, 12% water oak, 12% crepe myrtle (*Lagerstroemia indica*), 7% willow oak and 7% sweetgum. Other species of oak present are the southern red oak (*Q. falcata*), live oak (*Q. virginiana*), pin oak (*Q. palustris*) and southern magnolia (*Magnolia grandiflora*). Small tree and shrub species include the eastern red cedar, eastern redbud (*Cercis canadensis*) and the dogwood. More species are listed in Appendix B.

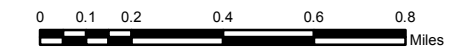
According to the Columbus AFB Forest Management Plan (AFCEE/ECC 2000a), kudzu (*Pueria montana*) and privet (*Ligustrum sinense*) are common exotic species found on the installation. Appendix C is a complete list of vegetation found on Columbus AFB and Shuqualak Auxiliary Airfield (SAA). Figure 5.2-1 shows vegetation at Columbus AFB.



Figure 5.2-1
Vegetation Map



- Trees
- Forestry Stands
- Primary Roads
- Secondary Roads
- Railroads
- Water Bodies
- Buildings
- Installation Boundary



FINAL

INRMP
Columbus AFB, MS



5.3 Fish and Wildlife

A complete list of animal species found on Columbus AFB is provided in Appendix A and C. Approximately 115 species of fish and at least 40 species of freshwater mussels have been found in the nearby Tombigbee River and its tributaries. The Buttahatchee River, just north of Columbus AFB, is an important tributary of the Tombigbee River that provides refuge for many fishes and invertebrates once found in the Tombigbee River. At least 94 species of fishes and 37 mussel species have been found in the Buttahatchee River and its tributaries (MDEQ 1998).

Terrestrial fauna in the Southern Mixed Forest Province varies with the age and stocking of timber stands, percent of deciduous trees, proximity to openings and presence of bottomland forest types. Game animals include whitetail deer (*Odocoileus virginianus*), cottontail rabbits (*Sylvilagus floridanus*), fox (*Sciurus nigra*) and gray squirrels (*S. carolinensis*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), opossum (*Didelphis virginiana*), beaver (*Castor canadensis*) and bobcat (*Lynx rufus*). Most of these animals prefer forest with adjacent cleared or open areas. When deciduous trees are present on uplands, the fox squirrel is common. Gray squirrels live along intersecting drainages. Among mammals frequently encountered in the western part of this province is the nine-banded armadillo.

Eastern wild turkey (*Meleagris gallopavo sylvestris*), bobwhite (*Colinus virginianus*), and mourning dove (*Zenaidura macroura*) are widespread throughout the Province. Turkey, bobwhite, mourning dove, rail (*Rallus* species), gallinule (*Gallinula* or *Porphyryla* species), coot (*Fulica Caribaea*), woodcock (*Scolopax minor*), snipe (*Gallinago gallinago*) and waterfowl are popular with hunters. Turkey and bobwhite, like deer, prefer woodlands near cleared areas. Of the 20-odd bird species present in mature forest, the most common are the pine warbler (*Dendroica pinus*), cardinal (*Cardinalis cardinalis*), summer tanager, Carolina wren (*Thryothorus ludovicianus*), ruby-throated hummingbird (*Archilochus colubris*), blue jay (*Cyanocitta cristata*), hooded warbler (*Wilsonia pusilla*), eastern (rufous-sided) towhee (*Pipilo erythrophthalmus*) and tufted titmouse (*Parus bicolor*). The red-cockaded woodpecker (*Picoides borealis*) is an endangered species that inhabits fire-driven old growth pine forest. Forest snakes include cottonmouth moccasin (*Agkistrodon piscivorus*), copperhead (*A. contortrix laticinctus*), rough green snake (*Opheodrys aestivus*), rat snake (*Elaphe obsoleta*), coachwhip (*Masticophis flagellum*) and speckled kingsnake (*Lampropeltis getula holbrookii*). Glass lizards (*Ophisaurus attenuatus*) are also found, as is the slimy salamander (*Plethodon glutinosus*).

SAC Lake on Columbus AFB was stocked with catfish in 1979. The lake was stocked in 1992 with hybrid bream based on the local Corps of Engineers recommendation that hybrid bream would be a better species for leisure fishing than catfish. Hybrid bream are a cross between a male bluegill (*Lepomis macrochirus*) and a female green sunfish (*L. cyanellus*). The lake was restocked with the same species in 2005 and 2007. In 2010 one hundred large bass were introduced into the lake. The United States Department of Agriculture (USDA) conducted an electro-shocking fish survey June 2010 and found the following species: large mouth bass, blue gill, and crappie. In addition, to these game species, gar, carp and hog suckers were also found. Large sunfish (presumably hybrid bream) were also present.



Hybrid Bream

5.4 Protected Species

Appendix A and B contains lists of threatened, endangered and special concern species in the vicinity of Columbus AFB and Lowndes County. This information was provided in correspondence by the USFWS and Mississippi Museum of Natural Science, (MMNS) 2000 and 2004.

5.4.1 Federally Listed Species

According to the USFWS, there are four federally listed threatened and endangered plant species in the state of Mississippi. These include pondberry (*Lindera melissifolia*), Price's potato-bean (*Apios*

priceana), Louisiana quillwort (*Isoetes louisianensis*) and American chaffseed (*Schwalbea americana*). See Appendix B for more details concerning the federally listed plant species in the State of Mississippi.

Of the four federally listed plant species in Mississippi, none are known to grow on or near Columbus AFB. However, there are habitats on Columbus AFB where one or more of the endangered species could occur. A 1994 Nature Conservancy report entitled First Annual Field Season Report and Data Analysis of the Surveys for Rare, Threatened, and Endangered Animals and Plants on Columbus Air Force Base, Columbus, MS, and Shuqualak Air Field, Shuqualak, MS. On 31 January 1993, concluded that there were no federally threatened or endangered species inhabiting Columbus AFB.

One species of turtle and two species of fish that occur in the Tombigbee River Basin are listed as federally endangered. Although these federally endangered species occur in the Tombigbee River Basin, they do not occur on the premises of Columbus AFB. These two species along with one other species occurring in the Buttahatchee River, the freckled darter (*Percina lenticula*), are currently candidates for federal protection by the USFWS. Generally all these fish require relatively clear rivers and streams that flow over a gravel, cobble or sandy substrate.

Mussels are members of the mollusk family and are called bivalve mollusks. This group includes mussels, clams, oysters and scallops. Freshwater mussels of the family Unionidae are an important part of aquatic ecosystems in the southeastern United States. Ninety percent of native North American mussel species are found in one or more states of the Southeast, with 84 species occurring historically in Mississippi. In many areas, mussels account for a large proportion of the biomass in streams and serve as an important food resource for fish and other animals. Dense populations of mussels also contribute to the functioning of aquatic ecosystems by filtering large volumes of water. Mussel populations throughout the country have declined precipitously in the last 50 years and currently, 72 percent of native species are considered endangered, threatened or of special concern. Threats to freshwater mussels include a variety of human-induced modifications to aquatic habitats such as channelization, impoundment and water pollution. National Forests contain some of the highest quality aquatic habitat remaining in the southeast and represent important refugia for remnants of the southern mussel fauna. The introduced zebra mussel is also a threat to native mussels. For more information on the exotic zebra mussel, see the website: http://www.baysprings.olemiss.edu/research/freshwater_mussels_of_the_cypres.html.

After 12 years of construction at a total cost of nearly two billion dollars, the Tennessee-Tombigbee Waterway was completed on December 12, 1984. The last plug of earth was removed from the waterway channel at Amory, Mississippi, allowing the mixing of the waters of the Tombigbee with that of the Tennessee River. Before and particularly since then, the Tombigbee River Basin has experienced a serious decline in its mussel population.

The construction of the Tennessee-Tombigbee Waterway reduced the diversity of aquatic habitats and destroyed most of the sand, gravel and cobble riffles and runs that were essential habitat for mussels and their host fish and other native species, such as the freckle belly madtom. As a result, many of the mussel and fish species were eliminated from the dammed and channelized segments of the river as their habitats and populations were fragmented or destroyed. Nine species of mussels still known to occur in the Tombigbee River Basin are listed as threatened or endangered by the State (MDEQ). Seven species of mussels still known to occur within a two-mile radius of Columbus AFB are federally listed as endangered (MMNS 2004). Six more species are of special concern. Appendix A shows the federally listed threatened or endangered mussel species occurring in Mississippi. Although these threatened or endangered mussel species occur in the Tombigbee River Basin, they are not known to occur on Columbus AFB.

The Buttahatchee River is also experiencing a loss of aquatic diversity. Large in-stream gravel mining operations have severely altered the channel causing massive erosion, or head-cutting upstream of the mining pits. Six federally listed mussels have been found in the Buttahatchee River which has been designated as Critical Habitat. (MDEQ 2004). These six mussel species include the orange-nacre mucket (*Lampsilis perovalis*), the Alabama moccasinshell (*Medionidus acutissimus*), the southern clubshell (*Pleurobema decisum*), the ovate clubshell (*Pleurobema perovatum*), the heavy pigtoe (*Pleurobema taitianum*) and the southern combshell (*Epioblasma penita*). These federally listed mussels found in the Buttahatchee River and its tributaries are not known to occur on Columbus AFB.

In an attempt to slow the further decline of these species, in January 2003, the USFWS proposed designating critical habitat for three threatened (fine-lined pocketbook, orange-nacre mucket and Alabama moccasinshell) and eight endangered freshwater mussels (Coosa moccasinshell, ovate clubshell, southern clubshell, dark pigtoe, southern pigtoe, triangular kidneyshell, southern acorn shell and upland comb shell), listed in 1993 under the Endangered Species Act of 1973, as amended. They proposed to designate 26 river and stream segments (units) in the Mobile River Basin as critical habitat for these 11 mussel species. These units encompass a total of approximately 1,760 kilometers or 1,093 miles of river and stream channels. Proposed critical habitat includes portions of the Tombigbee River drainage in Mississippi and Alabama; portions of the Black Warrior River drainage in Alabama; portions of the Alabama River drainage in Alabama; portions of the Cahaba River drainage in Alabama; portions of the Tallapoosa River drainage in Alabama and Georgia; and portions of the Coosa River drainage in Alabama, Georgia, and Tennessee. Areas to be designated as critical habitat closest to Columbus AFB are Unit 3, which includes the Buttahatchee River and Sipsey Creek in Lowndes and Monroe Counties, Mississippi; and Lamar County, Alabama; and Unit 4 consisting of Luxapallila Creek and Yellow Creek, Lowndes County, Mississippi and Lamar County, Alabama. Unit 3 (Buttahatchee River) lies just to the north of the Columbus AFB from its confluence with the Tombigbee upstream to its confluence with Beaver Creek in Alabama. Unit 4 includes the main stem of Luxapallila Creek from Waterworks Road, to approximately 0.6 miles above Caledonia Steens Road, Steen and Mississippi. Both Units 3 and 4 provide critical habitat for the ovate clubshell, southern clubshell and Alabama moccasinshell and orange-nacre mucket. Table 5.4.1-1 shows federally listed species in Mississippi.

*Ovate Clubshell**Five-lined Pocketbook**Orange-Nacre Mucket*

Table 5.4.1-1 Federally Threatened and Endangered Species in Mississippi.

Common Name and Scientific Name	Status
Animals	
Alligator, American (<i>Alligator mississippiensis</i>)	Threatened
Bat, Indiana (<i>Myotis sodalis</i>)	Endangered
Bear, Louisiana black (<i>Ursus americanus luteolus</i>)	Threatened
Bear, American black (<i>Ursus americanus</i>) County Range of Louisiana black bear	Threatened
Clubshell, black (<i>Pleurobema curtum</i>)	Endangered Critical Habitat
Clubshell, ovate (<i>P. perovatum</i>)	Threatened Critical Habitat
Clubshell, southern (<i>P. decisum</i>)	Endangered Critical Habitat
Pigtoe, flat (<i>Pleurobema marshalli</i>)	Endangered Critical Habitat
Combshell, southern (<i>Epioblasma penita</i>)	Endangered Critical Habitat
Mucket, orangenacre (<i>Lampsilis perovalis</i>)	Threatened Critical Habitat
Pocketbook, fat (<i>Potamilus capax</i>)	Endangered
Moccasinshell, Alabama (<i>Medionidus acutissimus</i>)	Threatened Critical Habitat
Crane, Mississippi sandhill (<i>Grus canadensis pulla</i>)	Endangered
Darter, bayou (<i>Etheostoma rubrum</i>)	Threatened
Eagle, bald (lower 48 States) (<i>Haliaeetus leucocephalus</i>)	Threatened
Frog, Mississippi gopher wherever found west of Mobile and Tombigbee Rivers in AL, MS, and LA. (<i>Rana capito sevosa</i>)	Endangered
Pelican, brown (except U.S. Atlantic coast, FL, AL) (<i>Pelecanus occidentalis</i>)	Endangered
Plover, piping (except Great Lakes watershed) (<i>Charadrius melodus</i>)	Threatened
Sea turtle, green (except where endangered) (<i>Chelonia mydas</i>)	Threatened
Sea turtle, hawksbill (<i>Eretmochelys imbricata</i>)	Endangered
Sea turtle, Kemp's ridley (<i>Lepidochelys kempi</i>)	Endangered
Sea turtle, leatherback (<i>Dermochelys coriacea</i>)	Endangered
Sea turtle, loggerhead (<i>Caretta caretta</i>)	Threatened
Stirrupshell (<i>Quadrula stapes</i>)	Endangered
Sturgeon, Alabama (<i>Scaphirhynchus suttkusi</i>)	Endangered
Sturgeon, gulf (<i>Acipenser oxyrinchus desotoi</i>)	Threatened
Sturgeon, pallid (<i>Scaphirhynchus albus</i>)	Endangered
Tern, least (interior pop.) (<i>Sterna antillarum</i>)	Endangered
Tortoise, gopher (W of Mobile/Tombigbee Rs.) (<i>Gopherus polyphemus</i>)	Threatened
Turtle, ringed map (<i>Graptemys oculifera</i>)	Threatened
Turtle, yellow-blotched map (<i>Graptemys flavimaculata</i>)	Threatened

Common Name and Scientific Name	Status
Whale, finback (<i>Balaenoptera physalus</i>)	Endangered
Whale, humpback (<i>Megaptera novaeangliae</i>)	Endangered
Woodpecker, red-cockaded (<i>Picoides borealis</i>)	Endangered
Plants	
Potato-bean, Price's (<i>Apios priceana</i>)	Threatened
Quillwort, Louisiana (<i>Isoetes louisianensis</i>)	Endangered
Pondberry (<i>Lindera melissifolia</i>)	Endangered
Chaffseed, American (<i>Schwalbea americana</i>)	Endangered

The threatened bald eagle is another species that occurs on or near the Tennessee-Tombigbee Waterway and its tributaries. These distinctive birds mate for life and build huge nests in the tops of large trees near rivers, lakes and marshes. The birds travel over great distances but normally return to nest within 100 miles of where they were born.

Bald eagles historically ranged throughout North America except extreme northern Alaska and Canada and central and southern Mexico. The raptors' habitat includes estuaries, large lakes, reservoirs, major rivers and some seacoast areas. These areas, however, must have an adequate food base, perching areas and nesting sites in order to support the species. In winter, bald eagles often congregate at specific wintering sites that are generally close to open water and offer good perch trees and night roosts. This information was derived from the USFWS website: <http://endangered.fws.gov/i/BOH.html>.

Columbus AFB has been involved in the proactive identification and prevention of conflict between eagle nesting areas and flight paths of aircraft utilized at the Base. Columbus AFB Natural Resources Flight works closely with the USFWS Mississippi Field Office in Jackson, MS. In 2004, this coordination resulted in the base identifying all the bald eagle nesting sites within the base's flight tracks. Although not required, the training squadrons took satellite imagery of the area with ground tracks for the flight patterns overlaid on the imagery identifying the nesting sites to be avoided. In addition, although none of the nesting sites are within the flight paths, the pilots are briefed with their locations and the imagery is placed in each flight room and duty desk to ensure awareness of these sensitive areas. The base will update the nesting site information annually with information obtained from the USACE. USACE are currently in the process of identifying the current nesting sites using GPS. The base will incorporate the GPS data into its GeoBase system so all environmental data can be updated.

Environmental personnel, with the assistance of the USDA wildlife biologist assigned to the base, also survey any proposed construction site any evidence of bald eagle nest or habitat. These surveys and information are forwarded to the USFWS Mississippi Field office for review and concurrence as part of the base's interagency coordination process.

Recently the USFWS established an Installation of the Year Conservation Award. The USFWS grants the award to officially commend citizens or organizations for contributions they have voluntarily made to the public service and whose contribution has benefited the USFWS programs, services, or operations. The USFWS recognizes that the military has made significant contributions to natural resource conservation and believes these contributions are deserving of recognition. Columbus AFB is a contender for this award because of its efforts to prevent conflict with nesting eagles.

5.4.2 State Listed Species

Columbus AFB has records of three Mississippi State “special-status” plant species recorded on the base: Oklahoma sedge (*Carex oklahomensis*), swamp hickory (*Carya cordiformis*) and lobed tickseed (*Coreopsis auriculata*) (USAF 1998). Another yearlong threatened and endangered species study began on 1 August 2004.

In July 2004, the MMNS searched their database for occurrences of state, federal and other special concern species on or within two miles of Columbus AFB. Two plant species were again documented as occurring on Columbus AFB property, the swamp hickory and lobed tickseed (Appendix B). There is one state special listed bird species that has been observed on the base, the loggerhead shrike (*Lanius ludovicianus*) (MMNS 2000). Two fish species listed as endangered by Mississippi, a catfish, the frecklebelly madtom (*Noturus munitus*), and the crystal darter (*Crystallaria asprella*), have been found in the Buttahatchee River. MMNS has records of one species of special concern, the Alabama shiner (*Cyprinella callistia*), occurring on Columbus AFB (MMNS 2000). A July 2004 database search, as mentioned previously, verified the presence of the freckle belly madtom on Columbus AFB. Appendix A provides a list of all threatened and endangered animal species occurring within two miles of Columbus AFB along with the global and state rankings of these species (MMNS).

Table 5.4.2-1 Mississippi State-Listed Threatened and Endangered Species within Two Miles of Columbus Air Force Base

Scientific and Common Name	State Status
Frecklebelly Madtom (<i>Noturus munitus</i>)	Endangered
Crystal Darter (<i>Crystallaria asprella</i>)	Endangered
Black-knobbed Map Turtle (<i>Graptemys nigrinoda</i>)	Endangered
Delicate Spike (<i>Elliptio arctata</i>)	Endangered
Southern Combshell (<i>E. penita</i>)	Endangered
Orange Nacre Mucket (<i>Lampsilis perovalis</i>)	Threatened
Alabama Moccasinshell (<i>Medionidus acutissimus</i>)	Threatened
Southern Clubshell (<i>Pleurobema decisum</i>)	Endangered
Ovate Clubshell (<i>P. perovatum</i>)	Threatened
Monkeyface (<i>Quadrula metanerva</i>)	Endangered

Source: Mississippi Museum of Natural Science, July 2004

5.5 Wetlands

The most recent wetland inventory was conducted in June and July of 2015 by the U.S. Corp of Engineers. In this study, 26 individual wetlands for a total of 241.24 acres were delineated. These ranged in size from 0.21 to 89.58 acres. Manipulated areas within and adjacent to the runways were considered as permanently altered and were not considered as wetlands in this report. In the northern part of the base, evidence of flooding was observed associated with the Buttahatchee River. Wetlands in the south, southwest and western portions of the Base were described as "entirely ponded" areas. Evidence of ponding includes stained leaves and tree trunks, buttressed, or thickened tree trunks, and standing water. Three of these wetlands, numbers 21, 3 and 4 are fed by active seeps. Wetland 4 is the largest and is located in the southern center of the Base and comprises approximately 89.58 acres. Wetlands 3 is located in the southwest corner of the Base and is 24.51 acres. All wetlands had hydric soil except numbers 15 and 26. Plants species observed during the previous study have not changed and are provided in the Table below. Wetlands at Columbus AFB are shown in Figure 5.5-1.

Table 5.5-1 Plant Species at Wetlands at Columbus AFB

Plant Species	Plant Indicator Status*	Plant Characteristics
Willow Oak (<i>Quercus phellos</i>)	FACW	Tree Canopy
Overcup Oak (<i>Q. lyrata</i>)	FACW	Tree Canopy
Green Ash (<i>Fraxinus pennsylvanica</i> var. <i>lanceolata</i>)	FACW	Tree Canopy
Tupelo Gum (Water Tupelo, <i>Nyssa aquatica</i>)	FACW	Tree Canopy
Black Gum (Black Tupelo, <i>N. sylvatica</i>)	FACW	Tree Canopy
Willow (<i>Salix spp.</i>)	FACW	Tree Canopy
Coral Green Briar (<i>Smilax walteri</i>)	OBL	Groundcover; native perennial vine
Climbing Hempweed (<i>Mikania scandens</i>)	FACW*	Groundcover; native perennial vine
Lizards Tail (<i>Saururus cernuus</i>)	OBL	Groundcover; native perennial herbaceous
Sedges (<i>Carex spp.</i>)	Ranges from UPL to OBL	Groundcover; native perennial grass-like plant of low lying areas
Ferns (<i>Polypodium spp.</i>)	No Information	Groundcover; native perennial herbaceous
Panic grass (<i>Panicum spp.</i>)	Ranges from UPL to OBL	Groundcover; native perennial grass

Source: Corps of Engineers, Wetland Delineation Manual, 1987

* - Denotes that species is more toward OBL than FACW

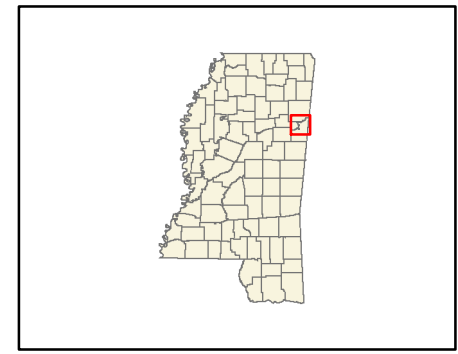
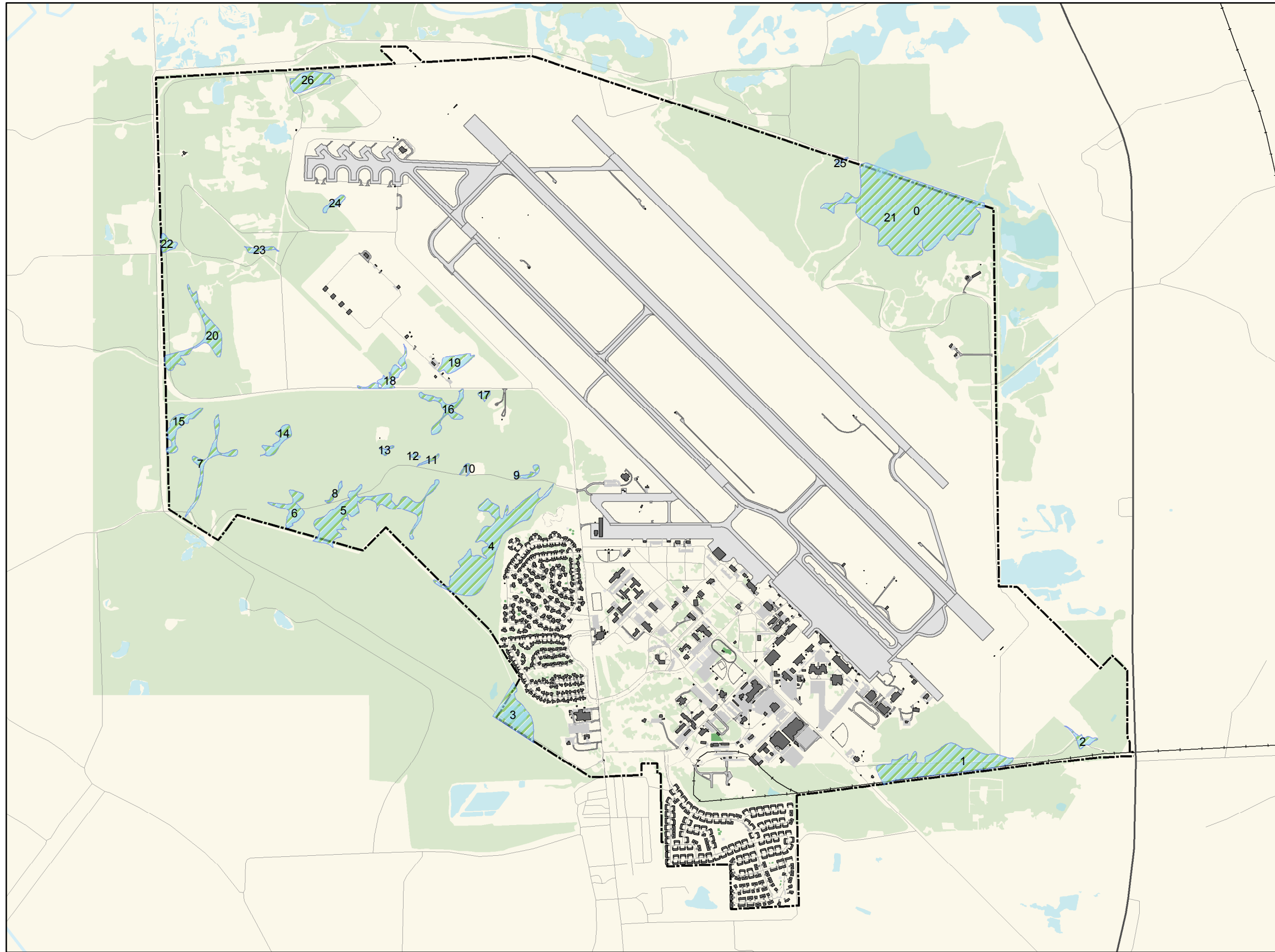
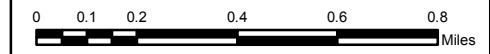


Figure 5.5-1
Wetlands



-  Wetlands
-  Primary Roads
-  Secondary Roads
-  Railroads
-  Vegetation
-  Buildings
-  Airfield
-  Installation Boundary



FINAL

INRMP
Columbus AFB, MS



OBL - Obligate wetland: Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions but which may also occur rarely (estimated probability <1 percent) in nonwetlands. Examples: *Spartina alterniflora*, *Taxodium distichum*.

FACW - Facultative Wetland: Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands but also occur (estimated probability 1 percent to 33 percent) in nonwetlands. Examples: *Fraxinus pennsylvanica*, *Cornus stolonifera*.

FAC - Plants with a similar likelihood (estimated probability 33 percent to 67 percent) of occurring in both wetlands and nonwetlands. Examples: *Gleditsia triacanthos*, *Smilax rotundifolia*



One of the Wetlands at Timberlane Nature Trail

FACU - Facultative Upland: Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in nonwetlands. Examples: *Quercus rubra*, *Potentilla arguta*.

UPL - Upland: Plants that occur rarely (estimated probability <1 percent) in wetlands, but occur almost always (estimated probability >99 percent) in nonwetlands under natural conditions. Examples: *Pinus echinata*, *Bromus mollis*.

5.6 Other Natural Resource Information

Recent biological inventories and surveys conducted at Columbus AFB include:

- Columbus AFB Forest Inventory and Report, September 2009: This report described forest and stand health, discussed concerns about erosion and standing water, *lps* beetle infestations and provided recommendations for improving the health of stands at Columbus AFB.
- Columbus AFB Urban Forest Inventory and Assessment, February 2004: This study and report assessed the size, health and maintenance needs for 6,288 trees and 200 tree planting spaces. A database and GIS technology were utilized to collect, store and manipulate data. The purpose was to provide a management strategy for taking care of this valuable resource. Recommendations were to identify high priority hazard trees for immediate pruning or removal, keep the database current and perform needed maintenance on a regular basis. Dominant trees identified on base were loblolly pine and water oak (Appendix C).
- Columbus AFB Threatened and Endangered Species Survey and Plan, July 2004-July 2005: This report documents all species including threatened and endangered species at Columbus AFB. Based on their surveys, areas that may support rare species are generally associated with permanent water bodies, temporary pools and forested wetlands. Ten sites were selected for intensive, replicated surveys. A tentative species list and write-up dated fall 2004 from this report is found in Appendix A.

- Columbus Air Force Base Wildland Fire Management Plan, July 2007, this report was developed to reduce threats to installation personnel and property; to protect and enhance natural resources and to be in compliance with AFIs regarding enhancing biodiversity at Air Force installations.
- Columbus Air Force Base Aero-Dome Tree Survey, September 2004, this report describes tree penetration into airspace and documents trees which need removal. To conclude this project, marked trees will be removed in the near future.
- Columbus Air Force Base Study of White-tailed Deer, September 2004, this report will describe base wide spatial and temporal (daily and seasonal) deer movements, reproductive rates, and how to manage deer with regard to airfield safety, how to merge BASH efforts with hunting and where deer are harvested at Columbus AFB.
- A 12-month Wildlife Hazard Assessment (WHA) has been completed of Columbus AFB and SAA as of August 2004. For this study at Columbus AFB, 150 diurnal bird surveys and 24 spotlight surveys have been completed, as with the above study spatial and temporal wildlife movements were examined and nuisance species identified. In the future, infrared technology will be employed.

Natural Resource Inventories that have been conducted in the past are shown below.

- The Nature Conservancy. 1994. First Annual Field Season Report and Data Analysis of the Surveys for Rare, Threatened, and Endangered Animals and Plants on Columbus Air Force Base, Columbus, MS, and Shuqualak Air Field, Shuqualak, MS, 31 January 1993.
- MMNS (Mississippi Museum of Natural Science). 3 August 2000. Endangered Species Reports for Columbus AFB and Shuqualak Auxiliary Airfield.
- Natural Resources Conservation Service (NRCS). 2000. Conservation Plan: Columbus AFB. July 7.
- Oklahoma Biological Survey. 1994. Integrated Natural Resources Management Plan 1994-1999. Columbus Air Force Base, Columbus, Mississippi.

6.0 MISSION IMPACTS ON NATURAL RESOURCES

6.1 Land Use

AFI 32-7064 specifies three principle categories of natural resources management units: improved, semi-improved and unimproved land. Grounds categories are determined by the intensity of grounds maintenance necessary to maintain a neat appearance to the landscape or to control for BASH. Table 6.1-1 lists the land use categories for Columbus AFB. Figure 6.1-1 shows land uses at Columbus AFB. In summary:

Improved grounds (1624 acres) require intensive and continued maintenance including mowing, irrigation and landscaping. Land that is located around offices and residential buildings is included in this category. Land use categories that are usually associated with improved grounds are: housing (accompanied), housing (unaccompanied), community (service), community (commercial), medical, and administrative. Outdoor recreation and selected open space areas may be improved (heavily landscaped open areas including golf courses, parks, playgrounds and athletic fields).

Semi-improved grounds (1707 acres) are those that require infrequent or unscheduled mowing and maintenance and little or no irrigation. Land use categories that are usually associated with semi-improved grounds are: outdoor recreation (unimproved parks and picnic areas, open fields), light industrial, aircraft operations and maintenance and airfield.

Unimproved grounds (1418 acres) do not require any maintenance except occasional brush control. Land use categories that are usually associated with unimproved grounds are open space, such as roads, forests wetlands (181 acres) and other surface water.

Table 6.1-1 Summary of Land Use Classification For Columbus AFB

Grounds Categories	Land Use Categories	Description
I	Airfield	Runways, taxiways, aprons
SI	Aircraft Operations and Maintenance	Maintenance shops, hush house, flight simulators, hangars, fire station
SI	Industrial	Water treatment plant, transportation, cold storage
I	Administrative	Offices, engineering
I	Community (Commercial)	Mall concessionaires, credit union, barber shop
I	Community (Service)	Chapel, theater, education center, post office
I	Medical	Composite clinic, dental clinic
I	Housing (Accompanied)	Family housing
I	Housing (Unaccompanied)	Apartments, visitor's housing
I, SI	Outdoor Recreation	Playgrounds, golf course, picnic areas, playing courts
I, SI, UI	Open Space/ Roads	Roads, fields, forests
UI	Water	Wetlands, lakes, ponds
I = Improved, SI = Semi-Improved, UI= Unimproved		

The Columbus AFB General Plan separates the three main grounds categories into 12 functional subdivisions that have a common general purpose. They are summarized as follows:

Airfield: This use consists of the entire airfield pavement system (runway, taxiway and apron), related open space, navigational aids and all airfield and airspace clearance surfaces.

Aircraft Operations and Maintenance: This category comprises all facilities that directly support the flying mission, including all activities taking place on the airfield and in the adjoining hangars, shops and terminals.

Industrial: Industrial land use accommodates industrial facilities such as warehouses, base maintenance and utilities functions and base industrial services such as those belonging to transportation, communications and civil engineering. Included are the BCE facility, open storage and Vehicle Maintenance Shop.

Administrative: Administrative areas serve as the primary decision-making centers, incorporating military command and tenant activity management, wing/group headquarters and civilian administrative activities. These areas have a higher density of workers than the industrial use.

Community (Commercial): This area covers the community center and commercial shopping, service, recreation and day-to-day living needs of base personnel, their families and military retirees within the area. At Columbus AFB, it corresponds to the mall concessionaires, the commissary, dining halls and personal services such as barbershops.

Community (Service): This category contains the noncommercial activities important in day-to-day living. It includes educational facilities, post office, childcare center, chapel, religious education facilities and many indoor recreational facilities.

Medical: This health care land use includes the composite clinic and dental clinic.

Housing (Accompanied): This is the family housing category. It consists of attached and detached residential units occupied by enlisted and officer families.

Housing (Unaccompanied): This category is comprised of housing for bachelor officers, the Airmen's dormitories and visiting officer and Airman's quarters.

Outdoor Recreation: There are three types of outdoor recreation spaces: general recreation areas that can support intensive recreation; natural environmental recreation areas suitable for such activities as fishing, birding, hiking and hunting; and special interest areas that have historical or botanical significance.

Open Space: These areas are undeveloped for the following reasons: buffer space between incompatible uses, constrained due to environmental or physical features or required for safety or security clearances. Roadsides and airfield buffers are included.

Undetermined Future Use: Undeveloped and unused land at Columbus AFB is being reserved for future mission capabilities.

Water: Open water includes ponds, major streams and lakes on base or shorefront areas along a river, large lake or ocean. Water areas on Columbus AFB include SAC Lake, streams, and ditches.

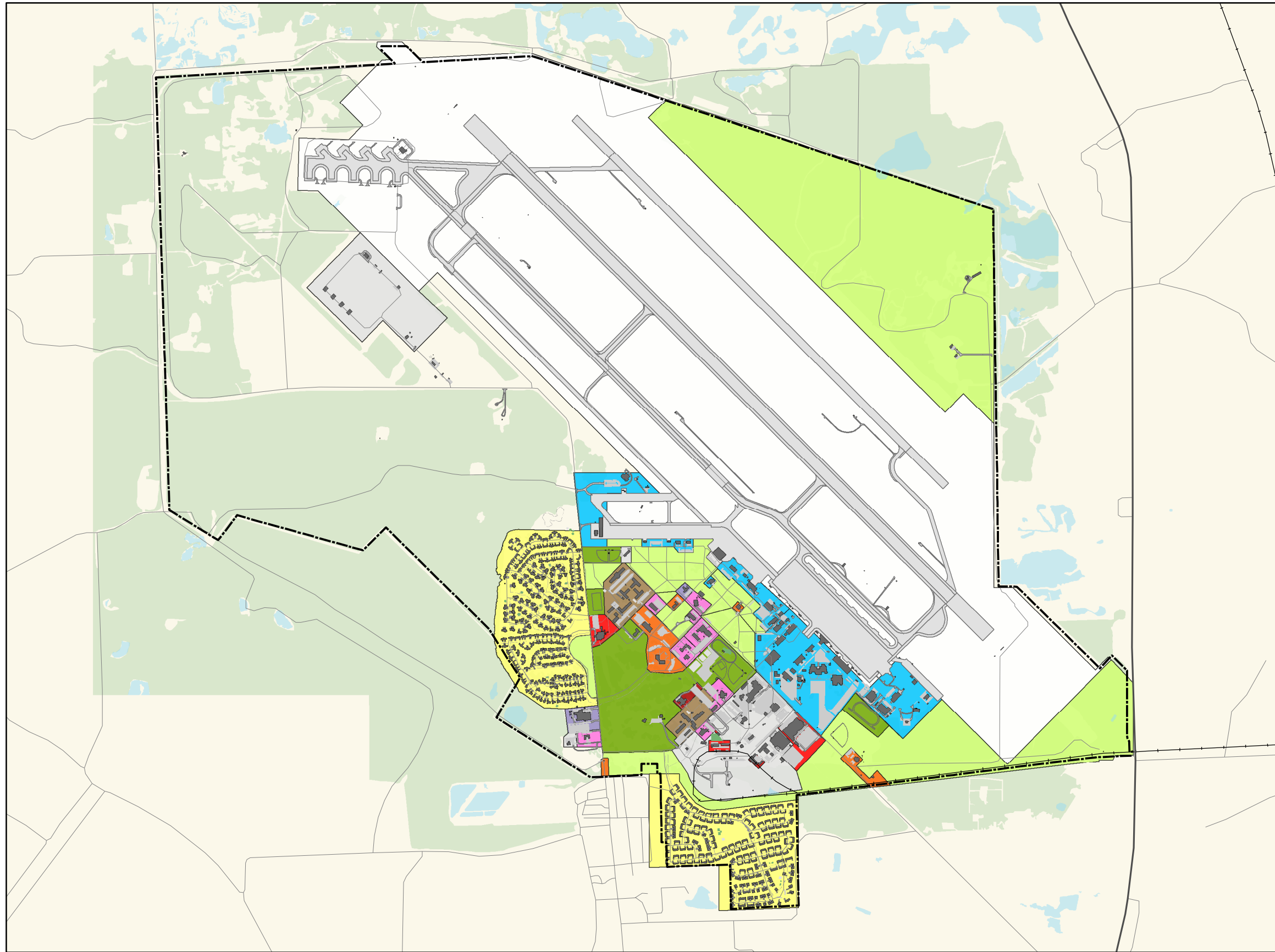


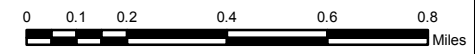
Figure 6.1-1
Existing Land Use



Existing Land Use

Layer

- N-AIRFIELD
- N-AIRCRAFT
- N-INDUSTRIAL
- N-COMMERICAL
- N-COMMERICAL-X
- N-SERVICE
- N-REC
- N-MEDICAL
- N-HOUSE-UA
- N-HOUSE-ACOMP
- N-ADMIN
- N-OPEN
- Primary Roads
- Secondary Roads
- Railroads
- Water Bodies
- Vegetation
- Buildings
- Airfield
- Installation Boundary



FINAL

INRMP
Columbus AFB, MS



6.2 Current Major Impacts

Water and Air Pollution Permits

Water

MDEQ has a statewide multimedia pollution prevention program, whose goal is to prevent or reduce the amount of pollution released to state lands, air or water. This program encourages the reduction of pollution at the generating source and the environmentally safe recycling of pollutants where feasible (MDEQ 1998).

MDEQ, in accordance with Section 305(b) of the Clean Water Act, is responsible for monitoring Mississippi's water quality conditions every 2 years. Columbus AFB is a part of the Tombigbee River Basin. Principal causes of water quality problems in the Tombigbee River Basin are nutrients, siltation, pathogens and organic enrichment from non-point source pollution. These pollutants usually originate from municipal or industrial sources or are transported as non-point source pollution from the land by runoff (MDEQ 1998).

Columbus AFB receives all of its drinking water from the City of Columbus water system, which obtains groundwater from the Eutaw Aquifer. Columbus AFB formerly used three Tuscaloosa Aquifer wells for potable water until 1998 when the base began using potable water supplied by the City of Columbus. A well, located at the Military Working Dog Kennel, supplies potable water for the dog kennel only. A third well screened in the Eutaw Aquifer at 175 feet below ground surface (bgs) supplies water to the horse stables for non-potable uses only. The well at the dog kennel is located approximately 1,500 ft north (i.e., upgradient) of Site SS-29 (the nearest of the five IRP sites). The well at the Building 1812 Area is located approximately 4,500 feet northwest (i.e., cross-gradient) of Site ST-24 (the nearest of the five IRP sites) (USAF 1998b). For locations of wells, see Figure 6.2 -1.

Columbus AFB currently holds a National Pollutant Discharge Elimination System (NPDES) permit issued by MDEQ. This permit authorizes Columbus AFB to discharge treated non-hazardous wastewater to a wastewater treatment plant in the City of Columbus.

Columbus AFB has a goal of reducing the amount of wastewater generated by:

- Eliminating or minimizing point sources (oil water separators and wash racks),
- Implementing Best Management Practices (BMPs) to eliminate the need for pretreatment and treatment of wastewater, apply the zero discharge alternative where possible,
- Maintain full compliance and prevent noncompliance with all applicable laws, regulations and requirements, and
- Provide training on storm water management, erosion control and oil/water separator management.

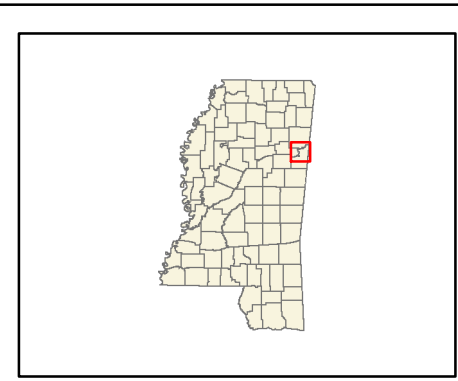
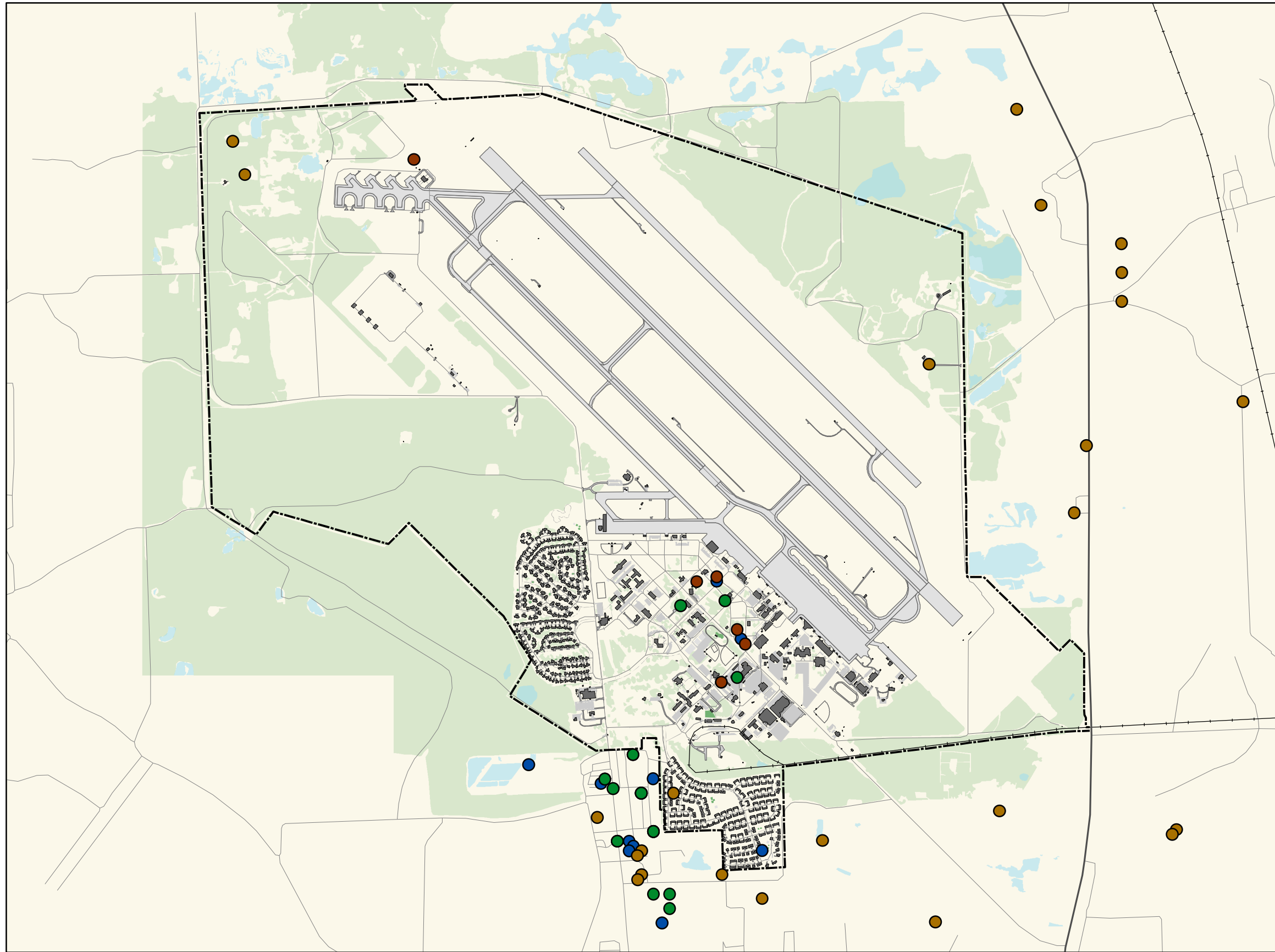
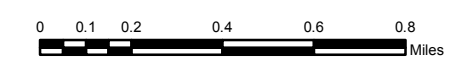


Figure 6.2-1
Water Wells



- Dept. of Health Wells
- Permit Wells
- USGS Private Wells
- USGS Public Wells
- Primary Roads
- Secondary Roads
- Railroads
- Water Bodies
- Vegetation
- Buildings
- Airfield
- Installation Boundary

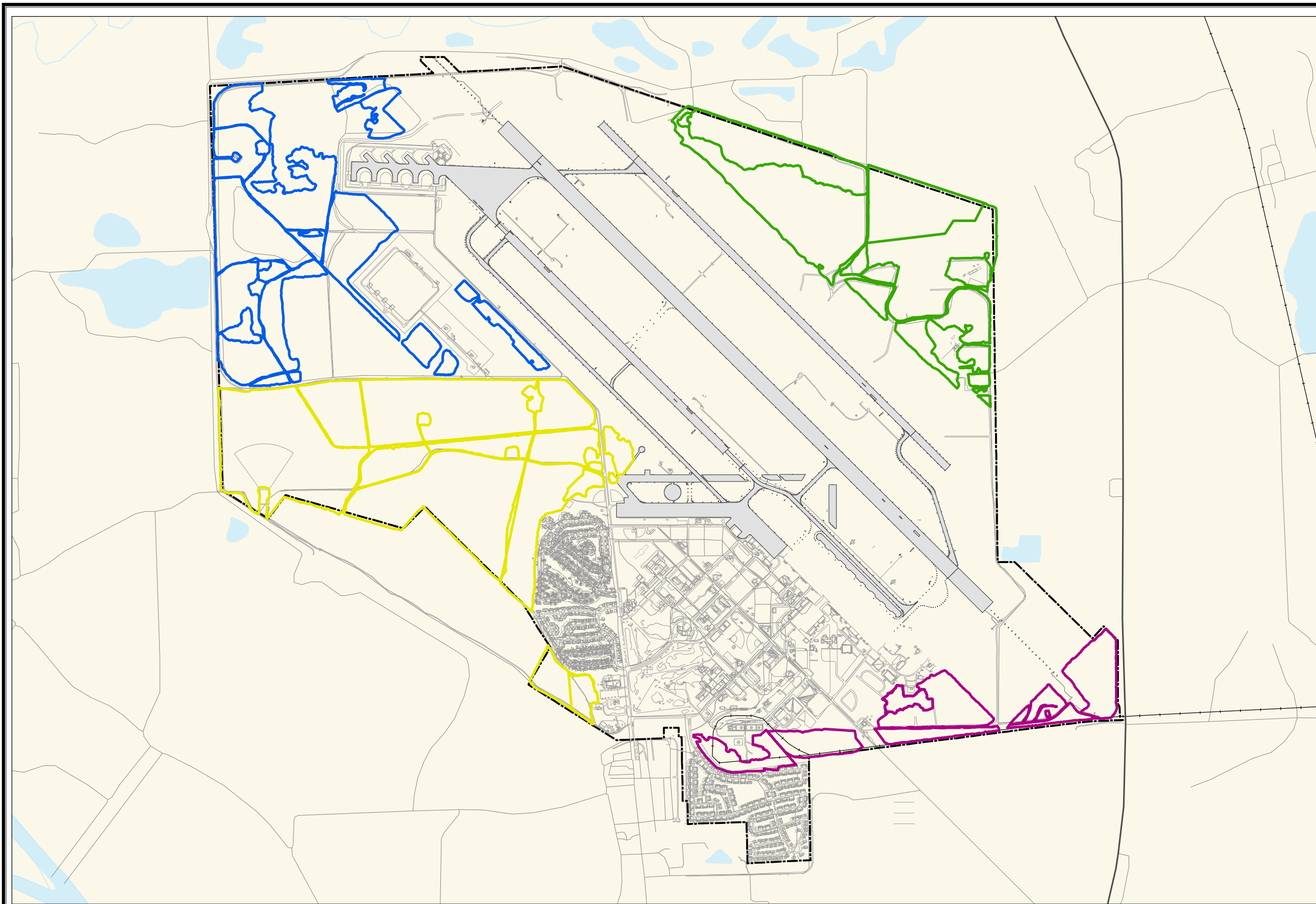


FINAL

INRMP
Columbus AFB, MS



DATE: JUNE 2005



Columbus AFB, MS

Figure 6.2-1
Forestry Stands and Compartments



- Compartment 1
- Compartment 2
- Compartment 3
- Compartment 4
- Primary roads
- Secondary Roads
- Railroads
- Buildings
- Major Rivers
- Water Bodies
- Airfield
- - - Installation Boundary

0 1,600 3,200
Feet

Integrated Natural Resource
Management Plan

FINAL

JUNE 2005



Sampling of storm water is performed at least annually for the following substances: oil and grease; dissolved oxygen; total phenolics; and total suspended solids. Parameters including pH, temperature and specific conductance are also measured. In addition, storm water inlets and outfalls are visually inspected at least annually as part of Columbus AFB's comprehensive site compliance evaluation. Visual inspections to certify non-storm water discharges are performed during dry weather. The Columbus AFB Storm Water Pollution Prevention Plan (1999) provides guidance for minimizing storm water contamination. Implementing the Plan and the projects described in it will assist Columbus AFB in achieving its water supply and storm water compliance goals.

Air

Air quality in any given region is measured by the concentration of various pollutants in the atmosphere, typically expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Air quality is not only determined by the types and quantities of atmospheric pollutants but also by surface topography, the size of the air basin, and by the prevailing meteorological conditions. The Clean Air Act Amendments of 1990 (CAAA) directed the United States Environmental Protection Agency (USEPA) to develop, implement and enforce environmental regulations that would ensure cleaner air for all Americans (USEPA 2000). USEPA classifies the air quality within an Air Quality Control Region (AQCR) according to whether or not the concentration of criteria air pollutants in the atmosphere exceeds primary or secondary National Ambient Air Quality Standards (NAAQS).

Columbus AFB is within the Northeast Mississippi Intrastate AQCR 135. This AQCR includes the counties of Alcorn, Atala, Benton, Calhoun, Carroll, Chickasaw, Choctaw, Clay, Grenada, Holmes, Itawamba, Kemper, Lafayette, Leake, Lee, Lowndes, Marshall, Monroe, Montgomery, Neshoba, Noxubee, Oktibbeha, Panola, Pontotac, Prentiss, Tate, Tippah, Tishomingo, Union, Webster, Winston and Yalobusha. The USEPA has designated the air quality within Lowndes County as better than NAAQS for total suspended particulates (TSP) and sulfur dioxide (SO_2) and unclassified for carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3) and particulate matter equal to or less than 10 microns in aerodynamic diameter (PM10). There are no non-attainment areas in the vicinity of Columbus AFB (USAF 1999a). For locations of Air Emissions Sources at Columbus AFB, see Figure 6.2-2.

Synthetic Minor operating permits was issued based on a facility's potential to emit criteria air pollutants. Columbus AFB is classified as a synthetic minor source under Title V of the Clean Air Act. Emissions sources include emergency generators, aerospace ground equipment (AGE), boilers, paint booths, degreasers, fuel loading racks and storage tanks (USAF 1997c). Painting operations are the single greatest HAP source at Columbus AFB. Columbus AFB has a permit to operate air emissions equipment at a synthetic minor source granted by the Mississippi Environmental Quality Permit Board. This permit was acquired 26 July 2004 and renewed 28 May 2009. The permit and a complete list of air emissions sources are found in Appendix F. Table 6.2-1 contains the hazardous air pollutant (HAP) potential to emit for the base's major emission sources.

Table 6.2-1 Summary of 2003 Air Emissions from Columbus AFB by Pollutant Type

Pollutant	Allowable Emission Rate (tpy*)	Actual Emission Rate (tpy*)
PM (particulate matter)	33.97	1.45
SOx (sulfur oxides)	53.22	0.98
NOx (nitrogen oxides)	189.4	12.33
CO (carbon monoxides)	2,010.00	28.99
VOCs (volatile organic compounds)	130.43	8.67
TRS (Total ReducedSulfur)**	0	0
Lead Compounds	0	0
CFC/HCFCs***	0	0.15
Other	0	0
Total HAPs (VOC)	14.54	1.31
Total HAPs (non-VOC)	0	0.03

*tpy - tons per year

**Hydrogen sulfides, mercaptans, dimethyl sulfide, and any other organic sulfides.

***CFC/HCFCs - chloroflouorocarbon/hydrochloroflouorocarbons

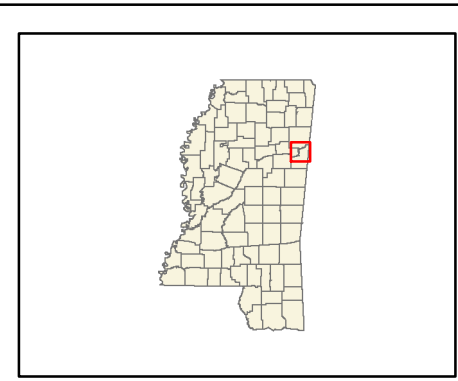
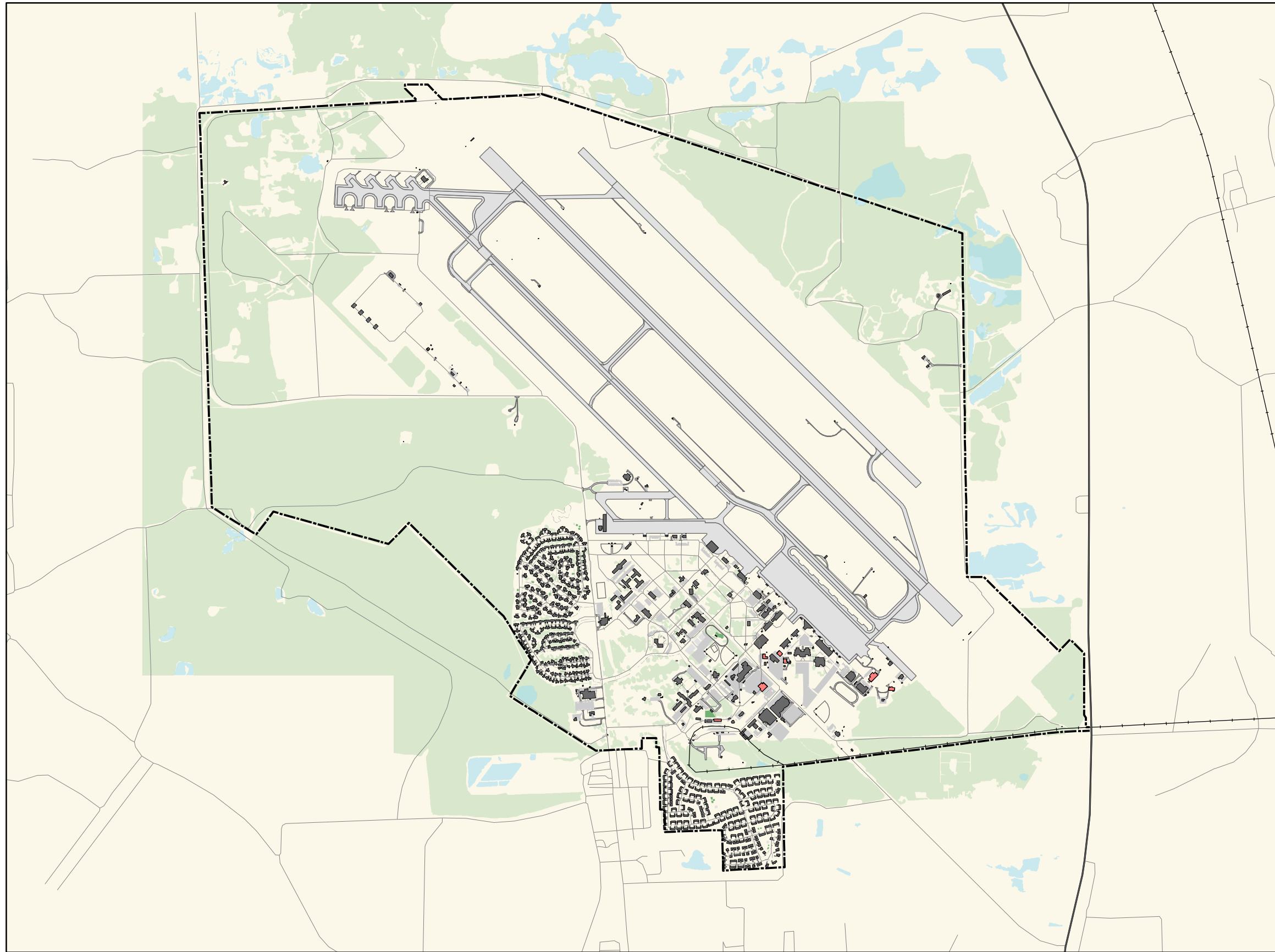
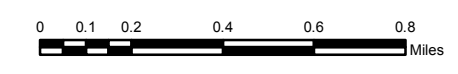


Figure 6.2-2
Locations of Air Emission Sources



- Air Emission Buildings
- Primary Roads
- Secondary Roads
- Railroads
- Water Bodies
- Vegetation
- Buildings
- Airfield
- Installation Boundary



FINAL

INRMP
Columbus AFB, MS



Columbus AFB is in an area in which the radioactive gas radon is known to occur. A known health risk is an increased chance of developing lung cancer. The level at which USEPA recommends consideration of radon mitigation measures is 4 picocuries per liter (pCi/L) (USEPA 1992). A series of 12-month radon studies were conducted from 1990 to 1994. The studies indicated that radon levels in non-housing facilities were less than the action level of 4 pCi/L. The same study found radon levels between 4 and 9 pCi/L present in 33 of 812 housing units at the base. Retesting of the same areas that tested above the 4 pCi/L failed to verify the previous results (USAF 1997c).

To reduce emissions, Columbus AFB will utilize low volatile organic compound (VOCs) spray paints, recover and reuse spent solvents, alternative fuels, switch to an electrostatic spray paint system, install new boilers and heaters, recover vapor at gas stations and provide training on how to determine VOC content of a product.

Aircraft Noise

Aircraft operations are the primary source of noise at Columbus AFB. Aircraft activities include pilot training, aircraft maintenance, and transient military aircraft operations. During periods of no flying activity at Columbus AFB, noise results primarily from aircraft maintenance and shop operations, ground traffic movement, occasional construction and similar sources. This noise is almost entirely restricted to the base itself. It is during periods of aircraft ground or flight activity that the noise environment changes.

Noise from aircraft operations at Columbus AFB was defined using the Air Force developed NOISEMAP (Version 6.5) modeling program. This model predicted areas exposed to day-night average sound level (DNL) of 65, 70, 75, 80, and 85 A-weighted sound level (dBA) (noise contours) for Columbus AFB. Figure 6.2-3 shows the Columbus AFB noise contours from aircraft operations. The contours represent the anticipated noise levels from the aircraft and aircraft maintenance run-up operations associated with maximum pilot production at the Base (USAF 1999a).

Hazardous Waste Management

Columbus AFB is registered with USEPA as a large quantity generator of hazardous waste. Aircraft maintenance operations are the main source of hazardous waste (USAF 1997c). Hazardous waste is initially accumulated under the control of a shop supervisor at an area designated as a satellite accumulation point. Columbus AFB has 12 satellite accumulation points for hazardous waste. These locations are in buildings 212 (Fabrication), 220A and B (Small Paint Shop), 246 (Fuel Shop), 262 (Corrosion Control), 304 (Vehicle Maintenance), 384 (CE Paint Shop), 406 (Corrosion Control), 630 (Hydraulic Brake Shop) and 1004 (Dental Clinic). A maximum of 55 gallons of hazardous waste or 1 quart of acute hazardous waste may be accumulated at an initial accumulation point. Once the 55-gallon limit is exceeded, the container is transferred to a hazardous waste storage site (14 CES/CEIE 2000).

Hazardous waste may be stored for up to 90 days from the accumulation start date at a hazardous waste storage site. There is one hazardous waste storage site at Columbus AFB. This location is in Building 267 (Environmental Element), 14 CES/CEIE. Figure 6.2-4 shows the location of the hazardous waste storage site.

The Resource Conservation and Recovery Act (RCRA) have increased disposal restrictions and requirements on waste management as an incentive for minimizing hazardous waste generation. The Air Force has set a goal of reducing hazardous waste disposal by 90 percent from the 1992 baseline of 231,734 pounds. Columbus AFB has met this goal.

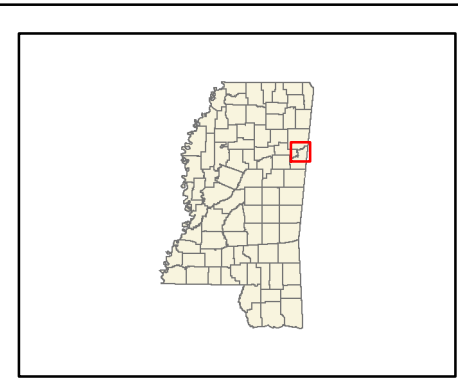
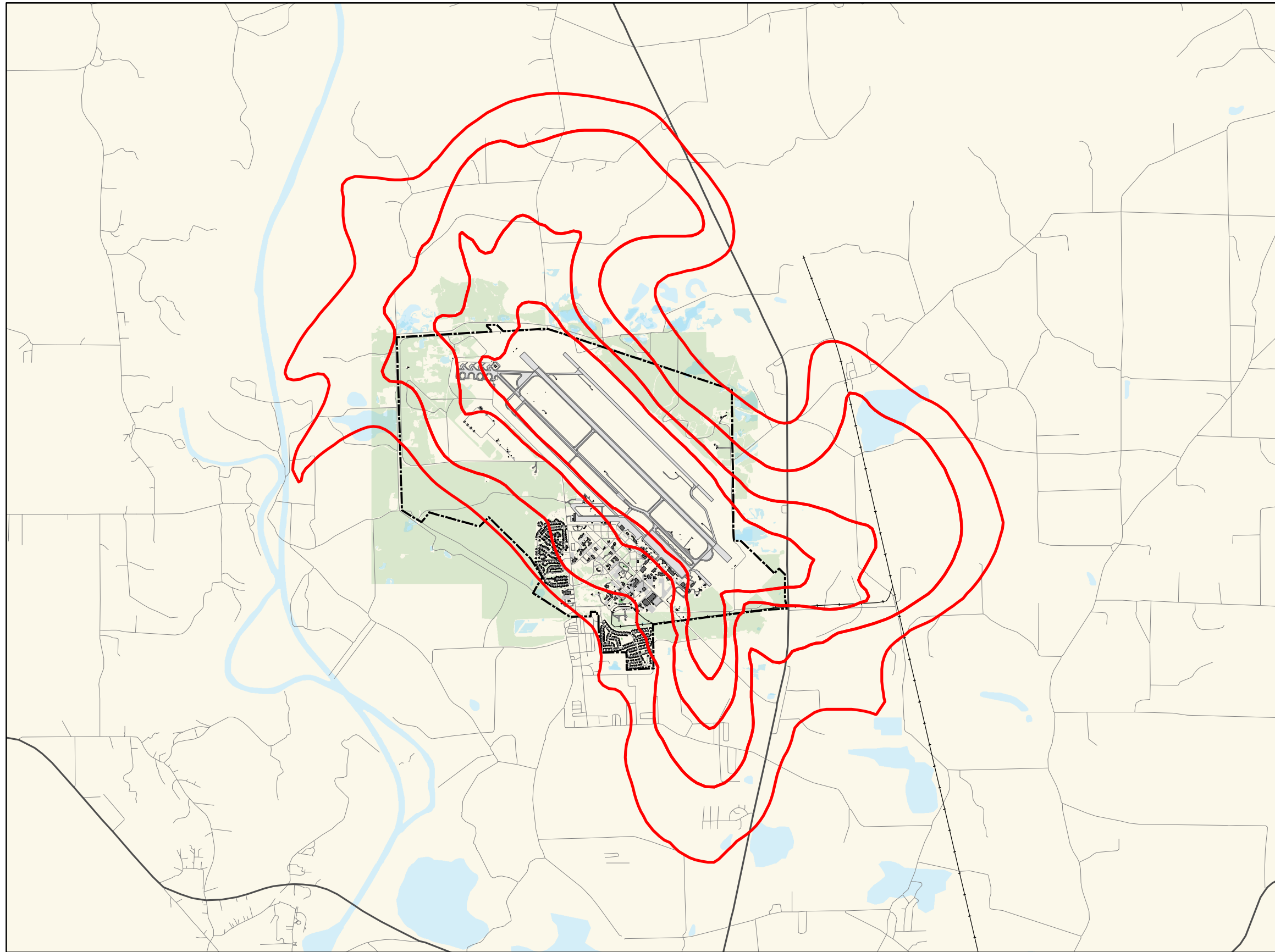









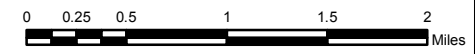


Figure 6.2-3
Noise Map



-  Noise Contours (5 DB Increments)
-  Primary Roads
-  Secondary Roads
-  Railroads
-  Water Bodies
-  Vegetation
-  Buildings
-  Airfield
-  Installation Boundary



FINAL

INRMP
Columbus AFB, MS



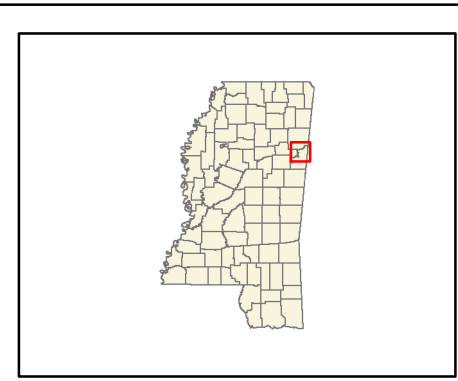
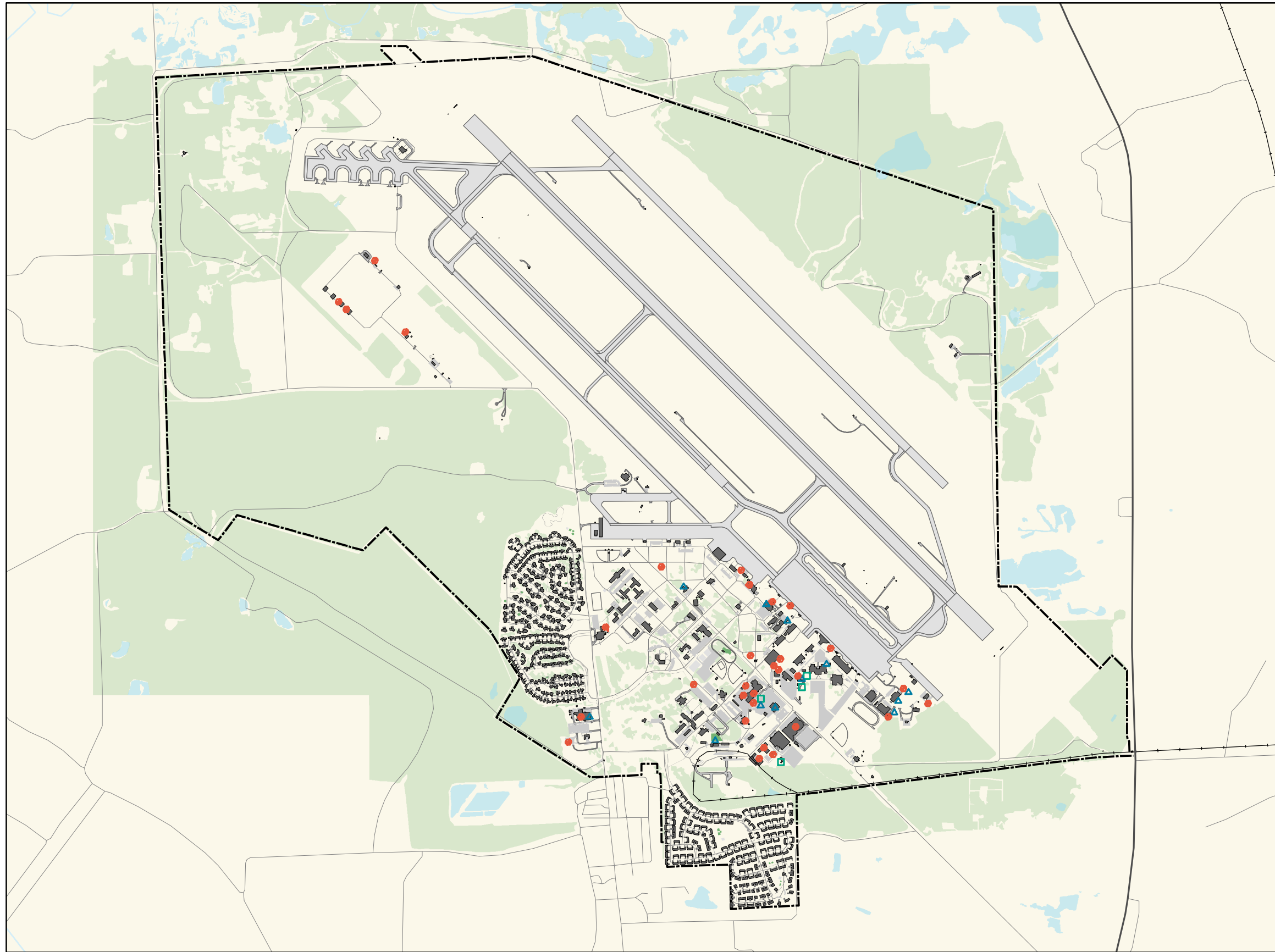
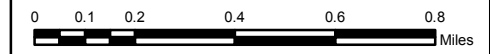


Figure 6.2-4
Locations of Hazardous Waste



- Hazardous Material Location
- △ Satellite Accumulation Location
- 90 Day Accumulation Location
- Primary Roads
- Secondary Roads
- Railroads
- Water Bodies
- Vegetation
- Buildings
- Airfield
- Installation Boundary



FINAL

INRMP
Columbus AFB, MS



Columbus AFB has set a goal of 50,000 pounds per year for hazardous waste. Columbus AFB will reduce hazardous waste disposal by materials substitution (less toxic), process engineering, or administrative controls. Columbus AFB is also working to reduce the amount of solid waste generated by recycling and composting. Ozone-depleting substances are also being phased out.

Installation Restoration Program

The Installation Restoration Program (IRP) is a subcomponent of the Defense Environmental Restoration Program (DERP), which became law under the Superfund Amendments and Reauthorization Act of 1986 (SARA). The IRP requires each DOD installation to identify, investigate and clean up hazardous waste disposal sites. The base has identified 33 IRP sites as potentially contaminated. These sites include former landfills, fire training areas, underground storage tank sites, spill sites, a demolition pit and a former outdoor firing range. Figure 6.2-5 depicts the location of the active sites (USAF 1999a). Figure 6.2-6 shows the location of monitoring wells at Columbus AFB.

None of the Base's IRP sites are on the National Priorities List (NPL) of Superfund Sites or under State of Mississippi enforcement action. MDEQ is the primary regulatory agency for RCRA and IRP sites. Of the 33 identified IRP sites, 19 require no further action with the concurrence of MDEQ and two require further investigation or cleanup.

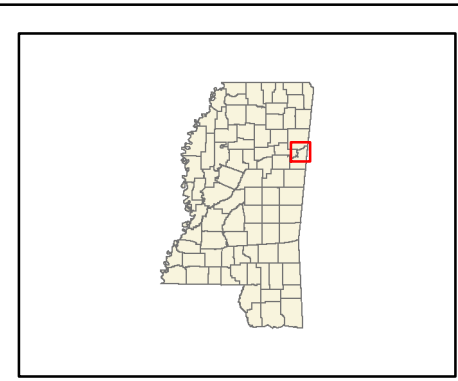
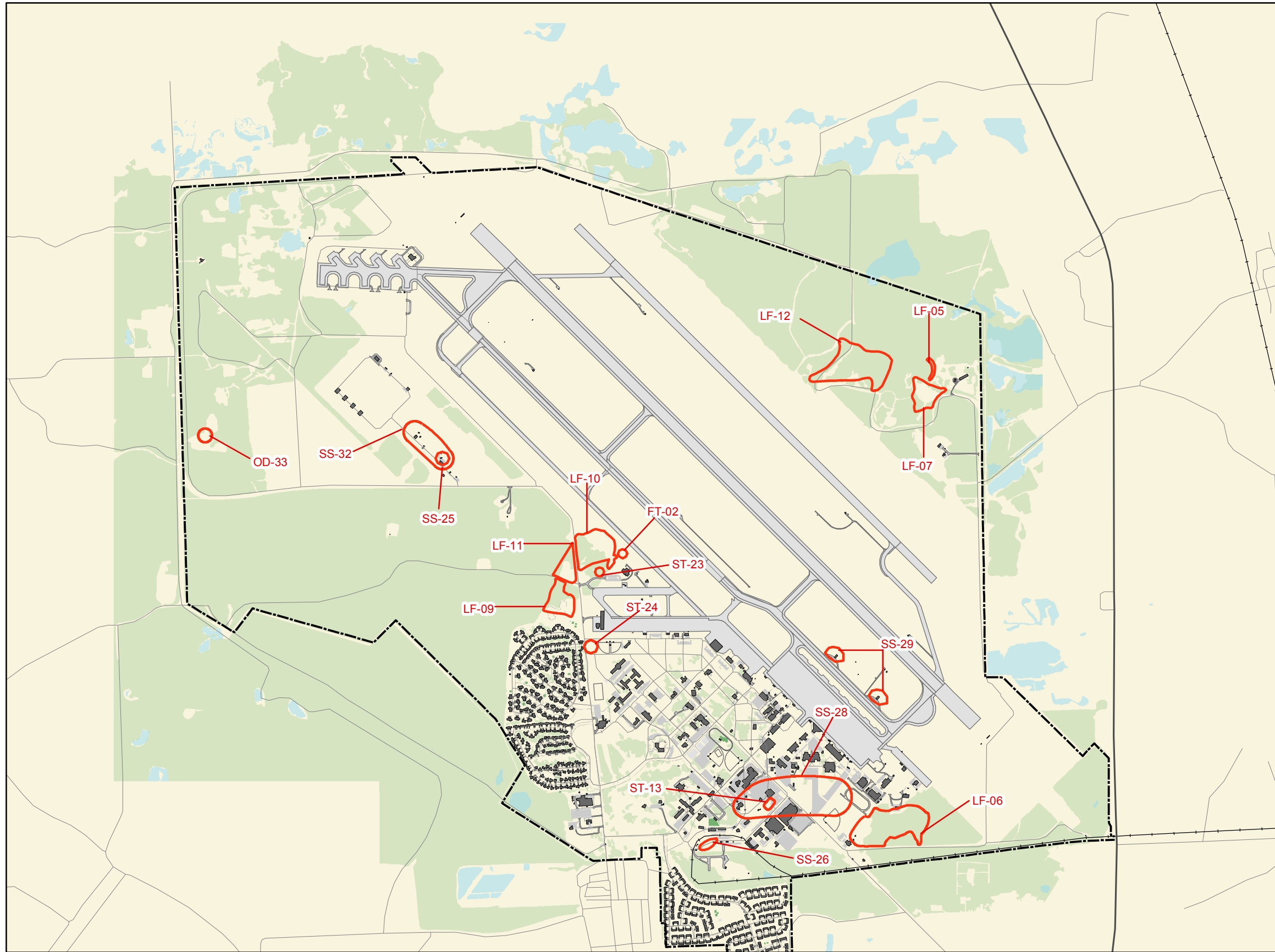
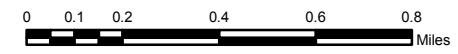


Figure 6.2-5
Locations of IRP Sites



- IRP Sites
- Primary Roads
- Secondary Roads
- +— Railroads
- Water Bodies
- Vegetation
- Buildings
- Airfield
- - - Installation Boundary



FINAL

INRMP
Columbus AFB, MS



6.3 Potential Future Impacts

Development of the infrastructure on Columbus AFB is likely to increase in the future. Additional construction is expected to occur in the core-developed areas to increase operational efficiency and to reduce the potential impacts in areas constrained by environmentally sensitive features (e.g., floodplains and wetlands) outside of the core-developed area. Future impacts to natural resources are expected to be similar to current impacts. Currently, a plan is being developed to project future development at Columbus AFB in the year 2030. See Figure 6.3-1 for future land use at Columbus AFB

6.4 Natural Resources Needed to Support the Military Mission

Healthy vegetation that stabilizes the soil at Columbus AFB is the most important natural resource that supports the mission at Columbus AFB. Utilizing grass, native landscaping shrubs and trees; forestry stands, forested wetlands is best. This vegetation should be protected to preserve soil at Columbus AFB. In addition, where possible, natural drainage pathways should be restored to prevent water from standing and damaging or killing trees in forest areas (i.e., where built-up roads block natural drainage patterns).

6.5 Natural Resource Constraints to Missions and Missions Planning

The previous sections describe permitted activities, noise, and hazardous waste management and cleanup activities affecting ecosystems existing on and adjacent to Columbus AFB. Current management practices such as grounds maintenance, pest management, and Bird-Aircraft Strike Hazard (BASH) reduction techniques have reduced the diversity and abundance of native species and their habitat. Noise from aircraft operations and disturbance of habitats by recreational use also affect biological resources.

Well-planned future development associated with Columbus AFB mission and training will help avoid many of the conflicts between infrastructure development and the natural resources present at the base. Integration of the INRMP with the General Plan and the Landscape Development Master Plan will help ensure that everyone involved understands any development and associated consequences before projects are undertaken. Table 6.5-1 provides a summary of opportunities and constraints associated with natural resources at Columbus AFB.

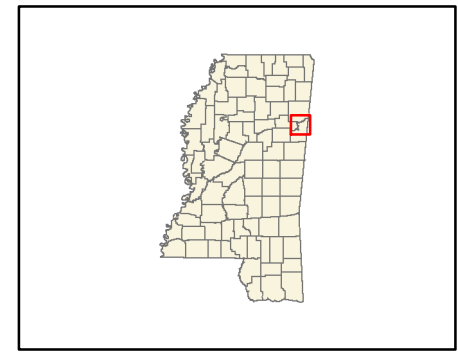
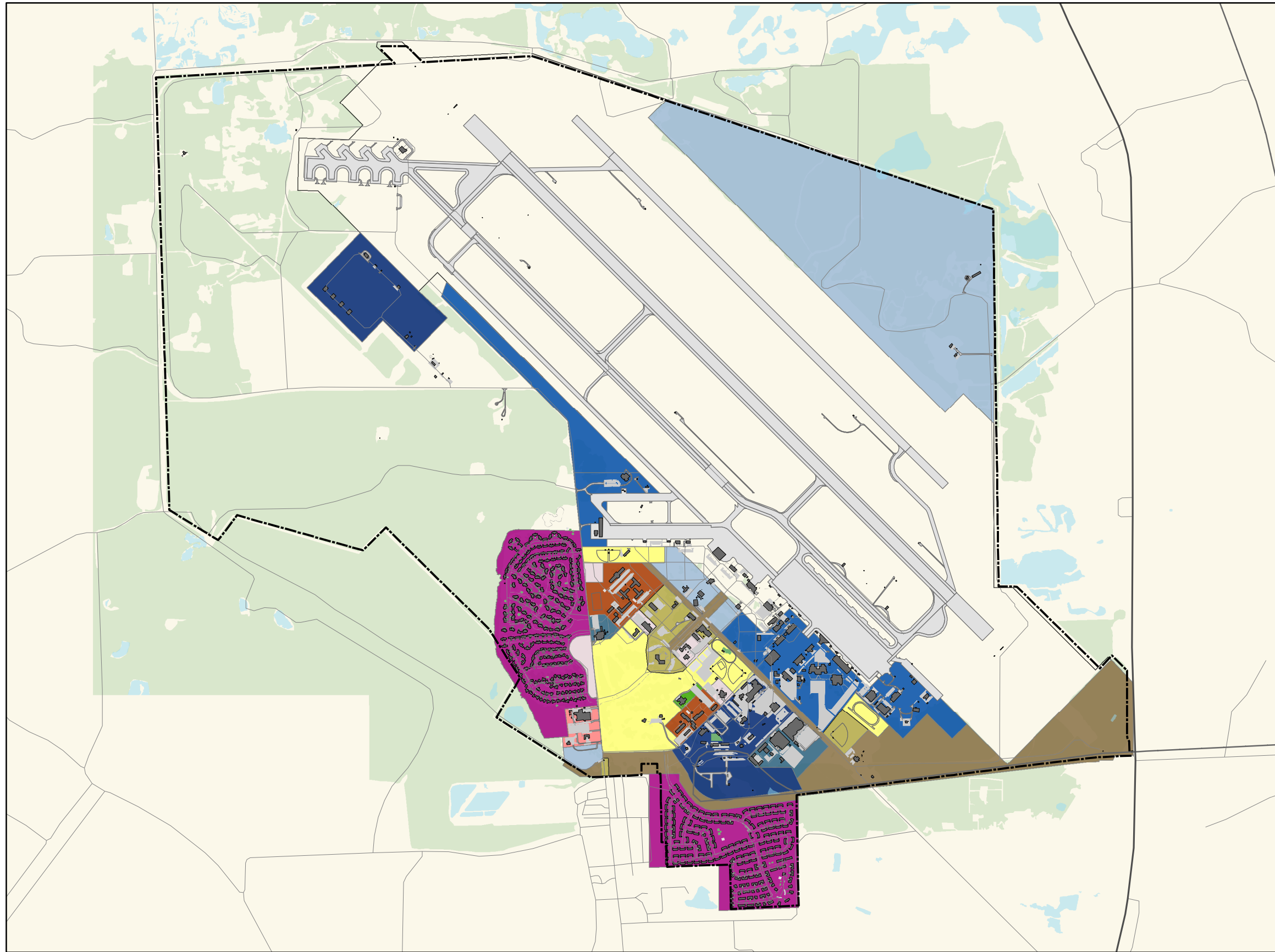
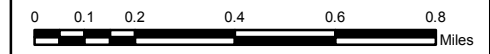


Figure 6.3-1
Future Land Use



Future Land Use Layer

- N-ADMIN
- N-AIRCRAFT
- N-AIRFIELD
- N-COMMERICAL
- N-COMMERICAL-X
- N-HOUSE-ACOMP
- N-HOUSE-UA
- N-INDUSTRIAL
- N-MEDICAL
- N-OPEN
- N-REC
- N-SERVICE
- N-UNDETERMINED
- Primary Roads
- Secondary Roads
- Railroads
- Water Bodies
- Vegetation
- Buildings
- Airfield
- Installation Boundary



FINAL

INRMP
Columbus AFB, MS



Table 6.5-1 Natural Resource Opportunities and Constraints Upon the Mission at Columbus AFB

Resource	Opportunity	Constraint
Geology and Soils	Expand construction on Columbus AFB.	Poor internal drainage and tendency to pond limit use for construction development. Restore natural drainage so that water can drain away. Revegetate denuded areas with wetland plants that do not produce food for birds or other wildlife.
Flood Hazard	Manage floodplains to preserve valuable functions. Limited, non-destructive uses may be appropriate.	Development of new facilities limited by potential for severe flooding due to approximately one third of Columbus AFB being in the 100-year floodplain; flood protection measures must be incorporated into design. May require USACE consultation.
Wildlife Habitat	Manage game species for hunting and fishing; provide opportunities to view wildlife with nature trails. Work with outside agencies to document T/E species.	Potential BASH problem if enhanced. Extent of new construction and recreation limited.
Vegetation Cover	Increase the health of the commercial forest and de-crease the amount of grounds maintenance.	Potential BASH problem if enhanced.
Jurisdictional Wetlands	Support for wildlife habitat, storm water management, pollution prevention, and aesthetics.	Development, recreation, and training activities limited. Potential BASH problem. Any alteration of wetlands may require USACE consultation.
Land Use	Implement and update General Plan and Landscape Master Development Plan to limit conflicts between developed land use and natural re-sources. A plan for the year 2030 is being developed.	Turf and other areas near active runways must be managed for BASH.
Outdoor Recreation	Maintain recreation activities. Keep trails and fields in good repair.	None.
Cultural	Maintain Cold War Era buildings.	Buildings and structures cannot be significantly changed.

7.0 NATURAL RESOURCE PROGRAM MANAGEMENT

Natural resource concerns for Columbus AFB are identified in this chapter. These issues and concerns are defined as essential points for consideration in developing goals and objectives and management strategies (Chapters 8). In several cases, they point to a need to resolve a conflict between the resource and the military mission. The natural resources present at Columbus AFB provide both opportunities for resource enhancement and certain constraints to further development or intensification of base activities. Resource management issues generally relate to the need of ensuring flight safety, accommodating recreational needs of base personnel, improving drainage and water quality and maintaining the visual quality of highly landscaped areas.

7.1 Natural Resource Program Management

Specific responsibilities of the 14 FTW are outlined in Chapter 2, Section 2.5. However, responsibility for implementing the INRMP is a combined effort of many parties. Other federal agencies involved in implementing the INRMP are: the Forest Service, assists with forest management; the USACE, delineates wetlands, the NRCS, assists with many aspects of natural resource conservation, and the USFWS, assists in the development of the INRMP and is a signatory agency for the INRMP. The Mississippi Department of Wildlife, Fisheries and Parks may assist with implementation of the INRMP. Mississippi Museum of Natural Science may assist in the identification of endangered or threatened species and their habitat.

7.2 Geographical Information System

Columbus AFB is in the process of converting auto CAD files to GIS. Columbus AFB personnel will maintain these new GIS files. A database of natural resource inventories will be created and interpreted into the GIS. An additional issue is the availability of 14 CES/CEIE personnel adequately trained to use and maintain this database over time.

To alleviate this situation, the following steps need to be undertaken. First appoint a GIS administrator who is familiar with the software and natural resource data layers, and provide training for the GIS administrator in new software and applications. This person should have a natural resource focus and background in natural resources and/or geography. Second, provide for annual or semi-annual updates of natural resource data layers. Some layers such a soil or geology will obviously change very little over the years, but some layer such as vegetation or land use have the potential to change more quickly and the means to rapidly incorporate these changes should be in place. In addition to the above-mentioned layers, resource layers should include arboretums, hunting and fishing areas, forestry stands, urban trees, wetlands, nature trails, streams and other bodies of water, floodplains, outdoor recreation areas, exotic species infestation areas and endangered or threatened species areas. Each data layer should be evaluated and a maintenance plan should be devised and adhered to. On-the-ground evaluation to determine accuracy of the data layers should also be performed.

In addition, Columbus AFB should not only maintain a natural resources management database, but also track progress toward goals. Consult with MAJCOM for information on the appropriate format and software to be used. Maps should be prepared on a scale that is practical for the size of the installation and should be reviewed annually. GIS maps should be compatible with base comprehensive planning maps. Share GIS and other information on species and habitat with state Natural Heritage database and the local Nature Conservancy. Cooperative agreements are the means to facilitate this exchange. Ensure that at least three or four people are annually trained in the use of GIS receivers and field computers.

7.3 Fish and Wildlife Management

Columbus AFB contains woodland and grassland communities that provide habitat for a variety of wildlife species. SAC Lake, Timberlane Nature Trail area and other wetlands and forests, which are the main wildlife habitats of importance as resource opportunities, are the areas most in need of preservation and/or enhancement. The adjacent Tombigbee and Buttahatchee Rivers, floodplains and landscaped areas also support wildlife.

Hunting and fishing license from the state of Mississippi is required for individuals who wish to fish in SAC Lake and/or hunt game in season. After obtaining the state license for these activities, a person must then go to Outdoor Recreation Building, (Building 152), pay a \$7 fee (fishing) or a \$22 fee (hunting).

SAC Lake is stocked with largemouth bass, hybrid bream and catfish.

Hunting is permitted in Area B near the nature trails and is marked off by signs. Revenues for the period January 2003 to December 2010 from hunting and fishing were \$8000

Deer are very numerous at Columbus AFB and are a problem on the airfield. The USDA Wildlife Services Division conducted a study entitled Columbus Air Force Base Study of White-tailed Deer. The purpose of this study is to learn about the movements and population dynamics of white-tailed deer to decrease the numbers of deer-related accidents on the airfield.

A biologist from NRCS performs periodic sampling of SAC Lake. Bluegill bream, largemouth bass, and other predator fish such as alligator gar have been harvested. It has been suggested that a record be kept of all fish that are caught, in order to determine when the lake needs to be restocked. In addition, NRCS recommends sinking cedar trees in three or four areas within the lake in order to enhance spawning in the pond. Lime has been added to the lake in the past based on recommendations from USACE staff.

Any proposed enhancements for fish and wildlife management must be in compliance with the approved BASH reduction plan for Columbus AFB. Suggested projects for improved fish habitat and the related fishing opportunities include renovation of SAC Lake. A design of the lake should be attempted to increase the value of fish habitat without compromising airmen and aircraft safety. Discussions with NRCS staff familiar with SAC Lake should commence to explore the possibility of improving fishing opportunities at SAC Lake.

The main concern at Columbus AFB is maintaining the airfield in such a manner that it is unattractive for wildlife to minimize accidents involving aircraft, or BASH. Birds and deer crossing the runways and airfield clear zones increase the potential for strikes between aircraft and wildlife. Since the Tennessee-Tombigbee lock-and-dam pool was completed in 1981, there has been an increase in the number of migratory ducks and geese in the Columbus AFB area. Bird habits are monitored closely, since bird and animal collisions with aircraft cause damage to aircraft annually and could result in loss of life.

Opportunity: Increase the numbers of deer harvested to help diminish deer problems around the airfield and raise money for natural resource enhancement on the Base.

Constraint: Probably none, as hunters are required to have a hunter's safety briefing and must stay within marked areas.

Opportunity: Manage game species for hunting and fishing opportunities.

Constraint: As mentioned above, BASH reduction must be taken into consideration before implementing any actions that may increase interactions between aircraft and wildlife. Involve personnel responsible for the BASH plan implementation in all proposed projects that may impact wildlife usage of Columbus AFB.

Opportunity: Work with outside agencies to document the presence of potential T/E species on or adjacent to lands controlled by Columbus AFB.

Constraint: Limit impacts to critical habitats, especially wetlands and waterways, caused by new construction, recreation or other mission roles.

7.4 Management of Threatened and Endangered Species and Critical Habitats

State

Several natural resource inventories have been conducted at Columbus AFB. As stated previously, the 1994 Nature Conservancy field survey found no endangered, threatened or special status species on Columbus AFB controlled lands. However, according to the MMNS in 2000, one state-endangered species is known to occur on Columbus AFB, the Alabama shiner. A MMNS 2004 list of endangered species located within two miles of the base is attached to this INRMP in Appendix A. Columbus AFB has records of state special status species that include the loggerhead shrike and three plant species: Oklahoma sedge, swamp hickory and lobed tickseed. At the present time, a year-long endangered species survey is underway. See Appendix A for progress report and tentative species list dated fall 2004. Lists of principal species found on Columbus AFB are also located in Appendix A of this INRMP.

In July 2004, the MMNS verified the presence of the freckle belly madtom on Columbus AFB (Appendix A). As long as wetland and riparian water quality on Columbus AFB is preserved in its current state, there should be no concern involved with protection of the freckle belly madtom. In addition, the current endangered and threatened species survey will identify areas containing rare species and recommend measures to avoid damage to these areas.

Federal

Federally listed animal species include the eagle, the Indiana bat, piping plover and several aquatic species including small fish and mussels whose habitat has been degraded by development, sedimentation and competition with introduced species. The bald eagle is a concern according to the USFWS. Eagles nest in large trees in areas that are transitional from open water to forest. Their nests are constructed in mature pines or bald cypress. A base wide survey for bald eagles has been conducted and no eagles or nest sites have been found on the base. Columbus AFB coordinates with the USFWS office in Jackson, Mississippi on its environmental assessments in accordance with the requirements of NEPA.

Commercial timber tracts, SAC Lake and Timberlane Nature Trails are valuable wildlife habitat. About 40 different species of birds were observed at the lake and nature trail habitat during the June 8-11 2004 site visit. This represents only a small fraction of those actually present whose identity could not be confirmed by call alone. Many birds were observed carrying food which is an indication of breeding. Fresh deer tracks were seen each time the Timberlane trail was visited. Most of the 40 bird species observed were

neotropical migrants including the wood thrush (*Hylocichla mustelina*), a valuable and vulnerable wildlife resource.

Opportunity: This area is important for recreational as well as habitat preservation opportunities and should be preserved in its current state for the benefit of Columbus AFB personnel, wildlife and in the interest of preserving wetlands.

The USFWS's proposed critical habitat designation for endangered mussel species includes portions of the Tombigbee River drainage in Mississippi and Alabama. Areas to be designated as critical habitat closest to Columbus AFB are Unit 3, which includes the Buttahatchee River and Sipsey Creek in Lowndes and Monroe Counties, Mississippi, and Lamar County, Alabama; and Unit 4 consisting of Luxapallila Creek and Yellow Creek, Lowndes County, Mississippi and Lamar County, Alabama. Unit 3 (Buttahatchee River) lies just to the north of the Columbus AFB from its confluence with the Tombigbee upstream to its confluence with Beaver Creek in Alabama. Unit 4 includes the main stem of Luxapallila Creek from Waterworks Road, to approximately 0.6 miles above Caledonia Steen Road, Columbus, Mississippi. Both Units 3 and 4 provide critical habitat for the ovate clubshell, southern clubshell, and Alabama moccasinshell and orange-nacre mucket.

Constraint: Controlling erosion and protecting surface water quality for people and wildlife on and off base is an important concern for Columbus AFB and the region. BMPs (mulching, use of hay bales, silt fences, and promptly revegetation-denuded areas) for reducing and controlling erosion should be employed during all soil-disturbing activities at Columbus AFB.

Constraint: Bald eagles are present in the waterways in the vicinity of Columbus AFB and pose a BASH concern to aircraft training.

Opportunity: Columbus AFB has been proactive in the location, mapping and avoidance of bald eagles nests and foraging areas and may win an award from the USFWS for its actions.

7.5 Water Resource Protection

Columbus AFB is within the Tombigbee River basin. Major surface water resources in the vicinity of Columbus AFB include the Tennessee-Tombigbee (Tenn-Tom) Waterway, the Buttahatchee River and numerous tributaries. The Tenn-Tom Waterway is located approximately one mile west of the base and receives the majority of surface water drainage from the base via Stinson Creek. Stinson Creek lies near the southwest corner of Columbus AFB. The Buttahatchee River is located approximately 1,000 feet north of the base and receives surface water drainage from the northeastern portion of the base via two drainage ditches. The Buttahatchee River flows into the Tenn-Tom Waterway approximately one mile from the northwestern corner of the base.

The Mississippi Department of Environmental Quality (MDEQ) monitors water quality in Mississippi. In 1998, MDEQ started using a Basin Management Approach. This approach involves state and federal agencies with the goal of coordinating all of the water quality activities that take place within the river basins to optimize the resources of all agencies. Columbus AFB is not currently a part of this working group but should consider sharing its resources.

Monitoring data and information collected by MDEQ are used to make water quality assessments. Assessments are general characterizations of water body health. The state's most comprehensive assessment report is the Federal Clean Water Act Section 305(b) Water Quality Inventory Report. Starting in 2000, MDEQ began focusing each 305(b) report on a particular basin and the 2000 report focused on the Pascagoula River Basin. Annual storm water sampling and inspections are performed in accordance with permit requirements.

Surface waters (e.g., streams, rivers, lakes, estuaries, etc) are assigned intended uses. These designations allow regulatory agencies to establish water quality goals, which protect aquatic life and allow safe use by the public. These goals are referred to as Water Quality Standards. Intended uses are Public Water Supply, Shellfish Harvesting, Recreation, and Fish and Wildlife (i.e., Aquatic Life Use Support).

MDEQ has listed several creeks and rivers in the Tombigbee River Basin as impaired water bodies particularly in regard to supporting aquatic life. The list of creeks and rivers in the vicinity of Columbus AFB includes the Buttahatchee River, McCrary Creek, Stinson Creek, Town Creek, Spring Creek, Unnamed Tributary of Tenn-Tom Waterway, segment 1, Unnamed Tributary of Tenn-Tom Waterway, segment 2, Yellow Creek, and Luxapallila Creek. As stated in the previous section, Columbus AFB will employ BMPs to reduce erosion and run-off to surface waters in the area.

7.6 Wetland Protection

In May and June of 2002, another wetland inventory was conducted by the United States Department of Agriculture, Natural Resource Conservation Service (USDA NRCS). In this study, 26 individual wetlands for a total of 181.24 acres were delineated. These ranged in size from 0.21 to 62.1 acres.

Opportunity: Jurisdictional wetlands provide opportunities for enhancing wildlife habitat. Preservation and enhancement of existing wetland areas serves many functions in addition to wildlife habitat, including storm water management, pollution prevention, and aesthetics. Implement the Long-Term Monitoring of Wetland Functions project to document trends in the health and value of wetland areas at Columbus AFB.

Constraint: Enhancement of wetlands and riparian zones for birds and other wildlife in some areas may be constrained by the base mission that requires minimization of potential BASH problems.

Opportunity: Forested areas have the potential to be used for realistic training should the need arise in the future. However many forested areas at Columbus AFB contain wetlands, which are protected by Section 404 of the CWA.

Constraint: Jurisdictional wetlands constitute constraints on development, recreation, and training activities that would result in the alteration, destruction, loss, or degradation of the wetlands. Implement the Permanent Wetland Database project to quantify the location, size, and distribution of jurisdictional wetlands at Columbus AFB.

Opportunity: Watercourses on Columbus AFB are considered opportunities for possible non-point source pollution control and cleanup, including the preservation or enhancement of wetlands and riparian zones for wildlife.

Constraint: Watercourses in the vicinity of the runway should not be improved because of BASH concerns. The 100-year return period flood hazard zone for Columbus AFB was determined in the Flood Insurance Study prepared by the Federal Emergency Management Agency (FEMA). The northwestern third of Columbus AFB is generally within the 100-year floodplain of the Tombigbee and Buttahatchee Rivers, adjacent to the west and north, respectively. Surface drainage in that area is generally poor, and ponding or flooding occurs occasionally. Before construction of the Tennessee-Tombigbee Waterway, the Buttahatchee River back flooded onto the base near the North gate. During the severe rains of 1973 and 1979, portions of the runways were inundated. The remaining portions of Columbus AFB are above the 100-year floodplain, and are well drained by several small, perennial streams.

Opportunity: Manage floodplains to preserve the valuable functions floodplains provide (i.e., wildlife habitat, flood moderation). Limited, non-destructive recreational uses of floodplains may be an appropriate use of this resource.

Constraint: The flood hazard area is a potential constraint to the development of facilities that could be severely damaged by flooding. Any new projects in the hazard area may require USACE consultation and incorporation of approved flood protection measures into their design.

7.7 Grounds Maintenance

Much of the grounds maintenance that occurs on Columbus AFB is provided by services contracted by the government. The involvement of Air Force personnel responsible for administration of the grounds maintenance contracts is essential for efficient grounds maintenance operations. Solicit their input early in the planning process. Air Force employees administering these contracts should ensure that the companies providing the grounds maintenance services are qualified to do the work and are familiar with the regulations and policies outlined in various plans, including this INRMP.

An urban tree inventory was completed for Columbus AFB (February 2004) by Trees America and their recommendations have been incorporated into the goals, objectives and projects chapter of Chapter 9. Meeting the criteria for Tree City USA designation is a directive specified in AFI 32-7064. Columbus AFB has achieved Tree City USA designation and should continue to maintain this status.

Pest management personnel are in charge of controlling certain species (rodents, birds, insects, and undesirable invasive plant species) in turf, ornamental and other areas on Columbus AFB. Emphasis is placed on inspections and integrated pest management techniques including mechanical removal of infested or diseased portions of plants. The current Pest Management Plan details the approved methods for managing pests in the developed portions of Columbus AFB. DoD-certified pest management personnel perform daily operations, which include surveillance, trapping, exclusion, pesticide application, and records maintenance for Columbus AFB, Shuqualak Auxiliary Airfield, and one radar site located at Greenwood Springs, Mississippi.

In accordance with the Columbus AFB Storm Water Pollution Prevention Plan, only EPA- and HQ AETC-approved herbicides and pesticides are used at Columbus AFB. Only the least toxic effective chemicals are used and application is in accordance with label instructions. The Pest Management Annual Work Plan states objectives and goals for such things as pesticide reduction. In addition, herbicide and pesticide application in sensitive areas, such as wetlands, will have appropriate controls for pesticide drift, including

inspection of sensitive areas and determination of the direction and speed of the wind. Pest management will coordinate with 14 CES/CEIE and 14 MDOS/SGOLJ before spraying in sensitive areas.

7.8 Forest Management

Commercial forestry occurs on Columbus AFB. Recommendations provided to Columbus AFB by the USFS should be implemented to improve stand health and provide for sustainable use. Columbus AFB actively manages pine and hardwood species for timber production to produce a 50-60 year pine turnover and 80-year hardwood turnover. Columbus AFB has an agreement with the USFS to manage its forestry stands. In general, they use the same management scheme as they use on the Tombigbee National Forest. Silvicultural treatments are as follows:

- Pine stands-even aged management is used with the seed tree method, limited clear cuts, prescribed burns and thinning; with the seed tree method all trees are removed except selected seed-producing trees
- Hardwoods-uneven aged management is used that promotes tree species improvement a selection process resulting in more oaks and less sweet gum; prescribed burns are also employed in hardwood stands.

The dominant vegetative cover present at Columbus AFB is mixed pine and oak. Non-forested areas contain both native and non-native herbaceous species under varied grounds maintenance scenarios. Plant species found in and along wetland drainages include cattail, pennywort, needle rush, pickerelweed, and cord grass (USAF 1998). Native vegetation also includes tupelo, sphagnum moss, and ferns. Vegetative cover at Columbus AFB provides wildlife habitat, a sustainable source of timber income, and recreational opportunities. A complete list of vegetation can be found in Appendix C.

Opportunity: Increase the health of the commercial forest by implementing the recommendations provided by the United States Forest Service (USFS) to improve the sustainability of the stands.

Opportunity: Decrease the amount of grounds maintenance in areas that do not require high maintenance programs. Replace high maintenance landscapes with lower maintenance landscapes.

Constraint: As stated earlier, BASH reduction must be taken into consideration before implementing any actions that may increase interactions between aircraft and wildlife. Do not alter current grounds maintenance operations in BASH areas without consulting personnel responsible for the BASH plan implementation.

A 1998 survey identified several pine stands that were in immediate need for thinning. Basal area in these stands was noted to be between 150 and 200 square feet per acre, while regional standards for forest management suggest an optimum level of stocking at about 80 square feet per acre. Under direction of Columbus AFB, the USACE executed a timber sale for the tree resulting from the forest thinning treatment in 1999 on 93 acres of overcrowded pine stands that were planted in 1981 and 1969.

Prior to award of a thinning contract, some of the overstocked pine stands at Columbus AFB suffered attacks from engraver bark beetles of the genus *Ips*. These beetles usually attack injured, dying, or stressed trees. Infestations are particularly common in trees weakened by drought, overcrowding, or lightning strikes. In 1999, Columbus AFB was forced to control epidemic *Ips* bark beetle infestations by

removing all trees from several small areas on the installation; these control measures appear to have saved the remaining forests.

Since 2000, several burns, thinning operations and a clear cut have been accomplished in accordance with recommendations from the USFS and the HQ AFCEE Forester to improve the health of timber stands at Columbus AFB. Below is a summary of forestry management actions at Columbus AFB conducted in response to the 2000 USFS and the HQ AFCEE Forester's recommendations:



- Burns were implemented in 2001 in Compartment 3, Stands 1 and 2 and in March of 2004, in Compartment 3 Stands 3 and 4 and parts of Stands 8, 12 and 13. Burns are difficult to conduct on Columbus AFB because weather conditions have to be coordinated with periods when the pilots are not flying.
- A thinning was conducted in September of 2003 in Compartment 3 Stands 7 and 8 and Compartment 4, Stand 3.
- Timber was also thinned in response to a 1998 survey that identified a pine beetle infestation. As a result Compartment 3, Stand 5 was thinned.
- A Clear Cut was done around the GATR site recently, which included parts of Compartment 4, Stands 5, 6, 7, 8, and 10. See Appendix D for photographs of forest management at Columbus AFB and SAA.

7.9 Wildland Fire Management

Headquarters of the Air Force Center for Engineering & the Environmental (HQ AFCEE) recommends periodic burns to control the growth of understory and to decrease insect and disease problems. Periodically burned forests often exhibit increased growth of grasses and flowering plants that can enhance the aesthetic quality of the forest for outdoor recreation. In addition to coordinating with the local Forest Service offices, prescribed burns must be coordinated with flight operations to determine burn times that do not conflict with flight activity (AFCEE/ECC 2000b). Since 2005 forestry mowing has substituted for burns. A Wildland Fire Management Plan has been developed for Columbus AFB (APPENDIX M). Columbus AFB has a state air quality permit to conduct prescribed burns.

7.10 Integrated Pest Management

Pest management records are maintained in the Integrated Pest Management Information System (IPMIS) Pest Program. The plan is reviewed annually by the Installation Pest Control Supervisor, Installation Pest Management Coordinator, Installation Environmental Coordinator, Senior Installation Engineer, Installation Medical Officer, Installation Commander and HQ Air Education and Training Command (AETC/A7CEZ) Chief, Environmental Planning Branch. The responsibility for the Pest Management Program is the Chief of Operations Flight. Daily operations are performed by DoD Certified Pest Management Personnel and include activities such as surveillance, trapping, exclusion, and pesticide application.

Pest control entails managing insects, weeds, and vertebrates that occur around the base. Columbus AFB only uses pesticides that are approved by the USEPA and HQ AETC. Insects such as fire ants, mosquitoes, cockroaches, fleas, ticks, bees, wasps, hornets, and termites are monitored and managed around the base. Low-toxicity Pesticides are applied to infested areas, when necessary. Pine beetles have been detected in the commercial forest stands at Columbus AFB and the USFS has made recommendations for their management. Herbicides are used to control weed growth, especially around the runways and taxiways. Vertebrates such as rats, opossums, and birds are controlled through the use of trapping devices and poisons. Exotic nuisance plant species like kudzu and privet will be treated with herbicide.

7.11 Bird/Aircraft Strike Hazard (BASH) Program

The Columbus AFB Bash Plan is found in Appendix E. An interview was conducted during the June 2004 site visit with the USDA, Animal Services wildlife biologist. He provided information on the types of birds and other wildlife that are managed or depredated on the airfield at Columbus AFB. Mammals include coyotes, foxes, beaver, deer, otter, muskrat, bobcats, nutria and rabbits. Birds include swallows and their nests, great blue and little blue herons, American egrets, ducks geese, meadowlarks, horned larks, blackbirds, turkey and black vultures, harriers, kestrels, mourning doves, Eurasian collared doves, pigeons, starlings, savannah, grasshopper, field and white-throated sparrows, other miscellaneous songbirds, nighthawks, whip-poor-wills, and a few bats. Turtles are occasionally a problem as they attempt to cross the airfield. The state endangered subspecies of wood stork may also occur at Columbus AFB, but because they are protected, they are harassed rather than killed, to make them leave the area.

The heaviest strike areas in the vicinity are the Tombigbee and Mississippi Rivers. Columbus AFB uses scare cannons to drive away birds, and is working with Mississippi State University on a real-time bird radar system to reduce strikes. Columbus AFB can also make use of predictive computer models so that flying can be avoided at times when bird strikes are most likely to occur.

Deer are a significant problem at the runway area too. They are attracted to grassy areas around the airfield because it resembles their natural feeding habitat, clearings near wooded areas. Deer are hunted at Columbus AFB. At the present time, they may be taken either with guns and/or archery equipment. Hunters are allowed to take three bucks and three antlerless deer with shotguns (slug or buckshot) and may add an additional two antlerless deer with bow and arrows. The USDA biologist is in favor of increasing the limits on hunting rather than just rounding up the deer and shooting them. They intend to initiate jaw collecting during harvest to determine age structure of the deer population on base to facilitate control of deer numbers.

7.12 Outdoor Recreation

Nature and exercise-related outdoor recreation occurs in the open areas on Columbus AFB. The public does not have access to Columbus AFB recreation facilities. Hunting by DoD personnel is permitted in marked areas around the base and fishing is permitted in SAC Lake.

It is DoD policy to allow public access to natural resources on military bases consistent with the installation's safety and security requirements and the availability of manpower and natural resources to support such activities without degradation or impairment of environmental qualities. In general, the mission of Columbus AFB precludes public use of the installation's natural resources, including hunting and

fishing. This does not pose a problem since Lowndes County provides significant public access to similar natural resources.

Recreation opportunities and facilities featured at Columbus AFB are: an outdoor recreation center with several playing fields including tennis, softball, soccer, flag football, volleyball, and basketball courts. The base also has a running track, swimming pool, trap and skeet range, and a nine-hole golf course. The outdoor recreation center offers a year-around schedule of activities including off-base backpacking, canoeing, white-water rafting, skiing, rappelling, camping, and water and wilderness education. Rental equipment for outdoor recreation is also available. There is also a youth recreation center. There are stables with 15 stalls for horses. There are also three self-guided nature trails within the Timberlane Trail area: Sparkleberry, Willowoak Walk and Dogwood Trails. Birds and other wildlife are abundant in the SAC Lake and Timberlane trail area. The Timberlane Trails were recognized as a certified Arboretum in 2010.

Opportunity: Maintain recreation opportunities. Keep trails and fields in good repair to minimize negative impacts to natural resources such as surface waters and soils.

7.13 Cultural Resources

Important historical cultural resource items are present at Columbus AFB. One is the historical marker made of stone that marks the site of one of the first homesteads in northern Mississippi. Another is a privately owned family cemetery, with graves that date from the 1840s. The cemetery is important because it marks the graves of some of the first inhabitants in Lowndes County. In addition, graves were discovered during the construction of the central runway and they were moved to the cemetery. It is also thought that the marker may have been moved possibly from the site of the central runway as well. The marker, set in modern concrete, is on the extreme eastern side of the base across a dirt road from the stables.

Although there are no known archaeological resources at Columbus AFB, there are Cold War Era buildings or structures that are eligible for listing in the National Register of Historic Places (NRHP). Of the 655 buildings or structures evaluated during a survey in 2003, only 22 were found to need further evaluation (Columbus AFB Integrated Cultural Resource Management Plan, 2004). Of the 22, only two were eligible for listing based on their association with the Cold War mission at Columbus AFB. These are: the Crew Alert Facility (demolished 2008) and the Alert Apron. The Hound Dog Missile Multiple-Cubicle Storage magazine (demolished 2010). Coordination with Miss. SHPO resulted in the removal of the two structures from a significant status.

7.14 Soils and Land Use

Many of the soils at Columbus AFB have poor drainage and remain saturated or ponded for extended periods of time. These soils are located primarily in the northeastern and southwestern portions of the base.

Constraint: The physical characteristics of many of the soils in the undeveloped portions of Columbus AFB limit their use for development. These soils have poor internal drainage and are prone to accumulations of standing water.

Restoration of natural drainage patterns through use of culverts or other structural means should help alleviate this problem. Groundcover plants such as native wetland species that do not produce food for wildlife should reduce erosion, which is an additional concern in these wet areas.

Land use issues at Columbus AFB relate primarily to conflicts between wildlife needs and military mission activities. There are approximately 3,000 acres of developed land at Columbus AFB. High-impact land uses include three on-base runways, and buildings for administration, education, medical treatment, aircraft operation, housing, and other support functions. Open space at Columbus AFB accounts for approximately 1,934 acres of the total base area. Low-impact land uses at Columbus AFB are associated with recreation and open space (aircraft runway easements and woodland areas) (USAF 1998). Approximately 300 acres at Columbus AFB are suitable for development without restriction, and another 140 acres could be developed by adding 2 or 3 ft of fill in order to bring them above the 100-year floodplain mark.

Opportunity: Well-planned future development will avoid many of the conflicts between development and the natural resources. Implementation of and updates to the General Plan will assure that any development and the associated consequences are understood before projects are undertaken. Also, implementation of the Land Management Plan Project may assist with limiting conflicts between developed land use and natural resources.

Constraint: Turf and other areas near active runways need to be properly maintained to minimize BASH potential. Follow the guidelines detailed in the BASH Plan (Appendix E) to minimize interactions between wildlife and aircraft.

7.15 Enforcement

Columbus AFB appoints base game wardens annually to provide enforcement of hunting and fishing regulations. Columbus AFB Game Wardens are selected and nominated by the Conservation Manager. Appointment is by the authority of the 14 Mission Support Group Commander (MSG/CC). All appointed game wardens are required to be trained in conservation law enforcement. Game Wardens are granted the authority to enforce Columbus AFB policies under requirements of AFI 32-7064, paragraph 6.4.2, the Columbus AFB Sportsman Proclamation, and other applicable guidance. Random patrols and surveys of hunting and fishing activities are performed to monitor safe and appropriate practices, with as little disturbance as possible. In addition, hunters and fishermen at Columbus AFB must possess a valid state hunting or fishing license.

7.16 Public Outreach

Columbus AFB sponsors both Earth Day and Arbor Day celebrations each year in April. Fourth grade students from local schools are invited to attend. Local sponsors including Weyerhaeuser and the Mississippi Forestry Commission, participate by developing environmental learning stations. In recognition of Arbor Day the Columbus AFB Arbor Day Proclamation is read by 14 FTW Wing Commander and native trees are planted.

8.0 MANAGEMENT GOALS AND OBJECTIVES

There are seven goals to guide natural resources planning and management at Columbus AFB and Shuqualak AA that express a vision for a desired future condition for the period covered by the INRMP (2005-2009). The goals and objectives listed in this section are policy statements that provide the overall program direction (goals) and specific management instruction (objectives) for the natural resources management programs. Natural resources management goals for Columbus AFB were formulated from a comprehensive analysis of regulatory requirements, the current condition of the natural resources on the installations, and a consideration of the value of these resources to the people who live and work on the installations.

Each INRMP goal is supported by objectives that outline the strategy that will be used to achieve a stated goal. An objective supports a written goal by proclaiming more specifically the management actions that must occur to accomplish each goal. As a final step, the INRMP goals and objectives are put into action by formulating and implementing specific projects. Projects are the “steps” for achieving each objective. A project can be completed using in-house resources, through cooperative agreements with other agencies and partners, or by contract action. Projects can be defined as specific budget line items that will be programmed into the Air Force Automated Civil Engineer System–Project Management (ACES-PM) for funding. Each project description is written to be specific and time bound. Consequently, the goals and objectives become management targets that will allow the 14 CES/CEIE to quantitatively track the progress towards implementation of the INRMP.

Goal 1: Provide a natural resource management program within 14 CES/CEIE that supports the 14 FTW mission while protecting ecosystem diversity to the maximum extent possible.

Objective 1.1 Ensure that the 14 CES/CEIE Natural Resources Manager is adequately trained in the principles and practices for the management of natural resources on an Air Force installation.

Project 1.1.1 The 14 CES/CEIE Natural Resources Manager will attend the Interservice Environmental Education Review Board (ISEERB) courses “Introduction to Natural and Cultural Resources” and “Natural Resources Compliance” (reference: <http://www.cess.afit.edu/ISEERB.cfm>).

Project 1.1.2 The 14 CES/CEIE Natural Resources Manager will attend at least one DoD-sponsored natural resources training workshop each year. Examples are: the Air Force Environmental Symposium, the National Military Fish and Wildlife Association annual training workshop, the annual DoD Forestry Workshop, and the DoD Conservation Workshop.

Project 1.1.3 Conduct the five-year update of the INRMP in 2015.

Objective 1.2 Provide access to local natural resources management expertise by developing a collaborative network of public agencies and personnel with experience in land stewardship and conservation.

Project 1.2.1 Create and annually update a list of Air Force, state and other federal agency natural resource points of contacts that can be accessed for consultant services.

Project 1.2.2 Host an annual INRMP coordination meeting electronically with the U.S. Fish and Wildlife Service Ecological Services Field Office and the Mississippi Department of Wildlife, Fisheries and Parks to review changes in INRMP goals and objectives and discuss plan implementation.

Project 1.2.3 Maintain the cooperative assistance agreement with the USFS, Tombigbee National Forest. Annually develop a Statement of Work (SOW) for support services prior to the beginning of each fiscal year. Budget for and fund cooperative assistance agreed to in the SOW. Host biannual coordination meetings at Columbus AFB with USFS staff to discuss and review cooperative assistance for forest management.

Project 1.2.4 Renew the 5-year cooperative assistance agreement with the Mississippi Forestry Commission for access to wildland fire management services at Columbus AFB. Current agreement expires in 2010.

Objective 1.3. Develop the capability within 14 CES/CEIE to display and analyze geospatial data necessary for the management of natural resources at Columbus AFB.

Project 1.3.1. Procure the necessary equipment and software to implement the HQ AETC approved CADD/GIS system within 14 CES/CEIE by 2005. At the present time, Columbus AFB GIS has ArcView 8; however Columbus AFB GIS would like to acquire ArcView 9 to operate at its full potential.

Project 1.3.2 Train the 14 CES/CEIE natural resources manager by 2006 in the operation of the installation geospatial database and the application of Air Force GeoBase principles (<<http://www.afcee.brooks.af.mil/geobase/index.asp>>). Contact HQ AFCEE/EC-GIO for access to on-line GIS training resources (contact: Ms. Debbie Locklair, DSN 240-3516, deborah.locklair@brooks.af.mil).

Project 1.3.3 Acquire, from both internal and external sources, existing natural resources geospatial data, and incorporate the data layers into the Columbus AFB GeoBase network by 2012.

Project 1.3.4 Acquire updated digital aerial photography for Columbus AFB by 2011.

Project 1.3.5 Update the digital map coverage of forest inventory stand data for Columbus AFB by 2008.

Objective 1.4. Incorporate natural resources information into the Columbus AFB land use planning and development process.

Project 1.4.1 The 14 CES/CEIE Natural Resources Manager will be an active participant in the 14 FTW EESOHC.

Project 1.4.2 Produce a digital map depicting natural resources constraints to Air Force land use and land use planning by 2005. Update the map coverage into the Columbus AFB GeoBase data network as necessary.

Goal 2: Sustain the Columbus AFB Airfield and surrounding Air Force property in a manner that reduces natural resources impacts to the 14 FTW flying mission.

Objective 2.1. Manage wildlife habitat to minimize BASH.

Project 2.1.1 The 14 CES/CEIE Natural Resources Manager will be a participating member of the Columbus AFB BASH Working Group.

Project 2.1.2 Conduct coyote, beaver, deer, and bird control operations, as required, in the vicinity of the Columbus AFB airfield in accordance with the terms and conditions of the November 2001 Cooperative Service Field Agreement with the USDA Animal and Plant Health Inspection Service (APHIS), Wildlife Services Division. The 14 CES/CEIE Natural Resources Manager will act as a liaison between the BASH Working Group, Flight Safety Officer, and Wildlife Services agents.

Project 2.1.3 Amend and renew the Columbus AFB/APHIS-WS Cooperative Service Field Agreement annually or as required.

Objective 2.2. Manage airfield environments so that trees and other vegetation do not violate airfield clearance criteria specified in Uniform Facilities Criteria (UFC) 3-260-01, Airfield and Heliport Planning and Design.

Project 2.2.1 Conduct a tree survey within airfield operations areas by 2005 and identified trees on Columbus AFB property that penetrate, or are within 10 feet of penetration, of flight surfaces as defined in UFC 3-260-01. Airfield tree data shall be collected in a geospatially-referenced digital format compatible with the installation GeoBase data network.

Project 2.2.2. Convert a 20-acre tract of cutover forest beneath the approach-departure clearance surface at Shuqualak AA into a grassland community. The tract is located at the northwest end of the runway between the clear zone and the fence.

Goal 3: Protect and improve the health and condition of the forest ecosystems at Columbus AFB.

Objective 3.1. Maintain current records of forest stand boundaries, species composition, and condition.

Project 3.1.1 Perform a field survey to update the commercial forest stands at Columbus AFB in 2008.

Project 3.1.2 Using the data collected above and other data, update the Columbus AFB forest inventory database and geospatial data coverages to reflect current forest condition.

Objective 3.2. Continue to apply the USDA Forest Service recommendations for forest thinning operations identified in the Columbus AFB Forest Inventory and Report of 30 September 2008.

Project 3.2.1 Prepare and Award Timber Sale Contracts to conduct forest thinning operations for the improvement of forest health. Complete forest thinning operations on a minimum of 200 acres by 2010. Develop timber sales from among the following forest stands, by priority for treatment:

Objective 3.3. Control the spread of pine-damaging insects to endemic (non-threatening) populations by 2012.

Project 3.3.1 Collaborate with the U.S. Forest Service Forest Health Protection office, Southern Region, to conduct an annual reconnaissance of Columbus AFB forest areas for the detection of southern pine beetle infestation. Report findings to the Columbus AFB ESOHC and to the HQ AFCEE/EC Forester.

Objective 3.4. Conduct prescribed burns or forestry mowing to improve forest health in upland forest areas and for the control of invasive and undesirable exotic species.

Project 3.4.1 Prepare Burn Plans and conduct controlled burns on a minimum of 500 acres by 2008.

Objective 3.5 Reduce the extent and potential for spread of invasive and undesirable exotic plants at Columbus AFB in accordance with the integrated pest management principles outlined in AFI 32-1053, Integrated Pest Management.

Project 3.5.1 Implement the preferred alternative for the control of kudzu vine for the entire base in accordance with the Environmental Assessment. Evaluate results after 1 year and retreat when necessary.

Project 3.5.2 Continue reconnaissance of kudzu presence and spread at Columbus AFB annually.

Project 3.5.3 Conduct additional kudzu vine control at Columbus AFB in 2007 as needed and in accordance with the Environmental Assessment.

Project 3.5.4 Conduct an installation-wide survey of Columbus AFB in 2010 to identify and map the presence and extent of invasive/exotic species.

Goal 4: Maintain appropriate populations of game or non-game species that are consistent with the 14 FTW mission and DoD guidelines of ecosystem management.

Objective 4.1. Prevent inundation of installation roadways and other infrastructure caused by beaver dam activity.

Project 4.1.1 Continue to utilize services of the USDA biologist to eliminate nuisance beavers at Columbus AFB

Objective 4.2 Prevent aircraft mishaps attributable to white-tailed deer at Columbus AFB. **Project 4.2.1** Complete the study of white-tailed deer population, habitats, and movements at Columbus AFB in 2004-2005, with an emphasis on detection of movements in and around the airfield.

Project 4.2.2 Complete report entitled "Management Recommendations for White-tailed Deer at Columbus AFB, MS" by 2006. The report shall specify management practices specifically targeted at the prevention of deer-aircraft mishaps at Columbus AFB.

Project 4.2.3 Implement actions specified in the “Management Recommendations for White-tailed Deer at Columbus AFB, MS” report by 2008.

Goal 5: Protect, maintain, and improve water quality in streams and other surface waters of Columbus compatible with the 14 FTW mission.

Objective 5.1 Enhance the potential of SAC Lake as a recreational fishing resource for Columbus AFB.

Project 5.1.1 Conduct an Aquatic Habitat Survey at SAC Lake and develop a Habitat Improvement Plan in 2010.

Project 5.1.2 Construct drainage control structures, spillway improvements, and other features by 2006 as specified in the SAC Lake Habitat Improvement Plan (if warranted by the plan).

Project 5.1.3 Control invasive/exotic species, plant wetland vegetation, and introduce fish-attracting structures at SAC Lake in accordance with the SAC Lake Habitat Improvement Plan.

Project 5.1.4 Stock game fish at SAC Lake annually in accordance with the Mississippi Department of Wildlife, Fisheries and Parks guidance and consistent with the SAC Lake Habitat Improvement Plan.

Objective 5.2 Plan military and recreational activities so that impacts to wetlands are minimized or avoided.

Project 5.2.1 Install signage to identify and protect wetlands in areas near mission activities and where wetlands are adjacent to roadways and established recreation trails.

Project 5.2.2 Install trail improvements where needed at SAC Lake and along the Timberland Nature Trail to reduce impacts to wetlands.

Project 5.2.3 Collect initial data to establish baseline conditions for water quality of wetlands at Columbus AFB. Conduct long term monitoring of wetlands for comparison to baseline and to judge relative health of wetlands.

Project 5.2.4 Implement the Permanent Wetland Database project to quantify the location, size, and distribution of jurisdictional wetlands at Columbus AFB.

Goal 6: Manage Columbus AFB grounds and landscape trees to optimize their value for energy conservation and storm water runoff reduction, and to provide an aesthetically attractive landscape.

Objective 6.1 Implement landscape designs that are site-appropriate and minimize the amount of irrigation and labor needed for grounds maintenance.

Project 6.1.1 Develop a list of commercially available native tree and shrub species that minimize the need for irrigation and maintenance. Include the list to the AETC 'Tree Policy.'"

Project 6.1.2 Implement, by action of the ESOHC, the Columbus AFB Approved Landscape Plant List as the required species for landscape plantings for Columbus AFB housing areas and for grounds maintenance on base cantonment areas.

Project 6.1.3 Update the Columbus AFB Approved Landscape Plant List in 2008 based upon lessons learned from trial plantings and input from the ESOHC and installation constituents.

Objective 6.2 Protect and enhance the urban forest resource at Columbus AFB.

Project 6.2.1 Incorporate maintenance requirements identified in the urban forest inventory and assessment into the Statement of Work for installation tree maintenance. Identify tree maintenance/removal needs by priority.

Project 6.2.2 Maintain Tree City USA status at Columbus AFB. Prepare a Tree City USA recertification application, as specified by the Arbor Day Foundation at: <http://www.arborday.org/programs/treecityapplication.html>, and submit it to the State Forester's Office by 31 December of each year. Post the Tree City USA certification and plaque in prominent locations for visibility by installation workers and residents.

Project 6.2.3 Plan and conduct an annual Arbor Day event to increase awareness of the Columbus AFB urban forest resource. Encourage participation in base beautification efforts from base constituents.

Project 6.2.4 Water and maintain support stakes on new tree plantings at SAC Lake in 2016.

Project 6.2.5 Install mulch and/or tree protection devices (i.e. string-trimmer protection) on new tree plantings.

Project 6.2.6 Install replacement tree plantings within the Columbus AFB memorial grove to replace trees lost by mortality. Relocate monument to Freedom Park by 2014.

Goal 7: Provide outdoor recreation opportunities that promote the mental, physical, and social wellbeing of installation personnel, both military and civilian.

Objective 7.1 Provide maximum outdoor recreational opportunities at Columbus AFB within the constraints of the military mission and the capacity of available resources.

Project 7.1.1 Develop an Outdoor Recreation Plan for SAC Lake and Timberlane Nature Trail to improve recreation opportunity.

Project 7.1.2 Close non-essential trail segments and secondary roads by 2006 to restrict vehicular, bike, and foot traffic, as determined by the Outdoor Recreation Plan for SAC Lake and Timberlane Nature Trail.

Project 7.1.3 Replace/repair interpretive signs on the Timberland Nature Trail as needed.

Project 7.1.4 Construct additional trail improvements in the SAC Lake and Timberlane Nature Trail.

Project 7.1.5 Develop a Watchable Wildlife Area by 2008, consistent with the Watchable Wildlife Program and SAC Lake and Timberlane Nature Trail Outdoor Recreation Plan, to provide wildlife viewing opportunities for base constituents.

Objective 7.2 Provide fishing and hunting opportunities at Columbus AFB consistent with 14 FTW mission requirements, DoD principles for ecosystem management, Air Force policy, and INRMP goals for the protection and management of natural resources.

Project 7.2.1 Designate 14 CES/CEIE as the office of primary responsibility for management of the installation hunting and fishing program by action of the EESoch or Wing Commander.

Project 7.2.2 Conduct an extensive review of the Columbus AFB hunting and fishing program annually for consistency with 1) the Columbus AFB BASH Reduction Plan; 2) DODI 4715.3, Environmental Conservation Programs, Attachment 6; and 3) AFI 32-7064, Integrated Natural Resources Management, Chapter 6 annually. Prepare a report of findings and present findings to the EESoch for action.

Project 7.2.3 Update the Columbus AFB Hunting and Fishing Policy annually in accordance with EESoch recommendations. Implement the new Hunting and Fishing Policy by action of the Wing Commander annually.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2016**

2009 Natural Resource Program

1. CES/CEIE Natural Resource Manager will complete various training courses:
 - a. Air Force Environmental Symposium
 - b. National Fish and Wildlife Association annual training workshop
 - c. Annual DoD Forestry Workshop
 - d. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
5. Prepare and award timber sale for compartment 3, Stand 6 based on 2007 inventory.
6. Coordinate with U.S. Forest Service to Prepare Burn Plans and conduct prescribed burns for timber stand improvement in Compartment 2, Stands 2, 4, 7, 9, and 10 or forestry mowing.
7. Conduct additional Kudzu vine control as needed at Columbus AFB.
8. Implement actions for the Management of White-tailed Deer at Columbus AFB.
9. Implement invasive species control in areas identified in the January 2004 EA.
10. Stock fish at SAC Lake
11. Work on Nature trails and SAC lake area. Develop a Watch able Wildlife Area.
12. Identify tree maintenance/removal needs by priority.
13. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval. (Aug 09)
14. Prepare Tree City USA renewal application.
15. Plan and conduct Arbor Day event.
16. Identify and map the locations of wetlands that occur at Columbus AFB.
Incorporate wetland map data into the Columbus AFB GeoBase data network.
17. Update the digital map coverage of forest inventory stand data for Columbus AFB and Shuqualak AA.
18. Complete Urban Tree data for Geo Base. (Sept 09)
19. Coordinate with U. S. Forestry Service to plant Parasail Field and Compartment 3, Stands 3 & 4 with pine and poplar.
20. Measure trees in growth rate study plot Compartment 4, stand 1.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2018**

2015 Natural Resource Program

1. 14 CES/CEV Natural Resource Manager will complete various training courses:
 - a. Air Force Environmental Symposium
 - b. National Fish and Wildlife Association annual training workshop
 - c. Annual DoD Forestry Workshop
 - d. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Have IST to program an acoustical bat survey base wide.
5. Wetlands revalidation by US Army Corps of Engineers
6. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
7. Program base wide Bat Survey. Project EEPZOS723117, programmed for 2017.
8. Prepare and award timber sale for compartments based USFS recommendations.
9. Identify tree maintenance/removal needs by priority.
10. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval.
11. Stock fish at SAC Lake
12. Work on Nature trails and SAC lake area.
13. Prepare Tree City USA renewal application.
14. Plan and conduct Arbor Day event.
15. Measure trees in growth rate study plot Compartment 4, stand 1.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2016**

2011 Natural Resource Program

1. 14 CES/CEIE Conservation Manager will complete various training courses:
 - e. Air Force Environmental Symposium
 - f. National Fish and Wildlife Association annual training workshop
 - g. Annual DoD Forestry Workshop
 - h. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Prepare and award timber sales contracts for forest clear-cuts to comply with the Airfield Tree Survey in sections of: Compartment 4 Stand 8 (Sep 07)
5. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
6. Prepare and award timber sale for compartments based on 2007 inventory.
7. Identify tree maintenance/removal needs by priority.
8. Work on Nature trails and SAC lake area.
9. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval.
10. Prepare Tree City USA renewal application.
11. Plan and conduct Arbor Day event.
12. Measure trees in growth rate study plot Compartment 4, stand 1.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2016**

2012 Natural Resource Program

1. 14 CES/CEIE Natural Resource Manager will complete various training courses:
 - a. Air Force Environmental Symposium
 - b. National Fish and Wildlife Association annual training workshop
 - c. Annual DoD Forestry Workshop
 - d. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
5. Prepare and award timber sale for compartments based on 2007 inventory.
6. Identify tree maintenance/removal needs by priority.
7. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval.
8. Stock fish at SAC Lake
9. Work on Nature trails and SAC lake area.
10. Prepare Tree City USA renewal application.
11. Plan and conduct Arbor Day event.
12. Measure trees in growth rate study plot Compartment 4, stand 1.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2016**

2013 Natural Resource Program

1. 14 CES/CEIE Natural Resource Manager will complete various training courses:
 - a. Air Force Environmental Symposium
 - b. National Fish and Wildlife Association annual training workshop
 - c. Annual DoD Forestry Workshop
 - d. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
5. Identify tree maintenance/removal needs by priority.
6. Prepare and award timber sale for compartments based on 2007 inventory.
7. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval.
8. Work on Nature trails and SAC lake area.
9. Prepare Tree City USA renewal application.
10. Plan and conduct Arbor Day event.
11. Measure trees in growth rate study plot Compartment 4, stand 1.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2016**

2014 Natural Resource Program

1. 14 CES/CEIE Natural Resource Manager will complete various training courses:
 - a. Air Force Environmental Symposium
 - b. National Fish and Wildlife Association annual training workshop
 - c. Annual DoD Forestry Workshop
 - d. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
5. Prepare and award timber sale for compartments based on USFS recommendations.
6. Identify tree maintenance/removal needs by priority.
7. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval.
8. Stock fish at SAC Lake
9. Work on Nature trails and SAC lake area.
10. Prepare Tree City USA renewal application.
11. Plan and conduct Arbor Day event.
12. Measure trees in growth rate study plot Compartment 4, stand 1.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2016**

2015 Natural Resource Program

1. 14 CES/CEIE Natural Resource Manager will complete various training courses:
 - a. Air Force Environmental Symposium
 - b. National Fish and Wildlife Association annual training workshop
 - c. Annual DoD Forestry Workshop
 - d. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
5. Prepare and award timber sale for compartments based USFS recommendations.
6. Identify tree maintenance/removal needs by priority.
7. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval.
8. Stock fish at SAC Lake
9. Work on Nature trails and SAC lake area.
10. Prepare Tree City USA renewal application.
11. Plan and conduct Arbor Day event.
12. Measure trees in growth rate study plot Compartment 4, stand 1.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2016**

2016 Natural Resource Program

1. 14 CES/CEIE Natural Resource Manager will complete various training courses:
 - a. Air Force Environmental Symposium
 - b. National Fish and Wildlife Association annual training workshop
 - c. Annual DoD Forestry Workshop
 - d. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
5. Prepare and award timber sale for compartments based on 2007 inventory.
6. Identify tree maintenance/removal needs by priority.
7. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval.
8. Stock fish at SAC Lake
9. Work on Nature trails and SAC lake area.
10. Prepare Tree City USA renewal application.
11. Plan and conduct Arbor Day event.
12. Measure trees in growth rate study plot Compartment 4, stand 1.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2018**

2017 Natural Resource Program

1. 14 CES/CEAIE Conservation Manager will complete various training courses:
 - a. Air Force Environmental Symposium
 - b. National Fish and Wildlife Association annual training workshop
 - c. Annual DoD Forestry Workshop
 - d. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
5. Identify tree maintenance/removal needs by priority.
6. Prepare and award timber sale for compartments based on 2007 inventory.
7. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval.
8. Work on Nature trails and SAC lake area.
9. Prepare Tree City USA renewal application.
10. Plan and conduct Arbor Day event.
11. Measure trees in growth rate study plot Compartment 4, stand 1.

**NATURAL RESOURCE MANAGEMENT WORK PLAN
COLUMBUS AFB
2009-2018**

2018 Natural Resource Program

1. 14 CES/CEAIE Conservation Manager will complete various training courses:
 - a. Air Force Environmental Symposium
 - b. National Fish and Wildlife Association annual training workshop
 - c. Annual DoD Forestry Workshop
 - d. DoD Conservation Workshop
2. Collaborate with U.S. Forest Service, Forest Service Protection office, Southern Region, to conduct annual reconnaissance of Columbus AFB forest areas for the detection of southern Pine beetle infestation.
3. Host an INRMP coordination meeting jointly with the U.S. Fish and Wildlife Ecological Services Field office and the Mississippi Department of Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.
4. Review/revise Statement of Work for U.S. Forest Service cooperative agreement support.
5. Prepare and award timber sale for compartments based on 2007 inventory.
6. Identify tree maintenance/removal needs by priority.
7. Review installation Wildlife Conservation Program Instruction, make appropriate changes and coordinate for approval.
8. Stock fish at SAC Lake
9. Work on Nature trails and SAC lake area.
10. Prepare Tree City USA renewal application.
11. Plan and conduct Arbor Day event.
12. Measure trees in growth rate study plot Compartment 4, stand 1.

APPENDIX A

PROGRESS REPORT AND TENTATIVE SPECIES LIST FOR COLUMBUS AFB THREATENED AND
ENDANGERED SPECIES SURVEY
COMMON WILDLIFE AND THREATENED AND ENDANGERED SPECIES LISTS
AND AGENCY CORRESPONDENCE

**Plant and animal species found at selected wetland sites on
Columbus Air Force Base, Fall 2004**

Table 1. Plants detected in selected wetlands and floodplain forests at Columbus Air Force Base from September through December 9, 2004.

Plant Species	Wetland Habitat Type ^a									
	Pond	P-Hwd Pool	Hwd FP	Hwd FP	Hwd Pool	Pond FP	Hwd Pool	Hwd Pool	P-Hwd FP	Hwd FP
Forbs										
<i>Ambrosia artemisiifolia</i>	X					X		X		
<i>Aster pilosus</i>	X					X		X		
<i>Bidens bipinnata</i>								X		
<i>Boltonia asteroides</i>										
<i>Croton</i> spp.						X				
<i>Desmodium</i> spp.									X	
<i>Diodia</i> spp.	X					X		X		
<i>Elephantopus tomentosus</i>										
<i>Erechtites hieracifolia</i>	X							X	X	
<i>Erigeron strigosus</i>	X				X	X		X		
<i>Eupatorium</i> spp.	X					X		X		
<i>Euphorbia pubentissima</i>										
<i>Euthamia tenuifolia</i>								X		
<i>Gnaphalium obtusifolium</i>								X		
<i>Helenium amarum</i>								X		
<i>Helianthus angustifolia</i>										
<i>Hypericum Walterii</i>			X	X		X	X		X	
<i>Iris verna</i>										
<i>Lobelia cardinalis</i>						X	X			
<i>Ludwigia alternifolia</i>					X	X				
<i>Oxalis stricta</i>										
<i>Passiflora incarnate</i>						X	X	X	X	
<i>Phytolacca Americana</i>				X			X		X	
<i>Polygonum</i> spp.	X		X		X	X		X	X	
<i>Polypremum procumbens</i>										
<i>Rhexia virginica</i>	X									
<i>Rudbeckia hirta</i>										
<i>Solanum carolinense</i>								X		
<i>Solidago</i> spp.	X					X		X		
<i>Verbena brasiliensis</i>	X									
<i>Vernonia</i> sp.	X									
Legumes										
<i>Centrosema virginianum</i>										
<i>Chamaecrista fasciculata</i>	X					X		X		
<i>Desmodium</i> spp.										
<i>Lespedeza cuneata</i>	X					X				
<i>Lespedeza repens</i>							X	X		
<i>Lespedeza virginica</i>						X				
<i>Trifolium</i> spp.								X		
Grasses, Sedges, Rushes										
<i>Andropogon virginicus</i>						X				
<i>Carex glaucescens</i>			X	X	X		X			
<i>Chasmanthium laxum</i>			X							X
<i>Cyperus odoratus</i>	X			X	X	X				
<i>Cynodon dactylon</i>	X									
<i>Dichanthelium</i> spp.	X							X		
<i>Digitaria</i> spp.	X							X		
<i>Juncus polycephalus</i>	X									
<i>Panicum</i> spp.								X		
<i>Paspalum</i> spp.					X					
<i>Rhynchospora corniculata</i>	X				X					

APPENDIX A

<i>Setaria glauca</i>									X	
<i>Sorghastrum halepense</i>									X	
<i>Tridens flavus</i>									X	

Table 1 continued.

	Pond	P-Hwd Pool	Hwd FP	Hwd FP	Hwd Pool	Pond FP	Hwd Pool	Hwd Pool	P-Hwd FP	Hwd FP
Woody Vines										
<i>Berchemia scandens</i>				X			X			
<i>Bignonia capreolata</i>				X						
<i>Brunnichia</i> sp.	X			X	X	X	X			
<i>Campsis radicans</i>	X				X	X	X		X	
<i>Lonicera japonica</i>	X				X				X	
<i>Mikania scandens</i>								X		
<i>Parthenocissus quinquefolia</i>										
<i>Rubus</i> spp.	X			X	X	X	X	X	X	X
<i>Smilax</i> spp.	X		X	X	X	X	X			X
<i>Toxicodendron radicans</i>	X			X	X		X		X	
<i>Vitis rotundifolia</i>					X		X	X	X	X
Shrubs										
<i>Aralia spinosa</i>			X				X		X	
<i>Baccharis halimifolia</i>	X									
<i>Callicarpa americana</i>							X		X	X
<i>Cephalanthus occidentalis</i>	X		X				X			X
<i>Ilex deciduas</i> , <i>I. opaca</i>				X			X		X	X
<i>Ligustrum sinense</i>							X			
<i>Rhus copallinum</i>						X				
<i>Symplocos tinctoria</i>					X					X
<i>Vaccinium</i> spp. (<i>V. arboretum</i> , <i>V. elliotii</i>)	X		X	X	X	X	X		X	X
Trees										
<i>Acer rubrum</i>	X		X	X	X		X		X	X
<i>Albizia julibrissin</i>										
<i>Betula nigra</i>	X					X				
<i>Carya tomentosa</i>					X				X	X
<i>Cornus florida</i>				X						
<i>Crataegus marshallii</i>									X	
<i>Diospyros virginiana</i>	X			X						
<i>Fagus grandifolia</i>									X	
<i>Fraxinus pennsylvanica</i>	X					X			X	
<i>Juniperus virginiana</i>	X					X			X	
<i>Liquidambar styraciflua</i>	X		X	X	X	X	X		X	X
<i>Morus rubra</i>			X							
<i>Nyssa</i> spp. (<i>N. aquatica</i> , <i>N. sylvatica</i>)			X	X	X		X			X
<i>Ostrya virginiana</i>							X		X	
<i>Oxydendrum arboretum</i>										
<i>Pinus taeda</i>	X		X	X	X	X	X		X	X
<i>Prunus angustifolia</i>	X								X	
<i>Prunus serotina</i>	X					X				X
<i>Quercus alba</i>			X		X				X	X
<i>Quercus falcata</i>									X	
<i>Quercus lyrata</i>				X				X		
<i>Quercus michauxii</i>									X	X
<i>Quercus myrtifolia</i>				X					X	
<i>Quercus nigra</i>	X			X	X				X	X
<i>Quercus phellos</i>	X		X			X	X			X
<i>Quercus rubra</i>									X	
<i>Quercus stellata</i>									X	
<i>Rhamnus caroliniana</i>						X				

APPENDIX A

<i>Robinia pseudoacacia</i>										X
<i>Salix nigra</i>	X					X				X
<i>Sassafras albidum</i>								X		
<i>Ulmus alata</i>	X				X	X		X		X
<i>Ulmus rubra</i>										

Table 2. Animals detected at Columbus Air Force Base in selected wetlands from September through December 9,2004

Animals	Wetland Habitat Type ^a									
	Pond	P-Hwd Pool	Hwd FP	Hwd FP	Hwd Pool	Pond FP	Hwd Pool	Hwd Pool	P-Hwd FP	Hwd FP
Amphibians and Reptiles										
<u>Frogs and Toads</u>										
<i>Acris gryllus</i> Southern Cricket Frog		X (v ^b)	X (v)					X (v)		
<i>Bufo americanus</i> American Toad								X (v)		
<i>Bufo woodhousii fowleri</i> Fowler's Toad								X (v)		
<i>Gastrophryne carolinensis</i> Eastern Narrowmouth Toad			X (v)					X (v)		
<i>Hyla avivoca</i> Bird-voiced Treefrog								X (v)		
<i>Hyla cinerea</i> Green Treefrog								X (v)		
<i>Pseudacris (Hyla) crucifer</i> Spring Peeper								X (v)		
<i>Rana clamitans</i> Bronze Frog	X (v)	X (v)								
<u>Salamanders</u>										
<i>Ambystoma opacum</i> Marbled Salamander		X (v)								
<i>Eurycea bislineata</i> Two-lined salamander		X (v)								
<u>Lizards</u>										
Five-lined Skink <i>Eumeces fasciata</i>								X (v)		
Ground Skink <i>Scincella lateralis</i>			X (v)							
Birds										
<i>Corvus brachyrhynchos</i> American Crow			X (c ^b)							
<i>Cyanocitta cristata</i> Blue Jay			X (c)					X (c)		
<i>Dendroica pinus</i> Pine Warbler			X (c)							
<i>Dryocopus pileatus</i> Pileated Woodpecker			X (c)					X (c)		
<i>Melanerpes carolinus</i> Red-bellied Woodpecker			X (c)					X (c)		
<i>M. erythrocephalus</i> Red-headed Woodpecker		X(c,v)								
<i>Strix varia</i> Barred Owl								X (c)		
<i>Thryothorus ludovicianus</i> Carolina Wren								X (c)		
<i>Toxostoma rufum</i> Brown Thrasher		X (v)								

APPENDIX A

<i>Vireo griseus</i> White-eyed Vireo			X (c)							
--	--	--	-------	--	--	--	--	--	--	--

Table 2 continued.

	Wetland Habitat Types ^a									
	Pond	P-Hwd Pool	Hwd FP	Hwd FP	Hwd Pool	Pond FP	Hwd Pool	Hwd Pool	P-Hwd FP	Hwd FP
Mammals			X (c)							
<i>Dasyopus novemcinctus</i> Nine-banded Armadillo								X (s)		
<i>Didelphis virginiana</i> Virginia Opossum			X (s ^b)					X (c)		
<i>Odocoileus virginianus</i> White-tailed Deer		X (s)	X (s)					X (v)		
<i>Procyon lotor</i> Raccoon			X (s)							
<i>Sciurus carolinensis</i> Gray Squirrel			X (c)					X (s)		

^a Wetland habitat types abbreviations are as follows:

- Pond - Permanent Pond of Water
- P-Hwd Pool - Temporary Pool surrounded by Pine-Hardwood Forests
- P-Hwd FP - Pine-Hardwood Forest Floodplain
- Hwd FP - Hardwood Forest Floodplain
- Hwd Pool - Temporary Pool surrounded by Hardwood Forests
- Pond FP - Permanent Pond of Water in Floodplain

^b Legend for method of animal detection:

- c - Vocalization of the animal (calls)
- s - Signs that are left behind by the animal (tracks)
- v - Visual encounter with the animal

**Progress Report
December 2004**

State and Federally protected Species Survey for Columbus Air Force Base, MS

Submitted by
Jeanne C. Jones, PhD
Jarrod Fogarty
Tyler Harris

As of 9 December 2004, all targeted survey areas on Columbus Air Force Base (CAFB) had been inspected to assess habitat conditions that might support rare plants and animals. Based on our surveys, areas that may support rare species are generally associated with permanent waterbodies, temporary pools, and forested wetlands. Ten sites were selected for intensive, replicated surveys. These sites were marked with flagging and surveyed to create a baseline list of plants found at each site. We will return to flagged sites during the spring and early summer months of 2005 to conduct additional frog call surveys, area searches, and plant surveys. Plant lists have been developed for these sites, and lists will be updated, with plant species being added as they are detected. Presence of animals, vocalizations, and animal sign (scat and tracks) were recorded at each plant survey site. Intensive animal surveys have been conducted at 3 of the selected sites. Intensive surveys consist of a 30-minute time-constrained search by 2 investigators. Frequent fall rains have prevented additional surveys in December, because of flooding. As of 10 December 2004, all survey sites were inundated.

All large sections of forested areas on CAFB were walked with investigators about 50 m apart to conduct preliminary surveys and search for sensitive areas. A large forested section on the northwest side of the base has been thoroughly inspected for rare plants and animals by walking through the section with investigators walking and inspecting marked linear transects that are spaced about 10 m apart. No rare, threatened, or endangered organisms have been detected to date. All plants that were not identified in the field were collected, pressed, and identified in the lab. Several are awaiting identification by plant taxonomists.

Plants and animals found to date on the CAFB are listed in Appendix 1. Listings in the appendix represent partial lists of species expected to occur on the landbase. To date, no state or federally listed species of plants or animals have been found. A map will accompany future reports showing exact locations of study sites. Surveys that will be conducted from January through March 2005 include winter bird inventories, call counts for anurans, ground and debris searches for salamanders and animal sign. Drive through surveys will be conducted at larger open water areas to detect wading birds and raptors, such as Wood Storks and Ospreys.

COLUMBUS AFB 2001

Species Known to Occur on the Base

Birds

Taxonomic Group	Scientific Name	Common Name
Family Accipitridae (Raptors)		
	<i>Accipiter cooperii</i>	Cooper's hawk
	<i>Buteo jamaicensis</i>	Red-tailed hawk
Family Phasianidae (Chicken-like birds)		
Turkeys	<i>Meleagris gallopavo</i>	Wild turkey
Quail	<i>Colinus virginianus</i>	Northern bobwhite
Family Columbidae (Doves)		
	<i>Columba livia</i>	Rock dove
	<i>Zenaida macroura</i>	Mourning dove
Family Lanidae (Shrikes)		
	<i>Lanius ludovicianus</i> *	Loggerhead shrike
Family Anatidae (Ducks)		
	<i>Aix sponsa</i>	Wood duck
Family Cuculidae (New World cuckoos)		
	<i>Coccyzus americanus</i>	Yellow-billed cuckoo
Family Picidae (Woodpeckers)		
	<i>Colaptes auratus</i>	Northern flicker
	<i>Enturus carolinus</i>	Red-bellied woodpecker
	<i>Melanerpes erythrocephalus</i>	Red-headed woodpecker
	<i>Picoides pubescens</i>	Downy woodpecker
Family Tyranidae (Flycatchers)		
	<i>Contopus virens</i>	Wood peewee
	<i>Empidonox virescens</i>	Acadian flycatcher
	<i>Tyrannus tyrannus</i>	Eastern kingbird
Family Corvidae (Jays, Magpies, and Crows)		
	<i>Corvus brachyrhynchos</i>	American crow
	<i>Cyanocitta cristata</i>	Blue jay
Family Paridae (Titmice)		
	<i>Parus bicolor</i>	Tufted titmouse
	<i>Parus carolinensis</i>	Carolina chickadee
Family Troglodytidae (Wrens)		
	<i>Thryothorus ludovicianus</i>	Carolina wren
Family Sylviidae (Gnatcatchers), Family Regulidae (Kinglets),		
	<i>Poliopitila caerulea</i>	Blue-gray gnatcatcher
	<i>Regulus calendula</i>	Ruby-crowned kinglet
Family Turdidae (Solitaires, thrushes, and allies)		
	<i>Hylocichia mustelina</i>	Wood thrush
	<i>Sialia sialia</i>	Eastern bluebird

APPENDIX A

Taxonomic Group	Scientific Name	Common Name
Family Mimidae (Mockingbirds, thrashers, and allies)	<i>Dumetella carolinensis</i>	Gray catbird
	<i>Mimus polyglottos</i>	Mockingbird
	<i>Turdus migratorius</i>	American robin
	<i>Toxostoma rufum</i>	Brown thrasher
Family Bombycillidae (Waxwings)		
	<i>Bombcilla cedrorum</i>	Cedar waxwing
Sturnidae (Starlings)		
	<i>Sturnus vulgaris</i>	European starling
Vireonidae (Vireos)		
	<i>Vireo griseus</i>	White-eyed vireo
Emberizidae (Wood Warblers, Tanagers, Blackbirds)		
	<i>Dendroica coronata</i>	Yellow-rumped warbler
	<i>Piranga rubra</i>	Summer tanager
	<i>Quiscalus quiscula</i>	Common grackle
	<i>Sturnella magna</i>	Eastern meadowlark
Passeridae (Cardinals, sparrows, grosbeaks, and allies)		
	<i>Cardinalis cardinalis</i>	Cardinal
	<i>Guiraca caerulea</i>	Blue grosbeak
	<i>Passerina cyanea</i>	Indigo bunting
	<i>Melospiza melodia</i>	Song sparrow
	<i>Passerculus sandwichensis</i>	Savanna sparrow
	<i>Pipilo erythrophthalmus</i>	Rufus-sided towhee
	<i>Spizella pusilla</i>	Field sparrow
	<i>Zonotrichia albicollis</i>	White-throated sparrow
	<i>Carduelis tristis</i>	American goldfinch

Mammals

Taxonomic Group	Scientific Name	Common Name
Family Didelphidae (Opossums)		
	<i>Didelphis virginiana</i>	Virginia opossum
Family Talpidae (Moles)		
	<i>Scalopus aquaticus</i>	Eastern mole
Family Leporidae (Hares and rabbits)		
	<i>Sylvilagus aquaticus</i>	Swamp rabbit
	<i>Sylvilagus floridanus</i>	Cottontail rabbit
Family Scuridae (Squirrels, etc.)		
	<i>Glaucomys volans</i>	Southern flying squirrel
	<i>Marmot monax</i>	Woodchuck
	<i>Sciurus carolinensis</i>	Gray squirrel
	<i>Sciurus niger</i>	Fox squirrel
	<i>Tamias striatus</i>	Eastern chipmunk
Family Castoridae (Beavers)		

APPENDIX A

Taxonomic Group	Scientific Name	Common Name
	<i>Castor canadensis</i>	Beaver
Family Muridae (Rats, mice, and voles)		
	<i>Mus musculus</i>	House mouse
	<i>Neotoma floridana</i>	Eastern woodrat
	<i>Ondatra zibethicus</i>	Muskrat
	<i>Peromyscus gossypinus</i>	Cotton mouse
	<i>Peromyscus polionotus</i>	Old field mouse
	<i>Sigmodon hispidus</i>	Cotton rat
Family Canidae (Wolves, foxes and coyotes)		
	<i>Urocyon cinereoargenteus</i>	Gray fox
	<i>Canis lutrans</i>	Coyote
Taxonomic Group	Scientific Name	Common Name
Family Procyonidae (Racoons, coatis and allies)		
	<i>Procyon lotor</i>	Raccoon
Family Mustelidae (Weasels Skunks, otters and badgers)		
	<i>Mephitis mephitis</i>	Striped skunk
Family Cervidae (Deer, elk, moose)		
	<i>Odocoileus virginianus</i>	White-tailed deer

Reptiles

Snapping turtles	<i>Chelydra serpentina</i>	Common snapping turtle
	<i>Terrapene carolina</i>	Eastern box turtle
Taxonomic Group	Scientific Names	Common Name
Emydids		
Mud and musk turtles	<i>Stenotherus minor</i>	Stripneck musk turtle
Iguanids	<i>Anolis carolinensis</i>	Green anole
Skinks	<i>Sceloporus undulatus</i>	Eastern fence lizard
	<i>Scincella lateralis</i>	Ground skink
Colubrids	<i>Coluber constrictor</i>	Racer
	<i>Elaphe obsoleta</i>	Rat snake
	<i>Farancia abacura</i>	Mud snake
	<i>Farancia crythrogammas</i>	Rainbow snake
	<i>Heterodon platyrhinos</i>	Eastern hog-nosed snake
	<i>Lampropeltis getulus</i>	Common kingsnake
	<i>Masticophis flagellum</i>	Coachwhip
Pit vipers	<i>Thamnophis sirtalis</i>	Common garter snake
	<i>Agkistrodon contortrix</i>	Copperhead
	<i>Agkistrodon piscivorus</i>	Cottonmouth moccasin
	<i>Crotalus horridus</i>	Timber rattlesnake

APPENDIX A

Amphibians

Taxonomic Group	Scientific Name	Common Name
Bufonids and toads	<i>Bufo americanus</i>	American toad
	<i>Bufo woodhousii</i>	Woodhouse's toad
Hylids and treefrogs	<i>Acris gryllus</i>	Southern cricket frog
	<i>Hyla crucifer</i>	Spring peeper
	<i>Hyla cinerea</i>	Green treefrog
Mole salamanders	<i>Ambystoma maculatum</i>	Spotted salamander
Ranids	<i>Rana catesbeiana</i>	Bullfrog

APPENDIX A

Fish

Taxonomic Group	Scientific Name	Common Name
Minnows and carps	<i>Cyprinus carpio</i>	Common carp
Catfishes	<i>Ictalurus catus</i>	White catfish
	<i>Ictalurus melas</i>	Black bullhead
Sunfishes	<i>Lepomis macrochirus</i>	Bluegill bream
	<i>Micropterus salmoides</i>	Largemouth bass
	<i>Pomoxis annularis</i>	White crappie

Source: Oklahoma Biological Survey 1994

RTE Animal Species Occurring Nearby Columbus AFB

Group	Scientific name	Endangered Specie	State Rank	Global Rank
Bivalve	<i>Elliptio arca</i>	Alabama Spike	S3	G3
	<i>Elliptio arctata</i>	Delicate Spike	S1	G4Q
	<i>Epioblasma penita</i>	Southern Combshell	S1	G1
	<i>Lampsilis perovalis</i>	Orange-Nacre Mucket	S1	G2
	<i>Lasmigona complanata</i>	White Heelsplitter	S3?	G5
	<i>Ligumia recta</i>	Black Sandshell	S2	G5
	<i>Medionidus acutissimus</i>	Alabama Moccasinshell	S1	G1
	<i>Obovaria jacksoniana</i>	Southern Hickorynut	S2	G1G2
	<i>Obovaria unicolor</i>	Alabama Hickorynut	S3	G3
	<i>Pleurobema decisum</i>	Southern Clubshell	S1S2	G1G2
	<i>Pleurobema perovatum</i>	Ovate Clubshell	S1	G1
	<i>Pleurobema taitianum</i>	Heavy Pigtoe	SH	G1
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula rumphiana</i>	Ridged Mapleleaf	S2	G3
	<i>Strophitus subvexus</i>	Southern Creekmussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S1?	G5
<i>Truncilla donaciformis</i>	Fawnsfoot	S4	G5	
Catfish	<i>Noturus munitus</i>	Frecklebelly Madtom	S2	G3
Minnows	<i>Cyprinella callistia</i>	Alabama Shiner	S2	G5
	<i>Notropis edwardraneyi</i>	Fluvial Shiner	S1	G4
Paddlefish	<i>Polyodon spathula</i>	Paddlefish	S3	G4
Perch	<i>Crystallaria asprella</i>	Crystal Darter	S1	G3
	<i>Percina lenticula</i>	Freckled Darter	S2	G2
Reptiles	<i>Graptemys nigrinoda</i>	Black-Knobbed Map Turtle	S2	G3
Sturgeon	<i>Scaphirhynchus suttkusi</i>	Alabama Sturgeon	S1	G1Q

Source: Museum of Natural Science 2000.

**Definition of Global and State Heritage Ranks developed by The Nature Conservancy and used by
The Natural Heritage Program**

Global Rank Codes	Definition of Ranks
G1	Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or stream miles (<10).
G2	Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or stream miles (10 to 50).
G3	Vulnerable globally either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction. Typically 21-100 occurrences or between 3,000 to 10,000 individuals.
G4	Uncommon but not rare, and usually widespread. Possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.
G5	Common, typically widespread and abundant. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
GQ	Taxonomic status is questionable; numeric rank may change with taxonomy.
G#G#	A numeric range rank is used to indicate uncertainty about the exact status of a taxon.
G?	Global rank not yet assessed.
State Rank Codes	Definition of Ranks
S1	Critically imperiled in Mississippi because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it vulnerable to extirpation.
S2	Imperiled in Mississippi because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it vulnerable to extirpation.
S3	Rare or uncommon in Mississippi (on the order of 21 to 100) occurrences.
S4	Widespread, abundant, and apparently secure in the state, but with cause for long-term concern (more than 101 occurrences).
SH	Element occurred historically in the state (with expectation that it may be rediscovered), perhaps having not been verified in the past 20 years, and suspected to be still extant.

Source: Museum of Natural Science and Pennsylvania Natural Diversity Inventory

SHUQUALAK AUXILIARY AIRFIELD

Species Known to Occur on Shuqualak AA

Birds

Taxonomic Group	Scientific Name	Common Name
Titmice	<i>Parus bicolor</i>	Tufted titmouse
	<i>Parus carolinensis</i>	Carolina chickadee
Wrens	<i>Thryothorus ludovicianus</i>	Carolina wren
Kites, eagles, hawks, and allies	<i>Buteo lineatus</i> *	Red-shouldered hawk
Woodpeckers and allies	<i>Enturus carolinus</i>	Red-bellied woodpecker
Mockingbirds, thrashers, and allies	<i>Toxostoma rufum</i>	Brown thrasher
Jays, magpies, and crows	<i>Corvus brachyrhynchos</i>	American crow
Emberizines	<i>Pipilo erythrophthalmus</i>	Rufus-sided towhee
Warblers	<i>Dendroica pinus</i>	Pine warbler

Source: *The Nature Conservancy 1994*

*Species are special status in Mississippi

Mammals

Taxonomic Group	Scientific Name	Common Name
Opossums	<i>Didelphis virginiana</i>	Virginia opossum
Moles	<i>Scalopus aquaticus</i>	Eastern mole
Hares and rabbits	<i>Sylvilagus aquaticus</i>	Swamp rabbit
	<i>Sylvilagus floridanus</i>	Cottontail rabbit
Squirrels	<i>Glaucomys volans</i>	Southern flying squirrel
	<i>Marmot monax</i>	Woodchuck
	<i>Sciurus carolinensis</i>	Gray squirrel
	<i>Sciurus niger</i>	Fox squirrel
Beavers	<i>Castor canadensis</i>	Beaver
Canids	<i>Urocyon cinereoargenteus</i>	Gray fox
Procyonids	<i>Procyon lotor</i>	Raccoon
Mustelids	<i>Mephitis mephitis</i>	Striped skunk
Cervids	<i>Odocoileus virginianus</i>	White-tailed deer

Source: *Oklahoma Biological Survey 1994*

Parsons 1998

The Mississippi Natural Museum of Science has not located any RTE animal species in the vicinity of Shuqualak AA

Federal Listed Endangered Animals for Mississippi

Group	Scientific name	Endangered Specie	Statu s	Habitat
Bivalve	<i>Epioblasma penita</i>	Combshell, southern	E	Occurs in Tombigbee River
	<i>Lampsilis perovallis</i>	Mucket, orangenacre*	T	Mobile River Basin (including Tombigbee)
	<i>Medionidus acutissimus</i>	Moccasinshell, Alabama*	T	Mobile River Basin (including Tombigbee)
	<i>Pleurobema curtum</i>	Clubshell, black	E	Rivers flowing over stable sand and gravel
	<i>Pleurobema decisum</i>	Clubshell, southern*	E	Mobile River Basin (including Tombigbee)
	<i>Pleurobema marshalli</i>	Pigtoe, flat	E	Rifle-run habitat, streams and canals
	<i>Pleurobema penita</i>	Penitent Shell		Mobile River Basin (including Tombigbee)
	<i>Pleurobema perovatum</i>	Clubshell, ovate*	E	Mobile River Basin (including Tombigbee)
	<i>Pleurobema taitianum</i>	Pigtoe, heavy* Judge Tait's mussel	E	Mobile River basin
	<i>Potamilus capax</i>	Pocketbook, fat	E	Large rivers in slow-flowing water in mud or sand
	<i>Potamilus inflatus</i>	Heelsplitter, Alabama	T	Soft, stable substrate (sand, mud, silt, and sandy gravel) in slow to moderate currents
	<i>Quadrula stapes</i>	Stirrupshell	E	Riffles, and runs of rivers with moderate to strong current
Birds	<i>Charadrius melodus</i>	Plover, piping	T	Breeds on beaches, lakeshores, and sand bars
	<i>Grus canadensis pulla</i>	Crane, Mississippi sandhill	E	Savannahs, wet grasslands, and wooden depressions
	<i>Haliaeetus leucocephalus</i>	Eagle, bald	T	Riparian (coasts, rivers, and lakes); nests in pines and cypress
	<i>Pelecanus occidentalis</i>	Pelican, brown	E	sand spits and offshore sand bars; feeding in shallow estuarine waters
	<i>Picoides borealis</i>	Woodpecker, red-cockaded	E	Pines, > 80 to 120 years old
	<i>Sterna antillarum</i>	Tern, least	E	Nests on sand bars and reservoir shorelines that are free of vegetation

APPENDIX A

Group	Scientific name	Endangered Species	Status	Habitat
Mammals	<i>Balaenoptera physalus</i>	Whale, finback**	E	Oceanic
	<i>Megaptera novaeangliae</i>	Whale, humpback**	E	Oceanic
	<i>Myotis sodalis</i>	Bat, Indiana	E	Limestone caves; foraging occurs in riparian and floodplain areas
	<i>Trichechus manatus</i>	Manatee, West Indian	E	Salt and fresh water (1.5 to 6 m), can be in canals, rivers, estuarine habitats and saltwater bays
	<i>Ursus americanus luteolus</i>	Bear, Louisiana black**	T	South of Greenville to Meridian line
Reptiles	<i>Chelonia mydas</i>	Sea turtle, green**	T	Tropical and temperate waters Burrows and hollow root channels of live oaks
	<i>Caretta caretta</i>	Sea turtle, loggerhead**	T	Continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters
	<i>Dermochelys coriacea</i>	Sea turtle, leatherback**	E	Tropical temperate, subpolar waters
	<i>Drymarchon corais couperi</i>	Snake, eastern indigo	T	Scrub and pine flatwoods; Burrows and hollow root channels of live oaks
	<i>Eretmochelys imbricata</i>	Sea turtle, hawksbill**	E	Coastal waters, coral reefs, pelagic environment, mangrove-fringed bays and estuaries
	<i>Gopherus polyphemus</i>	Tortoise, gopher	T	Open sandy spot w/ sunlight, burrows in temperate regions
	<i>Graptemys flavimaculata</i>	Turtle, yellow-blotched map	T	Clean, clear, limestone, spring-fed rivers and their tributaries
	<i>Graptemys oculifera</i>	Turtle, ringed map	T	Clean, clear, limestone, spring-fed rivers and their tributaries
	<i>Lepidochelys kempii</i>	Sea turtle, Kemp's ridley**	E	Coastal, tropical, and temperate waters in Atlantic Basin
Fishes	<i>Acipenser oxyrinchus desotoi</i>	Sturgeon, Gulf	T	Bays and estuaries, freshwater rivers including MS River

APPENDIX A

Fishes	Group	Scientific name	Endangered Species	Status
	<i>Etheostoma rubrum</i>	Darter, bayou	T	Clean, silt-free areas with shallow moderate to swift flowing water
	<i>Scaphirhynchus albus</i>	Sturgeon, pallid	E	MS River from St. Louis to Gulf of Mexico
	<i>Scaphirhynchus suttkusi</i>	Sturgeon, Alabama	E	Mobile River basin

Source: USFWS 2000

* Listed by USFWS in response to request for information on RTE species in the area**Unlikely to occur near or in Columbus AFB or Shuqualak AA

APPENDIX B

COMMON PLANTS AND THREATENED AND ENDANGERED PLANT SPECIES LISTS

COLUMBUS AFB

Species Known to Occur on the Base

1. Improved grounds vegetation

Taxonomic Group	Scientific Name	Common Name
Trees and Shrubs	<i>Lagerstroemia indica</i>	Crape myrtle
Grasses and Sedges	<i>Cynodon dactylon</i>	Bermuda grass
	<i>Zoysia</i> sp.	Emerald zoysia

Source: Oklahoma Biological Survey 1994

2. Semi-improved grounds vegetation

Taxonomic Group	Scientific Name	Common Name
Herbs and Vines	<i>Bidens</i> sp.	Beggarticks
	<i>Desmodium</i> sp.	Tickclover
Grasses and Sedges	<i>Andropogon</i> sp.	Broomsedge
	<i>Erianthus</i> sp.	Plumegrass
	<i>Panicum virgatum</i>	Switchgrass
	<i>Sorghastrum</i> sp.	Indian grass

Source: Oklahoma Biological Survey 1994

3. Unimproved grounds vegetation

Taxonomic Group	Scientific Name	Common Name
Trees and Shrubs	<i>Carya</i> sp.	Hickory
	<i>Fagus grandifolia</i>	American beech
	<i>Juglans nigra</i>	Black walnut
	<i>Juniperus virginiana</i>	Eastern red cedar
	<i>Liquidambar styraciflua</i>	American sweetgum
	<i>Liriodendron tulipifera</i>	Tulip tree/yellow poplar
	<i>Pinus echinata</i>	Shortleaf pine
	<i>Pinus taeda</i>	Loblolly pine
	<i>Plantanus occidentalis</i>	Sycamore
	<i>Quercus alba</i>	White oak
	<i>Quercus falcata</i>	Southern red oak
	<i>Quercus leucophylla</i>	Cherrybark oak
	<i>Quercus nigra</i>	Water oak
	<i>Quercus palustris</i>	Pin oak
	<i>Quercus phellos</i>	Willow oak
<i>Ulmus americana</i>	American elm	
Herbs and Vines	<i>Bidens</i> sp.	Beggartick
	<i>Desmodium</i> sp.	Tickclover
Taxonomic Group	Scientific Name	Common Name
Grasses and Sedges	<i>Andropogon</i> sp.	Broomsedge
	<i>Eleusine indica</i>	Goosegrass
	<i>Erianthus</i> sp.	Plumegrass
	<i>Panicum virgatum</i>	Switchgrass

Source: Oklahoma Biological Survey 1994

APPENDIX B

4. Other–Unclassified

Taxonomic Group	Scientific Name	Common Name
Trees and Shrubs	<i>Acer rubrum</i>	Red maple
	<i>Acer saccharinum</i>	Silver maple
	<i>Aralia spinosa</i>	Devils walking stick
	<i>Callicarpa americana</i>	French mulberry
	<i>Carpinus caroliniana</i>	American hornbeam
	<i>Carya leiodermis</i> *	Swamp hickory
	<i>Celtis laevigata</i>	Sugarberry
	<i>Cornus florida</i>	Flowering dogwood
	<i>Diospyros virginiana</i>	Persimmon
	<i>Fraxinus pennsylvanica</i>	Green ash
	<i>Ilex opaca</i>	American holly
	<i>Ligustrum sp.</i>	Swamp privet
	<i>Morus rubra</i>	Red mulberry
	<i>Nyssa aquatica</i>	Tupelo gum
	<i>Nyssa sylvatica</i>	Black gum (Sour gum)
	<i>Populus deltoides</i>	Cottonwood
	<i>Prunus augustifolia</i>	Chicksaw plum
	<i>Prunus serotina</i>	Blackcherry
	<i>Quercus stellata</i>	Post oak
	<i>Rubus fruticosus</i>	Blackberry bush
	<i>Rubus sp.</i>	Dewberry
	<i>Salix nigra</i>	Black willow
	<i>Sambucus canadensis</i>	Elderberry
	<i>Sassafras albidum</i>	Sassafras
	<i>Taxodium distichum</i>	Bald cypress
	<i>Ulmus alata</i>	Winged elm
<i>Vaccinium sp.</i>	Huckleberry	
<i>Yucca filamentosa</i>	Yucca plant	
<i>Zanthoxylum clava-herculis</i>	Hercules club	

Source: The Nature Conservancy 1994 and 14 CES/CEVP Undated-a (Timberlane Nature Trail Area & SAC Lake Brochure, Columbus AFB, Mississippi).

*Species are special status in Mississippi

APPENDIX B

Taxonomic Group	Scientific Name	Common Name
Herbs and Vines	<i>Anthemis cotula</i>	Dog fennel
	<i>Asclepias incarnata</i>	Milkweed
	<i>Asparagus asparagoides</i>	Similax vine
	<i>Campsis radicans</i>	Trumpet creeper
	<i>Coreopsis auriculata</i> *	Lobed tickseed
	<i>Crotalaria</i> sp.	Rattle box pea
	<i>Diodia virginiana</i>	Larger button-weed
	<i>Elephantopus tomentosus</i>	Hairy elephant's foot
	<i>Erigeron karvinskianus</i>	Daisy fleabane
	<i>Hydrocotyle</i> sp.	Pennywort
	<i>Ludwigia palustris</i>	Marsh purslane
	<i>Phlox pilosa</i>	Prairie phlox
	<i>Phytolacca americana</i>	Pokeweed
	<i>Piper nigrum</i>	Pepper vine
	<i>Pontederia cordata</i> L.	Pickerelweed
	<i>Pueraria lobata</i>	Kudzu
	<i>Rhus radicans</i>	Poison Ivy
	<i>Rudbeckia hirta</i>	Black-eyed susan
	<i>Salsola iberica</i>	Russian thistle
	<i>Saururus cernuus</i>	Lizard tail
	<i>Smilax auriculata</i>	Cat brier
	<i>Solidago odora</i>	Goldenrod
	<i>Sphagnum</i> sp.	Sphagnum moss
<i>Toxicodendron diversilobum</i>	Poison oak	
<i>Typha</i> sp.	Cattail	
<i>Vitis rotundifolia</i>	Muscadine vine	
Grasses and Sedges	<i>Andropogon</i> sp.	Bluestem
	<i>Aristida stricta</i>	Wiregrass
	<i>Axonopus fissifolius</i>	Carpet grass
	<i>Carex annectens</i>	Yellowfruit sedge
	<i>Carex frankii</i>	Kunth (Frank's sedge)
	<i>Carex oklahomensis</i> *	Oklahoma sedge
	<i>Eleusine indica</i>	Goosegrass
	<i>Juncus</i> sp.	Needlerush
	<i>Leersia virginica</i>	White grass
	<i>Panicum microcarpon</i>	Small-fruited panic grass
	<i>Spartina alterniflora</i>	Cordgrass

Source: The Nature Conservancy 1994 and 14 CES/CEVP Undated a (Timberlane Nature Trial Area & SAC Lake Brochure, Columbus AFB, Mississippi).

*Species are special status in Mississippi

RTE Plant Species Occurring Nearby Columbus AFB

Taxonomic Group	Scientific name	Endangered Species	State Rank	Global Rank
Trees and Shrubs	<i>Ilex montana</i>	Mountain Holly	S3?	G5
	<i>Carya leiodermis</i>	Swamp Hickory	S2S3	
	<i>Staphylea trifolia</i>	American Bladdernut	S3	G5
Herbs and Vines	<i>Asarum canadense</i>	Canada Wild-Ginger	S2S3	G5
	<i>Coreopsis auriculata</i>	Lobed Tickseed	S2S3	G5
	<i>Lilium superbum</i>	Turk's Cap Lily	S3	G5
	<i>Menispermum canadense</i>	Canada Moonseed	S3	G5
	<i>Oenothera grandiflora</i>	Large Flowered Evening Primrose	S1S3	G5
	<i>Osmorhiza longistylis</i>	Smoother Sweet-Cicely	S3	G5
	<i>Panax quinquefolius</i>	American Ginseng	S3	G4
	<i>Salvia urticifolia</i>	Nettle-Leaf Sage	S2S3	G5
Grasses and Sedges	<i>Carex laxiflora var laxifolia</i>	Loose Flowered Sedge	S1	G5
	<i>Coelorachis cylindrica</i>	Pitted Jointgrass	S1	G4G5

Source: Museum of Natural Science 2004.

SHUQUALAK AUXILIARY AIRFIELD

Species Known to Occur at SAA

Taxonomic Group	Scientific Name	Common Name
Trees and Shrubs	<i>Acer rubrum</i>	Red maple
	<i>Carya</i> sp.	Hickory
	<i>Cornus florida</i>	Flowering dogwood
	<i>Liquidambar styraciflua</i>	American sweetgum
	<i>Nyssa silvatica</i>	Black gum
	<i>Pinus echinata</i>	Shortleaf pine
	<i>Pinus taeda</i>	Loblolly pine
	<i>Quercus falcata</i>	Southern red oak
	<i>Quercus stellata</i>	Post oak
	<i>Rubus</i> sp.	Blackberry
Herbs and Vines	<i>Aster dumosus</i>	Long-stalked aster
	<i>Campsis radicans</i>	Trumpet creeper
	<i>Diodia virginiana</i>	Larger button-weed
	<i>Lespedeza procumbans</i>	Trailing bushclover
	<i>Lobelia appendiculata</i> *	Appendaged lobelia
	<i>Lonicera japonica</i>	Honeysuckle vine
	<i>Prunella vulgaris</i>	Heal-all
	<i>Rhus radicans</i>	Poison ivy
	<i>Rudbeckia hirta</i>	Black-eyed susan
	<i>Smilax</i> sp.	Greenbrier
	<i>Viola affinis</i>	Marsh violet
Grasses and Sedges	<i>Andropogon</i> sp.	Broomsedge
	<i>Chasmanthium sissiliflorum</i>	Spike grass
	<i>Typha</i> sp.	Cattail

Source: *The Nature Conservancy 1994*

*Species are special status in Mississippi

RTE Plant Species Occurring Nearby Shuqualak Auxiliary Airfield

Taxonomic Group	Scientific name	Endangered Species	State Rank	Global Rank
Trees and Shrubs	<i>Carya leiodermis</i>	Swamp Hickory	S2S3	G5T3T5*
Herbs and Vines	<i>Astragalus canadensis</i>	Rattle Vetch	S2	G5
	<i>Nemastylis geminiflora</i>	Prairie Iris	S2	G4
	<i>Penstemon tenuiflorus</i>	Narrow Flowered Beard Tongue	S2S3	G3?

Source: Museum of Natural Science 2000.

*The T-Rank follows the global status and indicates infraspecific taxa status.

Federal Listed Endangered Plants for Mississippi

Group	Scientific name	Endangered Species	Status	Habitat
Trees and Shrubs	<i>Lindera melissifolia</i>	Pondberry	E	Wetland habitats
Herbs and Vines	<i>Apios priceana</i>	Potato-bean, Price's	T	Rocky, open, mixed-oak forests, forest edges, and clearings on river bottoms and ravines
	<i>Isoetes louisianensis</i>	Quillwort, Louisiana	E	Sand and gravel bars on small to medium streams
	<i>Schwalbea americana</i>	Chaffseed, American	E	Sandy, acidic, seasonally moist to dry soils, pine flatwoods, savannas, ecotonal areas between peaty wetlands

Source: USFWS 2005.

APPENDIX C

COLUMBUS AIR FORCE BASE URBAN TREE INVENTORY

COLUMBUS AIR FORCE BASE URBAN TREE INVENTORY

Executive Summary

Air Force personnel requested that an urban tree inventory be conducted at Columbus Air Force Base, Columbus, MS to assess the size and condition of the tree resource in the Base cantonment as well as provide an effective planning and management tool for this valuable resource. Trees America of Brisbane, California, coordinated the project and contracted for the field data collection with Southern Urban Forestry Associates of Northport, AL. The inventory utilizes a non-proprietary database and graphic information system to collect, store, and manipulate the information collected.

This report assesses the tree population on the Base, its general health and species composition, tree locations, maintenance needs, and general management approaches. Summary points include the following:

- The Urban Tree Inventory System (UTIS) is composed of three major parts, the field system, the Access database, and ArcView GIS.
- The field system hardware includes a Hewlett Packard iPAQ handheld computer and a Garmin GPS 17M receiver using ArcPAD 6 software.
- The office portion of the system utilizes Access 2000 database and ArcView GIS 3.2. The field data is downloaded directly from the HP iPAQ unit to the desk computer via Microsoft ActiveSync.
- Data for ArcView include aerial photograph files of the Base, tree data files, and digital photographs of selected trees.
- 6,288 trees and 200 tree planting spaces were located and inventoried.
- 35 tree genera were identified on the Base with additional trees marked for later identification.
- Two genera of trees comprise 58% of the tree population. *Quercus* (oak) comprises nearly 35% of the total population. *Pinus* (pine) accounts for nearly 23% and *Lagerstroemia* (crepe myrtle) and *Liquidambar* (sweetgum) for 12% and 7%, respectively.
- Loblolly pine (*Pinus taeda*) alone makes up over 23% of the entire tree population and nearly 99% of all the pines. Water oak (*Quercus nigra*) accounts for 12% of the total population and 35% of the oaks.
- The trees size distribution is small trees (6 inches DBH and under) 18%, medium trees (7 – 24 inches) 71%, and large trees (greater than 24 inches) 11%.
- Tree condition was rated as good, fair, poor, or dead with the ratings representing approximately 71%, 20%, 8%, and 1% of the trees, respectively.
- Fifteen maintenance and inspection categories are recommended. The most urgent issues are Hazard 1 removals (trees) and Hazard 2 removals (74) along with Hazard 1 and 2 pruning (91 and 135 trees, respectively).

General Recommendations

APPENDIX C

- Perform all high priority (“hazard”) removals and pruning as quickly as possible, preferably within the next two years.
- Initiate early training pruning on as many smaller trees as possible as soon as possible, since more structural benefit is realized with young tree pruning at a vastly reduced cost.
- Follow ANSI A300 pruning and fertilization specifications. Use arborists certified by the International Society of Arboriculture to coordinate/conduct tree maintenance.
- Use the USAF Urban Tree Inventory System to budget and schedule maintenance activities and plan overall tree resource management. Keep all inventory and maintenance records up-to-date using the field and office systems in concert on a routine basis.

Columbus AFB Inventory Procedure

Introduction

The street and landscape trees in the Columbus AFB cantonment are a very valuable resource, aesthetically and environmentally. However, urban trees must be proactively maintained and managed in order to retain them as community assets. Urban tree inventories provide Baseline information about the location, condition, and maintenance needs of community trees or, in the case of a military installation, the Base trees. The inventory information provides the tool for Base personnel to plan, budget, and schedule tree maintenance, protection, and replacement for the Base.

By effectively using and maintaining the information in the USAF Urban Tree Inventory System, Base natural resource and maintenance personnel can accomplish the following:

- Plan and budget for tree-related activities over a multi-year period.
- Efficiently schedule personnel and equipment.
- Accurately and efficiently provide information and plans for tree protection related to construction and renovation activities.
- Minimize potential liability situations related to trees.
- Gradually improve and maintain the overall health and condition of the Base tree resource.

Methodology

Inventory System Development - The Urban Tree Inventory System was developed, so that the Air Force would have a non-proprietary system for its use at any Bases in the future. It is composed of three major parts, the field system, the Access database, and ArcView GIS.

The field system hardware includes a Hewlett Packard iPAQ handheld computer, and a Garmin GPS 17M receiver using ArcPAD 6 software. The office portion of the system utilizes Access 2000 database and ArcView GIS 3.2. The field data is downloaded directly from the HP iPAQ unit to the desk computer via Microsoft ActiveSync. Data for ArcView include an aerial photograph of the Base, building and road files, tree data, and digital photographs of selected trees. More details on the system are provided in documentation from TreesAmerica.

APPENDIX C

Data Collection – During the inventory of Columbus Air Force Base, 9279 trees were examined, identified, measured, and recorded. Data were entered on a handheld computer and transferred to an office computer for processing. Information was collected on the following parameters, which are described below:

- Tree or Planting Site Location
 - Species Identification
 - Trunk Diameter Class
 - Tree Condition
 - Canopy Width
 - Tree Height Range
 - Maintenance Type
 - Maintenance Class
 - Tree Location Type
 - Tree Location Value
 - Conflicts
 - Tree Owner
 - Tree Appraisal
1. Tree or Planting Site Location – Each tree or planting site may be assigned a unique number and GPS coordinates and each point plotted on ArcView maps.
 2. Species Identification – Each tree was identified by genus and species. Both the botanical name and the local common name are included.
 3. Trunk Diameter Class – Trunk diameters are listed in two-inch intervals beginning with 2 inches and going to 44 inches at diameter breast height (DBH as measured 4.5 feet above ground line).
 4. Tree Condition- Trees were rated as Good, Fair, Poor, or Dead
 - Good - Tree had no major structural problems, no significant pest damage, no significant mechanical damage, full crown, and good vigor for the species.
 - Fair – Tree had minor structural problems and/or mechanical damage, some damage from pests, some structural problems or competition from adjacent trees, or exhibiting poor past maintenance practices such as topping.
 - Poor – Tree is apparently unhealthy and may have structural defects, mechanical damage, decay and/or crown dieback.
 - Dead – Tree is not alive.
 5. Canopy Width – Canopy diameter in five-foot increments beginning with 0 – 4 feet up to 50+ feet.
 6. Tree Height Range – Height in five-foot increments beginning with 0 – 4 feet up to 19 feet and ten-foot increments from 20 feet to 60+ feet.
 7. Maintenance Type – Recommended maintenance treatments to include:
 - Fertilization
 - Mulching
 - Soil Aeration
 - Cabling and Rigid Bracing
 - Girdling Root Removal
 - Wound Scribing
 - Lightning Protection
 - Other
 - Removal Needs
 - Removal-Hazard1 – Tree dead or has serious structural defect that cannot be practically or effectively corrected and may present a potential liability. May include trunk decay and severely decayed or weakened V-crotches with included bark and high likelihood of failure.
 - Removal-Hazard2 – Similar to above but because of location presents less of a hazard or liability to personnel on Base.
 - Removal-Conflict - Trees that conflict with surrounding infrastructure (wires, buildings, signs, pedestrians, vehicles, lights, etc.) and cannot be corrected with pruning. Remove after hazard removals.
 - Removal-NoHazard – Similar to above but present no immediate liability to the public.

- Pruning Needs
 - Prune-Hazard1 – Trees require pruning to remove deadwood and/or broken branches that pose a potential for personal injury or property damage. Subject branches typically 4 inches in diameter or greater.
 - Prune-Hazard2 – As above but pose less risk for injury or property damage; typically 2 – 4 inches in diameter.
 - Prune – Conflict - Regular maintenance to correct current or prevent future conflict problems with wires, buildings, signs, pedestrians, vehicles, lights, etc.
 - Prune-Routine – Trees that would benefit from crown thinning, raising, improving visibility, or correcting structural problems.
 - Prune-Training – Pruning young trees, typically in the first 3 – 8 years following transplanting to develop good branch structure. One of the most important types of pruning and the most cost-effective for long-term tree health and safety.
 - Re-inspection
 - Obstruction Removal
 - Stake Removal
 - Tree Planting
8. Tree Location Type – Includes foundation, open, street tree, median, well, and other.
 9. Tree Location Value – Desirability of the tree location relative to above and below ground space.
 10. Conflicts – Competition with BASH, buildings, fences, pedestrians, utilities, sidewalks and hardscapes, signs, vehicles, and other.
 11. Tree Owner – Base administration responsible for trees and other infrastructure present in a particular are, including AFDBA, Civil Engineering, Golf Course, Housing, Services (not golf course), State, and Tenant Unit.
 12. Photographs – Digital photographs were taken of structurally weak portions of many trees considered to be prone to failure or creating a potential liability. Photographs are tied to tree number in the database.
 13. Tree Appraisal – A monetary value can be generated for each tree based on the ISA trunk formula method, which takes into account a local base value for a cross sectional square inch of a tree, condition, landscape location, size, and species. The calculated values are very rough and based partly on characteristic values supplied by the ISA Southern Chapter. Those values are updated periodically by the ISA Chapter and should be changed in the database when appropriate.

Columbus AFB Urban Forest Characteristics

Species Diversity

The tree diversity (including genera, species, and age/size) of an urban forest affects its potential sustainability, management, maintenance activities, and budgets.

Ideally, no single genus should comprise more than 20% nor one species more than 10% of the tree population to guard against potential catastrophic pest problems that could devastate one genus or one species. However, at Columbus, four genera account for over 77% of the tree population. *Pinus* or pine accounts for over 23% of all the trees, and more than 99% of the pines are loblolly (*P. taeda*). The four genera representing the most trees are illustrated in Figure 1.

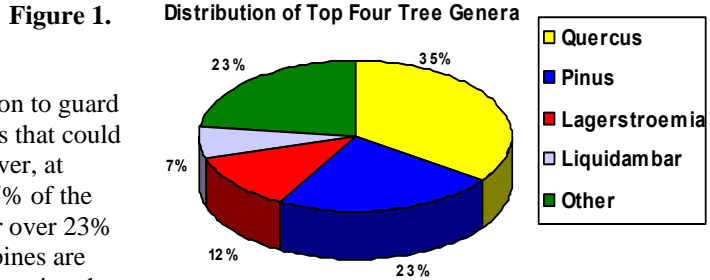


Figure 2. and Table 1. illustrate the distribution of the five most populous tree species on the Base.

Figure 2. Numbers Within Major Species

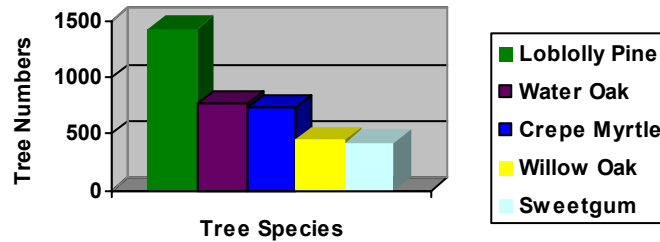


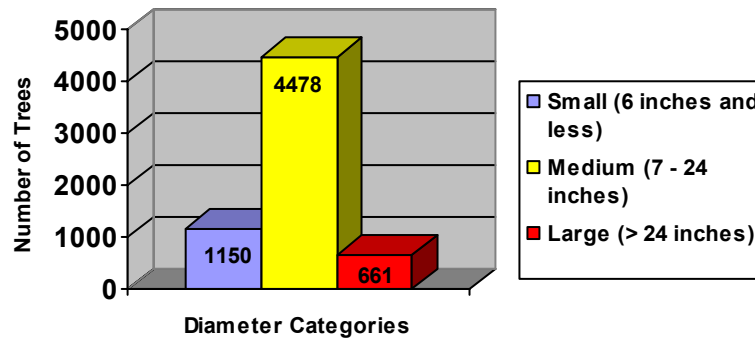
Table 1. Tree Species Distribution

Tree Species	Number of Trees	Percentage of Trees
Loblolly Pine	1431	23
Water Oak	772	12
Crepe Myrtle	737	12
Willow Oak	446	7
Sweetgum	422	7

The prevalence of loblolly pine reflects the influence of the pine monoculture which dominates traditional forestry in the southeastern United States. Many oak species besides water and willow oak, along with various other trees are, well-suited for the Columbus area and should be used when planting new trees on Base. Refer to the tree species list published by the Southern Chapter of the International Society of Arboriculture for species recommended for the area.

Tree size, as primarily gauged by trunk diameter, is a good indicator of tree age within a species, *i.e.* the larger the older the tree is. If a large percentage of the tree population is in the larger or older size class, the manager could be faced with a rapid decline in the vitality of the urban forest. Columbus does not face that situation, as the vast majority of the trees are in the small to medium range, as indicated in Figure 3. Only 19% of the trees are in the large category. However, now is the time to concentrate on managing with good plant or tree health care practices, so that the smaller trees will be in good health as they move into the larger/older classification. The healthier a tree is as it matures, the easier and less costly it will be to maintain throughout its life span.

Figure 3. Size Distribution by Trunk Diameter



Tree Health and Condition

The tree population at Columbus is in relatively good condition but needs to be maintained. Concentrating on tree health care practices, such as implementing the mulching recommendation on a majority of the trees, and protecting the trees from mechanical damage from grounds maintenance, renovation, and construction operations will be helpful. Table 2 and Figure 4 indicate the percentages of trees in the poor, fair, good, and dead categories. Implementing the removal, pruning, mulching recommendations over the next five years should vastly improve the conditions of the Base trees. Healthy trees are not only safer and less costly to maintain, they provide more environmental and aesthetic benefits.

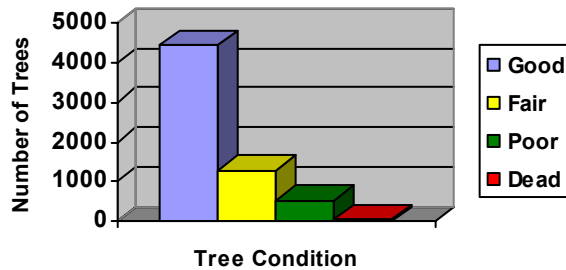
Certain tree species are more prone to wood decay and various pest problems. Arizona ash grows relatively fast, but like most fast-growing species, has a relatively short effective life in the landscape because of such problems. This species has the greatest number of individual trees recommended for priority pruning and removal at Columbus. Discriminate against this and other fast-growing species in the future.

Note in the maintenance recommendations that very few trees have fertilization recommendations. Fertilization can help with tree health if lack of nutrition is the problem. However, in most cases, including the trees at Columbus, nutrition is not the limiting factor. More typically, poor soil physical conditions and mechanical damage to roots are more limiting.

Table 2. Tree Condition by Number and

Tree Condition	Number of Trees	Percentage of Trees
Good	4456	71
Fair	1270	20
Poor	510	8
Dead	51	1

Figure 4. Number of Trees by Condition



General Observations on Columbus AFB Urban Forest

Construction Damage

A considerable number of trees have been damaged by construction activities, especially in the housing areas, and further damage was occurring during the time of the inventory. Problems include soil compaction, damage to the trunk and limbs of the trees, and severe damage to the root systems. Many of these trees are still alive but are showing signs of decline. This decline will continue to show up for the next three to five years, and many of these trees will die over this period. Tree protection plans and specifications should be developed and implemented prior to any work around the trees.

Recently Planted Trees

A considerable number of trees have been planted over the past several years. Most of these trees are in good to excellent condition but are beginning to be girdled by the guy wires that are still on the trees. When used, support wires should remain on the trees for a maximum of one year. These guys should be removed in the near future. In most cases staking and guying is seldom required and should not be used without documented reason in the future.

Mulching Around Trees

Many of the large, mature trees are beginning to show signs of old age and decline. The soil around many of these trees, especially around the ball fields, is highly compacted. Soil aeration and mulching will reduce this problem and minimize its occurrence in the future.

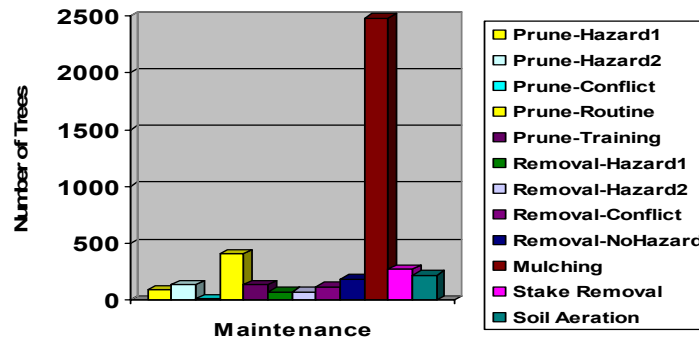
Similarly, groups of trees in some areas should receive less intense treatment. Such areas should be left more “natural” and should be mulched and not mowed. The mowing is doing severe damage to the roots and trunks of the trees and further compacting the soil. Among other problems, soil compaction causes tree roots to grow close to or even above the soil surface. These surface roots are being damaged by the mowers.

Additionally, several large stands of trees occur throughout the base (the NE Corner of D Street and Simler, the area around the water tower, and others). These areas could best be managed as natural stands, eliminating leaf/pine straw raking and grass cutting beneath the trees. This would reduce the damage to the trees by the mowers, reduce soil compaction, and maintenance costs.

Past Tree Care

Some past tree care, especially pruning, has been done improperly and some may have been done by the residents in the housing areas. Training should be given to the current staff, and the residents in the housing areas should be instructed not prune the trees. At least on Base staff member should become a Certified Arborist, or the Base should contract a Certified Arborist to oversee the tree care. Further, past tree maintenance appears to have been reactive rather than proactive. Base personnel need to use the tree inventory to implement a proactive tree maintenance/management program.

Figure 5. Major Maintenance Categories



Columbus AFB Urban Forest Maintenance Recommendations

Maintenance recommendations for many trees are included in the inventory. They have been based on general tree condition as well as specific symptoms or problems observed with the crown, trunk, roots, or immediate growing conditions of the tree. The recommendations for each individual tree are included in the database. They will only be summarized here, because the maintenance records should be updated regularly as treatments are applied, rendering a written listing quickly out-of-date.

Figure 5. and Table 3. summarize the maintenance recommendations. Details on pruning and removal categories were presented earlier in this document. Removal is critical to safety and aesthetics. Pruning is not only important to safety but also for tree health and structural stability. Using an ISA Certified Arborist for pruning and specifying that all pruning conform to ANSI A300 guidelines is critical for long term tree health and stability. Improper pruning can severely damage a tree and lead to structural and potential liability problems. Proper pruning, particularly on young trees is inexpensive and very beneficial.

Separating the tree maintenance from the other landscape maintenance contracts is highly recommended in order to assure qualified companies with competent crew members. At the very least, use contractors that have a distinct and qualified tree maintenance division if they offer a broad range of landscape maintenance services.

Obviously, the hazard related work, both pruning and removal, should have a very high priority. Mulching is extremely important to long term tree health and determining additional trees that would benefit and adding the recommendation to the database as management and maintenance proceeds is recommended.

Table 3. Maintenance Type by Number and Percentage of Trees

Maintenance Type	Number of Trees	Percentage of Trees
Prune-Hazard1	91	1
Prune-Hazard2	135	2
Prune-Conflict	11	<1
Prune-Routine	407	6
Prune-Training	135	2
Removal-Hazard1	77	1
Removal-Hazard2	74	1
Removal-Conflict	119	2
Removal-NoHazard	187	3
Mulching	2481	39
Stake Removal	270	4
Soil Aeration	222	4

Columbus AFB Urban Forest Planning and Management

Base personnel should use the information and data in the Air Force Urban Forestry Inventory System to plan, budget, schedule, implement, and track tree maintenance and management activities into the future. As mentioned previously, the high priority removal and pruning recommendations should be accomplished as soon as possible; within the first year if possible but certainly no later than year two.

A possible budgeting and scheduling scenario for the first three years for pruning and removal that would address the high priority needs and initiate some tree health care activities is presented below. Mulching and stake removal should also be budgeted and scheduled from the beginning. The schedule for routine pruning reflects a five-year rotation for the 407 trees recommended for that treatment. The unit costs are only estimates and may not accurately reflect prices that Base personnel may be able to obtain. The costs for most pruning and removal will also vary according to tree size and surrounding conditions.

APPENDIX C

2004 Maintenance Activity	Number Projected	Unit Cost (\$)	Projected Cost (\$)
Removal Hazard1	77	600	46,200
Removal Hazard2	20	400	8,000
Prune Hazard1	91	150	13,650
Total			\$67,850

2005 Maintenance Activity	Number Projected	Unit Cost (\$)	Projected Cost (\$)
Removal Hazard2	54	400	21,600
Prune Hazard2	135	150	27,000
Removal Conflict	19	300	5,700
Prune Conflict	11	100	1,100
Prune Routine	80	150	12,000
Prune Training	35	50	1,400
Total			\$68,800

2006 Maintenance Activity	Number Projected	Unit Cost (\$)	Projected Cost (\$)
Removal No Hazard	62	300	18,600
Removal Conflict	50	300	15,000
Prune Routine	80	150	12,000
Prune Training	100	40	4,000
Total			\$49,600

Columbus should consider having contract crews use the iPAQ handheld computer during maintenance activities and require that the contractor update the handheld database when maintenance is completed. The information can be synchronized with the office database and the inventory and management information can be kept up-to-date with little time or effort on the part of Columbus personnel.

Columbus AFB Urban Forest Inventory Conclusions

Base personnel, those dealing with tree management and those responsible for administering tree maintenance, should become very familiar with the Air Force Urban Forestry Inventory System. The information within the system provides vast knowledge about the tree resource that will enable making wise, cost-effective management decisions. Further, the system is a very powerful and flexible tool for planning, budgeting, scheduling, and tracking multiple types of information about the Base tree resource.

Every effort should be made to keep the database information up-to-date regularly, once a week if possible. Work orders and tree location maps can be printed for tree crews to facilitate their locating the trees and having clear instructions on work to be accomplished. Further, crews can also take the handheld PC to the field and up-date information as tasks are completed. That information can easily be synchronized with the 2015 Update

office computer to keep all files uniform. Some time will be required to become familiar with the system, but in turn time, effort, and money will be saved by using the system capabilities.

Contacts

Mr. Duane L. Dyer
President, Trees America
154 Kestrel Court
Brisbane, CA 94005

Dr. Donald L. Ham
Senior Urban Forester
4912 Bayshore Drive
Seneca, SC 29672

Mr. Tim Rowell
GIS Specialist
109 Evergreen Drive
Clemson, SC 29631

TreesAmerica

* For technical assistance with UTIS software, contact Tim Rowell at rowellt@earthlink.net or 864.653.4048.

APPENDIX D

PHOTOGRAPHS OF CAFB AND SAA

Photographs of CAFB and SAA



Burn, Compartment 3, Stands 3,4,11,12,13, picture shows stand 11



Same Burn as above, Compartment 3, Stand 3



Clear-cut Compartment 4, Stand 10



Clear-cut looking towards north end of the runways



Clear-cut Compartment 4, Stand 5



Thinning Compartment 3, Stand 8, done September 2003



TimberLane Nature Trail



Some of the Wetlands at TimberLane Nature Trail (CAFB)



SAC Lake viewing north



SAC Lake viewing northwest



Sparkleberry Trail Wetland



Before picture of Shuqualak Creek erosion



Shuqualak Creek after erosion control installed



Incomplete burn at Shuqualak



Shuqualak Viewing northeast



Shuqualak Viewing south



Shuqualak Viewing west

APPENDIX E
BIRD AIRCRAFT STRIKE HAZARD PLAN AND STATE DEPREDATION PERMITS

COLUMBUS AIR FORCE BASE
BIRD AIRCRAFT STRIKE HAZARD
(BASH)
PLAN 91-202



CAFB PLAN 91-202
14 FTW/SEF
COLUMBUS AFB, MS

30 September 2016

UNCLASSIFIED

LEFT
BLANK
INTENTIONALLY



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 14TH FLYING TRAINING WING
COLUMBUS AIR FORCE BASE MISSISSIPPI**

23 Sep 16

MEMORANDUM FOR DISTRIBUTION – (SEE ANNEX)

FROM: 14 FTW/SE

SUBJECT: Columbus AFB Plan 91-202, Bird Aircraft Strike Hazard (BASH) Reduction Plan

1. This plan provides guidance for reducing the bird/animal strike hazard where Columbus AFB (CAFB) conducts normal flying operations.
2. This plan is effective upon receipt and supersedes CAFB Plan 91-202, dated 15 May 2012. Superseded publication should be destroyed IAW appropriate directives.
3. Tasked organizations must annually review this plan and develop checklists. Recommended changes should be forwarded to the Wing Safety Office as soon as practical.
4. The office of primary responsibility (OPR) for this plan is Wing Safety (14 FTW/SE, 742-2842, fax 742-2521).

SMITH.NATHAN.S.

1106105355

NATHAN S. SMITH, Lt Col, USAF
Chief of Safety

Digitally signed by SMITH.NATHAN.S.1106105355
DN: cn=US, o=U.S. Government, ou=DoD, ou=PKI,
ou=USAF, cn=SMITH.NATHAN.S.1106105355
Date: 2016.09.23 10:10:21 -05'00'

Attachment:
CAFB PLAN 91-202

Date _____

MEMORANDUM FOR 14 FTW/XPO

FROM: _____

SUBJECT: Request for change in BASH Plan distribution

1. This headquarters/office/units are in receipt of _____ copy(s) of subject document.

2. Request that our distribution be amended as follows:

_____ be excluded from distribution.

Increase _____ number of copies to _____.

Decrease _____ number of copies to _____.

_____ Change address/office symbol:

OLD OFFICE SYMBOL AND ADDRESS:

NEW OFFICE SYMBOL AND ADDRESS:

3. Remarks:

(Signature Block of Authorized Rep)

NOTE: Complete and return to the above address ONLY if there are changes and/or comments.

- (1) The long title of this plan is the Columbus Air Force Base (CAFB) Bird Aircraft Strike Hazard (BASH) Plan 91-202. The short title is the CAFB Plan 91-202.
- (2) This document is UNCLASSIFIED and designated "FOR OFFICIAL USE ONLY."
- (3) Reproduction of this document in whole or in part is limited to the preparation of supporting directives, operating instructions, or checklists. Complete plans may be obtained through 14 FTW/SEF.
- (4) The provisions of AFI 10-701, *Operations Security (OPSEC)*, and AFI 31-401, *Information Security Program Management*, were considered during formation of this plan.
- (5) All changes will be posted as they are received and recorded.

RECORD OF CHANGES

CHANGE NO. AND DATE	DATE POSTED	POSTED BY/OFFICE SYMBOL

RECORD OF ANNUAL REVIEW

REVIEWED BY	DATE OF REVIEW	REMARKS

1. **PURPOSE:** To provide a base program designed to minimize local and transient aircraft exposure to potentially hazardous bird/animal strikes at or near Columbus AFB (CAFB) and auxiliary fields.

2. **CONDITIONS FOR IMPLEMENTATION:** This plan is based on hazards from both indigenous bird/animal populations and seasonal bird migration. Implementation of specific portions of the plan is continuous, while other portions require implementation as dictated by bird activity. This plan will be implemented under the direction of the Chief, Wing Safety, 14th Flying Training Wing, Columbus AFB, MS.

3. **OPERATIONS TO BE CONDUCTED:**

a. Specific operations include:

- (1) Establish a Bird Hazard Working Group (BHWG).
- (2) Develop procedures for reporting hazardous bird/animal activity and altering/discontinuing flying operations as appropriate.
- (3) Create provisions to disseminate information to all assigned and transient aircrews on specific bird/animal hazards and procedures for avoidance.
- (4) Conduct actions to eliminate or reduce environmental conditions that attract birds/wildlife to the airfield.
- (5) Determine office of primary responsibility (OPR) and procedures to disperse birds/animals on the airfield.
- (6) The establishment of a system to document bird/animal hazards and/or strikes on the airfield and the effectiveness of frightening/dispersal devices and eradication.

b. Tasked organizations: As listed in ANNEX A.

c. Supporting plans are required.

4. **ASSUMPTIONS:** None.

5. **OPERATIONAL CONSTRAINTS:** None.

6. **COMMAND RELATIONSHIP:** Normal.

7. **LOGISTICS REQUIREMENTS:** This plan is logistically supportable.

8. **LIMITING FACTORS:** None.

9. **COMMANDER'S APPRAISAL OF THE LOGISTICS AND TRANSPORTATION FEASIBILITY OF PLAN:**
This plan is feasible based on personnel requirements.

10. **TIME TO COMMENCE EFFECTIVE OPERATIONS:** The plan will become effective upon receipt and will be utilized continuously.

COLUMBUS AFB PLAN 91-202
TABLE OF CONTENTS

14TH FLYING TRAINING WING
COLUMBUS AFB, MS

<u>CONTENTS</u>	<u>PAGE NO.</u>
Security Instructions/Changes/Annual Review	i
Plan Summary	ii
Table of Contents	iii
Basic Plan	BP-1 thru BP-4
ANNEX A - TASKED ORGANIZATIONS	A-1
ANNEX B - OPERATIONS (TASKS AND RESPONSIBILITIES)	B-1 thru B-9
ANNEX C - BIRD HAZARD WARNING SYSTEM	C-1 thru C-6
ANNEX D - AIRFIELD WILDLIFE HAZARDS	D-1
Appendix 1 - Current Wildlife Hazards	D-1-1
Appendix 2 - Current Reduction Procedures/Techniques	D-2-1
Appendix 3 - Background on Wildlife Hazards	D-3-1 thru D-3-5
ANNEX E - USDA WILDLIFE SERVICES	E-1 thru E-2
ANNEX F - BIRD/ANIMAL DEPREDAATION PROCEDURES	F-1 thru F-4
Appendix 1 - BASH Shooting Safety Briefing	F-1-1
Appendix 2 - Bird Depredation List	F-2-1
Appendix 3 - Depredation Permit Statement of Understanding	F-3-1
Appendix 4 - Depredation Log	F-4-1
Appendix 5 - Bird Shoot Checklist	F-5-1
Appendix 6 - Deer Depredation Checklist	F-6-1
ANNEX G - MAPS AND CHARTS	G-1
Appendix 1 - Columbus AFB BASH Designation Zone Map	G-2
Appendix 2 - Columbus AFB Auxiliary Field Switchgrass Study Map	G-3
ANNEX H - BIRD AVOIDANCE MODEL (BAM)/ AVIAN HAZARD ADVISORY SYSTEM (AHAS) INFORMATION	H-1 thru H-2
ANNEX I - BIRD STRIKE PROCEDURES	I-1 thru I-2
Appendix 1 - AF Form 853, Air Force Wildlife Strike Report	I-1-1 thru I-1-2
ANNEX J thru Y not used	J-Y
ANNEX Z - DISTRIBUTION	Z-1

REFERENCES:

- a. AFI 91-202, *The US Air Force Mishap Prevention Program*
- b. AFI 91-204, *Safety Investigations and Reports*
- c. AFMAN 91-201, *Explosives Safety Standards*
- d. UFC 3-260-01, *Airfield and Heliport Planning and Design*
- e. AFI 13-204V3, *Airfield management Airfield Operations Procedures and Programs*
- f. AFI 32-1053, *Integrated Test Management Program*
- g. AFI 32-7064, *Integrated Natural Resources Management*
- h. FAA Order 5200.30, *Wildlife Hazard Detection and Control Procedures*
- i. FAA Order 7110.65, *Air Traffic Control*
- j. AFPAM 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Techniques*
- k. AFI 31-101, *Integrated Defense (FOUO)*
- l. BASH Team Staff Assistance Visit Reports
- m. Field Guide to Regional Birds

TASKED ORGANIZATIONS: ANNEX A

1. PURPOSE:

- a. General: An aircraft strike hazard exists at CAFB and its vicinity due to resident bird/animal and migratory bird species. Daily and seasonal movements along with changing plant-growing conditions may create various hazardous conditions. This plan establishes procedures to minimize the hazards at CAFB and the CAFB Auxiliary Airfield. No single solution exists to this BASH problem, and a variety of techniques and organizations are involved in the control program. This plan is designed to:
 - (1) Establish a bird hazard working group (BHWG) in accordance with AFI 91-202 and designate responsibilities to its members.
 - (2) Establish procedures to identify bird/animal hazardous strike situations.
 - (3) Establish aircraft and airfield operating procedures to avoid strike hazard situations.
 - (4) Provide a framework for disseminating information to all assigned and transient aircrews on bird/animal hazards and procedures for avoidance and reporting.
 - (5) Establish guidelines to decrease the airfield attractiveness to birds/wildlife by eliminating, controlling, or reducing environmental factors that support them.
 - (6) Provide guidelines for dispersing birds/wildlife when they are present on the airfield.

- (7) Identify organizations/OPRs with authority to upgrade, initiate, or downgrade BIRDWATCH conditions.

b. Airfield and Local Area:

- (1) Location: CAFB is located in Northeastern Mississippi, Lowndes County. The CAFB Auxiliary Airfield is located 35 miles south of CAFB, Mississippi, in Noxubee County.

(2) Base Acreage

	Columbus	Aux Airfield
Improved Grounds	370.0	1.0
Semi-Improved Grounds	1,707.0	227.0
Unimproved Grounds	1,830.8	867.2
Wetlands	181.0	0.0
Land Under Facilities	1,254.0	166.0
TOTAL	5,134.0	1,080.0

- (3) Elevation: Columbus 219', Auxiliary Field 253'.
- (4) General Topography: CAFB and CAFB Auxiliary Airfield are located on a bluff overlooking the Tennessee Tombigbee River in the upper Coastal Plains Resource Area of Mississippi. The land is largely made up of wide ridges and very narrow bottoms. The wide, flat ridges are composed of upland and terrace soils with very poor internal drainage.
- (5) Vegetation: Native vegetation on base includes grasses and forbs such as Broom sedge, Bluestem, Indian grass, Plume grass, Switch grass, Carpet grass, Wire grass, Goose grass, Tick clover, and Beggar tick. Native trees occurring on base include Water Oak, Willow Oak, Sycamore, Hickory, Walnut, Elm, Beech, Loblolly Pine, Short Leaf Pine, Red Cedar, and Yellow Poplar.
- (6) Other significant bird attractants include the base golf course, the wooded areas surrounding the airfield, the small ponds located on the northwest section of the airfield and the ponds located outside the airfield perimeter to the southeast.

c. Assumptions: None.

2. CONDITIONS FOR IMPLEMENTATION: This plan is based on hazards from both indigenous bird/animal populations and seasonal bird migration. Implementation of specific portions of the plan is continuous, while other portions require implementation as dictated by bird activity. This plan will be implemented under the direction of the Chief, Wing Safety, 14th Flying Training Wing, Columbus AFB, MS.

3. OPERATIONS TO BE CONDUCTED:

a. Concept of Operations:

(1) Reducing the bird/animal strike hazard at CAFB and the CAFB Auxiliary Field requires a cooperative effort between several base organizations. The OPR for coordinating this plan is the Wing Safety office.

(2) The Bird Hazard Working Group (BHWG).

(a) Function. Collects, compiles, reviews data on bird/animal strikes, then identifies and recommends actions to reduce hazards; recommends changes in operational procedures; prepares informational programs for aircrews; and assists the commander by acting as a point of contact for off-base BASH issues.

(b) Authority. The BHWG submits all recommendations to the 14 FTW/CC for approval. Implementation is through the normal chain of command.

(c) Composition. The chairperson will be the 14 FTW/CV or equivalent. This list represents the minimum composition of the BHWG, but other organizations may be tasked as required. Members who cannot attend BHWG meetings should send a knowledgeable representative.

14 FTW/CV	Vice Wing Commander (Chair, BHWG)
14 OG/CC	Commander, 14th Operations Group
14 MSG/CC	Commander, 14th Mission Support Group
14 FTW/MX	Division Manager, Aircraft Maintenance
14 FTW/SE	Chief, Wing Safety
14 FTW/SEF	Wing Flight Safety (BASH Program Manager) and USDA Wildlife Biologist
14 OSS/OSA	Airfield Operations Flight Commander
14 OSS/OSAB	Airfield Manager
14 OSS/OSAT	Tower Facility Chief
14 CES/CEIE	Conservation Manager
14 CES/CEOE	Grounds Maintenance Quality Control
14 OG/OGV	Chief, Supervisor of Flying (SOF)
37/41 FTS/DOV	Sunfish RSUTSO
50 FTS/DOV	Live Oak RSUTSO

(d) Meeting Schedule. Quarterly or as requested by members of the BHWG who have identified a problem and has been approved by the chairperson of the BHWG. Meeting minutes will be maintained and appropriate distribution made.

b. Tasks: ANNEX B outlines the general and continuing tasks and responsibilities for each organization. ANNEX D gives specific hazard reduction measures for varying bird hazard conditions.

4. ADMINISTRATION AND LOGISTICS:

a. Administration: Normal.

b. Logistics: Normal.

5. OPERATIONAL CONSTRAINTS: None.

6. COMMAND RELATIONSHIPS: Normal.

DOUGLAS C. GOSNEY, Colonel, USAF
Commander

COLUMBUS AFB PLAN 91-202
BASIC PLAN

14TH FLYING TRAINING WING
COLUMBUS AFB, MS

ANNEXES:

A - Tasked Organizations

B - Operations (Tasks and Responsibilities)

C - Bird Hazard Warning System

D - Airfield Wildlife Hazards

E - USDA Wildlife Services

F - Bird/Animal Depredation Procedures

G - Maps and Charts

H - Bird Avoidance Model (BAM)/Avian Hazard Advisory System (AHAS)

I - Bird/Animal Strike Procedures

Z - Distribution

ANNEX A TO COLUMBUS AFB PLAN 91-202
TASKED ORGANIZATIONS

ORGANIZATION

14 FTW

14 OG

14 STUS

14 OSS

14 CONS

37 FTS

41 FTS

48 FTS

49 FTS

50 FTS

14 CES

TENANT UNITS

14TH FLYING TRAINING WING

COLUMBUS AFB, MS

OFFICE SYMBOLS

CC, CV, SE, PA, MX

CC, OGV

DA

OSA, OSOP

CC

SE, RSUTSO

SE, RSUTSO

SE, DOV

SE, DOV

SE, RSUTSO

CC, CEIE, CEOHHE

1. WING COMMANDER (14 FTW/CC):

- a. Promotes and emphasizes a BASH program geared to reducing the possibility of bird and wildlife strikes.
- b. Ensures wing personnel implement this plan.
- c. Approves recommendations of the BHWG.
- d. Obtains resources necessary to ensure an effective BASH program.

2. VICE WING COMMANDER (14 FTW/CV):

- a. Chairs Bird Hazard Working Group (BHWG) meetings.
- b. Coordinates with tasked agencies to ensure execution of this plan.

3. OPERATIONS GROUP COMMMANDER (14 OG/CC):

a. Ensures guidelines are in place for declaring, disseminating and terminating bird-watch conditions on CAFB, training areas and low-level routes (ANNEX C).

b. Ensures guidelines are in place for disseminating Phase II bird watch condition restrictions for CAFB, training areas and low-level routes (ANNEX C).

c. Issues specific guidance and flying restrictions for aircrews and the supervisor of flying (SOF) on procedures to be followed under each bird watch condition (ANNEX C).

d. Issues specific guidance to the Command Post concerning actions requiring implementation of this plan (ANNEX C).

e. Ensures aircrews that observe increased bird activity contact the SOF.

f. Ensures all proposed new low-level routes and training areas, or changes to existing routes or areas, are reviewed for BASH potential.

g. Makes operational changes to avoid areas and times of known hazardous bird concentrations, mission permitting. Considers the following during periods of increased bird activity:

- (1) Raise traffic pattern altitude.
- (2) Change traffic pattern direction to avoid bird concentrations.
- (3) Avoid takeoffs/landings at sunrise/sunset \pm 1 hour.
- (4) Modify formation operations.
 - (a) Limit or prohibit formation takeoffs and landings.
 - (b) Depart pattern in trail; rejoin 3,000 ft AGL.
 - (c) Split formations during recovery.
 - (d) Discontinue formation instrument approaches.

- (e) Limit time spent in close formation below 5,000 AGL.
- (5) Reschedule local traffic pattern training or transition elsewhere.
- (6) Raise altitude enroute to low-level or training areas.
- (7) Limit time on low-level routes to minimum for training requirements.
- (8) Raise the minimum altitude for selected low-level routes and/or selected legs of low-level routes.
- (9) Select low-level routes or training areas based on bird hazard data from HQ AFSC/SEFW (Bird Avoidance Model and Avian Hazard Advisory System for low-level route analysis).
- (10) Close low-levels, low-level routes or training areas based on pilot reports (PIREPs) and/or bird hazard data from HQ AFSC/SEFW (Bird Avoidance Model and Avian Hazard Advisory System for low-level route analysis).
- (11) Close auxiliary field.
- (12) Make full-stop landings.

4. SUPERVISOR OF FLYING (14 OG/OGV):

a. Per ANNEX C of this plan, the SOF will declare the bird watch conditions (BWC) and/or animal hazards during normal flight operations. During all other periods, the chief of airfield management, or his or her designated representative, is the declaring authority.

(1) Declare, disseminate, and terminate applicable bird watch conditions (BWC) and/or animal hazards on CAFB, training areas, auxiliary fields and low-level routes (See ANNEX C).

(a) Will use all available information (AHAS/BAM, airborne aircraft, tower, transient alert, Airfield management, etc.) to determine BWC and then relay, by all means available, the BWC to local and transient aircrews.

(b) Will be the declaring authority for bird watch conditions. Relay change in BWC to airfield management and each flying squadron.

(c) Will monitor reported bird activity on local low levels and put restrictions on route segments or close the route for bird watch conditions reported severe (See ANNEX C).

b. Ensure the QRC (if applicable) is run when BWC changes.

c. Activates the bird dispersal team. This team will be activated when birds on the airfield create hazardous conditions.

d. Oversee and approve bird cannon operations as needed.

5. SQUADRON SUPERVISORS:

a. Will check BAM, AHAS and SOF declared BWC's and post the local airfield BWC. The operations supervisor will brief bird watch condition for the applicable airspace (to include low-level, range and out bases) to the aircrew at step.

b. Will assist aircrew in planning alternate missions as appropriate (delayed takeoff time coordination and/or alternate airspace coordination).

6. R 4404 RANGER (14 OG/OGA):

- a. Will check BAM and current AHAS (to include trend information) and brief flights entering the range.
- b. Will inform aircrew of increased bird activity on the range.
- c. Will recommend a change in bird watch condition based on all available information.

7. CONTRACT MAINTENANCE (14 FTW/MX):

a. Issues specific guidance to maintenance personnel for reporting all discovered bird strikes on aircraft to quality control and safety.

b. Ensures maintenance personnel are trained on completing the AETC Form 645-4 and that procedures are in place to forward the form to flight safety.

c. Issues procedures for the preservation of non-fleshy bird remains if discovered on aircraft. Even the smallest feather (down) should be forwarded to flight safety for identification. When feathers are not available, DNA samples should be gathered by maintenance personnel or wildlife services.

8. CONTRACTING SQUADRON (14 CONS): USDA Wildlife Services can assist with many of these responsibilities in conjunction with 14 CONS.

a. Ensures that all contracts awarded to civilian contractors are consistent with this plan and include all elements of integrated pest management (IPM) techniques and procedures, as outlined in AFI 32-1053 and DOD Directive 4150.7. Ensures safety review documented in file prior to solicitation. Integral to IPM is the fact that birds and unwanted wildlife are pests and affect our wing mission.

9. CHIEF OF FLIGHT SAFETY (14 FTW/SEF):

- a. Is the OPR for this plan.
- b. Monitors base-wide compliance with this plan and ensures all bird and wildlife strikes and hazards are reported IAW AFI 91-202 and AFI 91-204.
- c. Disseminates BASH data to the BHWG and flying units.
- d. Provides the BHWG with the current BASH guidance from higher headquarters, the BASH team and other agencies.
- e. Maintains a current bird activity map for CAFB and provides any additional information on migratory, local and seasonal bird activities.
- f. Monitors bird activity, bird strike statistics, and advises the BHWG chairperson when a meeting is deemed necessary.
- g. Coordinates with aircrews and maintenance personnel for collecting of nonfleshy remains after strikes. When feathers are not available, DNA samples should be gathered. Sends any salvaged bird strike remains to: Smithsonian Institution, Feather Identification Lab, NHB E-600, MRC 116, PO Box 37012, Washington DC 20013-7012.

h. Establishes and maintains a BASH program continuity folder with pertinent BASH information to assure continuity of knowledge with personnel turnover.

i. Establishes a wildlife hazard awareness program in conjunction with squadron flying unit safety representatives, to include information on local bird hazards, reporting procedures, and instruction on BAM/AHAS use.

j. Analyzes bird strikes by condition of flight and geographical location to determine the areas of high bird activity.

k. Ensures aircrews participate in the BASH reduction program by promptly reporting all bird strikes and hazardous bird/animal conditions to their supervisor (SUP) or safety representative as appropriate.

l. Ensures tenant units (if applicable) are familiar with the BASH plan and are trained on reporting procedures.

m. Maintains a log of bird/animal depredation shoots.

n. Prepares bird depredation permit applications and forwards to the US Fish and Wildlife Service for permit issuance. Ensures a current depredation permit is on file before any depredation actions are taken. USDA should assist with application process and obtaining permits.

10. AIRSPACE MANAGEMENT (14 OSS/OSOP): Reviews with 14 FTW/SE all proposed new low-level routes, transition routes, training areas and/or changes to existing routes/areas for BASH potential.

11. STANDARDIZATION/EVALUATION (14 OG/OGV):

a. Review with OG/CC all proposed guidance for aircrew and the SOF on procedures to be followed under bird watch conditions.

b. Monitor on a regular basis aircrew preflight briefings to ensure existing BASH is briefed.

c. Reviews with OG/CC potential operational changes to avoid areas and times of known hazardous bird conditions.

12. SQUADRON FLIGHT SAFETY OFFICERS AND STANDARDIZATION/EVALUATION (37 FTS/SE, 41 FTS/SE, 48 FTS/SE, 49 FTS/SE, 50 FTS/SE, 37/41 FTS/RSUTSO, 50 FTS/RSUTSO, 48 FTS/DOV, 49 FTS/DOV):

a. Brief aircrews to promptly report all bird strikes and hazardous conditions per this directive. Time and conditions permitting, bird sightings should be reported to the SOF/air traffic control (ATC) as soon as possible. The following information should be included:

- (1) Call sign.
- (2) Location.
- (3) Altitude.
- (4) Type of bird (if known).
- (5) Approximate number of birds.
- (6) Behavior of birds (soaring, migrant, flying to or from a location, etc.).

- b. Ensure units, to specifically include supervisors of flying (SOF), if applicable, and supervisors are trained on the Bird Avoidance Model (BAM) and Avian Hazard Awareness System (AHAS).
- c. Ensure the current bird activity data is available and briefed for each planned phase of flight (BAM, AHAS).
- d. Ensure adequate supplies of AF Form 853 (BASH report forms) are readily available for aircrews.
- e. Brief aircrews on seasonal bird hazards and provide access to the BAM and AHAS web sites on squadron mission planning computers. Videos, articles and other information will be used, as appropriate, to maintain and increase awareness.
- f. Ensure crews and squadron supervision are utilizing all available resources (BAM, AHAS, bird reports from crews, etc.) to mitigate bird hazards for all off-station flying operations.
- g. Ensure aircrews are aware of proper flight operations during “bird watch alert” status and BWC LOW, MODERATE and SEVERE (See ANNEX C).
- h. Provide accurate bird and wildlife strike information to 14 FTW/SEF within 24 hours of occurrence.

13. CIVIL ENGINEER SQUADRON COMMANDER (14 CES/CC): USDA Wildlife Services can assist with many of these responsibilities in conjunction with 14 CES.

- a. Provides the base conservation manager and pest management representatives to the BHWG to monitor and advise the group of environmental modification.
- b. Develops procedures for removal or control of bird/animal attractants in conjunction with USDA.
- c. Initiates surveys and writes environmental impact assessments and statements as required. USDA will accomplish where appropriate.
- d. Corrects environmental conditions that increase BASH potential.
- e. Uses land management practices that reduce BASH potential.
- f. Modifies airfield habitat consistent with runway lateral and approach zone management criteria per AFI 32-1026. Habitat reduction to reduce BASH beyond the 1,000’ distance criterion is desired and will further reduce BASH potential.
- g. Incorporates the following practices into the base land management plan:

(1) Managing Airfield Vegetation. Maintain a uniform grass height between 7 and 14 inches. Airfields with a variety of grass species may have a fast-growing strain that reaches 14 inches sooner than the rest of the airfield; therefore, to maintain a uniform grass height, the grass should be mowed when the average grass height reaches 14 inches. Grass shall be cut before it goes to seed. In addition, mowing in perpetually wet areas causes rutting, creating a wildlife attractant. Therefore, small patches may be allowed to grow beyond 14 inches to prevent significant damage and hazards caused by mowing when ground is wet, with advisement of wing safety and USDA. The use of heavy mowing equipment shall be reduced until these areas dry to prevent establishing ruts.

(a) Maintain the airfield as uniformly as possible to reduce the edge effect (i.e., the highly attractive transition zone between two distinct habitat types, such as from brush to grassland).

(b) Keep broad-leaf weeds to a minimum on the airfield. Apply herbicides as necessary to achieve this. Broad-leaved weeds attract a variety of birds, may produce seeds or berries, and may limit grass growth.

(c) Bare areas are frequently used by birds as resting sites, so plant grass as necessary and provide adequate irrigation to establish the grass. Selectively fertilize grasses, if required, to promote a uniform cover based on soil test results. Irrigation may be required to support turf growth in conjunction with fertilizer applications for limited times.

(d) Use vegetation that is appropriate for the region, controls erosion, and supports BASH reduction philosophy.

(e) Obtain assistance in herbicide selection for weed control, appropriate grass seed selection, fertilization, and erosion control vegetation from the United States Department of Agriculture Natural Resource Conservation Service, the Agricultural Extension Service or HQ AFCEA, Tyndall AFB, FL.

(f) Coordinate mowing with periods of low flight activity. On days when active mowing operations will be taking place on the airfield, ensure the grounds maintenance foreman calls control tower to advise the SOF and ATC personnel.

(2) Maintaining Drainage Ditches. Ditches shall be clear and obstacle free. The vegetation height within the ditches shall be maintained to a maximum of 14 inches, with it being ideal to have no vegetation within the waterline of ditches to hinder drainage. Vegetation shall be removed as often as necessary to maintain flow and discourage use by birds. Small equipment (e.g., push mowers, hand-powered tools, weed eaters) shall be used as appropriate during/following periods of significant rain fall to prevent rutting and damaging slope stability while maintaining these standards. Ditch sides shall be graded with a minimum slope ratio of 5:1 to discourage wading birds and emergent vegetation. Ditch maintenance shall be performed to maintain the integrity of the ditches and to repair any ruts along the banks that could impede collection of storm water runoff. Also, the ditches shall be dredged as necessary to remove excess vegetation and sediment. Drainage ditches will be periodically inspected (at least monthly during the growing season) for compliance with BASH standards.

(3) Eliminating Standing Water. Eliminate high and low spots on the field, including small ponds, puddles and large bodies of standing water as identified by the BASH working group, to reduce attractiveness to birds. The grounds contractor shall report previously unidentified low areas on the airfield to the grounds QAE (14 CES/CEOE), who will coordinate and verify these findings with airfield management and USDA Wildlife Services. Low spot and ditch maintenance is essential to preventing standing water. Eliminating standing water immediately is essential to avoiding the development of wetlands. Coordinate with the Army Corps of Engineers and the appropriate state environmental permitting office prior to altering wetlands. Filling of low areas with excess soil should be used to eliminate perpetual standing water. Also, ditching can be considered as a method to eliminate perpetual standing water areas.

(4) Removing Dead Vegetation. As soon as possible, remove dead vegetation such as brush piles, grass clippings, hay bales, etc., and the cover it affords. Grass clippings may be mulched provided they are not visible after mowing is complete.

(5) Removing Dead Birds and Animals. Remove dead birds or other animals from the field to avoid attracting vultures or other scavengers. Forward nonfleshy remains, which may be caused by collision with aircraft, to flight safety for identification.

(6) Controlling Pests. Invertebrates and rodents provide important food sources for birds. The civil engineer pest management section should periodically survey and reduce these pests when required. Control insects, earthworms, rodents, etc., by using IPM techniques under the supervision of the base pest management office with EPA-approved methods. Control should begin early in the spring. Coordinate this with the animal control section of the Mississippi Wildlife Management Plan.

(7) Controlling Waste Disposal. Landfills are the most significant attractant to hazardous bird species. Coordinate with local and state agencies to ensure that landfills near the base are operated according to FAA guidelines and comply with state and federal laws. Negotiate relocation or closing of landfills that do not meet FAA guideline criteria. If landfill relocation is not feasible, make the site as unattractive to birds as possible. Consider:

- (a) Maintaining a small working force to minimize exposed wastes.
 - (b) Incinerating waste.
 - (c) Operating a landfill as a pit or trench to limit access to birds.
 - (d) Dumping waste at night or during nonflying periods.
 - (e) Covering waste material immediately.
 - (f) Restricting gulls and other birds with overhead wire barriers.
 - (g) Relocating putrescible wastes.
 - (h) Using bioacoustics and pyrotechnics to frighten birds away. USDA will assist with bioacoustics and pyrotechnics.
- (8) Provide representative to work with outside agencies when potential hazards arise outside of the base (i.e., dumps, slaughterhouses, etc.).
- (9) Roosting Sites. Control blackbird and starling roosts by vegetation management of roost sites where possible. Prune trees to reduce the number of perches available and remove entire trees or stands if necessary. Refer to the Mississippi Land Management Plan, UFC 3-260-01, and AFI32-7064.
- (10) Bird-proofing Buildings and Hangars. Pigeons, sparrows and starlings frequently occur in buildings and hangars - exclude them. Denying access by screening windows, closing doors, and blocking entry holes is most effective. When necessary, consider:
- (a) Pellet Guns. Shoot birds for a short-term solution. Experience has shown that all birds cannot be removed using this technique. Proper safety equipment and skilled personnel are necessary. USDA will assist with this responsibility.
 - (b) Netting. Install under superstructure to exclude pest birds from roosting areas. Ensure no gaps or holes are present for birds to get through.
 - (c) Avitrol. Note that pest management should place in or near hangar to kill birds or create a distressed response, scaring others away. Coordinate with USDA animal damage control prior to using this product. USDA will assist with this responsibility.
 - (d) Trapping/Removal. Use a large cage with food, water and other birds to trap pest birds. Birds can either be released away from the hangar or killed. Permits from the USDA Fish and Wildlife Service and the state wildlife agency are required to kill most birds. [Permits are not required for rock doves (domestic pigeons), starling or sparrows]. USDA will assist with this responsibility.
 - (e) Design Features. Consider structures with the support features located on the outside of the building to greatly reduce bird numbers. Consider this design when planning a new hangar. Additionally, fabric roofs move in the wind and deter birds from nesting. Shelters can be made less attractive by using fabric roofs instead of metal ones that may invite nesting.
 - (f) Door Coverings. Use netting or plastic strips suspended over the doors to exclude birds. Ensure no tears or holes are present which allow birds' access to the hangar.

(g) Sharp Projections. Use in limited areas such as ledges, overhangs, or small places where birds cannot be allowed. Expense prohibits their use over the entire structure.

(h) Night Harassment. In conjunction with USDA, use high-pressure air or water to make hangars an undesirable roosting site. Persistence is the key; harassment just prior to roosting will discourage roosting and can eliminate roosting sites.

(i) Bird Feeders. Bird feeders are prohibited on base, to include in base housing. Feeding attracts birds and encourages nesting on base since there is a predictable food source. Birds as small as humming birds have caused thousands of dollars of damage to aircraft at CAFB. Additionally, many of these birds may become easy and predictable prey for larger predatory birds. Large birds such as hawks and other raptors historically cause significant damage to CAFB aircraft and pose a hazard to our aircrew.

(11) Preventing Other Animal Hazards to Aircraft. Use appropriate trapping and exclusion methods for animals such as wild hogs. Consider fencing for deer control. Some species or individual animals may be removed by shooting. Comply with the Integrated Natural Resource Management Plan and obtain appropriate permits. Dispatch entomology personnel to kill any wounded animals on or near the airfield when requested by the SOF, airfield management or flight safety. USDA will assist with this responsibility.

14. AIRFIELD MANAGER (14 OSS/OSA): USDA Wildlife Services can assist with many of these responsibilities where appropriate.

a. During normal airfield surveillance, airfield management will monitor bird/animal populations, grass height, drainage ditches, etc., and report problems to the appropriate OPR for modifying or eliminating the problem. Fill out and submit work orders as necessary to eliminate all discrepancies found during the periodic spot inspections. These work order requests should be coordinated through wing flight safety and 14 CES.

b. Will assume bird watch declaration duties when airfield is open for operation and SOF is not on duty.

c. Will ensure BWC is posted in base operations.

d. Will conduct daily airfield survey. Dead birds/wildlife will be removed from the airfield. Wing safety or the 14 FTW USDA representative will be called to determine if they want bird/wildlife for identification purposes.

e. Will have available an AF Form 853 for transient aircrews to fill out if a bird/animal strike is encountered.

f. Develop procedures for briefing transient aircrew members of known bird/animal hazards before departure and assisting transient aircrews that have experienced bird/animal strikes in completing the AF Form 853.

g. Forward all completed AF Form 853 to the wing flight safety office.

h. Brief airfield contractors on responsibilities for bird control on or near the airfield during preconstruction (PRECON) briefings.

i. Organizes a bird dispersal team. This team will be activated at any time when birds on the airfield create hazardous conditions. The bird dispersal team will, as a minimum, have immediate access to bioacoustics and pyrotechnic bird dispersal equipment. This equipment must be stored where readily available. USDA will assist with this responsibility.

j. Notifies security forces when significant bird scare activities will be necessary on the airfield.

15. USDA WILDLIFE SERVICES BIOLOGIST (USDA/WS):

a. Will assess bird/animal activity on and around CAFB and the CAFB auxiliary field.

- b. Will provide recommendations to reduce animal activity that is hazardous to flight operations.
- c. Will be responsible for the positioning of the bird cannons to maximize their effect.
- d. Will actively remove strike threats by depredation, trapping and releasing, or any other method deemed appropriate by the USDA. Will assist wing safety with obtaining required permits for depredation or trapping.
- e. Will aid maintenance in the collection and distribution to Wing Safety of remains from strikes to ensure they are identified.
- f. Will assist airfield management on the bird dispersal team if needed.
- g. Will comply with the directives in ANNEX E of this document.
- h. Will assist Golden Triangle Regional Airport with bird and wildlife issues.

16. AIR TRAFFIC CONTROL (ATC) TOWER (14 OSS/OSA):

- a. Will report observed bird/animal activity to the SOF or airfield management as appropriate.
- b. Will issue bird watch advisories to aircrews as required.
- c. Provides airfield management urgent access to the runway under bird watch condition MODERATE or SEVERE or as required.
- d. Identifies radar targets as possible bird activity when appropriate to provide warning to pilots.
- e. Recommends missed approaches or delayed takeoffs when possible bird hazards appear on ATC radar.

17. APPROACH CONTROL (14 OSS/OSA): Columbus RAPCON will provide aircrews with observed bird activity when applicable (i.e., aircrew reported bird activity on 10-mile final). Advisories by civilian run approach control would be based on letters of agreement and requirements outlined in the JO 7110.65, *Air Traffic Control*.

18. TENANT FLYING UNITS: Tenant units will provide a representative on the BHWG and support the base BASH program as appropriate. Responsibilities in the unit will mirror the responsibilities assigned in ANNEX B.

19. PUBLIC AFFAIRS (14 FTW/PA): The public affairs office will participate as required and upon request will provide a public information program designed to inform base personnel, dependents and the general public on the hazards and costs of uncontrolled bird activity and the measures being taken to minimize them.

20. BASE AUDIO VISUAL SERVICES (14 FTW/PAM):

- a. Provides photographic and video services to document bird strikes and related activities as required.
- b. Provides graphic support to publicize bird hazards and actions taken to minimize them as required.

21. TRAINING AREAS/RANGES: Use the Bird Hazard Warning System (ANNEX C) to report significant bird activity noted away from the base. Report sightings to the SOF or safety office and advise aircrews of hazardous conditions.

1. **GENERAL:** This annex establishes procedures to use for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds that pose a potential hazard to safe flying operations.

2. **BIRD WATCH CONDITIONS:** The bird watch condition (BWC) is based on bird activity in the local area pattern. The terminology in paragraph 6 below will be used for rapid communications to disseminate bird activity information and implement unit operational procedures for CAFB and CAFB auxiliary field. Bird location will be given with the condition code. Both condition and location will be posted on the bird hazard notification boards in each flying unit and base operations. Operational restrictions to the local flying operations will be tailored to observed bird activity. The SOF, and/or CAFB flying unit operational commanders, will determine what actions are necessary to decrease aircrew exposure to known areas of bird activity. In many situations, aircrew awareness that increased bird activity exists will be sufficient action. However, some situations require positive action to reduce the potential for bird strikes. During SEVERE or MODERATE conditions, the SOFs and/or CAFB flying unit commanders will restrict flying activities as required to reduce potential mishap occurrence.

3. The SOF will determine bird watch conditions during normal flight operations. At all other times, airfield management or the designated representative is the determining authority. The agency upgrading the bird watch condition should also downgrade or cancel the bird watch condition, commensurate with updated information. SOF/airfield management will consider the following when issuing a bird watch condition:
 - Bird Avoidance Model (BAM) and/or Aviation Hazard Advisory System (AHAS) conditions.
 - Information relayed by airborne aircraft.
 - Observations made by and relayed to Airfield management by CAFB tower SOF, transient alert personnel and RCS controllers.
 - Observations made by airfield management personnel.

4. Once the SOF changes the BWC, he/she will ensure:
 - Tower personnel are notified.
 - ATIS is updated.
 - Airfield management is notified.
 - Squadron supervisors are notified.
 - RSU personnel are notified.

5. The ranger will recommend and the flight lead will set the BWC at R 4404 Range based on:
 - BAM and/or AHAS conditions.
 - Observations from the tower.
 - Information relayed by airborne aircraft.

6. The following minimum restrictions apply:

Bird Watch Condition Low – Normal bird activities within the local pattern area with a low probability of hazard (no restrictions).

Traffic Pattern: No restrictions.

Low-level: No restrictions.

R 4404: No restrictions.

Low-altitude Operations other than R 4404 and Low-level Routes: No restrictions.

Bird Watch Condition Moderate – Concentrations of birds observed in locations that represent a probable hazard to safe flying operations. Considerations include size and number of birds, location, and direction of travel. Exercise increased vigilance and follow the restrictions below:

Departure: Minimize formation takeoffs to those required for training; depart in trail and rejoin above 3000'AGL when possible.

Traffic Pattern: Minimize pattern work to that which is required by training. To the maximum extent possible, T-38, T-1, and T-6 flight leads will direct wingmen to route (T-1s will use offset) below 5,000' MSL. Aircraft conducting formation approaches may fly close formation inside 5 miles for the T-6 and 9 miles for the T-38 (T-1s may use the visual position inside of 13nm). Formations on initial will maintain route (offset for T-1s) until 3 miles. **Note:** USDA or AMOPS will respond to mitigate the bird watch condition if the hazard is present on the airfield.

Low-level: Maintain at or above 1,000' AGL. Aircrew may fly as low as 500' AGL to complete minimum syllabus or check ride requirements. After requirements are met, aircrew will maintain at or above 1,000' AGL. Aircrews are encouraged to complete 500' AGL training on bird watch condition "low" legs if available.

R 4404: Maintain at or above 1,000' AGL. Aircrew may fly lower to complete minimum syllabus or check ride requirements. After requirements are met, aircrew will maintain at or above 1,000' AGL.

Low-altitude Operations other than R 4404 and Low-Level Routes: Maintain at or above 1,000' AGL. Aircrew may fly lower to complete minimum syllabus or check ride requirements. After requirements are met, aircrew will maintain at or above 1,000' AGL.

Bird Watch Condition Severe – Heavy concentration of birds on or immediately above the active runway or other specific locations that represents an immediate hazard to safe flying operations. Considerations include size and number of birds, location on or near the airfield, and direction of travel. Exercise extreme caution and follow the restrictions below:

Traffic Pattern: Stop all takeoffs. Divert aircraft as necessary. Landings should be accomplished from the overhead pattern to a full-stop landing. T-38 and T-6 formation procedures for bird watch condition MODERATE apply. Formation approaches will not be flown, except in an emergency. **Note:** USDA or airfield management will respond to mitigate the bird watch condition if the hazard is present on the airfield.

Low-Level: If AHAS indicates SEVERE +/- one hour of the time the route segment is to be flown, apply the following guidance, in order of precedence, to minimize the bird strike threat:

1. Select a different low-level route/mission (weather and operational constraints permitting).
2. Enter or exit the route at published (AP1/B) alternate entry/exit points to avoid the severe leg(s).
3. Maintain at or above 1,500' AGL minimum. Squadron SUPs may approve flying the affected route segments at the top of the route segment altitude block (do not exceed AP1/B route altitude restrictions) or 1,500' AGL, whichever is higher. SUPs will consider whether the AHAS model is based on NEXRAD, SOAR or BAM and the associated trend when approving flight under this option.

R 4404: If a range control officer (RCO) is present at a restricted area and he makes a bird observation of less than severe condition, Squadron Ops Sups may approve flying in the restricted area as long as aircrew fly a bird clearing pass to set the bird watch condition prior to use. This pass should be at or above 3,000' AGL.

1. If the flight lead determines the bird watch condition is severe, no deliveries are authorized and aircrews should perform an alternate mission.
2. With severe indications in preflight planning, and either no RCO or Class B range operations are planned, crews will not fly a mission to the restricted area.

Low-level Preflight Planning Guidance: Crews should use AHAS, BAM and other reports of bird activity to minimize bird strike threats with informed decision making and sound ORM practices. The primary data source for

current bird activity on low-level routes and military airfields is the Avian Hazard Advisory System (AHAS) (www.usahas.com). If AHAS is not operational, crews should use the Bird Avoidance Model (BAM) (www.usahas.com/bam/). Prior to the low-level mission briefing, aircrews will check AHAS for their planned low-level route +/- one hour of the time it is intended to be flown. Crews will also check the current AHAS at step time.

Note: AHAS is updated near real time by NEXRAD data, which makes the current hour forecast more accurate. Flight planning greater than 1 hour but less than 24 hours into the future should display a forecast based on current conditions and historical data (SOAR). Outside of 24 hours, the AHAS will default to the historical BAM levels. If the selected place and/or time are outside radar coverage or null radar data is received, the model should default to the historical BAM risk level. BAM calculates the mean bird mass for all bird species present during a particular daily time period for one of 26 two-week periods. The BAM MODERATE level indicates a risk ratio that is 57-708 times the risk of the LOW zone, while the SEVERE level indicates a risk ratio that is 2,503-38,647 times the risk of the LOW zone.

Local Bird Advisories: Aircrews are reminded to remain vigilant for bird activity regardless of the existing BWC and will report any hazardous bird activity to the SOF, tower, or RSU. The following information should be included in the PIREP: call sign, location, altitude, time, species/description, approximate number and behavior of birds/wildlife (soaring, direction of travel, etc.). Aircrews will broadcast on the appropriate frequency the location, intensity and altitude of bird hazards encountered during pattern operations and on all low-level routes. Additionally, contact the SOF as soon as practical after encountering bird activity or after route exit with the same information. SOFs will inform operations supervisors with hazard information to be used in preflight planning.

Off-Station Civil Airfield Planning Procedures: Prior to the mission briefing for an off station sortie to a civil airfield, check the current and forecast AHAS. If the AHAS does not provide data for the civil airfield, use the BAM for off-station planning. The BAM is a prediction of bird activity based solely on historical data and bird migration patterns. It is not the most current source for bird activity but does contain forecast data for civil airfields. If the current or forecast AHAS or BAM indicates SEVERE, call the tower at the destination airfield. If the tower indicates high bird activity, do not file without OG/CC approval. If the actual bird activity is moderate or low, you may file there but should have an alternate plan such as diverting or flying one approach to a full stop if the bird watch condition is severe upon arrival. Comply with local bird avoidance procedures.

Off-Station Military Airfield Planning Procedures: Prior to the mission briefing for an off-station sortie to a military airfield, check the current and forecast AHAS. If the current or forecast AHAS indicates severe, call the destination tower or airfield management to get the current bird watch condition or bird status. If the bird status is severe, do not file without OG/CC approval. If the actual bird activity is moderate or low, you may file there but should have an alternate plan such as diverting or flying one approach to a full stop if the bird status is SEVERE upon arrival. Comply with the local bird avoidance procedures.

Bird Watch Alert: Bird Watch Alert conditions can be caused by weather conditions, time of day, time of year, and other seasonal conditions resulting in an influx of birds. Reference to Bird Avoidance Models (BAMs), local Audubon society, US Department of Agriculture, US Fish and Wildlife Service and other such assessments is required.

7. **AUTHORITY:** The supervisor of flying will declare a bird watch condition during normal flight operations. The airfield manager or designated representative is the declaring authority during all other periods. Conditions should be declared based on composite information obtained from AHAS/BAM, ground observations, pilot reports, radar observation, flight safety recommendations, etc.

8. **COMMUNICATIONS:** Bird watch conditions will be disseminated by the following means:

a. During periods of flight operations, include bird watch conditions other than LOW at CAFB in the hourly automatic terminal information service (ATIS) information. When the SOF or designated representative declares BWC MODERATE or SEVERE, notify the applicable agencies. Airfield management will post the BWC on the airfield status board located in AMOPS.

- b. When declaring a BWC, the SOF or applicable agency will communicate local bird activity along with location, number and types of birds if able.
- c. If locations other than CAFB are declared MODERATE or SEVERE, the SOF will notify applicable organizations.
- d. All CAFB flying units and organizations will post the current bird watch condition so that it is readily available to all aircrew.
- e. Downgrading. Once a bird watch condition has been declared, it is the declaring authority's responsibility to either cancel or downgrade the condition commensurate with updated information and make sure the applicable organizations and personnel are informed.

9. PHASE I AND II BIRD ACTIVITY:

The following periods will apply to CAFB for bird activity:

a. Phase I. CAFB operates under Phase I from May-August. Bird activity is generally light during this period of the year. The primary threat during this period consists of occasional soaring raptors located in all quadrants during the midday time period. Additionally, caution should be used during dawn and dusk hours when the majority of bird movement occurs.

b. Phase II. CAFB typically operates under Phase II from September-April based on recommendations from the BWHG. The airfield and areas of operation in/near the Mississippi Migratory Flyway have the potential for dense migratory bird activity continuously during this period. In addition, the potential exists for waterfowl feeding flights from the surface to 2,000' AGL during the dawn/dusk time period from October-January. Moving from Phase I to Phase II operations is dependent on seasonal migratory patterns and the observed or forecasted avian threat. Local CAFB bird numbers, as well as those at commonly used off-station training locations and low-levels, will be considered. The BHWG may solicit, via the OG/CC, operations on IR 68, IR 70, and IR 91 for observed bird activity at specific times prior to entering the Phase II period and nearing the end of the Phase II period. Aircrew observing substantial bird activity or the lack thereof will report this to the OG/CC. Bird activity reports gained through the OG/CC may be used in determining the need to begin Phase II operations or return to Phase I. Additionally, the OG/CC may request limited flight operations on specific, previously closed low-levels during Phase II. These operations will be limited in time and scope. The OG/CC will continuously monitor the operations with sound ORM principles. Notification of Phase II status and restrictions will be disseminated by local Flight Crew Information File (FCIF), will be posted in base operations, and will be disseminated during low-level route briefings.

c. Wing Safety will create the list of BASH high risk airfields with the help of the USDA representative. Historical strike data and geographic limitation (e.g. the Mississippi flyway) will be taken into account when creating the list. Normally, the list will be published along with the BASH Phase II FCIF. Squadron Commanders may apply risk management points to high risk airfields as they see fit based on risk acceptance, volume of use, and other factors.

The following volume use airfields will be considered minimum BWC MODERATE during the period +/- 1 hour of sunrise and sunset:

Greenwood Leflore, MS (GWO)	Jackson, MS (JAN)
Greenville, MS (GLH)	Monroe, LA (MLU)

The following low-level route will be considered minimum BWC MODERATE during Phase II:

SR 137 points B-D

The following low-level routes will be closed during Phase II:

IR 68
IR 70
IR 91

Phase II will include:

- (1) Bird depredation shoots as required.
- (2) Increased airfield checks in areas that attract migratory birds.
- (3) The SOF will initially declare BWC MODERATE during the periods of sunrise +/- 1 hour and sunset +/- 1 hr. Observed activity may increase or decrease BWC.
- (4) Squadron scheduling procedures for IR 68, IR 70, and IR 91 will disseminate Phase II local restrictions to all users, especially those not based at CAFB, when booking and providing route briefs.
- (5) Base operations will brief transient aircrew on the increased bird activity when granting prior permission requests (PPRs).

1. GENERAL:

a. Purpose. This annex provides information on specific bird strike hazards, recommendations for countering each hazard and general background information on bird/animal hazards.

b. Mission. See Basic Plan.

2. CONCEPT OF OPERATIONS: The intent of the BASH program is to reduce the hazards of wildlife to airfield operations. Procedures/techniques found in this plan will be followed to help reduce these hazards. An important part of evaluating these hazards is learning about local bird activities, species that cause hazards, locations of local bird refuges, daily bird movements, seasonal bird populations, potential airfield food sources for birds, etc. After defining the hazards, there are several active and passive techniques that can be successful in reducing bird populations. The appendices will detail the information needed to evaluate current hazards.

Appendices:

- 1 - Current Wildlife Hazards
- 2 - Current Reduction Procedures/Techniques
- 3 - Background on Wildlife Hazards

1. Purpose: This section lists information that will be used to evaluate current wildlife hazards. This will include all species that cause a hazard, locations of local bird refuges, daily bird movements, seasonal bird populations, and possible attractants (AFPAM 91-212).

2. Migratory Birds and Time in Area: Puddle Ducks (Mallards, Wood Ducks, Pintail, Teal, American Widgeon, Gadwall) migrate from mid-November to late February.

3. Nonmigratory Birds:

- a. Vultures
- b. Hawks
- c. Doves
- d. Herons/Egrets
- e. Turkeys
- f. Quail
- g. Crows/Ravens
- h. Woodpeckers
- i. Wood Ducks
- j. Flycatchers
- k. Jays/Magpies
- l. Mockingbirds/Thrashers
- m. Cedar Waxwings
- n. Starlings
- o. Sparrows
- p. Robbins

4. Mammals:

- a. Deer
- b. Coyotes

1. Nonmigratory Birds:

a. Vultures and Hawks: Soaring raptors account for the majority of the damaging bird strikes. There are very few countermeasures for soaring raptors that have proven effective. They soar high enough to not be reached with a shotgun or most other scare devices. These birds are very territorial. Falconry is effectively employed at some other USAF bases; however, the congested traffic patterns at CAFB make it a poor candidate for the use of falconry. Remote controlled airplanes could be used to scare raptors out of the area; however, remote controlled airplanes would be a hazard in the congested traffic patterns at CAFB.

b. Meadowlarks, Grackles and Crows: Birds that stay in open grassy areas are evident in the areas along the three runways at CAFB. Periodic bird shoots have proven effective for periods of a few weeks and up to a few months. Grass control is paramount to reduce their numbers.

2. Mammals:

a. Deer: Unimproved areas of CAFB and CAFB auxiliary airfield are open to hunting IAW local hunting and fishing regulations. Hunting on the airfields creates a less hospitable environment for deer and reduces the deer population on base, which reduces the likelihood of an aircraft strike. Depredation of deer in specific high-threat areas can also be an effective means of reducing the threat. See ANNEX F.

b. Coyotes: Trapping is the most effective method of controlling coyote populations. Knowledge of trapping is specialized and should only be conducted by someone trained and familiar with the methods. Calling and night shooting can be effective methods of reducing denning areas on and around the airfield as necessary.

1. GENERAL:

a. Purpose. This appendix provides some general background information on bird/animal hazards and ways to combat these specific hazards to flight operations. A brief description of each bird and how each species can be controlled or avoided is included. Each control measure may require action by one or more tasked organizations as described in the basic plan. An appropriate field guide should be used to aid in bird identification.

(1) Keep in mind when dealing with bird hazards, that an effective way to minimize the hazard is to eliminate their roosting sites. For example, where possible, vegetation management of roost sites best controls blackbird and starling roosts. Trees will be pruned to reduce the number of perches available and entire trees, or stands removed if necessary.

(2) Bird-proof buildings and hangars near or around the flight line will greatly reduce bird-nesting sites. Pigeons, sparrows, and starlings frequently inhabit buildings and hangars and must be expelled. Denying access by screening windows, closing doors and blocking entry holes is most effective. When necessary, these methods should be considered. Design bird-proof structures when replacing buildings or facilities.

(a) Building design/renovation. Utilize design features that eliminate ledges, outside support, or other nesting or perching areas.

(b) Toxic perches and baits. Be aware that toxic perches and baits can cause secondary mortality of nontarget species. Pest Management will survey bird loafing and roosting sites. Control options will be evaluated and install perches or baits as needed.

(c) Netting. Netting is expensive and can be difficult to maintain. Based on local conditions and cost, netting can be installed under superstructure to exclude pest birds from roosting areas. Ensure no gaps or holes are present for birds to get through.

(d) Trapping/Removal. Specialized traps can be used to capture various kinds of birds/animals for relocation or disposal. Birds can either be released away from the hangar or killed. Depredation Permits from the US Fish and Wildlife Service are required to kill protected birds.

(3) Probably the most effective way of reducing the attractants to birds and animals is to maintain airfield grass height between 7 and 14 inches.

(a) Grass height management. Mowing operations should maintain a uniform grass height between 7 and 14 inches. Mowing frequency will be as needed to maintain height requirements. Coordinate mowing with periods of low flight activity. Grass must be cut before it goes to seed to discourage seed-eating birds from utilizing the airfield. Long grass discourages flocking species from entering the airfield because reduced visibility disrupts interflock communication and flock integrity and also prevents predator detection. Grass normally should not exceed 14 inches, as high grass will attract some bird species and rodents that in turn attract raptors. Airfields with a variety of grass species may have a fast-growing strain that reaches 14 inches sooner than the rest of the airfield. Mowing will be conducted when the average grass height reaches 14 inches. Obtain assistance in herbicide selection for weed control, appropriate grass seed selection, fertilization, and erosion control vegetation from the United States Department of Agriculture Natural Resource Conservation Service or the Agricultural Extension Service.

(b) Broad leaf weed control. Broad leaf weeds will be kept to a minimum on the airfield. Application of herbicides, as necessary, will be used to eradicate broad leaf weeds. Broad leaf weeds attract a variety of birds, may produce seeds or berries, and may limit grass growth. The Bermuda release program may be used. This program consists of semiannual applications of Roundup® and a pre-emergent herbicide to reduce broadleaf weed populations while encouraging Bermuda grass.

(c) Fertilizing. Selectively stimulate grasses to promote a uniform grass quality and cover. Irrigation may be required to support turf growth. Watering should be controlled to enhance root production and decrease seed head production.

(d) Sodding and/or hydroseeding. Bare areas are frequently used by birds as resting sites and should be eliminated on the airfield. Sodding and/or hydroseeding will be used as necessary and appropriate irrigation maintained.

(e) Erosion control vegetation. Vegetation should be used which is appropriate for the region and supports BASH reduction philosophy (i.e., do not control erosion using plants which produce seeds at heights below 14-18 inches).

(f) Bird Feeders. Bird feeders are prohibited on base, to include in base housing. Feeding attracts birds and encourages nesting on base since there is a predictable food source. Birds as small as humming birds have caused thousands of dollars of damage to aircraft at CAFB. Additionally, many of these birds may become easy and predictable prey for larger predatory birds. Large birds such as hawks and other raptors historically cause significant damage to CAFB aircraft and pose a hazard to our aircrew.

(4) Pest control. Invertebrates and rodents provide important food sources for many birds and animals. The civil engineer pest management section should periodically survey and reduce these pests when required. Control of insects, earthworms, rodents, etc., through use of insecticides and rodenticides should be accomplished under the supervision of the base pest management office with EPA-approved chemicals. Control should begin early in the spring. This must be coordinated with the animal control section of the Wildlife Management Plan.

2. BIRD INFORMATION:

a. Loons, Grebes, Pelicans, Cormorants and Mergansers. These are fish-eating birds. Control is best accomplished by removing fish-producing ponds near the airfield. Since removal of the food source is not always possible, pyrotechnics are effective in frightening the birds from the area. Avoid flying at sunrise and sunset when large flocks, often in formation, can be found flying to and from feeding areas. Knowledge of roost and feeding sites is essential to avoid strikes. Aquaculture ponds are high use areas for cormorants Nov-Apr.

b. Long-legged Waders (Hérons, Egrets, Ibises and Storks). Most of these species are attracted to water where they feed on fish, amphibians, reptiles and arthropods. Control is best accomplished by eliminating the food sources. Steepening the sides of ditches and ponds and removing emergent vegetation will drastically reduce accessibility to food sources. Use pyrotechnics to disperse any birds that do occur after habitat modification.

c. Cattle Egrets. These birds have different feeding habits than their relatives, preferring open fields where they primarily feed on insects. They frequently follow mowers for the insects and other animals, which are stirred up. Mow during nonflying hours when Cattle Egrets are present. Maintain grass between 7 and 14 inches. Periodic pesticide application may be necessary for insect control. Eliminate roost sites on or near base by removing or thinning roost trees and brush, and dispersing the birds each evening with pyrotechnics.

d. Waterfowl (Ducks, Geese and Swans). A distinction must be made between resident and migration populations.

(1) Resident waterfowl are attracted to an area to breed or feed. Ponds, lakes, ditches, etc., may attract these birds, particularly if these areas contain emergent or submerged vegetation for feeding, nesting or shelter. Steepening ditch and pond banks and removing vegetation will reduce waterfowl numbers. When possible, drain water sources after ensuring compliance with wetland laws and regulations. Grain fields may also attract waterfowl in large numbers and should be eliminated. Pyrotechnics along with gas cannons, are excellent methods of control. Use of live ammunition or opening base areas to waterfowl hunting are excellent methods of control. Resident birds are most active at dawn and dusk, moving at low altitudes to and from feeding areas. Avoid flying near wildlife refuges or any ponds, lakes, or rivers with known waterfowl concentration during these times. Nesting during spring/summer of resident geese can be a significant problem. Nesting birds should be harassed or removed.

(2) Migrating waterfowl are particularly dangerous to flight safety due to the large numbers and generally higher altitude of the birds. Large flocks of waterfowl travel along traditional flyways to their breeding and wintering grounds during spring and fall. Huge flocks may stop along the route awaiting favorable weather conditions to continue. Migrating birds are most active from sunset through midnight, with numbers decreasing in the early morning hours. Obtain BAM data from the BASH team web site at www-afsc.saia.af.mil/AFSC/BASH/conus_time.html for information and planning purposes for comparing low-level routes. Wintering fowl concentration areas should be avoided.

e. Raptors (Hawks, Falcons, Kites, Eagles and Vultures). These birds can be particularly hazardous to aircraft because of their size and widespread distribution over bases and low-level areas. Raptors (particularly vultures) use thermals to their advantage to search for prey. These birds become active during mid-morning and remain aloft until late afternoon. Avoid areas with thermal-generating terrain such as ridgelines, rolling hills and near water. Landfills are particularly attractive to soaring vultures. In the fall, raptors migrate by day to areas of heavy winter concentrations in the southern states and through Central America. The removal of dead animals on the airfield, proper management of landfills, rodent control on airfields and removal of dead trees and other perching sites on the airfield can control these birds. Use pyrotechnics to frighten raptors from the airfield.

f. Grouse, Quail and Pheasants. These game birds are most effectively controlled through proper grass height management. Do not allow grass to exceed 14 inches and eliminate all brush and weed patches on the field, particularly if the plants are seed producing. Pyrotechnics, gas cannons, live ammunition or periodic hunts can effectively disperse these birds. The killing of these birds outside the normal hunting season requires special permits from the US Fish and Wildlife Service and State Wildlife Agencies.

g. Cranes. These large birds are most hazardous during migrating periods, particularly in the fall when many thousands of birds may be concentrated in a small area. Avoid flying at dawn and dusk in areas of known concentrations. Use pyrotechnics on the airfield to disperse these birds.

h. Sandpipers and other Shorebirds. The most significant hazard related to these birds occurs when large numbers, flocking in tight groups, are present, particularly during migration and along coastlines. Many of the upland species such as Upland Sandpipers and Buff-breasted Sandpipers may nest on airfields in spring and early summer. Other species such as Killdeer are quite adept at avoiding aircraft and do not pose a significant hazard. Flocks in coastal areas can be hazardous and should be avoided. To control these birds, observe proper grass height management. Eliminate water in puddles and make ditch banks steeper to limit access to these birds. Eliminate bare spots that can be used for nesting. Use pyrotechnics for all species: Some species respond well to bioacoustics.

i. Gulls. These birds represent the most significant hazard to aircraft worldwide. Due to their omnivorous feeding habits and preference for flat, open areas to rest, they are commonly found on airfields. Gulls are most active just after sunrise and before sunset as they move to and from feeding areas. Improperly operated landfills are a significant source of attraction for gulls and should not be allowed in the airfield vicinity. Maintain grass height between 7 and 14 inches. This is critical in reduction of gull numbers. Even with this in effect, gulls may inhabit the airfield, particularly during inclement weather. Persistent harassment using pyrotechnics and bioacoustics is necessary to discourage these birds. Occasionally, use live ammunition to reinforce these techniques (permits required). Control of earthworms and insects (especially grasshoppers) may be accomplished if these invertebrates are found to attract gulls. Do not allow these birds to establish a habit of using the airfield to feed, breed or rest.

j. Pigeons and Doves. These birds are seed eaters and are attracted to seed-producing weeds, grasses and shrubs. Open areas or bare spots are attractive as resting or feeding sites. Pyrotechnics can be effective in frightening these birds. Proper grass height management, irrigation and mowing before grass goes to seed will limit the number of pigeons and doves on the field. Pigeons frequently congregate in structures such as hangars. Netting, shooting, trapping and poison baiting, can drastically reduce their numbers in these structures. Avoid construction projects near the airfield that produce bare ground Aug-Oct.

k. Owls. Most owls are nocturnal and attracted to rodents as a food source. Rodent control may be necessary on the airfield. Proper management of airfield grass will limit their numbers. Remove perch sites, such as

unnecessary fence posts and dead trees, to limit the number of owls. Avoid over flying landfills at night to reduce hazard from owls.

l. Flycatchers. These birds are present on airfields to feed on insects. Strikes are infrequent, but should not be overlooked. Controlling insects and removing perch sites such as fence posts, tree limbs, bushes, high spots on the field, etc., is the most effective means of control.

m. Horned Larks. These birds are very difficult to control. Bare spots, such as long runway sides where they eat weed seeds and insects, attract them. The best defense against these birds is a thick uniform grass with no bare spots. In the southwest, this may not be possible, as grass cannot be maintained. Consider coating bare spots, particularly along runways, with oil-base or asphalt cover. Use pyrotechnics, but these birds will tend to fly only short distances and settle down. Persistence is the key to success.

n. Swallows and Pratincoles. These birds eat insects in flight and are commonly found above airfields. Fortunately, swallows are adept at avoiding aircraft, but if they do present a problem, measures can be taken for their dispersal. Insect control will reduce swallow numbers and discouragement of nesting will further decrease numbers. Wash mud nests from eaves, culverts, etc., with a hose as the birds begin nesting. Harassing the birds as they work on building their nests can discourage nesting in banks. If swallows are noted resting on runways or taxiways, use pyrotechnics to disperse them. Aerosol applications of methylantranilate (ReJexIt) can discourage swallow flights.

o. Crows and Ravens. These omnivorous birds are common in open areas and around landfills. These birds may transit areas in large flocks, particularly at sunset as they return to the roost sites. Proper grass height management will reduce population numbers. Remove any known roost sites or thin individual trees. Operate landfills in a manner to discourage these birds. Use bioacoustics and pyrotechnics to frighten these birds if they congregate on the airfield.

p. Blackbirds, Grackles, Cowbirds and Starlings. These birds can be particularly hazardous because they frequently travel in huge flocks, sometimes in the millions. Blackbirds and starlings are attracted to flat, open areas to feed, rest, or stage/pre-roost. Maintain grass height between 7 and 14 inches to best reduce airfield blackbird and starling numbers. Do not allow seed producing plants to grow on the airfield nor out-lease grain crops in areas where these birds are known to occur. Eliminate roost sites near the flight line. Selectively prune or remove roost trees, brush or cattails if blackbirds and starlings are roosting on base. Blackbirds and starlings respond well to an intense frightening program using bioacoustics and pyrotechnics. Use other methods to supplement this program as necessary. Starlings are not federally protected and may be killed without permits. Permits are required for other species. Occasional shooting of birds will reinforce other frightening techniques. Consider poisoning or trapping with USDA assistance. Avoid at all costs flying near known blackbird and starling roosts, especially at sunrise and sunset and during spring and fall migration. Huge roosting colonies may also be present during winter months in southern states.

q. Meadowlarks. These birds occur on nearly every airfield and are attracted to grasslands and low weeds. Eliminate broad-leafed weeds and maintain grass height at 7 to 14 inches. Elimination of suitable perching sites, such as fence posts and brush, will also aid in reduction. Use pyrotechnics, but remember meadowlarks usually only fly a short distance before settling down again. Persistence is the key to success.

r. House Sparrows. Aircraft do not frequently strike these birds, but they are common pests around structures. House sparrows often nest in hangars and dense shrubs and trees. These birds are not protected by law and may be killed without permits. Frightening techniques are usually ineffective against these birds.

s. Warblers. The wide range of species of warblers thrives in a variety of habitats. Most prefer shrubs, trees or riparian habitats where they feed, breed, or rest. Do not allow habitat types on the airfield and warbler strikes will be rare as a result. Migrating warblers may be struck at night, especially as they fly south in the fall. Fortunately, these birds are very small and rarely cause damage.

t. Fringillids (Sparrows, Finches, Grosbeaks and Buntings). Most fringillids are not hazardous to aircraft operations, but occasional large flocks can be encountered, particularly during migration. These birds are seedeaters as a rule, and most prefer weedy, brushy, or forested areas. Proper grass height management is the best means of control. Grass exceeding 14 inches will attract many of these birds and should not be allowed. Mow before grass goes to seed. Use pyrotechnics to frighten many of these birds; success may be limited with others.

3. **OTHER WILDLIFE**: While concern is mostly centered on birds, several mammalian species also pose threats to flight operation and must be considered. Close coordination with the civil conservation manager is necessary to reduce this type of hazard.

a. Deer. Members of the deer family occasionally appear on airfields. These species are generally browsers, preferring broad-leafed weeds, shrubs, and trees. Do not allow growth of these plants on the airfield. The presence of these plants in surrounding areas will serve to draw these animals from the airfield. Electrified fences and tall fences (up to 15 feet) can discourage these animals from entering airfields, but due to expense, should only be used in urgent cases. On-base hunting is used to control on-base populations and may discourage the presence of deer species. Use pyrotechnics to frighten these animals when they do encroach upon the airfield. Your wildlife manager through your local US Fish and Wildlife Service office can arrange control of large deer populations.

b. Coyotes and Foxes. These animals are attracted to airfields by rodents, rabbits and other food sources. Dens may be found in banks, culverts or other suitable areas. Rodent control will reduce the numbers of these animals. Use pyrotechnics to frighten these species. Occasional shooting of individual animals or recurrent pests will also reduce the hazard. Coordinate with USDA on permit requirements.

c. Rabbits and Hares. In addition to direct hazards to aircraft, these animals can damage turf and attract raptors. Proper grass management will reduce the number of these animals on airfields. Occasional rabbit hunts on the field can reduce populations for several subsequent years. Poisoning can also be effective for reducing populations but be aware of the potential for secondary poisoning of nontarget species. Permits may be required.

d. Rodents. These animals can damage turf and attract raptors. Control by maintaining a uniform turf at the proper heights. The base civil engineer pest manager may use trapping or rodenticides.

1. GENERAL: The USDA Wildlife Services (WS) biologist can provide many of the services tasked to multiple organizations listed in this BASH plan. WS will comply with all applicable Wildlife Services Directives and is not limited by the depredation procedures listed in this plan. WS will be integrated into the BASH plan as follows:

2. WS will work in concert with the chief of flight safety as listed in Annex B, section 5 of this plan. In addition, WS will assume the following roles:

a. Coordinating agency for on-base bird control. WS will provide trained personnel to conduct continuous bird dispersal efforts on the base during periods of peak bird activity. WS will monitor bird activity and make BWC recommendations to the SOF and tower personnel. WS will use the following techniques to reduce the threat to aviation safety:

(1) Gas Cannons. CAFB has 33 propane gas cannons positioned throughout the airfield that may be used effectively for bird dispersal. These devices should be operated as birds come in to feed or roost. They are especially effective at dawn and dusk as the birds move to/from the cover of surrounding trees. Cannons must be relocated frequently to avoid habituation problems. Consideration must also be given to where birds may move to when using the cannons. Birds may take to flight and move to an area that creates an unwanted conflict on another runway. These devices are very effective on waterfowl, pheasants, and other game birds, and can also be used for gulls and blackbirds. They have also proven effective on deer.

(2) Bioacoustics. Bioacoustics are recorded distress or alarm calls of actual birds. Special care must be taken to play calls in short intervals to prevent habituation by the birds. The birds respond to the calls by taking flight or becoming alert. Five of the gas cannons have integrated bioacoustics that activate when the cannons are fired. These calls are effective for gulls, blackbirds, starlings, cowbirds, grackles, ravens and crows.

(3) Pyrotechnics. Pyrotechnics are very effective for dispersing most bird species and can also be used for foxes and other small mammals. Pyrotechnics include a hand-held launcher that fires 15mm bangers and screamers. The bangers produce a loud secondary explosion while the screamers produce a loud whistling sound. Bangers and screamers should be used alternately as necessary for best results. A 12-gauge version of each is also available for use with a shotgun. Pyrotechnics should be used in conjunction with bioacoustics for maximum effectiveness.

(4) Depredation. Birds must be killed occasionally as a reinforcement of other methods. Domestic Pigeons, European Starlings, and House Sparrows can be killed without a permit. Most other species require federal or state permits. Wing Flight Safety/USDA will contact the US Fish and Wildlife Service and state wildlife agency officials for permits and other assistance in this area.

b. Monitoring. WS will implement a monitoring plan including BASH surveys to track trends in bird and mammal populations and activity. Monitoring will help measure the effectiveness of control measures implemented.

c. Trend Analysis. WS will collect and assimilate bird strike and survey data to detect trends.

d. Liaison. WS will liaise with other state and federal wildlife agencies for the base. This includes depredation permit renewals.

e. Development of Standard Operating Procedures. WS will develop standard operating procedures for required BASH tasks including:

(1) Collection and preservation of bird strike remains.

(2) Operating procedures for wildlife removals (sharp shooting deer, shooting to reinforce harassment of birds, etc.)

f. Development of Community Based Management Plans. WS will work with other members of the community to develop community approaches to solving human/wildlife conflicts and reducing the threat to aviation safety.

1. GENERAL:

a. Purpose. This annex explains how personnel will employ depredation techniques at CAFB and Gunshy, should such actions become necessary. The procedures listed in annex F do not apply to WS daily activities which include wildlife depredation. WS will at all times comply with Wildlife Services directives.

b. Mission. Reference the basic plan. Habitat modification is the preferred solution to the BASH threat at CAFB. After exhausting other deterrence methods to reduce bird and wildlife strike damage, bird and wildlife species identified as a persistent threat may need to be eradicated. Our program consists of planned shoots of an identified threat. The purpose of the shoot is to train the birds and wildlife to associate a loud "bang" from shotguns, bird cannons, pyrotechnics or other dispersal/deterrence techniques, with danger, not to simply reduce the population. Reinforcing this association will aid us in deterring birds and wildlife for a period of time after a shoot without using lethal means. This technique should be used in conjunction with airfield and base wide surveys to determine wildlife density and threat status.

2. CONCEPT OF OPERATIONS:

a. For the purposes of this plan, USDA WS day to day operations will be in accordance with WS Directives and are not considered depredation activities as specified in this section. Depredation shooting must be under the direction of an employee of the US Government. A shooting team leader, designated by Wing Safety, will ensure the safe operation of each shoot to include all actions required in this annex. A full brief (Attachment 1) will be given by the team leader to include weapon safety, shoot/no shoot decisions, protected bird and wildlife species, fields of fire proximity to the runway, and any other matter the leader or chief of airfield management may want to emphasize. For mishaps or emergencies call extension 2525.

(1) Shooting safety procedures, restrictions, and clear zones:

(a) Shooters will clear their field of fire for all personnel, buildings and aircraft prior to firing each shot.

(a) Deer depredation will require perimeter road secure and patrols suspended. A pre-shoot sweep of the perimeter road will be conducted, and a barricade placed at all main access points to the perimeter road. Shooters will have proper hunter safety training and will only shoot while in a stand during daylight hours.

(b) Shooters will not shoot across runways, taxiways, roads, or base boundaries. Shooters will maintain a 300-yard clear zone for their field of fire from all buildings, runways, taxiways and base boundaries. Shooting may take place within these clear zones if shooting away from the obstruction.

(c) No shooting aimed at aircraft. A clear zone must extend to 500 yards in all directions.

(d) No shooting aimed at housing, base facilities or airfield structures.

(e) No shooting will be aimed at the munitions storage area. Shooters will maintain a minimum distance of 1,250 feet from the munitions storage area.

(f) No shooting will be aimed at the fuels storage area or the fuel stand on taxiway echo. A clear zone of 500 feet will exist around these areas.

(g) Bird depredations should take place after airfield operating hours, on weekends, or holidays. If shooting during local flying, a spotter will accompany each shooter to make the shoot/no shoot call for each shot.

(2) 14 FTW/SE does not provide weapons for depredation activities. Volunteers must bring their own weapon. *The U.S. government is not responsible for any damage that may occur to personal firearms during depredation activities.* All weapons and munitions will be transported in accordance with AFI 91-201, Wildlife Services Directives and CAFB Plan 31-101, *Integrated Defense Plan.*

(3) If necessary, the wing safety office or a designated representative will transport cased weapons and shooters to the designated shooting area. Ammunition and weapons will be separated during transport.

(4) Selection of field loads will be in accordance with AFPAM 91-212 guidance. Only standard field loads of shot size #4, #6, #7, or #7 1/2 will be issued for birds. Smaller shot sizes can be used but may have less "knock down" capability, therefore, compromising the effectiveness of the depredation program. Shot size #6 should be used for rabbits. Deer depredation shooters will use buckshot, slugs or suppressed high-powered rifles. When shooting over ponds or wetland areas, nontoxic shot will be used, regardless of the target species.

(5) Only military personnel, federal government employees, base contract employees and their guests will participate in a shoot.

- a. For deer depredations, a shooting team consisting of no less than 3 individuals will be chosen by the team leader and will be limited to approximately 10.
- b. The minimum required members will be a driver, spotlight operator, and shooter. Additional observer(s) may accompany the team. The three essential personnel will be familiar with the base as to know the safe shooting lanes, topography, and layout to ensure safety.

(6) Weapons will be cleaned and properly stored after each use (if government owned).

(7) Shell casings will be policed, accounted for, and properly disposed of. Munitions will be returned to storage (if applicable).

b. **General Procedures. See Appendix 5/6 for appropriate checklists.** All shoots will be scheduled and planned by the wing safety office based on the documented bird or wildlife hazard. Wing safety will coordinate with, at a minimum, airfield management, Conservation Manager (CM), and security forces desk 3 days prior to the shoot. If the shoot will take place during the flying window, then wing safety will follow appropriate checklist in this section. The team leader will work with the wing safety office and airfield management to ensure all agencies have been contacted. The day of the shoot, the team leader will notify security forces prior to the start of the shoot, as well as when the shoot is complete.

(1) A list of all shooters not affiliated with CAFB will be given to security forces at least seven days prior to the shoot. This will allow security forces to ensure a background check is conducted prior to entry and before transportation of weapons is allowed on base.

(2) The shoot will only take place in designated zones based on documented hazards.

(3) All expended shell casings will be picked up and disposed of properly.

(4) To limit the potential for foreign object damage (FOD), shooters will avoid discharging weapons in the vicinity and direction of paved surfaces.

(5) Every attempt will be made to collect each bird or wildlife taken.

(6) All participants will have attended shooter safety briefing and sign a statement of understanding prior to shooting (Attachment 3).

c. **Specific bird identification, collection, and disposal.** All shooters will be given a bird identification, collection, and disposal briefing as part of their initial training. For a proposed list of approved birds, see Appendix 2.

- (1) This training will have three components:
 - (a) A briefing on the purpose of this program, which birds will be shot, and procedures for identification, collection, and disposal of bird remains.
 - (b) All shooters will sign a statement of understanding (Appendix 3).
 - (c) A limited field trip (or detailed briefing) to identify areas where shooting will be conducted including restrictions associated with these areas. During the field trip, the USDA representative will conduct field bird identification.
 - (2) At least one copy of an approved field identification guide will be available to shooters during any shooting operation. An example of an identification guide is the Sibley Guide to Birds or the Peterson Field Guide. USDA will consider other identification sources upon request.
 - (3) Only birds listed on the CAFB bird depredation list (Appendix 2) will be shot unless directed by the base conservation manager. If any bird not listed is shot, the conservation manager/USDA will be immediately notified.
 - (4) After a bird has been shot, its identification is required. The shooter, the BASH manager or designee, or the base conservation manager will perform this. All birds will be collected, placed into a plastic bag, and deposited into a designated collection container. During depredation shoots, the shooter cannot keep the birds.
 - (5) Any bird not identified in the field will be placed into a plastic bag separate from the "identified" birds and properly stored until the USDA/Conservation Manager can make or confirm the identification, or feathers and non-fleshy remains will be sent to the Smithsonian Institute for identification.
 - (6) Birds not given to the Conservation Manager/USDA within two hours of the shooting operation will be refrigerated at a location designated by Wing Safety until identification confirmation.
 - (7) After the bird's identification has been confirmed, the identification will be recorded on the CAFB Bird Depredation Log (Appendix 4), or wildlife services log.
 - (8) After each shooting operation, the bird depredation log will be dated and signed by one of the shooters and given to the USDA/Conservation Manager.
 - (9) Unless otherwise directed by the Conservation Manager/USDA, all identified birds will be placed into a plastic bag and deposited into a designated base dumpster. Dumpsters located in or near military family housing or MWR activity will not be used.
- d. Wildlife other than birds.
- (1) Priority will be given to deer using the immediate airfield area.
 - (2) All deer killed will be documented with the location. If applicable other ecologically significant data should be collected (jaws for aging, reproductive status, health and disease samples).
 - (3) Deer will be collected at the time of the kill and dressed only after the shoot has been terminated.
 - (4) Deer will be dressed only, with remains disposed of so as not to create a BASH hazard. Wing safety and the civil engineer will determine the means of disposal (i.e., dumpster or predug pit).
 - (5) Deer will be stored in the walk-in refrigerator overnight and delivered to a licensed processor within 24 hours of the shoot to ensure sanitation. The processor and the donation recipient will be determined and contacted by wing safety or public affairs.

(6) Spotlight surveys should be continued to identify the effectiveness of the depredation shoot and identify target areas for future shoots.

(7) Depredation shoots should be used in conjunction with legal harvest, habitat management, and non-lethal airfield control methods.

(8) Depredation numbers and dates should be included in the MDWFP annual report that is included with the renewal application.

(9) Other wildlife, if depredated, will be collected and disposed of properly so as not to create a BASH hazard.

Appendices:

Appendix 1 - BASH Shooting Safety Briefing

Appendix 2 - Bird Depredation List

Appendix 3 - Depredation Permit Statement of Understanding

Appendix 4 - Depredation Log

Appendix 5 - Bird Shoot Checklist

Appendix 6 - Deer Depredation Checklist

1. **GENERAL:** This briefing will be as inclusive as possible. However, it is based on the assumption that basic firearms safety, safe hunting practices, and familiarity with the weapon are known to the shooter(s). If this is not the case, further safety measures must be taken. All shooters participating in the controlled shoots will be properly licensed in accordance with the appropriate state of Mississippi and federal laws.

Areas to be covered, as a minimum, by the shoot leader:

- a. Collect a list of all shooters full names.
- b. Primary emphasis is on safety, not on taking birds or wildlife.
- c. Muzzle discipline and fields of fire.
- d. Weapons will not be loaded until within the shoot area, and they will be completely unloaded prior to exiting the area.
- e. Hearing and eye protection will be worn at all times.
- f. No shooting in the direction of buildings if within 300 yards.
- g. Shooting is limited to areas dictated by specific threat, no shooting in the direction of the main base if within 300 yards of buildings and 500 yards of aircraft in all directions.
- h. No shooters will be closer to the munitions storage area than 1,250 feet. No shooting will be aimed at the munitions storage facilities.
- i. Only birds listed on the CAFB Bird Depredation List (Appendix 2 to Annex F) will be shot.

APPENDIX 2 TO ANNEX F
BIRD DEPREDATION LIST

14TH FLYING TRAINING WING
COLUMBUS AFB, MS

1. **GENERAL:** Only the following birds will be removed by depredation. Other birds will be removed at the discretion of USDA/Wing Safety.

- a. American Crow
- b. Barn Swallow
- c. Brown-Headed Cowbird
- d. Cattle Egret
- e. Chimney Swift
- f. Eastern Meadowlark
- g. European Starling
- h. Great Blue Heron
- i. House Finch
- j. Killdeer
- k. Mourning Dove
- l. Nighthawk
- m. Red-Wing Blackbird
- n. Rock Dove or Domestic Pigeon
- o. Western Meadowlark
- p. White Heron
- q. White-Wing Dove

Note 1:

Prior approval from the base conservation manager/USDA to shoot game or nongame waterfowl is required.

Note 2:

Shooting birds of prey is strictly prohibited unless approved by wing safety or USDA.

**COLUMBUS AFB DEPREDATION PERMIT
STATEMENT OF UNDERSTANDING**

I will conduct bird/animal control operations on CAFB properly, using methods and practices prescribed by the base Conservation Manager (CM), USDA, and ANNEX F to CAFB BASH Plan. I will, in no way, violate procedures dictated by the Department of the Interior, United States Fish and Wildlife Service, (MS) Parks and Wildlife Hunting regulations, nor the safe shooting practice outlined in this attachment.

Duties and responsibilities:

I will shoot only those bird/animal species identified by the base conservation manager, wing safety office, or designated representative. I have reviewed the CAFB Bird Depredation List. I will not shoot any bird not listed. I have received adequate training so that I am able to recognize which birds I may shoot.

While participating in a controlled shoot, I will have in my possession a current hunting license if required.

I will collect and dispose of all wildlife or wildlife parts as directed by USDA and the base conservation manager.

I will report all birds taken to USDA or the base conservation manager on the bird log.

I will use only shooting practices that will humanely destroy the intended bird/animal.

I have read, understand, and agree to the responsibilities above. With my signature, I accept all responsibility for my actions while performing bird/animal control actions under the direction of USDA and the base conservation manager.

Printed Name

Signature

Date

1. GENERAL:

This annex outlines the use and requirements for the maps and charts required to implement the BASH Program. This includes:

- | | |
|--------------------------------------|-----------------------------------|
| a. Columbus AFB Surrounding Area Map | Maintained by airfield management |
| b. Low-level Training Area Map. | Maintained by airfield management |
| c. Columbus AFB Grid Map | Maintained by 14 CES/CEC |

2. COLUMBUS AFB SURROUNDING AREA MAP:

- a. A map depicting the surrounding area is provided by airfield management.
- b. This map will be used to identify specific hazards, such as wildlife refuges, wetlands, lakes, landfills, etc., so crews can avoid flying over these areas. Through negotiation with the local community, hazards should be modified when possible.

3. LOW-LEVEL TRAINING AREA MAP:

- a. A map depicting the low-level training areas is provided by airfield management.
- b. Low-level bird strike data will be analyzed and disseminated to the flying units IAW procedures outlined in ANNEX B.
- c. This data will be used to determine if the use of certain routes or areas should be discontinued or altered.

4. COLUMBUS AFB GRID MAP:

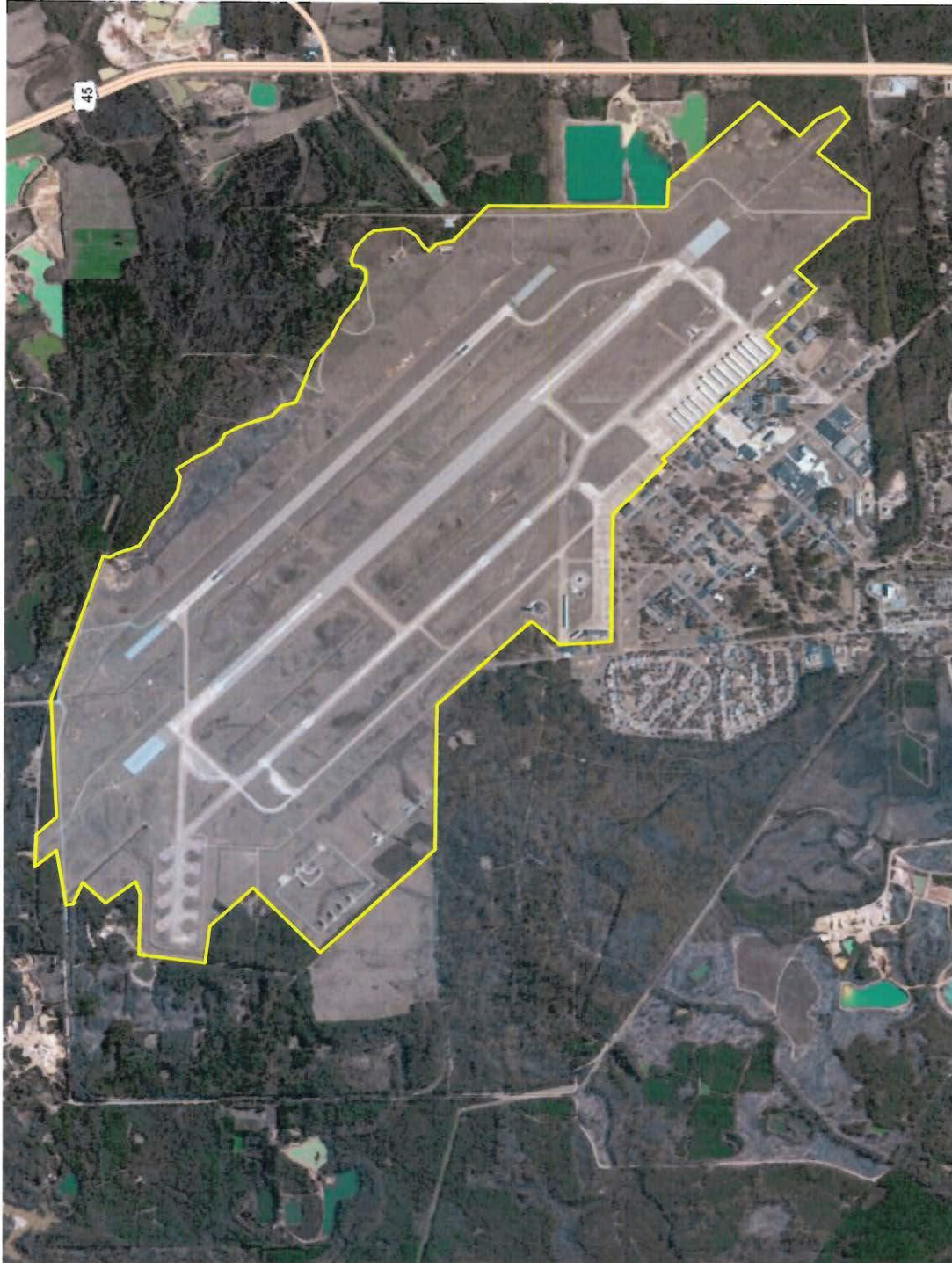
- a. A map that provides an overview of airfield operations, broken down into coordinates.
- b. Used as a reference tool to communicate a specific location on the base to other base organizations.

5. COLUMBUS AFB BASH DESIGNATED ZONE MAP (Figure 1):

- a. A map that provides BASH designated areas on the Columbus Air Force Base airfield that must be maintained in accordance with AFI91-202.
- b. Used as a reference tool for any future discussion of what is considered to be maintained as part of the BASH area. The designated BASH area was approved following the convening of the Bird Hazard Working Group on 7 November, 2013 with additional support and endorsement from Mr. Daniel Sullivan, Chief, USAF BASH Team.

6. COLUMBUS AFB AUXILIARY FIELD SWITCHGRASS STUDY MAP (Figure 2):

- a. A map that depicts the switchgrass plots at Columbus AFB's auxiliary field (GUNSHY) that the MSU/USDA Switchgrass study is using to identify a potential reduction in BASH risk.
- b. Used as a reference tool to identify the specific locations of the switchgrass and control group plots at GUNSHY.



(Figure 1)
COLUMBUS AFB BASH DESIGNATION ZONE MAP



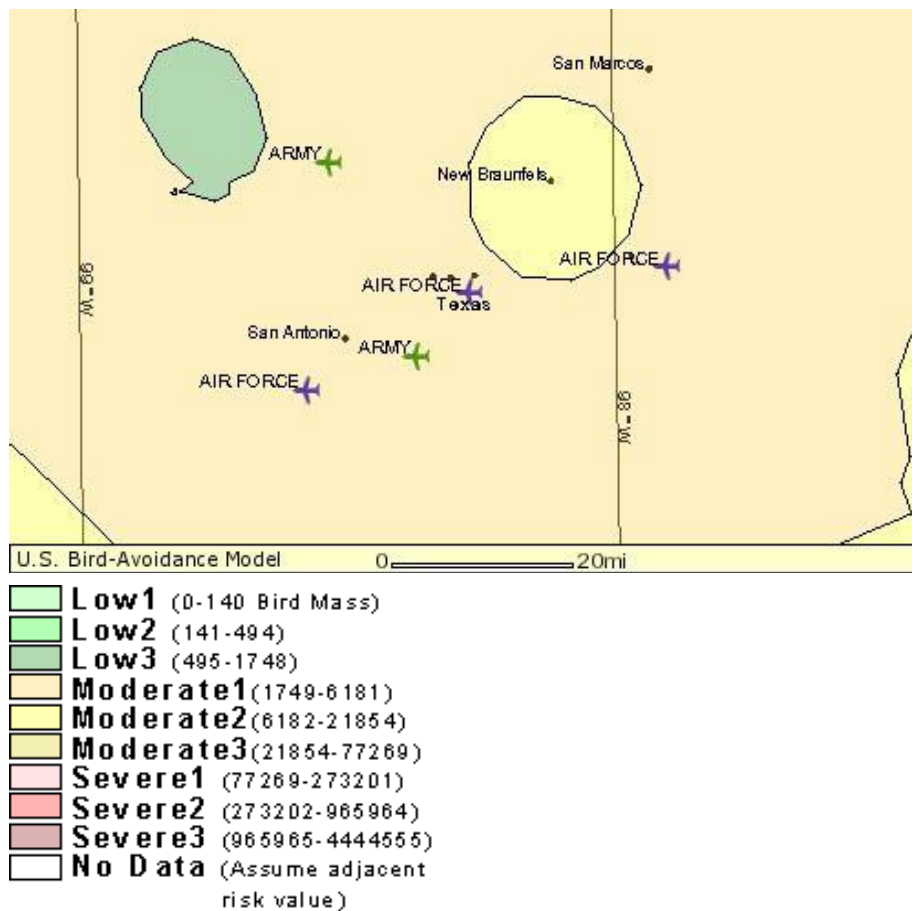
(Figure 2)
COLUMBUS AFB AUXILIARY FIELD SWITCHGRASS STUDY MAP

1. BIRD AVOIDANCE MODEL (BAM):

a. The BAM furnishes a representation of bird density (based on total bird weight) overlaid on a standard map with a resolution of one square kilometer. The output product (Figure 1) allows the user to see bird density levels, using color as a representation of the bird hazard. The BAM is divided into 26 two-week intervals throughout the calendar year with a selection of two daily periods (day and night BAMs). The BAM represents 60 species of birds that are most likely to pose a threat to aircraft flying at low levels. A complete explanation can be found on the BAM web site.

b. Limitations. The BAM is derived from fixed, historical data, so it does not adjust for real-time bird movements or population fluctuations. Additionally, local conditions such as the weather and wind direction/velocity are not considered in the model.

c. The information can be selected using different criteria. It can be by city, region, longitude/latitude, military airfield, military flight route (IR, SR, VR) and military heliport. Step-by-step directions will guide you through the windows-based program.



(Figure 1)

d. The BAM can be found on the AHAS web site, www.usahas.com.

2. AVIAN HAZARD ADVISORY SYSTEM (AHAS):

a. The Avian Hazard Advisory System (AHAS) web page (www.usahas.com) is operational and available to access information on bird strike risk. The web site provides simple to use pages to access bird strike risk for published IR, VR and SR routes, ranges, MOA's and military airfields. More than 4,000 locations in the lower 48 states are currently being evaluated. This web site is a major step forward in providing aircrews with effective and up-to-date bird strike risk management tools.

b. AHAS functions on the principle of assessing bird strike risk. Bird strike risk is the likelihood of a catastrophic event. For this reason, AHAS does not make recommendations on the restrictions that should be imposed for any category of bird strike risk. These decisions should be made at the local level based on the airframe, the nature of the mission, and the mission priority.

c. AHAS continuously monitors the current bird strike risk using the network of NEXRAD weather radar to look for bird activity on low-level routes, ranges, MOA's, or in the vicinity of military airfields. When bird activity is detected, in an area where the existing records indicate hazardous bird activity should be expected, a warning is generated. Predictive models are used for monitoring soaring bird activity that is not visible to NEXRAD.

d. The dynamic web pages provide you direct access to three important sources of bird strike risk data. If you request information for a time period more than 24 hours in advance, then the information displayed comes from the current version of the US BAM. If your request is for information less than 24 hours into the future, you get the forecast risk from AHAS that uses data from the US BAM and National Weather Service Weather Forecast data to predict hazardous bird activity. A request for information for the current hour retrieves the bird strike risk from observations made by the NEXRAD weather radar system. This weather radar data is processed by the AHAS system to detect birds in near real time. AHAS coverage is limited to areas under NEXRAD coverage. See AHAS web site for exact NEXRAD coverage.

e. The following is an AHAS request from the current hour. A complete explanation of AHAS can be found on the AHAS web site.

Avian Hazard Advisory System

AHAS Risk Table

The Current Time is: 13 MAR, 15:27 Zulu The Risk Data is from: 13 MAR, 15:22 Zulu					
SR137 SEGMENT	HOUR	AHAS RISK	BASED ON	Height (100ft AGL)	TREND
SR137A-B	15	LOW	NEXRAD	NA	^
SR137B-C	15	LOW	NEXRAD	NA	^
SR137C-D	15	LOW	NEXRAD	NA	^
SR137D-E	15	LOW	NEXRAD	NA	^
SR137E-F	15	LOW	NEXRAD	NA	^

(Figure 2)

1. GENERAL:

This annex outlines the procedures and forms required to report bird/animal strikes IAW AFIs 91-202 and 91-204. This reporting, in turn, provides a statistical base used to enhance the BASH program at CAFB.

2. **IF A BIRD/ANIMAL STRIKE OCCURS, DO THE FOLLOWING:**

a. Notify the flight safety office.

b. Collect and save all nonfleshy bird remains (beak, feet or feathers) for identification purposes. Most other animals can be readily identified.

c. The pilot must fill out the 14 FTW Bird Strike Log on the Wing Safety Sharepoint. If this log is unavailable, the pilot should complete an AF Form 853, *Air Force Wildlife Strike Report*. This form is normally located in the maintenance debrief section or will be provided by any squadron or wing-level flight safety representative once they are notified of the incident. This information is used to accomplish an Air Force Safety Automated System (AFSAS) report.

d. Maintenance personnel must complete the form to the best of their ability if the bird/animal strike was discovered after the pilot left the immediate area. Obtain additional form entry data from the pilot as soon as possible.

e. If a transient crew experiences a bird strike, airfield management personnel will assist them in filling out the AF Form 853, *AF Bird Strike Report*, and inform the wing safety office within 24 hours. If the strike occurs after normal duty hours contact Command Post for the on call Wing Safety representative.

f. Forward the remains and the completed form to flight safety by COB the next business day.

3. **BIRD STRIKE REPORT:** All nondamaging and damaging bird strikes will be reported to AFSC/SEFW via the Internet through AFSAS. IAW AFSC guidance, bird strikes will be reported on the day they occur if possible. See AFI 91-204 7.4.7.

4. **AFI 91-204, DAMAGING BIRD STRIKE REPORTS:** Bird and animal strikes, which cause reportable aircraft damage, are reported to appropriate agencies in message format IAW AFI 91-204. Include the following information in the message (this information can be obtained from the AF Form 853, *Air Force Wildlife Strike Report* or AETC Form 645-4, *Trend Data Report*).

a. Landing lights on or off?

b. Strobe lights on or off?

c. Phase of flight?

d. Aircraft speed (KIAS)?

e. Altitude (AGL and MSL)?

f. Flight path in relation to clouds (above, below, between layers)?

g. Species and number of bird(s) or animals?

h. Impact point on aircraft?

i. Was pilot warned of bird/animal hazard?

- j. Low-level route number if applicable?
- k. Did bird/animal strike result in fire?
- l. Geographic coordinates (latitude and longitude)?
- m. Remarks?

5. **BIRD REMAINS IDENTIFICATION:**

a. Nonfleshy bird remains taken from aircraft or airfields following all bird strikes will be forwarded to wing flight safety. Small remains such as downy feathers can be used for positive identification and are not to be discarded.

- b. The wing flight safety office will forward the remains and a copy of the BASH SAS report to the:

SMITHSONIAN INSTITUTION, FEATHER IDENTIFICATION LAB
NHB E-600, MRC 116
PO BOX 37012
WASHINGTON DC 20013-7012

AIR FORCE WILDLIFE STRIKE REPORT		
1. UNIT--WING/SQUADRON	7c. LOW-LEVEL ROUTE <input type="checkbox"/> INSTRUMENT ROUTE IR <input type="checkbox"/> SLOW ROUTE SR <input type="checkbox"/> VISUAL ROUTE VR <input type="checkbox"/> UNKNOWN OTHER:	14. PHASE OF OPERATION (cont) <input type="checkbox"/> LANDING TRAFFIC PATTERN <input type="checkbox"/> LANDING FLARE ROLLOUT <input type="checkbox"/> MISSED APPROACH/TOUCH & GO <input type="checkbox"/> OTHER
2. AIRCRAFT <i>(alphanumeric designation)</i>	8. STRIKE AWARENESS IN FLIGHT <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	15. BIRD AVOIDANCE MODEL <input type="checkbox"/> UNKNOWN <input type="checkbox"/> NO REPORT <input type="checkbox"/> LOW <input type="checkbox"/> MODERATE <input type="checkbox"/> SEVERE
3. TAIL NUMBER/REGISTRATION	9. LATITUDE (DDMM.M) N S	16. BIRD WATCH CONDITIONS <input type="checkbox"/> UNKNOWN <input type="checkbox"/> NO REPORT <input type="checkbox"/> LOW <input type="checkbox"/> MODERATE <input type="checkbox"/> SEVERE
4. DATE (dd mmm yyyy)	10. LONGITUDE (DDMM.M) E W	17. WILDLIFE STRUCK <input type="checkbox"/> UNKNOWN <input type="checkbox"/> NONE <input type="checkbox"/> ONE <input type="checkbox"/> 2-11 <input type="checkbox"/> 11-100 <input type="checkbox"/> MORE THAN 100
5. TIME (local)	11. EFFECT ON FLIGHT <input type="checkbox"/> UNKNOWN <input type="checkbox"/> ABORTED TAKE-OFF <input type="checkbox"/> ENGINES SHUTDOWN <input type="checkbox"/> NONE <input type="checkbox"/> OTHER <input type="checkbox"/> PRECAUTIONARY LANDING	18. AVIAN HAZARD ADVISORY SYSTEM <input type="checkbox"/> UNKNOWN <input type="checkbox"/> NO REPORT <input type="checkbox"/> LOW <input type="checkbox"/> MODERATE <input type="checkbox"/> SEVERE
6. DAILY PERIOD <input type="checkbox"/> UNKNOWN <input type="checkbox"/> DAWN <input type="checkbox"/> DAY <input type="checkbox"/> DUSK <input type="checkbox"/> NIGHT	12. SPEED (KIAS)	19. REMARKS ON LOCATION
7a. AIRPORT NAME ICAO HOST ID (FAA IDENT) RUNWAY OTHER	13. ALTITUDE (ft AGL)	
7b. SPECIAL USE AIRSPACE <input type="checkbox"/> ALERT <input type="checkbox"/> DANGER <input type="checkbox"/> MILITARY OPERATIONS AREA <input type="checkbox"/> PROHIBITED <input type="checkbox"/> RESTRICTED <input type="checkbox"/> TEMPORARY RESERVED AIRSPACE <input type="checkbox"/> RESTRICTED <input type="checkbox"/> UNKNOWN NAME:	14. PHASE OF OPERATION <input type="checkbox"/> UNKNOWN <input type="checkbox"/> PARKED <input type="checkbox"/> TAXIING <input type="checkbox"/> TAKEOFF ROLL <input type="checkbox"/> TAKEOFF INITIAL CLIMB <input type="checkbox"/> CRUISE CLIMB <input type="checkbox"/> CRUISE <input type="checkbox"/> CRUISE LOW LEVEL <input type="checkbox"/> RANGE OPS <input type="checkbox"/> CRUISE DESCENT <input type="checkbox"/> HOVER <input type="checkbox"/> LANDING FINAL APPROACH	

AF IMT 853, 20051015, V2

AIR FORCE WILDLIFE STRIKE REPORT																																																																																															
<p>20. COST ESTIMATE</p> <p><input type="checkbox"/> NOT APPLICABLE</p> <p><input type="checkbox"/> ESTIMATED COST (<i>not yet known</i>)</p> <p><input type="checkbox"/> ACTUAL COST</p> <p>\$ _____</p> <hr/> <p>21. CLASS</p> <p><input type="checkbox"/> CLASS A <input type="checkbox"/> CLASS C</p> <p><input type="checkbox"/> CLASS B <input type="checkbox"/> CLASS E</p> <hr/> <p>22. IMPACT POINTS <i>(description of impact points and struck or damaged; if list is not representative of the strike, please explain in the remarks section)</i></p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 5%; text-align: center;">S</th> <th style="width: 5%; text-align: center;">D</th> </tr> </thead> <tbody> <tr><td>UNKNOWN</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>INSIDE ENGINE 1</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>INSIDE ENGINE 2</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>INSIDE ENGINE 3</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>INSIDE ENGINE 4</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>INSIDE ENGINE 5</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>INSIDE ENGINE 6</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>INSIDE ENGINE 7</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>INSIDE ENGINE 8</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>OUTSIDE ENGINE 1</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>OUTSIDE ENGINE 2</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>OUTSIDE ENGINE 3</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>OUTSIDE ENGINE 4</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>OUTSIDE ENGINE 5</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>OUTSIDE ENGINE 6</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>OUTSIDE ENGINE 7</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>OUTSIDE ENGINE 8</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>FUSELAGE/ANTENNA/SKIN</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>RADOME/NOSE</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>WINDSHIELD/CANOPY</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>WINDSHIELD PENETRATION</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>TAIL/STABILIZER/RUDDER</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>WEAPONS/MISSILE POD</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>LANDING GEAR</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>LIGHTS</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>WING/ROTOR</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>FUEL TANKS</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>PROPELLER</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>ECM PODS/PYLONS</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>OTHER</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> </tbody> </table>		S	D	UNKNOWN	<input type="checkbox"/>	<input type="checkbox"/>	INSIDE ENGINE 1	<input type="checkbox"/>	<input type="checkbox"/>	INSIDE ENGINE 2	<input type="checkbox"/>	<input type="checkbox"/>	INSIDE ENGINE 3	<input type="checkbox"/>	<input type="checkbox"/>	INSIDE ENGINE 4	<input type="checkbox"/>	<input type="checkbox"/>	INSIDE ENGINE 5	<input type="checkbox"/>	<input type="checkbox"/>	INSIDE ENGINE 6	<input type="checkbox"/>	<input type="checkbox"/>	INSIDE ENGINE 7	<input type="checkbox"/>	<input type="checkbox"/>	INSIDE ENGINE 8	<input type="checkbox"/>	<input type="checkbox"/>	OUTSIDE ENGINE 1	<input type="checkbox"/>	<input type="checkbox"/>	OUTSIDE ENGINE 2	<input type="checkbox"/>	<input type="checkbox"/>	OUTSIDE ENGINE 3	<input type="checkbox"/>	<input type="checkbox"/>	OUTSIDE ENGINE 4	<input type="checkbox"/>	<input type="checkbox"/>	OUTSIDE ENGINE 5	<input type="checkbox"/>	<input type="checkbox"/>	OUTSIDE ENGINE 6	<input type="checkbox"/>	<input type="checkbox"/>	OUTSIDE ENGINE 7	<input type="checkbox"/>	<input type="checkbox"/>	OUTSIDE ENGINE 8	<input type="checkbox"/>	<input type="checkbox"/>	FUSELAGE/ANTENNA/SKIN	<input type="checkbox"/>	<input type="checkbox"/>	RADOME/NOSE	<input type="checkbox"/>	<input type="checkbox"/>	WINDSHIELD/CANOPY	<input type="checkbox"/>	<input type="checkbox"/>	WINDSHIELD PENETRATION	<input type="checkbox"/>	<input type="checkbox"/>	TAIL/STABILIZER/RUDDER	<input type="checkbox"/>	<input type="checkbox"/>	WEAPONS/MISSILE POD	<input type="checkbox"/>	<input type="checkbox"/>	LANDING GEAR	<input type="checkbox"/>	<input type="checkbox"/>	LIGHTS	<input type="checkbox"/>	<input type="checkbox"/>	WING/ROTOR	<input type="checkbox"/>	<input type="checkbox"/>	FUEL TANKS	<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER	<input type="checkbox"/>	<input type="checkbox"/>	ECM PODS/PYLONS	<input type="checkbox"/>	<input type="checkbox"/>	OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<p>23. REMAINS FOUND</p> <p><input type="checkbox"/> YES, remains found on aircraft</p> <p><input type="checkbox"/> YES, remains found on runway (<i>aircraft struck known</i>)</p> <p><input type="checkbox"/> YES, remains found on runway (<i>aircraft struck unknown</i>)</p> <p><input type="checkbox"/> NO</p> <hr/> <p>24. DATE REMAINS SENT TO SMITHSONIAN INSTITUTION <i>(dd mmm yyyy)</i></p> <p>_____</p> <hr/> <p>25. ADDITIONAL REMARKS</p> <p>_____</p>	<p>26. SHIPPING WILDLIFE REMAINS</p> <p>IAW AFMAN 91-223, 5.4.2, feather remains from every bird strike (if available) must be sent to the Smithsonian National Museum of Natural History for identification. Send feathers or feather fragments and a copy of the corresponding AFSAS report to:</p> <p>Smithsonian Institution Feather Identification Lab NHBE 610 MRC 116 PO BOX 37012 Washington, DC 20013-7012</p> <p>Send as much material as possible to include feet, beak, wing, tail, breast, and back feathers. For wildlife strikes other than birds, send samples of skin, fur, teeth, other non-fleshy remains, or a picture if possible, along with the corresponding AFSAS report to the Smithsonian for identification.</p> <p>In the event that remains are found on the runway as the result of a suspected strike, they should also be sent to the Smithsonian.</p> <p>For overnight shipping of a specimen, wrapping the remains in newspaper and freezing it entirely should be adequate. If you collect a whole bird carcass, freeze it per the above instructions and contact the Smithsonian at (202) 633-0801 to see if they could use the specimen in their collection. For overnight shipping send the remains to:</p> <p>Smithsonian Institution Feather Identification Lab ATTN: Dr. Carla Dove NHBE 610 MRC 116 10th and Constitution Ave NW Washington DC 20560</p>
	S	D																																																																																													
UNKNOWN	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
INSIDE ENGINE 1	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
INSIDE ENGINE 2	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
INSIDE ENGINE 3	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
INSIDE ENGINE 4	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
INSIDE ENGINE 5	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
INSIDE ENGINE 6	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
INSIDE ENGINE 7	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
INSIDE ENGINE 8	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
OUTSIDE ENGINE 1	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
OUTSIDE ENGINE 2	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
OUTSIDE ENGINE 3	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
OUTSIDE ENGINE 4	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
OUTSIDE ENGINE 5	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
OUTSIDE ENGINE 6	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
OUTSIDE ENGINE 7	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
OUTSIDE ENGINE 8	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
FUSELAGE/ANTENNA/SKIN	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
RADOME/NOSE	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
WINDSHIELD/CANOPY	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
WINDSHIELD PENETRATION	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
TAIL/STABILIZER/RUDDER	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
WEAPONS/MISSILE POD	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
LANDING GEAR	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
LIGHTS	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
WING/ROTOR	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
FUEL TANKS	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
PROPELLER	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
ECM PODS/PYLONS	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													
OTHER	<input type="checkbox"/>	<input type="checkbox"/>																																																																																													

AF IMT 853, 20051015, V2 (REVERSE)

ANNEX Z TO COLUMBUS AFB PLAN 91-202
DISTRIBUTION

14TH FLYING TRAINING WING
COLUMBUS AFB, MS

<u>ORGANIZATION</u>	<u>NUMBER OF COPIES</u>
HQ AETC/SEF	1
HQ AFMC/SEF	1
HQ AETC/AOS	1
HQ AETC/AOF	1
HQ AETC/CEIE	1
HQ AFSC/SEFW	1

COLUMBUS AFB AGENCIES: Only off-base agencies receive printed copies of this plan. All plans are located on SharePoint and are accessible by all wing personnel. Personnel without access to SharePoint may receive copies/changes via e-mail.

14 FTW/CC
 CV
 SE
 PA
 MXL
14 OG/CC
 CV
 OGV
 CAG
 LGM
14 MSG/CC
14 OSS/CC
 DO
 OSA
 OSAB
 OSW
 OSO
 OSOP
14 CES/CC
 CEC
 CEIE
 CEOHH
14 STUS/CC
 DA
14 CONS/CC
37 FTS/CC
 SE
41 FTS/CC
 SE
48 FTS/CC
 SE
49 FTS/CC
 SE
50 FTS/CC
 SE

APPENDIX F
PERMIT AND AIR EMISSIONS SOURCES



STATE OF MISSISSIPPI
HALEY BARBOUR
GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
TRUDY D. FISHER, EXECUTIVE DIRECTOR

May 28, 2009

CERTIFIED MAIL NO.: 7004 2510 0004 6737 4769

Colonel Roger Watkins
Commander
US Air Force, Columbus Air Force Base
14th CES/CEV, 555 Simler Boulevard, STE 114
Columbus AFB, MS 39710-6010

Dear Colonel Watkins:

Re: US Air Force, Columbus Air Force Base
Air Ref. No. 1680-00007
Lowndes County

Enclosed please find Operating Permit No. 1680-00007 issued for the operation of air emissions equipment at a "synthetic minor source." Operation of the air emissions equipment at the facility shall be in accordance with the terms, conditions, and limitations of the permit. This Operating Permit supersedes and replaces any previously held Operating Permit. Please note that this Operating Permit is federally enforceable.

Any modification to this process or facility which will alter the rate or composition of air pollutant emissions may require modification of this Operating Permit and may require a Construction Permit in accordance with Regulation APC-S-2.

This permit expires on April 30, 2014. A new permit application must be submitted one hundred and eighty (180) days prior to this date in order to renew this permit.

Any appeal of these permit actions must be made within the 30-day period provided for in Miss. Code Ann. Section 49-17-29(4)(b) (Rev. 2003).

If you have any questions or if we can be of service, please let me know.

Sincerely,

A handwritten signature in black ink, appearing to read "Bobby Hall".

Bobby Hall, P.E., BOEE
Environmental Permits Division

Enclosure

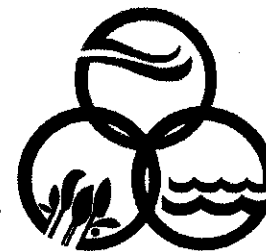
cc: DID, NRO, ECED

1356 PER20080001



State of Mississippi

FEDERALLY ENFORCEABLE AIR POLLUTION CONTROL PERMIT



Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

THIS CERTIFIES

US Air Force, Columbus Air Force Base

US Highway 45 North

Columbus AFB, MS

Lowndes County

has been granted permission to operate air emissions equipment in accordance with emission limitations, monitoring requirements and conditions set forth herein. This permit is issued in accordance with the Federal Clean Air Act and the provisions of the Mississippi Air and Water Pollution Control Law (Section 49-17-1 et. set., Mississippi Code of 1972), the regulations and standards adopted and promulgated thereunder, and the State Implementation Plan for operating permits for synthetic minor sources.

Mississippi Environmental Quality Permit Board

Mississippi Department of Environmental Quality

Issued/Modified: **MAY 28 2009**

Expires: **APR 30 2014**

Permit No. **1680-00007**

Agency Interest # **1356**

*** Official MDEQ Permit - Version 1.1 ***

Table of Contents

Subject Item Inventory.....	i
Facility Requirements.....	1
General Information.....	A-1
Other Relevant Documents:	

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Subject Item Inventory

Permit Number:1680-00007

Activity ID No.: PER20080001

Subject Item Inventory:

ID	Designation	Description
AI1356		
AREA1	AS-002	Fiberglass Repair Shop
EQPT1	AA-003	Bead Blasting Operation vented from four (4) stacks to a cyclone followed by a baghouse. (Bldg. 414)
EQPT2	AA-017	10.0 MMBTU/hr natural gas fired boiler (Bldg. 262)
EQPT3	AA-019	10.46 MMBTU/hr natural gas fired boiler (Bldg. 406)
EQPT4	AA-020	Combustion units with a heat capacity of each unit rated less than 10 MMBTu/hr; total heat capacity for all units is less than 130 MMBTU/hr
EQPT5	AE-001	Small Diesel Fuel-Fired Emergency Generators (Total Capacity not to exceed 5500 kW; Capacity of each individual unit shall not exceed 600 HP)
EQPT7	AJ-001	Jet engine testing (Buildings 203, 226)
EQPT8	AL-001	MOGAS loading rack
EQPT9	AS-001	Surface coating operations (Buildings 220, 262, 304, 406, and 440)
EQPT10	AF-001	Fire Training Facility
EQPT11	AT-001	2,800 gallon total capacity Diesel aboveground storage tanks
EQPT12	AA-021	13 Degreasing Tanks (1 to 120 gallons each) and 4 Paint Gun Cleaners
EQPT13	AL-002	JP-8 Fuel Loading Racks (2 total)
EQPT15	AL-003	Diesel Fuel Loading Rack
EQPT16	AA-023	Fuel Cell Maintenance
EQPT17	AA-022	Woodworking shops (Bldg. 335 and 385) controlled by a cyclone followed by a fabric bag filter system.
EQPT18	AE-002	Large Diesel Fuel-Fired Emergency Generators (Total Capacity not to exceed 1791kW; Capacity of each individual unit is greater than 600 HP).
EQPT19	AE-003	MOGAS Fuel-Fired Emergency Generators (Total Capacity not to exceed 16 kW).
EQPT21	AT-002	825 gallon total capacity MOGAS aboveground storage tanks
EQPT22	AT-003	1,706,684 gallon total capacity JP-8 aboveground storage tanks

*** Official MDEQ Permit - Version 1.1 ***

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Subject Item Inventory

Permit Number: 1680-00007

Activity ID No.: PER20080001

ID	Designation	Description
EQPT23	AT-004	3,000 gallon total capacity Jet Fuel Additive aboveground storage tanks
EQPT24	AT-005	2,452 gallon total capacity Used Oil aboveground storage tanks
EQPT25	AT-006	25,000 gallon capacity Diesel Underground Storage Tank (Tank Ref. ID 319.3)
EQPT26	AT-007	5,000 gallon capacity Diesel Underground Storage Tank (Tank Ref. ID 1100.1)
EQPT27	AT-0008	25,000 gallon capacity Diesel Underground Storage Tank (Tank Ref. ID 1100.2)
EQPT28	AT-008	Two (2) 25,000 gallon capacity MOGAS Underground Storage Tanks (Tank Ref. ID 319.1 and 319.2)
EQPT29	AT-009	Eight (8) 50,000 gallon capacity JP-8 Underground Storage Tanks (Tank Ref. ID 1918.1 through 1918.8)
EQPT30	AT-011	Eight (8) 50,000 gallon capacity JP-8 Underground Storage Tank (Tank Ref. ID 1922.1 through 1922.8)
EQPT31	AE-004	Aerospace Ground Equipment (AGE)

Subject Item Groups:

ID	Description	Components
GRPT1	Combined Emissions from AA-017, AA-019, and AA-020	EQPT4 Combustion units with a heat capacity of each unit rated less than 10 MMBTU/hr; total heat capacity for all units is less than 130 MMBTU/hr
		EQPT3 10.46 MMBTU/hr natural gas fired boiler (Bldg. 406)
		EQPT2 10.0 MMBTU/hr natural gas fired boiler (Bldg. 262)
GRPT2	Combined Emissions from AT-001 through AT-011	EQPT26 5,000 gallon capacity Diesel Underground Storage Tank (Tank Ref. ID 1100.1)
		EQPT30 Eight (8) 50,000 gallon capacity JP-8 Underground Storage Tank (Tank Ref. ID 1922.1 through 1922.8)
		EQPT21 825 gallon total capacity MOGAS aboveground storage tanks
		EQPT28 Two (2) 25,000 gallon capacity MOGAS Underground Storage Tanks (Tank Ref. ID 319.1 and 319.2)
		EQPT25 25,000 gallon capacity Diesel Underground Storage Tank (Tank Ref. ID 319.3)
		EQPT24 2,452 gallon total capacity Used Oil aboveground storage tanks
		EQPT29 Eight (8) 50,000 gallon capacity JP-8 Underground Storage Tanks (Tank Ref. ID 1918.1 through 1918.8)
		EQPT22 1,706,684 gallon total capacity JP-8 aboveground storage tanks
		EQPT23 3,000 gallon total capacity Jet Fuel Additive aboveground storage tanks

*** Official MDEQ Permit - Version 1.1 ***

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Subject Item Inventory

Permit Number: 1680-00007

Activity ID No.: PER20080001

ID	Description	Components
GRPT2	Combined Emissions from AT-001 through AT-011	EQPT11 2,800 gallon total capacity Diesel aboveground storage tanks EQPT27 25,000 gallon capacity Diesel Underground Storage Tank (Tank Ref. ID 1100.2)
GRPT3	Combined Emission Limit for AS-001 and AS-002	AREA1 Fiberglass Repair Shop EQPT9 Surface coating operations (Buildings 220, 262, 304, 406, and 440)
GRPT4	Facility-wide Emissions	EQPT15 Diesel Fuel Loading Rack EQPT13 JP-8 Fuel Loading Racks (2 total) EQPT12 13 Degreasing Tanks (1 to 120 gallons each) and 4 Paint Gun Cleaners EQPT10 Fire Training Facility EQPT9 Surface coating operations (Buildings 220, 262, 304, 406, and 440) GRPT3 Combined Emission Limit for AS-001 and AS-002 EQPT8 MOGAS loading rack EQPT7 Jet engine testing (Buildings 203, 226) EQPT30 Eight (8) 50,000 gallon capacity JP-8 Underground Storage Tank (Tank Ref. ID 1922.1 through 1922.8) EQPT11 2,800 gallon total capacity Diesel aboveground storage tanks EQPT5 Small Diesel Fuel-Fired Emergency Generators (Total Capacity not to exceed 5500 kW; Capacity of each individual unit shall not exceed 600 HP) EQPT4 Combustion units with a heat capacity of each unit rated less than 10 MMBTU/hr; total heat capacity for all units is less than 130 MMBTU/hr EQPT27 25,000 gallon capacity Diesel Underground Storage Tank (Tank Ref. ID 1100.2) EQPT16 Fuel Cell Maintenance EQPT26 5,000 gallon capacity Diesel Underground Storage Tank (Tank Ref. ID 1100.1) EQPT3 10.46 MMBTU/hr natural gas fired boiler (Bldg. 406) EQPT2 10.0 MMBTU/hr natural gas fired boiler (Bldg. 262) EQPT23 3,000 gallon total capacity Jet Fuel Additive aboveground storage tanks EQPT22 1,706,684 gallon total capacity JP-8 aboveground storage tanks EQPT1 Bead Blasting Operation vented from four (4) stacks to a cyclone followed by a baghouse. (Bldg. 414) EQPT24 2,452 gallon total capacity Used Oil aboveground storage tanks EQPT25 25,000 gallon capacity Diesel Underground Storage Tank (Tank Ref. ID 319.3)

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Subject Item Inventory

Permit Number: 1680-00007

Activity ID No.: PER20080001

ID	Description	Components
GRPT4	Facility-wide Emissions	EQPT21 825 gallon total capacity MOGAS aboveground storage tanks
		EQPT19 MOGAS Fuel-Fired Emergency Generators (Total Capacity not to exceed 16 kW).
		EQPT28 Two (2) 25,000 gallon capacity MOGAS Underground Storage Tanks (Tank Ref. ID 319.1 and 319.2)
		EQPT29 Eight (8) 50,000 gallon capacity JP-8 Underground Storage Tanks (Tank Ref. ID 1918.1 through 1918.8)
		AREA1 Fiberglass Repair Shop
		EQPT31 Aerospace Ground Equipment (AGE)
		GRPT1 Combined Emissions from AA-017, AA-019, and AA-020
		GRPT2 Combined Emissions from AT-001 through AT-011
		EQPT18 Large Diesel Fuel-Fired Emergency Generators (Total Capacity not to exceed 1791kW; Capacity of each individual unit is greater than 600 HP).
		EQPT17 Woodworking shops (Bldg. 335 and 385) controlled by a cyclone followed by a fabric bag filter system.

Receiving Stream Relationships:

Subject Item	Relationship	Receiving Stream
AI 1356	Discharges Into	Black Creek
	Then Into	Buttahatchee River
	Then Into	Stintson Creek
	Then Into	Tombigbee River

KEY

ACT = Activity

AREA = Area

CONT = Control Device

IA = Insignificant Activity

RPNT = Release Point

AI = Agency Interest

CAFO = Concentrated Animal Feeding Operation

EQPT = Equipment

MAFO = Animal Feeding Operation

TRMT = Treatment

*** Official MDEQ Permit - Version 1.1 ***

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Subject Item Inventory

Permit Number: 1680-00007

Activity ID No.: PER20080001

KEY

TRMT = Treatment

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number:1680-00007

Activity ID No.: PER20080001

Page 1 of 15

AI0000001356:

Submittal/Action Requirements:

Condition No.	Condition
S-1	General Condition: Except as otherwise specified herein, the permittee shall report all deviations from permit requirements, including those attributable to upsets, the probable cause of such deviations, and any corrective actions or preventive measures taken. Said report shall be made within five (5) working days of the time the deviation began. [APC-S-2 II.B(10)]
S-2	Except as otherwise specified herein, the permittee shall Submit a certified annual synthetic minor monitoring report: Due annually, by the 31st of January for preceding calendar year. This report shall address any required monitoring specified in the permit. [APC-S-2 II.B(11)]

Narrative Requirements:

Condition No.	Condition
T-1	General Condition: Any activities not identified in the application are not authorized by this permit. [Miss. Code Ann. 49-17-29 1.b]
T-2	General Condition: The permittee shall at all times maintain in good working order and operate as efficiently as possible all air pollution control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. [APC-S-2 V.A]
T-3	General Condition: Solids removed in the course of control of air emissions shall be disposed of in a manner such as to prevent the solids from becoming windborne and to prevent the materials from entering state waters without the proper environmental permits. [Miss. Code Ann. 49-17-29 1.a(i and ii)]
T-4	General Condition: Any diversion from or bypass of collection and control facilities is prohibited except as provided for in Regulation APC-S-1, "Air Emission Regulations for the Prevention, Abatement, and Control of Air Contaminants", Section 10. [APC-S-1 Section 10]
T-5	General Condition: Should the Executive Director of the Mississippi Department of Environmental Quality declare an Air Pollution Emergency Episode, the permittee will be required to operate in accordance with the permittee's previously approved Emissions Reduction Schedule. [APC-S-2 X]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number:1680-00007

Activity ID No.: PER20080001

Page 2 of 15

AI0000001356 (continued):

Narrative Requirements:

Condition No.	Condition
T-6	<p>General Condition: The permittee shall allow the Mississippi Department of Environmental Quality Office of Pollution Control and the Mississippi Environmental Quality Permit Board and/or their authorized representatives, upon the presentation of credentials:</p> <p>(a) To enter upon the permittee's premises where an air emission source is located or in which any records are required to be kept under the terms and conditions of this permit, and</p> <p>(b) At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any air emission. [Miss. Code Ann. 49-17-21]</p>
T-7	<p>General Condition: After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to:</p> <p>(a) Violation of any terms or conditions of this permit</p> <p>(b) Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or</p> <p>(c) A change in any condition that required either a temporary or permanent reduction or elimination of authorized air emissions. [APC-S-2 II.C]</p>
T-8	<p>General Condition: This permit and/or any part thereof may be modified, revoked, reopened, and reissued, or terminated for cause. Sufficient cause for this permit to be reopened shall exist when an air emissions stationary source becomes subject to Title V. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any condition of the permit. [APC-S-2 II.B(15)b]</p>
T-9	<p>General Condition: Except for data determined to be confidential under the Mississippi Air & Water Pollution Control Law, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Mississippi Department of Environmental Quality Office of Pollution Control. [Miss. Code Ann. 49-17-39]</p>
T-10	<p>General Condition: The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations. [APC-S-2 II.B(15)c]</p>
T-11	<p>General Condition: Nothing herein contained shall be construed as releasing the permittee from any liability for damage to persons or property by reason of the installation, maintenance, or operation of the air cleaning facility, or from compliance with the applicable statutes of the State, or with local laws, regulations, or ordinances. [APC-S-2 II.B(7)]</p>
T-12	<p>General Condition: This permit may only be transferred upon approval of the Mississippi Environmental Quality Permit Board. [APC-S-2 XVI.B]</p>
T-13	<p>General Condition: This permit is for air pollution control purposes only. [APC-S-2 I.D(1)]</p>

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number: 1680-00007

Activity ID No.: PER20080001

Page 3 of 15

AI0000001356 (continued):

Narrative Requirements:

Condition No.	Condition
T-14	General Condition: This permit is a Federally-approved permit to operate a synthetic minor source as described in Regulation APC-S-2, Section IV.D. [APC-S-2 IV.D]
T-15	General Condition: The provisions of this permit are severable. If any provision of this permit, or the application of any provision of this permit to any circumstances, is challenged or held invalid, the validity of the remaining permit provisions and/or portions thereof or their application to other persons or sets of circumstances, shall not be affected thereby. [APC-S-2 I.D(7)]
T-16	General Condition: The permittee shall furnish to MDEQ within a reasonable time any information MDEQ may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to MDEQ copies of records required to be kept by the permit or, for information claimed to be confidential, the permittee shall furnish such records to MDEQ along with a claim of confidentiality. [APC-S-2 II.B(15)d]
T-17	General Condition: This permit does not authorize a modification as defined in APC-S-2, "Permit Regulations for the Construction and/or Operation of Air Emissions Equipment". Modification is defined as "Any physical change in or change in the method of operation of a facility which increases actual emissions or potential uncontrolled emissions of any air pollutant subject to regulation under the Federal Act emitted into the atmosphere by that facility or which results in the emission of any air pollutant subject to regulation under the Federal Act into the atmosphere not previously emitted. A physical change or change in the method of operation shall not include: (a) routine maintenance, repair, and replacement; (b) use of an alternative fuel or raw material by reason of an order under Sections 2(a) and (b) of the Federal Energy Supply and Environmental Coordination Act of 1974 (or any superseding legislation) or by reason of a natural gas curtailment plan pursuant to the Federal Power Act; (c) use of an alternative fuel by reason of an order or rule under Section 125 of the Federal Act; (d) use of an alternative fuel or raw material by a stationary source which: (i) the source was capable of accommodating before January 6, 1975, unless such change would be prohibited under any federally enforceable permit condition which was established after January 6, 1975, pursuant to 40 CFR 52.21 or under regulations approved pursuant to 40 CFR 51.166; or (ii) the source is approved to use under any permit issued under 40 CFR 52.51 or under regulations approved pursuant to 40 CFR 51.166; (e) an increase in the hours of operation or in the production rate unless such change would be prohibited under any federally enforceable permit condition which was established after January 6, 1975, pursuant to 40 CFR 52.51, or under regulations approved pursuant to Subpart I or 40 CFR 51.166; or (f) any change in ownership of the stationary source" [APC-S-2 I.D(2)]
T-18	General Condition: It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit unless halting or reducing activity would create an imminent and substantial endangerment threatening the public health and safety of the lives and property of the people of this state. [APC-S-2 II.B(15)a]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number: 1680-00007

Activity ID No.: PER20080001

Page 4 of 15

AI0000001356 (continued):

Narrative Requirements:

Condition No.	Condition
T-19	General Condition: The permittee shall retain all required records, monitoring data, supported information and reports for a period of at least five (5) years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records, all original strip-chart recordings or other data for continuous monitoring instrumentation, and copies of all reports required by this permit. Copies of such records shall be submitted to MDEQ as required by Applicable Rules and Regulations or this permit upon request. [APC-S-2 IX]
T-20	General Condition: The knowing submittal of a permit application with false information may serve as the basis for the Permit Board to void the permit issued pursuant thereto or subject the applicant to penalties for constructing or operating without a valid permit. [APC-S-2 II.B(5)]
T-21	General Condition: Emergencies (a) Except as otherwise specified herein, an emergency means any situation arising from sudden and reasonably unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error. (b) An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the conditions specified in (c) following are met. (c) The affirmative defense of emergency shall be demonstrated through properly signed contemporaneous operating logs, or other relevant evidence as follows: (i) an emergency occurred and that the permittee can identify the cause(s) of the emergency; (ii) the permitted facility was at the time being properly operated; (iii) during the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the permit; and (iv) the permittee submitted notice of the emergency to MDEQ within two (2) working days of the time when emission limitations were exceeded due to the emergency which contained a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken. (d) In any enforcement proceeding, the permittee seeking to establish the occurrence of any emergency has the burden of proof. (e) This provision is in addition to any emergency or upset provision contained in any applicable requirement specified elsewhere herein [APC-S-2 II.B(10)]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number: 1680-00007

Activity ID No.: PER20080001

Page 5 of 15

AI0000001356 (continued):

Narrative Requirements:

Condition No.	Condition
T-22	<p>General Condition: Upsets</p> <p>(a) The occurrence of an upset constitutes an affirmative defense to an enforcement action brought for noncompliance with emission standards or other requirements of Applicable Rules and Regulations or any applicable permit if the permittee demonstrates through properly signed contemporaneous operating logs, or other relevant evidence that include information as follows: (i) an upset occurred and that the permittee can identify the cause(s) of the upset; (ii) the source was at the time being properly operated; (iii) during the upset the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements of Applicable Rules and Regulations or any applicable permit; (iv) the permittee submitted notice of the upset to the DEQ within five (5) working days of the time the upset began which contained a description of the upset, any steps taken to mitigate emissions, and corrective actions taken.</p> <p>(b) In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.</p> <p>(c) This provision is in addition to any upset provision contained in any applicable requirement. [APC-S-1 Section 10]</p>
T-23	<p>General Condition: Startups and Shutdowns</p> <p>(a) Startups and shutdowns are part of normal source operation. Emissions limitations applicable to normal operation apply during startups and shutdowns except as follows: (i) when sudden, unavoidable breakdowns occur during a startup or shutdown, the event may be classified as an upset subject to the requirements above; (ii) when a startup or shutdown is infrequent, the duration of excess emissions is brief in each event, and the design of the source is such that the period of excess emissions cannot be avoided without causing damage to equipment or persons; or (iii) when the emissions standards applicable during a startup or shutdown are defined by other requirements of Applicable Rules and Regulations or any applicable permit.</p> <p>(b) In any enforcement proceeding, the permittee seeking to establish the applicability of any exception during a startup or shutdown has the burden of proof.</p> <p>(c) In the event this startup and shutdown provision conflicts with another applicable requirement, the more stringent requirement shall apply. [APC-S-1 Section 10]</p>
T-24	<p>General Condition: Maintenance</p> <p>(a) Maintenance should be performed during planned shutdown or repair of process equipment such that excess emissions are avoided. Unavoidable maintenance that results in brief periods of excess emissions and that is necessary to prevent or minimize emergency conditions or equipment malfunctions constitutes an affirmative defense to an enforcement action brought for noncompliance with emission standards, or other regulatory requirements if the permittee can demonstrate the following: (i) the permittee can identify the need for the maintenance; (ii) the source was at the time being properly operated; (iii) during the maintenance the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements of Applicable Rules and Regulations or any applicable permit; (iv) the permittee submitted notice of the maintenance to MDEQ within five (5) working days of the time the maintenance began or such other times as allowed by MDEQ, which contained a description of the maintenance, any steps taken to mitigate emissions, and corrective actions taken.</p> <p>(b) In any enforcement proceeding, the permittee seeking to establish the applicability of this section has the burden of proof.</p> <p>(c) In the event this maintenance provision conflicts with another applicable requirement, the more stringent requirement shall apply. [APC-S-1 Section 10]</p>

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number: 1680-00007

Activity ID No.: PER20080001

AI0000001356 (continued):

Narrative Requirements:

Condition	Condition
T-25	General Condition: For renewal of this permit the applicant shall make application not less than one-hundred eighty (180) days prior to the expiration date of the permit substantiated with current emissions data, test results or reports or other data as deemed necessary by the Mississippi Environmental Quality Permit Board. [APC-S-2 VIII]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number:1680-00007

Activity ID No.: PER20080001

GRPT000000004 (Facility) Facility-wide Emissions:

Limitation Requirements:

Condition No.	Parameter	Condition
L-1	Carbon Monoxide	The permittee shall have facility-wide emissions of Carbon Monoxide ≤ 90.0 tons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-2	Particulate Matter	The permittee shall maintain a maximum permissible emission of ash and/or Particulate Matter ≤ 0.6 lb/MMBTU from fossil fuel burning installations of less than 10 million BTU per hour heat input. [APC-S-1 3.4(a)1]
L-3	Particulate Matter	Particulate Matter: The permittee shall maintain a maximum permissible emission of ash and/or Particulate Matter, from installations equal to or greater than 10 million BTU per hour heat input but less than 10,000 million BTU per hour heat input, \leq an emission rate as determined by the relationship $E = 0.8808 * I^{-0.1667}$ where E is the emission rate in pounds per million BTU per hour heat input and I is the heat input in millions of BTU per hour. [APC-S-1 3.4(a)2]
L-4	Fuel sulfur content	The permittee shall combust oil that contains a Fuel sulfur content ≤ 0.4 % by weight. [APC-S-2 II.B(11)]
L-5	Fuel sulfur content	For Emission Points AE-001- Engine #AE-001-023A, and AE-002- Engine #AE-002-044A, pursuant to 40 CFR 60.4207(a) and 40 CFR 80.510(a), the permittee shall comply with all applicable requirements including but not limited to combusting fuel oil that contains a Fuel sulfur content ≤ 500 ppm. Further, beginning June 1, 2010, pursuant to 40 CFR 60.4207(b) and 40 CFR 80.510(b), the permittee shall comply with all applicable requirements including but not limited to combusting fuel oil that contains a Fuel sulfur content ≤ 15 ppm. [40 CFR 60.4207]
L-6	Nitrogen oxides	The permittee shall have facility-wide emissions of Nitrogen oxides ≤ 90.0 tons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-7	Opacity	For each applicable emission source at the facility, the permittee shall have emissions of Opacity ≤ 40 % as determined by EPA Reference Method 9, 40 CFR 60, Appendix A. Note: Emission Point AF-001, the Fire Training Facility is excluded from this requirement. [APC-S-1 3.2]
L-8	Operating time	Operating time: For Emission Point AE-001, the permittee shall have Operating time $\leq 1,500,000$ KW-hrs as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number:1680-00007

Activity ID No.: PER20080001

Page 8 of 15

GRPT0000000004 (continued):

Limitation Requirements:

Condition No.	Parameter	Condition
L-9	Operating time	Operating time: For Emission Point AE-002, the permittee shall have Operating time \leq 425,000 KW-hrs as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-10	Operating time	Operating time: For Emission Point AE-003, the permittee shall have Operating time \leq 4,000 KW-hrs as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-11	Operating time	Operating time: For Emission Points AE-001- Engine #AE-001-023A, and AE-002- Engine #AE-002-044A, the permittee shall have Maintenance Checks and Readiness Testing operating hours \leq 100 hours per year. [40 CFR 60.4211(e)]
L-12	Sulfur Dioxide	The permittee shall have facility-wide emissions of Sulfur Dioxide \leq 90.0 tons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-13	Sulfur Dioxide	The permittee shall maintain a maximum discharge of Sulfur Dioxide \leq 4.8 lb/MMBTU from any fuel burning installation in which the fuel is burned primarily to produce heat or power by indirect heat transfer. [APC-S-1 4.1(a)]
L-14	VOC	The permittee shall have facility-wide emissions of VOC \leq 90.0 tons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-15	VOC	For Emission Points AS-001 and AS-002, the permittee shall have emissions of VOC \leq 30.0 tons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-16	HAP, Total (Limit)	The permittee shall have facility-wide emissions of HAP, Total (Limit) \leq 6.8 tons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-17	HAP, Total (Limit)	For Emission Points AS-001 and AS-002, the permittee shall have emissions of HAP, Total (Limit) \leq 6.25 tons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-18	HAP, Individual (Limit)	The permittee shall have facility-wide emissions of HAP, Individual (Limit) \leq 2.35 tons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-19	HAP, Individual (Limit)	For Emission Points AS-001 and AS-002, the permittee shall have emissions of HAP, Individual (Limit) \leq 1.75 tons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number: 1680-00007

Activity ID No.: PER20080001

Page 9 of 15

GRPT0000000004 (continued):

Limitation Requirements:

Condition No.	Parameter	Condition
L-20	Fuel Combusted	Fuel Combusted: For Emission Points AA-017, AA-019, and AA-020 combined, the permittee shall have usage of natural gas Fuel Combusted ≤ 476.8 MMft ³ /yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-21	Fuel Combusted	Fuel Combusted: For Emission Point AF-001, the permittee shall have Liquid Petroleum Gas (LPG) Fuel Combusted $\leq 100,000$ gallons/yr as determined for each consecutive, rolling 12-month period, and a maximum of 260 new and/or on-site generated used wood pallets. [APC-S-2 II.B(11)]
L-22		For Emission Points AA-017 and AA-019, the permittee is subject to and shall comply with 40 CFR 60, Subpart A, Standards of Performance for New Stationary Sources, General Provisions, including notification and recordkeeping as provided in 40 CFR 60.7, and the specific requirements outlined in 40 CFR 60.40, Subpart Dc - Standards of Performances for Small Industrial Commercial Institutional Steam Generating Units. [40 CFR 60.40(c)]
L-23		Jet Engine Tests: For Emission Point AJ-001, the permittee shall have Jet Engine Testing for engine type J-69 $\leq 1,000$ tests as determined for each consecutive, rolling 12-month period. Also, the permittee shall have Jet Engine Testing for engine type J-85 $\leq 2,000$ tests as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-24		MOGAS Throughput: For Emission Point AL-001, the permittee shall have throughput of MOGAS $\leq 1,800,000$ gallons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-25		JP-8 Throughput: For Emission Point AL-002, the permittee shall have throughput of JP-8 $\leq 63,324,795$ gallons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-26		Diesel Throughput: For Emission Point AL-003, the permittee shall have throughput of Diesel $\leq 900,000$ gallons/yr as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
L-27		For Emission Points AE-001- Engine #AE-001-023A, and AE-002- Engine #AE-002-044A, the permittee shall operate for emergency operation, and maintenance and testing only. [40 CFR 60.4211(e)]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number: 1680-00007

Activity ID No.: PER20080001

Page 10 of 15

GRPT0000000004 (continued):

Monitoring Requirements:

Condition No.	Parameter	Condition
M-1	Equipment/operational data	Equipment/operational data: For Emission Points AA-003, AA-022, AS-001, and AS-002, the permittee shall perform inspection and maintenance of the pollution control equipment each week or more often if necessary to ensure proper operation of all equipment. The permittee shall maintain on hand at all times equipment sufficient as is necessary to repair and/or overhaul the pollution control equipment. In the event of a failure of the pollution control equipment, the permittee shall cease operations until such time as repairs are made and the proper efficiency of the pollution control equipment is restored. [APC-S-2 II.B(11)]
M-2	Equipment/operational data	Equipment/operational data: For Emission Points AT-001 through AT-009, the permittee shall perform inspection of the tanks each week or more often if necessary to ensure proper operation of all equipment. Any tank leaks or damage to the roof seals shall be repaired as soon as possible after detection. These tanks shall be operated and maintained in a manner that will minimize volatile organic compound emissions. [APC-S-2 II.B(11)]
M-3	Nitrogen oxides	For the entire facility, the permittee shall have Nitrogen oxides monitored by Calculations Monthly determining the total emissions based on the amount of fuel combusted and applicable emission factors. [APC-S-2 II.B(11)] This requirement is applicable during the following months: Jan-Dec. Statistical basis: Maximum.
M-4	Operating time	For Emission Points AE-001- Engine #AE-001-023A, and AE-002- Engine #AE-002-044A, the permittee shall have Operating time monitored by Measurement Continuously, via non-resettable hour meters installed prior to startup of the engines. [40 CFR 60.4209(a)] This requirement is applicable during the following months: Jan-Dec. Statistical basis: Maximum.
M-5	Sulfur Dioxide	For the entire facility, the permittee shall have Sulfur Dioxide monitored by Calculations Monthly determining the total emissions based on the amount of fuel combusted, the sulfur content of the fuel, and applicable emission factors. [APC-S-2 II.B(11)] This requirement is applicable during the following months: Jan-Dec. Statistical basis: Maximum.
M-6	VOC	For the entire facility, the permittee shall have VOC monitored by Calculations Monthly determining the total emissions based on the amount of fuel combusted and applicable emission factors, and determining the following for each ink, coating, adhesive, solvent, or other VOC containing material used: a) Identification of each material, b) The percentage of VOCs by weight and a description of the method used to determine the content, c) The density (lbs/gal), d) The total gallons usage of each material on a monthly basis and consecutive, rolling 12-month period, and e) The emission rate, in tons per month and tons per year, for VOCs for each month and for each consecutive, rolling 12-month period. [APC-S-2 ii.B(11)] This requirement is applicable during the following months: Jan-Dec. Statistical basis: Maximum.

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number:1680-00007

Activity ID No.: PER20080001

Page 11 of 15

GRPT0000000004 (continued):

Record-Keeping Requirements:

Operating time:

Condition No.	Condition
R-1	For Emission Points AE-001, AE-002, and AE-003, the permittee shall perform Operating time recordkeeping by written log On Each Occasion for each emergency generator both on a monthly basis and as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
R-2	For Emission Points AE-001- Engine #AE-001-023A, and AE-002- Engine #AE-002-044A, the permittee shall perform Maintenance Checks, and Readiness Testing Operating time recordkeeping by written log On Each Occasion. [APC-S-2 II.B(11)]

Condition No.	Condition
R-3	Recordkeeping Requirements For Emission Points AA-017 and AA-019, the permittee shall maintain records of the amount of natural gas combusted each month, and each consecutive, rolling 12-month period. (Ref. 40 CFR 60.48c(g), 40 CFR 60.13c(i). [40 CFR 60]
R-4	Recordkeeping Requirements For Emission Point AA-020, the permittee shall maintain records of the amount of natural gas combusted each month, and each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
R-5	Recordkeeping Requirements For Emission Point AA-020, the permittee shall maintain records of the total rated capacity of all natural gas fired combustion equipment which has an individual rating less than 10 MMBTU/hr. These records must be kept in log form and made available for review upon request during any inspection visit by the Office of Pollution Control. [APC-S-2 II.B(11)]
R-6	For Emission Point AE-001, the permittee shall maintain records of the total rated capacity of the small diesel fuel-fired emergency generators at the facility. These records must be kept in log form and made available for review upon request during any inspection visit by the Office of Pollution Control. [APC-S-2 II.B(11)]
R-7	For Emission Point AE-003, the permittee shall maintain records of the total rated capacity of MOGAS fuel-fired emergency generators at the facility. These records must be kept in log form and made available for review upon request during any inspection visit by the Office of Pollution Control. [APC-S-2 II.B(11)]
R-8	For Emission Point AF-001, the permittee shall maintain records showing the dates and amounts of usage of LPG (in gallons) and wood pallets used daily, monthly, and as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number: 1680-00007

Activity ID No.: PER20080001

Page 12 of 15

GRPT0000000004 (continued):

Record-Keeping Requirements:

Condition No.	Condition
R-9	For Emission Point AJ-001, the permittee shall maintain records of the number of engine tests performed for each engine type on a monthly basis and as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
R-10	For Emission Point AL-001, the permittee shall maintain a logbook containing the MOGAS throughput in gallons on a monthly basis and as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
R-11	For Emission Point AL-002, the permittee shall maintain a logbook containing the JP-8 fuel throughput in gallons on a monthly basis and as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
R-12	For Emission Point AL-003, the permittee shall maintain a logbook containing the diesel fuel throughput in gallons on a monthly basis and as determined for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]
R-13	For Emission Points AT-001, AT-002, AT-003, AT-004, and AT-005, the permittee shall maintain records of the total capacity of aboveground storage tanks. These records must be kept in log form and made available for review upon request during any inspection visit by the Office of Pollution Control. [APC-S-2 II.B(11)]
R-14	For Emission Points AA-003, AA-022, AS-001, and AS-002, the permittee shall maintain records in log form of inspections and any maintenance performed and these records must be made available for review upon request during any inspection visit by Office of Pollution Control personnel. [APC-S-2 II.B(11)]
R-15	For Emission Points AS-001 and AS-002, the permittee shall determine the following and maintain sufficient records to document the following for each coating, adhesive, solvent or other VOC or HAP containing material used, utilizing data supplied by the manufacturer or by analysis of each coating and/or solvent using EPA Reference Method 24, 40 CFR 60, Appendix A: a) Identification of each material, b) The percentage of each Volatile Organic Compound (VOC) and Hazardous Air Pollutant (HAP) by weight, and a description of the method used to determine the content, c) The density (lbs/gal), d) The total gallons usage of each material on a monthly basis and consecutive, rolling 12-month period, and e) The emission rate, in tons per month and tons per year, for VOCs, HAPs (Total) and HAPs (Individual) for each month and for each consecutive, rolling 12-month period. [APC-S-2 II.B(11)]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number: 1680-00007

Activity ID No.: PER20080001

GRPT0000000004 (continued):

Record-Keeping Requirements:

Condition No.	Condition
R-16	<p>For the entire facility, the permittee shall maintain satisfactory records that demonstrate the Aerospace Ground Equipment (AGE) used at the facility meets the definition of nonroad engine. Further the permittee is allowed to operate this type of equipment without coverage under the Synthetic Minor Operating Permit as long as the equipment meets the definition of nonroad engine as provided in 40 CFR 89.2. The definition of non-road engine is as follows:</p> <p>Nonroad engine means:</p> <p>(1) Except as discussed in paragraph (2) of this definition, a nonroad engine is any internal combustion engine:</p> <p>(i) In or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function (such as garden tractors, off-highway mobile cranes and bulldozers); or</p> <p>(ii) In or on a piece of equipment that is intended to be propelled while performing its function (such as lawnmowers and string trimmers); or</p> <p>(iii) That, by itself or in or on a piece of equipment, is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.</p> <p>(2) An internal combustion engine is not a nonroad engine if:</p> <p>(i) the engine is used to propel a motor vehicle or a vehicle used solely for competition, or is subject to standards promulgated under section 202 of the Act; or</p> <p>(ii) the engine is regulated by a federal New Source Performance Standard promulgated under section 111 of the Act; or</p> <p>(iii) the engine otherwise included in paragraph (1)(iii) of this definition remains or will remain at a location for more than 12' consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any single site at a building, structure, facility, or installation. Any engine (or engines) that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full annual operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e., at least two years) and that operates at that single location approximately three months (or more) each year. This paragraph does not apply to an engine after the engine is removed from the location. [APC-S-2 II.B(11)]</p>
R-17	<p>Recordkeeping Requirements</p> <p>For Emission Points AE-001- Engine #AE-001-023A, and AE-002- Engine #AE-002-044A, the permittee shall maintain records of fuel supplier certifications to show compliance with fuel sulfur content limitations. [APC-S-2 II.B(11)]</p>

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number: 1680-00007

Activity ID No.: PER20080001

Page 14 of 15

GRPT0000000004 (continued):

Submittal/Action Requirements:

Condition No.	Condition
S-1	For Emission Points AA-017, AA-019, and AA-020, the permittee shall submit semi-annual reports summarizing the combined amount of fuel used for the previous consecutive 12-month period. The permittee shall also submit semi-annual reports summarizing the total amount of fuel used by Emission Points AA-017, AA-019, and AA-020, individually, for the previous consecutive 12-month period. The reports shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]
S-2	For Emission Point AE-001, the permittee shall submit semi-annual reports providing a summary of the hours of operations for each unit, the calculated kW-hr for each unit, and the total kW-hr usage for all units for the previous consecutive 12-month period. The reports shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]
S-3	For Emission Point AE-002, the permittee shall submit semi-annual reports providing a summary of the hours of operations for each unit, the calculated kW-hr for each unit, and the total kW-hr usage for all units for the previous consecutive 12-month period. The reports shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]
S-4	For Emission Point AE-003, the permittee shall submit semi-annual reports providing a summary of the hours of operations for each unit, the calculated kW-hr for each unit, and the total kW-hr usage for all units for the previous consecutive 12-month period. The reports shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]
S-5	For Emission Point AF-001, the permittee shall submit a semi-annual report summarizing the amount of LPG used (in gallons) and wood pallets used, on both a monthly basis and a 12-month rolling total basis. The report shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]
S-6	For Emission Point AJ-001, the permittee shall submit a semi-annual report summarizing the number of engine tests for each engine type for the previous consecutive 12-month period. The report shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]
S-7	For Emission Point AL-001, the permittee shall submit a semi-annual report providing a summary of the MOGAS throughput for the previous consecutive 12-month period. The report shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]
S-8	For Emission Point AL-002, the permittee shall submit a semi-annual report providing a summary of the JP-8 fuel throughput for the previous consecutive 12-month period. The report shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]

Permit to Operate Air Emissions Equipment at a Synthetic Minor Source

US Air Force, Columbus Air Force Base

Facility Requirements

Permit Number:1680-00007

Activity ID No.: PER20080001

Page 15 of 15

GRPT0000000004 (continued):

Submittal/Action Requirements:

Condition No.	Condition
S-9	For Emission Point AL-003, the permittee shall submit a semi-annual report providing a summary of the diesel fuel throughput for the previous consecutive 12-month period. The report shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]
S-10	For Emission Points AS-001 and AS-002, the permittee shall submit semi-annual reports providing the following for each coating, adhesive, solvent or other VOC or HAP containing material used: a) Identification of each material, b) The percentage of each Volatile Organic Compound (VOC) and Hazardous Air Pollutant (HAP) by weight, and a description of the method used to determine the content, c) The density (lbs/gal), d) The total gallons usage of each material on a monthly basis and consecutive, rolling 12-month period, and e) The emission rate, in tons per month and tons per year, for VOCs, HAPs (Total) and HAPs (Individual) for each month and for each consecutive, rolling 12-month period. The reports shall be submitted no later than the 31st of July and January for the semi-annual periods ending June 30th and December 31st of each calendar year. [APC-S-2 II.B(11)]

Narrative Requirements:

Condition No.	Condition
T-1	For Emission Point AE-002, the permittee shall maintain records of the total rated capacity of the large diesel fuel-fired emergency generators at the facility. These records must be kept in log form and made available for review upon request during any inspection visit by the Office of Pollution Control. [APC-S-2 II.B(11)]
T-2	For Emission Point AE-004, the permittee is subject to and shall comply with all applicable requirements of 40 CFR Part 89 - Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines. Also, the permittee shall comply with 40 CFR Part 60, Subpart IIII as applicable pursuant to 40 CFR 89.1(d). [40 CFR 89]
T-3	For Emission Points AE-001, AE-002, AE-003, the permittee is subject to and shall comply with all applicable requirements of 40 CFR Part 63 - Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants - Stationary Reciprocating Internal Combustion Engines. [40 CFR 63]
T-4	For Emission Points AE-001- Engine #AE-001-023A, and AE-002- Engine #AE-002-044A, the permittee is subject to 40 CFR 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines and shall comply with all applicable requirements. Also, any additional or replacement stationary internal combustion engines installed in the future will be subject to and shall comply with Subpart IIII or Subpart JJJJ, as applicable. [40 CFR 60_Subpart IIII]

GENERAL INFORMATION

US Air Force, Columbus Air Force Base
 US Highway 45 North
 Columbus AFB, MS
 Lowndes County

Alternate/Historic Identifiers

ID	Alternate/Historic Name	User Group	Start Date	End Date
1356	United States Department of the Air Force	Official Site Name	5/14/1996	
2808700007	US Air Force, Columbus Air Force Base	Air-AIRS AFS	10/12/2000	
MS7570024060	US Air Force, Columbus Air Force Base	Hazardous Waste-EPA ID	10/12/2000	
168000007	US Air Force, Columbus Air Force Base	Air-Construction	12/22/1997	
168000007	US Air Force, Columbus Air Force Base	Air-Construction	5/22/1998	
168000007	US Air Force, Columbus Air Force Base	Air-Construction	8/26/1998	
168000007	US Air Force, Columbus Air Force Base	Air-Title V Operating	8/27/1998	8/1/2003
168000007	US Air Force, Columbus Air Force Base	Air-Construction	11/5/1999	
168000007	US Air Force, Columbus Air Force Base	Air-Construction	9/27/1999	
MSR001351	US Air Force, Columbus Air Force Base	GP-Baseline	3/17/1999	11/7/2000
MSR101287	US Air Force, Columbus Air Force Base	GP-Construction	3/4/1999	5/13/2000
MSR101287	US Air Force, Columbus Air Force Base	GP-Construction	5/13/2000	6/9/2003
MSP091421	US Air Force, Columbus Air Force Base	Water - Pretreatment	5/29/1998	4/2/2003
MS0040258	US Air Force, Columbus Air Force Base	Water - NPDES	5/14/1996	7/24/1998
MSR102185	LJC Hammer	GP-Construction	6/4/2002	3/27/2005
MSR001351	US Air Force, Columbus Air Force Base	GP-Baseline	11/7/2000	1/9/2006
MSP091421	US Air Force, Columbus Air Force Base	Water - Pretreatment	4/2/2003	3/31/2008
168000007	US Air Force, Columbus Air Force Base	Air-Synthetic Minor Operating	7/26/2004	6/30/2009
C1010	United States Department of the Air Force, Columbus Air Force Base Compost F	SolidWaste - Composting - Yard	8/1/2005	9/22/2008
MSR001351	US Air Force, Columbus Air Force Base	GP-Baseline	1/9/2006	9/30/2010
11725	Facility 338 Auto Hobby Shop	UST	1/31/1996	
MSR104601	United States Department of the Air Force, Columbus Air Force Base	GP-Construction	5/17/2007	5/31/2010
MSR105030	AETC II Privatized Housing LLC, US Air Force, Columbus Air Force Base	GP-Construction	4/7/2008	5/31/2010

*** Official MDEQ Permit - Version 1.1 ***

GENERAL INFORMATION

Basin: Tombigbee River Basin

Section: 28

Township: 16S

Range: 18W

Latitude: 33° 37' 18" 8 tenths

Longitude: 88° 26' 7" 9 tenths

Location Description: PG- Plant Entrance (General). Data was collected by W. Stover on 8/15/01

APPENDIX G
REFERENCES AND LIST OF PREPARERS

REFERENCES

- 14 CES/CEVP (14th Civil Engineering Squadron Environmental Planning Element). Undated a. Timberlane Nature Trial Area & SAC Lake Brochure, Columbus AFB, Mississippi.
- 14 CES/CEVP (14th Civil Engineering Squadron, Environmental Planning Element). Undated b. Wildlife Conservation Program, Columbus AFB Instruction 32-701.
- 14 CES/CEVP (14th Civil Engineering Squadron Environmental Planning Element). 1995. Cultural Resources Plan for Columbus AFB, Mississippi.
- 14 CES/CEVP (14th Civil Engineering Squadron Environmental Planning Element). 1997. 813, Herbicide Application to 217 Acres of Commercial Forest at Shuqualak Auxiliary Airfield.
- 14 CES/CEVP (14th Civil Engineering Squadron Environmental Planning Element). 1998. Air Installation Compatible Use Program Study, Shuqualak Auxiliary Airfield, Columbus Air Force Base, Mississippi. Volume 1.
- 14 CES/CEVP (14th Civil Engineering Squadron Environmental Planning Element). 2000. Columbus AFB Draft Hazardous Waste Management Plan. January.
- 14 FTW/SEF (14th Flying Training Wing SEF). 1999. Columbus Air Force Base Plan 91-212, Bird Aircraft Strike Hazard (BASH) Plan. 9 September.
- AFCEE/ECC (Air Force Center for Environmental Excellence). Undated. Herbicide Treatment to Release 217 Acres of Planted Pine, Environmental Assessment, Columbus Air Force Base, Shuqualak Auxiliary Airfield.
- AFCEE/ECC (Air Force Center for Environmental Excellence). 1999. Columbus AFB Reforestation Project Shuqualak AA, Shuqualak, MS. 19 August.
- AFCEE/ECC (Air Force Center for Environmental Excellence). 2000a. Columbus Air Force Base Forested Area Management Plan. 13 March.
- AFCEE/ECC (Air Force Center for Environmental Excellence). 2000b. Trip Report, Forest Management Technical Assistance Site Visit at Columbus Air Force Base, MS. 23 February.
- AFPD (Air Force Policy Directive). 1994. Environmental Quality. Number 32-70. 20 July.
- DoDI (Department of Defense Instruction). 1988. Accounting for Production and Sale of Forested Products. Number 7310.5. 25 January.
- DoDI (Department of Defense Instruction). 1996. DoD Pest Management Program. Number 4150.7. 22 April.
- DoDI (Department of Defense Instruction). 1996. Environmental Conservation Program. Number 4715.3. 3 May.

- Human Resources Development, Inc. July 2000. Air Force Crossroads.
<http://www.afcrossroads.com/index.cfm>
- MDEQ (Mississippi Department of Environmental Quality). 1998. Tombigbee River Basin Status Report. October.
- MMNS (Mississippi Museum of Natural Science). 2000. Endangered Species Reports for Columbus AFB and Shuqualak Auxiliary Airfield. 3 August.
- Mississippi Natural Heritage Program. 2002. Special Plants - Tracking List
- Natural Resources Conservation Service (NRCS). 2000. Conservation Plan: Columbus AFB. July 7.
- The Nature Conservancy. 1994. First Annual Field Season Report and Data Analysis of the Surveys for Rare, Threatened, and Endangered Animals and Plants on Columbus Air Force Base, Columbus, MS, and Shuqualak Air Field, Shuqualak, MS. 1993. 31 January.
- Oklahoma Biological Survey. 1994. Integrated Natural Resources Management Plan 1994-1999. Columbus Air Force Base, Columbus, Mississippi.
- Parsons Engineering Science, Inc. 1998. Phase I Archeological Survey, Shuqualak Auxiliary Airfield, Columbus Air Force Base, Mississippi. July 1998.
- Parsons Engineering Science, Inc. 2001. Final Site-Specific Work Plan for the Air Force Environmental Directorate Passive Diffusion Bag Sampler Demonstration at Columbus AFB. May 2001.
- Radian International. 1998. Columbus AFB Storm Water Pollution Prevention Plan. August.
- Ruffin, Jimmy, NRCS District Conservationist for Lowndes County, (Personal Communication) 20 October 2004
- Snow Enterprises. 2000. Key to the City Web Page. July.
<http://www.pe.net/~rksnow/mscountyshuqualak.htm>
- USACE (U.S. Army Corps of Engineers). 1987. U.S. Army Corps of Engineers Wetland Delineation Manual (<http://www.wetlands.com/regs/tlpge02e.htm>)
- USACE (U.S. Army Corps of Engineers). 1998. Request for Wetland Determination, Shuqualak Auxiliary Airfield- Jurisdictional Number MSJ98-01826-D. 8 July.
- USAF (U.S. Air Force). 1994a. Design and Construction Standards and Execution of Facility Construction Projects, Air Force Instruction (AFI) 32-1023. 19 July.
- USAF (U.S. Air Force). 1994b. Planning and Programming of Facility Construction Projects, Air Force Instruction (AFI) 32-1021. 12 May.

- USAF (U.S. Air Force). 1995a. Environmental Impact Analysis Process, Air Force Instruction (AFI) 32-7061. 24 January.
- USAF (U.S. Air Force). 1995b. Cultural Resources Management Plan for Columbus Air Force Base, Mississippi. June.
- USAF (U.S. Air Force). 1997a. Bird Aircraft Safety Hazard Management Techniques. Air Force Pamphlet (AFPAM) 91-212. 1 April.
- USAF (U.S. Air Force). 1997b. Integrated Natural Resources Management, Air Force Instruction (AFI) 32-7064. 1 August.
- USAF (U.S. Air Force). 1997c. Comprehensive Plan, General Plan for Columbus Air Force Base. 8 September.
- USAF (U.S. Air Force). 1997d. Draft of untitled document listing 1997 Columbus AFB HAP emissions from stationary sources.
- USAF (U.S. Air Force). 1998. Installation Restoration Plan: Work Plan for Baseline Risk Assessments and Feasibility Studies for IRP Sites LF-06, ST-13, ST-24, SS-28, and SS-29, Columbus AFB, MS. September.
- USAF (U.S. Air Force). 1999a. Environmental Assessment: Six Military Construction Projects in Fiscal Years 00-05 for Columbus AFB, Mississippi. Department of the Air Force, Air Education and Training Command. March.
- USAF (U.S. Air Force). 1999b. Pest Management Program. Air Force Instruction (AFI) 32-1053. 1 April.
- USAF (U.S. Air Force). 2000. Narrative Pest Management Program. Currently under review.
- USDA (U.S. Department of Agriculture). 1986. Soil Survey of Noxubee County, Mississippi. Soil Conservation Service in cooperation with Mississippi Agricultural and Forestry Experiment Station. October.
- USDA (U.S. Department of Agriculture). 1999.
<ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/ms/28103.txt>
- USEPA (U.S. Environmental Protection Agency). 1992. A Citizen's Guide to Radon. May.
- USEPA (U.S. Environmental Protection Agency). 2000. Laws and Regulations.
<http://www.epa.gov/epahome/laws.htm> July.
- USFWS (United States Fish and Wildlife Service). 1995. National Wetlands Inventory: Mapping Report for Columbus Air Force Base.
- USFWS (United States Fish and Wildlife Service). 2000. Threatened and Endangered Species System.
http://ecos.fws.gov/webpage/webpage_usa_lists.html? July.

Websites Consulted:

http://www.deq.state.ms.us/MDEQ.nsf/page/Main_Home?OpenDocument
<http://www.mdwfp.com/museum/>
http://southeast.fws.gov/hotissues/mussesls/proposed_rule.html
<http://www.interaktv.com/MS/Fishes.html>
http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=16000US2815420
<http://msucares.com/pubs/publications/p1892.htm>
<http://www.tenntom.org/images/newmap.gif>

LIST OF PREPARERS

Kevin Porteck (AFCEE)
Air Force Forester

Frank Lockhart
Natural Resource Manager (CAFB)

Jamal Lewis
Water and Air Specialist (CAFB)

Robert Moyer (J.M. Waller Associates, Inc.)
Engineer in Training

Julie Jeter, (J.M. Waller Associates, Inc.)
Wildlife Biologist

Daniel Dunning, (J.M. Waller Associates, Inc.)
Environmental Scientist

Ellen Stutsman, (J.M. Waller Associates, Inc.)
Technical Editor

Alba M. Correa, (J.M. Waller Associates, Inc.)
Technical Editor

APPENDIX H
SHUQULAK INRMP

EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) is a comprehensive guide for natural resource management for the 14 Flying Training Wing (FTW) at Shuqualak Auxiliary Airfield (Shuqualak AA) in Mississippi. The Plan is to be implemented over the 5-year period of 2004 through 2008. This INRMP represents a commitment by the U.S. Air Force (AF) to protect the integrity and value of the natural resources for Shuqualak AA. The purpose of the INRMP is to integrate the Air Force mission with an interdisciplinary approach to ecosystem management of natural resources at Shuqualak AA. The comprehensive goal of ecosystem management for installations under the command of the 14 FTW is to maintain and improve the sustainability and biological diversity of native ecosystems while supporting the military mission. Implementation of the INRMP will help ensure that Columbus AFB continues to support present and future mission requirements while preserving, improving, and enhancing ecosystem integrity. \

This INRMP is focused on the achievement of seven natural resource management goals:

- Goal 1: Provide a natural resource management program within 14 CES/CEIE that supports the 14 FTW mission while protecting ecosystem diversity to the maximum extent possible;
- Goal 2: Sustain the Shuqualak AA Airfield and surrounding Air Force property in a manner that reduces natural resource impacts to the 14 FTW flying mission;
- Goal 3: Protect and improve the health and condition of the forest ecosystems at Shuqualak AA;
- Goal 4: Maintain appropriate populations of game or non-game species that are consistent with the 14 FTW mission and Department of Defense (DoD) guidelines of ecosystem management;
- Goal 5: Protect and improve water quality, and reduce erosion in streams and other surface waters of Shuqualak AA compatible with the 14 FTW mission;
- Goal 6: Manage Shuqualak AA grounds to provide an aesthetically attractive landscape that reduces erosion and the amount of storm water runoff; and
- Goal 7: Provide outdoor recreation opportunities that promote the mental, physical, and social wellbeing of installation personnel

The INRMP goals were formulated from a comprehensive analysis of regulatory requirements, the current condition of the natural resources on Shuqualak AA and a consideration of the value of these resources to the people who live and work on the installations. Chapter 9 identifies the specific objectives and projects that will be implemented to achieve each goal.

This INRMP is prepared according to Air Force Instruction (AFI) AFI 32-7064, *Integrated Natural Resources Management* (September 2004). The INRMP is prepared by the 14 CES Environmental Flight (CES/CEIE), endorsed by the 14 FTW Environmental Safety and Occupational Health Council (ESOHC) and approved by the Wing Commander. The INRMP will be implemented under the direction of the 14 CES/CEIE natural resources manager. Over the long term, implementation of this INRMP and future revisions of the INRMP will support 14 FTW military operations by ensuring the sustainability of the land and its ecosystems. Only certain projects will require separate environmental assessments for their implementation due to their size (i.e., kudzu eradication).

2.0 GENERAL INFORMATION

2.1 Purpose Of The Plan

This *Installation Natural Resource Management Plan* (INRMP) was prepared to assist in the conservation of natural resources on Shuqualak AA. The INRMP provides the means, or "road map," so to speak, for the 14 FTW to achieve the goals of conservation and management of installation natural resources. The INRMP integrates an interdisciplinary approach to ecosystem management with planning for the military mission. The INRMP enables managers to accomplish the following:

- Be aware of the past, present, and projected future condition of installation natural resources;
- Realize management issues and concerns for natural resource conservation;
- Understand the installation goals and objectives for the protection and enhancement of these resources;
- Ensure that management activities are consistent with laws to protect natural resources; and
- Ensure integration of the natural resource conservation program with the Air Force mission.

The INRMP is a component of the Base Comprehensive Planning Process for the 14 FTW and supports other component plans, such as the *General Plan*, *Pest Management Plan*, *Bird/Wildlife Aircraft Strike Hazard (BASH) Plan*, *Cultural Resources Management Plan*, and other essential plans by ensuring that natural resource conservation is integrated into all phases of installation operations.

The 14 FTW is a dynamic organization that must frequently adjust operations to accommodate a constantly changing Air Force mission. Any mission changes or future development that are implemented through the base comprehensive planning process will impact the land in one way or another. This INRMP will be used as a tool for determining the environmental constraints to new development and for assessing the impacts that any new development may have on natural resources.

2.2 Scope and Authority

The Sikes Act of 1960, (P.L. 86-779) provides for cooperation between the Departments of Defense and the Interior for the protection of natural resources on military lands. On 18 November 1997, as part of the FY98 DoD Authorization Act (P.L. 105-85), Congress passed the *Sikes Act Improvement Amendment* (SAIA), which required the preparation and implementation of an INRMP to support the sustainable use by the public of natural resources to the extent that that the use is not inconsistent with the needs of fish and wildlife resources. Title 16, U.S.C. § 670 *et. seq.*, implements the Sikes Act and states:

"...the Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary, unless the Secretary determines that the absence of significant natural resources on a particular installation makes preparation of such a plan inappropriate."

As stated previously, the SAIA also requires the INRMP be prepared in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the state fish and wildlife agency for the state in which the military installation is located. The cooperation with the USFWS and the state fish and wildlife agency is intended to "reflect the mutual agreement of the parties concerning conservation, protection, and management of fish and wildlife resources."

The INRMP for Shuqualak AA will focus on the land and all land uses associated with the land within the boundaries of each installation. Air Force Policy Directive (AFPD) 32-70, *Environmental Quality* (20 July

1994) and DoD Instruction (DoDI) 4715.3, *Environmental Conservation Program* state that natural resources at military installations will be managed through effective planning. In AFPD 32-70, the Deputy Undersecretary of Defense (Environmental Security) states “ecosystem management of natural resources draws on a collaboratively developed vision of desired future ecosystem conditions that integrates ecological, economic, and social factors.” To effectively integrate ecological, economic, and social factors along with the military mission into an effective ecosystem management program, the policy directive further states: “On DoD installations, ecosystem management will be achieved by developing and implementing *Integrated Natural Resources Management Plans* [INRMPs] and insuring that they remain current.”

Air Force Instruction AFI 32-7064, *Integrated Natural Resources Management* implements the Sikes Act and the DoD directives by establishing the INRMP as the primary planning document for natural resources at Air Force installations. AFI 32-7064 establishes the installation or wing commander as the signatory authority for approval of the INRMP. The commander’s signature on the INRMP commits the Air Force to the goals and objectives of the Plan. Once signed by the cooperating agencies (USFWS and state), the INRMP takes on the status of an interagency compliance agreement.

2.3 Management Philosophy

The guiding principle behind the development of this INRMP is ecosystem management. The comprehensive goal of ecosystem management on 14 FTW installations is to maintain and improve the sustainability and biological diversity of native ecosystems while supporting the Air Force mission, legal requirements, and the needs of the military community. Managing ecosystems will involve addressing the environment as a complex system of interrelated components rather than a collection of isolated units. Military operations, for example, are essential components of the installation’s environment. Successful ecosystem management on 14 FTW installations will require environmental managers to consider the military mission, environmental laws, base and surrounding community values, economics, and adjacent land uses in addition to the biological environment.

The Shuqualak AA INRMP was developed using an interdisciplinary team of planners, scientists, and other specialists. Air Force personnel included individuals from the 14 CES/CEIE, Environmental Management Element and the HQ AFCEE/EC Forester. Assistance was obtained from operations personnel at the installation both in obtaining resource information and in reviewing the INRMP document. The Mississippi Department of Wildlife, Fisheries and Parks (MDWFP) and federal agencies were consulted during preparation of resource inventories and other parts of the plan.

2.4 Conditions for Plan Implementation and Revision

2.4.1 Implementation

This INRMP will be implemented upon review and approval by the 14 FTW Wing Commander. The INRMP, when approved by the Commander, will serve as the overall guide to management of natural resources at Shuqualak AA. The 14 CES/CEIE will implement the plan with oversight from the Environmental Protection Council (ESOHC).

2.4.2 Revisions

The INRMP will be reviewed and updated every five years. Updates will also be required in the event of a major mission change or in the event that a significant new resource is identified, such as the discovery of a protected species. Interim requests for plan revision may be submitted at any time to the ESOHC through the 14 CES/CEIE. The 14 CES/CEIE will review proposed revisions to the INRMP and, when necessary,

recommend changes to the ESOHC. The ESOHC will approve most interim INRMP revisions. Major revisions, defined as a revision to a stated goal or objective of the INRMP, must be approved by the Wing Commander. Further, by way of the ESOHC, decisions related to land use that would not normally be evaluated for environmental impact will be brought to the attention of all key organizations on the installation.

2.5 Responsibilities

Responsibilities associated with INRMP implementation and compliance are as follows:

- The 14 FTW Wing Commander is responsible for ensuring that Base-assigned and tenant units comply with the laws and requirements associated with the management of natural resources, and that funding and staffing are sufficient to accomplish the projects and objectives of the INRMP,
- The ESOHC reviews and approves the INRMP along with its annual updates and revisions. In addition, the ESOHC ensures that 14 FTW organizations comply with the plan,
- The Base Civil Engineer (BCE) is responsible for the preparation, maintenance, and day-to-day implementation of the INRMP, and is the focal point for all plan actions and issues. The BCE also establishes mechanisms to review and analyze the impacts using the Air Force Environmental Impact Analysis Process (EIAP) for all proposed actions of the INRMP, and makes recommendations based on the analysis to the ESOHC for approval or disapproval,
- The 14 CES/CEIE Conservation Manager has primary responsibility for natural resources management. The Conservation Manager is the principal point-of-contact for determining consistency of proposed actions and projects with the INRMP. Table 2.5-1 below summarizes Air Force Conservation Management Responsibilities at Shuqualak AA.

Table 2.5-1 Air Force Natural Resource Management Responsibilities

Group	Squadron	Flight/Staff	Responsibilities
Wing Staff	14 FTW/CC	Wing Commander	Chairman, ESOHC
	14 FTW/JA	Judge Advocate	Regulatory Interpretation Off-Base Disputes/Complaint Resolution Legal Representation
	14 FTW/SE (Flying Training Wing)	Wing Safety	BASH Monitoring and Minimization (on and off base) Deer Removal From Airfield
Medical Group (Preventative Medicine)	14 MDOS/OAM	Bioenvironmental Engineer	NPDES* Storm Water Quality Monitoring NPDES Wastewater Discharge Monitoring
	14 MDOS/OAM	Military Public Health	Zoonosis Monitoring Mosquito Population Monitoring

Table 2.5-1 Air Force Natural Resource Management Responsibilities, Continued

Group	Squadron	Flight/Staff	Responsibilities
Operations Support Squadron	Airfield Operations 14 OSS/OSAA	Airfield Management	BASH Monitoring and Minimization
Mission Support Group	14CES/CEC (CEC)	Engineering	Storm Water/Erosion Control and Landscaping Specifications for New Construction
	CE 14 CES/CEO	Operations	Oil/Water Separator Maintenance General Grounds Maintenance Environmental Controls Airfields Grounds Maintenance (mowing)
	14 CES/CEIE	Environmental	Natural Resources Management Cultural Resources Management Hazmat/Hazwaste Management Installation Restoration Program Air Quality Monitoring/Compliance Environmental Impact Assessment Process Storm Water Management Pollution Prevention Clear Zone Tree Removal
	14 MSG/SV Services	Golf Course	Golf Course Grounds Maintenance
	14 MSG/SV Services	Outdoor Recreation	Outdoor Recreation Equipment Rental/Check Out

*National Pollutant Discharge Elimination System

2.6 National Environmental Policy Act Documentation

The INRMP may require review according to AFI 32-7061, EIAP, which provides guidelines for meeting the requirements of the National Environmental Policy Act (NEPA) of 1969 (USAF 1995a). To facilitate the environmental documentation for a limited number of generic projects, an Environmental Assessment (EA) will be completed for the INRMP in conjunction with the preparation of this INRMP. Any subsequent actions at Shuqualak AA involving specific sites or mission changes may be subject to separate review under NEPA. For example, implementation of specific projects to support INRMP objectives may require a NEPA review of the individual project. A NEPA review would be performed by 14 CES/CEIE.

3.0 Installation Overview

3.1 Location and Area

Shuqualak AA is located approximately 35 miles south of Columbus AFB in Noxubee and Kemper Counties in east-central Mississippi (Figure 3.6-1 Columbus AFB INRMP). The airfield consists of approximately 1,080 acres and lies approximately 3 miles southwest of the town of Shuqualak, approximately 10 miles west of the Mississippi-Alabama border. The elevation of the airfield is 253 ft above mean sea level (MSL).

Shuqualak AA has approximately 1,080 acres with a northwest-southeast runway, a taxiway, two Runway Supervisory Units (RSU) and access roads, an aircraft parking apron, a combined aircraft fire/crash station and aircraft operations building, and open space. There are approximately 211 acres suitable for development at Shuqualak AA.

Agricultural and wooded areas with gravel roads and very few houses surround Shuqualak AA. The nearest homes are located a minimum of one-half mile from the Shuqualak AA property fence. According to the U.S. Census Bureau 2000 data, the population of the town of Shuqualak is 562. About 10 miles north of Shuqualak is the town of Macon. According to the U.S. Census Bureau 2000 data, the population of the town of Macon is 2,461.

3.2 Installation History

Shuqualak AA is used for aircraft touch-and-go practice. This airfield consists of 13 parcels that were primarily owned by paper and lumber companies. This property was later purchased by the U.S. government during the period 1968-1969 for use as an auxiliary airfield for Meridian Naval Air Station. The airfield began pilot training operations and was named the Outlying Field (OLF)-Alpha (A). The ownership of the airfield was transferred to Columbus AFB in 1991 (Parsons 1998).

Shuqualak AA is in a very rural area surrounded by woodlands, forestland, and farmland. Immediately bordering the airfield are commercially owned or leased forest resource interests. The majority of the land in the vicinity of Shuqualak AA is classified as forest (MDEQ 1998). Both the Weyerhaeuser and Georgia Pacific corporations manage pine plantations near the Shuqualak AA. Weyerhaeuser owns land to the east and south of the airfield, while Georgia Pacific owns lands to the north of the airfield (14 CES/CEVP 1997). There are two Land Use Classifications for Shuqualak AA: forest and pasture/rangeland. The majority of the land in the area is classified as forest.

3.3 Military Mission

Columbus AFB uses Shuqualak AA for touch-and-go training in the T-37 jet trainer (Parsons 1998). No Air Force personnel or aircraft are based at Shuqualak AA; however, crash/rescue/fire-fighting vehicles and equipment are housed at the airfield. Fire department personnel commute to the airfield from Columbus AFB on a daily basis (14 CES/CEVP 1998).

3.4 Surrounding Communities

The town of Shuqualak lies on U.S. Highway 45 approximately half way between the towns of Columbus (to the north) and Meridian, Mississippi (to the south). The town of Philadelphia, Mississippi is located approximately 40 miles to the southwest of Shuqualak. The state capital, Jackson, is about 100 miles southwest of Shuqualak.

3.5 Regional Land Use

Timber production and agriculture are the main land uses in the vicinity of Shuqualak AA. The small town of Shuqualak is near the airfield and the surrounding area is very rural.

3.6 Local and Regional Natural Areas

Natural areas in the vicinity are Tombigbee National Forest, Noxubee National Wildlife Refuge and Legion State Park. The 66,000-acre Tombigbee National Forest is made up of two units and offers campgrounds, swimming and fishing lakes and trails for biking, hiking and horseback riding. About 40,000 acres are on the Ackerman Unit and the other 26,000 acres are on the Trace Unit. The Ackerman Unit is closest to Shuqualak and is located in Winston, Choctaw and Oktibbeha counties and is bounded by a triangle of towns: Ackerman, Starkville, and Louisville. The Trace Unit is located east of Houston, Mississippi, in Chickasaw and Pontotoc counties. It skirts the Natchez Trace Parkway, which is located about 27 miles west of Columbus (www.fs.fed.us/r8/tombigbee).

The Tombigbee National Forest is northwest of Shuqualak and can be reached by traveling north on U.S. Highway 45 approximately 18 miles to Brooksville and traveling west approximately another 25 miles towards State Highway 25 that runs between Starkville and Louisville. All three of these natural areas are located in the same general area.

The office for the 48,000-acre Noxubee National Wildlife Refuge is located in Brooksville, Mississippi. The refuge serves as a resting and feeding area for migratory birds and as an example of proper land stewardship. The refuge is managed intensively for the endangered red-cockaded woodpecker. The woodpecker is a colonial nester living in social units called clusters. The number of clusters at Noxubee National Wildlife Refuge has doubled in the last ten years and the refuge staff is very proud of this fact (<http://noxubee.fws.gov/>).

Shuqualak AA being a highly disturbed and altered site contains no habitat similar to these two important natural areas. It was cleared and grubbed in 1997. According to the 10-year old Nature Conservancy survey in 1994, no endangered species have been found. However, the appendaged lobelia (*Lobelia appendiculata*) has been documented on the property in the past. For more information on the lobelia see: http://plants.usda.gov/cgi_bin/plant_profile.cgi?symbol=loapg. A new endangered species survey was initiated in 2004 with a completion date of July 2005.

4.0 GENERAL PHYSICAL ENVIRONMENT

4.1 Climate

Climate data for Shuqualak AA are provided below and came from www.weather.com (8/10/04).

Table 4-3 Precipitation and Temperature Data for the Town of Shuqualak

Month	Average (in.)	Average (High) °F	Temp.	Average (Low) °F	Temp.
January	6.10	53		31	
February	4.74	59		34	
March	5.79	67		42	
April	5.65	74		49	
May	4.51	82		58	
June	4.41	89		67	
July	4.59	92		70	
August	3.70	86		69	
September	3.58	77		62	
October	3.11	66		49	
November	5.33	56		41	
December	4.84	56		33	

4.2 Landforms

Portions of Shuqualak AA are located in the Interior Flatwoods province and the Blackland Prairie region (Figure 4-1). The soils and topography of the area are mostly characteristic of the Flatwoods region. The topography is characterized by gently rolling to relatively flat ground, but steep slopes exist along stream banks (USDA 1986). Elevations in the Blackland Prairie range from 300 feet MSL in the northern part of Noxubee County to 200 feet MSL in the southern part of the county. Elevations in the Flatwoods region tend to be slightly higher than in the Blackland Prairie, with a range from 325 feet MSL in the north to 250-275 feet MSL in the south-central part of the county (MDEQ 1998; USAF 1998).

4.3 Soils and Geology

The soils found at Shuqualak AA are somewhat poorly drained silty soils, characteristic of the Flatwoods region. The soils are acidic, and fine textured and generally wet except in time of drought. Due to poor drainage, soils in the Flatwoods region are generally not favorable to cultivation, but are well suited to growing pines (see: <http://www2.msstate.edu/~wmp2/01-%20Origin%20of%20Soil%20Materials.pdf>). Shuqualak AA is in an area of the Wilcox-Falkner soil association. The Wilcox soils, which occupy upland ridges and hillsides, are formed in clayey marine deposits overlain by silty material. These soils are mostly used for woodlands, cultivated crops, or pasture (USDA 1986). The erosion hazard for Wilcox soils ranges from moderate to severe, while the hazard for Falkner soils is slight (Parsons 1998).

4.4 Hydrology

Shuqualak AA is also part of the Tombigbee River Basin (see Figure 4-2 Columbus AFB INRMP). The Noxubee River is the primary drainage for the area around the airfield. One of the larger tributaries of the Noxubee River, Shuqualak Creek, is located northwest of the runway. The watershed occupied by this

stream is characterized by small areas of ponded water and hydric soils, and has a well-defined channel where it enters the Shuqualak AA property from the north.

MDEQ has listed several creeks and rivers in the Tombigbee River Basin as impaired water bodies particularly in regard to supporting aquatic life. Shuqualak Creek near the city of Shuqualak from its headwaters to its mouth near the Noxubee River is listed as no attaining, biological impairment in regard to supporting aquatic life.

5.0 GENERAL BIOTIC ENVIRONMENT

5.1 Ecosystem Classification

The following natural resource information was adapted from Bailey's 1995 Ecoregion classification and is located on the Internet at: http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html.

Shuqualak AA is part of the Southern Mixed Forest Province comprises the Piedmont and the irregular Gulf Coastal Plains, where 50 to 80 percent of the area slopes gently toward the sea. Relief in the region varies from 100 to 600 ft (30 to 180 m) on the Gulf Coastal Plains to 300 to 1,000 ft (90 to 300 m) on the Piedmont. The flat coastal plains have gentle slopes and local relief of less than 100 ft (30 m). Most of the numerous streams in the region are sluggish with numerous marshes, lakes, and swamps.

5.2 Vegetation

Historic Vegetative Cover: Climax vegetation in the Southern Mixed Forest Province is characterized by medium-tall to tall forests of broadleaf deciduous and needleleaf evergreen trees. At least 50 percent of the stands are made up of loblolly pine, shortleaf pine, and other southern yellow pine species, singly or in combination. Common associates include oak, hickory, sweetgum, blackgum, red maple, and winged elm. The main grasses are bluestem, panicums, and longleaf uniola. Dogwood, viburnum, haw, blueberry, American beautyberry, yaupon, and numerous woody vines are common understory species. Shuqualak AA lies mainly within the Flatwoods region, so discussion of the historic vegetation cover will focus on Flatwoods communities. According to the USDA Forest Service's *An Old Growth Definition for Wet Pine Forests, Woodlands and Savannahs*, vegetative communities in the vicinity of Shuqualak AA would have been wet pine forests, woodlands or savannah depending on the amount of moisture and the frequency of fire. Soils in all in Flatwoods communities are poorly drained and all three types of Flatwoods communities are maintained by periodic fires.

Current Vegetated Cover: Most of the Shuqualak AA is covered with airfield grasses. Current vegetative cover bears no resemblance to historic Southern Flatwood communities, which are a subset of the Southern Mixed Forest Province. Trees and brush occur well off the ends of the runway at Shuqualak AA. In 1997, the majority of the wooded area at Shuqualak AA was clearcut for airfield safety reasons. Trees removed were either within the established safety clear zone, or intruded into the approach-departure or transitional glide slopes of the airfield. Portions of the forested area within the established clear zones were then grubbed, graded, and converted to managed grasslands. In 1999, 217 acres of cleared forest beneath the approach-departure and transitional surfaces were replanted to loblolly pine. Trees are harvested 15-20 year rotation (before they begin to intrude into airfield safety zones) and are sold as pulp only.

Turf and Landscaped Areas:

Turf grasses include centipede grass (*Eremochloa ophiuroides*), Bermuda grass (*Cynodon dactylon*), and annual ryegrass (*Lolium multiflorum*). Very little landscaping is present at Shuqualak AA.

5.3 Fish and Wildlife

Shuqualak AA lies within the vast Southern Mixed Forest Province. Terrestrial fauna with the potential to occur at Shuqualak AA vary with the age and stocking of timber stands, percent of deciduous trees, proximity to openings, and presence of bottomland forest types. Game animals include whitetail deer (*Odocoileus virginianus*), cottontail rabbits (*Sylvilagus floridanus*), fox (*Sciurus nigra*) and gray squirrels (*S. carolinensis*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), opossum (*Didelphis virginiana*), beaver (*Castor canadensis*) and bobcat (*Lynx rufus*). Most of these animals prefer forest with adjacent cleared or open areas. When deciduous trees are present on uplands, the fox squirrel is common. Gray squirrels live along intersecting drainages. Among mammals frequently encountered in the western part of this province is the nine-banded armadillo.

Where suitable habitat occurs in this region, eastern wild turkey (*Meleagris gallopavo sylvestris*), bobwhite (*Colinus virginianus*), and mourning dove (*Zenaida macroura*) are widespread throughout the Province. Turkey, bobwhite, mourning dove, rail (*Rallus* species), gallinule (*Gallinula* or *Porphyryla* species), coot (*Fulica Caribaea*), woodcock (*Scolopax minor*), snipe (*Gallinago gallinago*), and waterfowl are popular with hunters. Turkey, and bobwhite, like deer, prefer woodlands neared cleared areas. Of the 20-odd bird species present in mature forest, the most common are the pine warbler (*Dendroica pinus*), cardinal (*Cardinalis cardinalis*), summer tanager, Carolina wren (*Thryothorus ludovicianus*), ruby-throated hummingbird (*Archilochus colubris*), blue jay (*Cyanocitta cristata*), hooded warbler (*Wilsonia pusilla*), eastern (rufous-sided) towhee (*Pipilo erythrophthalmus*), and tufted titmouse (*Parus bicolor*). Forest snakes include cottonmouth moccasin (*Agkistrodon piscivorous*), copperhead (*A. contortrix laticinctus*), rough green snake (*Ophedrys aestivus*), rat snake (*Elaphe obsoleta*), coachwhip (*Masticophis flagellum*), and speckled kingsnake (*Lampropeltis getula holbrooki*). Glass lizards (*Ophisaurus attenuatus*) are also found, as is the slimy salamander (*Plethodon glutinosus*). There is very little wildlife habitat at Shuqualak AA. A list of species known to occur at Shuqualak AA is found in Appendix D.

5.4 Threatened and Endangered Species

There are habitats on Shuqualak AA where one or more of the four federally-listed endangered plant species could occur. However, to date, none have been found at the airfield. One state special status plant species, the appendaged lobelia, has the potential to occur on the property, (The Nature Conservancy 1994). For more information on rare plant species, see Appendix B.



Although there are no federally listed species that have been documented at Shuqualak AA, according to the Nature Conservancy 1994, there is one state special status species that occurs, the red-shouldered hawk (*Buteo lineatus*). Appendix A contains additional information concerning the protected vertebrate species that occur on Columbus AFB and

Shuqualak AA.

According to The Nature Conservancy survey completed in 1994, freshwater mussels have been observed and collected on Shuqualak AA along the forming headwaters of Shuqualak Creek, which could possibly be of concern, but it is unlikely due to the channelization of this creek at Shuqualak AA (The Nature Conservancy 1994). At the airfield, the creek has been channelized and its sides stabilized with concrete riprap to reduce erosion (see photograph above).

5.5 Wetlands

There are no wetlands at Shuqualak AA.

5.6 Other Natural Resource Information

Recent biological inventories and surveys conducted at Columbus AFB that have relevance to natural resource management at Shuqualak AA include:

- Columbus Air Force Base Forest Inventory and Report, September 2000, this report described forest and stand health, discussed concerns about erosion and standing water, Ips beetle infestations and provided recommendations for improving the health of stands at Columbus AFB
- Columbus AFB Urban Forest Inventory and Assessment, February 2004, this report provided a list of all landscape trees on Columbus AFB, and recommendations for improved health and care of urban trees.
- Columbus AFB Threatened and Endangered Species Survey and Plan, July 2004-July 2005, at the present time, this report is documenting all species including threatened and endangered species at CAFB. Based on their surveys, areas that may support rare species are generally associated with permanent water bodies, temporary pools, and forested wetlands. Ten sites were selected for intensive, replicated surveys. A tentative species list and write-up dated fall 2004 from this report is found in Appendix A.
- Columbus Air Force Base Wildland Fire Management Plan, July 2004, this report was developed to reduce threats to installation personnel and property; to protect and enhance natural resources and to be in compliance with AFIs regarding enhancing biodiversity at Air Force installations.
- Columbus Air Force Base Aero-Dome Tree Survey, September 2004, this report described tree penetration into airspace and identified trees, which need removal. To conclude this project, marked trees will be removed in the near future.
- Columbus Air Force Base Study of White-tailed Deer, September 2004, this report will describe base wide spatial and temporal (daily and seasonal) deer movements, reproductive rates, and how to manage deer with regard to airfield safety, how to merge BASH efforts with hunting, and where deer are harvested at Columbus AFB.
- A 12-month Wildlife Hazard Assessment (WHA) has been completed of Columbus AFB and Shuqualak AA as of August 2004. For this study at Columbus AFB 150 diurnal bird surveys and 24 spotlight surveys have been completed, as with the above study spatial and temporal wildlife movements were examined, and nuisance species identified. In the future, infrared technology will be employed.

Natural Resource Inventories that have been conducted in the past are shown below.

- The Nature Conservancy. 1994. First Annual Field Season Report and Data Analysis of the Surveys for Rare, Threatened, and Endangered Animals and Plants on Columbus Air Force Base, Columbus, MS, and Shuqualak Air Field, Shuqualak, MS. 1993. 31 January.
- MMNS (Mississippi Museum of Natural Science). 2000. Endangered Species Reports for Columbus AFB and Shuqualak Auxiliary Airfield. 3 August.
- Natural Resources Conservation Service (NRCS). 2000. Conservation Plan: Columbus AFB. July 7.
- Oklahoma Biological Survey. 1994. Integrated Natural Resources Management Plan 1994-1999. Columbus Air Force Base, Columbus, Mississippi

6.0 MISSION IMPACTS ON NATURAL RESOURCES

6.1 Land Use

AFI 32-7064 specifies three categories of natural resource management units. Grounds categories follow the traditional divisions of improved, semi-improved, and unimproved land. These types of categories are defined by the intensity of grounds maintenance required for their upkeep. Improved lands are those that require the most maintenance (mowing, fertilization, application of pesticides, etc.) followed by semi-improved and unimproved which do not require the same commitment of time, and labor for their upkeep. Lands at Shuqualak AA are categorized as Airfield, Airfield Operations and Maintenance, Open Space, or Water. Shuqualak Creek, a perennial stream, transverses a portion of the Shuqualak AA. Land use at Shuqualak AA is shown in Table 6.1-1 below.

Table 6.1-1 Land Use at Shuqualak Auxiliary Airfield

Grounds Category	Land Use Categories	Description
Improved/167 acres	Airfield	Runways, taxiways, aprons
Semi-improved/227 acres	Aircraft operations & maintenance	Fire station, operations building
Improved, semi-improved, unimproved	Open space/ roads	Roads, fields, forests
Unimproved/686 acres	Water	Creeks, ponds

6.2 Current Major Impacts

Water and Air Pollution Permits

Water

MDEQ has a statewide multimedia pollution prevention program, whose goal is to prevent or reduce the amount of pollution released to state lands, air, or water. This program encourages the reduction of pollution at the generating source and the environmentally safe recycling of pollutants where feasible (MDEQ 1998).

MDEQ, in accordance with Section 305(b) of the Clean Water Act, is responsible for monitoring Mississippi's water quality conditions every 2 years. Like Columbus AFB, Shuqualak AA is a part of the Big Black River and Tombigbee River Basin. Principal causes of water quality problems in this basin are nutrients, siltation, pathogens, and organic enrichment from non-point source pollution. These pollutants usually originate from municipal or industrial sources or are transported as non-point source pollution from the land by runoff (MDEQ 1998).

Shuqualak AA gets its water from a well on the property. This well also supplies the local water system. Shuqualak AA utilizes a septic tank for wastes. Water and NPDES permits are not required.

Air

Air quality in any given region is measured by the concentration of various pollutants in the atmosphere, typically expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Air quality is not only determined by the types and quantities of atmospheric

pollutants, but also by surface topography, the size of the air basin, and by the prevailing meteorological conditions.

The Clean Air Act Amendments of 1990 (CAAA) directed the United States Environmental Protection Agency (USEPA) to develop, implement, and enforce environmental regulations that would ensure cleaner air for all Americans (USEPA 2000). USEPA classifies the air quality within an Air Quality Control Region (AQCR) according to whether or not the concentration of criteria air pollutants in the atmosphere exceed primary or secondary National Ambient Air Quality Standards (NAAQS).

Shuqualak AA is within the Northeast Mississippi Intrastate AQCR 135. This AQCR includes the counties of Alcorn, Atala, Benton, Calhoun, Carroll, Chickasaw, Choctaw, Clay, Grenada, Holmes, Itawamba, Kemper, Lafayette, Leake, Lee, Lowndes, Marshall, Monroe, Montgomery, Neshoba, Noxubee, Oktibbeha, Panola, Pontotac, Prentiss, Tate, Tippah, Tishomingo, Union, Webster, Winston, and Yalobusha. The USEPA has designated the air quality within Lowndes County as better than NAAQS for total suspended particulates (TSP) and sulfur dioxide (SO₂), and unclassified for carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), and particulate matter equal to or less than 10 microns in aerodynamic diameter (PM₁₀). There are no attainment areas in the vicinity of Shuqualak AA (USAF 1999a).

Title V operating permits are issued based on a facility's potential to emit criteria air pollutants. Shuqualak AA does not have an air permit. There are no air emission data for Shuqualak AA.

Aircraft Noise

Aircraft operations are the primary source of noise at Shuqualak AA. These operations include activities such as pilot training. During periods of no flying activity at Shuqualak AA, there is no noise associated with aircraft or other activities. It is during periods of aircraft flight activity that the noise environment changes.

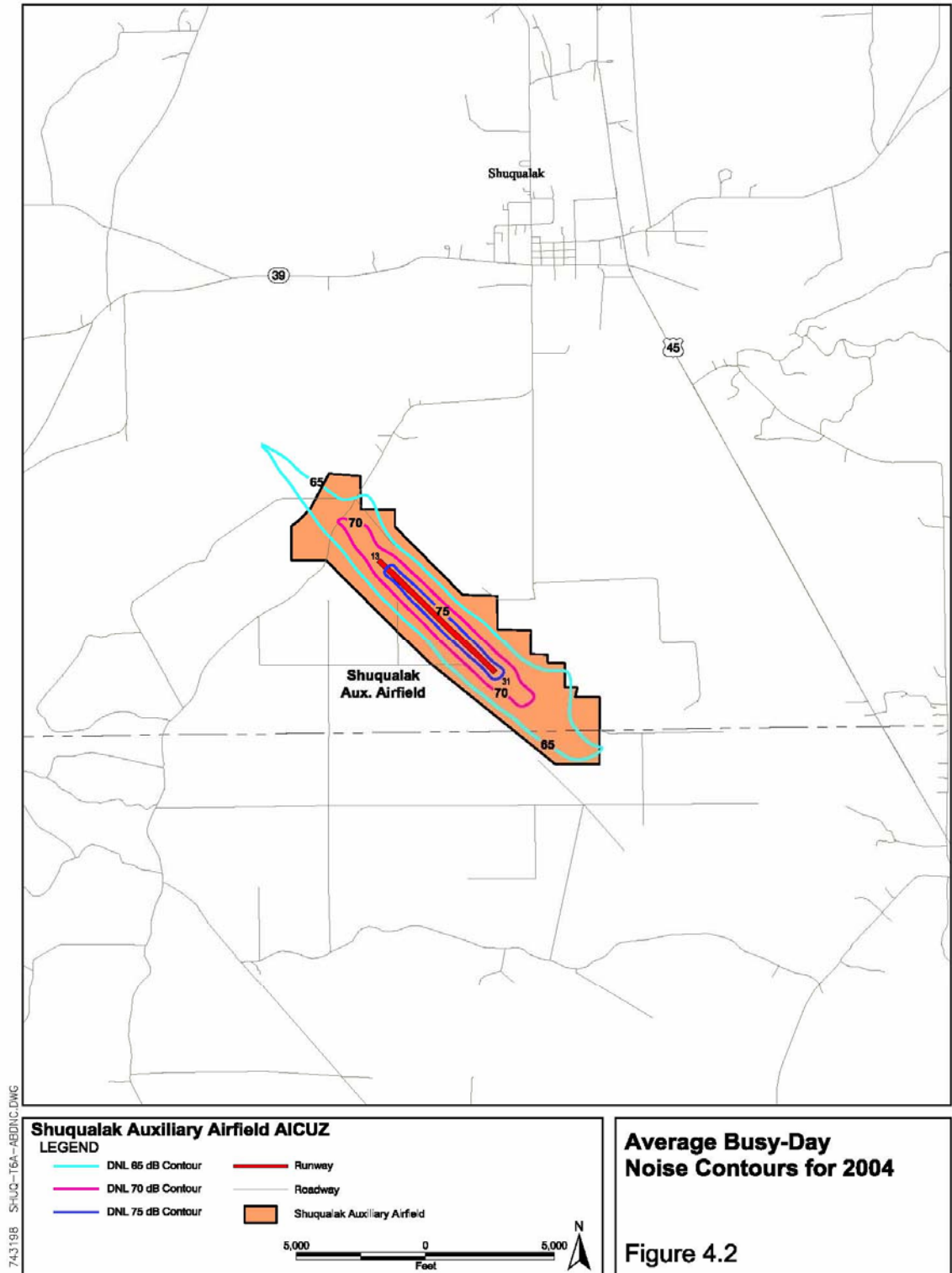
Noise from aircraft operations at Shuqualak AA was defined using the Air Force NOISEMAP (Version 6.5) modeling program. This model predicted areas exposed to a DNL of 65, 70, 75, and 80 (noise contours) for Shuqualak AA. See Figure 6.2-1 for noise contours at Shuqualak AA.

Hazardous Waste Management

Aircraft operations are the main source of hazardous waste (USAF 1997c). Hazardous waste is initially accumulated under the control of a shop supervisor at an area designated as an initial accumulation point. Shuqualak AA has 13 initial accumulation points for hazardous waste. A maximum of 55 gallons of hazardous waste or 1 quart of acute hazardous waste may be accumulated at an initial accumulation point. Once the 55-gallon limit is exceeded, the container is transferred to a hazardous waste storage site (14 CES/CEVP 2000). There is no refueling at Shuqualak AA.

The Resource Conservation and Recovery Act (RCRA) has increased disposal restrictions and requirements on waste management as an incentive for minimizing hazardous waste generation. The Air Force has set a goal of reducing hazardous waste disposal by 90 percent December 2004

Figure 6.2-1 Noise map for Shuqualak AA



from the 1992 baseline of 231,734 pounds. Columbus AFB will measure its progress toward the reduction goal by tracking hazardous waste reduction in pounds against its 1992 baseline. Columbus AFB has set a goal of 50,000 pounds per year for hazardous waste. Some of the ways Columbus AFB will reduce hazardous waste disposal is by materials substitution (less toxic), process engineering, or administrative controls. Columbus AFB is also working to reduce the amount of solid waste generated by recycling and composting. The use of ozone-depleting substances is also being phased out.

Installation Restoration Program

The Installation Restoration Program (IRP) is a subcomponent of the Defense Environmental Restoration Program (DERP), which became law under the Superfund Amendments and Reauthorization Act of 1986 (SARA). The IRP requires all installations to identify, investigate, and clean up hazardous waste disposal sites. There are no IRP sites at Shuqualak AA.

6.3 Potential Future Impacts

Although the mission of Shuqualak AA is expected to increase in the future, this increase should not impact the environment at Shuqualak AA. The current level of mission impacts to the natural resources is expected to remain constant in the near term.

6.4 Natural Resources Needed to Support the Military Mission

Erosion has been a problem at Shuqualak AA. It has occurred around Shuqualak Creek and in other areas. Shuqualak AA personnel are actively trying to solve this problem by applying mulch and have stabilized the sides of Shuqualak Creek with riprap (see Appendix D for photographs of Shuqualak Creek). Healthy vegetation that holds and stabilizes the soil at Shuqualak AA is the most important natural resource that supports the mission at Shuqualak AA. Healthy vegetation includes ground covers like grass, landscaping shrubs and trees; forestry stands, forested wetlands. Ground-stabilizing vegetation should be protected to preserve soil at Shuqualak AA. In addition, where possible, low-growing native vegetation should be installed to control erosion at Shuqualak AA.

6.5 Natural Resource Constraints to Missions and Missions Planning

The previous sections describe permitted activities, noise, and hazardous waste management and cleanup activities affecting ecosystems existing on and adjacent to Shuqualak AA. Current management practices such as grounds maintenance, pest management, and Bird-Aircraft Strike Hazard (BASH) reduction techniques have reduced the diversity and abundance of native species and their habitat. Noise from aircraft operations and disturbance of habitats by vehicles may also affect biological resources.

Well-planned future development associated with Shuqualak AA mission and training will help avoid many of the conflicts between infrastructure development and the natural resources present at the base. Integration of the INRMP with the General Plan and the Landscape Development Master Plan will help ensure that everyone involved understands any development and associated consequences before projects are undertaken.

7.0 NATURAL RESOURCE PROGRAM MANAGEMENT

7.1 Natural Resource Program Management

Natural resource concerns for the 14 CES at Shuqualak AA are identified in this chapter. These issues and concerns are used to define management strategies for consideration in developing goals, objectives and specific projects (Chapter 8). In several cases, they point to a need to resolve a conflict between the resource and the military mission. Limited natural resources present at Shuqualak AA pose some constraints to further development or intensification of base activities. Protection of soil and water quality is the primary natural resource concerns. Mission requirements at Shuqualak AA generally relate to the need of ensuring flight safety, accommodating recreational needs of base personnel (hunting), reducing erosion and improving drainage.

7.1 Natural Resource Program Management

Responsibility for implementing the INRMP is a combined effort of many parties. Responsibilities were previously outlined in Chapter 2, Section 2.5 of this INRMP.

Other federal agencies involved in implementing the INRMP are: the Forest Service, assists with forest management; the Army Corps of Engineers, delineates wetlands, the NRCS, assists with many aspects of natural resource conservation, and the USFWS, assists in the development of the INRMP and is a signatory agency for the INRMP. The Mississippi Department of Wildlife, Fisheries and Parks may assist with implementation of the INRMP. Mississippi Museum of Natural Science may assist in the identification of endangered or threatened species and their habitat.

7.2 Geographical Information System

Columbus AFB is in the process of converting auto CAD files to GIS for use at Columbus AFB and Shuqualak AA. Columbus AFB personnel will maintain these new GIS files. A database of natural resource inventories will be created and interpreted into the GIS. An additional issue is the availability of 14 CES/CEIE personnel adequately trained to use and maintain this database over time.

To alleviate this situation, the following steps need to be undertaken. First, appoint a GIS administrator who is familiar with the software and natural resource data layers, and provide training for the GIS administrator in new software and applications. This person should have a natural resource focus and background in natural resources and/or geography. Second, provide for annual or semi-annual updates of natural resource data layers. Some layers such as soil or geology will obviously change very little over the years, but some layers such as vegetation or land use have the potential to change more quickly and the means to rapidly incorporate these changes should be in place. In addition to the above-mentioned layers, resource layers should include arboretums, hunting and fishing areas, forestry stands, urban trees, wetlands (when applicable), nature trails, streams and other bodies of water, floodplains, outdoor recreation areas, exotic species infestation areas, and endangered or threatened species areas. Each data layer should be evaluated and a maintenance plan should be devised and adhered to. On-the-ground evaluation to determine accuracy of the data layers should also be performed.

In addition, Columbus AFB should not only maintain a natural resources management database, but also track progress toward goals. Consult with MAJCOM for information on the appropriate format and software to be used. Maps should be prepared on a scale that is practical for the size

of the installation and should be reviewed annually. GIS maps should be compatible with base comprehensive planning maps. Share GIS and other information on species and habitat with state Natural Heritage database and the local Nature Conservancy. Cooperative agreements are the means to facilitate this exchange. Ensure that at least three or four people are annually trained in the use of GIS receivers and field computers.

7.3 Fish and Wildlife Management

Shuqualak AA contains some woodland and grassland vegetative communities that provide limited habitat for wildlife species. The nearby Noxubee River and its numerous tributaries, and floodplains also support wildlife.

A hunting license from the state of Mississippi is required for individuals who wish to hunt deer in season. After obtaining the state license for these activities, a person must then go to the Accounting and Finance Building, (Building 926), pay a \$20 fee and have their state license stamped. Revenues for both Columbus AFB and Shuqualak AA for the period January 2003 to December 2003 from hunting and fishing were \$690 with \$660 of that generated by hunting.

Deer are very numerous at Shuqualak AA and are a problem on the airfield. The USDA Wildlife Services Division is conducting a study entitled Columbus Air Force Base Study of White-tailed Deer. The purpose of this study is to learn about the movements and population dynamics of white-tailed deer to decrease the numbers of deer-related accidents on the airfield.

The main concern at Shuqualak AA is maintaining the airfield in such a manner that it is unattractive for wildlife to minimize accidents involving aircraft, or BASH. Birds and deer crossing the runways and airfield clear zones increase the potential for strikes between aircraft and wildlife. Bird habits are monitored closely, since bird and animal collisions with aircraft cause damage to aircraft annually and could result in loss of life.

Opportunity: Increase the numbers of deer harvested to help diminish deer problems around the airfield and raise money for natural resource enhancement on the Base.

Constraint: Probably none, as hunters is required to have a hunter's safety briefing and must stay within designated areas.

Opportunity: Manage game species for hunting opportunities.

Constraint: As mentioned above, BASH reduction must be taken into consideration before implementing any actions that may increase interactions between aircraft and wildlife. Involve personnel responsible for the BASH plan implementation in all proposed projects that may increase wildlife usage of Shuqualak AA.

Opportunity: Work with outside agencies to document the presence of potential T/E species on or adjacent to lands controlled by Shuqualak AA.

Constraint: Limit impacts to critical habitats, especially waterways, caused by new construction, driving in sensitive areas (along or across creek), recreation, or other mission roles.

7.4 Management of Threatened and Endangered Species and Critical Habitats

There are habitats on Shuqualak AA where one or more of the four federally listed endangered plant species could occur. However, to date, none has been found near the airfield. One state plant species of special concern occurs at the airfield, the appendaged lobelia. The appendaged lobelia occurs in grassy areas and is a facultative wetland plant (plants that have a 33 to 67 percent chance of being found in both wetlands and nonwetlands). The Mississippi Natural Heritage Program (2002), recommends that prior to conducting any earth moving activities near wet or riparian areas, implement measures to identify the lobelia (*Lobelia appendiculata*), and to develop precautions to prevent disturbance to the species and its environment, if encountered.

Although there are no federally listed species that have been documented at Shuqualak AA, according to the Nature Conservancy 1994, there is one state special status species that occurs, the red-shouldered hawk (*Buteo lineatus*). The red-shouldered hawk prefers riparian habitats with large trees. Appendix A contains additional information concerning the protected vertebrate species that occur on Columbus AFB and Shuqualak AA.

7.5 Water Resources Protection

Shuqualak AA is within the Tombigee River basin. Major surface water resources near Shuqualak AA include the Noxubee River and numerous tributaries. Shuqualak Creek crosses Shuqualak AA just north of the end of the runway. Sid Creek lies to the south and west. Many unnamed tributaries skirt the property.

The Mississippi Department of Environmental Quality (MDEQ) monitors water quality in Mississippi. In 1998, MDEQ started using a Basin Management Approach. This approach involves state and federal agencies with the goal of coordinating all of the water quality activities that take place within the river basins to optimize the resources of all agencies. Columbus AFB is not currently a part of this working group but should consider sharing its resources.

Monitoring data and information collected by MDEQ are used to make water quality assessments. Assessments are general characterizations of water body health. The state's most comprehensive assessment report is the Federal Clean Water Act Section 305(b) Water Quality Inventory Report. Starting in 2000, MDEQ began focusing each 305(b) report on a particular basin and the 2000 report focused on the Pascagoula River Basin. Annual storm water sampling and inspections are performed in accordance with permit requirements.

Surface waters (e.g., streams, rivers, lakes, estuaries, etc) are assigned intended uses. These designations allow regulatory agencies to establish water quality goals, which protect aquatic life and allow safe use by the public. These goals are referred to as Water Quality Standards. Intended uses are Public Water Supply, Shellfish Harvesting, Recreation, and Fish and Wildlife (i.e., Aquatic Life Use Support).

MDEQ has listed several creeks and rivers in the Tombigbee River Basin as impaired water bodies particularly in regard to supporting aquatic life. Shuqualak Creek near the city of Shuqualak from its headwaters to its mouth near the Noxubee River is listed as nonattaining, biological impairment in regard to supporting aquatic life.

7.6 Wetland Protection

There are no wetlands at Shuqualak AA.

7.7 Grounds Maintenance

Much of the grounds maintenance that occurs on Shuqualak AA is provided by services contracted by the government. The involvement of Air Force personnel responsible for administration of the grounds maintenance contracts is essential for efficient grounds maintenance operations. Solicit their input early in the planning process. Air Force employees administering these contracts should ensure that the companies providing the grounds maintenance services are qualified to do the work and are familiar with the regulations and policies outlined in various plans, including this INRMP.

Pest management personnel are in charge of controlling certain species (rodents, birds, insects, and undesirable invasive plant species) in turf, ornamental and other areas on Shuqualak AA. Emphasis is placed on inspections and integrated pest management techniques including mechanical removal of infested or diseased portions of plants. The January 2004 Pest Management Plan details the approved methods for managing pests in the developed portions of Shuqualak AA. Two DoD-certified pest management personnel perform daily operations, which include surveillance, trapping, exclusion, pesticide application, and records maintenance for Shuqualak AA.

In accordance with the Storm Water Pollution Prevention Plan, only EPA- and HQ AETC-approved herbicides and pesticides are used at Columbus AFB and Shuqualak AA. Only the least toxic effective chemicals are used and application is in accordance with label instructions. The Pest Management Annual Work Plan states objectives and goals for such things as pesticide reduction. In addition, pesticide application in sensitive areas, such as wetlands, will have appropriate controls for pesticide drift, including inspection of sensitive areas and determination of the direction and speed of the wind. Pest management will coordinate with 14 CES/CEIE and 14 MDOS/SGOJ before spraying in sensitive areas.

7.8 Forest Management

Forestry operations occur at Shuqualak AA mainly to keep airfield safety zones clear. Recommendations provided by the USFS should be implemented to improve stand health and provide for sustainable use. Shuqualak AA manages pine and hardwood species to produce a 15-year turnover for pulp production. At the present time, due to a recent clear cut, only brushy areas exist at Shuqualak AA.

The dominant vegetative cover present at Shuqualak AA is airfield turf with some mixed young pine and oak at either end of the runway. Nonforested areas contain both native and nonnative herbaceous species under varied grounds maintenance scenarios. Plant species found in and along streams and wetland, drainages includes cattail, pennywort, needlerush, pickerelweed, and cordgrass (USAF 1998).

7.9 Wildland Fire Management

Since 2000, several burns, thinning operations and a clear cut have been accomplished in accordance with recommendations from the Forest Service and the HQ AFCEE Forester to

improve the health of timber stands at Shuqualak AA. A burn was attempted in March of 2004, but it was incomplete due to wet spots and a lack of fuel on the ground (see photograph below). The USFS plans to roller chop the area to prepare it for the next burn prior to establishing an appropriate airfield ground cover.



Headquarters of the Air Force Center for Environmental Excellence (HQ AFCEE) recommends periodic burns to control the growth of understory and to decrease insect and disease problems. Periodically burned forests often exhibit increased growth of grasses and flowering plants that can enhance the aesthetic quality of the forest for outdoor recreation. In addition to coordinating with the local Forest Service offices, prescribed burns must be coordinated with flight operations to determine burn times that do not conflict with flight activity (AFCEE/ECC 2000b). Prior to a burn, the USFS Fire Management Officer or his assistant call the Mississippi Forestry Commission to receive permission to proceed with the burn. Currently, a Wildland Fire Management Plan is being developed for Columbus AFB and Shuqualak AA.

7.10 Integrated Pest Management

Pest management records are maintained in the Integrated Pest Management Information System (IPMIS) Pest Program. The plan is reviewed annually by the Installation Pest Control Supervisor, Installation Pest Management Coordinator, Installation Environmental Coordinator, Senior Installation Engineer, Installation Medical Officer, Installation Commander and Command Entomologist AFCEC/COSC, Environmental Planning Branch. The responsibility for the Pest Management Program is the Chief of Operations Flight. Daily operations are performed by two DoD Certified Pest Management Personnel and include activities such as surveillance, trapping, exclusion, herbicide and pesticide application.

Pest control entails managing insects, weeds, and vertebrates that occur around the base. Columbus AFB pest control only uses pesticides at both of its facilities that are approved by the USEPA and HQ AETC. Insects such as fire ants, mosquitoes, cockroaches, fleas, ticks, bees, wasps, hornets, and termites are monitored and managed around the base. Low-toxicity pesticides are applied to infested areas, when necessary.

Herbicides are used to control weed growth, especially around the runways and taxiways. Vertebrates such as rats, opossums, and birds are controlled through the use of trapping devices and poisons. Exotic nuisance plant species like kudzu and privet will be treated with herbicide.

7.11 Bird/Aircraft Strike Hazard (BASH) Program

The Columbus AFB Bash Plan is also applicable to Shuqualak AA and is found in Appendix E. An interview was conducted during the June 2004 site visit with the USDA, Animal Services wildlife biologist. He provided information on the types of birds and other wildlife that are managed or depredated on the airfield at Shuqualak AA. Mammals include coyotes, foxes, beaver, deer, otter, muskrat, bobcats, nutria and rabbits. Birds include swallows and their nests, great blue and little blue herons, American egrets, ducks geese, meadowlarks, horned larks, blackbirds, turkey and black vultures, harriers, kestrels, mourning doves, Eurasian collared doves, pigeons, starlings, savannah, grasshopper, field and white-throated sparrows, other miscellaneous songbirds, nighthawks, whip-poor-wills, and a few bats. Turtles are occasionally a problem as they attempt to cross the airfield. The state endangered subspecies of wood stork may also occur at Shuqualak AA, but because they are protected, they are harassed rather than killed, to make them leave the area.

Potentially the heaviest strike area in the vicinity is the Noxubee River. Shuqualak AA uses scare cannons to drive away birds, and is working with Mississippi State University on a real-time bird radar system to reduce strikes. Shuqualak AA can also make use of predictive computer models so that flying can be avoided at times when bird strikes are most likely to occur.

Deer are a significant problem at the runway area too. They are attracted to grassy areas around the airfield because it resembles their natural feeding habitat, clearings near wooded areas. Deer are hunted at Shuqualak AA. At the present time, they may be taken either with guns and/or archery equipment. Hunters are allowed to take three bucks and three antlerless deer with shotguns (slug or buckshot) and may add an additional two antlerless deer with bow and arrows. The USDA biologist is in favor of increasing the limits on hunting rather than just rounding up the deer and shooting them.

7.12 Outdoor Recreation

Hunting by DoD personnel is permitted in marked areas around the base. It is DoD policy to allow public access to natural resources on military bases consistent with the installation's safety and security requirements and the availability of manpower and natural resources to support such activities without degradation or impairment of environmental qualities. In general, the mission of Shuqualak AA precludes public use of the installation's natural resources, including hunting and fishing. This does not pose a problem since other areas in the Noxubee County area provide significant public access to similar natural resources.

Opportunity: Maintain hunting opportunities. Keep roads in good repair to minimize negative impacts to natural resources such as surface waters and soils.

7.13 Cultural Resources

A Phase I Archeological Survey for Shuqualak AA was completed in July 1998 by Parsons Engineering Science, Inc (Parsons). A total of 454 shovel tests, including radial and judgmental

shovel tests, were excavated during the survey. The survey revealed that clear cutting of timber across Shuqualak AA has resulted in extensive erosion, leaving prehistoric and historic deposits at a shallow depth. Timbering practices involving the use of heavy equipment impacted the topsoil along logging roads and staging areas, and may have resulted in redeposition of the historic artifact scatter. Due to possible artifact redeposition, and the late artifact dates associated with the site, Mississippi Department of Archives and History determined that no state trinomial number (i.e., site number) would be assigned. No evidence of features or additional artifacts were found in association with either historic artifact scatter site. Parsons found that none of the archeological resources identified at Shuqualak AA contain potentially significant information and recommended that none of the resources be recommended eligible for the NRHP.

7.14 Soils and Land Use

Many of the soils at Shuqualak AA have poor drainage and remain saturated or ponded for extended periods of time. These soils are located primarily in the northeastern and southwestern portions of the base.

Constraint: The physical characteristics of many of the soils in the undeveloped portions of Shuqualak AA limit their use for development. These soils have poor internal drainage and are prone to accumulations of standing water.

Opportunity: Restoration of natural drainage patterns through use of culverts or other structural means should help alleviate this problem. Groundcover plants such as native wetland species that do not produce food for wildlife should reduce erosion, which is an additional concern in these wet areas.

Constraint: Past logging, operations have caused erosion.

Opportunity: Logging generates income and helps keep airfield safety zones clear. Procure the services of loggers that use best management practices to protect soil at Shuqualak AA.

Opportunity: Well-planned implementation of potential future mission changes will avoid many of the conflicts between mission and the natural resources. Implementation of and updates to the General Plan will assure that any mission changes and associated activities are understood before projects are undertaken.

Constraint: Turf and other areas near active runways need to be properly maintained to minimize BASH potential. Follow the guidelines detailed in the BASH Plan (Appendix E) to minimize interactions between wildlife and aircraft.

7.15 Enforcement

Columbus AFB appoints state game wardens annually to provide enforcement of hunting and fishing regulations. Columbus AFB Game Wardens are selected and nominated by the Natural Resources Manager. Appointment is by the authority of the 14 Mission Support Group Commander (MSG/CC). All appointed game wardens are required to be trained in conservation law enforcement. Game Wardens are granted the authority to enforce Columbus AFB policies under requirements of AFI 32-7064, paragraph 6.4.2, the Columbus AFB Sportsman Proclamation,

and other applicable guidance. Random patrols and surveys of hunting and fishing activities are performed to monitor safe and appropriate practices, with as little disturbance as possible. In addition, hunters and fishermen at Shuqualak AA must possess a valid state hunting or fishing license.

7.16 Public Outreach

There is no public outreach program at Shuqualak AA.

APPENDIX I
ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL ASSESSMENT

Goals, Objectives and Projects

Seven goals to guide natural resources planning and management at CAFB and SAA express a vision for a desired future condition for the period covered by the INRMP. Objectives and their associated projects are described below that address these goals. This table provides a cursory review of these INRMP projects and the anticipated impacts to environmental resources on CAFB.

Goal 1: Provide a natural resource management program within 14 CES/ that supports the 14 FTW mission while protecting ecosystem diversity to the maximum extent possible.

Objective 1.1 Insure that the 14 CES/CEIE Natural Resources Manager is adequately trained in the principles and practices for the management of natural re-sources on an Air Force installation.

Project Description	Anticipated Impact(s)	Is EIAP Needed for Project?
<u>Project 1.1.1</u> The 14 CES/CEIE Natural Resources Manager will attend the Interservice Environmental Education Review Board (ISEERB) courses "Introduction to Natural and Cultural Resources" and "Natural Resources Compliance"	Beneficial	No, administrative/training action
<u>Project 1.1.2</u> The 14 CES/CEIE Natural Resources Manager will attend at least one Department of Defense sponsored natural resources training workshop each year	Beneficial	No, administrative/training action

Objective 1.2 Provide access to local natural resources management expertise by developing a collaborative network of public agencies and personnel with experience in land stewardship and conservation.

<u>Project 1.2.1</u> Create and annually update a list of Air Force, state and other federal agency natural resource points of contacts that can be accessed for consult-ant services	Beneficial	No, administrative, interagency coordination action
<u>Project 1.2.2</u> Host an annual INRMP coordination meeting jointly with the U.S. Fish and Wildlife Service Ecological Services Field Office and the Mississippi Department of	Beneficial	No, administrative, interagency coordination action

Wildlife, Fisheries and Parks to review INRMP goals and objectives and discuss plan implementation.		
<u>Project 1.2.3</u> Maintain a cooperative assistance agreement with the U.S. Forest Service (USFS), Tombigbee National Forest. Annually develop a Statement of Work (SOW) for support services prior to the beginning of each fiscal year. Budget for and fund cooperative assistance agreed to in the SOW. Host biannual coordination meetings at CAFB with USFS staff to discuss and review cooperative assistance for forest management.	Beneficial	No, administrative, interagency coordination action
<u>Project 1.2.4</u> Renew the 5-year cooperative assistance agreement with the Mississippi Forestry Commission for access to wildland fire management services at CAFB and SAA.	Beneficial	No, administrative, interagency coordination action

Objective 1.3 Develop the capability within 14 CES/CEIE to display and analyze geospatial data necessary for the management of natural resources at CAFB and SAA.

<u>Project 1.3.1</u> Procure the necessary equipment and software to implement the HQ AETC approved CADD/GIS system within 14 CES/CEIE	Beneficial	No, administrative action
<u>Project 1.3.2</u> Train the 14 CES/CEIE conservation manager by 2004 in the operation of the installation geospatial database and the application of Air Force GeoBase principles.	Beneficial	No, administrative/training action
<u>Project 1.3.3</u> Acquire, from both internal and external sources, existing natural resources	Beneficial	No, administrative action

geospatial data, and incorporate the data layers into the CAFB GeoBase network by 2005.		
<u>Project 1.3.4</u> Acquire updated digital aerial photography for CAFB and SAA by 2006.	Beneficial	No, administrative action
<u>Project 1.3.5</u> Update the digital map coverage of forest inventory stand data for CAFB and SAA by 2007.	Beneficial	No, administrative action

Objective 1.4 Incorporate natural resources information into the CAFB land use planning and development process.

<u>Project 1.4.1</u> The 14 CES/CEIE Natural Resources Manager will be an active participant in the 14 FTW ESOHC.	Beneficial	No, administrative action
<u>Project 1.4.2</u> Produce a digital map depicting natural resources constraints to Air Force land use and land use planning. Incorporate the map coverage into the CAFB GeoBase data network	Beneficial	No, administrative action

Goal 2: Sustain the CAFB and SAA Airfields and surrounding Air Force property in a manner that reduces natural resources impacts to the 14 FTW flying mission.

Objective 2.1 Manage wildlife habitat to minimize Bird/Wildlife Aircraft Strike Hazard (BASH).

<u>Project 2.1.1</u> The 14 CES/CEIE Natural Resources Manager will be a participating member of the CAFB BASH Working Group.	Beneficial	No, administrative action
<u>Project 2.1.2</u> Conduct coyote, beaver, deer, and bird control operations, as required, in the vicinity of the CAFB airfield in accordance with the terms and conditions of the November 2001 Cooperative Service Field Agreement with the USDA Animal and Plant Health Inspection Service (APHIS), Wildlife Services Division. The	Beneficial if implemented properly	No, providing that concurrence for wildlife management action is obtained from federal and state agencies as appropriate

14 CES/CEIE Conservator Manager will act as a liaison between the BASH Working Group, Flight Safety Officer, and Wildlife Services agents.		
<u>Project 2.1.3</u> Amend and renew the CAFB/APHIS-WS Cooperative Service Field Agreement as required.	Beneficial	No, administrative action

Objective 2.2 Manage airfield environments so that trees and other vegetation do not violate airfield clearance criteria specified in Uniform Facilities Criteria (UFC) 3-260-01, Airfield and Heliport Planning and Design.

<u>Project 2.2.1</u> Conduct an airfield tree survey to identify trees on CAFB property that penetrate or are within 10 feet of penetration of flight surfaces as defined in UFC 3-260-01. Airfield tree data shall be collected in a geospatially-referenced digital format compatible with the installation GeoBase data network.	Beneficial	No, administrative action
<u>Project 2.2.2</u> Convert a 20-acre tract of cutover forest beneath the approach-departure clearance surface at SAA into a grassland community. The tract is located at the northwest end of the runway between the clear zone and the fence. Prepare a Burn Plan and conduct a minimum of two (2) controlled with the first controlled burn prior to 2004 and repeat the burn on the same area prior to 2007.	Beneficial if implemented properly	No, providing that concurrence for forest management action is obtained from federal and state agencies as appropriate
<u>Project 2.2.3</u> Reforest approximately 30 acres of cutover forest areas surrounding the SAA clear zones (beneath the transitional surface) by 2004. Reforestation shall consist of site preparation by burning, herbicide,	Beneficial if implemented properly	No, providing that concurrence for forest management action is obtained from federal and state agencies as appropriate

or mechanical means followed by the planting of loblolly pine.		
--	--	--

Goal 3: Protect and improve the health and condition of the forest ecosystems at CAFB and SAA.

Objective 3.1 Maintain current records of forest stand boundaries, species composition, and condition.

<u>Project 3.1.1</u> Conduct an installation-wide forest inventory at SAA in 2003. Map forest stands in a geospatially referenced format in accordance with GeoBase guidelines.	Beneficial	No, administrative action
<u>Project 3.1.2</u> Update the CAFB forest inventory database and geospatial data coverages to reflect current forest conditions by 2007.	Beneficial	No, administrative action

Objective 3.2 Apply the USDA Forest Service recommendations for forest thinning operations identified in the CAFB Forest Inventory and Report of 30 September 2000.

<u>Project 3.2.1</u> Prepare and Award Timber Sale Contracts to conduct forest thinning operations for the improvement of forest health. Complete forest thinning operations on a minimum of 200 acres by 2007. Develop timber sales from among the following forest stands by priority for treatment: <ul style="list-style-type: none"> • Compartment 3, Stands 6, 7, and 11 • Compartment 4, Stands 2 and 5 • Compartment 2, Stands 4, 5, 6, 7, 9, and 10 	Beneficial if implemented properly	No, providing that concurrence for forest management action is obtained from federal and state agencies as appropriate
<u>Project 3.2.2</u> Conduct Pre-Commercial Timber Stand Improvement Thinning (TSI) on 55 acres in forest Compartment 4 Stand 1 by 2004.	Beneficial if implemented properly	No, providing that concurrence for forest management action is obtained from federal and state agencies as appropriate

Objective 3.3 Control the spread of pine-damaging insects to endemic (non-threatening) populations by 2007.

<p><u>Project 3.3.1</u> Collaborate with the U.S. Forest Service Forest Southern Region Health Protection office to conduct an annual reconnaissance of CAFB forest areas for the detection of southern pine beetle infestation. Report findings to the CAFB ESOHC and to the HQ AFCEE/EC Forester.</p>	Beneficial	No, administrative action
---	------------	---------------------------

Objective 3.4 Conduct prescribed burns to improve forest health in upland forest areas and for the control of invasive/exotic species.

<p><u>Project 3.4.1 a</u> Wildland Fire Management Plan for CAFB and SAA by 2004 in accordance with guidance established in AFI 32-7064</p>	Beneficial	No, administrative action
<p><u>Project 3.4.2</u> Prepare Burn Plans and conduct controlled burns on a minimum of 500 acres by 2007. The following forest stands are listed by priority for a prescribed burn treatment:</p> <ul style="list-style-type: none"> • Compartment 4, Stands 5, 6, 7, 8, 9, 10 • Compartment 3, Stands 3, 4, 5, 7, 8, 9, 11 • Compartment 1, Stands 1, 2, 3, 4 • Compartment 2, Stands 2, 4, 7, 9, 10 • Compartment 3, Stands 1, 2, 7, 8, 9, 11 	Beneficial if implemented properly	No, providing that concurrence for forest management action is obtained from federal and state agencies as appropriate

Objective 3.5 Reduce the extent and potential for spread of invasive/exotic plants at CAFB in accordance with the integrated pest management principles outlined in AFI 32-1053, Integrated Pest Management.

<u>Project 3.5.1</u> Conduct an environmental analysis in 2003 for the control of kudzu vine at CAFB in accordance with Air Force (EIAP) procedures.	Beneficial	Yes, this proposed action incorporates EIAP
<u>Project 3.5.2</u> Implement the preferred alternative for the control of kudzu vine in forest Compartment 3, Stand 12 in 2004 in accordance with the Environmental Assessment. Evaluate results after 1 year.	Beneficial if implemented properly	Yes, this proposed action incorporates EIAP
<u>Project 3.5.3</u> Conduct a survey of kudzu presence and spread at CAFB in 2005.	Beneficial	No, administrative action
<u>Project 3.5.4</u> Conduct additional kudzu vine control at CAFB in 2006 as needed and in accordance with the Environmental Assessment.	Beneficial if implemented properly	Yes, this proposed action incorporates EIAP
<u>Project 3.5.5</u> Conduct an installation-wide survey of CAFB in 2007 to identify and map the presence and extent of invasive species.	Beneficial	No, administrative action

Goal 4: Maintain appropriate populations of game or non-game species that are consistent with the 14 FTW mission and DoD guidelines of ecosystem management.

Objective 4.1 Prevent inundation of installation roadways and other infrastructure caused by beaver dam activity.

<u>Project 4.1.1</u> Install one beaver dam excluder device on perimeter road to test the efficacy of the technique for preventing flooding of installation roadways from beaver activity.	Beneficial if implemented properly	No, providing that concurrence for wildlife management action is obtained from federal and state agencies as appropriate
<u>Project 4.1.2</u> Install additional beaver dam excluder devices by 2007 (as warranted by test	Beneficial if implemented properly	No, providing that concurrence for wildlife management action is obtained from federal and state

results), or alternative action, to prevent beaver-caused flooding of installation infrastructure.		agencies as appropriate
--	--	-------------------------

Objective 4.2 Prevent aircraft mishaps attributable to white-tailed deer at CAFB and SAA.

<u>Project 4.2.1</u> Conduct a study of white-tailed deer population habitats and movements at CAFB and SAA in 2003 with an emphasis on detection of movements in and around the airfield.	Beneficial if implemented properly	No, providing that concurrence for wildlife management action is obtained from federal and state agencies as appropriate
<u>Project 4.2.2</u> Produce a report entitled "Management Recommendations for White-tailed Deer at CAFB MS" by 2005. The report shall specify management practices specifically targeted at the prevention of deer-aircraft mishaps at CAFB.	Beneficial if implemented properly	No, providing that concurrence for wildlife management action is obtained from federal and state agencies as appropriate
<u>Project 4.2.3</u> Implement actions specified in the "Management Recommendations for White-tailed Deer at CAFB MS" report by 2007.	Beneficial if implemented properly	EIAP should be incorporated to obtain formal concurrence for this wildlife management action from federal and state agencies as appropriate

Goal 5: Protect, maintain, and improve water quality in streams and other surface waters of CAFB and SAA compatible with the 14 FTW mission.

Objective 5.1 Enhance the potential of SAC Lake as a recreational fishing resource for CAFB.

<u>Project 5.1.1</u> Conduct an Aquatic Habitat Survey at SAC Lake and develop a Habitat Improvement Plan in 2003.	Beneficial	No, administrative action
<u>Project 5.1.2</u> Construct drainage control structures, spillway improvements, and other features by 2005 as specified in the SAC Lake Habitat Improvement Plan (if warranted by the plan).	Beneficial if implemented properly	EIAP should be incorporated to obtain formal concurrence for this surface water management action from federal and state agencies as appropriate
<u>Project 5.1.3</u> Prior to 2006, control invasive/exotic species,	Beneficial if implemented	EIAP should be incorporated to obtain formal concurrence for this

plant wetland vegetation, and introduce fish-attractant structures at SAC Lake in accordance with the SAC Lake Habitat Improvement Plan.	properly	vegetation and wildlife management action from federal and state agencies as appropriate
<u>Project 5.1.4</u> Stock game fish at SAC Lake by 2007 in accordance with the Mississippi Department of Wildlife, Fisheries and Parks guidance and consistent with the SAC Lake Habitat Improvement Plan.	Beneficial if implemented properly	EIAP should be incorporated to obtain formal concurrence for this wildlife management action from federal and state agencies as appropriate

Objective 5.2 Plan military and recreational activities so that impacts to wetlands are minimized or avoided.

<u>Project 5.2.1</u> Identify and map the locations of wetlands that occur on CAFB by 2004. Incorporate geospatial wetland map data into the CAFB GeoBase data network.	Beneficial	No, administrative action
<u>Project 5.2.2</u> Identify and map the locations of wetlands that occur at SAA by 2006. Incorporate geospatial wetland map data into the CAFB GeoBase data network.	Beneficial	No, administrative action
<u>Project 5.2.3</u> Install signage by 2007 to identify and protect wetlands in areas near mission activities and where wetlands are adjacent to roadways and established recreation trails.	Beneficial	No, land management action intended to protect wetland areas and not anticipated to result in any degradation of resources
<u>Project 5.2.4</u> Install trail improvements where needed at SAC Lake and along the Timberland Nature Trail to reduce impacts to wetlands.	Beneficial	No, land management action intended to protect natural areas and not anticipated to result in any degradation of resources

Objective 5.3 Reduce the amount of sediment that is released into streams and wetlands from erosion at SAA.

<u>Project 5.3.1</u> Survey and map erosion problem areas along the fence line fire lanes at SAA by 2004. For each erosion problem encountered, identify appropriate remediation measures and budget requirements.	Beneficial	No, administrative action
<u>Project 5.3.2</u> Implement erosion control measures required to control erosion along fire lanes at SAA by 2006.	Beneficial	No, land management action intended to protect natural areas and not anticipated to result in any degradation of resources

Goal 6: Manage CAFB grounds and landscape trees to optimize their value for energy conservation and storm water runoff reduction, and to provide an aesthetically attractive landscape.

Objective 6.1 Implement landscape designs that are site-appropriate and minimize the amount of irrigation and labor needed for grounds maintenance.

<u>Project 6.1.1</u> Develop a list of commercially available native tree and shrub species that minimize the need for irrigation and maintenance by 2004. Distribute the list to base elements as the "CAFB Approved Landscape Plant List."	Beneficial	No, administrative action
<u>Project 6.1.2</u> Implement, by action of the ESOHC, the CAFB Approved Landscape Plant List as the required species for landscape plantings for CAFB housing areas and for grounds maintenance on base cantonment areas by 2005.	Beneficial if implemented properly	EIAP should be incorporated to obtain concurrence for this landscape management action from federal and state agencies as appropriate
<u>Project 6.1.3</u> Update the CAFB Approved Landscape Plant List in 2007 based upon lessons learned from trial plantings and input from the ESOHC and installation constituents.	Beneficial	No, administrative action

Objective 6.2 Protect and enhance the urban forest resource at CAFB.

<u>Project 6.2.1</u> Conduct an urban forest inventory and assessment of CAFB cantonment and housing areas by 2004 utilizing the Air Force Urban Tree Inventory System.	Beneficial	No, administrative action
<u>Project 6.2.2</u> Incorporate maintenance requirements identified in the urban forest inventory and assessment into the Statement of Work for installation tree maintenance by 2006. Identify tree maintenance/removal needs by priority.	Beneficial if implemented properly	No, providing that concurrence for urban forest management action is obtained from federal and state agencies as appropriate
<u>Project 6.2.3</u> Maintain Tree City USA status at CAFB. Prepare a Tree City USA recertification application and submit it to the State Forester's Office each year. Post the Tree City USA certification and plaque in prominent locations for visibility by installation workers and residents.	Beneficial	No, administrative action
<u>Project 6.2.4</u> Plan and conduct an annual Arbor Day event to increase aware-ness of the CAFB urban forest resource. Encourage participation in base beautification efforts from base constituents.	Beneficial	No
<u>Project 6.2.5</u> Water and maintain support stakes on new tree plantings at SAC Lake in 2003.	Beneficial	No

<u>Project 6.2.6</u> Install mulch and/or tree protection devices (i.e. string-trimmer protection) on new tree plantings at SAC Lake by 2004.	Beneficial	No
<u>Project 6.2.7</u> Install replacement tree plantings within the CAFB memorial grove to replace trees lost by mortality. Replace non-native species or species varieties that have succumbed to mortality with native species and varieties by 2004.	Beneficial if implemented properly	No, providing that concurrence for urban forest management action is obtained from federal and state agencies as appropriate

Goal 7: Provide outdoor recreation opportunities that promote the mental, physical, and social wellbeing of installation personnel, both military and civilian.

Objective 7.1 Provide maximum outdoor recreational opportunities at CAFB within the constraints of the military mission and the capacity of available re-sources.

<u>Project 7.1.1</u> Develop an Outdoor Recreation Plan for SAC Lake and Timberlane Nature Trail to improve recreation opportunity by 2004. The plan shall consider the impacts of all users, to include motorized and non-motorized off-road vehicle use.	Beneficial	No, administrative action
<u>Project 7.1.2</u> Close non-essential trail segments and secondary roads by 2005 to restrict vehicular, bike, and foot traffic, as determined by the Outdoor Recreation Plan for SAC Lake and Timberlane Nature Trail.	Beneficial	No
<u>Project 7.1.3</u> Replace/repair interpretive signs on the Timberland Nature Trail as needed by 2005.	Beneficial	No, administrative action
<u>Project 7.1.4</u> Construct additional trail improvements specified in the SAC Lake and Timberlane	Beneficial if implemented properly	No, land management action intended to protect natural areas and not anticipated to result in

Nature Trail Outdoor Recreation Plan by 2007.		any degradation of resources
<u>Project 7.1.5</u> Develop a Watchable Wildlife Area by 2007, consistent with the Watchable Wildlife Program and SAC Lake and Timberlane Nature Trail Outdoor Recreation Plan, to provide wildlife viewing opportunities for base constituents.	Beneficial if implemented properly	No, providing that concurrence for wildlife management action is obtained from federal and state agencies as appropriate

Objective 7.2 Provide fishing and hunting opportunities at CAFB and SAA consistent with 14 FTW mission requirements, DoD principles for ecosystem management, Air Force policy, and INRMP goals for the protection management of natural resources.

<u>Project 7.2.1</u> Designate 14 CES/CEIE as the office of primary responsibility for management of the installation hunting and fishing program by action of the ESOHC or Wing Commander.	Beneficial	No, administrative action
<u>Project 7.2.2</u> Conduct an extensive review of the CAFB hunting and fishing program prior to 2004 for consistency with 1) the CAFB BASH Reduction Plan; 2) DODI 4715.3, Environmental Conservation Programs, Attachment 6; and 3) AFI 32-7064, Integrated Natural Resources Management, Chapter 6. Prepare a report of findings and present findings to the ESOHC for action.	Beneficial	No, administrative action
<u>Project 7.2.3</u> Update the CAFB Hunting and Fishing Policy by 2005 in accordance with ESOHC recommendations. Implement the new Hunting and Fishing Policy by action of the Wing Commander by 2006.	Beneficial	No, administrative action. Guidance for wildlife management action implementation should be obtained from federal and state agencies as appropriate

Summary of Cumulative Effects

Cumulative Impacts

Cumulative impacts result when the effects of an action are added to or interact with other actions in a particular place and within a particular time. This interaction and any resulting environmental degradation should be the focus of cumulative impact analysis. While impacts can be differentiated by direct, indirect, and cumulative, the concept of cumulative impacts takes into account all disturbances since cumulative impacts result in the compounding of the effects of all actions over time. Thus the cumulative impacts of an action can be viewed as the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource no matter what entity (federal, non-federal, or private) is taking the actions (CEQ, 1987). The level of analysis and scope should be commensurate with the potential impacts, resources affected, project scale, and other factors.

Because the implementation of the INRMP would generally benefit the CAFB's ecosystem and boost morale, total effects on all resources are considered positive through the passing of time. Natural resource projects are restorative or educational in nature and will not involve major construction or earth-disturbing activities. Overall, implementation of the INRMP would result in minor, temporary impacts to the following resources:

- **Geology and Soils:** Implementation of the INRMP would not contribute to cumulative impacts on the geology or soils of CAFB. Any excavation or minor construction activities for the purpose of enhancement or restoration would entail little excavation and for soil erosion would be localized and properly mitigated.
- **Water Resources:** Implementation of the INRMP would not contribute to the cumulative impact on the surface water and groundwater of CAFB. No discharges to surface or groundwater are anticipated as a result of any of the restoration activities.
- **Cultural Resources:** Implementation of the INRMP would not contribute significantly to cumulative impacts on cultural resources at CAFB. If remains are encountered during such activities as planting native species in selected areas or building observation decks, all activity in the area will cease and the CAFB natural, cultural resource managers, and the appropriate state historic agency will be notified.
- **Air Quality:** Additional air emissions or changes to air quality as a result of implementation of the INRMP would be minor or negligible and temporary as a result of any preservation, enhancement or restoration project.
- **Noise:** As a result of any preservation, enhancement or restoration project, noise levels may increase during the activity, but the noise would be temporary and negligible and cumulative impacts would not occur.
- **Socioeconomic:** Environmental effects on the economy and community from implementation of the INRMP would be minimal and positive. There would be some short-term benefits from jobs created by restoration projects. However, due to the temporary nature of the activities, no long-term impacts would be anticipated. In addition, restoration and enhancement of CAFB natural areas should boost morale. There would be no cumulative impact or change to regional income, housing markets, or the demand for community services.
- **Environmental Justice:** There would be no cumulative effects on environmental justice as a result of implementing the INRMP. No procedural, geographical, or social inequities are anticipated.

- **Visual Aesthetics:** There would be positive cumulative effects to visual aesthetics as a result of the implementation of the INRMP due to the preservation, enhancement and restoration activities at CAFB.
- **Land Use:** The implementation of the INRMP would result in minimal and positive changes in land use and therefore there would be no cumulative impacts.
- **Biological Resources:** The implementation of the INRMP would positively benefit the ecosystem at CAFB in a cumulative sense. Fish and wildlife, vegetation, and wetlands would benefit from proper management through time, with proper monitoring.
- **Invasive plants:** The extermination or reduction of noxious and invasive species would be affected in a cumulative sense if properly managed as addressed in the INRMP. The population of these species would be reduced over time, thus, benefiting the growth and success of desirable native species and resulting in increased biodiversity on CAFB.

APPENDIX J
PEST MANAGEMENT PLAN

PEST MANAGEMENT PLAN

**Columbus Air Force Base
Mississippi
01 October 2015**

14th Civil Engineer Squadron

Approval and Technical Review
Supersedes and replaces 2011 PMP Technical Review and Approval

Columbus Air Force Base, Mississippi
01 October 2015

X 

ROBERT B. MILLER
Installation Pest Management Coordinator

Date: 2 NOV 2015

X 

MICHAEL J. JAGO
Environmental Element Chief

Date: 2 NOV 2015

X 

FRANK LOCKHART
Natural Resources Manager

Date: 3 NOV 2015

X 

BRYDON K. MANNING, Capt, USAF
Public Health Officer

Date: 12 NOV 2015

X 

ANDREW J. MCUMBER, Maj, USAF
Bioenvironmental Engineer Officer

Date: 4 NOV 2015

X 

ELIZABETH M. HARWOOD, Lt Col, USAF
Base Civil Engineer

Date: FEB 17 2016

X 

KURT W. KAYSER, Colonel, USAF
Mission Support Group Commander

Date: FEB 19 2016

X 

JOHN J. NICHOLS, Colonel, USAF
Wing Commander

Date: FEB 19 2016

X _____

THOMAS A. CURRIN, MAJCOM
Command Biologist PMC

Date:

Installation Pest Management Plan Annual Update

Fiscal Year:

Date:

Installation Name:

Currency of Installation Pest Management Plan (IPMP)

1.	Does the installation have an approved Installation Pest Management Plan?	
2.	Date the IPMP received final signature (5 year start date: YYYY-MM-DD)	
3.	Are you planning to rewrite/revise the IPMP?	
3a.	If yes, when? Enter date range. (ex: 2015 Jan-Jun)	
4.	Have monthly reports been sent to the PACAF Command Entomologist and/or has all Pesticide usage data been entered into IPMIS Web? [Required by AFI 32-1053, para 3.5.15?] Pesticide Inventory report, Pesticide Applicator Certification report, Pesticide Application report] If no, please submit all required reports along with this form. These are considered monthly updates to the IPMP. These reports will change when IPMIS Web is used consistently.	

Integrated Pest Management Coordinator

1.	Has an integrated pest management coordinator been assigned in writing? Required by AFI 32-1053, para 3.4.5.	
1a.	If PMC changed, Please forward copy of new appointment letter.	

Plan Maintenance

1.	Attach a page change sheet listing any minor changes (i.e. personnel changes, certifications, standard operating procedures, etc.) to the plan for the new Fiscal Year. Major plan revisions require re-staffing and re-submittal of the IPMP. Please attach an updated pesticide inventory.	
----	--	--

On-Site Assistance:

1.	Please indicate if you would like a Staff Assistance Visit (SAV) this year and briefly describe the reason for the visit.	
----	---	--

Aerial Application Requirement

1.	Are there any projects requiring the aerial applications of pesticides for the upcoming FY?	
2.	Does the installation have an approved aerial spray Statement of Need for the project(s) from the PACAF Pest Management Consultant?	
3.	Does the installation have the appropriate Environmental Assessment(s) (EA) or Environmental Impact Statement(s) (EIS)?	
4.	Additional Comments Attached (Check Box if Yes):	

Installation Points of Contact

1.	Attach a change sheet listing any POC changes at the installation (as necessary).	
----	---	--

Installation Pest Management Plan Annual Update

This FY2016 Annual IPMP Update is submitted by:

Name	
Duty Title	
Office Symbol	
Street Address	
City, ST Zip Code	
Phone Number	
DSN	
e-mail	
E-Signature:	

FY 2016 Annual IPMP Update Command Entomologist Review

Command Entomologist IPMP Annual Update Certification
Mr. Thomas A. Currin
PACAF Command Entomologist
AFCEC/COSC
139 Barnes Dr. Suite 1
Tyndall AFB, FL 32403
Phone #: (850) 283-6825
DSN: 523-6825
mailto:thomas.currin@us.af.mil

MAINTAIN A SIGNED COPY OF THIS FORM WITH THE IPMP.

TABLE OF CONTENTS

Narrative Pest Management Plan	Page
1. Introduction	5
a. Objective of the Pest Management Plan	5
b. Responsibilities for Conduct of the Pest Management Program	5
2. Pest Management Requirements and Strategies for Applicable Pest/Disease	5
Vector Categories	5
a. Disease Vectors and Other Health-Related Pests	5
b. General Household and Nuisance Pests	7
c. Structural Pests	7
d. Weed Control	7
e. Stored Products Pests	7
f. Pests of Ornamental Plants and Turf	7
g. Pests of Natural Resources	8
h. Golf Course Pests	8
i. Miscellaneous Pests	8
j. Vertebrate Pests	8
k. Other Categories	8
3. Administration	8
a. Job Orders	8
b. Contracts	8
c. Inter-Service Support Agreements	8
d. Out-leases	8
e. Resources (Current and Proposed)	8
f. Reports and Records	9
g. Training Plans	9
h. Coordination with Food Service Managers, Building Managers, etc	9
i. Termite Inspection Plan	9
j. The Pest Management Annual Work Plan	9
4. Health and Safety Measures Requirements	9
a. Requirements	9
b. Methods to Reduce Potential Hazards to	9
c. Safety and Health Measures Associated with the Pest Management Shop	10
d. Safety and Health Measures Associated with the Pest Management Vehicles	10
5. Public Laws and Regulations	10
a. DoDI 4150.07, Pest Management Program	10
b. AFI 32-1053, Pest Management Program	10
6. Coordination with Other Organizations and Agencies	11
a. Public Health (PH)	11
b. Bioenvironmental Engineer (BEE)	11
c. Fire Department	11
7. Measure for Compliance with Memorandum of Understanding with State Pesticide Regulatory Office	11
8. Pest Management Operations with Special Environmental Considerations	11
a. Operations Using Restricted-Use Pesticides	11

b. Operations with Potential to Contaminate Surface or Groundwater	11
--	----

TABLE OF CONTENTS

Narrative Pest Management Plan	Page
c. Operations More Than 640 Acres	11
d. Operations in Areas with Endangered or Protected Species	11
e. Operations Involving Aerial Application	11
f. Operations Involving Experimental-Use Permits	11
g. Operations Involving Environmentally-Sensitive Areas	11
h. Operations Involving Designated Noxious Weeds	11
i. Operations Involving Invasive Tree Species	11
9. Other Pest Management Plan Issues	12
a. Contract Chemical Usages	12
b. Applicable Pollution-Control Projects	12
c. Applicable Pollution-Abatement Procedures in Pest Management Shop	12
10. Table 3.1 Pest Management Annual Work Plan for FY11 Financial Plan	13
11. Pest Management Program Review Plan Forms (Cover Sheet)	14
12. Pesticide Management Review Tables of Pesticide/Herbicide use	15
13. Attachments	51
a. Personnel	51
b. Golf Course Pest Management Plan	52
c. Self Help Pest and Vegetation Management Program	68
d. Maps	70
e. Storm Water Pollution Prevention Plan	72
f. Monthly Record Of Action	73

NARRATIVE PEST MANAGEMENT PLAN

1. Introduction:

a. Objective of the Integrated Pest Management (IPM) Plan: A narrative IPM Plan is required by DoDI 4150.07 and DoDI 41507.07 volume I for installations conducting IPM annually. This plan, required for Columbus Air Force Base (CAFB), describes IPM operations and management, health and safety, regulatory compliance and environmental protection.

(1) Emphasis is placed on surveillance data and integrated IPM techniques. IPM records, including self-help items issued golf course and contractor applications are maintained in the Integrated IPM Information System (IPMIS) Pest Program. The procedures are as follows:

The facilities building managers are to maintain control of unwanted pest first. The 14 CES Warehouse has traps and pesticide for control of small infestation of pest. If pest cannot be controlled or eliminated, a work order form must be submitted to 14 CES. Entomology will inspect the facility and make recommendations or treat for pest problem.

(2) The plan is reviewed annually by CAFB Natural Resources Manager, IPMC and other as directed by the most current Management Internal Control Toolset (MICT). The plan will be updated incorporating all changes as needed and formally staffed every five years per AFI32-1053.

b. Responsibilities for Conduct of the IPM Program: Daily operations are performed by DoD-certified integrated IPM (IPM) personnel (entomology aka. IPM) under the supervision of 14CES/CEO chief. Daily responsibilities include surveillance, trapping, exclusion, pesticide application and records maintenance for CAFB, Shuqualak auxiliary airfield and one radar site located at Greenwood Springs, Mississippi.

2. IPM Requirements and Strategies for Applicable Pest/Disease Vectors:

a. Disease Vectors and Other Health-Related Pests: In accordance with the CAFB Storm Water Pollution Prevention Plan (SWPP), only EPA MAJCOM approved herbicides and pesticides are used on base. All pesticides and herbicide applications will be of the least toxic effective chemical and applied in accordance with label instructions. Further, the application of these substances will be kept to an absolute minimum throughout the base.

(1) Mosquitoes: IPM personnel coordinate survey and control procedures with 14th Medical Group, Public Health (PH). Adult and larval surveys are performed (Apr-Oct) by PH, and they direct mosquito-fogging operations when possible disease vector areas are identified.

IPM methods: Water management in ditches and low lying areas to reduce breeding areas. Vegetation controls such as mowing to reduce resting sites. Chemical control - Larvicides, liquids with residuals, non-residuals (aerosols), and fogging for control.

(2) Cockroaches: IPM coordinate survey and control procedures with PH. PH performs surveys at all food handling, childcare and medical facilities to identify possible insect and rodent infestations and unsanitary conditions within the facility. Upon completion of survey of control

procedures, building occupants are informed of any recommendations that would aid in pest reduction and improved sanitation. Survey hours made by PH will be reported to the IPM personnel for inclusion in the monthly report (IPMIS).

IPM methods: Sanitation is the first method for control of roaches. Clean areas without harborage spots and left over food will be the facility manager responsibility. The use of soap and high pressure washing for equipment, floors and walls will help in sanitation. Facilities manager use mechanical and physical methods of IPM need to eliminate harborage spots such as unused equipment, caulking and blocking entry points, using roach- proof containers for food storage and glue traps for monitoring, and control of excessive moisture and debris around equipment. Chemical Control: The use of residual liquids and granules insecticides, bait products and dust will help for control of roaches.

(3) Bed Bugs: IPM will respond to possible bed bug reports in TLF and Magnolia Inn housing. IPM will make inspection of rooms and make recommendations to eliminate pest. Follow-up visits to evaluate success and provide additional control measures if necessary for treatment.

IPM methods: Facilities managers must educate employees and residents for signs and identification of bed bugs and report issues immediately to Pest Control as soon as identified. Cultural control for bed bugs includes cleaning and organizing, inspection the rooms, furniture, beds and including eliminating clutter. Mechanical Control: The use of sticky traps and bed bug interceptors under bed post before and after bed bugs are found are a useful tool for IPM and inspection. Chemical Control: When bed bug infestation occurs in rooms the room will be toughly cleaned with steam vacuuming to help kill all stages and remove dead bed bugs. Inspection of room to reduce all harborage spots, remove infested mattress and box springs encasements and fix and repair cracks crevices around the room. The treatment of residual, aerosol, and dust products can be helpful in the control and elimination of pest. Facilities manager and Pest Control will monitor the room until clear of pest.

(4) Fleas and Ticks: Treat identified points of infestation as needed for fleas and ticks.

IPM methods: Vegetation control as needed. Insecticide sprays or dust chemicals as needed.

(5) Fire Ants: This biting insect is found throughout the base. Control procedures are primarily chemical. IPM personnel treat all common areas when notified by managers, such as parks, athletic fields, playgrounds and street curbsides.

IPM methods and Sanitation Control by residents and enforced by building management: Remove and control areas of food products that attract pest, store products in closed plastic containers and clean with soap and water to remove unwanted residue to prevent attraction. Products are available and encouraged to use for control of pest at 14 CES Warehouse. Chemical application in the form of granulated pesticides is encouraged, as per the CAFB Storm Water Pollution Prevention Plan. Chemical Control: The use of baits, residual liquids, Granules, dust products and mound treatments are ways for control of pest.

(6) Bees/Wasps/Hornets: Due to the high potential for personal injury, IPM personnel respond and assist in the control of all bee/wasp/hornet calls. The primary control for these pests is chemical. Mechanical means are also implemented when applicable.

b. General Household and Nuisance Pests: Insects such as ants, crickets, millipedes, American and Oriental cockroaches, flies and non-venomous spiders fall into this category.

IPM methods: Building managers must ensure sanitation, vacuuming up debris, caulking holes, replacing broken screens, door seals and keeping debris from accumulating around and inside buildings and using products available from the 14 CES Warehouse. Washing areas with soap and water will help in management of pest. If these IPM methods do not eliminate the pest problem, then Pest Control will inspect area and make recommendations to facility for control of pest. If managers cannot control problem of pest in reasonable time Pest Control will respond to the problem. Chemical Control: The use of baits, residual liquids, aerosol, granules, dust products and mound treatments are ways for control of pest.

c. Structural Pests: The only structural pest of any importance on CAFB is the subterranean termite.

IPM methods: provide a positive identification of termites, then report the infestation to 14th Civil Engineer Squadron, Operations Flight, Operations Support Element. Operations Support Element then acquires pest control services from a local pest control company to perform termite control procedures. The termite treatment contract is monitored by a certified IPM quality assurance evaluator (QAE).

d. Weed Control: Weed control on CAFB is accomplished at numerous sites for various reasons. The most important site is the airfield, including the runways, taxiways and parking ramps. Other areas include fence lines, sidewalks, parking lots and athletic fields.

IPM methods: cleaning, sealing cracks and mechanical controls such as string edgers are implemented prior to the use of herbicides to control crack grass throughout the base. Ground Contractors use a mixture of herbicides to spray as a growth retardant for grass and to reduce unwanted weeds throughout the base when needed. Contractors use approved herbicide for control of unwanted grass throughout CAFB. Building managers are strongly encouraged to use the products available from the CES Warehouse (Self-Help) for the control of small weed growth around buildings and sidewalks.

e. Stored Products Pests: There are currently no problems with stored products pests on CAFB. If any infestations were discovered, it would most likely be at the commissary or some other food handling facility. Survey for these pests is primarily the responsibility of food receiving facilities with Public Health assistance for verification. If an infestation is found, IPM personnel will implement needed sanitation and chemical controls.

f. Pests of Ornamental Plants and Turf: These pests are of very little significance on CAFB. Fall webworms appear in late summer. Control procedures consist primarily of mechanically removing the webs from the trees. Occasionally, an airborne fungus or bacteria will attach to trees and bushes. Chemical control or mechanical control applications are used to reduce the effects of

the fungus. Dead or severely damaged (hazard) trees are reported for removal. Trees are removed and recycled for mulch or fire wood.

g. Pests of Natural Resources: Ips beetles are the more common pine plantation pests. Pine beetles can cause high mortality among timber. Identified infestation will be reported to CES for removal and sale as commercial timber.

h. Golf Course Pests: Golf course personnel control a wide variety of pests, to include insects, vertebrates, weeds and fungus. Golf course personnel, State certified in appropriate EPA categories, also apply pesticides and herbicides throughout the year to reduce damage from these pests. (see: Golf Course Attachment B)

i. Miscellaneous Pests: IPM personnel shall identify and remove snakes found on base when notified by base personnel.

j. Vertebrate Pests: There are numerous vertebrate pests found on CAFB. They include mice, rats, armadillos, opossums, skunks, squirrels, birds and bats.

IPM methods: trapping devices. Mice and rats can be controlled by sticky traps and the use of poison baits. Animals found dead as a result of trapping, baiting or some other reason are disposed of in a safe and sanitary method (sanitary landfills). Wild animals trapped in live traps are released back to the wild. Feral dogs and cats are trapped and turned over to the local Animal Control Officer for proper handling. All those operations are performed by IPM

k. Other Categories: USDA Wildlife Service's works with airfield personnel to protect airfield and control unwanted wildlife from entering airfield and Bird Aircraft Strike Hazard (BASH) program.

3. Administration:

a. Job Orders: All work performed by IPM is accomplished by job orders.

b. Contracts: All contractors use DoD-approved pesticides and are monitored by the Operations Support Element quality assurance personnel. Chemical usage is tracked by IPM personnel using IPMIS. IPM provides assistance whenever it is required.

c. Inter-Service Support Agreements: There are no inter-service support agreements for pest control at CAFB.

d. Out-leases: There are two out-leases on base, the Credit Union and several gas/oil wells. IPM does not provide services to either out-lease.

e. Resources (Current and Proposed):

(1) Funding: The budget for IPM is included in the general civil engineer budget. Spending is tracked in PEC 85778, using cost center 0441 and organizational code 462 LF.

(2) Staffing: There are currently two civilian personnel assigned to IPM and one alternate civilian for backup: (see Attachment A)

(3) Materials: IPM currently has one truck, one tractor and two Toro carts assigned to the shop. Application equipment includes: one 1,000 gallon hydraulic sprayer, two 200-gallon hydraulic sprayers, one ULV (ultra low volume) fogger, two 50-gallon 12-volt electric sprayers, John Deere Gator, one Buffalo Turbine and one Golden Eagle Thermal Fogger.

(4) Facilities: The IPM shop was constructed in 1991. It was designed in accordance with 1990 Technical Information Memorandum No. 17 guidance.

f. Reports and Records: Records for all IPM actions and chemical quantities are currently maintained through the IPMIS WEB programs. Monthly and special reports are maintained for IPM. A copy of material safety data sheets and labels for each chemical are maintained in IPM shop, Bldg.1120. Monthly reports contain information from IPM, golf course, self-help, grounds and other contractors.

g. Training Plans: After completion of initial training, IPM personnel receive their initial DoD pesticide applicator certification. Recertification must be accomplished every three years. Attendance at one of the approved schools is mandatory. All IPM personnel are currently DoD certified.

h. Coordination with Food Service Managers, Building Managers, etc.: Prior to pest control being provided in any food facility, building managers and PH are contacted. Degree of insect/rodent problems is identified and control procedures to be used are discussed. A memo with building number, date and time of scheduled appointment and control procedures used is kept on file at IPM.

i. Termite Inspection Plan: Due to limited manpower, termite inspections are performed on an as-needed basis. When a customer notifies IPM about a possible termite infestation, personnel respond to make a positive identification. Operations Support Element oversees the termite-control services from a local source for term of contract. After contract expires 14 CES Pest Control maintains quarterly inspections. Contracting requests specifying use of chemicals are routed through IPMC, CES and hazardous material management process personnel for approval. New contract requirements are sent to MAJCOM, PMC, and 14CES/CEOS for pesticide approval prior to actual contracting action.

j. The IPM Annual Work Plan (Table 3.1, page 13) states Financial yearly cost of Pesticides, Termite Treatment, TDY and Training, and Equipment cost and repair.

4. Health and Safety Measures:

a. Requirements: All pest control and golf course personnel are certified to apply pesticides and participate in the occupational health program. IPM personnel are on the respiratory protection program. The 14th Medical Group, Bioenvironmental Engineering, provides the testing and records the results in the individual's health record.

b. Methods to Reduce Potential Hazards:

(1) IPM Personnel: IPM personnel use mechanical control of pests when possible which involves removing pests by hand or using mechanical devices to trap, to remove pest. By using this method, all personnel are exposed to chemicals as little as possible. Personnel also use all required safety equipment and ensure that they are properly maintained.

(2) Installation Personnel: Building managers are encouraged to use self-help products available in the CES Warehouse. IPM and warehouse personnel educate Building Managers to possible hazards of pesticide use and instructions.

(3) Public: Educate through newspaper articles, attending building manager meetings or any other medium available including newcomer's briefing.

c. Safety and Health Measures Associated with the IPM Shop: Storage and mixing rooms are separated from clean areas. Laundering facilities are available to clean coveralls. Personnel are provided all required safety equipment and the means to repair or replace any faulty safety equipment immediately. Physical exams are scheduled annually. Exhaust fan is tested quarterly.

d. Safety and Health Measures Associated with the IPM Vehicles: Shop vehicles are not shared by other shops due to the potential of pesticide contamination. Trucks are equipped with locking compartments to secure pesticides and equipment. Trucks are equipped with spill cleanup kits and shop personnel are trained on how to contain and report spills. Yellow hazard warning beacons are installed on vehicles that are used in slow-driving, pest control operations, i.e., mosquito fogging and treating ant mounds. All vehicles will have a safety eye wash kits.

5. Public Laws and Regulations: The IPM operations are directed by the following directives:

a. DoDI 4150.07, IPM Program, 29 May 2008

b. AFI 32-1053, IPM Program, 20 Nov 2014

6. Coordination with Other Organizations and Agencies: The IPM shop coordinates with the following base agencies in the completion of its pest control objectives:

a. Public Health: Performs surveys of food facilities and discusses control procedures as needed. Treatment schedules for food facilities will be coordinated with PH. PH will provide a count of survey hours on food handling facilities for inclusion in the monthly IPM report.

b. Bioenvironmental Engineering: Schedules annual shop industrial hygiene visits and ventilation survey.

c. Fire Department: IPM notifies the base fire department when fogging inside base facilities. IPM provides the fire department with an updated chemical inventory on a monthly basis.

7. Measures for Compliance with Memorandum of Understanding with State Pesticide Regulatory Office: The only support agreement in effect is the DoD/Mississippi memorandum of agreement to allow DoD-certified applicators to operate at DoD facilities and allow appropriate Mississippi officials to enter premises to inspect pest-management facilities and activities.

8. IPM Operations with Special Environmental Considerations:

a. Operations Using Restricted-Use Pesticides: There are no restricted-use pesticides used by the IPM Section.

b. Operations with Potential to Contaminate Surface or Groundwater: IPM personnel do not apply pesticides where there is a potential to contaminate ground or surface water. Grounds maintenance contractor uses herbicides that are labeled aquatic safe. This includes: spraying ditch banks or bottoms, applying pesticides outdoors during inclement weather and where runoff cannot be controlled.

c. Operations Involving Environmentally-Sensitive Areas: No environmentally sensitive areas are designated on Columbus. Wetlands protections must be observed and are discussed under 7 b. above

d. Operations Involving Designated Noxious Weeds: Refer to 2.d., Weed Control. CAFB. Has two species of noxious weeds (Cogon grass and Kudzu) to be controlled. Approved chemicals for control of invasive or noxious weeds will be used according to labels and monitored for success of control. Herbicides and quantity (PAI) will be recorded in IPMIS program for records.

e. Operations Involving Invasive Tree Species: Inspection on CAFB. by IPM and Forest Manager for control measures and herbicide treatment plans for invasive trees. Contracts for herbicides and quantity (PAI) will be approved by Base coordinator (IPMC) and MAJCOM PMC for environmental issues and base limits of Pounds of Active Ingredients. There are three species of invasive trees on CAFB. (Chinese Privet, Chinese Tallow and Aralia Spinoza).

9. Other IPM Plan Issues:

a. Contractors Chemical Usages: Contracts which use pesticides must go through proper channels before applications are made to keep base Pounds of Active Ingredients (PAI) within base limits. Columbus Air Force base PAI is 1481Lb.

(1) Approved by Installation IPM Coordinator (IPMC) and Operation Management / CEOS and MAJCOM PMC.

(2) Comply with DODI 4150.07, AFI 32-1053, AFPMB Technical Guides, and Federal, State and local laws.

b. Applicable Pollution-Abatement Procedures in IPM Shop: Drains in mixing and storage rooms and outdoor wash rack are plugged at all times. Floor of chemical- storage room is sloped to the center to facilitate containment of any spills. Wash rack has a berm to contain any spills. Shop has a fully stocked spill cabinet and personnel are trained on spill cleanup procedures.

Table 3.1
Annual Work Plan For FY15 Financial Plan

<u>DESCRIPTION</u>	<u>COST</u>
INSECTICIDE	\$6,562.00
BAIT	\$8,250.00
HERBICIDE	\$20,000.00
TERMITE TREATMENT	\$20,000.00
TDY AND TRAINING	\$5,000.00
EQUIPMENT	\$10,000.00

The above figures are based on the previous year's usage. They are the combined figures of the IPM section, self-help store and termite contracts.

**PEST MANAGEMENT PROGRAM
REVIEW PLAN FORMS
(COVER SHEET)**

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF 1A-08 Roaches Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Pyrethrins Whitmire Micro Gen ULD BP-100 499-452 1%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Liquid Can use a white mineral oil
	4. a. Contract or in House Application	IN House
	5. a. Method (aerial, ground, manual)	Portable Microgen
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,482,329 SF As Needed Various Base buildings
	7. a. Month(s) of year b. State	All year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Water sources , foodstuff Food handling facilities
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Safety equipment Certification N/A

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-1C-08 Roaches Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Deltamethrin Suspend SC Aventis 432-763 4.75%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Compressed sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	15,000 SF Compressed sprayer As needed Various Base buildings
	7. a. Month(s) of year b. State	All year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Water sources Lakes, Streams Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-1D-08 Roaches Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Pyrethroid Tempo SC Bayer 3125-498 11.8%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Compressed sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	15,000 SF As needed Various Base buildings
	7. a. Month(s) of year b. State	All year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Where children and pets play Lakes, Streams Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-1E-08 Roaches Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Cypermethrin Demon Max Zeneca 100-1218 25.3%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Compressed sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,000 SF As needed Various Base buildings
	7. a. Month(s) of year b. State	All year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Avoid human exposure Crack and crevice only in food facilities Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-1F-08 Roaches Morale & Economic
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	(s)-Hydroprene Gentrol Wellmark International 2724-351 9.0%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Solution Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Compressed Sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,000 Sq Ft. As Needed Various Base Buildings
	7. a. Month(s) of year b. State	All year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Electrical portion of equipment, Food handling surfaces or food
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-1G-08 Roaches Health & Morale
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Hydramethylnon Combat Source Kill Combat 64240-2 2%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Bait Station N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hand Dispersal
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,000 SF As Needed Various Base Buildings
	7. a. Month(s) of year b. State	All Year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Small Children & pet areas
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Dispose according to Label USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-1H-08 Roaches Health & Morale
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Boric Acid Perma-Dust Whitmire Micro-Gen 499-384 35.5%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Pressurized Dust N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	Crack & Crevice Areas As Needed Various Base Buildings
	7. a. Month(s) of year b. State	All Year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Water areas, classrooms when in use, aircraft cabins. Food handling, Establishments, Small children and pets Wash thoroughly with soap and water after handling N/A Use according to label

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-11-08 Roaches Health & Morale
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	(S)-Hydroprene Gentrol Zoecon 2724-484 .36%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Aerosol N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,000 SF As Needed Various Base Buildings
	7. a. Month(s) of year b. State	All Year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Electrical portions of Equipment Do not apply directly to food products
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Use according to label N/A

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF 1J-08 Roaches Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Indoxacarb Advion Dupont 352-652 .6%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Gel Bait Crack and Crevice
	4. a. Contract or in House Application	In House
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	Base Buildings Apply as needed Various Buildings and Food handling areas
	7. a. Month(s) of year b. State	All Year MS
	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Areas easily accessible to children and pets Surfaces that contact food Do not apply to water Electrical equipment, Avoid contact with skin and eyes USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF 1k-08 Roaches Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Indoxacarb Advion Dupont 352-668 .5%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Bait Arena
	4. a. Contract or in House Application	In House
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	Base Buildings Apply as needed Various Buildings and Food handling areas
	7. a. Month(s) of year b. State	All Year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Areas easily accessible to children and pets Surfaces that contact food Do not contaminate water, food, or feed N/A Disposal by label USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-2A-08 Ticks Health and Morale
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Deltamethrin Suspend SC Aventis 432-763 4.75%
Application	3. a. form Applied (dust ,emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Compressed air sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,000 SF As Needed Various Improved grounds
	7. a. Month(s) of year b. State	Mar.-Sept. MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Water Food and humans
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-2B-08 Ticks Health and Morale
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Cypermethrin Demon MAX Zeneca 100-1218 25.3%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Compressed Air sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,00 SF As Needed Various Improved Grounds
	7. a. Month(s) of year b. State	May.-Oct. MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Water and food prep area Food and human exposure
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-3A-08 Fleas Health and Morale
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Deltamethrin Suspend SC Aventis 432-763 4.75%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Compressed sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,00 SF As Needed Various Improved Grounds
	7. a. Month(s) of year b. State	Mar-Sept MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Water sources and food prep. areas Food-human exposure
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-4A-08 Adult Mosquitoes Health and Morale
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Permethrin Permanone Roussel Uclaf 432-1182 3.98%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Oil Solution N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Fogging
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC on CAFB and surrounding buffer zone Dependent on invasion of base by pest species after flooding in local area, or independent outbreak of SIE used only in emergency situations, CAFB and buffer zones
	7. a. Month(s) of year b. State	May-Sept MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Water sources Use caution not to contaminate skin or clothing
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Toxic to fish-avoid direct application to lakes streams and ponds Certification Applied using air conditioned vehicle USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-4B-08 Mosquito Larvae Lower number of adult mosquitoes
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	<i>Bacillus thuringiensis Berliner var. israelensis</i> Bactimos Briquets Summit 621847 10%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Briquet N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hand dispersal
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC As Needed Various Mosquito breeding areas I.E. aquatic sites
	7. a. Month(s) of year b. State	Feb-Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	N/A N/A Keep out of reach of children. Avoid contact with eyes or open wounds. Wash thoroughly with soap and water after use. USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-4C-10 Mosquito Larvae Lower number of adult mosquitoes
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	(S)Methoprene Altosid XR-G WellmarkInternational 2724-451 1.5%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Granular N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Ground Equipment
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC As Needed Various Mosquito breeding areas I.E. aquatic sites
	7. a. Month(s) of year b. State	Feb-Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Keep out of reach of children. Avoid contact with skin or eyes. Wash thoroughly with soap and water after use. Wear protective eye wear and protective clothing. USE ACCORDING TO LABEL
	9. a. Precautions to be taken b. State and Local Coordination c. Other	

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-5A-08 Wasps, Bees & Hornets Health and Morale
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	d-trans Allethrin Wasp Freeze Formula 1 Whitmire Prod. Co. 499-153-AA .129%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Aerosol N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	Each As needed Various Base Buildings
	7. a. Month(s) of year b. State	Mar-Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Avoid lakes streams ponds etc. Use caution any time used
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-6A-08 Ants Morale Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Hydramethylnon MaxForce Royal Pakhoed Co. 64248-6 1%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Bait None
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC As Needed c. Various Base Buildings and improved grounds
	7. a. Month(s) of year b. State	Mar- Aug
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Food handling areas Avoid human exposure, Lakes and streams Safety equipment Certification N/A USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-6B-08 Ants Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Bifenthrin Talstar EZ FMC Corp. 279-3168 .2%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Bait None
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC As Needed Various Base Buildings
	7. a. Month(s) of year b. State	Mar-Oct
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Food handling areas Avoid human exposure Safety equipment Certification Do not broadcast apply more than 0.4 lbs. A.I. (200 lbs.) per Acre per year. USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-6C-08 Ants Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Orthoboric acid Drax Ant Bait Gel Waterbury company Inc. 9444-131 5.0%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Gel N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,000 SF As needed Various Base Buildings
	7. a. Month(s) of year b. State	All year MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Food storage areas Food handling area Placement USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-6D-08 Ants Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Hydramethylnon Amdro American Cyanamid Co. 241-322 0.73%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Granular N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC As needed Various Improved Grounds
	7. a. Month(s) of year b. State	Feb - Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Animal grazing areas (stables)
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Placement USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-6E-08 Ants Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Fipronil Maxforce FC Maxforce 432-1256 0.01%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Bait Station N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hand Dispersal
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,000 SF As needed Various Base Buildings
	7. a. Month(s) of year b. State	Jan-Dec MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Around small children & pets
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Wash thoroughly with soap & water after handling USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-6F-08 Ants Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Fipronil Termidor SC Aventis 7969-210 9.1%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hydraulic & hand sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC As needed Various Base Buildings
	7. a. Month(s) of year b. State	Jan-Dec MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Water areas Do not let residents and pets in immediate area during application Safety equipment Maximum number of 2 applications per year. USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

	1. a. Project No. b. Target Pest c. Purpose	AF-6G-08 Ants Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Fipronil Topchoice Chipco 432-1217 .0143%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Granular Bait N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hand or Powered Spreader
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC As needed Various Improved Grounds
	7. a. Month(s) of year b. State	Mar-Oct MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Toxic to fish, birds and aquatic invertebrates Apply when drift is minimal
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Use Safety equipment Do not apply more than 1 application per year of 87 pounds of product per acre. Read label

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-6H-08 Ants Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Boric Acid Perma-Dust Whitmire Micro-Gen 499-384 35.5%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Pressurized Dust N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	Indoor & Outdoor areas As needed Various Base Buildings
	7. a. Month(s) of year b. State	Mar-Oct MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Water areas, classrooms in use, aircraft cabins Food handling establishments small children & pets Wash thoroughly with soap & water after handling Use according to label

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-7A-08 Spiders Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Deltamethrin Suspend SC . Aventis 432763 4.75%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Compressed air sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	1,500,000 SF As Needed Various Base Buildings
	7. a. Month(s) of year b. State	Jan-Dec
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Food handling areas, Water sources Avoid human exposure,
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-7B-08 Spiders Morale and Health
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Boric Acid Perma-Dust Whitmire Micro-Gen 499-384 35.5%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Pressurized Dust
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	Inside/Outside Areas As Needed Various Base Buildings
	7. a. Month(s) of year b. State	Jan-Dec MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Water areas, classroom in use, aircraft cabins Food handling establishments, areas around small children & pets Wash thoroughly with soap & water after handling Use according to label

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-8A-08 Broadleaf & grassy weeds Aquatic weed control
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Diquat Reward Zeneca 100-1091 36.4%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hydraulic Sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC As Needed Various Base wide
	7. a. Month(s) of year b. State	Apr-Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Toxic to wildlife Do not apply directly to water except as specified on the label
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Safety equipment USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-8B-08 Weedy grasses Beautification
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Prodiamine Alligare Prodiamine 65WG 81927-36 65%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hydraulic Sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	6013 AC As Needed Various Base wide
	7. a. Month(s) of year b. State	Apr-Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Do not apply directly to water. Do not contaminate water by cleaning of equipment or disposal of waste Avoid contact with skin SafetyEquipment (PPE) USEACCORDINGTOLABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-8C- 08 Brush & Grassy weeds Control unwanted vegetation
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Diquat Herbicide Alligare Diquat dibromide 81927-35 37.3%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hydraulic Sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	400AC As Needed Flight line and Base streets
	7. a. Month(s) of year b. State	March -Oct
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Keep out of reach of children Aquatic use by label
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Aquatic use PPE Equipment Use according to label

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-8D-08 Broadleaf & Grassy weeds Total vegetation control
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Ammonium salt of imazapic Panoramic 2SL Alligare 20101129 23.3%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hydraulic Sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	400 AC As Needed Various Base wide
	7. a. Month(s) of year b. State	Mar-Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Do not apply directly to water Do not use on lawns, walks, driveways, tennis courts
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Avoid breathing spray mist, contact with skin, eyes or clothing Use according to label

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-8E-08 Brush & Grassy weeds Control Unwanted vegetation
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Glyphosate & Diquat dibromide Quick Pro Monsanto 524-535 73.3%/2.9%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Water soluble granule Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hydraulic Sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	400 AC As Needed Various Base wide
	7. a. Month(s) of year b. State	Mar-Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Water areas Avoid contact with foliage, green stems, exposed non-woody roots or fruit of crops, desirable plants and trees
	9. a. Precautions to be taken b. State and Local Coordination c. Other	Keep out of treated area till dry USE ACCORDING TO LABEL

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-8F-10 Broadleaf & Grassy weeds Total vegetation control
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Isopropyl amine salt of Imazapy Polaris AC NuFarm 228-480 53.1%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hydraulic Sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	400 AC As Needed Various Base wide
	7. a. Month(s) of year b. State	Mar-Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Do not apply directly to water Do not use on lawns, walks, driveways, tennis courts Avoid breathing spray mist, contact with skin, eyes or clothing Use according to label

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-8G-10 Broadleaf & Grassy weeds Total vegetation control
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Diuron Diuron 4L Drexel 19713-36
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Emulsion Water
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Hydraulic Sprayer
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	400 AC As Needed Various Base wide
	7. a. Month(s) of year b. State	Mar-Nov MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc) 9. a. Precautions to be taken b. State and Local Coordination c. Other	Do not apply directly to water Do not use on lawns, walks, driveways, tennis courts Avoid breathing spray mist, contact with skin, eyes or clothing Use according to label

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION CAFB	COMMAND AETC	DATE APPROVED FOR USE 1 JAN 11
	PERSON TO CONTACT/AUTOVON NO. Mr. Miller/742-7393		

REFER TO AFI 32-1053 BEFORE COMPLETION

Objective	1. a. Project No. b. Target Pest c. Purpose	AF-9A-08 Rodents Health & Economic
Pesticide	2. a. Active ingredient(s) b. Trade Name c. EPA Registration e. Concentration	Bromadiolone Contra Blox Bell Laboratories, Inc 12455-79 .005%
Application	3. a. form Applied (dust, emulsion, gas, etc) b. Diluent	Bait N/A
	4. a. Contract or in House Application	In-house
	5. a. Method (aerial, ground, manual)	Manual
	6. a. Acres or other units to be treated b. Number of applications c. Number of sights d. Specific Identify of Sites	835 Facilities As Needed Various Base Buildings
	7. a. Month(s) of year b. State	Jan-Dec MS
Sensitive Areas	8. a. Areas to be avoided b. Areas to be treated with Caution (Croplands, lakes, streams, food, human exposure, endangered species, etc)	Areas with children, pets, and sewers
	9. a. Precautions to be taken b. State and Local Coordination c. Other	USE ACCORDING TO LABEL

**Attachment A:
Personnel**

Name:	Certificate NO.	Expiration Date
Robert B. Miller	A-139-04-0415	31 Apr. 2018
Kenneth J. Yearby	AF-034-03-0115	30 Jan. 2018
Craig G. Hoke	AF 1086-03-1114	30 Nov. 2017

Attachment B: (WPGC)

WHISPERING PINES GOLF COURSE PEST MANAGEMENT PLAN COLUMBUS AIR FORCE BASE MISSISSIPPI 2015

1.0 INTRODUCTION

1.1 Purpose:

a. This narrative provides a framework through which pest problems and procedures can be effectively addressed at the Whispering Pines Golf Course. Main elements of the installation's pest management program, including health and environmental safety, pest identification, transportation, program management, pesticide use and disposal are defined within the main body of the installation Pest Management Plan.

b. The golf course's pest management mission is to maintain an aesthetically pleasing course that offers an excellent playing surface for its customers.

c. Golf Course pest management is the only one component of the overall installation IPM Program. Golf Course operations are important inasmuch as DoD golf courses are typically significant users of pesticides on an installation.

d. Whispering Pines Golf Course has demonstrated success in many areas. Pesticide reduction, IPM innovations, cultural control practices, precision targeting, and establishment of threshold action levels are just a few successful innovations.

e. This plan will serve as a mechanism for continued successes and to ensure effective, economical, and environmentally acceptable Integrated Pest Management (IPM) while maintaining compliance with all pertinent laws and regulations.

2.0 RESPONSIBILITIES:

2.1 Golf Course Manager: Pam Wickham

a. Obtain contract for Pest Control and Application. Ensure contractor has pest management certification.

b. Maintain adequate records of IPM operations.

2.2 Golf Course Superintendent:

a. Provide technical information and report daily chemical (PAI) to the installation IPM Coordinator on pesticide use trends on the course.

b. Maintain records of daily pest scouting and pesticide applications. Consolidate records and reports monthly and provide that information before the 6th of the month to the Installation IPM Coordinator to report in the Base usage IPMIS program.

c. Monitor certification status of golf course pesticide applicators.

d. Serve as the single source point of contact for all golf course pest management issues.

e. Supervise all pesticide applications, set pest scouting schedules, and implement IPM procedures and manage the overall golf course pest management program.

2.3 Pest Management Personnel:

a. Use IPM Techniques to the maximum extent possible.

b. Control pest according to the provisions of this plan.

c. Operate in a manner that minimizes the risk of contamination to the environment and personnel accessing the course.

d. Ensure that supervisors are kept informed of changes in IPM requirements.

3.0 GENERAL:

3.1 Golf Course Description:

a. The course has a clubhouse, pro shop, snack bar, and associated facilities. Maintenance facilities are separate of the clubhouse and consist of a pesticide storage building, office area, equipment maintenance/storage area, and cart storage area.

b. There is one 9-hole course. The course also has a putting and chipping green. There is also a 9-hole Foot golf Course.

c. The course plays between 12,000-15,000 rounds per year.

3.2 Inventory of Land Use and Layout of Facilities:

a. There are five categories of land on the course: Greens, Tees, Fairways, Roughs, and Practice range.

Area	Grass Type	Acres
Greens	Mississippi Express	1.0
Tees	Bermuda/419	1.0
Fairways	Bermuda/419	20.0
Roughs	Bermuda/Common	30.0

(1) Greens: Greens primarily consist of Mississippi Express. The greens on the course are intensely maintained and scouted daily for insect pest and diseases. There is no tolerance for insect or disease pests on the golf course greens.

(2) Tees and Fairways: Tees and fairways primarily consist of Bermuda grass, and are scouted daily throughout the growing season for insect pests and diseases.

(3) Roughs: Roughs surround the fairways and greens areas. Roughs primarily consist of 50% trees and 50% Bermuda grass and are maintained at a lesser frequency than tees and greens.

b. Layout of Facilities:

(1) Clubhouse and Pro Shop, Bldg 570 - This facility is an old cinder block building, having been built in 1975. The clubhouse consists of an office/administrative area, snack bar, pro shop, club storage area, and lounge area. The clubhouse is large enough to serve as a small party facility and hosts many meetings and seminars throughout the year. The facility offers lessons, cart/club rentals, and merchandise for sale.

(2) Maintenance Facilities, Bldg. 566 - There are four buildings that make up the golf course maintenance facilities. The main building consists of the superintendent/assistants office area and vehicle storage/maintenance area. Other buildings located within the maintenance area are the pesticide storage building, equipment storage, and a cart storage area.

4.0 PRIORITY OF IPM:

4.1 Disease of Turf grass: Turf grass diseases are the top management priority on the Whispering Pines Golf Course. Many diseases can rapidly spread and cause significant damage when conditions favor development. Some turf grass diseases have to be treated on a preventative basis in order to not incur significant damage and affect the playability and appearance of the course.

a. Dollar Spot:

(1) Dollar spot is the most persistent turf grass disease on the WPGC. The disease can occur regardless of management or soil fertility, although damage usually is most severe if there is a deficiency of nitrogen. Dollar spot results in the formation of small,

roughly circular, bleached patches in the lawn. The patches are more numerous in areas where there is poor air circulation or drainage. Most spots are only a few inches in diameter: however, under favorable environmental conditions and mowing heights greater than two inches, individual spots may exceed six inches in diameter. Affected plants within the diseased spots on the turf grass turn into large irregular dead areas. This can result in substantial damage to the turf grass.

(2) On individual infected plants, leaves develop light yellow to tan lesions with reddish-brown borders. On cool-season grasses, such as tall fescue and Kentucky bluegrass, lesions normally are located near the middle of the leaf and extend completely across the leaf blade. The bleached area is bordered by dark red to brown margins or lines, which are characteristic of dollar spot. On warm-season grasses (Bermuda grass, buffalo grass, and zoysia grass) the bleached zones on leaves may be more numerous and smaller, but still bordered by brown bands. In the early morning when dew is still present on the turf grass, small cottony strings of fungus can sometimes be seen growing from the diseased leaf blades. This growth can be confused with spider webs, “cotton” from plant seeds, or other fungi, and therefore is not a reliable diagnostic feature.

b. Brown Patch:

(1) Brown patch ranks number two in turf grass diseases on the course. The disease normally occurs in midsummer and results in the formation of unsightly patches of blighted turf. The fungal disease is capable of killing turf grass during extended periods of hot, humid weather.

(2) On some grasses, the disease may appear as roughly circular patches of blighted turf that range in size from a few inches to several feet in diameter. Turf in patches initially develops a dark purple-green color similar to that associated with drought stress. The damaged turf quickly fades to light tan or brown. Patches may coalesce to blight large sections of the turf. A more common symptom on the newer tall fescue varieties is a uniform blighting without formation of distinct, circular patches. Diseased turf exhibits a droughty or wilted appearance even though sufficient soil moisture is present.

(3) Symptoms on individual plants are also helpful for diagnosing brown patch. The brown patch fungus initially attacks the leaves of the turf grass plant, causing the formation of irregular, water-soaked spots. The spots may be bordered by a dark brown margin. As the disease progresses, the fungus attacks the plant crown and kills the plant.

(4) Brown patch development can be very rapid; large blighted areas may develop within a 24 to 48 hour period. In light attacks, turf recovers within two to three weeks. When conditions favorable for disease persist, the tall fescue plants may be killed.

(5) Disease development is favored by nighttime temperatures above 70 degrees F and by a high relative humidity and/or a thin film of moisture on the leaf surface. Those turf grass under high management, especially high nitrogen fertilization, are more

susceptible to severe damage from brown patch. In most cases, the fungus attacks only leaves, but during severe disease pressure, the crowns or roots may also be killed.

4.2 Undesirable Vegetation: Weed pests affect not only the appearance of the course but also greatly inhibit the playability of the course for golfers. Weeds compete with turf grass for water and nutrients. If left unchecked, would alter the uniformity of color and the course would fail to offer a consistent turf grass surface for play. A sighting of weed pests or pest would trigger a corrective action or a preventative application.

a. Smooth Crabgrass: Crabgrass is a warm seasonal annual weed that germinates when soil temperatures reach 55 to 60 degrees F and thrives throughout the summer if not controlled. The species of crabgrass commonly found on the course is smooth crabgrass (*Digitaria sanguinalis*). The plant has light green foliage color and a prostrate growth habit. Seed heads, which look like finger-like projections, begin appearing in late summer and continue until frost. Individual plants have the potential to produce thousands of seeds each.

b. Goose grass:

(1) Goose grass (*Eleusine indica*) is a troublesome weed throughout the course. It is most frequently found in high traffic areas where turf grass cover is thin. Golf courses are prime sites for an infestation of goose grass. The name goose grass is commonly used for this species, but it is also called silver crabgrass, crowfoot, or wiregrass.

(2) Goose grass is a warm season annual grass, develops in leafy, commonly reclining tufts. Goose grass is a prolific seeder and in most cases has three to seven fingers like racemes on a single stem. Often 15 to 20 stems are produced by a mature plant and as many as 50,000 seeds can be produced by a single plant. Once goose grass becomes established, annual re-infestations are likely to occur.

(3) Goose grass has a strong extensive root system and readily invades hard, compacted soils found in high traffic areas. It adapts well to close, frequent mowing and even produces seed when mowed at putting green heights.

(4) Mature leaf blades of goose grass are extremely difficult to cut with a mower. Often the leaf blades are frayed by the mower and the tips develop a whitish cast. Mower blades must be kept sharp to maintain a satisfactory cut on goose grass infested turf.

(5) Goose grass emergence from seed begins as early as May. Emergence continues throughout the summer months. Plants are usually killed by the first frost in the fall.

c. White Clover:

(1) White Clover is a cool season perennial member of the Legume family (*Fabaceae*) that produces primarily by seeds and occasionally creeping stems that can root at the nodes. It will form patches in turf and emerges from a fibrous root system. The

compound leaves are composed of three unstalked oval leaflets up to 4/5 inch long. They are dark green and often with faint white, crescent-shaped markings.

(2) White clover occurs in ball-shaped, white-to-pink clusters of pea-shaped flowers that are held slightly above the foliage. The plants are up to 1-1/4 inch in diameter, composed of 40 to 100 flowers and appear from April to October.

4.3 Pest: Insect pest damage turf by feeding on the roots of turf grasses, sucking on the juices of the grasses, or by actually eating the grasses. This type of activity, if allowed to go uncorrected, would alter the playability of the course, severely damage the course's grass and lessen the aesthetics of the course. Insect pest also cause damage to the trees and shrubs that are planted throughout the course.

a. Green June Beetle:

(1) Green June beetles are found throughout the turf on the course. The beetle is an active pest that seems to be causing more damage and is currently the number one insect pest.

(2) The June beetle larvae (grubs) eat organic matter including the roots of plants. Therefore, damage first appears to be drought stress. Heavily infested turf first appears off color, gray-green, and wilts rapidly in the hot sun. Continued feeding will cause the turf to die in large irregular patches. The tunneling of the grubs make the turf to feel spongy and the turf can often be rolled back like a loose carpet. Grub populations may not cause observable turf injury but predatory mammals such as skunks, raccoons, opossums, birds, and moles dig in the turf in search of a meal.

b. Cutworms: Cutworms are the caterpillars of several species of moths that are considered an occasional pest on the course. They vary in color from dull-brown to gray or nearly black and range from one to two inches in length. They usually hide in the soil during the day and feed at night. They feed on the blades of grass or cut the grass at soil level, causing injury similar to that of sod webworms.

c. Fire Ant: Fire Ants belong to the Family Formicidae whose members live in colonies in the ground with more than one queen, immature, female workers, and occasionally males. Workers of the fire ants will chew on the roots, stems, and leaves of plants. Ants can spoil golf courses by building mounds and clearing sites for their nest and leave a painful bite.

5.0 Integrated Pest Management (IPM):

a. IPM Procedures: The use of multiple techniques to prevent or suppress pest in a given situation. Although IPM emphasizes the use of nonchemical strategies, chemical control may be an option used in conjunction with other methods. IPM strategies depend on surveillance or scouting to establish the need for control and to monitor the effectiveness of IPM efforts.

b. The primary focus of IPM at the golf course is in cultural control: Maintaining a vigorous and healthy turf grass will discourage weeds, insects, and disease from gaining a foothold and causing large amounts of damage. Maintaining a healthy turf grass will also allow the plant to recover quickly if any pest damage occurs. The four basic IPM principles described below are the heart of IPM and are descriptive of the IPM philosophy used at the Whispering Pines Golf Course.

5.1 Mechanical and Physical Control: This type of control alters the environment in which pest live, traps and removes pests where they are wanted or excludes pests. Examples of this type control include: trapping moles, hand removal of weeds from flowerbeds and sand traps, using weed block to discourage weeds and grasses from growing, and close mowing to kill weeds and grasses and prevent seed heads from forming.

5.2 Cultural Control:

a. Strategies developed for this method involve manipulating environmental conditions to suppress or eliminate pests. Types of cultural control methods employed on the golf course include precise irrigation, fertilization methods, de-thatching, aerification, and top dressing. Soil testing to determine the precise amounts of nutrients needed and adjustments of soil PH is another example.

b. Another example of cultural control would be converting certain rough areas into non- mow/reduced-mow/native meadow areas. Practices such as these help reduce the course's reliance on pesticides by converting areas of the course previously highly managed for weed and insect pests into areas where virtually no pest management occurs.

5.3 Biological Control:

In this control strategy, predators, parasites, or disease organisms are used to control pest populations. The course has tried different forms of microbial for the control of turf disease but to date no one form has proven effective. Biological control may be effective but is often used in conjunction with other types of control.

5.4 Chemical Control:

a. Chemicals will only be applied on the golf course by a License applicator for the State. The state of Mississippi requires recertification every three years.

b. Chemicals are applied on the golf course through State certified personnel and contractors.

c. Pesticides kill living organisms, whether they are plants, animals or diseases. At one time, chemicals were considered to be the most effective control available, but evolved pest resistance rendered many pesticides ineffective. In recent years, there is an increasing trend to use pesticides, which have limited residual action. This is especially true in

treating turf diseases. Repeated use of fungicides has shown to increase disease resistance in golf course turf. While this has reduced human exposure and lessened environmental impact, the cost of chemical control has risen due to the need for more frequent application. Since personal protection and special handling and storage requirements are necessary with the use of chemicals, the overall cost of using chemicals as a sole means of control can be quite costly when compared with nonchemical methods.

d. Although chemical control is an integral part of IPM, nonchemical control is promoted. Chemical control is almost always a temporary measure and in the long run more expensive, Nonchemical control, which may initially be more expensive than chemicals will usually be more cost effective in the long run. Most importantly, nonchemical controls are non-toxic, thereby reducing the potential risk of adverse effects to human health and the environment.

6.0 GOLF COURSE OPERATIONS:

6.1 Mowing:

a. Mowing is the single most time consuming effort on the golf course. Proper mowing techniques are required on the golf course in order to retain turf density, retard annual grass and weed invasion, maintain an aesthetically pleasing quality, and to offer a superior playing surface.

b. Mowing activities also directly impact IPM operations and can create problems if not done properly. All mowing equipment is thoroughly maintained and cutting edges are kept sharp and in good working order. Improperly maintained equipment and dull cutting edges will cause damage to plant leaves resulting in the plant's increased susceptibility to insect and disease damage. Mowing equipment is thoroughly cleaned after use to prevent the possible spread of turf diseases from one area of the course to another.

Mowing Schedule		
Area	Height	Frequency
Greens	5/32" – 3/16"	Daily
Tees	5/8"	2 cuts per week
Fairways	1/2" - 3/4"	2 cuts per week
Roughs	2" – 3"	Weekly

6.2 Irrigation:

a. Many irrigation issues and challenges face the golf course. Too much or too little water can encourage the growth of fungal diseases and contribute to IPM problems and increased pesticide use. Water use is an important factor in environmental stewardship and the course remains committed to finding ways to reduce the amount of water used on the course.

b. Whispering Pines Golf Course uses city water. The course deploys a time controlled irrigation system and has approximately six acres of the course under irrigation – 10 greens, 14 tees, and 9 fairways.

c. The irrigation rates are determined on a daily basis and run times for each green and tee are manually fed into the central controller. The area being irrigated (green, tee, and fairway); grass type, soil type, slope, and soil compaction are taken into consideration when irrigation times and rates are set. Decisions to water or not to water are made on a daily basis by the superintendent or one of his assistants after carefully considering numerous factors such as weather forecast, recent rains/lack of rain, temperatures, etc.

6.3 Fertilization/Turf Maintenance: All fertilization and soil nutrient adjustments are accomplished on the basis of current soil tests. Soil is tested once per year throughout the course at greens, tees, and fairways. PGA constructed greens require soil test more often and test times are based on local conditions. Soil nutrients are closely monitored on the course because they have a direct impact on various turf diseases. Too much available nutrients may provide a condition favorable for one type of turf disease while too little nutrients may provide a favorable habitat for another.

a. Greens:

(1) The greens are core aerated with ½” tines twice per year, usually the third week of April and the second week of August. The greens are also de-thatched on this schedule. Spiking is performed 2-3 times during the growing season.

(2) The greens are fertilized at a rate of one pound of nitrogen per 1,000 square feet per month during the growing season. Natural, organic sources are also used during summer applications. Soil PH is monitored and lime is applied according to test recommendations for the particular type of turf grass being grown. 18-4-10 NPK blend, 31-0-0 Ammonia Nitrate and milorganite 6-2-2 are most often used.

b. Tees/Fairways:

(1) Tees and fairways are core aerated with ¾” tines in the spring.

(2) Fairways are maintained with 2-3 pounds of nitrogen/Potassium per 1,000 square feet per year. 22-11-11 NPK is recommended.

(3) Tees are maintained with 5-6 pounds of Nitrogen/Potassium per year. 13-13-13 NPK is recommended.

c. Roughs/Practice Range: The roughs surrounding the fairway and green areas are maintained along with the fairways. A much lower level of maintenance is used on the rough areas of the course. There is usually no fertilization, aeration, or de-thatching activities on the roughs and practice range.

*Fertilizer blends as stated are recommendation only and currently in use. Equivalent Blends may be substituted to meet the monthly nutrient requirements.

6.4 Scouting and IPM:

a. The course is scouted on a daily basis by the superintendent or one of his assistants. Scouting for disease is particularly important when environmental conditions favor disease development. Many diseases can rapidly cause significant damage when conditions favor development. Weather conditions are also closely monitored. When certain weather conditions favoring the development of turf disease are approached or exceeded preventative fungicide applications are applied.

b. The golf course superintendent gives close scrutiny to “indicator greens.” Indicator greens are areas on the course that have historically been flagged for a particular disease or insect first. The course is also scouted daily for weed infestation, mower cut, moisture levels in plants and soil, and mechanical damage.

7.0 ADMINISTRATION:

7.1 Resources:

a. Staffing. The following personnel are involved in IPM activities at the WPGC.
Gene Holcomb, Superintendent

b. Materials and Equipment Buildings are furnished by the U.S. Government or Non-Appropriated Fund. Materials and equipment are purchased with Non-Appropriated funds only. Those pesticides and pesticide application equipment required by the program are maintained on the golf course. Pesticides are ordered as required to maintain at least a one-year supply. Professional pesticides are generally packaged and shipped in “bulk containers,” 1 gal, 2 ½ gal, case vs. pound etc., and most will not ship lesser amounts. Pesticides which are required for use during a specific time of year (e.g., herbicides applied in the spring when weeds are emerging) are ordered in a timely manner to ensure effective application. An inventory of pesticides provided at the entrance to the chemical storage locker lists the pesticides on hand at the golf course. An inventory of pesticide application equipment used at the course is provided in the HAZCOM binder located in the superintendent’s office. These inventories are kept current and updated as changes occur. At a minimum, a revised inventory is included in the IPM Plan’s annually updated edition.

c. Facilities (Mixing and Storage Sites):

(1) Pesticides classified as moderately or highly toxic are no longer maintained at WPGC due to contracting out of this service for greens and fairways.

(2) Mixing is done off base by the contractor and disposed of off base by the contractor.

7.2 Records and Reports:

a. Records of all IPM operations performed are maintained in the superintendent’s office and by the Installation IPM Coordinator.

b. Scouting and pesticide application records are maintained by the golf course superintendent.

7.3 Training:

a. The golf course superintendent will maintain his certification for pesticide applications to keep abreast of the latest techniques for pest control. Recertification will be accomplished every 3 years. A list of current personnel, along with their certification expiration dates, can be found in the superintendent's HAZCOM Binder. Photocopies of training certificates are found in each personnel's training folder located in the Golf Manager's Office.

b. In order to keep abreast of problems and IPM techniques which are unique to this area, certified personnel attend local IPM classes, workshops, seminars, etc. These local seminars provide opportunities for golf course personnel to meet other local IPM professionals who are familiar with many of the pest problems within this geographic area. The type of information garnered from these seminars is particularly helpful when dealing with vegetation control issues and turf grass disease management where local conditions dictate product concentration and herbicide/fungicide labels indicate application strength techniques.

8.0 ENVIRONMENTAL CONSIDERATIONS:

8.1 Protection of the Public: Precautions are taken during pesticide application to protect the public, on and off the golf course. Signs indicating pesticide applications on the golf course area are posted at the pro shop entrance and left displayed for 24 hours after application. Whenever pesticides are applied outdoors, care is taken to make sure that any spray drift is kept away from individuals, including the applicator. Pesticides are not applied outdoors when the wind speed exceeds eight miles per hour. At no time are personnel permitted in a treatment area during pesticide application unless they have met the medical monitoring standards and are appropriately protected. The Golf Course Manager is notified prior to the application of any pesticide as to the reason, type, and precautions necessary.

8.2 Pesticide Reduction/Measure of Merit:

a. Whispering Pines Golf Course is fully committed to the Department of Defense's Measure of Merit for pesticide reduction. The course has provided input for the IPM Plan since 1990. All personnel applying pesticides are state certified and the course has reduced the amount of pesticides by more than 50% of the 1993 baseline.

b. The following efforts have enabled the course to meet and in some cases exceed the DoD's Measures of Merit:

- (1) Increased scouting for weed and insect problems

- (2) Established set threshold levels for pesticide applications
- (3) Selected pesticides that have lower rates/lbs. A.I. and/or have longer residual lives
- (4) Incorporating directed applications and spot treatments rather than blanket control
- (5) Using weather forecasts and data to skip or delay fungicide applications for disease

Attachment: C: Self-Help

Self Help Pest and Vegetation Management
Program

Columbus Air Force Base
Columbus, MS

14th Civil Engineer Squadron

1. Introduction: This narrative plan is for CAFB Self Help program.

a. Emphasis is placed on integrated IPM techniques. Self Help IPM issue records are loaded into the IPMIS program and the Acknowledgements of Understanding letters are maintained at Entomology (Bldg. 1120). Records and reports are entered and reported to MAJCOM monthly.

b. CAFB Self Help is located in Bldg 385 which provides guidance and issues the materials to the facility manager. There are 157 buildings with 1.6 million sq feet.

2. Application:

a. Does not apply to Privatized Housing.

b. Self Help applies to Building Facility managers.

c. Self Help pest control may also be used in government-leased, permanent-party military housing if approved by installation housing office and the Base Civil Engineer.

3. Attachments: Engineering Technical Letter (ETL) 10-5 found at http://www.wbdg.org/ccb/AF/AFETL/etl_10_5.pdf includes the following:

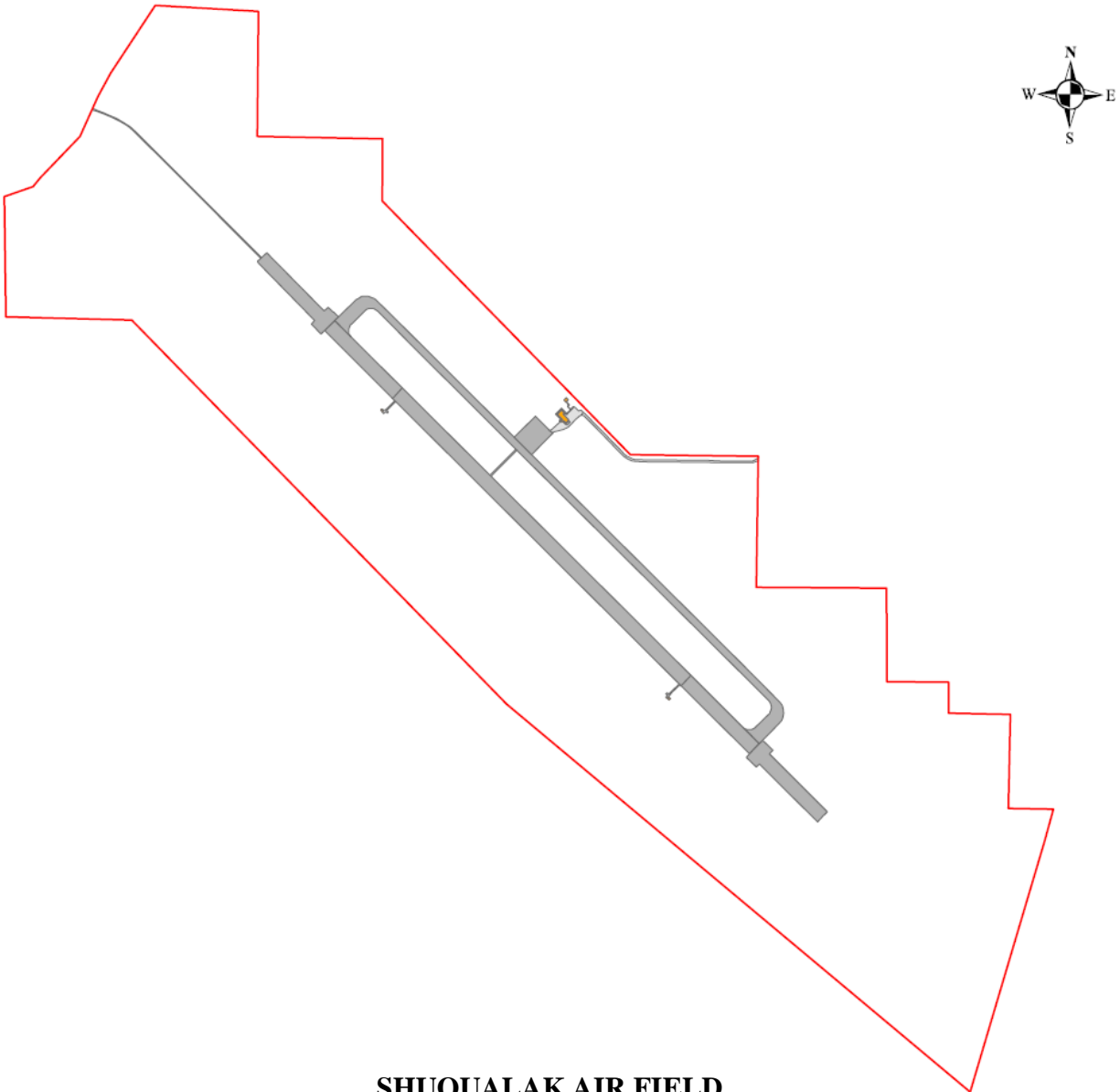
a. Approved Self –Help Pesticides and Pest Control Items

b. Acknowledgements of understanding (sample)

c. Integrated IPMs Outlines (Sample)

d. Distribution List

**ATTACHMENT D:
MAPS**



SHUQUALAK AIR FIELD

**ATTACHMENT E:
STORM WATER POLLUTION PREVENTION PLAN**



Columbus AFB 2012
SWPPP.pdf

**ATTACHMENT F:
MONTHLY RECORD OF ACTION**

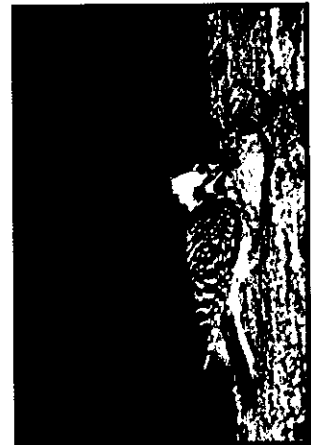
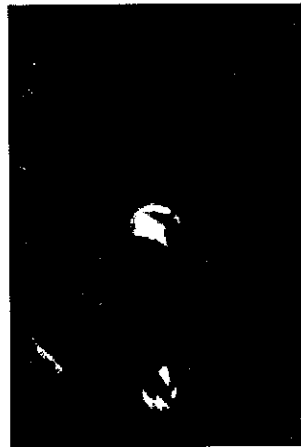


MONTHLY
TREATMENT FORM.pdf

APPENDIX K
THREATENED AND ENDANGERED SPECIES SURVEY

FINAL REPORT

Endangered and Threatened Species Survey of Columbus Air Force Base Columbus, Mississippi



Submitted by:

J.M. WALLER
ASSOCIATES
MANAGING THE VISION

Written by:

Dr. Jeanne C. Jones, Certified Wildlife Biologist
Dr. Jarrod Fogarty, Wildlife Ecologist
Mr. Tyler Harris Wildlife Field Biologist

Contributors and co-authors

Phillip Barbour, Botanist
Kyle Van Why, Wildlife Biologist

FINAL REPORT

Endangered and Threatened Species Survey of Columbus Air Force Base Columbus, Mississippi

September 13, 2005

Submitted by:

J.M. Waller Associates, Inc.

Written by:

Dr. Jeanne C. Jones,
Certified Wildlife Biologist, TWS
1323 Singleton Church Road
Louisville, Mississippi 39339
(662) 779-0973
jjones@cfr.msstate.edu

and

Dr. Jarrod Fogarty, Wildlife Ecologist
Mr. Tyler Harris Wildlife Field Biologist
Starkville, Mississippi
(662) 418-5848
jhfl@ra.msstate.edu

Contributors and co-authors

Phillip Barbour, Botanist
Box 9690
Mississippi State, MS 39762

and

Kyle Van Why,
Wildlife Biologist
USDA-Wildlife Services
595 1st St., Suite 3
Columbus AFB, MS 37910

Table of Contents

1.0 INTRODUCTION..... 1
2.0 OBJECTIVES 1
3.0 METHODS 1
 3.1 Habitat Types 1
 3.2 Summary of Survey Methods 2
4.0 RESULTS 4
 4.1 Protected Fauna..... 4
 4.2 Rare Plants 6
5.0 REFERENCES..... 7

Tables

Table 1 Survey Methods Used To Detect State and Federally Listed Flora and Fauna at Columbus Air Force Base, Mississippi (August 2004-July 2005).8
Table 2 Threatened, Rare, Endangered, and Sensitive Fauna that Could Inhabit Columbus Air Force Base, Lowndes County, Mississippi Due to Historical Distributions and Habitat Requirements, Mississippi (USFWS and MNHP Listings as of June 2005).....9

Figures

Figure 1 General habitat types and permanently established sampling sites for rare species surveys at Columbus Air Force Base, MS, 2004-2005.....10

Appendices

Appendix A Plant and Animal Species Found at Selected Wetland Sites on Columbus Air Force Base, 2004-2005
Appendix B Plant Survey of Columbus Air Force Base, Mississippi
Appendix C Wildlife Hazard Assessment Species List, Columbus Air Force Base, Mississippi

1.0 INTRODUCTION

In response to requests from professionals of Columbus Air Force Base (CAFB) and J. M. Waller Associates, Inc. (JMWA), threatened and endangered species surveys were conducted on Columbus Air Force Base in Lowndes County, Mississippi from August 2004 through August 2005. The survey was conducted to comply with requirements of the Endangered Species Act (NEPA), to augment information required for the National Environmental Policy Act, and to enhance the scope of integrated natural resources management at CAFB. Survey methods utilized in this effort were employed to increase the potential for detection of state and federally listed species. During surveys, records were maintained on species sightings, sign, or sounds and habitat types were identified and described in terms of dominant vegetative cover types (Appendices A – C).

2.0 OBJECTIVES

The primary objective of this effort was to develop and perform surveys that would lead to the detection of state and federally listed flora and fauna. Major objectives were as follows:

1. To detect and report the presence of threatened, endangered or concern species as designated by the Mississippi Natural Heritage Program (MNHP) or U.S. Fish and Wildlife Service (USFWS);
2. To provide information on habitat conditions that may support selected rare species; and
3. To document occurrence of highly mobile, federally listed species that may occur within a five mile radius of CAFB.

3.0 METHODS

Sampling methodologies used varied depending on the species targeted for detection. Table 1 lists sampling methods used for detection of protected species on Columbus AFB. These methods were selected based on species or species' group seasonal activity or residency and were selected to increased probability of detection due to greater visibility and vocalization. Species or species groups in Table 2 exhibit distributional ranges that encompass the central part of Mississippi; thus, these species could inhabit CAFB (USFWS and MNHP databases).

3.1 Habitat Types

The CAFB land base was evaluated for initial habitat typing through the use of current maps and coverages supplied by environmental resources professionals of CAFB (Figure 1). After inspection of these resources, field inspections were conducted to validate and identify major habitat types on the landscape. Major habitat types identified at CAFB include the following:

1. Maintained vegetation of operational, training, and residential areas;
2. Old field habitats and young forest stands along roadsides, wetland edges, and small clearings with sparse tree or shrub cover;
3. Pine and mixed pine hardwood forests occurring on upland and floodplain ridge sites;
4. Bottomland hardwood forests within floodplain;
5. Forested and shrub wetlands within floodplain; and
6. Other, including manmade impoundments, channelized and maintained stream, bridges, abandoned buildings, and canvas structures.

Of the habitat types occurring at CAFB, maintained and old field vegetation comprised most of the total acreage with bottomland hardwood forests being the dominant forest type followed by mixed pine hardwood and young age class pine forests. Within bottomland hardwood forest types, forested and shrub wetlands occur seasonally depending on rainfall amounts, topography, and flood pulse. Other habitat types total less than 10% of the total acreage; however, these habitats influence wildlife occurrence and species richness especially in areas where streams and water bodies occur and create terrestrial-aquatic ecosystem ecotones. Of the habitats at CAFB, bottomland hardwood forests and associated wetlands exhibited the highest probabilities of supporting protected fauna and flora.

3.2 Summary of Survey Methods

Based on habitat surveys, areas that may support rare species are generally associated with permanent water bodies, temporary pools, and forested wetlands. Ten sites were selected for intensive, replicated surveys (Figure 1). These sites were marked with flagging and surveyed to create a baseline list of plants found at each site. We returned to flagged sites during the winter, spring and summer months of 2005 to conduct additional frog call surveys, area searches, and plant surveys. Plant lists were developed for these sites, and lists were updated through July 1, 2005, with plant species being added as they were detected. Presence of animals, vocalizations, and animal sign (scat and tracks) were recorded at each plant survey site. Intensive animal surveys were conducted at three of the selected sites. Intensive surveys consist of a 30-minute time-constrained search by two investigators. Survey efforts were least intensive in December 2004 due to inundation of all study sites.

Birds

Visual transect surveys were conducted in older age class pine stands to detect the presence of red-cockaded woodpeckers (RCW; *Picoides borealis*), and new, active, or abandoned RCW cavities in pine trees of greater than 45 years of age. We conducted auditory and visual surveys to detect Bachman's Sparrows (*Aimophila aestivalis*) and Bald Eagles (*Haliaeetus leucocephalus*). Searches were continued to detect protected spring migrant and breeding birds with special emphasis on searches for foraging or nesting RCW's and Bachman's Sparrows.

Point count surveys were conducted at seven locales during April-May 2005. Birds were also recorded when incidentally sighted or heard during other inventories. Mist netting was not performed during winter months for the detection of wintering birds due to potential negative effects on captured birds under adverse climatic conditions (< 40° F with rainy conditions). Additionally, old field grassland habitats at CAFB were determined to be inadequate size and quality for Bachman's Sparrows which would have been the primary species targeted for detection with use of mist nets. Thus, mist netting was not conducted during our surveys.

Mammals

Searches to detect rare bat species were conducted during May 2005 and included inspection of bridges, culverts, abandoned buildings and canvas huts, and selected large cavity trees. Buildings within the residential and operational areas of CAFB were not inspected for bat occurrence. Crevices and cavities of searched structures were visually inspected during daylight hours to detect resting and roosting bats. Hollow trees with basal cavities were inspected through the use of a mirror and flash light. During all surveys, sightings and observations of mammal sign, calls and sounds, and sightings were recorded (Appendix A). During flora, reptile, and amphibian

sampling, scientists intensified searches for scat and tracks of Louisiana Black Bear (*Ursus americanus luteolus*). Additional information on mammals and birds was supplied by Mr. Kyle Van Why, Wildlife Biologist for USDA-Wildlife Services (Appendix C).

Reptiles and Amphibians

Ground and debris ground searches were conducted along streamside and wetland areas to evaluate habitat conditions and occurrence of southern red and Webster's salamanders (*Pseudotriton ruber vioscai* and *Plethodon websteri*). Searches of downed woody debris, logs, and leaf litter for crawfish frogs (*Rana areolata*), southern red salamanders, and Webster's salamanders were conducted from fall 2004 through spring 2005. These species are most active during the late fall through early spring. Because crawfish frogs initiate their breeding cycles during late winter and early spring months, call counts were conducted to detect this species at temporary and floodplain wetlands during dusk and evening hours from February through March 2005. During spring and summer inspection of wetlands, scientist searched for signs of American Alligators (*Alligator mississippiensis*). Because CAFB has numerous waterbodies and floodplain habitats adjacent to the Tennessee Tombigbee Waterway, there is a high probability that alligators disperse through and utilize CAFB habitats. Habitat conditions are suitable for transient use by this reptile in larger acreage wetlands (greater than 1 acre) of CAFB.

Invertebrates (Freshwater mussels)

One stream that could support freshwater mussels transects CAFB. This stream is maintained through channelization and placement of riprap for bank stabilization; thus, habitat conditions are generally inadequate for sensitive mussels' species. In an effort to determine the occurrence of rare or protected mussels on adjacent lands, we communicated with MNHP and U.S. Army Corps of Engineers (USACE) biologists. Based on communication with these professionals, the likelihood of state or federally listed mussels inhabiting habitats of CAFB is minimal. Despite the low probability of rare mussel occurrence, we sampled flowing water habitats on CAFB by inspection to detect shells and living specimens of freshwater mussels and sieving of gravel and sand substrates during spring 2005.

Rare Plants

Surveys to detect state and federally listed plants were conducted in September 2004 and May-June 2005. Early successional and maintained habitats were inspected to detect the occurrence of rare or federally listed plants. Based on habitat requirements of Price's Potato Bean (*Apios priceana*), a federally listed species that could occur at CAFB, wetland edges and mesic openings were most intensely inspected through 100% coverage of suitable habitats. For preliminary detection of state listed species, all forested areas of ≥ 2 acres in size were inspected by investigators walking approximately 150 feet apart to conduct preliminary surveys and search for sensitive areas. Following this effort, one large forested section on the northwest side of the base was identified as potential habitat for rare flora and was surveyed by investigators walking through the section and inspecting marked linear transects that a spaced about 30 feet apart. This site was revisited and inspected by the consultant botanist in June 2005. All plants not identifiable in the field were collected, pressed, and identified in the lab.

4.0 RESULTS

4.1 Protected Fauna

We did not detect federally threatened or endangered fauna as listed by the USFWS. We did not detect RCW's or their nesting cavities. Pines of adequate size existed on ridges in some areas of CAFB; however, well-developed midstory and bottomland habitat conditions produced unsuitable nesting and foraging habitats for RCW's. Upland, mature pine habitats support colonies of RCW's at Noxubee National Wildlife Refuge which is located over 45 miles from CAFB. Dispersal of RCW's from this distance is highly unlikely. We did not detect Bachman's Sparrows during winter or spring point count or transect surveys. Although we did not detect Bachman's Sparrows, this species could be attracted to roadsides and meadows of CAFB during dispersal or migration. Habitat quality for breeding populations of Bachman's Sparrows is marginal to poor due to size of grassland habitats and density of over story and midstory cover. Therefore, the Bachman's Sparrow may be primarily a transitory resident of CAFB and would generally not be threatened by ongoing training and management activities. A Grasshopper Sparrow (*Ammodramus savannarum*) was observed using maintained vegetation near the airfield in late June 2005. Due to the time of sighting, this bird species was probably breeding on CAFB. Although this bird has no state or federal status, this sighting was significant due to the scarcity of this sparrow statewide and the rarity of breeding groups of Grasshopper Sparrows in Mississippi.

Most habitats at CAFB are inadequate for resident use by Bald Eagles. However, due to the impoundments on the base and regular use by breeding and wintering eagles along the Tennessee Tombigbee Waterway (TTW), eagles could utilize the base when moving to and from nesting and wintering areas along the TTW. For example, at least three active eagle nests are located within 5 miles of the CAFB along the TTW and associated lakes (USACE Eagle Survey 2004-2005). Due to home range and foraging distance, these nesting eagles and their fledglings could potentially inhabit CAFB during movements associated with foraging and dispersal. Therefore, natural resource managers should be aware of the potential for eagles to move across CAFB landscapes, and young adult eagles that are dispersing from their "birth place" may utilize ponds and impoundments during dispersal. Therefore, educational programs or materials to increase awareness about eagle conservation among employees, contractors, and enlisted personnel are recommended. This education should focus on restrictions on taking eagles which includes collecting, harming, injuring, harassment, disturbance, or killing of eagles. Additionally, because young eagles often lack the identifiable white head coloration of mature adults, educational information should also focus on identification of immature and mature bald eagles.

If eagle nesting sites are detected on CAFB in future years, wildlife biologists of the USFWS Ecological Services Office in Jackson, MS should be contacted at (601) 321-1121. Additional information and assistance with conservation education can be obtained from the Mississippi Natural Heritage Program in Jackson, MS (phone number: 601, 354-7303; contact: Charles Knight or Libby Hartfield). We also recommend that natural resources professionals at CAFB contact the US Army Corps of Engineers so that they can become involved and gain information from eagle surveys conducted by USACE biologists. This action will allow CAFB managers to garner information about eagles that utilize the Tennessee-Tombigbee Waterway (TTW), the Tombigbee River watershed and corridor habitats, which are in close proximity to CAFB. {Contact information: Danny Hartley or Jason Ross, USACE Wildlife Biologists, Phone: (662)

327-2142}. Within CAFB operational areas, quality habitat for Bald Eagles is lacking; thus, negative impacts to this raptor's populations are not anticipated with ongoing training activities.

Other federally and state-listed birds that may occur within the locale of CAFB included Wood Storks (*Mycteria americana*) and Bewick's Wren (*Thryomanes bewickii*). We did not detect these species during our surveys. We do not anticipate that Bewick's Wren would inhabit CAFB due to the rareness of this species, its habitat requirements, and the available habitat at CAFB. Although we did not detect Wood Storks during our surveys, Wood Storks may use CAFB impoundments and wetlands in a transitory manner. The probability of transient use for resting or foraging is high due to the location of CAFB along the TTW. The potential for transitory occurrence is also enhanced due to the vast movements (> 1,000 miles) exhibited by Wood Storks during migration and the annual occurrence of these birds on USACE, USFWS, and private properties located within 3 to 45 miles of CAFB (i.e. TTW and associated wetlands and lakes, aquaculture units in Lowndes, Clay, Oktibbeha, and Noxubee counties, in privately-owned ponds and wetlands located within 10 miles of CAFB, and at Noxubee National Wildlife Refuge, Noxubee county).

The TTW, managed by the USACE, serves as a corridor for many migratory birds, including Wood Storks and other water birds, passerines, waterfowl, and raptors, such as Bald Eagles. Cooperation of CAFB with USACE in Wood Stork and Bald Eagle conservation and surveys is recommended to attain goals set forth in Department of Defense guidelines for cooperative landscape level, ecosystem management and protection of biological diversity. Therefore, we recommend similar actions as those aforementioned for Bald Eagles. Additionally, the USACE conducts periodic water bird surveys along the TTW, and this information can be acquired by contacting aforementioned USACE biologists or the MNHP at (601) 354-7303.

We did not detect any of the following freshwater mussel species: Southern Creekmussel (*Strophitus subvexus*), Southern Clubshell (*Pleurobema decisum*), or Rayed Creekshell (*Anodontooides radiatus*). We found a lack of freshwater mussels in stream habitats of CAFB, and determined that habitat conditions for protected mussel species was of poor quality.

Although our surveys did not detect the presence of protected fauna at CAFB, several species of birds were detected that have high concern conservation concern scores as designated by the Partners-in-Flight Program of the American Ornithological Union. These birds included Northern Parula, American Redstart, Indigo Bunting, Prairie Warblers, Field Sparrow, and Grasshopper Sparrow (Appendix A and C). Indigo Buntings, Field Sparrows, and Prairie Warblers were using early successional grassland, shrub, and edge habitats; thus, retention of these habitats would benefit these songbirds. A Grasshopper Sparrow was observed using maintained vegetation; typically this species utilizes old fields and grasslands for feeding, nesting, and escape cover (see note in Appendix B). Retention of open grasslands dominated by native herbaceous plants will benefit the aforementioned grassland bird species and ecotones dominated by native shrubs and vines, such as wild plum and blackberry will continue to provide habitat for birds that forage and nest in midstory habitats.

To retain habitat quality for forest dwelling thrushes and warblers, such as northern parula, amphibians, and aquatic reptiles, we recommend that bottomland hardwood forests and forested wetlands be managed with minimal disturbance. Protective buffers of at least 75 feet in width should be retained along streams and wetlands. Cavity trees should be retained for cavity nesting

birds and mammals. These measures should attract wildlife away from training areas and should result in protection rare plants that were detected during surveys during late June 2005.

4.2 Rare Plants

We did not detect any federally listed plant species at CAFB. One iris species was detected that could possibly be listed by the MNHP; thus, this plant should be protected from destruction or collection. This unidentified *Iris* occurs on CAFB in moist to wet, bottomland hardwood forest near and along a small stream (drainage ditch). Two separate populations are in what appears to be stable habitat, meaning there are no imminent threats. Based on a review of several Floras^{a, b, c, d} and from discussions with John MacDonald and Sydney McDaniel, the *Iris* is likely one of two species, both of which are rare. The unknown could be either *Iris brevicaulis* Raf., Short-stem Iris or *Iris hexagona* Walter, Carolina Iris, or Dixie Iris. *Iris brevicaulis* is considered the rarer of the two by Sydney McDaniel. *Iris brevicaulis* is known to be a shy bloomer and may go undetected or unnoticed because of its propensity to not flower. *Iris hexagona* is not known to be a shy bloomer and probably blooms annually in natural conditions. A sterile (not blooming) living *Iris hexagona* growing in a pot at John MacDonald home was inspected by the consultant botanist, Phillip Barbour in June 2005. The plant from CAFB looks very much like John's potted plant. John's collection of *Iris brevicaulis* from Monroe County along the Tombigbee River was of a flowering plant very short in stature (30-40 cm in height) which is inconsistent with the plants at CAFB. However, from descriptions in the cited floras, the sterile *Iris* found at CAFB is well within the ranges of length and width of leaf measurements for *Iris brevicaulis*. Leaves of *Iris brevicaulis* are described in at least one source as being flaccid, while leaves of *Iris hexagona* are described as being erect. The CAFB *Iris* had erect, not flaccid leaves. Whichever species it is, the habitat requirements are likely very similar. The MNHP is tracking *Iris brevicaulis* but is not tracking *Iris hexagona* (personal communication with Heather Sullivan). No specific state guidelines or protection requirements are delineated for the two rare *Iris* species discussed herein. To protect this rare plant, we recommend retention of conditions that currently exist in these forested wetlands. During forestry operations or construction, we recommend a protective buffer of at least 75 feet around wetlands to create a safe zone for rare plants and many wildlife species. These 2 species occur along margins of wetlands, so the sites should not be inundated permanently, or for extensive periods (unnaturally). Hydrology of the sites should not be altered through ditching, drainage or high levels of sediment deposition. Additionally, removal of forest cover could cause alteration of hydrology. It appears the sites are low in elevation, and stay wet for extended periods following rain events. The populations present are likely adapted to whatever the hydrology in that area has been for the past decade or more. These plants are located in the same habitats that support the highest abundance of amphibians, forest and wetland birds, and aquatic and semi aquatic reptiles; thus, we recommend that these forested wetlands be retained to support biological diversity of CAFB.

5.0 REFERENCES

- ^a MacDonald, J. 1996. A survey of the flora of Monroe County, Mississippi. Thesis, Mississippi State University, Mississippi State, Mississippi, USA.
- ^b Radford, A.E., H.E. Ahles, and C. R. Bell. 1964. Manual of the vascular flora of the Carolinas. The University of North Carolina Press. Chapel Hill, N.C., USA.
- ^c USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). National Data Center, Baton Rouge, LA 70874-4490 USA.
- ^d Steyermark, J.A. 1963. Flora of Missouri. The Iowa State University Press. Ames, Iowa, USA.

Table 1 Survey methods used to detect state and federally-listed flora and fauna at Columbus Air Force Base, Mississippi (August 2004-July 2005).

Species group	Survey Method	Method description and survey periods
Anurans - Frogs and Toads (Crawfish Frog)	Anuran call counts	Minimum of two surveys monthly following sunset from February - May.
Salamanders (Southern Red Salamander)	Forest litter and deadwood searches	Minimum of two surveys monthly in hardwood forests from November-January and March-April.
Reptiles (Map Turtles <i>Graptemys</i> spp.)	Evaluation of habitat; basking surveys	Condition of lotic habitats were evaluated for map turtles and if suitable habitat is found, basking surveys were conducted.
Fishes, amphibians, aquatic invertebrates	Sweep netting Substrate sieving	Sweep netting in selected wetlands to detect aquatic fauna and inspection of sand/gravel substrates of to detect mussels in spring.
Wintering passerines and raptors	Transect surveys	Flush counts along established transects in open canopy pine forests or grass dominated, old field habitats from September-January.
Raptors, wading birds (Sharp-shinned, Cooper's Hawks, Osprey, Bald Eagle, and Wood Stork)	Call counts, wetland surveys, and point counts	Point count and transect surveys September through May for Buteos and Accipiters. Inspection of wetland sites and communication with natural resource professionals (USACE, Columbus AFB, USFWS) from September-May for detection of Eagles, Wood Storks, and Ospreys; reference to annual eagle survey conducted on TTW by USACE.
Breeding passerines and woodpeckers including Red- cockaded Woodpeckers	Point count surveys; Inspection of mature pine for RCW cavities	Permanent listening stations established within major habitat types; all birds seen or heard recorded according to species; Inspection of all mature pine trees within suitable habitat for RCW inspected for start cavities, active cavities, or abandoned cavities.
Mammals (Louisiana Black Bear)	Sign identification Communication with biologist	During all other faunal and floral surveys, mammal sign (tracks, feces, scent mounds, burrows, feeding sign, and lodges or dens) were recorded and listed.
Flora	Transect surveys	≥ 95% coverage of forested and wetland habitats potentially supporting state or federally listed plants from June-September.

Table 2 Threatened, Rare, Endangered, and Sensitive Fauna that could inhabit Columbus Air Force Base, Lowndes County, Mississippi due to historical distributions and habitat requirements, Mississippi (USFWS and MNHP listings as of June 2005).

Scientific Name	Common Name	Federal Status	State Rank	Occurrence Status on CAFB
		USFWS	MNHP	
Birds				
<i>Picoides borealis</i>	Red-Cockaded Woodpecker	Endangered	S1	Not detected
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Threatened (recovered, monitored)	S1,S2	Not detected
<i>Mycteria americana</i>	Wood Stork	Threatened (eastern population)		Not detected
<i>Grus canadensis pulla</i>	Mississippi Sandhill Crane	Endangered		Transitory Sandhill Crane observed in runway area, not identified to species
<i>Aimophila aestivalis</i>	Bachman's Sparrow		S3	Not detected
<i>Thryomanes bewickii</i>	Bewick's Wren		S3?	Not detected
Mammals				
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat		S3?	Not detected
<i>Myotis austroriparius</i>	Southeastern Myotis		S1?B,S1,N	Not detected
Reptiles				
<i>Alligator mississippiensis</i>	American Alligator	Threatened (reclassified & monitored)		Not detected
<i>Graptemys pulchra</i>	Alabama Map Turtle		S3?	Not detected
<i>Macrocllemys temminckii</i>	Alligator Snapping Turtle		S3?	Not detected
Amphibians				
<i>Plethodon websteri</i>	Webster's Salamander		S3	Not detected
<i>Pseudotriton ruber voiscai</i>	Southern Red Salamander		S3	Not detected
<i>Rana areolata</i>	Crawfish Frog		S3	Not detected
Invertebrates (Mussels)				
<i>Andontoidea radiatus</i>	Rayed Creekshell		S2	Not detected
<i>Pleurobema decisum</i>	Southern Clubshell	Endangered	S1, S2	Not detected
<i>Strophitus subvexus</i>	Southern Creekmussel		S2	Not detected

U.S. D. I. Fish and Wildlife Service (USFWS) Rankings: E= Federally listed due to danger of becoming extinct; Threatened = Federally listed due potential for upgrading to endangered status due to habitat destruction and population declines; Mississippi Natural Heritage Program (MNHP) S1-S4 = State rankings and are as follows: S1= Critically imperiled in Mississippi because of extreme rarity; S2 = Imperiled in Mississippi because of rarity; S3 = Rare and uncommon in Mississippi; C= Candidate for Federal T&E list. (S1-S3? Rankings require clarification from MNHP).

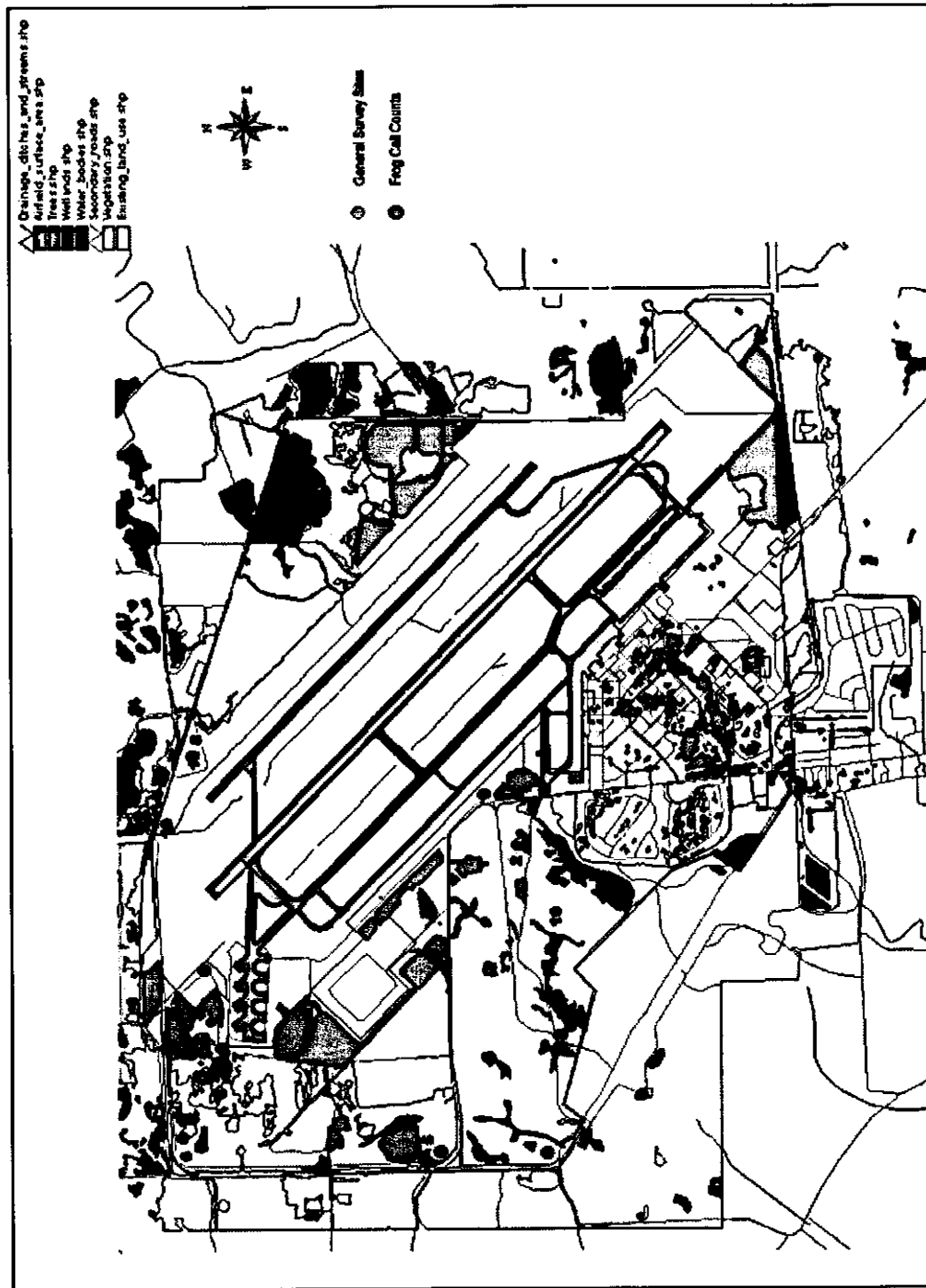


Figure 1: General habitat types and permanently established sampling sites for rare species surveys at Columbus Air Force Base, MS, 2004-2005

Appendix A

**Plant and Animal Species Found at Selected Wetland Sites on
Columbus Air Force Base, 2004-2005**

Table A1: Plants detected in selected wetlands and floodplain forests at Columbus Air Force Base from September 2004-June 28, 2005 (continued).

Plant Species	SS7 Pond	SS1 P-Hwd Pool	SS2 Hwd FP	SS8 Hwd FP	SS5 Hwd Pool	SS6 Pond FP	SS4 Hwd Pool	SS3 Hwd Pool	SS10 P-Hwd FP
<i>Iris brevicaulis</i> Lamance Iris			X						
<i>Lactuca floridana</i> Florida Lettuce						X		X	
<i>Lobelia cardinalis</i> Cardinalflower						X	X		
<i>Lycopus virginicus</i> Bugle-weed			X						
<i>Ludwigia alternifolia</i> Seedbox					X	X			
<i>Micranthemum umbrosum</i> Wetland Figwort						X			
<i>Onoclea sensibilis</i> Sensitive Fern			X					X	
<i>Oxalis stricta</i> Yellow Woodsorrel							X		X
<i>Passiflora incarnata</i> Maypop Passionflower						X	X	X	X
<i>Penstemon tenuis</i> Sharpsepal Beardtongue			X			X			
<i>Penthorum sedoides</i> Ditch Stonecrop							X		
<i>Phytolacca americana</i> Common Pokeweed				X			X		X
<i>Plantago aristata</i> Bracted Plantain						X			
<i>Plantago rugelii</i> Blackseed Plantain						X			
<i>Pluchea camphorate</i> Stinkweed		X				X		X	
<i>Podophyllum peltatum</i> May-apple							X	X	
<i>Polygonum scandens</i> Climbing Smartweed							X	X	
<i>Polygonum</i> spp. Smartweed	X		X		X	X		X	X
<i>Polypremum procumbens</i> Rustweed			X						
<i>Potamogeton diversifolius</i> Waterthread Pondweed								X	
<i>Ptilimnium capillaceum</i> Mock Bishop's-weed						X			
<i>Rhexia mariana</i> Maryland Meadow-beauty			X						
<i>Rhexia virginica</i> Meadowbeauty	X								
<i>Rudbeckia hirta</i> Black-eyed Susan	X		X						
<i>Sanicula smallii</i> Small's Snakeroot			X						
<i>Saururus cernuus</i> Lizard's Tail		X	X	X	X		X	X	
<i>Scutellaria elliptica</i> Hairy Skullcap			X				X		
<i>Sisyrinchium altanticum</i> Blue-eyed Grass						X			

Table A1: Plants detected in selected wetlands and floodplain forests at Columbus Air Force Base from September 2004-June 28, 2005 (continued).

Plant Species	SS7 Pond	SS1 P-Hwd Pool	SS2 Hwd FP	SS8 Hwd FP	SS5 Hwd Pool	SS6 Pond FP	SS4 Hwd Pool	SS3 Hwd Pool	SS10 P-Hwd FP
<i>Solanum carolinense</i> Horsenettle								X	
<i>Solidago</i> spp. Goldenrod	X					X		X	
<i>Tradescantia ohiensis</i> Common Spiderwort			X					X	
<i>Utricularia biflora</i> Bladderwort	X								
<i>Verbena brasiliensis</i> Brazil vervain	X								
<i>Vernonia</i> spp. Ironweed	X								
Legumes									
<i>Centrosema virginianum</i> Spurred Butterfly Pea						X	X		
<i>Chamaecrista fasciculata</i> Partridge Pea	X					X		X	
<i>Desmodium</i> spp. Beggarrlice		X	X						X
<i>Lespedeza cuneata</i> Sericea Lespedeza	X					X			
<i>Lespedeza repens</i> Creeping Lespedeza							X	X	
<i>Lespedeza virginica</i> Slender Bush Clover						X			
<i>Tephrosia spicata</i> Loose-flowered Goat's Rue						X			
<i>Trifolium</i> spp. Clover								X	
Grasses, Sedges, Rushes									
<i>Andropogon virginicus</i> Broomsedge						X			
<i>Carex glaucescens</i> Waxy Sedge			X	X	X		X		
<i>Carex lupulina</i> Hop Sedge		X	X						
<i>Chasmanthium laxum</i> Spike Uniola			X						
<i>Cyperus odoratus</i> Flatsedge	X			X	X	X			
<i>Cynodon dactylon</i> Bermudagrass	X								
<i>Dichanthelium</i> spp. Low Panicgrass	X							X	
<i>Digitaria</i> spp. Crabgrass	X							X	
<i>Juncus polycephalus</i> Manyhead Rush	X								
<i>Panicum</i> spp. Panicgrass								X	
<i>Paspalum</i> spp. Paspalum Grass					X				
<i>Rhynchospora corniculata</i> Shortbristle Horn Beaksedge	X				X				

Table A1: Plants detected in selected wetlands and floodplain forests at Columbus Air Force Base from September 2004-June 28, 2005 (continued).

Plant Species	SS7 Pond	SS1 P-Hwd Pool	SS2 Hwd FP	SS8 Hwd FP	SS5 Hwd Pool	SS6 Pond FP	SS4 Hwd Pool	SS3 Hwd Pool	SS10 P-Hwd FP
<i>Setaria glauca</i> Yellow Foxtail								X	
<i>Sorghum halepense</i> Johnsongrass	X		X			X			
<i>Tridens flavus</i> Purpletop								X	
Woody Small Plants/Vines									
<i>Berchemia scandens</i> Alabama Supplejack				X			X		
<i>Bignonia capreolata</i> Crossvine				X					
<i>Brunnichia</i> spp. Buckwheat Vine	X			X	X	X	X		
<i>Campsis radicans</i> Trumpet creeper	X				X	X	X		X
<i>Lonicera japonica</i> Japanese Honeysuckle	X				X				X
<i>Mikania scandens</i> Climbing Hempvine								X	
<i>Parthenocissus quinquefolia</i> Virginia Creeper		X	X	X	X	X	X	X	X
<i>Rubus</i> spp. Blackberry	X			X	X	X	X	X	X
<i>Sabal minor</i> Palmetto						X		X	
<i>Smilax</i> spp. Greenbrier	X		X	X	X	X	X		
<i>Toxicodendron radicans</i> Poison-ivy	X			X	X		X		X
<i>Vitis rotundifolia</i> Wild Grape					X		X	X	X
Shrubs									
<i>Aralia spinosa</i> Devil's Walkingstick			X				X		X
<i>Baccharis halimifolia</i> Eastern Baccharis	X								
<i>Callicarpa americana</i> American Beautyberry							X		X
<i>Cephalanthus occidentalis</i>	X		X				X		
<i>Euonymus americanus</i> Strawberry Bush			X					X	
<i>Foresteria acuminata</i> Swamp Privet						X			
<i>Ilex deciduas, I. opaca</i> Holly				X			X		X
<i>Ligustrum sinense</i> Chinese Privet							X		
<i>Rhododendron canescens</i> Wild Azalea							X	X	
<i>Rhus copallina</i> Winged Sumac						X			
<i>Sebastiania fruticosa</i> Sebastian Bush		X	X	X		X	X		X

Table A1: Plants detected in selected wetlands and floodplain forests at Columbus Air Force Base from September 2004-June 28, 2005 (continued).

Plant Species	SS7 Pond	SS1 P-Hwd Pool	SS2 Hwd FP	SS8 Hwd FP	SS5 Hwd Pool	SS6 Pond FP	SS4 Hwd Pool	SS3 Hwd Pool	SS10 P-Hwd FP
<i>Symplocos tinctoria</i> Sweetleaf					X				
<i>Vaccinium spp.</i> (<i>V. arboreum</i> , <i>V. elliotii</i>) Wild Blueberry	X		X	X	X	X	X		X
Trees									
<i>Acer rubrum</i> Red Maple	X		X	X	X		X		X
<i>Albizia julibrissin</i> Mimosa-tree	X					X		X	
<i>Alnus serrulata</i> Tag Alder								X	
<i>Asimina triloba</i> Pawpaw			X						
<i>Betula nigra</i> River Birch	X					X			
<i>Carya tomentosa</i> Mockernut Hickory					X				X
<i>Cornus florida</i> Flowering Dogwood				X					
<i>Cornus stricta</i> Swamp Dogwood						X	X		
<i>Crataegus marshallii</i> Parsley Hawthorn									X
<i>Diospyros virginiana</i> Common Persimmon	X			X					
<i>Fagus grandifolia</i> American Beech									X
<i>Fraxinus pennsylvanica</i> Green Ash	X					X			X
<i>Juniperus virginiana</i> Eastern Redcedar	X					X			X
<i>Liquidambar styraciflua</i> Sweetgum	X		X	X	X	X	X		X
<i>Liriodendron tulipifera</i> Tulip Poplar			X			X	X		
<i>Magnolia virginiana</i> Sweet Bay Magnolia		X	X						
<i>Morus rubra</i> Red Mulberry			X						
<i>Nyssa spp.</i> (<i>N. aquatica</i> , <i>N. sylvatica</i>) Water Tupelo, Blackgum			X	X	X		X		
<i>Ostrya virginiana</i> Eastern Hophornbeam							X		X
<i>Oxydendrum arboretum</i> Sourwood			X						
<i>Pinus taeda</i> Loblolly Pine	X		X	X	X	X	X		X
<i>Prunus angustifolia</i> Chickasaw Plum	X								X
<i>Prunus mexicana</i> Mexican Plum							X		
<i>Prunus serotina</i> Black Cherry	X					X			

Table A1: Plants detected in selected wetlands and floodplain forests at Columbus Air Force Base from September 2004-June 28, 2005 (continued).

Plant Species	SS7 Pond	SS1 P-Hwd Pool	SS2 Hwd FP	SS8 Hwd FP	SS5 Hwd Pool	SS6 Pond FP	SS4 Hwd Pool	SS3 Hwd Pool	SS10 P-Hwd FP
<i>Pyrus calleryana</i> Bradford Pear						X			
<i>Quercus alba</i> White Oak			X		X				X
<i>Quercus falcate</i> Southern Red Oak									X
<i>Quercus lyrata</i> Overcup Oak				X				X	
<i>Quercus michauxii</i> Swamp Chestnut Oak									X
<i>Quercus hemisphaerica</i> Laurel Oak				X					X
<i>Quercus nigra</i> Water Oak	X			X	X				X
<i>Quercus phellos</i> Willow Oak	X		X			X	X		
<i>Quercus rubra</i> Northern Red Oak									X
<i>Quercus stellata</i> Post Oak									X
<i>Rhamnus caroliniana</i> Carolina Buckthorn						X			
<i>Robinia pseudoacacia</i> Black Locust						X			
<i>Salix nigra</i> Black Willow	X					X			
<i>Sassafras albidum</i> Sassafras							X		
<i>Ulmus alata</i> Winged Elm	X				X	X	X		

Table A2: Animals detected at Columbus Air Force Base in selected wetlands from September 2004 through June 28, 2005 (continued).

Animals	SS7 Pond	SS1 P-Hwd Pool	SS2 Hwd FP	SS8 Hwd FP	SS5 Hwd Pool	SS6 Pond FP	SS4 Hwd Pool	SS3 Hwd Pool	SS10 P-Hwd FP
<i>Cardinalis cardinalis</i> Northern Cardinal	X (v)		X (c)			X (v)		X (c)	
<i>Casmerodius albus</i> Great White Egret	X (v)								
<i>Ceryle alcyon</i> Belted Kingfisher	X (v)								
<i>Charadrius vociferous</i> Killdeer	X (v)								
<i>Contopus virens</i> Eastern Wood Pewee		X (c)	X (c)			X (v)			
<i>Corvus brachyrhynchos</i> American Crow	X (v)		X (c ^b)			X (v)		X (c)	
<i>Cyanocitta cristata</i> Blue Jay			X (c)					X (c)	
<i>Dendroica pinus</i> Pine Warbler	X (c)		X (c)			X (c)			
<i>Dryocopus pileatus</i> Pileated Woodpecker			X (c)					X (c)	
<i>Dumetella carolinensis</i> Gray Catbird									
<i>Icterea virens</i> Yellow-breasted Chat	X (c)							X (c)	
<i>Melanerpes carolinus</i> Red-bellied Woodpecker			X (c)					X (c)	
<i>M. erythrocephalus</i> Red-headed Woodpecker		X(c,v)	X (c)					X (c)	
<i>Mimis polyglottos</i> Northern Mockingbird	X (v)								
<i>Strix varia</i> Barred Owl								X (c)	
<i>Parula americana</i> Northern Parula		X (c)							
<i>Passerina cyanea</i> Indigo Bunting	X (c)					X (v)		X (c)	
<i>Pipilo erythrophthalmus</i> Eastern Towhee		X (c)							
<i>Spizella pusilla</i> Field Sparrow	X (v)								
<i>Thryothorus ludovicianus</i> Carolina Wren	X (c)		X (c)			X (c)		X (c)	
<i>Toxostoma rufum</i> Brown Thrasher	X (v)	X (v)							
<i>Turdus migratorius</i> American Robin	X (v)								
<i>Vireo griseus</i> White-eyed Vireo			X (c)			X (c)			
<i>V. olivaceus</i> Red-eyed Vireo			X (c)					X (c)	

Table A2: Animals detected at Columbus Air Force Base in selected wetlands from September 2004 through June 28, 2005 (continued).

Animals	SS7 Pond	SS1 P-Hwd Pool	SS2 Hwd FP	SS8 Hwd FP	SS5 Hwd Pool	SS6 Pond FP	SS4 Hwd Pool	SS3 Hwd Pool	SS10 P-Hwd FP
Mammals									
<i>Dasyopus novemcinctus</i> Nine-banded Armadillo			X (c)						X (s)
<i>Didelphis virginiana</i> Virginia Opossum			X (s ^b)						X (c)
<i>Odocoileus virginianus</i> White-tailed Deer		X (s)	X (s)						X (v)
<i>Procyon lotor</i> Raccoon			X (s)						
<i>Sciurus carolinensis</i> Gray Squirrel			X (c)						X (s)
<i>Lutra canadensis</i> River Otter	Incidental sightings of animal sign								
<i>Castor Canadensis</i> American Beaver	Incidental sightings of animal sign								
<i>Sylvlagus spp.</i> Cottontail and Swamp Rabbits	Incidental sightings of animal sign								

^a Wetland habitat types abbreviations are as follows:

- Pond - Permanent Pond of Water
- P-Hwd Pool - Temporary Pool surrounded by Pine-Hardwood Forests
- P-Hwd FP - Pine-Hardwood Forest Floodplain
- Hwd FP - Hardwood Forest Floodplain
- Hwd Pool - Temporary Pool surrounded by Hardwood Forests
- Pond FP - Permanent Pond of Water in Floodplain

^b Legend for method of animal detection:

- c - Vocalization of the animal (calls)
- s - Signs that are left behind by the animal (tracks)
- v - Visual encounter with the animal

Appendix B

Plant Survey of Columbus Air Force Base, Mississippi

Philip J. Barbour, Botanist

Survey Date - June 24, 2005

Table B1. Plants found in selected wetlands and floodplain forests and not previously reported from Columbus AFB, Lowndes County, Mississippi (June 2005; Survey Method: ground search and site inspection)

Family	Scientific Name	Common Name
Arecaceae	<i>Sabal minor</i> (Jaquin) Persoon	Palmetto
Annonaceae	<i>Asimina triloba</i> (L.) Dunal	Pawpaw
Apiaceae	<i>Chaerophyllum tainturieri</i> Hooker	Wild Chervil
Apiaceae	<i>Hydrocotyle verticillata</i> var. <i>verticillata</i> Thunberg. ^b	Whorled Marsh Pennywort
Apiaceae	<i>Ptilimnium capillaceum</i> (Michx.) Raf.	Mock Bishop's-weed
Apiaceae	<i>Sanicula smallii</i> E.P. Bicknell	Small's Snakeroot
Aspidaceae	<i>Onoclea sensibilis</i> L.	Sensitive Fern
Asteraceae	<i>Lactuca floridana</i> (L.) Gaertner	Florida Lettuce
Asteraceae	<i>Elephantopus carolinianus</i> Willd.	Carolina Elephant's foot
Asteraceae	<i>Helenium flexuosum</i> Raf.	Narrow-leaved Sunflower
Asteraceae	<i>Pluchea camphorata</i> (L.) Willd.	Stinkweed
Balsaminaceae	<i>Impatiens capensis</i> Meerb.	Jewel-weed
Berberidaceae	<i>Podophyllum peltatum</i> L.	May-apple
Betulaceae	<i>Alnus serrulata</i> (Aiton) Willd.	Tag Alder
Celastraceae	<i>Euonymus americanus</i> L.	Strawberry Bush
Cistaceae	<i>Helianthemum rosmarinifolium</i> Pursh	Rosemary Frostweed
Commelinaceae	<i>Tradescantia ohiensis</i> Raf.	Common Spiderwort
Convolvulaceae	<i>Bonamia humistrata</i> (Walt.) Gray	Southern Breweria
Cornaceae	<i>Cornus stricta</i> Lam.	Swamp Dogwood
Cyperaceae	<i>Carex lupulina</i> Muhl. ex Schkuhr.	Hop Sedge
Dioscoreaceae	<i>Dioscorea villosa</i> L.	Wild Yam
Ericaceae	<i>Rhododendron canescens</i> (Michx.) Sweet	Wild Azalea
Euphorbiaceae	<i>Sebastiania fruticosa</i> (Bartr.) Fern.	Sebastian Bush
Fabaceae	<i>Tephrosia spicata</i> (Walt.) T. & G.	Loose-flowered Goat's Rue
Iridaceae	<i>Iris brevicaulis</i> Raf. ^{b, d}	Lamance Iris
Iridaceae	<i>Sisyrinchium altanticum</i> E. Bickn.	Blue-eyed Grass
Lamiaceae	<i>Lycopus virginicus</i> L.	Bugle-weed
Lamiaceae	<i>Scutellaria elliptica</i> Muhl.	Hairy Skullcap
Lentibulariaceae	<i>Utricularia biflora</i> Lam.	Bladderwort
Magnoliaceae	<i>Liriodendron tulipifera</i> L.	Tulip-poplar
Magnoliaceae	<i>Magnolia virginiana</i> L.	Sweet Bay
Melastomataceae	<i>Rhexia mariana</i> L.	Maryland Meadow-beauty
Oleaceae	<i>Forestiera acuminata</i> (Michx.) Poir.	Swamp Privet
Plantaginaceae	<i>Plantago aristata</i> Michx.	Bracted Plantain
Plantaginaceae	<i>Plantago rugelii</i> Dcne.	Blackseed Plantain
Polygonaceae	<i>Polygonum scandens</i> L.	Climbing Knotweed
Potamogetonaceae	<i>Potamogeton diversifolius</i> Raf.	Waterthread Pondweed
Ranunculaceae	<i>Clematis crispa</i> L.	Leather-flower
Ranunculaceae	<i>Clematis reticulata</i> Walter	Leather-flower
Rosaceae	<i>Prunus mexicana</i> S. Wats.	Mexican Plum
Rosaceae	<i>Pyrus calleryana</i> Dcne.	Bradford Pear
Saururaceae	<i>Saururus cernuus</i> L.	Lizard's Tail
Saxifragaceae	<i>Penthorum sedoides</i> L.	Ditch Stonecrop
Scrophulariaceae	<i>Micranthemum umbrosum</i> (J. F. Gmelin) Blake	Wetland Figwort
Scrophulariaceae	<i>Penstemon tenuis</i> Small. ^c	Sharpsepal Beardtongue
Urticaceae	<i>Boehmeria cylindrica</i> (L.) Swartz	False Nettle

Reference information for superscripts on Table B1.

- ^a MacDonald, J. 1996. A survey of the flora of Monroe county, Mississippi. Thesis, Mississippi State University, Mississippi State, Mississippi, USA.
- ^b Radford, A.E., H.E. Ahles, and C. R. Bell. 1964. Manual of the vascular flora of the Carolinas. The University of North Carolina Press. Chapel Hill, N.C., USA.
- ^c USDA, NRCS. 2004. The PLANTS Database, Version 3.5
<http://plants.usda.gov>. National Data Center, Baton Rouge, LA 70874-4490 USA.
- ^d This determination is not certain, and is based on the salient characteristic that it appears to be always sterile which this species is known for (see Steyermark, J.A. 1963. Flora of Missouri. The Iowa State University Press. Ames, Iowa, USA, p. 463.) In addition, John MacDonald collected this species in Monroe County, Mississippi along the shoreline of the Tombigbee River (see MacDonald ^a p.68)

Note:

A Grasshopper Sparrow (*Ammodramus savannarum*) was found along the interior perimeter road adjacent to the runways in a grassy (mowed) open area. Noted: A small *Ammodramus* sparrow with characteristic flat forehead, short wings and tail, pale coloration with buffy breast and pale eye stripe. The single adult bird was perched on a short (~ 30-40 cm in height) sign alongside the asphalt road. We backed up after passing the bird, which I called a Grasshopper Sparrow as we drove past it. Upon stopping, the bird flushed across the road into an adjacent grassy field. I studied it briefly before it flew again. This is possibly a county record for this species. Furthermore, it is likely breeding in the area. This species has been found breeding in Clay County, east of West Point, MS, on Bryan Farms in open soybean fields and fescue pastures. USFWS considers this a species of concern due to rarity year round and it has very local breeding.

Appendix C

Wildlife Hazard Assessment Species List

Columbus Air Force Base, Mississippi

Prepared by Kyle Van Why
Wildlife Biologist
USDA-Wildlife Services
595 1st St., Suite 3
Columbus AFB, MS 37910
662-434-2027 office
662-386-0019 cell
kyle.r.vanwhy@aphis.usda.gov

Wildlife Hazard Assessment Species List CAFB.

Species	
Common Name	Scientific Name
American Coot	<i>Fulica americana</i>
American Crow	<i>Corvus brachyrhynchos</i>
American Goldfinch	<i>Carduelis tristis</i>
American Kestrel	<i>Falco sparverius</i>
American Pipit	<i>Anthus rubescens</i>
American Redstart	<i>Setophaga ruticilla</i>
American Robin	<i>Turdus migratorius</i>
Armadillo	<i>Dasyopus novemcinctus</i>
Barn Swallow	<i>Hirundo rustica</i>
Barred Owl	<i>Strix varia</i>
Beaver	<i>Castor canadensis</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Black Vulture	<i>Coragyps atratus</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>
Blue Jay	<i>Cyanocitta cristata</i>
Blue-winged Teal	<i>Anas discors</i>
Bobcat	<i>Lynx rufus</i>
Brown Thrasher	<i>Toxostoma rufum</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Canada Goose	<i>Branta canadensis</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Chimney Swift	<i>Chaetura pelagica</i>
Chipping Sparrow	<i>Spizella passerina</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Common Grackle	<i>Quiscalus quiscula</i>
Common Nighthawk	<i>Chordeiles minor</i>
Common Snipe	<i>Gallinago gallinago</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Coyote	<i>Canis latrans</i>
Dickcissel	<i>Spiza americana</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Eastern Bluebird	<i>Sialia sialis</i>
Eastern Cottontail	<i>Sylvilagus floridanus</i>
Eastern Fox Squirrel	<i>Sciurus niger</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Eastern Meadowlark	<i>Sturnella magna</i>
Eastern Phoebe	<i>Sayornis phoebe</i>
Eastern Towhee	<i>Pipilo erythrophthalmus</i>
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>
European Starling	<i>Sturnus vulgaris</i>
Field Sparrow	<i>Spizella pusilla</i>
Fish Crow	<i>Corvus ossifragus</i>
Gadwall	<i>Anas strepera</i>
Grasshopper Sparrow*	<i>Ammodramus savannarum</i>

Wildlife Hazard Assessment Species List CAFB (continued).

Species	
Common Name	Scientific Name
Gray Catbird	<i>Dumetella carolinensis</i>
Great Blue Heron	<i>Ardea herodias</i>
Great Egret	<i>Ardea alba</i>
Green Heron	<i>Butorides virescens</i>
Herring Gull	<i>Larus argentatus</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
Horned Lark	<i>Eremophila alpestris</i>
House Finch	<i>Carpodacus mexicanus</i>
House Sparrow	<i>Passer domesticus</i>
Indigo Bunting	<i>Passerina cyanea</i>
Killdeer	<i>Charadrius vociferus</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Little Blue Heron	<i>Egretta caerulea</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Mallard	<i>Anas platyrhynchos</i>
Mississippi Kite	<i>Ictinia mississippiensis</i>
Mourning Dove	<i>Zenaida macroura</i>
Muskrat	<i>Ondatra zibethica</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>
Northern Flicker	<i>Colaptes auratus</i>
Northern Harrier	<i>Circus cyaneus</i>
Northern Mockingbird	<i>Mimus polyglottos</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Northern Shoveler	<i>Anas clypeata</i>
Nutria	<i>Myocastor coypus</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
Pine Warbler	<i>Dendroica pinus</i>
Prairie Warbler	<i>Dendroica discolor</i>
Raccoon	<i>Procyon lotor</i>
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Ring-necked Duck	<i>Aythya collaris</i>
Rock Dove	<i>Columba livia</i>
Rusty Blackbird	<i>Euphagus carolinus</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Sandhill Crane**	<i>Grus canadensis</i>
Semipalmated Sandpiper	<i>Calidris pusilla</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Song Sparrow	<i>Melospiza melodia</i>
Sora	<i>Porzana carolina</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Summer Tanager	<i>Piranga rubra</i>
Swamp Rabbit	<i>Sylvilagus aquaticus</i>
Tree Swallow	<i>Tachycineta bicolor</i>

Wildlife Hazard Assessment Species List CAFB (continued).

Species	
Common Name	Scientific Name
Tufted Titmouse	<i>Baeolophus bicolor</i>
Turkey Vulture	<i>Cathartes aura</i>
Upland Sandpiper	<i>Bartramia longicauda</i>
Vesper Sparrow	<i>Pooecetes gramineus</i>
White-breasted Nuthatch	<i>Sitta carolinensis</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
White-eyed Vireo	<i>Vireo griseus</i>
White-throated Sparrow	<i>Zonotrichia albicollis</i>
Wild Turkey	<i>Meleagris gallopavo</i>
Wood Duck	<i>Aix sponsa</i>
Wood Stork	<i>Mycteria americana</i>
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>

USDA, APHIS, WS

*No state status, but nesting populations rare in Mississippi. Observed in June 2005, possibly a new county record.

**Mississippi Sandhill Crane: State and federally listed as endangered

APPENDIX L

GOLF COURSE ENVIRONMENTAL MANAGEMENT PLAN



**Whispering Pines Golf Course
Environmental Management Plan
Columbus AFB, MS
February 2007**



Whispering Pines Golf Course Environmental Policy Statement

In concert with the Columbus AFB mission, Whispering Pines Golf Course management pledges to employ management practices that minimize or eliminate the potential for negative impacts to the environment and the surrounding community whenever practicable. In addition, the Director of Golf is committed to ensuring compliance with all appropriate regulations, and to consistently review our processes to balance the highest standards of environmental excellence with standards of aesthetic quality expected at this installation's prominent golf course.

Pam Wickham, Director of Golf

Richard Bryde, Golf Superintendent

Executive Summary

U. S. Air Force GEM Program

The U. S. Air Force Golf Course Environmental Management (GEM) program is a proactive Air Force Center for Environmental Excellence (AFCEE) initiative to foster a better understanding of the environmental challenges facing our golf courses worldwide. Armed with the support and approval of the Air Force Services Agency golf program, AFCEE's goal is to facilitate the creation of an environmentally friendly golf course facility while supporting the installation mission. AFI 32-7064 requires a GEM Plan as part of the Integrated Natural Resources Management Plan (INRMP).

The primary tenets of the GEM Program are to minimize or eliminate potential negative environmental impacts, attain and maintain daily compliance with all appropriate regulations, and constantly examine all aspects of golf course management to achieve the highest standards of environmental excellence.

GEM Program process

There are five steps in the GEM program process.

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision



Environmental Compatibility Quotient

Actual ECQ (76) Showing Progress
Potential ECQ (88) Showing Progress

Final environmental challenges

The following environmental challenge was identified during the GEM Plan process:

- Water Quality

Where do we go from here?

The true measure of a successful GEM program is how well is it executed in the field each and every day. The installation golf and environmental staffs should continue to analyze, document, monitor, evaluate, revise, and implement changes based on lessons learned. The GEM Plan should be updated annually and revised during the next INRMP iteration update. The entire GEM process can be found on the regularly improved AFCEE GEM program website (<http://www.afcee.brooks.af.mil/ec/golf/>).

Analysis

Course details

Architect	Unknown
Year constructed	Circa 1947
Climate	Hot, humid summers & Mild winters
Average annual rainfall	40-60 inches, with dry periods occurring most summers
Average growing season	200-300 days, with frost occurring nearly every year
Winds/Prevailing Direction	SW to NE
Total Facility Acreage	50 acres + 5 for driving range
Par	35-35-70 (9 holes)
Yardage/Rating/Slope	Tee- Yards/Rating/Slope White/Blue- 5293/ Total yardage 5300 Men's slope 128 Ladies Slope 120 Ladies Slope 120 Men's Course Rating 66.7 Ladies Course Rating 67.0
Golf course manager	Pam Wickham
Superintendent	Richard Bryde
Turfgrass	Bermuda (Tif Green 328)
Tees-	Bermuda (Tif Green 328)
Fairways-	Bermuda (Tif Dwarf 419)
Greens	Bermuda (Tif Green 328)
Roughs-	Bermuda (Tif Green 328)

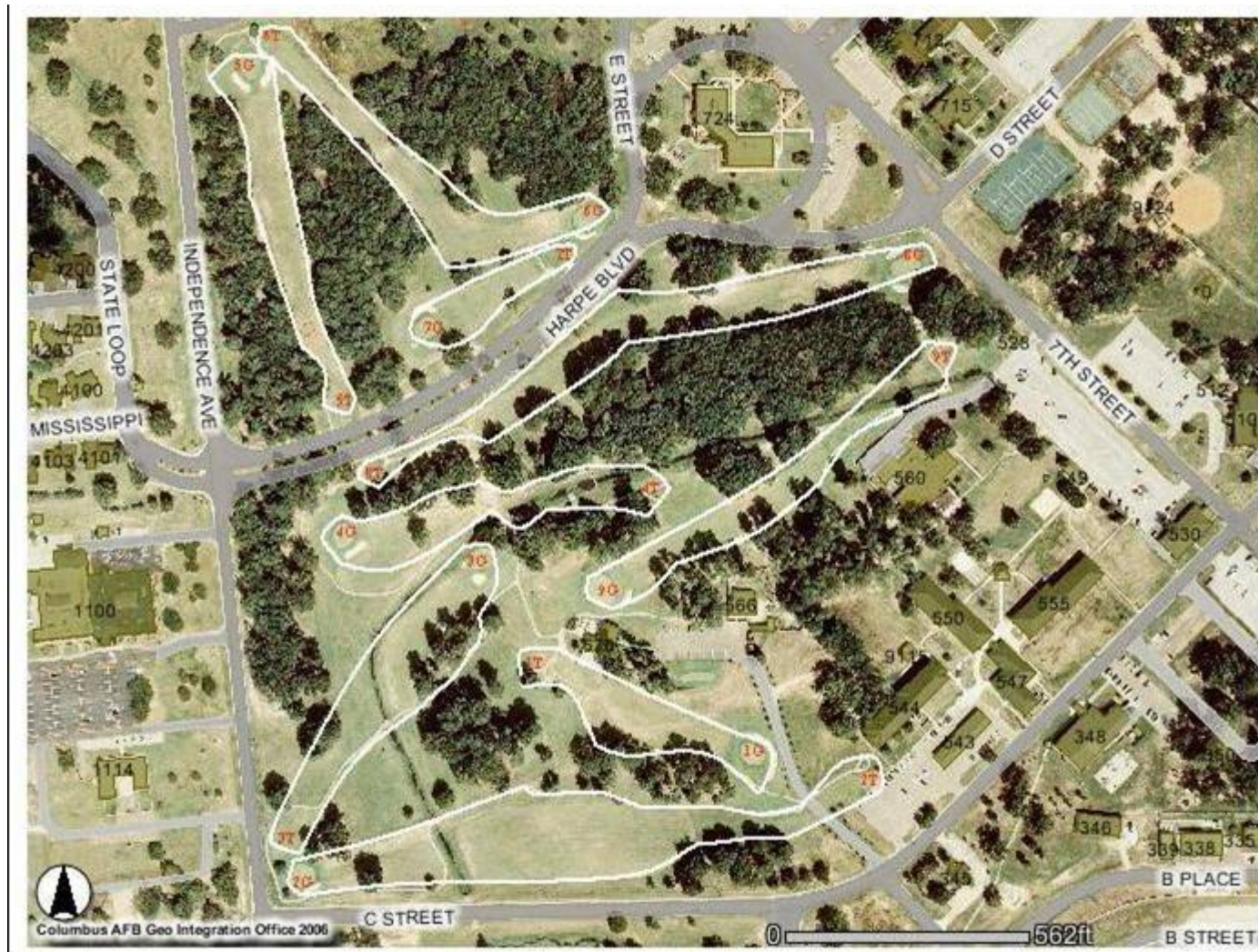
Course description

Whispering Pines Golf Course was built in the 1940s by the Civil Engineering Squadron at the heart of Columbus AFB, adjacent to wing headquarters and near the south gate of the installation. It is located in the southwestern portion of the installation. The course is relatively short as it features nine holes, and has been wedged into a small area of land between the dormitories, wing headquarters, Independence Avenue, and military family housing. There are many trees on the course, owing to its position away from the airfield. In addition, a creek runs through the golf course, adding challenging elements to the game and a natural aesthetic to the course.



Pine and juniper trees line the tee on hole one.

Course Whispering Pines Golf Course Hole Layout Map



Determining the Baseline (ECQ)

The following is a brief compilation of some of the responses in each of the ten Environmental Compatibility Quotient (ECQ) categories obtained in an interview with the superintendent and the manager conducted during the site visit.

ECQ Categories

- Overall Management Philosophy & Documentation
- Safety, Training, And Awareness
- Compliance
- Pesticide Use, Storage, & Handling
- Pollution Prevention
- Conservation Practices
- Water Resources
- Maintenance Practices
- Customer Relations & Education
- Miscellaneous Special Projects & Activities

Key to checklist responses

- **Yes** = Practice is complete or ongoing and can be verified.
- **Partial** = Practice has been initiated but needs further attention and improvement.
- **No** = Practice is not in place.

ECQ Checklists

The Environmental Compatibility Quotient (ECQ) checklists are a convenient method of assessing the overall performance, implementation, and completeness of an installation's Golf Course Environmental Management Plan. The checklists can be used in many ways including:

- As an analytical tool while compiling a Golf Course Environmental Baseline Assessment like this one.
- As a self-assessment tool for the golf course manager or superintendent.
- As an award nomination evaluation by a Golf Course Assessment Team (GCAT).



An attractive granite sign adorns the entry to the pro shop.



A beautiful creek winds through the golf course.

obtained as a result of using the ECQ checklists to determine the status or quality of the environmental management program: 1) determining the actual and; 2) potential environmental compatibility quotients.

- **Actual ECQ-** the total percentage of "Yes" responses for all ten checklists. This number represents the current level of the golf course management practice compatibility with the environment
- **Potential ECQ-** the total percentage of "Yes" responses plus the total percentage of "Partial" responses for all ten checklists. Maybe the most significant measure; the potential ECQ represents a level of compatibility that could be reached by finalizing or fully implementing a particular practice or procedure.

ECQ Scoring Scale

<u>Percent Responses Yes or Partial per Category</u>	<u>Level</u>
90-100%	Advanced (Green)
70-89%	Showing progress (Yellow)
69% or less	Getting started (Red)

Interpreting the ECQ

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two measures

Overall Management Philosophy & Documentation				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Has installation environmental and golf management demonstrated that the environment is an important part of their responsibilities by initiating the GEM Planning process?	✓		
2	Has the golf course adopted and posted an Environmental Policy?	✓		
3	Is the GEM Plan underway or completed, available, and updated regularly?	✓		
4	Is a map of the property highlighting identified environmental challenges available, used in the environmental management decision-making process, and is it posted for customers?	✓		
5	Are environmental challenges and their management method, target, and objective, and overall golf course GEM program goals evaluated at least annually and are they regularly communicated to employees, customers, management, and the local community?			✓
6	Are written records of water quality monitoring activities, results, and control measures collected and readily available?	✓		
7	Is there an inventory of bird and mammal species maintained and readily available?	✓		
8	Is there a general understanding of how course management practices may positively enhance or adversely impact the environment?	✓		
9	Are the environmental impacts of pest control measures considered prior to their use as part of the course environmental management planning process?	✓		
10	Are records of pest treatments and their effectiveness maintained and used to guide future pest control decisions?	✓		
	Point totals for each column	9	0	1

Safety, Training, & Awareness				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are all golf course employees familiar with the GEM program and are they trained on the importance of environmental compliance with the goals and objectives of the program as it applies to their specific duties?		✓	
2	Are all appropriate employees trained to be familiar with U. S. Air Force, federal, state, and OSHA regulations that apply to the storage, handling, and disposal of all chemicals potentially used on the property?	✓		
3	Are all employees aware of the potential risks to human health and the environment of chemical use, storage, and disposal?	✓		
4	All appropriate employees receive documented training on practices that may adversely impact worker health, on- and off-site water quality, and wildlife species and their habitats?	✓		
5	Is a current copy of Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property maintained and readily available for use by regularly trained employees?	✓		
6	All employees receive regular, documented training on all potential OSHA issues associated with their specific duties?	✓		
7	Are all golf course pesticide applicators active participants in a respiratory and pulmonary testing program?	✓		
8	Are all pesticides, fertilizers, and other chemicals stored on appropriate shelving in an approved storage facility?	✓		
9	Are golfers notified in the pro shop and on the first and tenth tees about the planned or recently completed spraying of any chemical or fertilizer that may potentially be hazardous to human health or general public safety?	✓		
10	Are key staff members trained regarding water quality and conservation issues pertinent to the course and their particular duties?	✓		
	Point totals for each column	9	1	0

Compliance				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the fuel storage/delivery area and associated equipment managed in accordance with federal, state, and local regulations?	✓		
2	Are installation environmental staff members regularly consulted on pertinent course management discussions and plans?	✓		
3	Are there golf course staff meetings where environmental management issues are regularly discussed with all employees?	✓		
4	Do the director of golf and the superintendent attend all internal and external ESOHCAMP in-briefings and out-briefings?		✓	
5	Do the director of golf and/or the superintendent coordinate their input on the various management plans that affect or include the golf course with installation environmental staff?	✓		
6	Have all environmental challenges been physically identified and mapped to aid the golf staff's daily management efforts?	✓		
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are oil containers used to collect old oil in good condition and correctly labeled?	✓		
9	Has the golf course staff assisted the installation environmental staff with the required Golf course Environmental Management Plan requirements?	✓		
10	Were there less than two major golf course facility-related findings during the last official ESOHCAMP visit?	✓		
Point totals for each column		9	1	0

Pesticide Use, Storage, & Handling				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there trained scouts on staff other than the superintendent to monitor turf and plant pest populations that notify management include findings into a report or guide for future use?		✓	
2	Are there written pest profiles of common pest species with a variety of potential control measures including cultural, biological, physical, and mechanical controls prior to treating the problem on the course?	✓		
3	Are there established, documented, and utilized aesthetic and functional thresholds for effective management of pests that may also reduce chemical use?		✓	
4	Is there a specially designed pesticide mixing area where all mixing is performed by appropriately trained personnel?	✓		
5	Has a current list of all pesticides and other chemicals stored or used at the golf facility recently been provided to the appropriate Fire Department(s)?	✓		
6	Is there a written, readily available, and regularly updated Integrated Pest Management Plan for the entire golf course facility?	✓		
7	If personal protective equipment is required for pesticide use, storage, or handling, is it available for use by trained individuals?	✓		
8	Are written and readily available records maintained of all applications of pesticides made by certified applicators, including the following? - the quantity of each pesticide used; - the chemical or common name of the active pesticidal ingredient(s); - the pest or purpose for which the pesticide was applied; and the date and place of application.	✓		
9	Is the chemical storage structure/area well ventilated, fire resistant, and locked with access limited to select personnel?	✓		
10	Are there designated and documented "no spray" areas around pond, river, stream, or lake edges and have they been communicated to pesticide applicators?			✓
Point totals for each column		7	2	1

Pollution Prevention				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there designated and documented "minimally-maintained" or natural vegetative buffer areas around pond, river, stream, or lake edges and have they been communicated to mower operators and pesticide applicators?			✓
2	Is there a readily available copy of the Installation Spill Plan that includes the golf course facility and is there a spill containment kit at each required location with spill containment procedures in place?	✓		
3	Does the chemical storage area have a sealed metal or concrete floor and are all liquid pesticides handled over an impermeable surface?	✓		
4	Does the chemical storage area have a lip along the edges to contain spills?	✓		
5	Are liquid products stored below dry products and are dry materials stored on appropriate pallets or shelves to keep them off the floor?	✓		
6	Do all golf facility employees regularly receive documented and approved HAZCOM and safety and health training?	✓		
7	Are grass clippings removed from equipment with compressed air instead of or prior to washing?	✓		
8	Are gasoline, motor oil, brake and transmission fluid, solvents, and other chemicals used to operate or maintain equipment and vehicles prevented from directly or indirectly entering water bodies?	✓		
9	Has the watershed in which the course resides and contributes runoff to been identified and mapped to aid the golf course staff?	✓		
10	Are appropriate quantities of fertilizers applied during weather conducive to reducing the potential for leaching and runoff?	✓		
Point totals for each column		9	0	1

Conservation Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?	✓		
2	Are there appropriately designated and mapped minimally maintained areas on the golf course facility grounds?			✓
3	Has the irrigation system or its components recently been upgraded to reduce inefficiency, malfunction, and overall water use?	✓		
4	Has all “non-target” irrigation (ponds, natural, or out of play areas, etc.) been eliminated or minimized?	✓		
5	Have irrigation system flow meters been installed to monitor water use and detect potential waste?			✓
6	Has the entire golf course facility property been examined for landfills, critical habitats, threatened or endangered species, wetlands, floodplains, and historical/cultural resources or other environmentally sensitive features?	✓		
7	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels and minimize potentially harmful exhaust emissions?	✓		
8	Do the restaurant and/or snack bar utilize reusable plates and silverware for use by customers throughout the facility’s operating hours?	✓		
9	Have the annual maintenance practices for the officially designated “minimally-maintained” or natural areas been coordinated with the installation Bird/Wildlife Aircraft Strike Hazard (BASH) officer and installation environmental management personnel?			✓
10	Are all motorized golf course equipment regularly checked for excessive air polluting emissions?	✓		
Point totals for each column		7	0	3

Water Resources				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are water features regularly monitored for algae, erosion, excessive aquatic plant growth, fish kills, and sedimentation?	✓		
2	Are equipment wash or wastewater kept from directly entering surface water and are they recycled or allowed to filter through a vegetative area?	✓		
3	Are outdoor irrigation of non-golf course landscape areas regularly monitored and maintained for leaks and efficient performance?	✓		
4	Has the golf course staff coordinated with the installation’s environmental staff on potential storm water management planning requirements?	✓		
5	Have part circle irrigation heads been installed where possible to preserve water resources and reduce maintenance while minimizing potential negative impacts to surrounding minimally maintained, natural, or water feature areas?	✓		
6	Are all water feature maintenance tasks coordinated with the installation Bird/Wildlife Aircraft Strike Hazard (BASH) officer and installation environmental management personnel?	✓		
7	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?		✓	
8	Are moving water bodies that pass through the golf course such as streams or creeks regularly monitored both upstream and downstream of the course for overall water quality?	✓		
9	Does the facility have an approved written and readily available Drought Management Plan if, or when irrigation restrictions may be required by the community or the installation?			✓
10	Is there a comprehensive, up to date, and readily available written Water Feature Management Plan for the entire golf course facility?			✓
	Point totals for each column	7	1	2

Maintenance Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is there a written, regularly updated, and readily available Golf Course Maintenance Plan?	✓		
2	Does the Maintenance Plan include individual plans such as Integrated Pest Management, Tree Management, and Hazard Communication?	✓		
3	Are green, tee, and fairway mowing heights maintained at reasonable levels that do not unduly stressing turf or requiring additional chemical inputs?	✓		
4	Are there regular and documented procedures in place to continually improve overall course soil health such as topdressing, organic amendments, aeration, and drainage improvements?	✓		
5	Is there an up to date and readily-available map of the course's "hot spots", or those areas requiring special care or regular attention?	✓		
6	Is all maintenance equipment maintained and cleaned in a manner that minimizes or eliminates the potential for spreading of pest or disease contamination?	✓		
7	Has there been a complete examination of all aspects of the golf course facility operation (including the snack bar and grill, clubhouse, pro shop, cart storage facility, and maintenance complex) for potential negative environmental impacts?	✓		
8	Is contour mowing used to conserve fuel and increase playability and aesthetics?	✓		
9	Have all playing surfaces been inventoried and mapped for potentially agronomically challenging soil types?	✓		
10	Are soil tests and plant tissue analysis used to determine nutritional requirements?	✓		
	Point totals for each column	10	0	0

Customer Relations & Education				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the course manager and superintendent involved in an on-going and documented customer environmental management educational program?		✓	
2	Is there a highly visible location at the course or clubhouse where golf course environmental management notices and informational messages are regularly posted for the education and enjoyment of customers?	✓		
3	Do the course manager and superintendent actively communicate with customers to determine their points of view?	✓		
4	Is there documented, regular communication by course management with installation civil engineering, environmental, and leadership on GEM program issues or concerns?		✓	
5	Does the golf staff regularly survey their customers on how they rate the various elements of the golf course facility?	✓		
6	Is there consistent and attractive signage around the course and grounds that would increase the awareness of the average golfer to the environmental management practices employed?	✓		
7	Are there signs appropriately located to warn golfers of hazards around or near recycled or otherwise non-potable water?	✓		
8	If applicable, have areas of the course been designated "Environmentally Sensitive Zones" per USGA rules?	✓		
9	Are course staff members regularly trained on how to improve their dealings with customers?	✓		
10	Are there clinics provided to teach beginning golfers the basics of the game to include the rules as well as the environmental challenges faced by the golf staff at their facility?	✓		
	Point totals for each column	8	2	0

Miscellaneous Special Projects & Activities				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there projects planned and funded for execution in the near future that would demonstrate the compatibility of the course's management methods with GEM program initiatives?		✓	
2	Are there projects planned and funded to reduce the course's potential negative environmental impacts?		✓	
3	Are there tournaments or other events planned that may educate customers on the environmental challenges faced by the golf staff?			✓
4	Are there regular field trips hosted at the course for local students or other community groups?			✓
5	Are there projects planned to eliminate or minimize a potential erosion problem?	✓		
6	Does the course have a native tree installation program complete with planting plan and maintenance schedule?	✓		
7	Are any of the local schools or universities involved in educational or research activities at your course?			✓
8	Are there special facility-wide recycling programs underway?	✓		
9	Is your course an active participant in the USAF Golf Environmental Management Program?		✓	
10	Has your facility been nominated by your MAJCOM for the golf course environmental management award in the last 3 years?			✓
	Point totals for each column	3	3	4

ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	9	0	1
2	Safety, Training, & Awareness	9	1	0
3	Compliance	9	1	0
4	Pesticide Use, Storage, & Handling	7	2	1
5	Pollution Prevention	9	0	1
6	Conservation Practices*	7	0	3
7	Water Resources	7	1	2
8	Maintenance Practices	10	0	0
9	Customer Relations & Education	8	2	0
10	Miscellaneous Special Projects & Activities*	3	3	4
	Composite point total/response percentage	78	10	12

Checklist GCEBA Results compiled in February 2007

Whispering Pines Golf Course, Columbus AFB, MS

- Actual ECQ (# of "Yes") = **78** (Yellow, Showing progress)

- Potential ECQ (Actual ECQ plus "Partial") = **88** (Yellow, Showing progress)

* = Category requires improvement or attention

Environmental challenges

One of the important results of the GCEBA process is the identification of potential environmental challenges to be addressed in the long-term GEM Planning process. After determining the relative significance and validation of each potential environmental challenge, the installation golf and environmental staffs should determine the set of final challenges that will be actively managed in the GEM Plan. Armed with the list of final environmental challenges, the golf staff should determine the best management approach that satisfies the goals of the golf facility from the course playability and customer satisfaction perspectives. Then the golf staff's preferred management approach should be coordinated with the installation's environmental staff for refinement, coordination, and approval.

Ultimately, the combined environmental and golf staff team should proceed toward finalizing the GEM Plan. The entire process can be viewed at the AFCEE GEM website (<http://www.afcee.brooks.af.mil/ec/golf/>). The following potential environmental challenges were identified during the GCEBA process:



Runoff from the airfield drains through the golf course.

FINAL ENVIRONMENTAL CHALLENGE

The following final environmental challenge was identified during the GEM Plan process:

- Water quality

The creek flows west and south through the golf course. Runoff from the flightline drains to this creek.



Whispering Pines Golf Course Environmental Challenge Map

WATER QUALITY

- Maintaining high standards of water quality in the creek is a challenge due to runoff from the flightline.

Management Practice

- Spill containment boom has been installed at the headwaters of the creek.
- Condition of creek is monitored by golf course personnel on a regular basis.
- Unfavorable or unusual conditions are reported to the water quality manager for evaluation and action.

Target

- Golf course management, natural resources, and grounds maintenance personnel are forming a Resource Advisory Group to help plan and implement best management practices for the golf course.

Objectives

- Continue monitoring water quality in the creek.
- Identify and communicate best management practices to improve water quality.



Boom installed on far side of bridge restrains runoff from flightline.



Spill gate installed near hole 4 prohibits spills from leaving the installation in emergencies.

GEM Plan goals & objectives

Goals are defined as actions or results that should be accomplished in the next year.

- Whispering Pines Golf Course will form a Resource Advisory Group in conjunction with Natural Resource Management, Water Quality Management, and Grounds Maintenance to identify and implement best management practices to protect water quality and ensure environmental compliance.

Objectives:

- Continue monitoring water quality in the creek.
- Identify and communicate best management practices to improve water quality.
- The group should serve as a forum to resolve all environmental issues arising on the golf course.



The Resource Advisory Group will work together to maintain high water quality standards for Whispering Pines Golf Course.

Best practices are defined as any action, method, practice, or result that has proven its value and worth over time. The GEM program has been designed to create a body of scientific data to share with all U.S. Air Force installation golf and environmental staff members.

GEM Plan best practices

- Collect data to establish baseline conditions for water quality.
- Develop a plan to control the spread of pine-damaging insects to endemic (non-threatening) populations.
- Implement landscape designs that are site-appropriate and minimize the amount of irrigation and labor needed for grounds maintenance.
- Purchase landscape plants from locally-grown sources, whenever possible, to support the genetic integrity of local native plant communities.
- Restore degraded habitats, such as eroded slopes, compacted soils, polluted water sources, or areas overrun with invasive exotic species.
- Clean up trash from habitat areas when necessary.



Conclusion

The Civil Engineering Squadron's unit natural resource program manager should provide the key oversight to assist in improving the ability of the golf and environmental staffs to work together to better support the Columbus AFB mission.

This report has identified one environmental challenge for Whispering Pines Golf Course. Maintaining high standards of water quality in the creek is a challenge due to runoff from the flightline. The proposed solution involves the creation of a Resource Advisory Board. This Board would include personnel from the golf course, the environmental flight, and the QAE for the grounds maintenance contract. This group would meet periodically to discuss and implement new programs to resolve this challenge and any other environmental concerns that may arise.

The gallery



Lush trees create dappled shade on the fourth hole tee.



Proper signage and spill containment characterize the above ground fuel storage tank.



Frequent tournaments generate crowds at the golf course.



Majestic pines line the cart path near hole seven.



Erosion control measures are implemented as needed.



Proper storage includes solids stored over liquids.



The golf course provides recreation opportunities for everyone.



Hole six green framed by vegetation



Bibliography

Audubon International, Environmental Performance Audit, *Integrated Environmental Management*, Golf Course Superintendents Association of America, February 2000, New Orleans, LA.

The Center for Resource Management, *Golf & the Environment: Charting a sustainable future*. Environmental Principles for Golf Courses in the United States, 1996, Salt Lake City, Utah

AFCEE/TDN, GEM Plan Template, accessed from AFCEE GEM website on 02/14/07, William H. Bushman

The following records were reviewed during the preparation of this report:

AFCEE/ECS; *Integrated Natural Resource Management Plan, Columbus AFB, MS* July 2005

Endangered and Threatened Species Survey of Columbus Air Force Base, Columbus, Mississippi, July 2005, Dr. Jeanne C. Jones and Dr. Jarrod Fogarty, TWS

Golf Course Pesticide Management Plan, 2004 (from Integrated Pest Management Plan), Sarah Fafinski, 14 CES/CEIE

Maintenance Report, Whispering Pines Golf Course July 2006, AFCEE

Spill Prevention, Control, and Countermeasures Plan, September 2006, Versar, Inc.

Stormwater Pollution Prevention Plan, July 2006, Kendra Gomez, 14 CES/CEIE

Integrated Solid Waste Management Plan, March 2006, Tetra Tech, Inc.

Environmental Assessment: Golf Course Irrigation System, January 2007, SpecPro Environmental Services, LLC.

Environmental Assessment: Clean/Stabilize Ditches at Golf Course and "C" Street, July 2003, Frank Lockhart, 14 CES/CEIE





**Air Force Center for Environmental Excellence
Technical Directorate
Natural Infrastructure Division**

For additional assistance or more information, please contact:
William H. Bushman – 210-536-3719 - DSN 240-3719
AFCEE/TDN, 3300 Sidney Brooks, San Antonio, TX 78235-5112
bill.bushman@brooks.af.mil

Please visit our Golf course Environmental Management (GEM) Program website:
<http://www.afcee.brooks.af.mil/ec/golf/>

APPENDIX M

WILDLAND FIRE MANAGEMENT PLAN

Wildland Fire Mutual Aid Agreements

Columbus Air Force Base

**AGREEMENT FOR MUTUAL AID IN FIRE EMERGENCY SERVICES (US)
BETWEEN
COLUMBUS AIR FORCE BASE
AND
CLAY COUNTY FIRE DEPARTMENT**

This Mutual Aid agreement is made and entered into this 3rd day of February 2015, between the Secretary of the Air Force acting by and through the Commander Colonel John Nichols, pursuant to the authority of 42 U.S.C. 1856(a) and the Clay County Fire Department. Together the Air Force and Clay County Fire Department are hereinafter referred to as the "Parties".

WITNESSETH:

WHEREAS, each of the Parties hereto maintains equipment and personnel for the suppression of fires and the management of other emergency incidents occurring within areas under their respective jurisdictions; and

WHEREAS, as set forth in 42 U.S.C. § 1856 the term 'fire protection' includes personal services and equipment required for fire prevention, the protection of life and property from fire, firefighting, and emergency services, including basic medical support, basic and advanced life support, hazardous material containment and confinement, and special rescue incidents involving vehicular and water mishaps, and trench, building, and confined space extractions; and

WHEREAS, the Parties hereto desire to augment the fire protection capabilities available in their respective jurisdictions by entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements herein established, the Parties hereby agree as follows:

- a. The authority to enter into this Agreement is set forth in 42 U.S.C. § 1856a, and Title 15 United States Code Section 2210, the regulations implementing same at Title 44 Code of Federal Regulations Part 151 *Emergency Management and Assistance* and Air Force Instruction 32-2001, *Fire Emergency Services Program*.
- b. This Agreement will serve as the agreement between the Parties for securing to each mutual aid in fire protection services as defined above.
- c. On request to a representative of the Columbus Air Force Base fire department by a representative of the Clay County Fire Department, fire protection equipment and personnel of the Columbus Air Force Base fire department will be dispatched to any point within the area for which the Clay County Fire Department normally provides fire protection services as designated by the representatives of the Clay County Fire Department.
- d. On request to a representative of the Clay County Fire Department by a representative of the Columbus Air Force Base fire department, fire protection equipment and personnel of the Clay County Fire Department will be dispatched to any point within the jurisdiction of the Columbus

Air Force Base as designated by the representative of the Columbus Air Force Base fire department.

e. Any dispatch of equipment and personnel by the Parties pursuant to this Agreement is subject to the following conditions:

(1) Any request for aid hereunder will include a statement of the amount and type of equipment and personnel requested and will specify the location to which the equipment and personnel are to be dispatched, but the amount and type of equipment and the number of personnel to be furnished will be determined by the responding organization. The requesting organization will ensure access to site for the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and will be subject to the orders of that official.

(3) The responding organization will be released by the requesting organization when the services of the responding organization are no longer required or when the responding organization is needed within the area for which it normally provides fire protection.

(4) Hazardous Materials incident response will include the response to, and control and containment of any release or suspected release of any material suspected to be or known to be hazardous. Where the properties of a released material are not known, it will be considered hazardous until proven otherwise by the requesting organization using all technical resources available. Cleanup and removal of contained hazardous materials will be the responsibility of the requesting organization.

(5) In the event of a crash of an aircraft owned or operated by the United States or military aircraft of any foreign nation within the area for which the Clay County Fire Department normally provides fire protection services, the chief of the Columbus Air Force Base fire department or his or her representative may assume full command on arrival at the scene of the crash.

(6) Where local agencies do not assign an incident safety officer, an Air Force representative will be assigned to act as the incident safety officer for Columbus Air Force Base fire department to observe Air Force operations.

f. Each Party hereby agrees that its intent with respect to the rendering of assistance to the other Party under this Agreement is not to seek reimbursement from the Party requesting such assistance. Notwithstanding the above, the Parties hereby recognize that pursuant to the Section 11 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. § 2210) and Federal regulations issued there under (44 CFR Part 151), the Clay County Fire Department is permitted to seek reimbursement for all or any part of its direct expenses and losses (defined as additional firefighting costs over normal operational costs) incurred in fighting fires on property under the jurisdiction of the United States. Furthermore, under the authority of 42 U.S.C. § 1856a, and pursuant to any applicable state or local law each Party hereby reserves the right to seek

reimbursement from the other for all or any part of the costs (defined as additional firefighting costs over normal operational costs) incurred by it in providing fire protection services to the other Party in response to a request for assistance.

g. Both Parties agree to implement the National Incident Management System during all emergency responses on and off installations in accordance with National Fire Protection Association (NFPA) Standard 1561.

h. Each Party waives all claims against the other Party for compensation for any loss, damage, personal injury, or death occurring as a consequence of the performance of this Agreement. This provision does not waive any right of reimbursement pursuant to paragraph f.

i. All equipment used by the Clay County Fire Department in carrying out this Agreement will, at the time of action hereunder, be owned by it; and all personnel acting for the Clay County Fire Department under this Agreement will, at the time of such action, be an employee or volunteer member of the Clay County Fire Department.

j. The rendering of assistance under the terms of this Agreement will not be mandatory; however, the Party receiving a request for assistance will endeavor to immediately inform the requesting Party if the requested assistance cannot be provided and, if assistance can be provided, the quantity of such resources as may be dispatched in response to such request.

k. Neither Party will hold the other Party liable or at fault for failing to respond to any request for assistance or for failing to respond to such a request in a timely manner or with less than optimum equipment and/or personnel, it being the understanding of the Parties that each is primarily and ultimately responsible for the provision of fire protection services needed within their own jurisdictions.

l. Should a dispute arise between the Parties under or related to this Agreement, the Parties agree that within 30 days after notice of the dispute from one Party to the other, the Parties will attempt to resolve the dispute through negotiations. If such negotiations reach an impasse, the Parties agree that within 60 days after Notice of an impasse, they will attempt to resolve the matter through any method or combination of non-binding alternative dispute resolution (ADR) methods available under the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320 (codified at 5 U.S.C. §§ 571-583). The cost of any third party neutral will be divided equally between the Parties, and the selection of any third party neutral will be by agreement of the Parties. If such ADR proceeding does not result in resolution of the dispute, the Parties may separately pursue any remedy available to a Party under the law. However, both Parties agree that the initiation of formal litigation does not preclude further attempts at resolving the dispute through alternative dispute resolution methods. Both Parties agree that the terms of this clause will be considered the "Administrative Remedies" that must be exhausted, prior to institution of any formal litigation.

m. All notices, requests, demands, and other communications which may or are required to be delivered hereunder will be in writing and will be delivered by messenger, by a nationally-

recognized overnight mail delivery service or by certified mail, return receipt requested, at the following addresses:

For the Air Force:

Columbus Air Force Base
Colonel John J. Nichols
555 Seventh Street
Columbus Air Force Base, Mississippi 39710

And:

Department of the Air Force
AFCEC/CXF
139 Barnes Dr, Suite 1
Tyndall AFB FL 32403-5319

And:

Columbus Air Force Base Fire Department
Chief Ricky L. Songer
1028 Independence Ave
Columbus AFB, Mississippi 39710

TERMS OF THE AGREEMENT

n. This Agreement will become effective on the date of the last signature to the Agreement and will remain in effect for 5 years from that date and automatically renews annually for a term of 20 years. Either Party may unilaterally terminate this Agreement during the Term by sending notification of its intent to terminate to the other Party at least one hundred and eighty (180) days in advance of the proposed date of termination. Such notification will be in the form of a written submission to the other Party.

o. Upon becoming effective, this Agreement will supersede and cancel all previous agreements between the Parties concerning the rendering of assistance from one to the other for the purposes stated in this Agreement.

p. The modification or amendment of this Agreement, or any of the provisions of this Agreement, will not become effective unless executed in writing by both Parties.

q. This Agreement may be executed in one or more counterparts, each of which will be deemed an original.

IN WITNESS WHEREOF, The Parties have caused this Agreement to be executed by their duly authorized representatives on the dates shown below:

4/3/2015

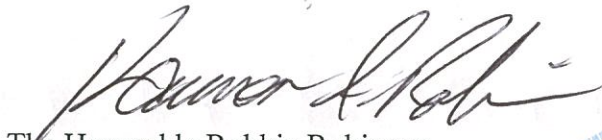
X

JOHN J. NICHOLS, Colonel, USAF

Commander

Signed by: NICHOLS.JOHN.JOSEPH.1073038738

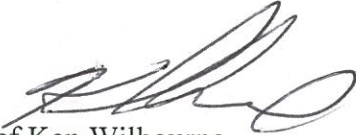
FOR THE CITY OF WESTPOINT



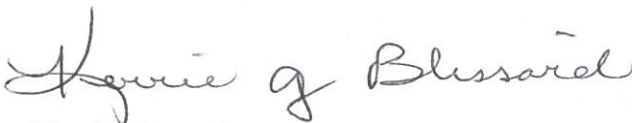
The Honorable Robbie Robinson
Mayor, City of West Point Mississippi



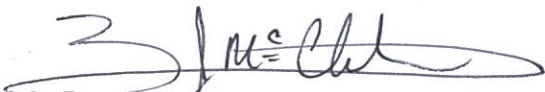
The Honorable Lynn Horton
President, Clay County Mississippi Board of Supervisors



Chief Ken Wilbourne
Fire Chief, City of West Point Mississippi



Kerrie Blissard
Director, ^{West Point - Clay County} Clay County Mississippi E-911/Emergency Management Agency



Mr. Brandon J. McClenton
Fire Coordinator, Clay County Mississippi

**AGREEMENT FOR MUTUAL AID IN FIRE EMERGENCY SERVICES (US)
BETWEEN
COLUMBUS AIR FORCE BASE
AND
CITY OF COLUMBUS FIRE DEPARTMENT**

This Mutual Aid agreement is made and entered into this 3rd day of February 2015, between the Secretary of the Air Force acting by and through the Commander Colonel John Nichols, pursuant to the authority of 42 U.S.C. 1856(a) and the City of Columbus Fire Department. Together the Air Force and City of Columbus Fire Department are hereinafter referred to as the "Parties".

WITNESSETH:

WHEREAS, each of the Parties hereto maintains equipment and personnel for the suppression of fires and the management of other emergency incidents occurring within areas under their respective jurisdictions; and

WHEREAS, as set forth in 42 U.S.C. § 1856 the term 'fire protection' includes personal services and equipment required for fire prevention, the protection of life and property from fire, firefighting, and emergency services, including basic medical support, basic and advanced life support, hazardous material containment and confinement, and special rescue incidents involving vehicular and water mishaps, and trench, building, and confined space extractions; and

WHEREAS, the Parties hereto desire to augment the fire protection capabilities available in their respective jurisdictions by entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements herein established, the Parties hereby agree as follows:

- a. The authority to enter into this Agreement is set forth in 42 U.S.C. § 1856a, and Title 15 United States Code Section 2210, the regulations implementing same at Title 44 Code of Federal Regulations Part 151 *Emergency Management and Assistance* and Air Force Instruction 32-2001, *Fire Emergency Services Program*.
- b. This Agreement will serve as the agreement between the Parties for securing to each mutual aid in fire protection services as defined above.
- c. On request to a representative of the Columbus Air Force Base fire department by a representative of the City of Columbus Fire Department, fire protection equipment and personnel of the Columbus Air Force Base fire department will be dispatched to any point within the area for which the City of Columbus Fire Department normally provides fire protection services as designated by the representatives of the City of Columbus Fire Department.
- d. On request to a representative of the City of Columbus Fire Department by a representative of the Columbus Air Force Base fire department, fire protection equipment and personnel of the City of Columbus Fire Department will be dispatched to any point within the jurisdiction of the

Columbus Air Force Base as designated by the representative of the Columbus Air Force Base fire department.

e. Any dispatch of equipment and personnel by the Parties pursuant to this Agreement is subject to the following conditions:

(1) Any request for aid hereunder will include a statement of the amount and type of equipment and personnel requested and will specify the location to which the equipment and personnel are to be dispatched, but the amount and type of equipment and the number of personnel to be furnished will be determined by the responding organization. The requesting organization will ensure access to site for the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and will be subject to the orders of that official.

(3) The responding organization will be released by the requesting organization when the services of the responding organization are no longer required or when the responding organization is needed within the area for which it normally provides fire protection.

(4) Hazardous Materials incident response will include the response to, and control and containment of any release or suspected release of any material suspected to be or known to be hazardous. Where the properties of a released material are not known, it will be considered hazardous until proven otherwise by the requesting organization using all technical resources available. Cleanup and removal of contained hazardous materials will be the responsibility of the requesting organization.

(5) In the event of a crash of an aircraft owned or operated by the United States or military aircraft of any foreign nation within the area for which the City of Columbus Fire Department normally provides fire protection services, the chief of the Columbus Air Force Base fire department or his or her representative may assume full command on arrival at the scene of the crash.

(6) Where local agencies do not assign an incident safety officer, an Air Force representative will be assigned to act as the incident safety officer for Columbus Air Force Base fire department to observe Air Force operations.

f. Each Party hereby agrees that its intent with respect to the rendering of assistance to the other Party under this Agreement is not to seek reimbursement from the Party requesting such assistance. Notwithstanding the above, the Parties hereby recognize that pursuant to the Section 11 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. § 2210) and Federal regulations issued there under (44 CFR Part 151), the City of Columbus Fire Department is permitted to seek reimbursement for all or any part of its direct expenses and losses (defined as additional firefighting costs over normal operational costs) incurred in fighting fires on property under the jurisdiction of the United States. Furthermore, under the authority of 42 U.S.C. § 1856a, and pursuant to any applicable state or local law each Party hereby reserves the right to

seek reimbursement from the other for all or any part of the costs (defined as additional firefighting costs over normal operational costs) incurred by it in providing fire protection services to the other Party in response to a request for assistance.

g. Both Parties agree to implement the National Incident Management System during all emergency responses on and off installations in accordance with National Fire Protection Association (NFPA) Standard 1561.

h. Each Party waives all claims against the other Party for compensation for any loss, damage, personal injury, or death occurring as a consequence of the performance of this Agreement. This provision does not waive any right of reimbursement pursuant to paragraph f.

i. All equipment used by the City of Columbus Fire Department in carrying out this Agreement will, at the time of action hereunder, be owned by it; and all personnel acting for the City of Columbus Fire Department under this Agreement will, at the time of such action, be an employee or volunteer member of the City of Columbus Fire Department.

j. The rendering of assistance under the terms of this Agreement will not be mandatory; however, the Party receiving a request for assistance will endeavor to immediately inform the requesting Party if the requested assistance cannot be provided and, if assistance can be provided, the quantity of such resources as may be dispatched in response to such request.

k. Neither Party will hold the other Party liable or at fault for failing to respond to any request for assistance or for failing to respond to such a request in a timely manner or with less than optimum equipment and/or personnel, it being the understanding of the Parties that each is primarily and ultimately responsible for the provision of fire protection services needed within their own jurisdictions.

l. Should a dispute arise between the Parties under or related to this Agreement, the Parties agree that within 30 days after notice of the dispute from one Party to the other, the Parties will attempt to resolve the dispute through negotiations. If such negotiations reach an impasse, the Parties agree that within 60 days after Notice of an impasse, they will attempt to resolve the matter through any method or combination of non-binding alternative dispute resolution (ADR) methods available under the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320 (codified at 5 U.S.C. §§ 571-583). The cost of any third party neutral will be divided equally between the Parties, and the selection of any third party neutral will be by agreement of the Parties. If such ADR proceeding does not result in resolution of the dispute, the Parties may separately pursue any remedy available to a Party under the law. However, both Parties agree that the initiation of formal litigation does not preclude further attempts at resolving the dispute through alternative dispute resolution methods. Both Parties agree that the terms of this clause will be considered the "Administrative Remedies" that must be exhausted, prior to institution of any formal litigation.

m. All notices, requests, demands, and other communications which may or are required to be delivered hereunder will be in writing and will be delivered by messenger, by a nationally-

recognized overnight mail delivery service or by certified mail, return receipt requested, at the following addresses:

For the Air Force:

Columbus Air Force Base
Colonel John J. Nichols
555 Seventh Street
Columbus Air Force Base, Mississippi 39710

And:

Department of the Air Force
AFCEC/CXF
139 Barnes Dr, Suite 1
Tyndall AFB FL 32403-5319

And:

Columbus Air Force Base Fire Department
Chief Ricky L. Songer
1028 Independence Ave
Columbus AFB, Mississippi 39710

TERMS OF THE AGREEMENT

n. This Agreement will become effective on the date of the last signature to the Agreement and will remain in effect for 5 years from that date and automatically renews annually for a term of 20 years. Either Party may unilaterally terminate this Agreement during the Term by sending notification of its intent to terminate to the other Party at least one hundred and eighty (180) days in advance of the proposed date of termination. Such notification will be in the form of a written submission to the other Party.

o. Upon becoming effective, this Agreement will supersede and cancel all previous agreements between the Parties concerning the rendering of assistance from one to the other for the purposes stated in this Agreement.

p. The modification or amendment of this Agreement, or any of the provisions of this Agreement, will not become effective unless executed in writing by both Parties.

q. This Agreement may be executed in one or more counterparts, each of which will be deemed an original.

IN WITNESS WHEREOF, The Parties have caused this Agreement to be executed by their duly authorized representatives on the dates shown below:


4/3/2015


X 

JOHN J. NICHOLS, Colonel, USAF
Commander

Signed by: NICHOLS.JOHN.JOSEPH.1073038738

FOR THE CITY OF COLUMBUS


The Honorable Robert E. Smith
Mayor, City of Columbus Mississippi


Chief Martin Andrews
Chief, City of Columbus Fire Rescue

**AGREEMENT FOR MUTUAL AID IN FIRE EMERGENCY SERVICES (US)
BETWEEN
COLUMBUS AIR FORCE BASE
AND
GOLDEN TRIANGLE REGIONAL FIRE DEPARTMENT**

This Mutual Aid agreement is made and entered into this 3rd day of February 2015, between the Secretary of the Air Force acting by and through the Commander Colonel John Nichols, pursuant to the authority of 42 U.S.C. 1856(a) and the Golden Triangle Regional Fire Department. Together the Air Force and the Golden Triangle Regional Fire Department are hereinafter referred to as the "Parties".

WITNESSETH:

WHEREAS, each of the Parties hereto maintains equipment and personnel for the suppression of fires and the management of other emergency incidents occurring within areas under their respective jurisdictions; and

WHEREAS, as set forth in 42 U.S.C. § 1856 the term 'fire protection' includes personal services and equipment required for fire prevention, the protection of life and property from fire, firefighting, and emergency services, including basic medical support, basic and advanced life support, hazardous material containment and confinement, and special rescue incidents involving vehicular and water mishaps, and trench, building, and confined space extractions; and

WHEREAS, the Parties hereto desire to augment the fire protection capabilities available in their respective jurisdictions by entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements herein established, the Parties hereby agree as follows:

- a. The authority to enter into this Agreement is set forth in 42 U.S.C. § 1856a, and Title 15 United States Code Section 2210, the regulations implementing same at Title 44 Code of Federal Regulations Part 151 *Emergency Management and Assistance* and Air Force Instruction 32-2001, *Fire Emergency Services Program*.
- b. This Agreement will serve as the agreement between the Parties for securing to each mutual aid in fire protection services as defined above.
- c. On request to a representative of the Columbus Air Force Base fire department by a representative of the Golden Triangle Regional Fire Department, fire protection equipment and personnel of the Columbus Air Force Base fire department will be dispatched to any point within the area for which the Golden Triangle Regional Fire Department normally provides fire protection services as designated by the representatives of the Golden Triangle Regional Fire Department.

d. On request to a representative of the Golden Triangle Regional Fire Department by a representative of the Columbus Air Force Base fire department, fire protection equipment and personnel of the Golden Triangle Regional Fire Department will be dispatched to any point within the jurisdiction of the Columbus Air Force Base as designated by the representative of the Columbus Air Force Base fire department.

e. Any dispatch of equipment and personnel by the Parties pursuant to this Agreement is subject to the following conditions:

(1) Any request for aid hereunder will include a statement of the amount and type of equipment and personnel requested and will specify the location to which the equipment and personnel are to be dispatched, but the amount and type of equipment and the number of personnel to be furnished will be determined by the responding organization. The requesting organization will ensure access to site for the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and will be subject to the orders of that official.

(3) The responding organization will be released by the requesting organization when the services of the responding organization are no longer required or when the responding organization is needed within the area for which it normally provides fire protection.

(4) Hazardous Materials incident response will include the response to, and control and containment of any release or suspected release of any material suspected to be or known to be hazardous. Where the properties of a released material are not known, it will be considered hazardous until proven otherwise by the requesting organization using all technical resources available. Cleanup and removal of contained hazardous materials will be the responsibility of the requesting organization.

(5) In the event of a crash of an aircraft owned or operated by the United States or military aircraft of any foreign nation within the area for which the Golden Triangle Regional Fire Department normally provides fire protection services, the chief of the Columbus Air Force Base fire department or his or her representative may assume full command on arrival at the scene of the crash.

(6) Where local agencies do not assign an incident safety officer, an Air Force representative will be assigned to act as the incident safety officer for Columbus Air Force Base fire department to observe Air Force operations.

f. Each Party hereby agrees that its intent with respect to the rendering of assistance to the other Party under this Agreement is not to seek reimbursement from the Party requesting such assistance. Notwithstanding the above, the Parties hereby recognize that pursuant to the Section 11 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. § 2210) and Federal regulations issued there under (44 CFR Part 151), the Golden Triangle Regional Fire Department is permitted to seek reimbursement for all or any part of its direct expenses and losses (defined as

additional firefighting costs over normal operational costs) incurred in fighting fires on property under the jurisdiction of the United States. Furthermore, under the authority of 42 U.S.C. § 1856a, and pursuant to any applicable state or local law each Party hereby reserves the right to seek reimbursement from the other for all or any part of the costs (defined as additional firefighting costs over normal operational costs) incurred by it in providing fire protection services to the other Party in response to a request for assistance.

g. Both Parties agree to implement the National Incident Management System during all emergency responses on and off installations in accordance with National Fire Protection Association (NFPA) Standard 1561.

h. Each Party waives all claims against the other Party for compensation for any loss, damage, personal injury, or death occurring as a consequence of the performance of this Agreement. This provision does not waive any right of reimbursement pursuant to paragraph f.

i. All equipment used by the Golden Triangle Regional Fire Department in carrying out this Agreement will, at the time of action hereunder, be owned by it; and all personnel acting for the Golden Triangle Regional Fire Department under this Agreement will, at the time of such action, be an employee or volunteer member of the Golden Triangle Regional Fire Department.

j. The rendering of assistance under the terms of this Agreement will not be mandatory; however, the Party receiving a request for assistance will endeavor to immediately inform the requesting Party if the requested assistance cannot be provided and, if assistance can be provided, the quantity of such resources as may be dispatched in response to such request.

k. Neither Party will hold the other Party liable or at fault for failing to respond to any request for assistance or for failing to respond to such a request in a timely manner or with less than optimum equipment and/or personnel, it being the understanding of the Parties that each is primarily and ultimately responsible for the provision of fire protection services needed within their own jurisdictions.

l. Should a dispute arise between the Parties under or related to this Agreement, the Parties agree that within 30 days after notice of the dispute from one Party to the other, the Parties will attempt to resolve the dispute through negotiations. If such negotiations reach an impasse, the Parties agree that within 60 days after Notice of an impasse, they will attempt to resolve the matter through any method or combination of non-binding alternative dispute resolution (ADR) methods available under the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320 (codified at 5 U.S.C. §§ 571-583). The cost of any third party neutral will be divided equally between the Parties, and the selection of any third party neutral will be by agreement of the Parties. If such ADR proceeding does not result in resolution of the dispute, the Parties may separately pursue any remedy available to a Party under the law. However, both Parties agree that the initiation of formal litigation does not preclude further attempts at resolving the dispute through alternative dispute resolution methods. Both Parties agree that the terms of this clause will be considered the "Administrative Remedies" that must be exhausted, prior to institution of any formal litigation.

m. All notices, requests, demands, and other communications which may or are required to be delivered hereunder will be in writing and will be delivered by messenger, by a nationally-recognized overnight mail delivery service or by certified mail, return receipt requested, at the following addresses:

For the Air Force:

Columbus Air Force Base
Colonel John J. Nichols
555 Seventh Street
Columbus Air Force Base, Mississippi 39710

And:

Department of the Air Force
AFCEC/CXF
139 Barnes Dr, Suite 1
Tyndall AFB FL 32403-5319

And:

Columbus Air Force Base Fire Department
Chief Ricky L. Songer
1028 Independence Ave
Columbus AFB, Mississippi 39710

TERMS OF THE AGREEMENT

n. This Agreement will become effective on the date of the last signature to the Agreement and will remain in effect for 5 years from that date and automatically renews annually for a term of 20 years. Either Party may unilaterally terminate this Agreement during the Term by sending notification of its intent to terminate to the other Party at least one hundred and eighty (180) days in advance of the proposed date of termination. Such notification will be in the form of a written submission to the other Party.

o. Upon becoming effective, this Agreement will supersede and cancel all previous agreements between the Parties concerning the rendering of assistance from one to the other for the purposes stated in this Agreement.

p. The modification or amendment of this Agreement, or any of the provisions of this Agreement, will not become effective unless executed in writing by both Parties.

q. This Agreement may be executed in one or more counterparts, each of which will be deemed an original.

IN WITNESS WHEREOF, The Parties have caused this Agreement to be executed by their duly authorized representatives on the dates shown below:

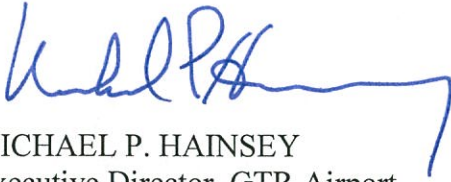
4/3/2015

X 

JOHN J. NICHOLS, Colonel, USAF
Commander

Signed by: NICHOLS.JOHN.JOSEPH.1073038738

FOR THE GOLDEN TRIANGLE REGIONAL AIRPORT



MICHAEL P. HAINSEY
Executive Director, GTR Airport
Lowndes County, Mississippi

KEITH WHITE
Chief, GTR Airport Fire Services
Lowndes County, Mississippi



**AGREEMENT FOR MUTUAL AID IN FIRE EMERGENCY SERVICES (US)
BETWEEN
COLUMBUS AIR FORCE BASE
AND
LOWNDES COUNTY VOLUNTEER FIRE DEPARTMENT**

This Mutual Aid agreement is made and entered into this 3rd day of February 2015, between the Secretary of the Air Force acting by and through the Commander Colonel John Nichols, pursuant to the authority of 42 U.S.C. 1856(a) and the Lowndes County Volunteer Fire Department. Together the Air Force and Lowndes County Volunteer Fire Department are hereinafter referred to as the "Parties".

WITNESSETH:

WHEREAS, each of the Parties hereto maintains equipment and personnel for the suppression of fires and the management of other emergency incidents occurring within areas under their respective jurisdictions; and

WHEREAS, as set forth in 42 U.S.C. § 1856 the term 'fire protection' includes personal services and equipment required for fire prevention, the protection of life and property from fire, firefighting, and emergency services, including basic medical support, basic and advanced life support, hazardous material containment and confinement, and special rescue incidents involving vehicular and water mishaps, and trench, building, and confined space extractions; and

WHEREAS, the Parties hereto desire to augment the fire protection capabilities available in their respective jurisdictions by entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements herein established, the Parties hereby agree as follows:

- a. The authority to enter into this Agreement is set forth in 42 U.S.C. § 1856a, and Title 15 United States Code Section 2210, the regulations implementing same at Title 44 Code of Federal Regulations Part 151 *Emergency Management and Assistance* and Air Force Instruction 32-2001, *Fire Emergency Services Program*.
- b. This Agreement will serve as the agreement between the Parties for securing to each mutual aid in fire protection services as defined above.
- c. On request to a representative of the Columbus Air Force Base fire department by a representative of the Lowndes County Volunteer Fire Department, fire protection equipment and personnel of the Columbus Air Force Base fire department will be dispatched to any point within the area for which the Lowndes County Volunteer Fire Department normally provides fire protection services as designated by the representatives of the Lowndes County Volunteer Fire Department.

d. On request to a representative of the Lowndes County Volunteer Fire Department by a representative of the Columbus Air Force Base fire department, fire protection equipment and personnel of the Lowndes County Volunteer Fire Department will be dispatched to any point within the jurisdiction of the Columbus Air Force Base as designated by the representative of the Columbus Air Force Base fire department.

e. Any dispatch of equipment and personnel by the Parties pursuant to this Agreement is subject to the following conditions:

(1) Any request for aid hereunder will include a statement of the amount and type of equipment and personnel requested and will specify the location to which the equipment and personnel are to be dispatched, but the amount and type of equipment and the number of personnel to be furnished will be determined by the responding organization. The requesting organization will ensure access to site for the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and will be subject to the orders of that official.

(3) The responding organization will be released by the requesting organization when the services of the responding organization are no longer required or when the responding organization is needed within the area for which it normally provides fire protection.

(4) Hazardous Materials incident response will include the response to, and control and containment of any release or suspected release of any material suspected to be or known to be hazardous. Where the properties of a released material are not known, it will be considered hazardous until proven otherwise by the requesting organization using all technical resources available. Cleanup and removal of contained hazardous materials will be the responsibility of the requesting organization.

(5) In the event of a crash of an aircraft owned or operated by the United States or military aircraft of any foreign nation within the area for which the Lowndes County fire department normally provides fire protection services, the chief of the Columbus Air Force Base fire department or his or her representative may assume full command on arrival at the scene of the crash.

(6) Where local agencies do not assign an incident safety officer, an Air Force representative will be assigned to act as the incident safety officer for Columbus Air Force Base fire department to observe Air Force operations.

f. Each Party hereby agrees that its intent with respect to the rendering of assistance to the other Party under this Agreement is not to seek reimbursement from the Party requesting such assistance. Notwithstanding the above, the Parties hereby recognize that pursuant to the Section 11 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. § 2210) and Federal regulations issued there under (44 CFR Part 151), Lowndes County Volunteer Fire Department is permitted to seek reimbursement for all or any part of its direct expenses and losses (defined as

additional firefighting costs over normal operational costs) incurred in fighting fires on property under the jurisdiction of the United States. Furthermore, under the authority of 42 U.S.C. § 1856a, and pursuant to any applicable state or local law each Party hereby reserves the right to seek reimbursement from the other for all or any part of the costs (defined as additional firefighting costs over normal operational costs) incurred by it in providing fire protection services to the other Party in response to a request for assistance.

g. Both Parties agree to implement the National Incident Management System during all emergency responses on and off installations in accordance with National Fire Protection Association (NFPA) Standard 1561.

h. Each Party waives all claims against the other Party for compensation for any loss, damage, personal injury, or death occurring as a consequence of the performance of this Agreement. This provision does not waive any right of reimbursement pursuant to paragraph f.

i. All equipment used by Lowndes County Volunteer Fire Department in carrying out this Agreement will, at the time of action hereunder, be owned by it; and all personnel acting for Lowndes County fire department under this Agreement will, at the time of such action, be an employee or volunteer member of Lowndes County Volunteer Fire Department.

j. The rendering of assistance under the terms of this Agreement will not be mandatory; however, the Party receiving a request for assistance will endeavor to immediately inform the requesting Party if the requested assistance cannot be provided and, if assistance can be provided, the quantity of such resources as may be dispatched in response to such request.

k. Neither Party will hold the other Party liable or at fault for failing to respond to any request for assistance or for failing to respond to such a request in a timely manner or with less than optimum equipment and/or personnel, it being the understanding of the Parties that each is primarily and ultimately responsible for the provision of fire protection services needed within their own jurisdictions.

l. Should a dispute arise between the Parties under or related to this Agreement, the Parties agree that within 30 days after notice of the dispute from one Party to the other, the Parties will attempt to resolve the dispute through negotiations. If such negotiations reach an impasse, the Parties agree that within 60 days after Notice of an impasse, they will attempt to resolve the matter through any method or combination of non-binding alternative dispute resolution (ADR) methods available under the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320 (codified at 5 U.S.C. §§ 571-583). The cost of any third party neutral will be divided equally between the Parties, and the selection of any third party neutral will be by agreement of the Parties. If such ADR proceeding does not result in resolution of the dispute, the Parties may separately pursue any remedy available to a Party under the law. However, both Parties agree that the initiation of formal litigation does not preclude further attempts at resolving the dispute through alternative dispute resolution methods. Both Parties agree that the terms of this clause will be considered the "Administrative Remedies" that must be exhausted, prior to institution of any formal litigation.

m. All notices, requests, demands, and other communications which may or are required to be delivered hereunder will be in writing and will be delivered by messenger, by a nationally-recognized overnight mail delivery service or by certified mail, return receipt requested, at the following addresses:

For the Air Force:

Columbus Air Force Base
Colonel John J. Nichols
555 Seventh Street
Columbus Air Force Base, Mississippi 39710

And:

Department of the Air Force
AFCEC/CXF
139 Barnes Dr, Suite 1
Tyndall AFB FL 32403-5319

And:

Columbus Air Force Base Fire Department
Chief Ricky L. Songer
1028 Independence Ave
Columbus AFB, Mississippi 39710

TERMS OF THE AGREEMENT

n. This Agreement will become effective on the date of the last signature to the Agreement and will remain in effect for 5 years from that date and automatically renews annually for a term of 20 years. Either Party may unilaterally terminate this Agreement during the Term by sending notification of its intent to terminate to the other Party at least one hundred and eighty (180) days in advance of the proposed date of termination. Such notification will be in the form of a written submission to the other Party.

o. Upon becoming effective, this Agreement will supersede and cancel all previous agreements between the Parties concerning the rendering of assistance from one to the other for the purposes stated in this Agreement.

p. The modification or amendment of this Agreement, or any of the provisions of this Agreement, will not become effective unless executed in writing by both Parties.

q. This Agreement may be executed in one or more counterparts, each of which will be deemed an original.

IN WITNESS WHEREOF, The Parties have caused this Agreement to be executed by their duly authorized representatives on the dates shown below:

4/3/2015

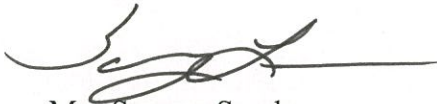
X 

JOHN J. NICHOLS, Colonel, USAF
Commander
Signed by: NICHOLS.JOHN.JOSEPH.1073038738

FOR LOWNDES COUNTY

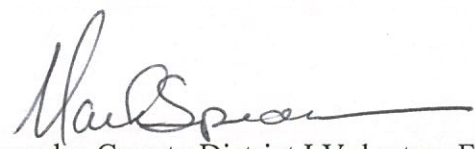


The Honorable Harry Sanders
President, Lowndes County Mississippi Board of Supervisors



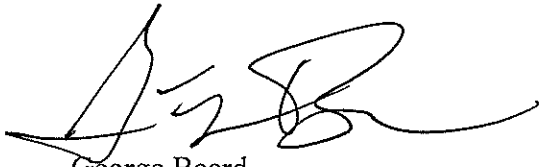
Mr. Sammy Sondren
Fire Coordinator, Lowndes County Mississippi

~~Ms. Melanie McCoy~~ 
Director, Lowndes County Mississippi E-911/Emergency Management Agency

Mark Spears 
Fire Chief, Lowndes County District I Volunteer Fire Department


Wayne Doyle

Fire Chief, Lowndes County District III Volunteer Fire Department

A handwritten signature in black ink, appearing to be 'G. Beard', written in a cursive style.

George Beard

Fire Chief, Lowndes County District V Volunteer Fire Department

A handwritten signature in black ink, appearing to be 'A. Perkins', written in a cursive style.

Andy Perkins

Fire Chief, Lowndes County District II Volunteer Fire Department

A handwritten signature in black ink, appearing to be 'Louis Hairston', written in a cursive style.

Louis Hairston

Fire Chief, Lowndes County District IV Volunteer Fire Department

**AGREEMENT FOR MUTUAL AID IN FIRE EMERGENCY SERVICES (US)
BETWEEN
COLUMBUS AIR FORCE BASE
AND
MISSISSIPPI FORESTRY COMMISSION**

This Mutual Aid agreement is made and entered into this 3rd day of February 2015, between the Secretary of the Air Force acting by and through the Commander Colonel John Nichols, pursuant to the authority of 42 U.S.C. 1856(a) and Mississippi Forestry Commission. Together the Air Force and Mississippi Forestry Commission are hereinafter referred to as the "Parties".

WITNESSETH:

WHEREAS, each of the Parties hereto maintains equipment and personnel for the suppression of fires and the management of other emergency incidents occurring within areas under their respective jurisdictions; and

WHEREAS, as set forth in 42 U.S.C. § 1856 the term 'fire protection' includes personal services and equipment required for fire prevention, the protection of life and property from fire, firefighting, and emergency services, including basic medical support, basic and advanced life support, hazardous material containment and confinement, and special rescue incidents involving vehicular and water mishaps, and trench, building, and confined space extractions; and

WHEREAS, the Parties hereto desire to augment the fire protection capabilities available in their respective jurisdictions by entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements herein established, the Parties hereby agree as follows:

a. The authority to enter into this Agreement is set forth in 42 U.S.C. § 1856a, and Title 15 United States Code Section 2210, the regulations implementing same at Title 44 Code of Federal Regulations Part 151 *Emergency Management and Assistance* and Air Force Instruction 32-2001, *Fire Emergency Services Program*.

b. This Agreement will serve as the agreement between the Parties for securing to each mutual aid in fire protection services as defined above.

c. On request to a representative of the Columbus Air Force Base fire department by a representative of the Mississippi Forestry Commission, fire protection equipment and personnel of the Columbus Air Force Base fire department will be dispatched to any point within the area for which the Mississippi Forestry Commission normally provides fire protection services as designated by the representatives of the Mississippi Forestry Commission.

d. On request to a representative of the Mississippi Forestry Commission by a representative of the Columbus Air Force Base fire department, fire protection equipment and personnel of the Mississippi Forestry Commission will be dispatched to any point within the jurisdiction of the

Columbus Air Force Base as designated by the representative of the Columbus Air Force Base fire department.

e. Any dispatch of equipment and personnel by the Parties pursuant to this Agreement is subject to the following conditions:

(1) Any request for aid hereunder will include a statement of the amount and type of equipment and personnel requested and will specify the location to which the equipment and personnel are to be dispatched, but the amount and type of equipment and the number of personnel to be furnished will be determined by the responding organization. The requesting organization will ensure access to site for the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and will be subject to the orders of that official.

(3) The responding organization will be released by the requesting organization when the services of the responding organization are no longer required or when the responding organization is needed within the area for which it normally provides fire protection.

(4) Hazardous Materials incident response will include the response to, and control and containment of any release or suspected release of any material suspected to be or known to be hazardous. Where the properties of a released material are not known, it will be considered hazardous until proven otherwise by the requesting organization using all technical resources available. Cleanup and removal of contained hazardous materials will be the responsibility of the requesting organization.

(5) In the event of a crash of an aircraft owned or operated by the United States or military aircraft of any foreign nation within the area for which the Mississippi Forestry Commission normally provides fire protection services, the chief of the Columbus Air Force Base fire department or his or her representative may assume full command on arrival at the scene of the crash.

(6) Where local agencies do not assign an incident safety officer, an Air Force representative will be assigned to act as the incident safety officer for Columbus Air Force Base fire department to observe Air Force operations.

f. Each Party hereby agrees that its intent with respect to the rendering of assistance to the other Party under this Agreement is not to seek reimbursement from the Party requesting such assistance. Notwithstanding the above, the Parties hereby recognize that pursuant to the Section 11 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. § 2210) and Federal regulations issued there under (44 CFR Part 151), the Mississippi Forestry Commission is permitted to seek reimbursement for all or any part of its direct expenses and losses (defined as additional firefighting costs over normal operational costs) incurred in fighting fires on property under the jurisdiction of the United States. Furthermore, under the authority of 42 U.S.C. § 1856a, and pursuant to any applicable state or local law each Party hereby reserves the right to

seek reimbursement from the other for all or any part of the costs (defined as additional firefighting costs over normal operational costs) incurred by it in providing fire protection services to the other Party in response to a request for assistance.

g. Both Parties agree to implement the National Incident Management System during all emergency responses on and off installations in accordance with National Fire Protection Association (NFPA) Standard 1561.

h. Each Party waives all claims against the other Party for compensation for any loss, damage, personal injury, or death occurring as a consequence of the performance of this Agreement. This provision does not waive any right of reimbursement pursuant to paragraph f.

i. All equipment used by the Mississippi Forestry Commission in carrying out this Agreement will, at the time of action hereunder, be owned by it; and all personnel acting for the Mississippi Forestry Commission under this Agreement will, at the time of such action, be an employee or volunteer member of the Mississippi Forestry Commission.

j. The rendering of assistance under the terms of this Agreement will not be mandatory; however, the Party receiving a request for assistance will endeavor to immediately inform the requesting Party if the requested assistance cannot be provided and, if assistance can be provided, the quantity of such resources as may be dispatched in response to such request.

k. Neither Party will hold the other Party liable or at fault for failing to respond to any request for assistance or for failing to respond to such a request in a timely manner or with less than optimum equipment and/or personnel, it being the understanding of the Parties that each is primarily and ultimately responsible for the provision of fire protection services needed within their own jurisdictions.

l. Should a dispute arise between the Parties under or related to this Agreement, the Parties agree that within 30 days after notice of the dispute from one Party to the other, the Parties will attempt to resolve the dispute through negotiations. If such negotiations reach an impasse, the Parties agree that within 60 days after Notice of an impasse, they will attempt to resolve the matter through any method or combination of non-binding alternative dispute resolution (ADR) methods available under the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320 (codified at 5 U.S.C. §§ 571-583). The cost of any third party neutral will be divided equally between the Parties, and the selection of any third party neutral will be by agreement of the Parties. If such ADR proceeding does not result in resolution of the dispute, the Parties may separately pursue any remedy available to a Party under the law. However, both Parties agree that the initiation of formal litigation does not preclude further attempts at resolving the dispute through alternative dispute resolution methods. Both Parties agree that the terms of this clause will be considered the "Administrative Remedies" that must be exhausted, prior to institution of any formal litigation.

m. All notices, requests, demands, and other communications which may or are required to be delivered hereunder will be in writing and will be delivered by messenger, by a nationally-

recognized overnight mail delivery service or by certified mail, return receipt requested, at the following addresses:

For the Air Force:

Columbus Air Force Base
Colonel John J. Nichols
555 Seventh Street
Columbus Air Force Base, Mississippi 39710

And:

Department of the Air Force
AFCEC/CXF
139 Barnes Dr, Suite 1
Tyndall AFB FL 32403-5319

And:

Columbus Air Force Base Fire Department
Chief Ricky L. Songer
1028 Independence Ave
Columbus AFB, Mississippi 39710

TERMS OF THE AGREEMENT

n. This Agreement will become effective on the date of the last signature to the Agreement and will remain in effect for 5 years from that date and automatically renews annually for a term of 20 years. Either Party may unilaterally terminate this Agreement during the Term by sending notification of its intent to terminate to the other Party at least one hundred and eighty (180) days in advance of the proposed date of termination. Such notification will be in the form of a written submission to the other Party.

o. Upon becoming effective, this Agreement will supersede and cancel all previous agreements between the Parties concerning the rendering of assistance from one to the other for the purposes stated in this Agreement.

p. The modification or amendment of this Agreement, or any of the provisions of this Agreement, will not become effective unless executed in writing by both Parties.

q. This Agreement may be executed in one or more counterparts, each of which will be deemed an original.

IN WITNESS WHEREOF, The Parties have caused this Agreement to be executed by their duly authorized representatives on the dates shown below:

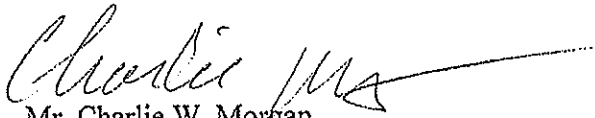
4/3/2015

X 

JOHN J. NICHOLS, Colonel, USAF
Commander

Signed by: NICHOLS.JOHN.JOSEPH.1073038738

FOR THE MISSISSIPPI FORESTRY COMMISSION



Mr. Charlie W. Morgan
Mississippi Forestry Commission

**AGREEMENT FOR MUTUAL AID IN FIRE EMERGENCY SERVICES (US)
BETWEEN
COLUMBUS AIR FORCE BASE
AND
MONROE COUNTY FIRE DEPARTMENT**

This Mutual Aid agreement is made and entered into this 3rd day of February 2015, between the Secretary of the Air Force acting by and through the Commander Colonel John Nichols, pursuant to the authority of 42 U.S.C. 1856(a) and Monroe County Fire Department. Together the Air Force and Monroe County Fire Department are hereinafter referred to as the "Parties".

WITNESSETH:

WHEREAS, each of the Parties hereto maintains equipment and personnel for the suppression of fires and the management of other emergency incidents occurring within areas under their respective jurisdictions; and

WHEREAS, as set forth in 42 U.S.C. § 1856 the term 'fire protection' includes personal services and equipment required for fire prevention, the protection of life and property from fire, firefighting, and emergency services, including basic medical support, basic and advanced life support, hazardous material containment and confinement, and special rescue incidents involving vehicular and water mishaps, and trench, building, and confined space extractions; and

WHEREAS, the Parties hereto desire to augment the fire protection capabilities available in their respective jurisdictions by entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements herein established, the Parties hereby agree as follows:

- a. The authority to enter into this Agreement is set forth in 42 U.S.C. § 1856a, and Title 15 United States Code Section 2210, the regulations implementing same at Title 44 Code of Federal Regulations Part 151 *Emergency Management and Assistance* and Air Force Instruction 32-2001, *Fire Emergency Services Program*.
- b. This Agreement will serve as the agreement between the Parties for securing to each mutual aid in fire protection services as defined above.
- c. On request to a representative of the Columbus Air Force Base fire department by a representative of the Monroe County Fire Department, fire protection equipment and personnel of the Columbus Air Force Base fire department will be dispatched to any point within the area for which the Monroe County Fire Department normally provides fire protection services as designated by the representatives of the Monroe County Fire Department.
- d. On request to a representative of the Monroe County Fire Department by a representative of the Columbus Air Force Base fire department, fire protection equipment and personnel of the Monroe County Fire Department will be dispatched to any point within the jurisdiction of the

Columbus Air Force Base as designated by the representative of the Columbus Air Force Base fire department.

e. Any dispatch of equipment and personnel by the Parties pursuant to this Agreement is subject to the following conditions:

(1) Any request for aid hereunder will include a statement of the amount and type of equipment and personnel requested and will specify the location to which the equipment and personnel are to be dispatched, but the amount and type of equipment and the number of personnel to be furnished will be determined by the responding organization. The requesting organization will ensure access to site for the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and will be subject to the orders of that official.

(3) The responding organization will be released by the requesting organization when the services of the responding organization are no longer required or when the responding organization is needed within the area for which it normally provides fire protection.

(4). Hazardous Materials incident response will include the response to, and control and containment of any release or suspected release of any material suspected to be or known to be hazardous. Where the properties of a released material are not known, it will be considered hazardous until proven otherwise by the requesting organization using all technical resources available. Cleanup and removal of contained hazardous materials will be the responsibility of the requesting organization.

(5) In the event of a crash of an aircraft owned or operated by the United States or military aircraft of any foreign nation within the area for which the Monroe County Fire Department normally provides fire protection services, the chief of the Columbus Air Force Base fire department or his or her representative may assume full command on arrival at the scene of the crash.

(6) Where local agencies do not assign an incident safety officer, an Air Force representative will be assigned to act as the incident safety officer for Columbus Air Force Base fire department to observe Air Force operations.

f. Each Party hereby agrees that its intent with respect to the rendering of assistance to the other Party under this Agreement is not to seek reimbursement from the Party requesting such assistance. Notwithstanding the above, the Parties hereby recognize that pursuant to the Section 11 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. § 2210) and Federal regulations issued there under (44 CFR Part 151), the Monroe County Fire Department is permitted to seek reimbursement for all or any part of its direct expenses and losses (defined as additional firefighting costs over normal operational costs) incurred in fighting fires on property under the jurisdiction of the United States. Furthermore, under the authority of 42 U.S.C. § 1856a, and pursuant to any applicable state or local law each Party hereby reserves the right to

seek reimbursement from the other for all or any part of the costs (defined as additional firefighting costs over normal operational costs) incurred by it in providing fire protection services to the other Party in response to a request for assistance.

g. Both Parties agree to implement the National Incident Management System during all emergency responses on and off installations in accordance with National Fire Protection Association (NFPA) Standard 1561.

h. Each Party waives all claims against the other Party for compensation for any loss, damage, personal injury, or death occurring as a consequence of the performance of this Agreement. This provision does not waive any right of reimbursement pursuant to paragraph f.

i. All equipment used by the Monroe County Fire Department in carrying out this Agreement will, at the time of action hereunder, be owned by it; and all personnel acting for the Monroe County Fire Department under this Agreement will, at the time of such action, be an employee or volunteer member of the Monroe County Fire Department.

j. The rendering of assistance under the terms of this Agreement will not be mandatory; however, the Party receiving a request for assistance will endeavor to immediately inform the requesting Party if the requested assistance cannot be provided and, if assistance can be provided, the quantity of such resources as may be dispatched in response to such request.

k. Neither Party will hold the other Party liable or at fault for failing to respond to any request for assistance or for failing to respond to such a request in a timely manner or with less than optimum equipment and/or personnel, it being the understanding of the Parties that each is primarily and ultimately responsible for the provision of fire protection services needed within their own jurisdictions.

l. Should a dispute arise between the Parties under or related to this Agreement, the Parties agree that within 30 days after notice of the dispute from one Party to the other, the Parties will attempt to resolve the dispute through negotiations. If such negotiations reach an impasse, the Parties agree that within 60 days after Notice of an impasse, they will attempt to resolve the matter through any method or combination of non-binding alternative dispute resolution (ADR) methods available under the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320 (codified at 5 U.S.C. §§ 571-583). The cost of any third party neutral will be divided equally between the Parties, and the selection of any third party neutral will be by agreement of the Parties. If such ADR proceeding does not result in resolution of the dispute, the Parties may separately pursue any remedy available to a Party under the law. However, both Parties agree that the initiation of formal litigation does not preclude further attempts at resolving the dispute through alternative dispute resolution methods. Both Parties agree that the terms of this clause will be considered the "Administrative Remedies" that must be exhausted, prior to institution of any formal litigation.

m. All notices, requests, demands, and other communications which may or are required to be delivered hereunder will be in writing and will be delivered by messenger, by a nationally-

recognized overnight mail delivery service or by certified mail, return receipt requested, at the following addresses:

For the Air Force:

Columbus Air Force Base
Colonel John J. Nichols
555 Seventh Street
Columbus Air Force Base, Mississippi 39710

And:

Department of the Air Force
AFCEC/CXF
139 Barnes Dr, Suite 1
Tyndall AFB FL 32403-5319

And:

Columbus Air Force Base Fire Department
Chief Ricky L. Songer
1028 Independence Ave
Columbus AFB, Mississippi 39710

TERMS OF THE AGREEMENT

n. This Agreement will become effective on the date of the last signature to the Agreement and will remain in effect for 5 years from that date and automatically renews annually for a term of 20 years. Either Party may unilaterally terminate this Agreement during the Term by sending notification of its intent to terminate to the other Party at least one hundred and eighty (180) days in advance of the proposed date of termination. Such notification will be in the form of a written submission to the other Party.

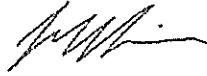
o. Upon becoming effective, this Agreement will supersede and cancel all previous agreements between the Parties concerning the rendering of assistance from one to the other for the purposes stated in this Agreement.

p. The modification or amendment of this Agreement, or any of the provisions of this Agreement, will not become effective unless executed in writing by both Parties.

q. This Agreement may be executed in one or more counterparts, each of which will be deemed an original.

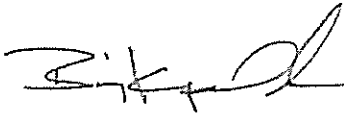
IN WITNESS WHEREOF, The Parties have caused this Agreement to be executed by their duly authorized representatives on the dates shown below:

4/3/2015

X 

JOHN J. NICHOLS, Colonel, USAF
Commander
Signed by: NICHOLS.JOHN.JOSEPH.1073038738

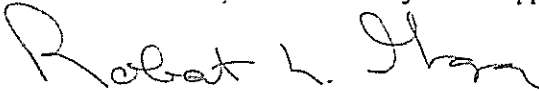
FOR THE COUNTY OF MONROE



Mr. Billy Kirkpatrick
President, Monroe County Mississippi Board of Supervisors



Terry Tucker
Fire Coordinator, Monroe County Mississippi



Mr. Robert L. Goza
Director, Monroe County Mississippi Emergency Manager

**AGREEMENT FOR MUTUAL AID IN FIRE EMERGENCY SERVICES (US)
BETWEEN
COLUMBUS AIR FORCE BASE
AND
NOXUBEE COUNTY FIRE DEPARTMENT**

This Mutual Aid agreement is made and entered into this 3rd day of February 2015, between the Secretary of the Air Force acting by and through the Commander Colonel John Nichols, pursuant to the authority of 42 U.S.C. 1856(a) and Noxubee County Fire Department. Together the Air Force and Noxubee County Fire Department are hereinafter referred to as the "Parties".

WITNESSETH:

WHEREAS, each of the Parties hereto maintains equipment and personnel for the suppression of fires and the management of other emergency incidents occurring within areas under their respective jurisdictions; and

WHEREAS, as set forth in 42 U.S.C. § 1856 the term 'fire protection' includes personal services and equipment required for fire prevention, the protection of life and property from fire, firefighting, and emergency services, including basic medical support, basic and advanced life support, hazardous material containment and confinement, and special rescue incidents involving vehicular and water mishaps, and trench, building, and confined space extractions; and

WHEREAS, the Parties hereto desire to augment the fire protection capabilities available in their respective jurisdictions by entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements herein established, the Parties hereby agree as follows:

- a. The authority to enter into this Agreement is set forth in 42 U.S.C. § 1856a, and Title 15 United States Code Section 2210, the regulations implementing same at Title 44 Code of Federal Regulations Part 151 *Emergency Management and Assistance* and Air Force Instruction 32-2001, *Fire Emergency Services Program*.
- b. This Agreement will serve as the agreement between the Parties for securing to each mutual aid in fire protection services as defined above.
- c. On request to a representative of the Columbus Air Force Base fire department by a representative of the Noxubee County Fire Department, fire protection equipment and personnel of the Columbus Air Force Base fire department will be dispatched to any point within the area for which the Noxubee County Fire Department normally provides fire protection services as designated by the representatives of the Noxubee County Fire Department.
- d. On request to a representative of the Noxubee County Fire Department by a representative of the Columbus Air Force Base fire department, fire protection equipment and personnel of the Noxubee County Fire Department will be dispatched to any point within the jurisdiction of the

Columbus Air Force Base as designated by the representative of the Columbus Air Force Base fire department.

c. Any dispatch of equipment and personnel by the Parties pursuant to this Agreement is subject to the following conditions:

(1) Any request for aid hereunder will include a statement of the amount and type of equipment and personnel requested and will specify the location to which the equipment and personnel are to be dispatched, but the amount and type of equipment and the number of personnel to be furnished will be determined by the responding organization. The requesting organization will ensure access to site for the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and will be subject to the orders of that official.

(3) The responding organization will be released by the requesting organization when the services of the responding organization are no longer required or when the responding organization is needed within the area for which it normally provides fire protection.

(4) Hazardous Materials incident response will include the response to, and control and containment of any release or suspected release of any material suspected to be or known to be hazardous. Where the properties of a released material are not known, it will be considered hazardous until proven otherwise by the requesting organization using all technical resources available. Cleanup and removal of contained hazardous materials will be the responsibility of the requesting organization.

(5) In the event of a crash of an aircraft owned or operated by the United States or military aircraft of any foreign nation within the area for which the Noxubee County Fire Department normally provides fire protection services, the chief of the Columbus Air Force Base fire department or his or her representative may assume full command on arrival at the scene of the crash.

(6) Where local agencies do not assign an incident safety officer, an Air Force representative will be assigned to act as the incident safety officer for Columbus Air Force Base fire department to observe Air Force operations.

f. Each Party hereby agrees that its intent with respect to the rendering of assistance to the other Party under this Agreement is not to seek reimbursement from the Party requesting such assistance. Notwithstanding the above, the Parties hereby recognize that pursuant to the Section 11 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. § 2210) and Federal regulations issued there under (44 CFR Part 151), the Noxubee County Fire Department is permitted to seek reimbursement for all or any part of its direct expenses and losses (defined as additional firefighting costs over normal operational costs) incurred in fighting fires on property under the jurisdiction of the United States. Furthermore, under the authority of 42 U.S.C. § 1856a, and pursuant to any applicable state or local law each Party hereby reserves the right to

seek reimbursement from the other for all or any part of the costs (defined as additional firefighting costs over normal operational costs) incurred by it in providing fire protection services to the other Party in response to a request for assistance.

g. Both Parties agree to implement the National Incident Management System during all emergency responses on and off installations in accordance with National Fire Protection Association (NFPA) Standard 1561.

h. Each Party waives all claims against the other Party for compensation for any loss, damage, personal injury, or death occurring as a consequence of the performance of this Agreement. This provision does not waive any right of reimbursement pursuant to paragraph f.

i. All equipment used by the Noxubee County Fire Department in carrying out this Agreement will, at the time of action hereunder, be owned by it; and all personnel acting for the Noxubee County Fire Department under this Agreement will, at the time of such action, be an employee or volunteer member of the Noxubee County Fire Department.

j. The rendering of assistance under the terms of this Agreement will not be mandatory; however, the Party receiving a request for assistance will endeavor to immediately inform the requesting Party if the requested assistance cannot be provided and, if assistance can be provided, the quantity of such resources as may be dispatched in response to such request.

k. Neither Party will hold the other Party liable or at fault for failing to respond to any request for assistance or for failing to respond to such a request in a timely manner or with less than optimum equipment and/or personnel, it being the understanding of the Parties that each is primarily and ultimately responsible for the provision of fire protection services needed within their own jurisdictions.

l. Should a dispute arise between the Parties under or related to this Agreement, the Parties agree that within 30 days after notice of the dispute from one Party to the other, the Parties will attempt to resolve the dispute through negotiations. If such negotiations reach an impasse, the Parties agree that within 60 days after Notice of an impasse, they will attempt to resolve the matter through any method or combination of non-binding alternative dispute resolution (ADR) methods available under the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320 (codified at 5 U.S.C. §§ 571-583). The cost of any third party neutral will be divided equally between the Parties, and the selection of any third party neutral will be by agreement of the Parties. If such ADR proceeding does not result in resolution of the dispute, the Parties may separately pursue any remedy available to a Party under the law. However, both Parties agree that the initiation of formal litigation does not preclude further attempts at resolving the dispute through alternative dispute resolution methods. Both Parties agree that the terms of this clause will be considered the "Administrative Remedies" that must be exhausted, prior to institution of any formal litigation.

m. All notices, requests, demands, and other communications which may or are required to be delivered hereunder will be in writing and will be delivered by messenger, by a nationally-

recognized overnight mail delivery service or by certified mail, return receipt requested, at the following addresses:

For the Air Force:

Columbus Air Force Base
Colonel John J. Nichols
555 Seventh Street
Columbus Air Force Base, Mississippi 39710

And:

Department of the Air Force
AFCEC/CXF
139 Barnes Dr, Suite 1
Tyndall AFB FL 32403-5319

And:

Columbus Air Force Base Fire Department
Chief Ricky L. Songer
1028 Independence Ave
Columbus AFB, Mississippi 39710

TERMS OF THE AGREEMENT

n. This Agreement will become effective on the date of the last signature to the Agreement and will remain in effect for 5 years from that date and automatically renews annually for a term of 20 years. Either Party may unilaterally terminate this Agreement during the Term by sending notification of its intent to terminate to the other Party at least one hundred and eighty (180) days in advance of the proposed date of termination. Such notification will be in the form of a written submission to the other Party.

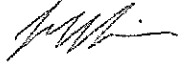
o. Upon becoming effective, this Agreement will supersede and cancel all previous agreements between the Parties concerning the rendering of assistance from one to the other for the purposes stated in this Agreement.

p. The modification or amendment of this Agreement, or any of the provisions of this Agreement, will not become effective unless executed in writing by both Parties.

q. This Agreement may be executed in one or more counterparts, each of which will be deemed an original.

IN WITNESS WHEREOF, The Parties have caused this Agreement to be executed by their duly authorized representatives on the dates shown below:

4/3/2015

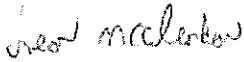
X 

JOHN J. NICHOLS, Colonel, USAF
Commander
Signed by: NICHOLS.JOHN.JOSEPH.1073038738

FOR THE CITY OF SHUQUALAK

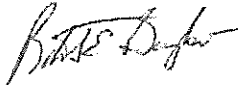


The Honorable Velma Jenkins
Mayor, City of Shuqualak, Mississippi



Chief Leon McClendon
Fire Chief, City of Shuqualak, Mississippi

FOR THE CITY OF MACON



The Honorable Bob Boykin
Mayor, City of Macon, Mississippi




Chief William Whitehead
Fire Chief, City of Macon, Mississippi

FOR THE TOWN OF BROOKSVILLE

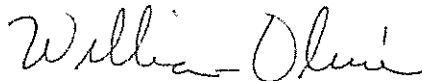


The Honorable David Boswell
Mayor, Town of Brooksville, Mississippi

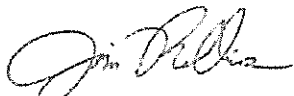


Chief Galen Mast
Fire Chief, Town of Brooksville, Mississippi

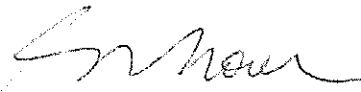
FOR THE COUNTY OF NOXUBEE



The Honorable William Oliver
President, Noxubee County Mississippi Board of Supervisors



Mr. Jim Robins
Fire Coordinator, Noxubee County Mississippi



Mr. Brad Moore
Director, Noxubee County Mississippi E-911/Emergency Management Agency

**AGREEMENT FOR MUTUAL AID IN FIRE EMERGENCY SERVICES (US)
BETWEEN
COLUMBUS AIR FORCE BASE
AND
ALL OKTIBBEHA COUNTY VOLUNTEER FIRE DEPARTMENTS**

This Mutual Aid agreement is made and entered into this 3rd day of February 2015, between the Secretary of the Air Force acting by and through the Commander Colonel John Nichols, pursuant to the authority of 42 U.S.C. 1856(a), all Oktibbeha County Volunteer Fire Departments. Together the Air Force, all Oktibbeha County Volunteer Fire Departments are hereinafter referred to as the "Parties".

WITNESSETH:

WHEREAS, each of the Parties hereto maintains equipment and personnel for the suppression of fires and the management of other emergency incidents occurring within areas under their respective jurisdictions; and

WHEREAS, as set forth in 42 U.S.C. § 1856 the term 'fire protection' includes personal services and equipment required for fire prevention, the protection of life and property from fire, firefighting, and emergency services, including basic medical support, basic and advanced life support, hazardous material containment and confinement, and special rescue incidents involving vehicular and water mishaps, and trench, building, and confined space extractions; and

WHEREAS, the Parties hereto desire to augment the fire protection capabilities available in their respective jurisdictions by entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements herein established, the Parties hereby agree as follows:

- a. The authority to enter into this Agreement is set forth in 42 U.S.C. § 1856a, and Title 15 United States Code Section 2210, the regulations implementing same at Title 44 Code of Federal Regulations Part 151 *Emergency Management and Assistance* and Air Force Instruction 32-2001, *Fire Emergency Services Program*.
- b. This Agreement will serve as the agreement between the Parties for securing to each mutual aid in fire protection services as defined above.
- c. On request to a representative of the Columbus Air Force Base fire department by a representative of the Oktibbeha County Volunteer Fire Departments, fire protection equipment and personnel of the Columbus Air Force Base fire department will be dispatched to any point within the area for which the Oktibbeha County Volunteer Fire Departments normally provide fire protection services as designated by the representatives of the Oktibbeha County Fire Department.

d. On request to a representative of the Oktibbeha County Volunteer Fire Departments by a representative of the Columbus Air Force Base fire department, fire protection equipment and personnel of the Oktibbeha County Volunteer Fire Departments will be dispatched to any point within the jurisdiction of the Columbus Air Force Base as designated by the representative of the Columbus Air Force Base fire department.

e. Any dispatch of equipment and personnel by the Parties pursuant to this Agreement is subject to the following conditions:

(1) Any request for aid hereunder will include a statement of the amount and type of equipment and personnel requested and will specify the location to which the equipment and personnel are to be dispatched, but the amount and type of equipment and the number of personnel to be furnished will be determined by the responding organization. The requesting organization will ensure access to site for the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and will be subject to the orders of that official.

(3) The responding organization will be released by the requesting organization when the services of the responding organization are no longer required or when the responding organization is needed within the area for which it normally provides fire protection.

(4) Hazardous Materials incident response will include the response to, and control and containment of any release or suspected release of any material suspected to be or known to be hazardous. Where the properties of a released material are not known, it will be considered hazardous until proven otherwise by the requesting organization using all technical resources available. Cleanup and removal of contained hazardous materials will be the responsibility of the requesting organization.

(5) In the event of a crash of an aircraft owned or operated by the United States or military aircraft of any foreign nation within the area for which the Oktibbeha County Volunteer Fire Departments normally provides fire protection services, the chief of the Columbus Air Force Base fire department or his or her representative may assume full command on arrival at the scene of the crash.

(6) Where local agencies do not assign an incident safety officer, an Air Force representative will be assigned to act as the incident safety officer for Columbus Air Force Base fire department to observe Air Force operations.

f. Each Party hereby agrees that its intent with respect to the rendering of assistance to the other Party under this Agreement is not to seek reimbursement from the Party requesting such assistance. Notwithstanding the above, the Parties hereby recognize that pursuant to the Section 11 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. § 2210) and Federal regulations issued there under (44 CFR Part 151), the Oktibbeha County Volunteer Fire Departments are permitted to seek reimbursement for all or any part of its direct expenses and

losses (defined as additional firefighting costs over normal operational costs) incurred in fighting fires on property under the jurisdiction of the United States. Furthermore, under the authority of 42 U.S.C. § 1856a, and pursuant to any applicable state or local law each Party hereby reserves the right to seek reimbursement from the other for all or any part of the costs (defined as additional firefighting costs over normal operational costs) incurred by it in providing fire protection services to the other Party in response to a request for assistance.

g. Both Parties agree to implement the National Incident Management System during all emergency responses on and off installations in accordance with National Fire Protection Association (NFPA) Standard 1561.

h. Each Party waives all claims against the other Party for compensation for any loss, damage, personal injury, or death occurring as a consequence of the performance of this Agreement. This provision does not waive any right of reimbursement pursuant to paragraph f.

i. All equipment used by the Oktibbeha County Volunteer Fire Departments in carrying out this Agreement will, at the time of action hereunder, be owned by it; and all personnel acting for the Oktibbeha County Volunteer Fire Departments under this Agreement will, at the time of such action, be an employee or volunteer member of the Oktibbeha County Volunteer Fire Departments.

j. The rendering of assistance under the terms of this Agreement will not be mandatory; however, the Party receiving a request for assistance will endeavor to immediately inform the requesting Party if the requested assistance cannot be provided and, if assistance can be provided, the quantity of such resources as may be dispatched in response to such request.

k. Neither Party will hold the other Party liable or at fault for failing to respond to any request for assistance or for failing to respond to such a request in a timely manner or with less than optimum equipment and/or personnel, it being the understanding of the Parties that each is primarily and ultimately responsible for the provision of fire protection services needed within their own jurisdictions.

l. Should a dispute arise between the Parties under or related to this Agreement, the Parties agree that within 30 days after notice of the dispute from one Party to the other, the Parties will attempt to resolve the dispute through negotiations. If such negotiations reach an impasse, the Parties agree that within 60 days after Notice of an impasse, they will attempt to resolve the matter through any method or combination of non-binding alternative dispute resolution (ADR) methods available under the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320 (codified at 5 U.S.C. §§ 571-583). The cost of any third party neutral will be divided equally between the Parties, and the selection of any third party neutral will be by agreement of the Parties. If such ADR proceeding does not result in resolution of the dispute, the Parties may separately pursue any remedy available to a Party under the law. However, both Parties agree that the initiation of formal litigation does not preclude further attempts at resolving the dispute through alternative dispute resolution methods. Both Parties agree that the terms of this clause will be considered the "Administrative Remedies" that must be exhausted, prior to institution of any formal litigation.

m. All notices, requests, demands, and other communications which may or are required to be delivered hereunder will be in writing and will be delivered by messenger, by a nationally-recognized overnight mail delivery service or by certified mail, return receipt requested, at the following addresses:

For the Air Force:

Columbus Air Force Base
Colonel John J. Nichols
555 Seventh Street
Columbus Air Force Base, Mississippi 39710

And:

Department of the Air Force
AFCEC/CXF
139 Barnes Dr, Suite 1
Tyndall AFB FL 32403-5319

And:

Columbus Air Force Base Fire Department
Chief Ricky L. Songer
1028 Independence Ave
Columbus AFB, Mississippi 39710

TERMS OF THE AGREEMENT

n. This Agreement will become effective on the date of the last signature to the Agreement and will remain in effect for 5 years from that date and automatically renews annually for a term of 20 years. Either Party may unilaterally terminate this Agreement during the Term by sending notification of its intent to terminate to the other Party at least one hundred and eighty (180) days in advance of the proposed date of termination. Such notification will be in the form of a written submission to the other Party.

o. Upon becoming effective, this Agreement will supersede and cancel all previous agreements between the Parties concerning the rendering of assistance from one to the other for the purposes stated in this Agreement.

p. The modification or amendment of this Agreement, or any of the provisions of this Agreement, will not become effective unless executed in writing by both Parties.

q. This Agreement may be executed in one or more counterparts, each of which will be deemed an original.

IN WITNESS WHEREOF, The Parties have caused this Agreement to be executed by their duly authorized representatives on the dates shown below:

X

JOHN J. NICHOLS, Colonel, USAF
Commander

FOR THE COUNTY OF OKTIBBEHA



Mr. Orlando Trainer
President, Oktibbeha County Board of Supervisors



Mr. Shank Phelps, Director
Oktibbeha County Mississippi E-911/Emergency Management Agency



Mr. Kirk Rosenhan
Oktibbeha County Fire Coordinator



Chief Danny Waltmon
Fire Chief, Adaton / Self Creek Fire Department



Chief Wade Howell
Fire Chief, Bell Schoolhouse Fire Department



Chief Joe Pennell
Fire Chief, Central Oktibbeha Fire Department



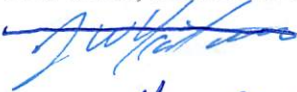
Chief Terry Skinner
Fire Chief, District 5 Fire Department



Chief Greg Ball
Fire Chief, East Oktibbeha Fire Department



Chief Wayne Yeatman
Fire Chief, Maben Fire Department



Chief Greg Wall
Fire Chief, Sturgis Fire Department