FINAL

ENVIRONMENTAL ASSESSMENT
ADDRESSING THE ESTABLISHMENT OF THE MERIDIAN 2 MILITARY OPERATIONS AREA AT NAVAL AIR STATION MERIDIAN, MISSISSIPPI

AUGUST 2012

Abbreviations and Acronyms

186 ARW	186th Air Refueling Wing
AAQS	Ambient Air Quality Standards
AAS	Approved Accumulation Sites
ACM	Air Combat Maneuvering
AEM	Area Equivalent Method
AFB	Air Force Base
AGL	Above Ground Level
AICUZ	Air Installations Compatible Use Zones
APZ	Accident Potential Zone
ANG	Air National Guard
AQCR	Air Quality Control Region
ARTCC	Air Route Traffic Control Center
ARW	Air Refueling Wing
ATC	Air Traffic Control
BASH	Bird/Wildlife Aircraft Strike Hazard
CAA	Clean Air Act
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CY	Calendar Year
CZ	Clear Zone
dB	Decibels
DNL	Day-Night Average Sound Level
DOD	Department of Defense
DOT	Department of Transportation
EA	Environmental Assessment
EGCP	East Gulf Coastal Plain
EHS	Extremely Hazardous Substance
EIS	Environmental Impact Statement
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FICON	Federal Interagency Committee on Noise
FONSI	Finding of No Significant Impact
FRS	Fleet Replacement Squadron
FY	Fiscal Year
GCI	Ground Control Intercept
GHG	Greenhouse Gas
HAP	Hazardous Air Pollutant
HUD	U.S. Department of Housing and Urban Development
IFR	Instrument Flight Rules
INRMP	Integrated Natural Resources Management Plan
JP-8	Jet Propellant-8 (Jet Fuel)
LOA	Letter of Agreement
MBTA	Migratory Bird Treaty Act
MDEQ	Mississippi Department of Environmental Quality
MDWFP	Mississippi Department of Wildlife, Fisheries, and Parks
$\mu g/m^3$	Micrograms Per Cubic Meter
mg/m^3	Milligrams Per Cubic Meter
MOA	Military Operations Area

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MOGAS	Mobility Gasoline
MOU	Memorandum of Understanding
MRA	Multiple Resource Area
MR_NMAP	MOA and Range NOISEMAP
MSL	Mean Sea Level
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NATOPS	Naval Air Training and Operating Procedures Standardization
NAVAID	Navigational Aid
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NM	Nautical Mile
NOA	Notice of Availability
NO_x	Nitrogen Oxides
NO_2	Nitrogen Dioxide
NOTAM	Notice to Airmen
NRHP	National Register of Historic Places
NVG	Night Vision Goggles
O_3	Ozone
OPNAVINST	Chief of Naval Operations Instruction
Pb	Lead
PM_{10}	Particulates Equal to or Less Than 10 Microns In Diameter
$PM_{2.5}$	Particulates Equal to or Less Than 2.5 Microns In Diameter
ppb	Parts Per Billion
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
R	Restricted Airspace
RCRA	Resource Conservation and Recovery Act
RHICS	Regional Hazardous Inventory Control System
ROD	Record of Decision
ROI	Region of Influence
SEIS	Supplemental Environmental Impact Statement
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SO_2	Sulfur Dioxide
SSPP	Strategic Sustainability Performance Plan
SUA	Special Use Airspace
SPCC	Spill Prevention Control and Countermeasures
tpy	Tons Per Year
TW-1	Training Air Wing One
UEGCP	Upper East Gulf Coastal Plain
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VFR	Visual Flight Rules
VOC	Volatile Organic Compound
WMA	Wildlife Management Area

Executive Summary

Introduction

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental consequences of establishing a new Military Operations Area (MOA), called the Meridian 2 MOA, near Naval Air Station (NAS) Meridian in east-central Mississippi. The establishment of this new MOA would result in the transit of Training Air Wing One (TW-1) aircraft between NAS Meridian and the proposed MOA. This EA will also evaluate a proposed increase in sorties at NAS Meridian. There would be no personnel changes or construction activities as part of the Proposed Action.

The designation of special use airspace (SUA) identifies the areas where military activity occurs and provides for segregation of that activity from other potential users of the airspace. A MOA is a type of SUA where certain limitations are placed on aircraft that are not participating in the military activities. The Federal Aviation Administration (FAA) is a cooperating agency for this EA. As a cooperating agency, the FAA assists the lead agency (i.e., U.S. Navy, U.S. Fleet Forces Command) in preparing the Proposed Action.

The proposed MOA would have a designated altitude between 8,000 feet above mean sea level (MSL) and 17,999 feet MSL and would be divided into two sections: a northeastern block, referred to as Meridian 2 East; and a southwestern block, referred to as Meridian 2 West. The northeastern corner of the proposed MOA would be approximately 22 NM southwest of NAS Meridian.

TW-1 is the military unit at NAS Meridian that would train in the proposed MOA. The mission of TW-1 is to provide newly designated aviators to the fleet for further training in operational combat aircraft. TW-1 conducts flight training in the T-45C aircraft.

Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to establish an additional MOA where student naval aviators based at NAS Meridian can complete their required training sorties, alleviate the MOA capacity shortfall, and ensure that mission capabilities are sustained. The need for the Proposed Action results from changes in the Navy's training syllabus and from the increase in the use of existing local military airspace by other military units. Changes in the Navy's training syllabus will require an increase in aircraft sorties to support military readiness by providing the realistic training needed by aircrews.

Adequate airspace to accommodate realistic military training is required to ensure naval aviators are mission-trained, qualified, and prepared for deployment to support real-world events. TW-1 trains in the Meridian 1, Pine Hill, Camden Ridge, and Birmingham MOAs. However, in 2009 TW-1 did not complete some of the scheduled sorties in these MOAs (a sortie is a single military aircraft flight from takeoff through landing), due in part to the congestion of the existing available airspace. This shortfall in the capacity of the local MOAs could result in training cycle delays which would prolong the time needed to achieve qualifications for deployment.

The number of sorties flown by TW-1 at NAS Meridian is proposed to increase from 32,000 to 37,000 annually due to changes in the Navy's pilot training syllabus. The current MOAs cannot support an additional 5,000 sorties without negative impacts. If TW-1 had to fly these additional sorties in the existing local MOAs only, this would result in unsafe flying conditions due to increased risk of collisions, decreased quality of training due to limitations on aircraft maneuvers, and an increase in training cycle time.

Description of the Proposed Action and No Action Alternative

The Proposed Action consists of the establishment of a new MOA, Meridian 2, near NAS Meridian which would result in the transit of TW-1 aircraft between NAS Meridian and the proposed MOA, and a proposed increase in sorties at NAS Meridian. There would be no personnel changes or construction activities as part of the Proposed Action. This EA will not address operations that TW-1 might conduct at other airfields.

Proposed Action

NAS Meridian. The expected additional 5,000 sorties would take off from and land at NAS Meridian using existing flight tracks, profiles, and procedures.

Transit Region. The transit region is the area where TW-1 pilots would fly between NAS Meridian and the proposed MOA. The size and shape of the transit region was estimated for the purposes of this EA. The transit region would not be designated as SUA and no military training activities would be conducted in this region.

Proposed Meridian 2 MOA. The proposed Meridian 2 MOA would be approximately 22 NM southwest of NAS Meridian and have a designated altitude between 8,000 feet MSL and 17,999 feet MSL. Within the MOA, the airspace between 8,000 and 10,000 feet MSL would be used to transition to the airspace above 10,000 feet MSL, where training exercises would be conducted. This transition area would also serve as flight safety buffer and would be used less than 10 percent of the time the MOA is active. The buffer portion of the MOA would be active at the same time that the rest of the MOA is active.

No Action Alternative

The No Action Alternative serves as a baseline against which the impacts of the Proposed Action can be evaluated. Under the No Action Alternative, the proposed Meridian 2 MOA would not be established and the additional sorties would not be flown at NAS Meridian. Consequently, TW-1 would not be able to meet their training requirements, which would adversely impact their training mission and ability to meet future needs.

Summary of Potential Environmental Impacts

The existing environmental and socioeconomic conditions provide the basis for identifying and evaluating potential environmental impacts resulting from the implementation of the alternatives. The Region of Influence for this EA includes the area within the 60-decibel (dB) Day-Night Average Sound Level (DNL) noise contour at NAS Meridian, the approximate transit region between NAS Meridian and the proposed Meridian 2 MOA, the proposed Meridian 2 MOA, and the land underneath the Meridian 2 MOA airspace.

This EA examines potential effects of the Proposed Action and alternative on the following nine resource categories: air quality; noise; compatible land use; fish, wildlife, and plants; human health and safety; light emissions and visual resources; historical, architectural, archaeological, and cultural resources; hazardous materials and wastes; and socioeconomic resources, environmental justice, and children's environmental health and safety risks. A summary of potential impacts on each of the various resource categories is provided in the following paragraphs.

Proposed Action

Air Quality. The emissions associated with the Proposed Action constitute less than 0.05 percent of the criteria air pollutant emissions within the two air quality control regions for the Region of Influence. Based on this level of emissions and their location, the air quality impact from the Proposed Action at NAS Meridian is not expected to (1) cause or contribute to a violation of any national or state ambient air quality standard, (2) expose sensitive receptors to substantially increased pollutant concentrations, or, (3) exceed any evaluation criteria established by the Mississippi State Implementation Plan. No significant impacts from stationary or mobile source emissions from the proposed increase in aircraft sorties or aircraft maintenance activities would be expected.

Aircraft sorties in the transit region and the proposed Meridian 2 MOA would occur above 7,000 feet MSL and 8,000 feet MSL, respectively, which is above the mixing height of 3,000 feet above ground level (AGL). Currently, there is no guidance or regulatory requirement to estimate emissions above the mixing height. Since no aircraft sorties within the transit region or proposed MOA would occur below the mixing height, no impacts from aircraft emissions would be expected.

Noise. The potential impacts on the environment from noise apply to all three components of the ROI (i.e., NAS Meridian, the transit region, and the proposed MOA).

The noise levels at NAS Meridian under the Proposed Action would likely increase by less than 1 dB DNL. It is unlikely that this increase would be noticeable by persons living in the NAS Meridian vicinity. Although the average noise level around the airfield would not significantly change, a small number of persons could be annoyed by noise from intermittent aircraft overflights at NAS Meridian. The FAA analysis results concur with the Navy analysis that the increase of 5,000 sorties at NAS Meridian would not result in significant changes on the environment and no further noise analysis is required.

The result of the noise modeling conducted by the FAA indicates that T-45C flights within the transit region would result in noise increases of less than 5 dB DNL. Therefore, the FAA has determined that no additional analysis for the area under the transit region is needed. The Navy concurs with the FAA analysis in the transit region.

The Navy used an FAA-approved computer model to predict noise levels within the proposed MOA. The predicted average noise levels on the ground from aircraft flying in the proposed MOA would be approximately 36 to 38 dB DNL. This is well below the level at which speech interference or hearing loss could begin to occur (approximately 65 and 75 dB DNL, respectively). It is estimated that persons on the ground near an aircraft's flight path would hear aircraft flying in the proposed MOA a few times a month. Aircraft flyovers would not interfere with speech communication or other activities.

Consequently, no significant impacts on the environment from noise at NAS Meridian, underneath the transit region, or underneath the proposed Meridian 2 MOA would be expected.

Compatible Land Use. The Proposed Action would not involve changes to land use and would not affect the viability of existing land use in the vicinity of NAS Meridian; therefore, no changes to land use activities would occur.

Noise levels of less than 65 dB DNL are considered to have low or no impact on land use, including residential development. Land in the NAS Meridian vicinity exposed to noise above 65 dB DNL would not be expected to significantly increase under the Proposed Action as compared to baseline conditions. Noise resulting from the Proposed Action would be below 65 dB DNL in the areas under the transit

region and proposed Meridian 2 MOA. Potentially annoying individual aircraft overflights in the areas under the proposed MOA would be infrequent, and would not be expected to interfere with normal activities. No significant impacts on land use from aircraft noise would be expected under the Proposed Action.

Fish, Wildlife, and Plants. The potential impacts on fish, wildlife, and plants apply to all three components of the ROI (i.e., NAS Meridian, the transit region, and the proposed MOA).

Habitat and Plants. The Proposed Action does not include ground-disturbing activities; therefore, no impacts on plants or habitat are expected. No known federally designated critical habitat occurs within the ROI.

Fish. Generally, fish and other aquatic organisms are not disturbed by aircraft noise because they live below the surface of the water and therefore experience lower sound levels than terrestrial animals would experience. Fish have been found to habituate to disturbances caused by overflights. As discussed previously, the noise modeling conducted for NAS Meridian, the transit region, and the proposed MOA indicates that no significant changes in noise levels would be expected under the Proposed Action. Since fish experience lower sound levels than terrestrial animals and because only minimal noise level changes would be expected under the Proposed Action, no significant impacts on fish from aircraft noise would be expected.

Wildlife. The number of operations at NAS Meridian has remained approximately constant for several years; therefore, wildlife in the area are expected to have habituated to noise and flights. No significant changes to noise levels would occur under the Proposed Action and individual aircraft overflights would be infrequent in the areas under the proposed MOA. Therefore, chronic stress on animals or disruption to the normal activities of wildlife would not be expected under the Proposed Action. No significant impacts on wildlife from noise would be expected.

Bird/wildlife aircraft strike hazard (BASH) incidents occurred in less than 0.04 percent of the total number of operations at NAS Meridian in 2009. The increase in sorties at NAS Meridian could increase BASH incidents, though the increase would likely be very low. Aircraft operations would generally occur above 7,000 feet MSL in the transit region and above 8,000 feet MSL in the proposed MOA. No BASH incidents with NAS Meridian aircraft have been reported at altitudes above 6,500 feet MSL and the vast majority of strikes at known altitudes occurred below 3,000 feet MSL. Consequently, the potential for a bird/wildlife strike within the transit region or proposed MOA is very low. No significant impacts on wildlife from BASH incidents would be expected.

Protected and Sensitive Species. Potential impacts on threatened and endangered species, migratory birds, and bald eagles are discussed in the following paragraphs.

Threatened and Endangered Species. Similar to the previous discussion for wildlife, no significant impacts on threatened or endangered species from noise would be expected at NAS Meridian, under the transit region, or under the Meridian 2 MOA. Potential aircraft strikes with threatened or endangered species would be unlikely and very rare, and would not be expected to jeopardize the continued existence of a threatened or endangered species within the ROI. Therefore, no effect on threatened or endangered species from noise or BASH would be expected and formal consultation with the USFWS under Section 7 of the ESA would not be required.

Migratory Birds. No bird/wildlife strikes have been recorded by TW-1 pilots above 6,500 feet MSL and most migratory bird species within the ROI would not likely occur at altitudes above 7,000 feet MSL. Noise resulting from aircraft overflights would not be expected to increase migratory bird mortality or

decrease reproductive output. No significant effects on a population of a migratory bird species from noise or BASH incidents would be expected.

Bald Eagles. Within the counties underlying the ROI, known bald eagle breeding occurs only in Rankin and Lauderdale counties. Potentially disruptive individual aircraft overflights would be infrequent, and thus would not be expected to significantly disturb any potential nesting bald eagles. The Proposed Action would not be expected to disturb bald eagles to a degree that causes injury to an eagle, decreases productivity, or causes nest abandonment. Therefore, no significant impacts on bald eagles would be expected and the Navy would be in compliance with the Bald and Golden Eagle Protection Act.

Human Health and Safety. The additional sorties at NAS Meridian would not impact the NAS Meridian Air Traffic Control facility's ability to coordinate military flights, or the Memphis Air Route Traffic Control Center's (ARTCC) ability to coordinate commercial traffic within their region. No significant impacts on airspace management from the proposed increase in aircraft operations at NAS Meridian and within the transit region would be expected.

Aircraft flying under instrument flight rules would be given alternate altitudes or routes to keep them separated from military activities, which can be dangerous for nonparticipating aircraft. Delays to civilian aircraft are expected to be minimal and increases in their flying time are not expected to be significant. No significant impacts on airspace management from the establishment of the Meridian 2 MOA would be expected.

A total of five aircraft crashes occurred between 2000 and 2010; each was within or adjacent to the installation boundary. Therefore, the risk of a mishap where debris could reach the ground is very low outside of the installation boundary, underneath the transit region, and underneath the proposed Meridian 2 MOA. The additional 5,000 sorties do not significantly increase this risk. The BASH analysis for this resource area is comparable to that discussed in the Fish, Wildlife, and Plants section. Therefore, no significant impacts on human health and safety from aircraft mishaps or BASH incidents would be expected.

Light Emissions and Visual Impacts. The additional aircraft lights that would occur with the increase in sorties under the Proposed Action would not be expected to annoy the vast majority of persons living near NAS Meridian and would not interfere with their normal activities. Normal aircraft lighting at the altitudes in the transit region and proposed MOA lacks the intensity to have significant impacts on human activity and would be perceptible as twinkling lights. As such, no significant impacts from aircraft light emissions would be expected.

The land underlying the transit region and the proposed MOA is rural with scattered residential houses. Visual resources are normally impacted if there would be a substantial alteration to an existing sensitive visual setting. Since the setting in the transit region and proposed MOA is rural, it is not likely that the Proposed Action would alter the existing visual setting. T-45C aircraft operating within the Meridian 2 MOA could be visible under certain conditions; however the aircraft would not be prominent. Consequently, no significant impacts on the existing visual setting from the establishment of the Meridian 2 MOA would be expected.

Historical, Architectural, Archaeological, and Cultural Resources. The Proposed Action does not include ground-disturbing activities, and acoustic changes to the ambient environment of archaeological and historical resources from aircraft overflights would be minimal. Therefore, the Proposed Action would not affect archaeological or historical resources listed or eligible for listing on the National Register of Historic Places (NRHP) within the ROI.

Currently, the Navy has not indentified any resources at NAS Meridian, within the transit region, or within the proposed MOA that qualify as traditional cultural properties, sacred sites, or sites of religious or cultural significance. Therefore, the Navy has concluded that the Proposed Action would have no significant impact on historic properties, archaeological sites, or Native American sites at NAS Meridian, beneath the transit region, or beneath the proposed Meridian 2 MOA. The Choctaw tribe was notified of the Proposed Action in a letter dated 10 March 2011 and offered no comments to the Navy.

Wastes and Hazardous Materials. The Proposed Action would be in compliance with applicable Federal or state regulations and would not increase the amount of hazardous materials, hazardous wastes, or solid wastes generated or procured beyond current NAS Meridian waste management procedures and capacities. In addition, the Proposed Action would not result in significant changes to the existing pollution prevention program. No changes in the NAS Meridian fuel storage system would be required due to the slight increase in jet fuel consumption under the Proposed Action. As such, no significant impacts from hazardous materials, hazardous and solid waste generation, or increased jet fuel consumption at NAS Meridian would be expected.

Socioeconomic Resources, Environmental Justice, and Children's Environmental Health and Safety Risks. Additional employees would not be necessary to support the increase in sorties at NAS Meridian within the transit region, or for the establishment of the proposed MOA. Therefore, there would not be any direct or indirect changes to population demographics, employment, or environmental justice, and children's environmental health and safety risks. In addition, the Proposed Action would not result in significant noise impacts. Disproportionate impacts on minority, low-income, or youth populations would not be expected. Therefore, no significant impacts on socioeconomic resources, environmental justice, and children's environmental health and safety risks would be expected.

Other Regulatory Requirements – Department of Transportation (DOT) Act: Section 4(f). Designation of airspace for military flight operations is exempt from Section 4(f) (Public Law 105-85, 111 Stat. 1916, Sec. 1079). This section is included because the FAA (one of several organizations within the DOT) is a Cooperating Agency for this EA. Although not required under Section 4(f), the FAA has consulted with the U.S. Forest Service regarding possible constructive use impacts.

No Action Alternative

Under the No Action Alternative, the proposed Meridian 2 MOA would not be established and the expected additional sorties would not be flown at NAS Meridian. TW-1 would continue to be impacted from congestion in the current MOAs and would not be able to meet their additional training requirements.

Conclusion

Based on information gathered during the preparation of the EA, the Navy finds that the Proposed Action would not have a significant impact on the environment. As such, an Environmental Impact Statement is not required and a Finding of No Significant Impact is recommended.

FINAL
ENVIRONMENTAL ASSESSMENT ADDRESSING THE ESTABLISHMENT OF THE MERIDIAN 2 MILITARY OPERATIONS AREA AT NAVAL AIR STATION MERIDIAN, MISSISSIPPI

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1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental consequences of (1) establishing a new Military Operations Area (MOA), called the Meridian 2 MOA, near Naval Air Station (NAS) Meridian in east-central Mississippi which would result in the transit of Training Air Wing One (TW-1) aircraft between NAS Meridian and the proposed MOA, and (2) a proposed increase in sorties at NAS Meridian. This EA will not address operations that TW-1 might conduct at other airfields.

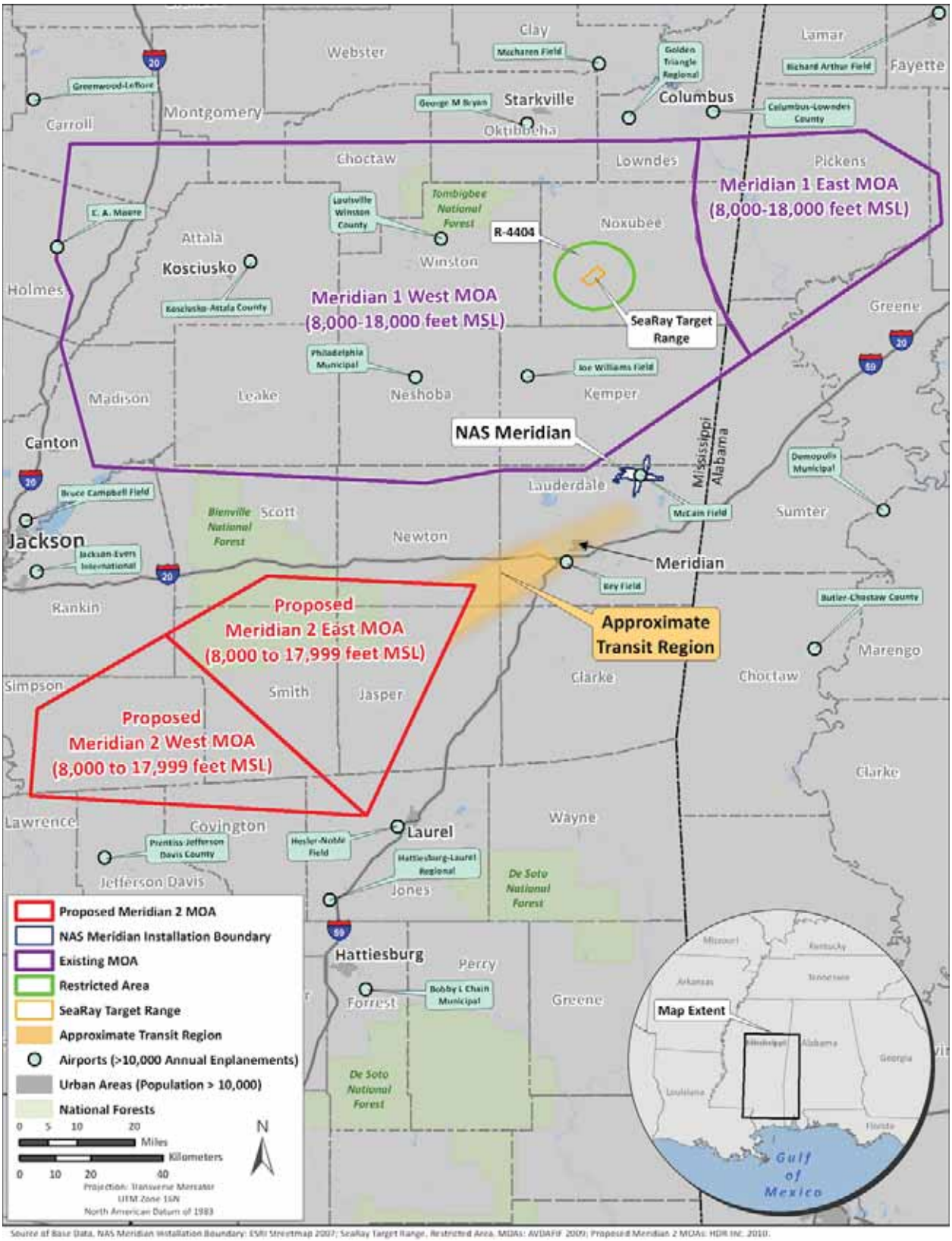
NAS Meridian is one of the largest naval installations in the southeastern United States whose primary mission is "to train the warfighter." NAS Meridian is under the Commander Navy Region Southeast and has several tenant commands (NAS Meridian 2007c). TW-1, based at NAS Meridian, would be the primary user of the proposed Meridian 2 MOA.

NAS Meridian is in east-central Mississippi, approximately 15 miles northeast of the City of Meridian. The primary mission of NAS Meridian is "to train the warfighter."

NAS Meridian is in east-central Mississippi in Lauderdale and Kemper counties (see **Figure 1-1**). The installation is approximately 15 miles northeast of the City of Meridian. The main installation area occupies more than 8,000 acres of land, including McCain Field. NAS Meridian owns an additional 1,255 acres at Joe Williams Field, approximately 30 miles northwest of the installation, and holds 218 acres of easements around the field. NAS Meridian also owns 654 acres of the Searay Target Range, approximately 30 miles north of the installation, and holds 2,226 acres of easement around the range.

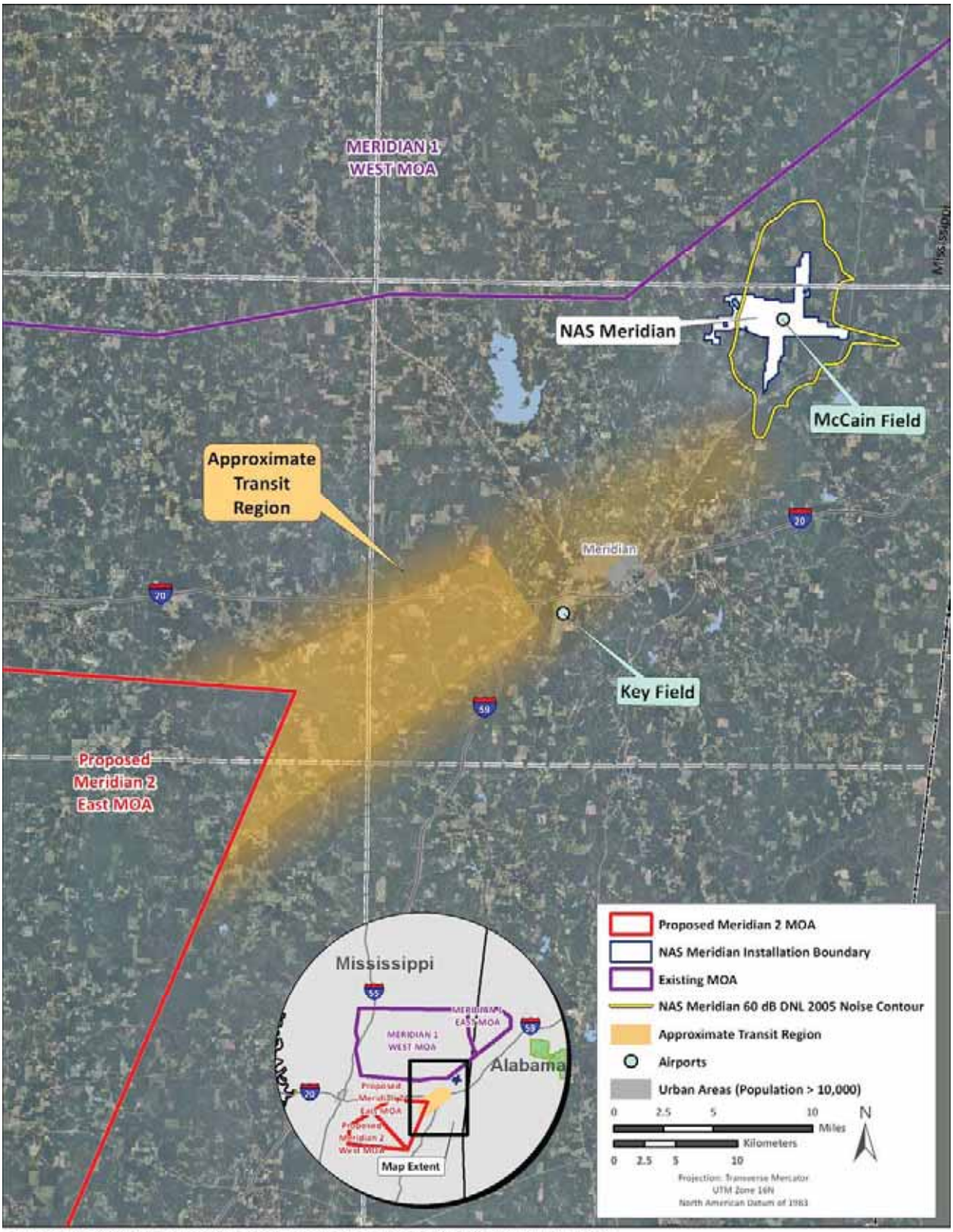
The Proposed Action to establish the Meridian 2 MOA and increase the number of sorties at NAS Meridian is one of two alternatives evaluated in this EA. The other alternative is the No Action Alternative, which serves as a benchmark against which project alternatives can be measured. If the analyses prepared for the EA indicate that implementation of the Proposed Action would not result in significant environmental or socioeconomic impacts, a Finding of No Significant Impact (FONSI) would be prepared. A FONSI briefly presents the reasons why a Proposed Action would not have a significant impact on the human environment and explains why the preparation of an Environmental Impact Statement (EIS) would not be required. If significant environmental issues were identified that could not be mitigated to insignificant levels, an EIS would be prepared or the Proposed Action would be abandoned and no action would be taken.

The Region of Influence (ROI) is defined as the geographical area that could be affected in some way by the Proposed Action or the No Action Alternative. The ROI, unless otherwise defined for a particular resource category, is defined as the following: the area within the 60 decibel (dB) Day-Night Average Sound Level (DNL) noise contour at NAS Meridian, the approximate transit region between NAS Meridian and the proposed Meridian 2 MOA, the proposed Meridian 2 MOA, and the land underneath the Meridian 2 MOA airspace (see **Figures 1-1** and **1-2**). In the transit region TW-1 pilots currently fly between NAS Meridian and Key Field Airport; however, they do not fly between Key Field Airport and the proposed Meridian 2 MOA. As shown on **Figures 1-1** and **1-2**, the transit region between Key Field Airport and the proposed Meridian 2 MOA is shaded a darker orange and the transit region between NAS Meridian and Key Field Airport is shaded a lighter orange to indicate this difference. The size and shape of the transit region was estimated in this EA for the purpose of analyzing the impact of T-45C aircraft operations under the Proposed Action.



Source of Base Data. NAS Meridian Installation Boundary: ESRI Streetmap 2007; SeaRay Target Range, Restricted Area, MOAs: AVDAFIF 2009; Proposed Meridian 2 MOAs: HDR Inc. 2010.

Figure 1-1. NAS Meridian, Transit Region, Proposed Meridian 2 MOA, and Airport Vicinity Map



Source of Base Data: NAS Meridian Installation Boundary: ESRI Streetmap 2007; MOAs: AVDAF® 2009; Proposed Meridian 2 MOAs: HDR Inc. 2010.

Figure 1-2. NAS Meridian and Transit Region Vicinity Map

1.2 Background

To ensure proficiency training for student naval aviators, approximately 65 percent of TW-1's sorties should be flown in MOAs that are local to NAS Meridian. In 2009, approximately 15 percent of the local sorties were not completed as a result of training cycle delays caused in part by congestion of the existing available airspace. This shortfall could result in an extended pilot training period, prolonging the time needed to achieve qualifications for deployment (TW-1 Operations Officer 2011a).

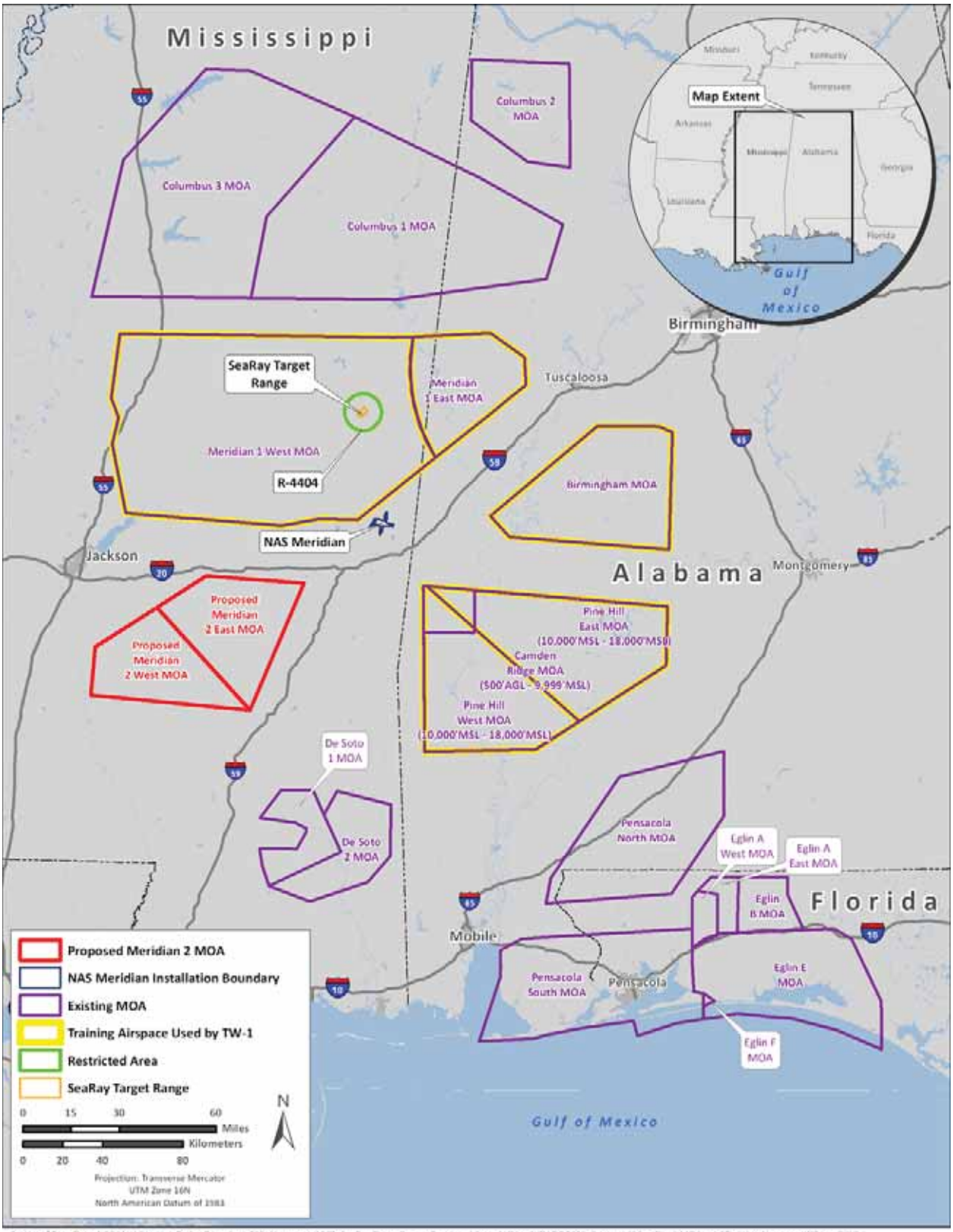
Although airspace is generally viewed as being unlimited, airspace is a finite resource that can be defined vertically, horizontally, and temporally when describing its use for aviation purposes. The Federal Aviation Administration (FAA) is charged with the safe and efficient use of the nation's airspace and, therefore, has established certain criteria and limits for its use. The FAA uses the National Airspace System in order to accomplish this task. The National Airspace System is a common network of U.S. airspace, air traffic facilities, equipment, services, and airports or landing areas (FAA 2010).

Special use airspace (SUA) is airspace of defined dimensions wherein activities must be confined because of their nature. MOAs are a type of SUA typically below 18,000 feet MSL and are used to separate or identify certain military flight activities from civilian traffic. Flight service stations maintain current schedules and contacts for the agency controlling each MOA. A flight service station is an air traffic facility that provides pilot briefings, flight plan processing, en route radio communications, search and rescue services, and assistance to lost aircraft and aircraft in emergency situations. Flight service stations also relay Air Traffic Control (ATC) clearances, process Notices to Airmen, broadcast aviation weather and aeronautical information, and notify Customs and Border Protection of transborder flights (FAA 2008b).

Student naval aviators from NAS Meridian use MOAs for proficiency training in specific areas of Mississippi and Alabama, including the Meridian 1, Pine Hill, Camden Ridge, and Birmingham MOAs, as shown on **Figure 1-3**. The existing Meridian 1 MOA, north of NAS Meridian, is managed by the scheduling office of TW-1 and consists of the Meridian 1 West MOA and the Meridian 1 East MOA. It includes Restricted Airspace (R-4404), which overlies the Searay Target Range and is used for bomb and simulated strafe ordnance deliveries as shown on **Figures 1-1** and **1-3**. The existing Pine Hill MOA, southeast of NAS Meridian, is also managed by the scheduling office of TW-1 and consists of the Pine Hill East and the Pine Hill West. The Camden Ridge MOA underlies portions of the Pine Hill MOA. The Camden Ridge MOA and Birmingham MOA are managed by the 187th Fighter Wing of the Alabama Air National Guard (ANG).

TW-1 is based at NAS Meridian and consists of Training Squadron Seven and Training Squadron Nine. The mission of TW-1 is to provide newly designated aviators to the fleet for further training in operational combat aircraft. TW-1 is also tasked with training international military aviators from countries including Brazil, France, Italy, and Spain. TW-1 conducts flight training in the high-performance T-45C "Goshawk" aircraft which gives student naval aviators the ability to qualify for a standard instrument rating, learn basic fighter and attack maneuvering tactics, and accomplish initial carrier qualification. During initial carrier qualification, student naval aviators begin training for arrested landings and catapult launches aboard aircraft carriers.

This EA will not address flights that TW-1 might conduct at other airfields. A more detailed explanation of the purpose of and need for the Proposed Action and a description of the Proposed Action are provided in **Section 1.3** and **Chapter 2**, respectively.



Source of Base Data, NAS Meridian Installation Boundary: ESRI Streetmap 2007; SeaRay Target Range, Restricted Area, MOAs: AVDAFIF 2009; Proposed Meridian 2 MOAs and Training Airspace: HDR Inc. 2010.

Figure 1-3. MOAs in the Vicinity of NAS Meridian and TW-1 Local Flying Area

1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to establish an additional MOA, from 8,000 feet MSL to 17,999 feet MSL, where student naval aviators based at NAS Meridian can complete their required training sorties, alleviate the MOA capacity shortfall, and ensure that mission capabilities are sustained. Adequate airspace to accommodate realistic training is required to ensure naval aviators are mission-trained, qualified, and prepared for deployment to support real-world events.

The need for the Proposed Action results from changes in the Navy's training syllabus and from the increase in the use of existing local MOAs by other military units, such as those based at Columbus Air Force Base (AFB), Maxwell AFB, Eglin AFB, and Key Field Airport. Changes in the Navy's training syllabus will require an increase in aircraft sorties to support military readiness by providing the realistic training needed by aircrews.

TW-1 currently trains in the Meridian 1, Pine Hill, Camden Ridge, and Birmingham MOAs; however, airspace use at these MOAs will increase due to the following events:

- Recent changes to the Navy's E-2/C-2 and Strike training syllabi which have increased the number of required aircraft sorties (defined as a single military aircraft flight from takeoff through landing) by approximately 1,400 annually
- Expected transfer of approximately 3,600 annual training sorties from Fleet Replacement Squadrons (FRSs) F/A-18 aircraft to TW-1 T-45C aircraft at NAS Meridian.

The number of sorties flown by TW-1 at NAS Meridian would increase from 32,000 to 37,000 annually. This increase of 5,000 sorties cannot be completed within the current available MOAs because of capacity issues. This would have a negative impact on safety due to the increased risk of collisions and a negative impact on the quality of training as a result of limitations on aircraft maneuvers, which would impact overall combat readiness. The Proposed Action would alleviate the MOA capacity shortfall currently projected for TW-1.

The creation of the Meridian 2 MOA is proposed to (1) alleviate the existing estimated MOA capacity shortfall, and (2) accommodate the increased airspace use resulting from the recent changes to the Navy's E-2/C-2 and Strike training syllabi, and (3) accommodate the transfer of training from the F/A-18 aircraft to the T-45C aircraft. The Navy's initiative to use the T-45C instead of the F/A-18 aircraft is due to the following:

- F/A-18 aircraft are more expensive to build and operate than the T-45C aircraft
- Transferring sorties to the T-45C would increase the life expectancy of the F/A-18 aircraft
- There would be a reduction in fuel consumption and noise with the use of the T-45C as compared to the F/A-18 aircraft.

T-45C aircraft have one engine and a 3,000-pound fuel capacity. The F/A-18 aircraft has two engines and an 18,000-pound fuel capacity. Both aircraft burn the majority of their fuel during a training sortie so pilots can maximize their training time. Since the same training sorties occur with the F/A-18 and the T-45C aircraft, approximately 83 percent less fuel is burned when the training occurs with the T-45C as compared to the F/A-18 aircraft. The T-45C has a single non-afterburning engine and is appreciably quieter than the F/A-18 aircraft which has two engines with afterburner.

1.4 Summary of Key Environmental Compliance Requirements

1.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] Section 4321–4347) is a Federal statute requiring the identification and analysis of potential environmental impacts associated with proposed Federal actions before those actions are taken. The intent of NEPA is to help decisionmakers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) that was charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA. The CEQ regulations mandate that all Federal agencies use a prescribed, structured approach to environmental impact analysis. This approach also requires Federal agencies to use an interdisciplinary and systematic approach in their decisionmaking process. This process evaluates potential environmental consequences associated with a Proposed Action and considers alternative courses of action.

The process for implementing NEPA is codified in Title 40 of the Code of Federal Regulations (CFR), Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. The CEQ regulations specify that an EA be prepared to briefly provide evidence and analysis for determining whether to prepare a FONSI or whether the preparation of an EIS is necessary. The EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required.

The Navy implements NEPA through *Procedures for Implementing the National Environmental Policy Act* (32 CFR 775). Additional guidance is found in Secretary of the Navy Instruction 5090.6A, *Evaluation of Environmental Effects from Department of Navy Actions* (U.S. Navy 2004), and Chief of Naval Operations Instruction (OPNAVISNT) 5090.1C, *Environmental and Natural Resources Program Manual* (U.S. Navy 2007a).

A Memorandum of Understanding between the FAA and the Department of Defense (DOD) was signed on October 4, 2004, to provide for the issuance of environmental documents for the development, designation, modification, and use of SUA (see **Appendix A**). On August 19, 2009, the FAA agreed to participate as a cooperating agency for this EA, as shown in **Appendix A**. As a cooperating agency, the FAA assists the lead agency (i.e., U.S. Navy, U.S. Fleet Forces Command) in preparing the Proposed Action. The FAA is responsible for managing navigable airspace for public safety and ensuring efficient use for commercial air traffic, general aviation, and national defense, including SUA used by the DOD. FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, provides FAA policy and procedures to ensure agency compliance with the requirements set forth in the CEQ regulations for implementing the provisions of the NEPA (40 CFR, Parts 1500–1508), Department of Transportation (DOT) Order 5610.1C, *Procedures for Considering Environmental Impacts*, and other related statutes and directives (FAA 2006).

1.4.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decisionmaking process for Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decisionmaker to have a comprehensive view of major environmental issues and requirements associated with a Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review

procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

FAA Order 7400.2H, *Procedures for Handling Airspace Matters*, specifically Chapter 32, provides guidance to air traffic personnel to assist in applying the requirements in FAA Order 1050.1E to air traffic actions (FAA 2011b).

Department of Transportation Act: Section 4(f). Section 4(f) of the DOT Act of 1966 (recodified in 1983 to 49 U.S.C. 303) was implemented in an effort to preserve the natural beauty of the countryside and public and recreational lands, wildlife and waterfowl refuges, and historic sites. The FAA, a cooperating agency for this EA, is one of several organizations within the DOT. Designation of airspace for military flight operations is exempt from Section 4(f) (Public Law 105-85, 111 Stat. 1916, Sec. 1079). Although not required under Section 4(f), the FAA has consulted with the U.S. Forest Service regarding possible constructive use impacts.

In compliance with NEPA, FAA, CEQ guidelines, and 32 CFR Part 775, the evaluation of environmental impacts focuses on those resources and conditions potentially subject to effects and on potentially significant environmental issues deserving of study, and deemphasizes insignificant issues.

1.5 Interagency Coordination and Public Involvement

The Intergovernmental Coordination Act and Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs,* requires Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. DOD Directive 4165.61, *Intergovernmental Coordination of DOD Federal Development Programs and Activities* assigns responsibilities, and prescribes procedures for an intergovernmental process to assist coordination of appropriate DOD Federal programs and activities with state and local governments and Federal agencies. Through the Intergovernmental Coordination process, the Navy notifies relevant Federal, state, and local agencies of the Proposed Action and alternative and provides them sufficient time to make known their environmental concerns specific to the Proposed Action.

NEPA requirements also help ensure that environmental information is made available to the public during the decisionmaking process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if Federal proponents of an action provide information to state and local governments and the public and involve them in the planning process. CEQ guidance in 40 CFR 1501.7 specifically states, "There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to proposed actions. This process shall be termed scoping." The public involvement process augments the Navy opportunity to cooperate with and consider state and local views in implementing a Federal proposal.

As a cooperating agency, the FAA assists the lead agency with the public involvement process. The FAA issued a circular on March 6, 2009, outlining the proposal to establish the Meridian 2 MOA and solicit comments regarding the aeronautical impacts of the proposal prior to reaching a final decision (see **Appendix B**). The purpose of the circular was to provide the public with the opportunity to review and comment on the effects that the proposal might have on aeronautical activities. Public comments on the FAA circular are also included in **Appendix B**.

The FAA circular outlining the proposal for the Meridian 2 MOA was issued on March 6, 2009.

An agency outreach meeting took place on August 20, 2009, to solicit input on impacts that the proposed MOA might have on the environmental and aeronautical

communities. Public involvement materials, including the invitation list and a sample of the agency invitation letters, are provided in **Appendix C**. The agency outreach meeting minutes and concurrence with the minutes from the agencies that attended is also provided in **Appendix C**. Through the public involvement process, relevant Federal, state, and local agencies were notified of the Proposed Action and input regarding environmental concerns was requested. U.S. Navy, U.S. Fleet Forces Command coordinated with the U.S. Forest Service (USFS); U.S. Environmental Protection Agency (USEPA); U.S. Fish and Wildlife Service (USFWS); Mississippi State Historic Preservation Office (SHPO); and other Federal, state, and local agencies. The public involvement process provides U.S. Navy, U.S. Fleet Forces Command with the opportunity to cooperate with and consider state and local views in its decision regarding implementation of this Federal proposal. Input from agency responses is incorporated into the analysis of potential environmental impacts.

Copies of the Draft EA were available for review online at both http://www.cnic.navy.mil/meridian and http://www.public.navy.mil/airfor/facsfacjax, and at the Eudora Welty Library, Jackson, Mississippi; Meridian-Lauderdale County Public Library, Meridian, Mississippi; and the Evon A. Ford Library, Taylorsville, Mississippi from August 9 to September 9, 2011 (see **Appendix D**). Notices were sent to all agencies invited to the agency outreach meeting. Comments received from the public and other Federal, state, and local agencies were addressed in this EA and are included in **Appendix D**. The Draft EA was used to solicit comments and involve the local community in a manner that will support the decisionmaking process.

A Notice of Availability (NOA) for the Final EA (see **Appendix D**) and signed Navy FONSI has been published in the *Meridian Star* from August 5 to 7, 2012 and the *Star Weekly* on August 8, 2012. Copies of the EA and signed Navy FONSI are available for review online at http://www.cnic.navy.mil/meridian and http://www.public.navy.mil/airfor/facsfacjax.

1.6 Organization of the EA

This EA is organized into seven chapters. **Chapter 1** contains background information on NAS Meridian, a statement of the purpose of and need for the Proposed Action, a summary of applicable regulatory requirements, a discussion of agency coordination and public involvement, and an introduction to the organization of the EA. **Chapter 2** provides a detailed description of the Proposed Action, the No Action Alternative, and a discussion of the alternatives considered but eliminated from further detailed analysis; and a description of the decision to be made. **Chapter 3** contains a characterization of the affected environment, or baseline environmental conditions. **Chapter 4** addresses potential environmental consequences associated with the Proposed Action and No Action Alternative. **Chapter 5** provides an analysis of the potential cumulative impacts. **Chapter 6** presents the preparers of the document. **Chapter 7** lists the reference documents used in the preparation of the EA. Various appendices support these seven chapters of the EA and provide additional data and information.

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2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVE

This chapter provides detailed information on the Proposed Action, the No Action Alternative, and the alternatives that have been considered but eliminated from further detailed analysis.

2.1 Creation of the Proposed Meridian 2 MOA

The FAA is charged with managing Federal airspace, and must consider civilian (including commercial and private) and military aviation when establishing and modifying airspace. Airspace contains Jet (J) and Victor (V) routes, or airways. Jet routes are high-altitude airways above 18,000 feet MSL. Victor routes are low altitude airways below 18,000 feet MSL. Victor routes are established between two navigation aids (NAVAIDs). A NAVAID is any visual or electronic device that provides point-to-point guidance information or position data to aircraft in flight. NAVAIDs are used for traffic under Instrument Flight Rules (IFR), which govern the conduct of flight under instrument meteorological conditions. Visual Flight Rules (VFR) govern the procedures for conducting flights under visual conditions. These terms are also used by pilots and controllers to indicate a visual or instrument flight plan (FAA 2010).

The first official Navy proposal for the Meridian 2 MOA was submitted to the FAA in 2004. In response to the 2004 proposal, Memphis Air Route Traffic Control Center (ARTCC) stated that IFR traffic needed to be able traverse the MOA, along V-11 (see **Figure 2-1**). In October 2006, a revised Meridian MOA proposal was submitted that divided the MOA into East and West MOAs in order to improve civilian access to the airspace. The East and West MOAs can be activated or deactivated separately. The proposal created a boundary between the two sections that was parallel to and just west of V-11.

The 2006 proposal was examined in an aeronautical study by Memphis ARTCC System Support (Memphis ARTCC 2007). This study concluded that the MOA would impact aircraft flying in and out of Jackson-Evers International Airport, that airway routes through the MOA would be affected, and that aircraft arriving at various airports in the area could be required to descend early to avoid the MOA. In August 2007, a revised proposal was submitted in which the size of the MOA was reduced by approximately 29 percent, the eastern and northwestern boundaries were shifted to reduce the impact on aircraft arriving at nearby airports, and there were fewer airway routes through the MOA.

The FAA issued a circular on March 6, 2009, outlining the proposal to establish the Meridian 2 MOA and solicit comments regarding the aeronautical impacts of the proposal prior to reaching a final decision. Public comments on the FAA circular were received and are included in **Appendix B**.

In April 2009, the MOA was revised again to consider the requirements of Memphis ARTCC, Houston ARTCC, Jackson Approach Control, and Meridian Approach Control. These changes allow civilian aircraft to arrive and depart adjacent airports with minimal impacts. In addition, only two small general aviation airports lie underneath the proposed MOA. The 2009 revision reduced the size of the MOA from the original proposal by approximately 700 NM (approximately 35 percent), shifted the centerline dividing the East MOA and West MOA to just west of V-11, and affected fewer airways.

In August 2010, the FAA requested that the northern boundary of the proposed MOA be moved slightly to the south (approximately 2.5 NMs) to reduce potential aircraft congestion in the corridor between the Meridian 1 MOA and the proposed MOA. In October 2010, the Navy agreed to move the northern boundary approximately 2.5 NMs south (see **Figure 2-1**). The revised U.S. Navy endorsement for the proposed MOA is included in **Appendix E**.

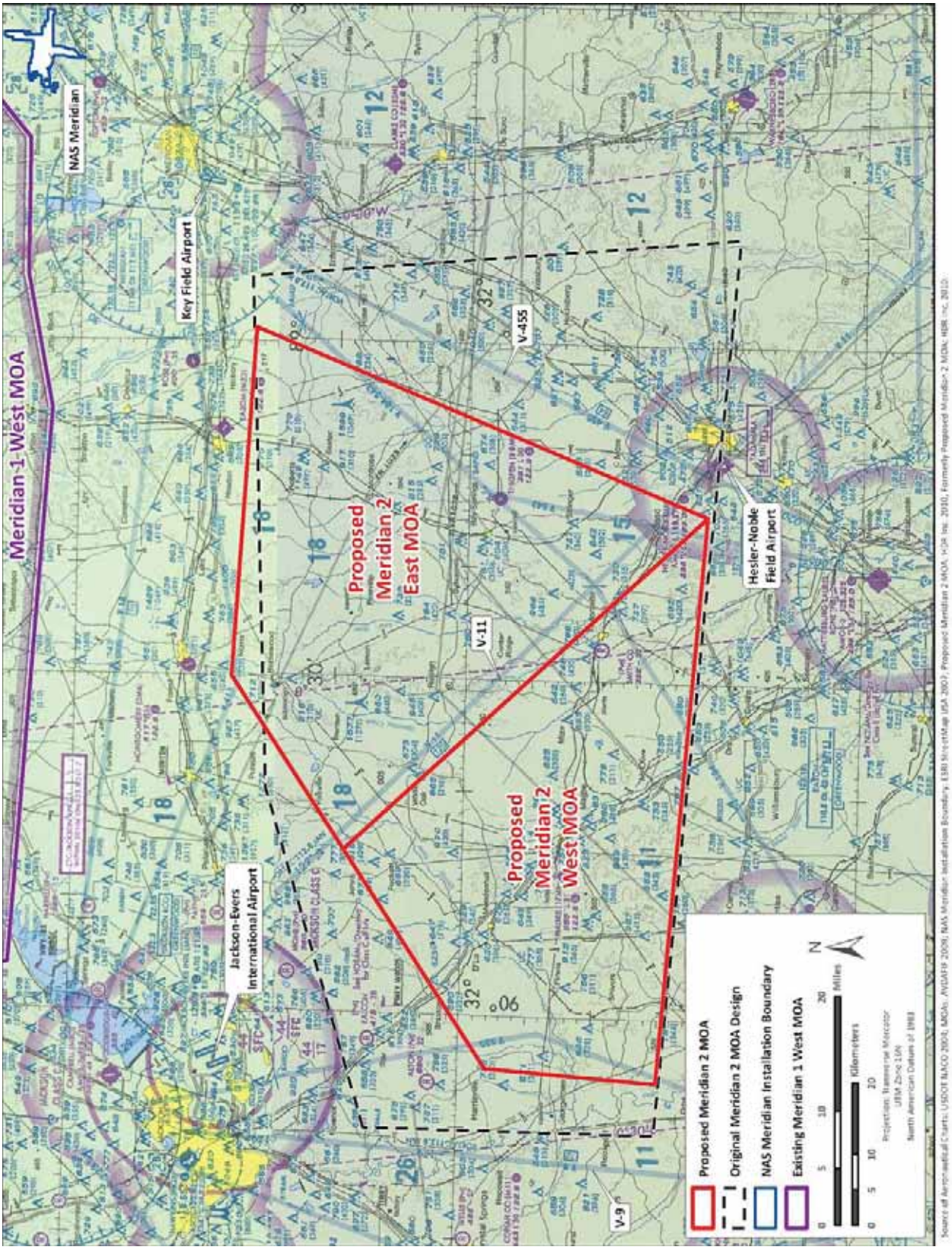


Figure 2-1. Original and Current Proposed Meridian 2 MOA

Under the current proposal, aircraft flying IFR would not be able to transit on V-11 if the East MOA was active. IFR traffic would have to fly underneath, fly above, or be vectored around the MOA. Pilots flying VFR must contact ATC and request status of the MOA to determine if the airspace is active. However, VFR traffic is not prohibited from flying through an active MOA. Consequently, VFR aircraft could fly underneath, above, or around the MOA or could transit through the active MOA, and use V-11, at their own risk.

2.2 Detailed Description of the Proposed Action

The Proposed Action consists of the establishment of a new MOA, Meridian 2, near NAS Meridian which would result in the transit of TW-1 aircraft between NAS Meridian and the proposed MOA (see **Figure 2-1**), and a proposed increase in sorties at NAS Meridian. There would be no personnel changes or construction activities as part of the Proposed Action.

A **sortie** is defined as a single military aircraft flight from takeoff through landing. The additional sorties that would be flown under the Proposed Action would be training sorties that would require time within a MOA. These sorties generally consist of a departure and arrival and do not include additional training at the airfield since the pilots reserve their time and fuel to train within the MOA.

One **aircraft operation** includes a takeoff or landing at an airfield; whereas, one sortie includes the entire flight of a military aircraft that could include a departure from the airfield, multiple types of training activities in an adjacent MOA, and the arrival back at the airfield. Therefore, the number of flights at an airfield is typically recorded in term of operations.

NAS Meridian. Under the Proposed Action, the number of sorties flown by TW-1 at NAS Meridian is projected to increase from 32,000 to 37,000 annually due to changes in the Navy's pilot training syllabus. The additional 5,000 sorties would consist of an estimated 10,000 operations at the NAS Meridian airfield. These additional operations would be completed using existing flight tracks, profiles, and procedures. Upon departure T-45C aircraft normally reach 2,000 feet MSL within 2 NM (2.3 miles) and 7,000 feet MSL within 7 NM (8 miles) of the runway end.

Transit Region to the Proposed Meridian 2 MOA. If the proposed Meridian 2 MOA were established, TW-1 aircraft would fly between NAS Meridian and the proposed MOA using the transit region that is shown on **Figure 1-2**. Currently, when TW-1 pilots finish training in the local MOAs, they might fly to Key Field Airport (a public-use airport approximately 16 miles southwest of NAS Meridian) to refuel prior to returning to NAS Meridian. Under the Proposed Action, TW-1 pilots could fly directly from NAS Meridian to the proposed Meridian 2 MOA, or stop at Key Field Airport to obtain fuel and then fly to their destination. Currently TW-1 pilots fly between NAS Meridian and Key Field Airport, but they do not fly from Key Field Airport to the area proposed as the Meridian 2 MOA. As shown on **Figures 1-1** and **1-2**, the transit region between Key Field Airport and the proposed Meridian 2 MOA is shaded a darker yellow and the transit region between NAS Meridian and Key Field Airport is shaded a lighter yellow to indicate this difference. TW-1 pilots typically do not fly over urban areas, including the downtown area of the City of Meridian. The size and shape of the transit region was estimated in this EA for the purpose of analyzing the impact of T-45C aircraft operations during transit between Key Field Airport and the proposed Meridian 2 MOA. The transit region that TW-1 aircraft would use to fly to the proposed MOA would not be designated as a SUA. Therefore, TW-1 would not conduct military training activities in this region.

Proposed Meridian 2 MOA. The design and location of the proposed Meridian 2 MOA was established using the following screening criteria:

1. The ideal distance from the closest refueling point (Key Field Airport) to the center of the primary training area of the MOA should be no further than 50 NM. This criterion is required because of the fuel limitations of the T-45C aircraft.
2. Minimal impacts on civilian aviation. As discussed in **Section 2.1**, the original design of the Meridian 2 MOA was reshaped and the size of the MOA was reduced to accommodate requests from the FAA to allow civilian aircraft to arrive and depart adjacent airports with minimal impacts.
3. Sufficient vertical and horizontal boundaries that allow Air Combat Maneuvering (ACM) training between two or more military jet aircraft (U.S. Navy 2009b). The minimum vertical airspace required in an established MOA for most of the training activities is 9,999 feet between the floor and the ceiling of the airspace. The horizontal length of the MOA needs to be at least 40 NM to conduct Ground Control Intercept (GCI) training missions.
4. The availability of a 2,000-foot vertical area used for transit and coordination, and as a buffer for training activities. The airspace between 8,000 to 10,000 feet MSL would be used as a transition area before the T-45C aircraft climb above 10,000 feet MSL to train. TW-1 would not complete training exercises within the 8,000 to 10,000 feet MSL airspace region. This airspace would also act as a safety of flight buffer for students training in ACM exercises. As a result, this region of the MOA (i.e., between 8,000 to 10,000 feet MSL) would be used for less than 10 percent of a standard training flight's time. The buffer portion of the MOA would be active at the same time that the rest of the MOA is active.
5. Control by one ARTCC. If the MOA were to overlap two ARTCC boundaries, it would be the responsibility of the controlling agency (the FAA ATC facility that exercises control of the airspace when an SUA area is not activated) to coordinate the airspace. However, this process does not always happen without delays. Coordinating airspace within two separate ARTCCs would invariably induce unnecessary delays, which would result in inefficient use of training time. Delays result in the use of additional fuel; if too much fuel is burned, pilots might not be able to complete their mission. Additionally, aircraft safety could become an issue since delays could lead to late coordination with nonparticipating aircraft.
6. Dependable Availability. One of the MOAs within 50 NM from the closest refueling point (Key Field Airport) includes FAA restrictions during periods of high traffic, making ACM training extremely difficult. This restriction is often not imposed until after an aircraft has started training within a MOA, which results in an incomplete training event. Other MOAs within the NAS Meridian local flying area are used primarily by other military units; consequently, there are large periods of time when the airspace is not available (TW-1 2009).
7. Capable of handling the required number of training sorties.

The T-45C aircraft has a fuel capacity of approximately 3,000 pounds. When the center of the training area is 50 NM away or less, TW-1 naval aviators have enough fuel to conduct approximately 45 minutes of the most fuel-intensive training. Beyond this distance, the amount of training time begins to significantly decline. This optimal 50 NM distance and its relation to the proposed Meridian 2 MOA is illustrated on **Figure 2-2**. The amount of fuel that the T-45C aircraft must have to leave the MOA if they refuel at Key Field Airport consists of the following:

- *Meridian 1 West MOA:* 1,200 pounds
- *Pine Hill MOA:* 900 pounds
- *Proposed Meridian 2 MOA:* 900 pounds.

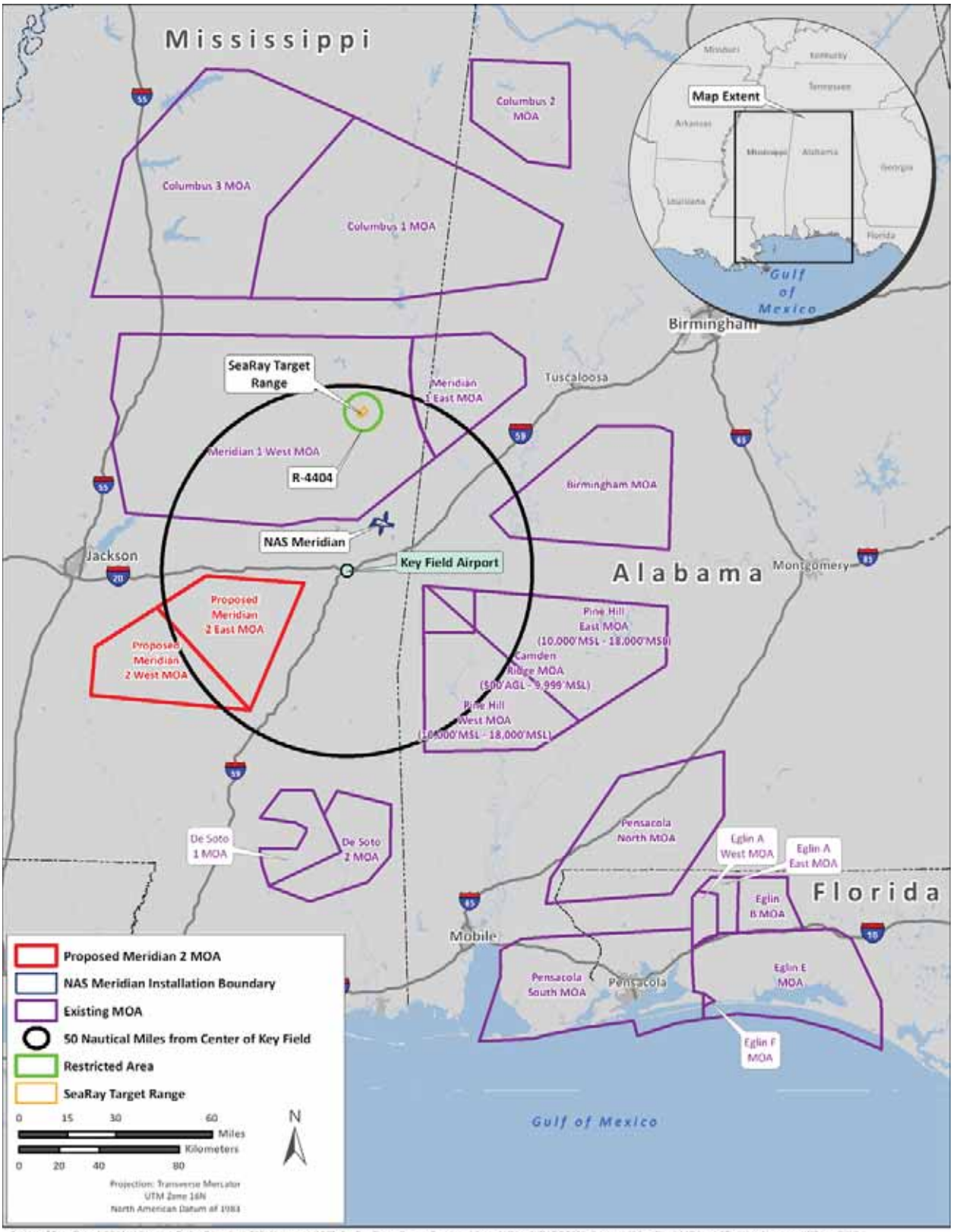


Figure 2-2. MOAs within 50-NM Radius of Key Field Airport

In TW-1's local flying area, the aircraft must have more fuel left to return to Key Field Airport when they are coming from Meridian 1 West MOA as compared to Pine Hill MOA (TW-1 Operations Officer 2011b). Consequently, pilots must spend less time training in the Meridian 1 West MOA as compared to Pine Hill MOA. When TW-1 trains at Pine Hill MOA, they have an additional 300 pounds of fuel to use for training. This gives them approximately 15 minutes of additional ACM training, or up to 30 minutes of less aggressive maneuvers. If the Meridian 2 MOA were established, TW-1 pilots would also be able to leave the MOA with 900 pounds of fuel, similar to Pine Hill MOA, which would result in longer training periods.

The proposed Meridian 2 MOA would be divided into a northeastern block, referred to as Meridian 2 East, and a southwestern block, referred to as Meridian 2 West. The Meridian 2 East MOA would be the primary training area and is within 50 NM of NAS Meridian. Since the primary training area would be within 50 NM of NAS Meridian, the proposed Meridian 2 MOA would meet the requirements of the first selection criteria.

The Meridian 2 MOA would be approximately 38 NM on the eastern side, 23 NM along the northern border, 39 NM along the northwestern border, 12 NM along the western border, and 41 NM along the southern border. The length of the widest area would be approximately 65 NM. Since the proposed MOA would have a vertical distance of 9,999 feet between the floor and the ceiling of the airspace and a lateral distance greater than 40 NM, the proposed Meridian 2 MOA would meet the requirements of screening criterion 3.

The Meridian 2 West MOA would be used less than 25 percent of the time during training periods. The West MOA would not be used as often as the East MOA because the distance between NAS Meridian and the center of the West MOA is greater than 50 NM. However, the West MOA would be used in conjunction with the East MOA for specific training events:

- Night Vision Goggle (NVG) training.
- GCI is an airspace intensive training activity that requires a 40-NM straight run. The East MOA is approximately 35 NMs across at the widest; therefore both East MOA and West MOA must be used to complete this training.

The Meridian 2 East MOA would exist within the following coordinates:

- 32°16'34"N 88°58'40"W
- 31°42'00"N 89°15'00"W
- 32°09'10"N 89°45'14"W
- 32°18'00"N 89°29'54"W.

The Meridian 2 West MOA would exist within the following coordinates:

- 31°42'00"N 89°15'00"W
- 31°45'00"N 90°05'30"W
- 31°58'00"N 90°04'30"W
- 32°09'10"N 89°45'14"W.

The specific activities and altitudes proposed to occur in the Meridian 2 MOA are provided in **Table 2-1**. Supersonic flights and ordnance testing are not included under the Proposed Action. The proposed utilization rates of the Meridian 2 MOA are shown in **Table 2-2**. Proposed training activities include the following:

- ***ACM*** (the primary MOA activity) can be generally described as aggressive maneuvering between two or more aircraft simulating offensive or defensive aerial combat.
- ***Familiarization*** training is conducted to familiarize aircrews with an aircraft's operation, capabilities, requirements, missions, and limitations. It also covers an installation's ATC procedures and facilities, NAVAIDs, communications, and approach and departure procedures.
- ***Formation flights*** include multiple aircraft operating as a single unit with respect to position, altitude, and navigation.
- ***Instrument flights*** generally include training on instrument requirements and procedures.
- ***Maintenance check flights*** are conducted following a maintenance activity on an aircraft to provide reassurance of handling characteristics, performance, or to establish the correct functioning of a system that cannot be fully established during ground testing.
- ***GCI*** is an air defense tactic where a communications center guides a pilot to an airborne target. The GCI mission requires a 40-NM straight run; therefore, GCI training would occur in the Meridian 2 East and Meridian 2 West MOAs together.
- ***NVGs*** training would occur at night. NVG training would not occur with all of the aircraft lights turned off. In addition, aggressive maneuvering would not be conducted.
- ***In-Flight Refueling*** includes activities where pilots practice connecting with an air refueling aircraft. No fuel would be exchanged during these training activities since the T-45 does not have air refueling capabilities as does the F/A-18.

Some of the training conducted by TW-1 would occur above 17,999 feet MSL. An ATC Assigned Airspace would be requested for this airspace region with a Letter of Agreement between the Navy and the FAA. TW-1 training currently occurs above 17,999 feet MSL within an established ATC Assigned Airspace in the Meridian 1 MOA. TW-1 would continue this training in the proposed Meridian 2 MOA.

As previously mentioned, the airspace between 8,000 to 10,000 feet MSL would be used as a transition area and act as a flight buffer for student training. As a result, this region of the MOA would be used less than 10 percent of a standard training flight's time. Therefore, the proposed Meridian 2 MOA would meet the requirements of screening criterion 4.

Communications and radar monitoring within Meridian 2 MOA would be conducted only through FAA, Memphis ARTCC. Standard operating procedures would be developed by the FAA and would be employed to ensure appropriate airspace management by all participating aircraft. Therefore, the proposed Meridian 2 MOA would meet the requirements of screening criterion 5.

The Meridian 2 MOA would be used from 0700 to 2200 hours Monday through Friday and at other times by Notice to Airmen (NOTAM). A NOTAM is filed with an aviation authority to alert aircraft pilots of any hazards en route or at a specific location. The Meridian 2 East MOA is expected to be used 30 to 45 minutes during each training sortie, approximately 9 hours per day, for approximately 270 days per year, totaling approximately 2,400 hours per year. The Meridian 2 West MOA is expected to be used 30 to 45 minutes during each training sortie, approximately 3 hours per day, for approximately 180 days per year, totaling approximately 540 hours per year.

Table 2-1. Proposed Training Activities and Operating Altitudes within Meridian 2 MOA

Activity (T-45C Aircraft-Specific)	Normal Working Airspace of MOA	Minimum Airspace Requirements of MOA
Air Combat Maneuvering (primary MOA activity)	8,000 – 17,999 feet MSL Meridian 2 East	8,000 – 17,999 feet MSL Meridian 2 East
Familiarization	8,000 – 17,999 feet MSL Meridian 2 East	8,000 – 17,999 feet MSL Meridian 2 East
Cruise/Tactical Formation	8,000 – 17,999 feet MSL Meridian 2 East	8,000 – 17,999 feet MSL Meridian 2 East
Basic/Division Formation	8,000 – 17,999 feet MSL Meridian 2 East	10,000 – 16,000 feet MSL Meridian 2 East
Instruments	8,000 – 17,999 feet MSL Meridian 2 East	10,000 – 16,000 feet MSL Meridian 2 East
Maintenance Check Flights	8,000 – 17,999 feet MSL Meridian 2 East	8,000 – 17,999 feet MSL Meridian 2 East
Ground Control Intercepts	8,000 – 17,999 feet MSL Meridian 2 East and West	8,000 – 17,999 feet MSL Meridian 2 East and West
Night Vision Goggles	8,000 – 17,999 feet MSL Meridian 2 East and West	8,000 – 17,999 feet MSL Meridian 2 East and West
In-Flight Refueling *	8,000 – 17,999 feet MSL Meridian 2 East	10,000 – 16,000 feet MSL Meridian 2 East

Note: * In Flight Refueling activities would consist of TW-1 aircraft conducting practice rendezvous and hook-up with an air refueling squadron aircraft. No fuel would be exchanged during these training activities.

Table 2-2. Proposed Airspace Utilization Rates for the Meridian 2 MOA

Activity (T-45C Aircraft-Specific)	Proposed Utilization Rate	Duration per Flight
Air Combat Maneuvering (primary MOA activity)	320 sorties/month	50 minutes
Familiarization	50 sorties//month	40 minutes
Cruise/Tactical Formation	150 sorties//month	50 minutes
Basic/Division Formation	50 sorties/month	50 minutes
Instruments	50 sorties//month	1 hour
Maintenance Check Flights	50 sorties//month	40 minutes
Ground Control Intercepts	150 sorties//month (future need [3])	40 minutes
Night Vision Goggles [1]	150 sorties//month (future need [3])	40 minutes
In-Flight Refueling [2]	150 sorties//month (future need [3])	40 minutes

Notes:

1. NVG training would be conducted in accordance with the requirements of 14 CFR Part 91.209. This training would be conducted as Night Formation, Night Tactical Formation, and Night GCI events with the use of NVGs.
2. In-Flight Refueling activities would consist of TW-1 aircraft conducting practice rendezvous and hook-up with an air refueling squadron aircraft. No fuel would be exchanged during these training activities.
3. Future Need: Activities that are expected to occur in 4 to 5 years.

It is DOD policy that military airspace is made available for civilian use when it is not required by the DOD (DOD 2003). The Meridian 2 MOA would be considered a shared-use MOA even though there are no operations anticipated from other military units at this time. Therefore, the proposed Meridian 2 MOA would meet the requirements of screening criteria 6 and 7.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

2.3.1 Introduction

Under NEPA, reasonable alternatives to the Proposed Action must be considered in the EA. Considering alternatives helps to avoid unnecessary impacts and allows an analysis of reasonable ways to achieve the stated purpose. To warrant detailed evaluation, an alternative must be reasonable. To be considered reasonable, an alternative must be "ripe" for decisionmaking (i.e., any necessary preceding events having taken place), capable of implementation, and satisfactory with respect to meeting the purpose of and the need for the action. The development of alternative training scenarios was based on the U.S. Navy, U.S. Fleet Forces Command purpose and need to establish and sustain a military training environment that will meet and sustain the mission requirements of TW-1. This process involved analysis of operational needs and requirements for training activities.

The MOAs surrounding NAS Meridian (i.e., Meridian 1, Pine Hill, Camden Ridge, and Birmingham), MOAs north of NAS Meridian (i.e., Columbus 1, Columbus 2, and Columbus 3) affiliated with Columbus AFB in Mississippi northeast of NAS Meridian, and MOAs south of NAS Meridian (i.e., De Soto 1, De Soto 2, Pensacola North, Pensacola South, Eglin A, Eglin B, Eglin E, and Eglin F) are listed in **Table 2-3** and shown on **Figure 2-2**. These airspaces were considered potential alternatives to meet the training requirements. However, in order to be considered reasonable alternatives, these airspaces needed to meet the screening criteria discussed in **Section 2.2**, including having a distance of less than 50 NM from the closest refueling point (i.e., Key Field Airport) to the center of the primary training area of the MOA.

Figure 2-2 illustrates the MOAs whose centers are within the 50-NM radius from Key Field Airport; these include Meridian 1, Pine Hill, and Camden Ridge MOAs. The need for the Proposed Action is partially due to the increased use of these local MOAs by other military units, such as those based at Key Field Airport, Columbus AFB, Maxwell AFB, and Eglin AFB.

As shown in **Table 2-3**, each MOA has a controlling agency and a using agency. Generally, the controlling agency is the ATC facility that exercises control of the airspace when a MOA is not activated. The using agency is the military unit or other organization whose activity established the requirement for the MOA (FAA 2011b).

The following discussion identifies alternatives considered by the Navy and identifies whether they are reasonable and, hence, subject to detailed evaluation in the EA. As discussed in **Section 1.3**, the local flying areas available to TW-1 (Meridian 1, Pine Hill, Camden Ridge, and Birmingham MOAs) are already congested. Therefore, these areas cannot accommodate the increased sorties under the Proposed Action without creating very congested flying conditions, which would have negative impacts on safety from the increased risk of collisions, quality of training due to limitations on aircraft maneuvers, and completing pilot training in a timely manner.

Table 2-3. MOAs Surrounding NAS Meridian

MOAs	Controlling Agency	Using Agency	Altitude
Birmingham	Atlanta ARTCC	187th Fighter Wing of the Alabama ANG	Varies
Camden Ridge	Atlanta ARTCC	187th Fighter Wing of the Alabama ANG	500 feet above ground level to 10,000 feet MSL
Columbus	Memphis ARTCC	Columbus AFB	8,000 to 18,000 feet MSL
De Soto	Houston ARTCC	ANG Combat Readiness Training Center at Gulfport-Biloxi Regional Airport	Varies
Eglin	Jacksonville ARTCC	Eglin AFB	Varies
Meridian 1	Memphis ARTCC	NAS Meridian	8,000 to 18,000 feet MSL
Pensacola North	Jacksonville ARTCC	NAS Pensacola	10,000 to 18,000 feet MSL
Pensacola South	Pensacola ATC Tower	NAS Pensacola	10,000 to 18,000 feet MSL
Pine Hill	Atlanta ARTCC	NAS Meridian	10,000 to 18,000 feet MSL

2.3.2 Meridian 1 MOA Alternative

The center of the Meridian 1 MOA is within the 50-NM radius identified under the screening criteria (as shown on **Figure 2-2**) and it has sufficient lateral and vertical boundaries; however, it is not large enough to handle the current training sorties plus the additional training sorties that are required from the change in the Navy's training syllabus. As discussed in **Section 1.2**, to ensure proficiency training for student naval aviators, approximately 65 percent of TW-1's sorties should be flown in MOAs that are local to NAS Meridian, which currently includes the Meridian 1, Pine Hill, Camden Ridge, and Birmingham MOAs. In 2009, approximately 15 percent of the local sorties were not completed as a result of training cycle delays caused in part by congestion of the existing available airspace. The increase in 5,000 sorties would exacerbate the existing capacity shortfall and would result in an extended pilot training period, prolonging the time needed to achieve qualifications for deployment (TW-1 Operations Officer 2011a).

In addition to the capacity issue, there is a Restricted Area (R-4404) and joint use target (Searay Target Range) in the eastern portion of Meridian 1 West MOA (see **Figure 1-1**). Airspace is designated as a restricted area to indicate the existence of hazards to aircraft such as artillery firing or bombing. Consequently, when R-4404 is active, there are altitude restrictions for aircraft flying in that region, which results in a smaller area available for TW-1 training within the Meridian 1 MOA.

Since the Meridian 1 MOA would not be able to support the additional sorties included under the Proposed Action, this alternative does not meet screening criterion 7. This alternative is not considered viable and is not carried forward for further detailed analysis in this EA.

2.3.3 Pine Hill MOA and Camden Ridge MOA Alternative

TW-1 currently conducts some training in the Pine Hill and Camden Ridge MOAs. Since Camden Ridge MOA underlies portions of the Pine Hill MOA as shown in **Figure 2-2**, it is possible the two MOAs could be used in conjunction to accommodate TW-1 training. TW-1 normally requests the Pine Hill and Camden Ridge MOAs to be active at the same time when conducting ACM sorties, but this is not always available and requires coordination.

NAS Meridian is the using agency for the Pine Hill MOA, and is not the using agency for Camden Ridge MOA. Moreover, units from Maxwell AFB and Eglin AFB are the primary users of both the Pine Hill and Camden Ridge MOAs. Consequently, there are large periods of time when this airspace is not available to TW-1. Therefore, this alternative does not meet screening criterion 6.

The floor of the Pine Hill MOA is 10,000 feet MSL. Camden Ridge MOA extends from 500 feet above ground level (AGL) to 9,999 feet MSL under portions of the Pine Hill MOA. As previously noted, TW-1 uses the airspace between 8,000 to 10,000 feet MSL for transition and coordination, and as a buffer for students practicing their training activities. Consequently, students training in some sections of Pine Hill MOA would need to train without the 2,000-foot buffer. Therefore, this alternative does not meet screening criterion 4.

Since Pine Hill MOA and Camden Ridge MOA do not meet screening criteria 4 and 6, this alternative is not a viable option and is not carried forward for further detailed analysis in this EA.

2.3.4 Birmingham MOA Alternative

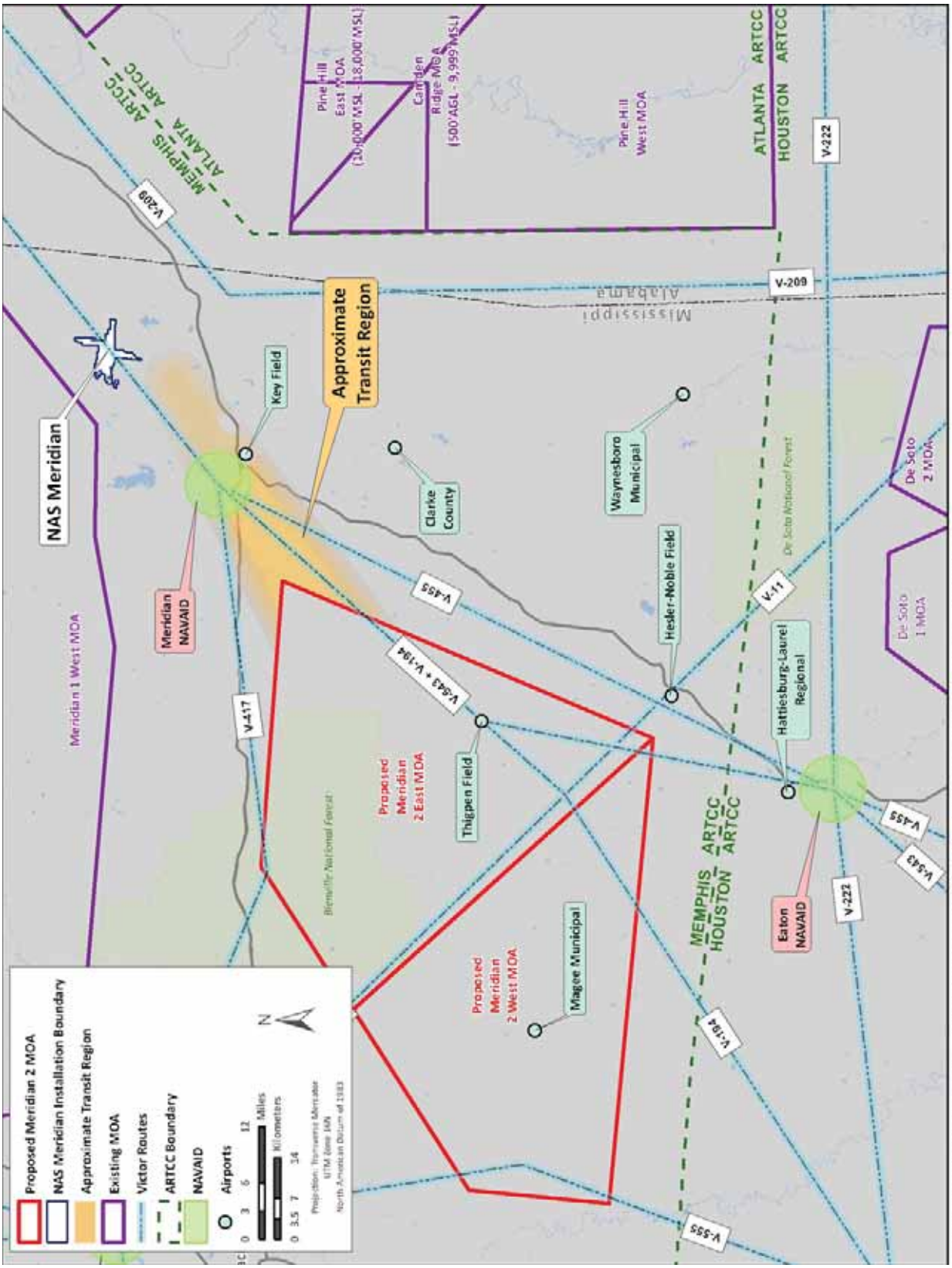
Although TW-1 is currently training at Birmingham MOA, the center of the MOA is not within the 50-NM distance needed for students to complete all stages of required training. Therefore the Birmingham MOA fails to meet screening criterion 1. In addition, altitude restrictions imposed by Atlanta ARTCC during periods of high traffic make ACM training extremely difficult. This restriction is often not imposed until an aircraft is established within the MOA, which results in an incomplete training event. Therefore, the Birmingham MOA does not meet screening criterion 6.

Since Birmingham MOA does not meet screening criteria 1 and 6, this alternative is not a viable option and is not carried forward for further detailed analysis in this EA.

2.3.5 Establishment of a New MOA South of NAS Meridian

Other locations were examined when determining the placement of the proposed MOA. An area directly south of NAS Meridian was considered but dismissed for two reasons. First, the airspace contains more airways than the proposed MOA and would have a greater impact on civilian air traffic. As shown on **Figure 2-3**, the airspace south of Meridian contains the airways V-194, V-455, V-209 (which is the route for traffic west of the Pine Hill MOAs) and V-222 (which is the route for traffic south of the Pine Hill MOAs). Though the proposed MOA includes five routes (V-11, V-194, V-417, V-543, and V-555), the majority of the routes only traverse a small portion of the proposed MOA.

The area south of Meridian could also affect Key Field Airport, which had approximately 103,700 operations in 2010 (FAA 2011a). As shown on **Figure 2-3**, this area includes four other civilian airports: Hesler-Noble Field Airport, Clark County Airport, Waynesboro Municipal Airport, and Hattiesburg-Laurel Regional Airport. Two of these airports have enplanements (passenger boarding) that are greater than 10,000 per year. Under the Proposed Action, the two airports underneath the MOA have enplanements of less than 10,000 per year. Therefore, the area directly south of NAS Meridian does not meet screening criterion 2.



Source of Base Data: NAS Meridian Installation Boundary 1341 Street Map 2007; MOAs, Victor Routes and NAVAID: AVDAF© June 2009; Proposed Meridian 2 MOAs: HDR Inc. 2010.

Figure 2-3. Federal Airways and Airports South of NAS Meridian

The airspace south of NAS Meridian overlaps two ARTCCs (Houston and Memphis), as shown on **Figure 2-3**. If the MOA were to overlap two ARTCC boundaries, it would be the responsibility of the controlling agency to coordinate the airspace. In this case, if Memphis ARTCC was the controlling agency, Memphis ARTCC would call Houston ARTCC and request their part of the MOA airspace. When coordinated, Memphis ARTCC would control the MOA airspace in its entirety. However, coordinating airspace between two separate ARTCCs often induces unnecessary delays and would likely create severe inefficiency, particularly if weather was an issue. Delays result in the use of additional fuel. If too much fuel is burned, pilots might not be able to complete their mission. Additionally, flight safety could be adversely affected, as the coordination needed to prevent conflicts with nonparticipating aircraft could be late. Therefore, the area directly south of NAS Meridian does not meet screening criterion 5.

Due to the inability to meet screening criteria 2 and 5, this alternative is not considered a viable option and is not carried forward for further detailed analysis in this EA.

2.3.6 Replace Flight Training with Simulator Training

Simulators are a valuable tool for preliminary training, especially during initial aircrew qualification. Simulators are also used for continuation training for various procedures, including emergency training and instrument refresher courses. However, the dynamics of weather, the three-dimensional environment in flight, G-forces, and many other flight conditions can only be experienced in actual flight. Therefore, this alternative is not considered a viable alternative to the Proposed Action and is not carried forward for further detailed analysis in this EA.

Navy personnel practice ground-training exercises in the TC12B Visual Simulator at NAS Corpus Christi, Texas.

The alternatives discussed do not meet the screening criteria listed in **Section 2.2**, and, therefore, were eliminated from further detailed analysis in this EA.

2.4 No Action Alternative

CEQ regulations require consideration of the No Action Alternative. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential action alternatives can be evaluated.

Currently, TW-1 completes the majority of its training at the Meridian 1 MOA; however, they also train at Pine Hill, Camden Ridge, and Birmingham MOAs. These MOAs do not meet the necessary screening criteria as discussed in **Sections 2.3.2** through **2.3.4** and are already congested as discussed in **Section 1.3**. In general, these MOAs either have altitude restrictions for T-45C aircraft training activities or issues with air traffic congestion. Meridian 1 West MOA has a joint use target (within R-4404, see **Figure 1-1**) that necessitates altitude restrictions for aircraft flying in that region, which can result in smaller areas in which to train. There are altitude restrictions in Pine Hill, Camden Ridge, and Birmingham MOAs, which reduce the effectiveness of training. In addition, aircraft from Columbus AFB and Maxwell AFB train at Pine Hill, Camden Ridge, and Birmingham MOAs, which limits the amount of time available for TW-1 to train at these MOAs.

Under the No Action Alternative, the proposed Meridian 2 MOA would not be established. TW-1 would continue to fly in congested MOAs and pilot training would be negatively impacted. In addition, TW-1 would not be able to complete the additional sorties that are required as a result of the change in the Navy's training syllabus. Consequently, the No Action Alternative does not meet the stated purpose and need. It would adversely impact the TW-1 training mission and anticipated future needs. The No Action Alternative will be carried forward for further detailed analysis in **Chapters 3** and **4** of this EA.

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3. AFFECTED ENVIRONMENT

This EA examines potential effects of the Proposed Action and alternative on the following nine resource categories: air quality; noise; compatible land use (including community facilities and services); fish, wildlife, and plants; human health and safety; light emissions and visual resources; historical, architectural, archaeological, and cultural resources; hazardous materials and wastes; and socioeconomic resources, environmental justice, and children's environmental health and safety risks.

This section provides baseline information on the resources that could be potentially affected by the Proposed Action. An analysis of the potential direct and indirect impacts each alternative could have on the affected environment are provided in **Chapter 4**. Cumulative and other impacts are discussed in **Chapter 5**.

The ROI, unless otherwise defined for a particular resource category, includes the area within the 60 dB DNL noise contour at NAS Meridian, the approximate transit region between NAS Meridian and the proposed Meridian 2 MOA, the proposed Meridian 2 MOA, and the land underneath the Meridian 2 MOA airspace (see **Figures 1-1** and **1-2**). Consequently, the resources in the following chapters are divided into the three sections: NAS Meridian, the transit region to the Proposed Meridian 2 MOA, and the Meridian 2 MOA.

Resources and Conditions Eliminated from Detailed Analysis

Some environmental resources and conditions that are often analyzed in an EA have been eliminated from detailed analysis. The following provides the basis for such exclusions.

- ***Aesthetics.*** Aesthetic impacts deal with the extent that development could contrast with the existing environment and whether the jurisdictional agency considers this contrast objectionable (FAA Order 1050.1E) (FAA 2006). The Proposed Action would not require any development, such as construction of any facilities, ground-disturbing activities, or alteration of existing structures, which could obstruct or tarnish a scenic area. Therefore, no impacts on the existing aesthetic qualities of the ROI are anticipated. This EA will not provide a detailed examination of aesthetics.
- ***Coastal Resources.*** A coastal resource is defined as "any land or water use or natural resource of the coastal zone" (15 CFR Part 930). Mississippi's coastal zone includes the three counties adjacent to the coast (Hancock, Harrison, and Jackson), all adjacent coastal waters, and the barrier islands off the coast (NOAA 2004). The ROI is more than 100 miles north of the closest portion of the Mississippi coastal zone; therefore, the Proposed Action would not affect any coastal resources or require any water use within the state's coastal zone. Therefore, no impacts on coastal resources are anticipated. This EA will not provide a detailed examination of coastal resources.
- ***Construction Impacts.*** Impacts from construction could include noise, dust, disposal of debris, and air and water pollution (FAA 2006). The Proposed Action would not require construction of any facilities or result in ground-disturbing activities; therefore, no construction impacts are anticipated. This EA will not provide a detailed examination of construction impacts.

- ***Farmlands.*** Under the Farmland Protection Policy Act, the U.S. Department of Agriculture and other Federal agencies are required to take steps to ensure that the actions of the Federal Government do not cause U.S. farmland to be irreversibly converted to nonagricultural uses (7 U.S.C. 4201). The Proposed Action would not result in ground-disturbing activities; therefore, no farmland would be converted to nonagricultural uses and no impacts on farmlands are anticipated. This EA will not provide a detailed examination of farmlands.

- ***Floodplains.*** As stated in EO 11988, Federal agencies are required to take action to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. The Proposed Action would not include any activities that could occur in or adjacent to a floodplain and would not include ground-disturbing activities. Therefore, no impacts on floodplains are anticipated. This EA will not provide a detailed examination of floodplains.

- ***Infrastructure.*** Chief of Naval Operations Instruction 5090.1C describes infrastructure as "buildings, roads, runways, fence lines, and utilities" (U.S. Navy 2007a). The Proposed Action would not require construction of any facilities, result in an increase in personnel (which could affect road systems or utility use), require any alteration to existing runways, or result in ground-disturbing activities (which could disturb underground utilities). Therefore, no impacts on infrastructure are anticipated. This EA will not provide a detailed examination of infrastructure.

- ***Natural Resources, Energy Supply, and Sustainable Design.*** The term "natural resource" in this instance is used to describe finite resources such as petroleum, energy, and water (FAA 2006). Currently, EO 13423 and EO 13514 shape the Federal government's policies on natural resources, energy supply, and sustainable design.

  According to FAA Order 1050.1E, the use of natural resources other than fuel needs to be examined only if the action involves a need for unusual materials or those in short supply (FAA 2006). The Proposed Action would not require development of new facilities or result in notable changes in energy demands or consumption of other natural resources. Since aircraft operations in the transit region would generally occur above 7,000 feet MSL and the floor of the proposed Meridian 2 MOA is 8,000 feet MSL, raw materials in these areas (including Bienville National Forest) would not be impacted.

  Fuel consumption at NAS Meridian is discussed in **Section 3.8.2**. Since no facilities or other sources of natural resources, besides jet fuel, would be used under the Proposed Action, no additional impacts are expected on natural resources. This EA will not provide a detailed examination of natural resources, energy supply, and sustainable design.

- ***Water Quality.*** The Clean Water Act establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating water quality standards for surface waters. The Proposed Action would not require construction of any facilities (i.e., there would be no changes in impervious surfaces from existing conditions) or result in ground-disturbing activities (which could increase runoff). Therefore, no impacts on hydrology or water quality are anticipated. This EA will not provide a detailed examination of water quality.

- ***Wetlands.*** EO 11990 requires that Federal agencies actions minimize the loss or degradation of wetlands. Examples of wetland impacts include dredge or fill activities within or adjacent to wetlands, or impacts from storm water runoff (e.g., erosion and sedimentation) from exposed soils. The Proposed Action would not result in ground-disturbing activities; therefore, no impacts on wetlands hydrology or water quality are anticipated. This EA will not provide a detailed examination of wetlands.

- ***Wild and Scenic Rivers.*** The Wild and Scenic Rivers Act requires a Federal agency with jurisdiction over any lands that include, border upon, or are adjacent to any river included, or under study for inclusion, in the Wild and Scenic Rivers System to take action necessary to protect such river in accordance with the purposes of the Act (FAA 2006). The nearest designated wild and scenic river to NAS Meridian is in southern Mississippi and is not within the ROI. In addition to the Wild and Scenic River Act, the National Rivers Inventory considers rivers for designation as a wild or scenic river. Per FAA Order 1050.1E, if a river listed on the Inventory is not adversely affected by a proposed action, no further analysis is necessary (FAA 2006). The proposed increase of sorties at NAS Meridian would not result in ground-disturbing activities; therefore, no impacts on hydrology or water quality are anticipated. No significant impacts on the environment from noise would be expected, and noise from the proposed aircraft operations would not reach a wild and scenic river. This EA will not provide a detailed examination of wild and scenic rivers.

Additional Topic Eliminated from Detailed Analysis

Secondary (Induced) Impacts. Examples of secondary impacts include changes in population growth or movement, changes to public service demands, and alteration of demand for goods and services in the affected region (FAA 2006). The Proposed Action would not result in an increase in personnel or use of public services and would not result in ground-disturbing activities. The demand for goods and services that would be altered from the proposed increase in sorties would be aircraft-related (e.g., fuel); baseline levels for fuel are discussed in **Section 3.8.2**. No other secondary (induced) changes are anticipated. Therefore, this EA will not provide a detailed examination of secondary impacts.

3.1 Air Quality

3.1.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

Ambient Air Quality Standards. The CAA, amended in 1990, requires the USEPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment (40 CFR Part 50). The CAA established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings. The USEPA Office of Air Quality Planning and Standards set NAAQS for six principal pollutants, called "criteria" pollutants: carbon monoxide (CO); lead (Pb); nitrogen oxides (NO_x), which are measured by nitrogen dioxide (NO_2) as an indicator for the group of NO_x; particulate matter equal to or less than 10 microns in diameter (PM_{10}); particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$); ozone (O_3); and sulfur dioxide (SO_2) (40 CFR Part 50).

Under the CAA, the USEPA can grant states the authority to establish air quality rules and regulations. The ambient air quality standards (AAQSs) for the State of Mississippi are listed in the Mississippi Commission on Environmental Quality Regulation APC-S-4, Ambient Air Quality Standards (MDEQ 2002). The AAQSs for Mississippi are the same as the NAAQS as promulgated by the USEPA with the addition of standards for odor. **Table 3-1** presents the USEPA NAAQS and state AAQS.

Table 3-1. National and State Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard		Secondary Standard
		Federal	State	
CO	8-hour (1)	9 ppm (10 mg/m^3)	Same	None
	1-hour (1)	35 ppm (40 mg/m^3)	Same	None
Pb	Quarterly average	1.5 µg/m^3	Same	Same as Primary
	Rolling 3-Month Average	0.15 µg/m^3 (2)	--	Same as Primary
NO_2	Annual Arithmetic Mean	53 ppb (3)	Same	Same as Primary
	1-hour	100 ppb (4)	--	None
PM_{10}	Annual Arithmetic Mean	--	--	Same as Primary
	24-hour (5)	150 µg/m^3	Same	Same as Primary
$PM_{2.5}$	Annual Arithmetic Mean (6)	15 µg/m^3	Same	Same as Primary
	24-hour (7)	35 µg/m^3	Same	Same as Primary
O_3	8-hour (8)	0.075 ppm (2008 Standard)	Same	Same as Primary
	8-hour (9)	0.08 ppm (1997 Standard)		Same as Primary
	1-hour (10)	0.12 ppm	--	Same as Primary
SO_2	Annual Arithmetic Mean	0.03 ppm	Same	0.5 ppm (3-hour) (1)
	24-hour (1)	0.14 ppm	Same	0.5 ppm (3-hour) (1)
	1-hour	75 ppb (11)	Same	None

Sources: USEPA 2010a, MDEQ 2002

Key: ppm = parts per million; ppb = parts per billion; mg/m^3 = milligrams per cubic meter; µg/m^3 = micrograms per cubic meter.

Notes: Parenthetical values are approximate equivalent concentrations.

1. Not to be exceeded more than once per year.
2. Final rule signed 15 October 2008.
3. The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of cleaner comparison to the 1-hour standard.
4. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective 22 January 2010).
5. Not to be exceeded more than once per year on average over 3 years.
6. To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.
7. To attain this standard, the 3-year average of the weighted annual of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective 17 December 2006).
8. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective 27 May 2008).
9. a. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
   b. The 1997 standard – and the implementation rules for that standard – will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
   c. USEPA is in the process of reconsidering these standards (set in March 2008).
10. a. USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard (anti-backsliding).
    b. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
11. Final rule signed on 2 June 2010. To attain this standard, the 3-year average of the 99th percentile of daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Attainment Verses Nonattainment and General Conformity. The USEPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either "attainment," "nonattainment," "maintenance," or "unclassified" for each of the six criteria pollutants. Nonattainment and maintenance areas either currently or previously exceeded an NAAQS. Attainment and unclassified areas are in compliance or assumed to be in compliance with the NAAQS. General Conformity requirements help to ensure that a Federal action will not negatively affect compliance with the NAAQS. General Conformity applies only to significant actions by Federal agencies that occur in nonattainment or maintenance areas.

Federal Prevention of Significant Deterioration. The purpose of Federal Prevention of Significant Deterioration (PSD) requirements is to prevent further deterioration of air quality in areas that are in attainment or unclassified regarding compliance with NAAQS. Therefore, Federal PSD regulations apply to a new major stationary source (i.e., source with the potential to emit of 250 tons per year (tpy) of any criteria pollutant, or a significant modification to an existing major stationary source. A significant modification subject to PSD requirements would include a change that adds 15 to 100 tpy, depending on the pollutant, to the facility's potential to emit). PSD regulations can also apply if a proposed project is within 10 kilometers of a Class I area, which are areas of special national or regional natural, scenic, recreational, or historic value for which the PSD regulations provide special protection. They include international parks, national wilderness areas or national memorial parks that exceed 5,000 acres in size, national parks that exceed 6,000 acres in size, and areas specially designated Class I by a state or Native American tribe. PSD regulations could apply if a proposed project is within 10 kilometers of a Class I area and if the project emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more. If an area is not a Class I area, it is a Class II area. There are no Class III areas in the United States at this time.

Title V Requirements. Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source has the potential to emit more than 100 tpy of any one criteria air pollutant, 10 tpy of a hazardous air pollutant (HAP), or 25 tpy of any combination of HAPs. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality. Section 112 of the CAA defines the sources and types of HAPs.

Greenhouse Gas Emissions. Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO_2), methane, and nitrous oxide. Fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride are examples of GHGs created and emitted primarily through human activities.

Some greenhouse gases occur naturally and others are created and emitted solely through human activities. According to the USEPA, the principal greenhouse gases that enter the atmosphere because of human activities are:

1. *Carbon Dioxide*
2. *Methane*
3. *Nitrous Oxide*
4. *Fluorinated Gases*

Each GHG is assigned a global warming potential, which is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of one. For example, methane has a global warming potential of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. To simplify analyses, total GHG emissions from a source are often expressed as a CO_2 equivalent.

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Scientific evidence indicates a trend of increasing global

temperature over the past century due to an increase in GHG emissions from human activities (IPCC 2007). The climate change associated with this global warming is predicted to produce negative environmental, economic, and social consequences across the globe. Recent observed changes due to global warming include shrinking glaciers, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges (IPCC 2007).

Federal agencies are, on a national scale, addressing emissions of GHGs by reductions mandated in Federal laws and EOs; most recently, EO 13514 *Federal Leadership in Environmental, Energy, and Economic Performance*. EO 13514 was signed in October 2009 and requires agencies to set goals for reducing GHG emissions. One requirement within EO 13514 is the development and implementation of an agency Strategic Sustainability Performance Plan (SSPP) that prioritizes agency actions based on lifecycle return on investment. Each SSPP is required to identify, among other things, "agency activities, policies, plans, procedures, and practices" and "specific agency goals, a schedule, milestones, and approaches for achieving results, and quantifiable metrics" relevant to the implementation of EO 13514.

On August 26, 2010, the DOD released its SSPP to the public. This implementation plan describes specific actions the DOD will take to achieve its individual GHG reduction targets, reduce long-term costs, and meet the full range of goals of the EO. All SSPPs segregate GHG emissions into three categories: Scope 1, Scope 2, and Scope 3 emissions. Scope 1 GHG emissions are those directly occurring from sources that are owned or controlled by the agency. Scope 2 emissions are indirect emissions generated in the production of electricity, heat, or steam purchased by the agency. Scope 3 emissions are other indirect GHG emissions that result from agency activities but from sources that are not owned or directly controlled by the agency. The GHG goals in the DOD SSPP include reducing Scope 1 and Scope 2 GHG emissions by 34 percent by 2020, relative to Fiscal Year (FY) 2008 emissions, and reducing Scope 3 GHGs by 13.5 percent by 2020, relative to FY 2008 emissions (DOD 2010). It should be noted that EO 13514 exempts emissions from aircraft and non-road equipment used in combat support or combat training from DOD GHG reduction targets. The DOD reduction goals will not be uniformly applied to each installation.

On September 22, 2009, the USEPA issued a final rule for mandatory GHG reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on CO_2 and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of CO_2 equivalent per year. The first emissions report is due in 2011 for 2010 emissions.

GHG emissions will also be factors in PSD and Title V permitting and reporting of stationary sources, according to a USEPA rulemaking issued on June 3, 2010 (75 FR 31514). Evaluation factors for stationary source GHG potential emissions are 75,000 tons of CO_2 equivalent per year and 100,000 tons of CO_2 equivalent per year under these permit programs. Under the PSD construction permitting program, between January 2, 2011 and July 1, 2011, the 75,000 tpy criteria applies to existing PSD major sources for non-GHG pollutants that have an increase of 75,000 tons of CO_2 equivalent per year of GHGs as well as a significant increase in non-GHG pollutants (i.e. 15 to 100 tpy depending on the pollutant). Beginning July 1, 2011, the 100,000 tons of CO_2 equivalent per year defines a new PSD major source for GHGs, and the 75,000 tpy GHG criteria applies to a modification of a newly-defined PSD major source. In addition, beginning July 1, 2011, PSD permitting for GHG pollutants alone can be triggered regardless of whether PSD applies for non-GHG pollutants. Under the Title V operating permit program, the 100,000 tons of CO_2 equivalent per year defines a major source requiring a Title V permit.

The U.S. Energy Information Administration estimates that in 2007, gross CO_2 emissions in the State of Mississippi were 67.4 million metric tons of CO_2 equivalents (EIA 2010). However, the potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG

emissions are not large enough to have an appreciable effect on climate change. Therefore, GHG emissions from NAS Meridian, the transit region, and the Meridian 2 MOA are not discussed in detail in **Sections 3.1.2 or 4.1.2**. The impact of proposed GHG emissions on climate change is discussed in the context of cumulative impacts in **Chapter 5**.

3.1.2 Description of the Affected Environment

3.1.2.1 NAS Meridian

Local and Regional Air Quality and General Conformity. The NAS Meridian portion of the ROI is in Kemper and Lauderdale counties. Kemper County is in the Northeast Mississippi Intrastate AQCR (40 CFR 81.62). Lauderdale County is within the Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate AQCR (40 CFR 81.68). The Northeast Mississippi Intrastate AQCR consists of 32 counties in Mississippi, including Kemper County. The Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate AQCR consists of 3 counties in Alabama, 10 counties in Florida, and 37 counties in Mississippi, including Lauderdale County. The actions within the ROI are subject to rules and regulations developed by the Mississippi Department of Environmental Quality (MDEQ). The MDEQ is responsible for implementing and enforcing state and Federal air quality regulations in the State of Mississippi. The air quality in Kemper and Lauderdale counties has been characterized by the USEPA as unclassified/attainment for all criteria pollutants (USEPA 2010b). Therefore, the General Conformity requirements do not apply to the NAS Meridian portion of the ROI.

Local and Regional Air Emissions Inventories. The most recent emissions inventories for Kemper and Lauderdale counties, Northeast Mississippi Intrastate AQCR, and the Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate AQCR are shown in **Table 3-2**. Kemper and Lauderdale counties are considered the local areas of influence, and the AQCRs are considered the regional areas of influence for the air quality analysis.

Table 3-2. Local and Regional Air Emissions Inventory (2002)

County and Air Quality Control Region (AQCR)	Pollutant					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Kemper County	723	840	4,448	104	1,857	245
Northeast Mississippi AQCR	67,682	92,039	330,513	13,938	119,209	20,007
Lauderdale County	5,035	7,727	33,551	354	5,834	1,064
Alabama-Florida-Southern Mississippi AQCR	338,587	339,121	1,478,543	277,876	270,386	78,256

Source: USEPA 2002

Air Permit Requirements. NAS Meridian is classified as a synthetic minor source of stationary source air emissions and has a federally enforceable *Permit to Operate Air Emissions Equipment at a Synthetic Minor Source* issued by MDEQ under permit No. 1460-00060, Agency Interest #1324 (NAS Meridian 2009a). This permit was effective on February 19, 2009, and expires on January 31, 2014. It also requires NAS Meridian to calculate and report 12-month rolling total emissions from specified stationary sources to demonstrate that the facility maintains synthetic minor status (NAS Meridian 2009a). There are various stationary sources on-installation that emit criteria pollutants and HAPs and that are included

in the MDEQ air-operating permit, including generators, boilers, jet engine test cell operations, painting and solvent use, fuel storage and dispensing tanks, woodworking, and other miscellaneous sources.

Aircraft-Related Emissions

Baseline aircraft-related emissions at NAS Meridian include stationary source emissions (i.e., aircraft engine test cell emissions) and mobile source emissions (i.e., aircraft operational emissions). The engine test cell emissions are classified as stationary source emissions and the aircraft operations and in-frame maintenance operations are classified as mobile source emissions. In-frame maintenance operations consist of engine maintenance conducted on the aircraft without removing the aircraft engine.

Most of the operational data and emissions factors that form the basis of the air quality emissions calculations were provided by the U.S. Navy Aircraft Environmental Support Office in San Diego, California, and are provided in **Appendix F**. The U.S. Navy Aircraft Environmental Support Office conducted interviews and exchanged other correspondence with NAS Meridian personnel to obtain the data necessary to support this EA.

Stationary Source Emissions (Aircraft Engine Test Cell). The baseline emissions from the aircraft engine test cell operations were estimated based on FY 2010 operational data (i.e., September 2009 to September 2010). Operational and emissions data were provided on a per aircraft engine test basis for the F405-RR-401 engine used in the T-45C aircraft. No other aircraft engine types are currently tested at the NAS Meridian test cell. Data concerning the test cell operations is provided in **Appendix F**. Baseline aircraft engine test cell emissions were calculated by multiplying the emissions from one aircraft engine test by the total number of tests conducted in FY 2010, which were 96. The aircraft-related FY 2010 stationary source baseline emissions in tpy (i.e., aircraft engine test cell emissions) are provided in **Table 3-3**.

Table 3-3. FY 2010 NAS Meridian Aircraft-Related Stationary Source Emissions

	Pollutant						
	NO_X (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2 (tpy)
FY 2010 Aircraft-Related Stationary Source Emissions	1.20	0.58	3.24	0.07	0.98	0.98	541.73

Key: VOC = volatile organic compound

Mobile Source Emissions (Aircraft Operations). The baseline emissions from aircraft operations were calculated based on calendar year (CY) 2009 T-45C aircraft operational data. Operational data for transient and civilian aircraft was not provided by NAS Meridian personnel. However, transient military and civilian aircraft operations account for approximately 0.1 percent of aircraft operations at NAS Meridian, the remaining 99.9 percent are T-45C aircraft operations. Therefore, the transient military and civilian aircraft operations were assumed to be T-45C aircraft operations for the purpose of calculating air emissions from aircraft operations.

Neither the MDEQ nor the USEPA requires tracking emissions from ground support equipment; therefore, NAS Meridian does not track these emissions. **Table 3-4** provides a summary of the baseline aircraft operational emissions at NAS Meridian in tpy. Assumptions used in conducting the emissions calculations are provided in **Appendix F**.

Table 3-4. CY 2009 NAS Meridian Aircraft-Related Mobile Source Emissions

	Pollutant						
	NO_X (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2 (tpy)
CY 2009 Aircraft-Related Mobile Source Emissions	220.79	140.46	839.08	14.26	212.18	212.18	111,016.24

A comparison of NAS Meridian aircraft emissions as a percent of regional and state emissions is presented in **Table 3-5**, which also includes a comparison of NAS Meridian's CO_2 emissions to the total estimated CO_2 emissions in the State of Mississippi. There is no regulatory basis for percent emissions comparisons to countywide emissions; therefore, this percentage is not provided. As shown, NAS Meridian baseline aircraft emissions constitute less than 0.35 percent of the emissions within the two AQCRs that NAS Meridian is part of, with the exception that NAS Meridian aircraft emissions constitute 1.07 percent of the $PM_{2.5}$ emissions within the Northeast Mississippi AQCR.

Table 3-5. NAS Meridian Total Baseline Air Emissions from Aircraft Related Operations and Percent of Regional/State Emissions

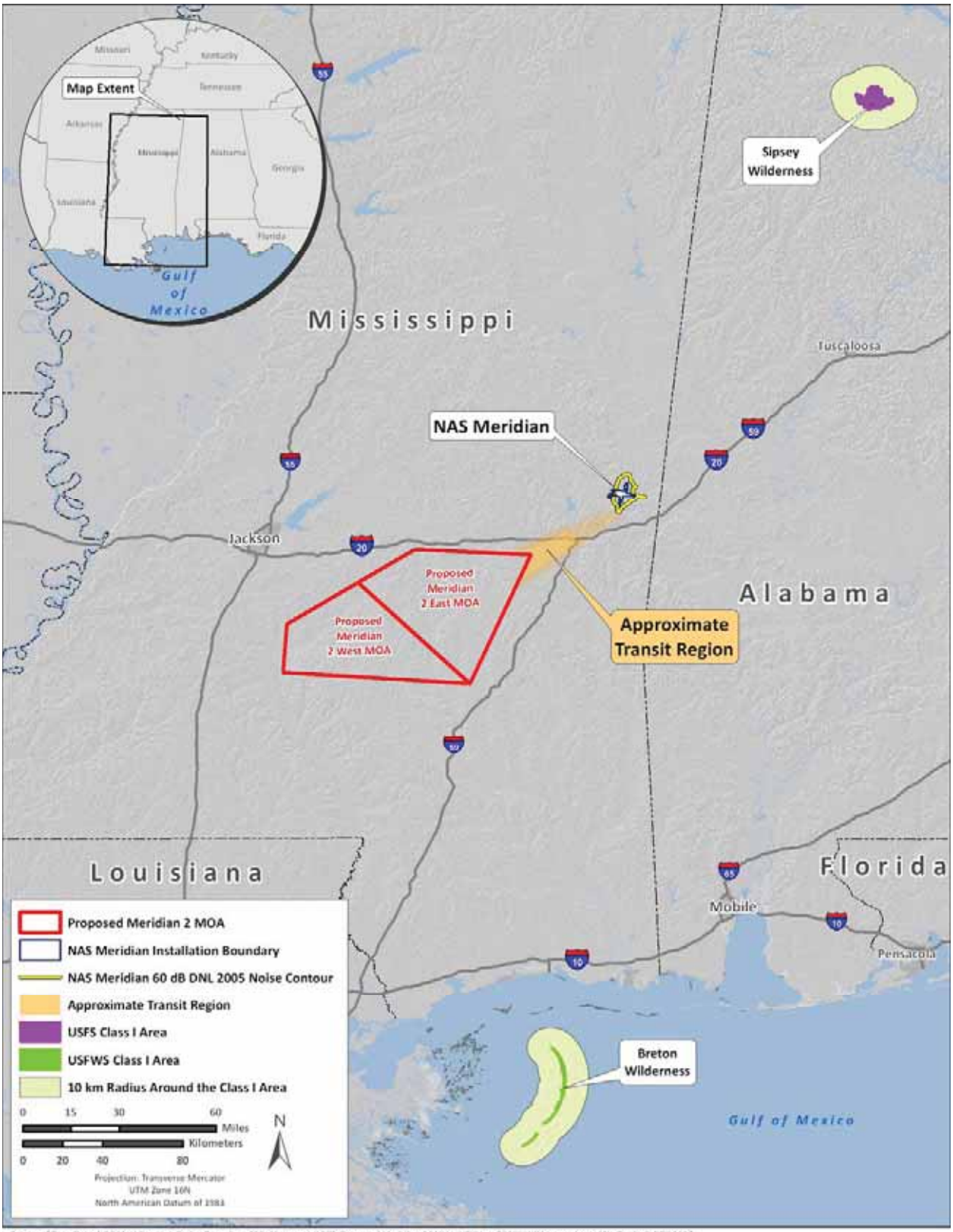
	NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total NAS Meridian Baseline Aircraft-Related Emissions (tpy)	221.99	141.04	842.32	14.33	213.16	213.16	111,557.97
Percent of Northeast Mississippi AQCR Emissions (1)	0.33%	0.15%	0.25%	0.10%	0.18%	1.07%	N/A
Percent of Alabama-Florida-Southern Mississippi AQCR Emissions (1)	0.07%	0.04%	0.06%	0.01%	0.08%	0.27%	N/A
Percent of CO_2 Emissions in State of Mississippi (2)	----	----	----	----	----	----	0.15%

Sources for AQCR and Mississippi emission levels:

1. USEPA 2010b
2. EIA 2010

Key: N/A = Not available.

As shown in **Figure 3-1**, no Class I areas are in the vicinity of the ROI or even within the State of Mississippi (USEPA 2010c). Therefore, the ROI is classified as Class II. In addition, NAS Meridian maintains a federally enforceable Synthetic Minor Air Operating Permit issued by MDEQ. This permit means the facility has potential criteria pollutant emissions below the PSD and Title V major source thresholds. In addition, GHG emissions for 2009 baseline conditions are expected to be well below the 75,000 and 100,000 tons of CO_2 equivalent per year PSD and Title V permit criteria. The 2008 estimate of CO_2 emissions for NAS Meridian is 5,091 tpy according to the Navy's Clean Air Act Steering Committee (U.S. Navy CAA Services 2008). It is expected that 2009 GHG emissions would be comparable to the 2008 estimate. Therefore, Federal PSD regulations and Title V permit regulations do not apply to the 2009 baseline conditions at NAS Meridian. In addition, the 2008 estimate of GHG emissions is well below the 25,000 metric ton criteria for reporting these emissions to the USEPA.



Source of Base Data, NAS Meridian Installation Boundary: ESRI Streetmap 2007; Proposed Meridian 2 MOAs: HDR Inc. 2010; Wilderness Areas (Air Quality): NPS 2007.

Figure 3-1. Class I Areas in the Vicinity of the ROI

3.1.2.2 Transit Region

The transit region is in the following Mississippi counties: Lauderdale, Clarke, Newton, and Jasper. These counties are included in the Northeast Mississippi Intrastate AQCR. In addition, these counties have been characterized by the USEPA as unclassified/attainment for all criteria pollutants (USEPA 2010b). Therefore, the General Conformity requirements do not apply to the transit region portion of the ROI. County air emissions inventory data for these counties are not provided here since these counties are included in the Northeast Mississippi Intrastate AQCR discussed in **Section 3.1.2.1**.

3.1.2.3 Meridian 2 MOA

The Meridian 2 MOA encompasses all or portions of ten counties in east-central Mississippi: Covington, Jasper, Jefferson Davis, Jones, Lawrence, Newton, Rankin, Scott, Simpson, and Smith counties. All counties in Mississippi are designated as in attainment with all criteria pollutants (MDEQ 2009). Therefore, the General Conformity requirements do not apply to the Meridian 2 MOA portion of the overall ROI. The ROI is more than 62 miles (100 kilometers) from any Class I area as shown on **Figure 3-1**.

County air emissions inventory data for the ten counties that the Meridian 2 MOA is located in are not provided here because these counties are included in the Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate AQCR discussed in **Section 3.1.2.1**.

3.2 Noise

3.2.1 Definition of the Resource

Noise represents the most identifiable concern associated with aircraft operations. Although communities and even isolated areas receive more consistent noise from other sources (e.g., cars, trains, construction equipment, stereos, wind), the noise generated by aircraft overflights often receives the greatest attention. General patterns concerning the perception and effect of aircraft noise have been identified, but attitudes of individual people toward noise are subjective and depend on their situation when exposed to noise.

Average Noise Levels. Noise levels, resulting from multiple single events, are used to characterize community noise effects from aircraft operations and are modeled using Day-Night Average Sound Level (DNL). DNL provides the energy-averaged sound level measured over a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. to account for the increased sensitivity to nighttime noise events. DNL is the energy average of all noise events that occur during a 24-hour period; it is not the sound level heard at any given time. A-weighted decibels are used to characterize sound levels that emphasize the frequency range most sensitive to the human ear. "A-weighted" denotes the adjustment of the frequency content of a sound-producing event to represent the way in which the average human ear responds to the audible event. A-weighting can be used to characterize both average and single-event noise levels.

DNL is the preferred sound level metric used to characterize noise impacts by the FAA, U.S. Department of Housing and Urban Development (HUD), USEPA, and DOD for modeling airport environments. The scientific community has endorsed the use of DNL (ANSI 2005) and the Federal Interagency Committee on Noise (FICON) has reaffirmed its use for community noise impacts (FICON 1992).

Peak Noise Levels. Average noise levels, such as DNL, might not provide an accurate depiction of maximum noise levels from loud, single noise events such as an aircraft flyover, which are typically heard for only a few seconds. Therefore, while the DNL is the most useful single metric for characterizing the long-term noise environment, other metrics such as the Sound Exposure Level (SEL) metric, are more

useful in characterizing the noise associated with individual events. The SEL is a measure of the total sound exposure of an event compressed into a 1-second time interval. The SEL does not represent the level of sound heard at any specific instant; however, it provides a measure of the total sound energy of a single event and permits comparison of events that differ in both level and duration.

When determining the SEL from a single event, the variations in aircraft flight profile caused by changes in weight, airspeed, and power settings and daily and seasonal weather fluctuations and wind should be considered. Consequently, the SEL from a single event has limited use in determining long-term noise impacts. When a SEL from a single event is used to supplement the DNL, it serves only to provide additional information and does not predict long-term human health impacts (FICON 1992). However, there have been some preliminary field studies that show the relationship between sleep disturbance and SELs (FICAN 1997). Outdoor peak noise levels of approximately 75 dB SEL, 95 dB SEL, and 115 dB SEL would awaken approximately 5 percent, 10 percent, and 18 percent of the population, respectively.

Noise Regulations

Federal Regulations. The Federal government has established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. According to Navy, FAA, and HUD criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds 75 dB DNL, "normally unacceptable" in regions exposed to noise between 65 and 75 dB DNL, and "normally acceptable" in areas exposed to noise of 65 dB DNL or less. Noise levels of less than 65 dB DNL are considered to have low or no impact on land use, including residential development (U.S. Navy 2008). The USEPA has identified 55 dB DNL as adequate to protect human health and welfare with a sufficient margin of safety (USEPA 1974).

Navy AICUZ Program. OPNAVINST 11010.36C, *Air Installations Compatible Use Zones (AICUZ) Program*, provides policies, procedures, and guidelines for implementation of the DOD AICUZ Program (U.S. Navy 2008). The purpose of the AICUZ Program is to protect the public's health, safety, and welfare and to prevent encroachment so that the military can fulfill their mission and national security needs. The AICUZ Program includes a study that is intended as a planning document for local, state, regional, and other Federal agencies; and community leaders to encourage compatible development of land adjacent to military airfields. All airports attract development. People who work at an airport want to live nearby; others want to provide goods and services to the airport and its personnel. Therefore, encroachment prevention is also important in rural areas like NAS Meridian to ensure that any future development is compatible with airport activities. Installation-specific AICUZ studies quantify aircraft noise zones, identify accident potential zones, prepare a compatible land use plan for the installation and surrounding areas, and develop a strategy to promote compatible development on land within these areas.

State Regulations. The State of Mississippi has not established statewide standards with respect to aircraft noise (State of Mississippi 1972).

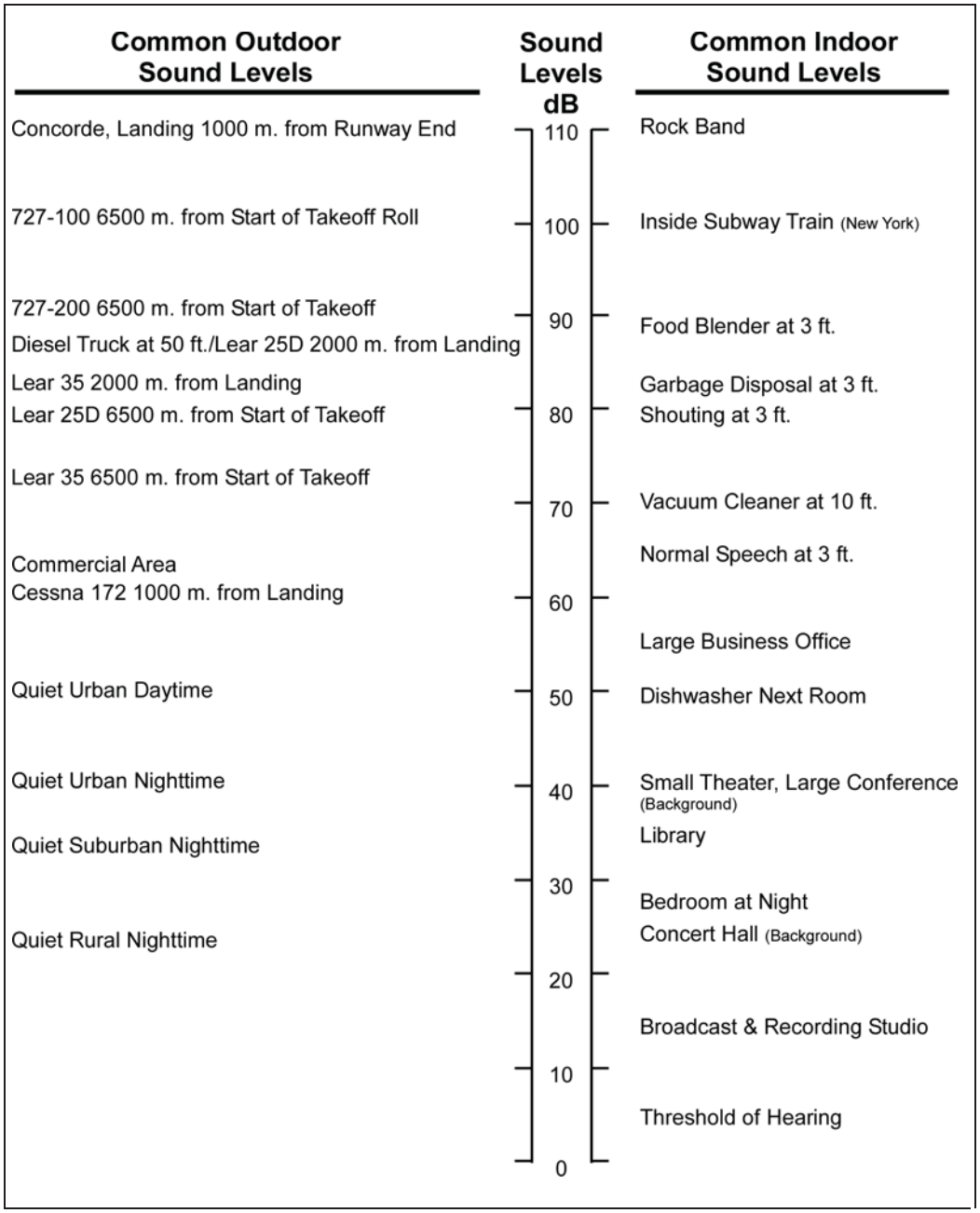
Local Regulations. Lauderdale and Kemper counties, where NAS Meridian is located, each have an AICUZ ordinance, which is discussed in **Section 3.3.2.1**.

The ROI for the Meridian 2 MOA encompasses all or portions of ten counties in east-central Mississippi. However, the majority of the ROI is in Jasper, Simpson, and Smith counties; therefore, only those counties are discussed in further detail. The ROI also encompasses 17 cities and towns. However, the cities of Bay Springs, Mendenhall, and Raleigh are the county seats for Jasper, Simpson, and Smith counties, respectively, and the City of Magee is the largest city in the ROI; therefore, only these cities are discussed in detail.

The counties of Jasper, Simpson, and Smith do not have a noise ordinance. The cities of Bay Springs, Mendenhall, Raleigh, and Magee also do not have noise ordinances.

Noise Levels and Effects

Figure 3-2 provides the estimated noise levels for common sounds. As shown, the threshold of hearing is approximately 5 dB, normal speech at 3 feet is approximately 65 dB, and shouting at 3 feet is approximately 80 dB (FICAN 2009).



Source: FICAN 2009

Figure 3-2. Estimated Noise Levels for Common Sounds

Noise levels in residential areas vary depending on the housing density and location. As shown in **Table 3-6**, a rural partially developed area is estimated to be approximately 40 dB DNL (FICON 1992), an agricultural area is approximately 44 dB DNL, and a normal suburban area is about 55 dB DNL, which increases to 60 dB DNL for an urban residential area, and to 80 dB DNL in the downtown section of a city (USEPA 1974).

Table 3-6. Typical Outdoor Estimated Noise Levels

dB DNL	Location
40	Rural, partially developed [1]
44	Agricultural areas [2]
50	Residential area in a small town or quiet suburban area [1,2]
55	Suburban residential area [2]
60	Urban residential area [2]
65	Noisy urban residential area [2]
70	Very noisy urban residential area [2]
80	City noise (downtown of major metropolitan area) [2]
88	3rd floor apartment in a major city next to a freeway [2]

Sources: 1. FICON 1992; 2. USEPA 1974

Table 3-7 describes several aspects of the effect of noise on people in residential areas to varying levels of noise exposure in DNL, including indoor and outdoor speech interference, hearing loss, and the percentages of people that would be projected to be "highly annoyed" when exposed to various levels of noise measured in DNL. For example, 12 to 22 percent of persons exposed to 65 to 69 dB DNL on a long-term basis are expected to be annoyed by these levels.

Speech Interference. Speech interference caused by aircraft noise is a primary source of annoyance to persons on the ground. As shown in **Table 3-7** persons speaking outdoors must be closer together to be able to understand each another as the outdoor DNL increases. For an outdoor noise level of 75 dB DNL, persons would have to be less than 2 feet (0.6 meters) apart to be able to understand each other 95 percent of the time.

One of the primary effects of aircraft noise is its tendency to drown out or "mask" speech, making it difficult or impossible to carry on a normal conversation without interruption.

Sleep Disturbance. The effect of aviation noise on sleep is a long-recognized concern of those interested in addressing the impacts of noise on people (FICAN 1997). The 10 dB nighttime penalty from 10:00 p.m. to 7 a.m. included in the DNL metric is intended to account for the intrusiveness of noise at night, in part due to the lower ambient noise level, and therefore tends to reflect to some extent the potential for sleep disturbance. However, since sleep disturbance is caused by an individual aircraft flyover, the peak noise level can also be used to analyze sleep disturbance semi-quantitatively, in terms of the number of wakeups (FICON 1992). An outdoor peak noise level of 75 to 85 dB (windows open and closed, respectively) would be estimated to awaken approximately 5 percent of a residential population (FICAN 1997).

Hearing Loss. It has been well established that continuous exposure to high noise levels will damage human hearing (USEPA 1974). The Occupational Safety and Health Administration minimum requirement states that constant noise exposure in the workplace must not exceed 90 dB over an 8-hour period. However, noise-induced hearing loss is also a concern outside the workplace. The USEPA estimates that the noise level in the community should be less than 70 dBA to adequately guard against hearing loss (USEPA 1982).

Table 3-7. Effects of Noise on People in Residential Areas

dB DNL	Annoyance [1]		Speech Interference [2]		Hearing Loss	Average Community Reaction [3]	General Community Attitude Towards Area
			Indoor	Outdoor			
	Percentage of Population Highly Annoyed [2]		Percentage of Sentence Intelligibility	Distance in Feet (Meters) for 95 Percent Speech Intelligibility	Qualitative Description		
	Low	High					
55 and below	3	7	100	11.5 (3.5)	Would not occur	Negligible to moderate	Noise considered no more important than various other environmental factors.
60–64	7	12	100	6.6 (2.0)	Would not occur		Noise can be considered an adverse aspect of the community environment.
65–69	12	22	100	4.9 (1.5)	Would not occur	Significant	Noise is one of the important adverse aspects of the community environment.
70–74	22	36	99	3.0 (0.9)	Would not likely occur	Severe	Noise is one of the most important adverse aspects of the community environment.
75 and above	36	> 54	98	1.6 (0.5)	Could begin to occur	Very severe	Noise is likely to be the most important of all adverse aspects of the community environment.

Sources: FICUN 1980, FICON 1992, Finegold et al. 1994

Notes:

1. Depends on attitudes and other factors.
2. The percentage of people reporting annoyance to lesser extents is higher in each case. An unknown small percentage of people will report being "highly annoyed" even in the quietest surroundings. One reason is the difficulty all people have in integrating annoyance over a very long time.
3. Attitudes or other non-acoustic factors can modify this. Noise at low levels can still be an important problem, particularly when it intrudes into a quiet environment.

The USEPA estimates that an indoor noise level of 45 dB DNL and an outdoor noise level of 55 dB DNL in residential areas protect the vast majority of the population under most conditions against annoyance. It is the USEPA's judgment that these levels should be maintained to protect the public from adverse health and welfare effects (USEPA 1974).

3.2.2 Description of the Affected Environment

3.2.2.1 NAS Meridian

The main source of noise at naval air installations are aircraft operations, including flight and engine maintenance operations. The level of noise exposure is related to a number of variables, which include the following (NAS Meridian 2004a):

- Type of operation (arrival, departure, pattern)
- Number of operations per day
- Time of operation
- Flight track
- Aircraft power settings, speeds, and altitudes
- Number and duration of maintenance run-ups
- Environmental data (temperature and humidity).

The types of aircraft, number of aircraft operations, and flight tracks are the most important factors with respect to noise exposure. This section discusses noise associated with NAS Meridian aircraft operations.

Annual Aircraft Operations. An aircraft operation includes any takeoff or landing at an airfield. **Table 3-8** shows the annual operations at NAS Meridian (2005–2009). The 2005 annual operations were forecasted in the 2004 *AICUZ Study Update for NAS Meridian and Outlying Landing Field Joe Williams, MS* (NAS Meridian 2004a). These forecasted operations were used to create the 2005 DNL noise contours discussed in the following paragraphs. As shown, the actual number of 2005 annual operations recorded in the Air Traffic Activity Reports (NAS Meridian 2010c) was 52 percent higher than what the 2004 AICUZ Study expected. NAS Meridian averaged 192,173 annual aircraft operations between 2005 and 2009.

Table 3-8. Historical and Current Annual Operations at NAS Meridian (2005–2010)

Year	Aircraft Type			Total
	Navy/Marine (T-45 Aircraft)	Other Military	General Aviation	
2005 Forecasted [a]	132,603	2,216	100	**134,919**
2005 Actual [b]	205,357	302	106	**205,765**
2006 [b]	200,508	385	67	**200,960**
2007 [b]	194,282	709	144	**195,135**
2008 [b]	170,896	81	188	**171,165**
2009 [b]	187,676	73	92	**187,841**

Sources:
a. NAS Meridian 2004a
b. NAS Meridian 2010c

Noise Contours. The NAS Meridian AICUZ Study addresses aircraft noise, aircraft safety, and land use compatibility in the vicinity of NAS Meridian. Navy guidance requires that noise contours be plotted for 60, 65, 70, 75, and 80 dB DNL in AICUZ Studies (U.S. Navy 2008). For land use planning purposes, the noise exposure from aircraft operations is divided into the following three noise zones (NAS Meridian 2004a):

- *Noise Exposure Zone 1* (< 65 dB DNL) is the area of minimal impact where sound attenuation (or noise level reduction) is not suggested in most cases. Noise exposure zone 1 accounts for potential noise impacts in areas of low ambient noise levels. The NAS Meridian 60 dB DNL noise contour is the defined ROI for NAS Meridian.
- *Noise Exposure Zone 2* (65 to 75 dB DNL) is an area of moderate impact where some land use controls are needed.
- *Noise Exposure Zone 3* (> 75 dB DNL) is the most severely impacted area and the area that requires the greatest degree of compatible land use controls.

Figure 3-3 illustrates the 60 dB DNL through 80 dB DNL noise contours for the forecasted 2005 operations at NAS Meridian from the latest AICUZ Study (NAS Meridian 2004a). As discussed in **Section 1.1**, the ROI at NAS Meridian is the 60 dB DNL noise contour. This represents a conservative approach, since residential units and other noise-sensitive land uses are "normally acceptable" in areas exposed to noise of 65 dB DNL or less according to Navy, FAA, and HUD criteria.

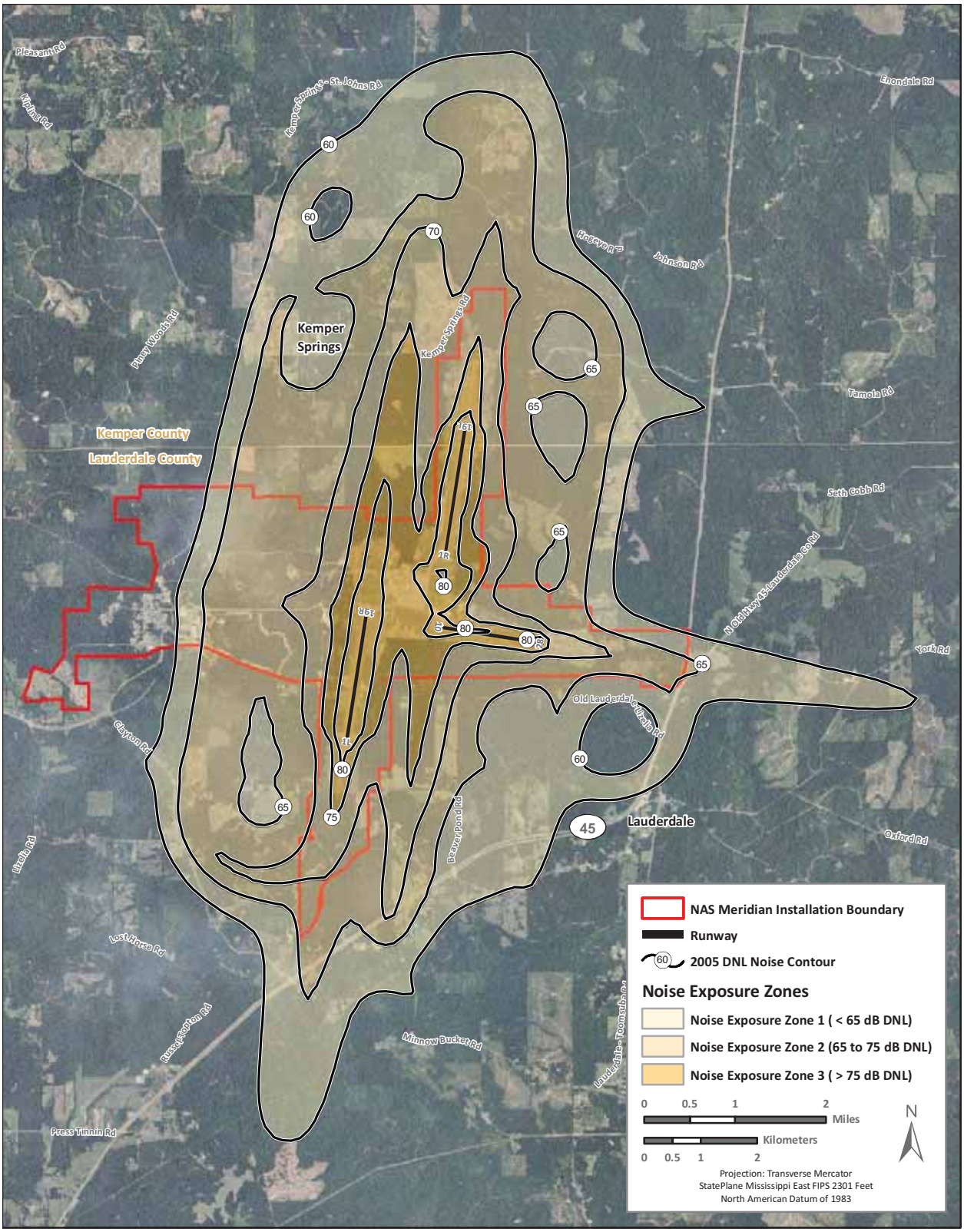
As shown, the 60 dB DNL noise contour extends 6 miles to the north and south, 5 miles to the east, and 3 miles to the west when measured from the center of the NAS Meridian airfield. The shape of the contour follows the arrival and departure flight tracks for each of the three runways.

The 134,919 annual operations shown in **Table 3-8** were forecasted for the 2005 scenario and therefore do not represent the annual operations that were actually flown at the airfield in 2005. The actual operations flown in 2005 were 52 percent higher than the forecasted amounts; however, the 2005 forecasted AICUZ noise contours are the most recent noise contours produced for the installation. NAS Meridian is currently updating their AICUZ Study, which will include the 2010 annual operations; this update is anticipated to be completed in 2012. Therefore, the updated AICUZ Study will not be available for inclusion in this EA.

FICON states that a 3 dB DNL increase represents a doubling of noise energy and that the majority of people characterize a change in aircraft noise exposure of 3 dB DNL as "clearly noticeable." Based on this, FICON considers an increase of 3 dB DNL as an indicator of the need for additional noise analysis (FICON 1992).

A 3 dB DNL increase would occur if the number of annual operations at the airfield doubled. A doubling of operations from the 2005 forecasted scenario would be approximately 270,000 annual operations. As shown in **Table 3-8**, the number of annual operations has not doubled over the past 5 years.

Noise Complaint Response Program. A noise complaint response and abatement program has been implemented at NAS Meridian to log and track noise complaints, analyze complaint locations and times, and identify the operations that generated the complaints (NAS Meridian 2004a). Noise complaints received on the hotline are initially answered by air operations personnel and pertinent information, such as time, location and extent of the event is recorded. The responsible squadron is then contacted for a response, which can be passed on to the party making the initial complaint. Operational procedures may be adjusted to avoid future conflicts if the mission permits.



Source: Noise Exposure Zones and Installation Boundary: NAS Meridian 2010; Aerial Photography: NAIP 2009

Figure 3-3. 2005 DNL Noise Zones at NAS Meridian

Noise-Abatement Procedures. In an effort to reduce noise levels, flight crews are briefed on noise-abatement procedures for flight operations. NAS Meridian abides by the following noise-abatement procedures to the best of its ability, commensurate with safety and operational training requirements (NAS Meridian 2004a):

- Visiting F/A-18 flight crews are instructed to secure afterburners before leaving the airfield boundary during takeoff. T-45 aircraft engines do not have afterburners.
- Maintenance personnel are instructed to avoid prolonged periods of aircraft high power turn-ups.
- Flight crews are briefed on existing patterns and the need to maintain the published patterns. The Navy enforces pattern discipline.

Flight crews adhere to FAA regulations that require an aircraft to maintain an altitude of at least 1,000 feet in congested areas and 500 feet in rural areas except on approaches and departures.

3.2.2.2 Transit Region

Military, commercial, and transient aircraft currently use the airspace in the transit region; however, baseline noise levels that are not associated with an airfield have not been established.

The transit region is spread across a large predominately rural area. Land use below the transit region is predominately rural in nature. There is a concentration of low and medium intensity development in the northeast section of this region centered on the City of Meridian and Key Field Airport. Typically, in rural areas, the dominant noise sources consist of vehicle traffic, agricultural equipment, and possibly industrial facilities. Multiple state routes, local roadways, and a small portion of two interstate highways are within the transit region. Except in the immediate vicinity of major noise sources, such as state highways or airfields, the forested portions of this region would be classified as rural (partially developed) and are estimated to be approximately 40 dB DNL (FICON 1992). The agricultural areas are estimated to be approximately 44 dB DNL (USEPA 1974). Average noise levels would be slightly higher (approximately 55 to 60 dB DNL) in the City of Meridian, due primarily to greater volumes of highway traffic (FICON 1992). TW-1 pilots typically do not fly over urban areas, including the downtown area of the City of Meridian.

As shown in **Figure 1-2**, Key Field Airport is within the transit region. Key Field Airport is a civilian-operated joint use facility and is used by a wide variety of civilian and military aircraft (NGB 2011). T-45C aircraft from NAS Meridian frequently refuel at Key Field Airport after training in areas south or east of NAS Meridian. Therefore, the eastern portion of the ROI is frequently used by T-45C aircraft. The 2010 Key Field Airport 65 dB DNL noise contour extends approximately 2 miles to the north, 2.5 miles to the south, and 0.5 miles to the east and west from the center of the airfield. The shape of the contour follows the arrival and departure flight tracks from the airfield's primary runway, which is oriented in a north-south direction. During times where no aircraft overflights are occurring, the sound environment at the airport is dominated by natural sounds such as wind and birds (NGB 2011).

3.2.2.3 Meridian 2 MOA

A baseline noise study has not been completed for the airspace proposed to be established as the Meridian 2 MOA.

The land underneath the proposed MOA is spread across a large predominately rural area. Several towns in the area are classified as developed (low and medium intensity). Typically, in rural areas, the dominant noise sources consist of vehicle traffic, agricultural equipment, and possibly industrial facilities. Multiple

state routes, local roadways, and a small portion of an interstate highway are within the ROI. Except in the immediate vicinity of major noise sources, such as state highways or airfields, noise levels would be similar to those within the transit region**.** The forested portions would be classified as rural (partially developed) and are estimated to be approximately 40 dB DNL (FICON 1992). The agricultural areas are estimated to be approximately 44 dB DNL (USEPA 1974). Average noise levels would be slightly higher (approximately 55 to 60 dB DNL) in cities and towns, due primarily to greater volumes of highway traffic (FICON 1992).

3.3 Compatible Land Use

3.3.1 Definition of the Resource

The term "land use" refers to real property classifications that indicate either the types of human activity or natural conditions occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, classifications, and definitions vary among jurisdictions.

There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations.

In the context of aircraft operations, land use compatibility is also described in terms of safety and clearance zones and noise levels. Land use in the Clear Zones (CZs) and Accident Potential Zones (APZs) is restricted due to aircraft operations.

The AICUZ Program was established in the 1970s by the DOD to analyze operational training requirements and to address communities' concerns about aircraft noise and accident potential. As discussed in **Section 3.2.1**, the goal of the AICUZ Program is to achieve compatibility between air installations and neighboring communities by the following measures (U.S. Navy 2008):

- Protecting the health, safety, and welfare of civilians and military personnel by encouraging land use that is compatible with aircraft operations
- Protecting Navy installation investment by safeguarding the installation's operational capabilities
- Reducing noise impacts caused by aircraft operations while meeting operational, training, and flight safety requirements
- Informing the public about the AICUZ Program while seeking cooperative efforts to minimize noise and potential aircraft accident impacts.

3.3.2 Description of the Affected Environment

The ROI is in east-central Mississippi and encompasses portions of 12 counties: Lauderdale, Kemper, Newton, Scott, Jasper, Clarke, Smith, Simpson, Lawrence, Jefferson Davis, Covington, and Jones.

3.3.2.1 NAS Meridian

NAS Meridian is primarily in northeastern Lauderdale County, Mississippi; however one runway extends northward into south-central Kemper County (see **Figure 1-1**). The installation is approximately 15 miles northeast of the City of Meridian. The installation can be accessed by State Route 39 to the west and U.S. Highway 45 to the east.

NAS Meridian consists of 8,060 acres of land at the main installation area. An additional 4,479 acres are owned or held in easement at the following two geographically separate facilities:

- ***Joe Williams Field.*** NAS Meridian owns 1,255 acres and holds 218 acres of easements approximately 12 miles northwest of the main installation
- ***Searay Target Range.*** NAS Meridian owns 654 acres and holds 2,352 acres of easements approximately 30 miles north of the main installation.

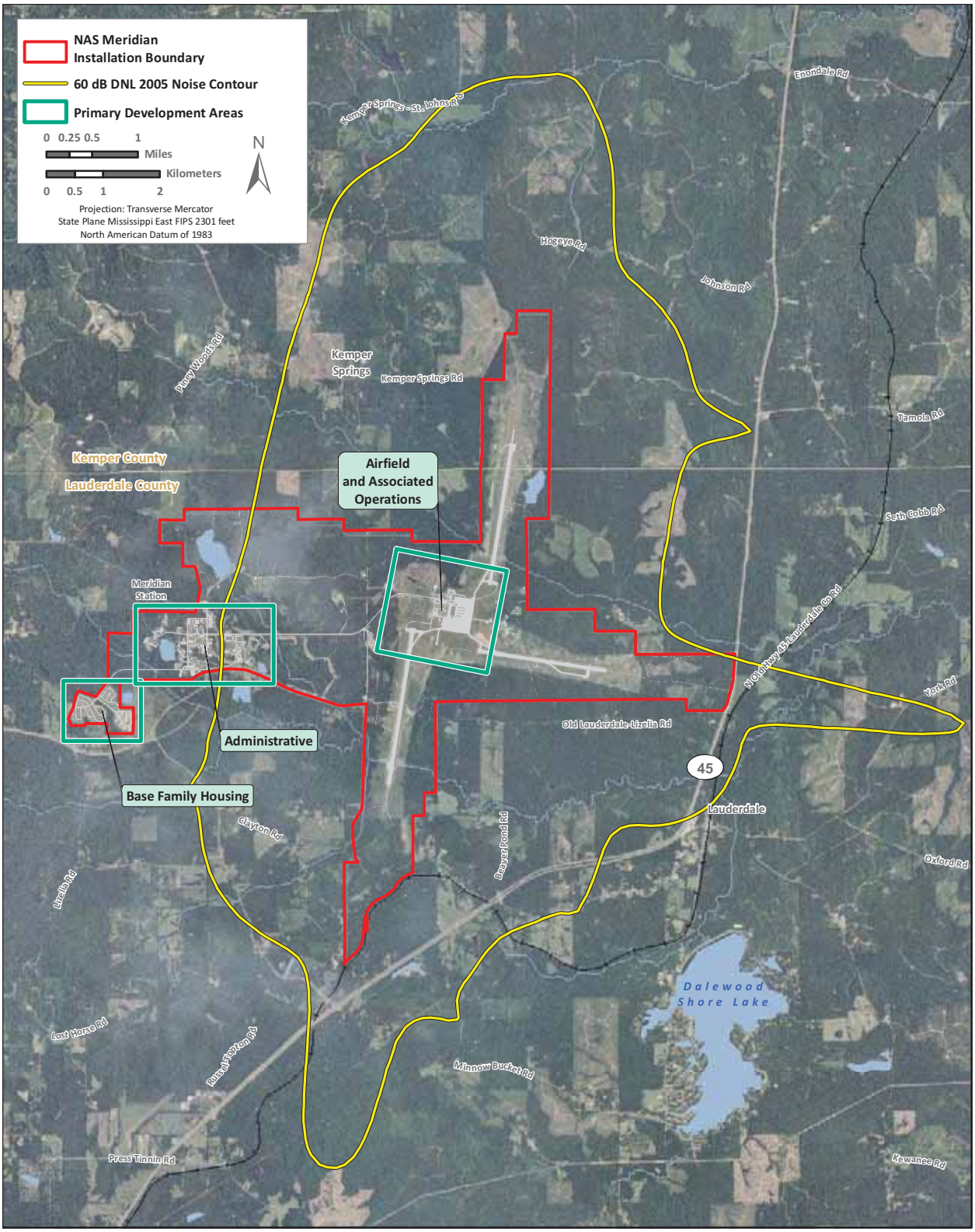
Overall, NAS Meridian has 2.3 million square feet of building space in 562 buildings (NAS Meridian 2010a). As shown on **Figure 3-4**, NAS Meridian is divided into the following three primary development areas:

- Installation family housing, which is privatized, consisting of two neighborhoods (Pine Crest and Juniper Ridge) in the western portion of the installation
- Administrative area, which contains most of the installation, mission, and personnel support uses, including unaccompanied housing, commercial and services functions, recreation facilities, and training functions; and is in the central portion of the installation
- McCain Airfield and associated operations in the eastern portion of the installation.

The *NAS Meridian Master Plan* identifies 11 land use categories at NAS Meridian: administrative, aircraft operations and maintenance, airfield pavement, community (commercial), community (services), housing (unaccompanied), manufacturing and production, medical/dental, open space/buffer zone, outdoor recreation, and training (NAS Meridian 2010a) (see **Figure 3-5**). Although not an official installation land use category, privatized family housing is inside the installation boundary in the western portion of the installation.

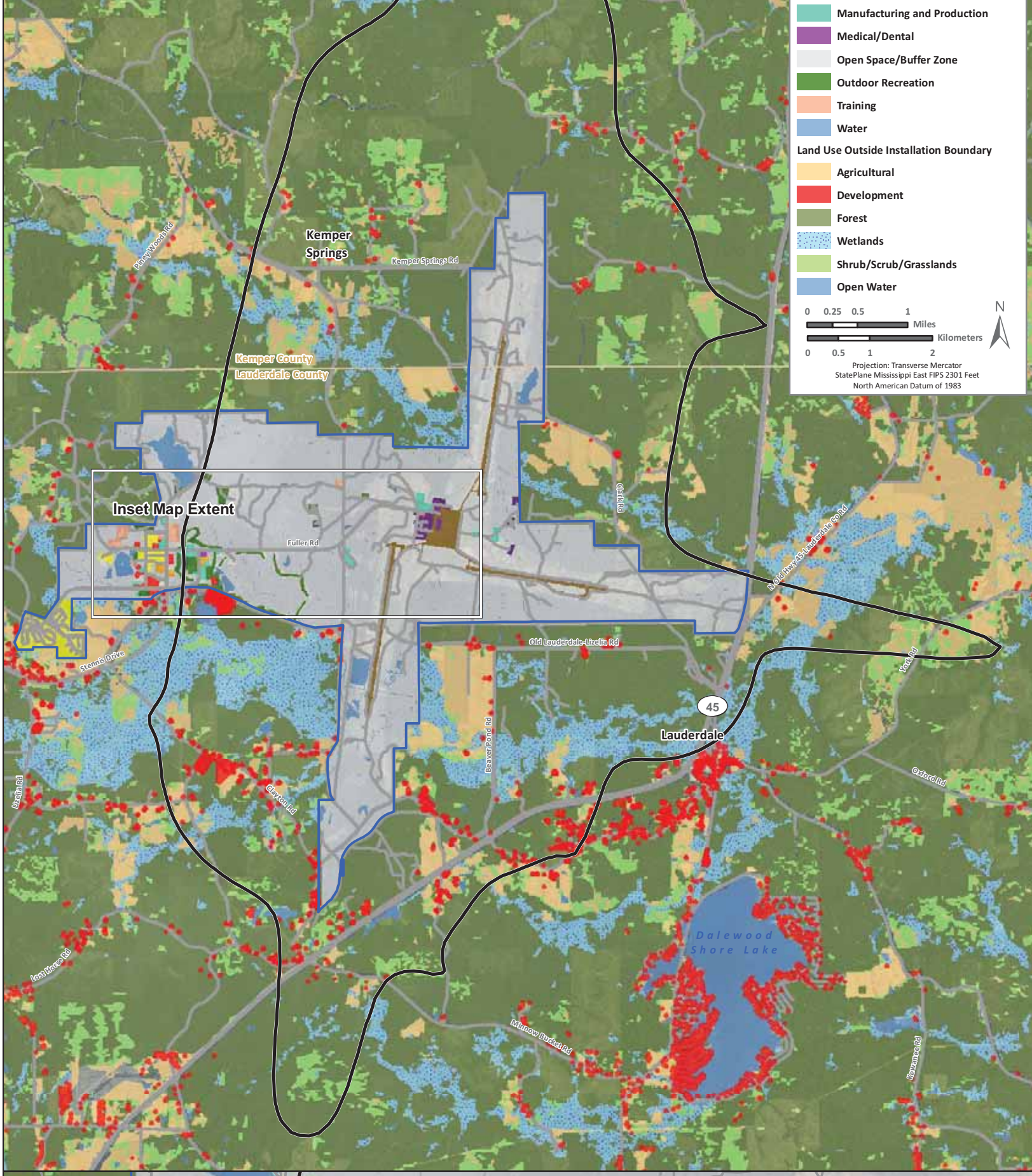
The administrative area is separated from the airfield by approximately 3 miles and includes two main training uses, the Naval Technical Training Center and the Regional Counterdrug Training Academy. Outdoor recreational facilities at NAS Meridian include tennis courts; a golf course; baseball, softball, and multipurpose fields; campgrounds; hiking and horseback riding trails; and parks (NAS Meridian 2010a). Hunting and fishing are permitted on the installation with the appropriate state licenses and NAS Meridian permits (NAS Meridian 2007c).

The airfield consists of three runways and associated taxiways, aircraft parking aprons, alert areas, and arm/disarm areas. It is a dominant land use at NAS Meridian composing more than 10,674,000 square feet. Given their interdependent relationship, aircraft operations and maintenance and industrial uses are found in close proximity west of the airfield.



Source: Noise Contour: NAS Meridian 2005; Aerial Photography: NAIP 2009

Figure 3-4. Primary Development Areas at NAS Meridian


Manufacturing and Production
Medical/Dental
Open Space/Buffer Zone
Outdoor Recreation
Training
Water
Land Use Outside Installation Boundary
Agricultural
Development
Forest
Wetlands
Shrub/Scrub/Grasslands
Open Water
0 0.25 0.5 1 Miles
0 0.5 1 2 Kilometers
N
Projection: Transverse Mercator
StatePlane Mississippi East FIPS 2301 Feet
North American Datum of 1983
Kemper Springs
Kemper Springs Rd
Piney Woods Rd
Kemper County
Lauderdale County
Inset Map Extent
Fuller Rd
Clark Rd
N Old Hwy 45-Lauderdale Co Rd
Old Lauderdale-Lizella Rd
Stennis Drive
York Rd
45
Lauderdale
Beaver Pond Rd
Oxford Rd
Lizella Rd
Clayton Rd
Dalewood Shore Lake
Lost Horse Rd
Munow Bucker Rd
Kewanee Rd

Inset Map
Mud (Stables) Rd
Radar Rd
Pecan Field Rd
Mud Lake Rd

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Regarding the three runways at NAS Meridian: two are 8,000 feet long and run north-south (1L-19R and 1R-19L); the third is 6,400 feet long and runs east-west (10-28). Based on statistical analysis of past DOD aircraft accidents, APZs have been established at NAS Meridian: the CZ, APZ I, and APZ II (which is discussed in **Section 3.5.2.1**). The CZs are the closest to the runway end and have the highest accident potential of the three zones. In accordance with DOD policy, NAS Meridian owns the property within their CZs. While aircraft accident potential in APZ I and APZ II do not warrant land acquisition, land use planning and controls are strongly encouraged in these areas to protect the public (NAS Meridian 2004a). Most of the on-installation land within the CZs and APZs is in the airfield and open space (buffer zone) land use categories. However, other land uses within APZ II include outdoor recreation (golf course and stables/horse training ring), industrial, community commercial, and training.

There are seven Installation Restoration Program sites at NAS Meridian in various stages of investigation or closure. All sites are in commercial and industrial areas of the installation and have been or are in the process of being remediated to industrial land use standards (NAS Meridian 2010a).

Minimal quantities of ordnance and explosives are stored at NAS Meridian, east of the airfield. Due to the small quantities, restrictions imposed by Explosive Safety Quantity Distance criteria are minimal (NAS Meridian 2010a).

Off-Installation. The ROI outside of NAS Meridian includes 12,491 acres in Lauderdale County and 8,798 acres in Kemper County. Lauderdale County is predominantly forestland and agricultural land except for the urbanized area encompassing the City of Meridian and the City of Marion. Timbering and farming operations are generally distributed throughout the county. Small crossroad communities, which consist mostly of residences and a few commercial, public, and quasi-public uses, are scattered throughout the county. Kemper County is similar to the nonurbanized, rural portions of Lauderdale County.

The areas surrounding NAS Meridian are rural and generally consist of forests, wetlands, agricultural lands, and low-density residential properties (see **Figure 3-5**). Adjoining landowners are primarily non-industrial private landowners with land holdings ranging in size from 1 to 640 acres, except for an approximate 6,700-acre tract within the ROI near the north and east runways that is leased to Weyerhaeuser and managed as timberland (NAS Meridian 2007c). The area is characterized by scattered residential structures, church buildings, cemeteries, farm buildings, a few stores, farm land (mostly haying operations), pasture land, and fallow land. Single-family homes on large lots and remnants of former large agricultural operations exist throughout the area (NAS Meridian 2004a).

Development is starting to encroach into NAS Meridian AICUZ environments to the south and southwest of the airfield (NAS Meridian 2007c). According to the 2004 AICUZ Study, approximately 200 single-family residences are within the NAS Meridian AICUZ area. As shown in **Figure 3-5,** most development in proximity to NAS Meridian is along roadways, including Will Butchee Road and Fred Clayton Road southwest of the southern runway, Campground Road east of the southern runway, and Lauderdale-Lizelia Road south of the eastern runway. The Lakeside Estates mobile home community is directly adjacent to the NAS boundary, just south of the golf course. In Kemper County, there is scattered development in the Kemper Springs area as shown on **Figure 3-5**. Outside the ROI, development is present in the community of Lauderdale south of U.S Highway 45, around Dalewood Shore Lake southeast of the installation, and southwest of the installation south of Lost Horse Road.

Portions of APZs from Runways 1L/19R and 1R/19L extend outside the installation boundary into Lauderdale and Kemper counties. There are small portions of land in APZ I that extend outside of the NAS Meridian boundary. The land use within the APZ I that does extend outside the installation consists primarily of undeveloped forest, wetlands, and agriculture land; however, one uninhabited residence and

short sections of Old Lauderdale-Lizelia Road, Fred Clayton Road, and U.S. Highway 45 in Lauderdale County are within APZ I. Larger portions of land in APZ II are outside the installation boundary. The land uses within APZ II include residences that are primarily in Lauderdale County in the Lakeside Estates mobile home community along Fred Clayton Road. Some residences also exist in the Kemper Springs area of Kemper County. Other land uses within APZ II include agricultural land, forested land, lakes, and roadways.

Local Regulations. Lauderdale County passed their AICUZ Ordinance on September 8, 1992. Kemper County passed its AICUZ ordinance on May 7, 1993. The ordinances are essentially the same and work in tandem to promote compatible development around NAS Meridian. The ordinances consist of provisions that promote compatible development within the safety hazard and high noise areas created by aircraft operations at NAS Meridian. The ordinances also recognize Federal recommendations with respect to aircraft and adjacent community lighting, the need to limit visual hazards, and the hazard of electronic interference with aircraft. The ordinances are designed to make the public aware of the existing Federal rules and regulations (NAS Meridian 2004a). For example, in accordance with FAA regulations both ordinances require property owners to permit the county to mark and light any hazards to aircraft flight, such as trees or other structures.

The purpose of the Navy's land use recommendations is not to preclude productive use of land around Naval air installations, but to recommend best uses of the land that are protective of human health, safety, and welfare. While control over land use and development in the vicinity of NAS Meridian is the responsibility of Lauderdale and Kemper counties, the Navy AICUZ Program recommends that noise-sensitive uses (e.g., houses, churches, hospitals, amphitheaters) should not be located in high noise zones, and people-intensive uses (e.g., apartment buildings and sports arenas) should not be located in APZs. In 2005 the Lauderdale County Board of Supervisors authorized the county Engineer to post Navy-supplied noise area signs on county roads at the boundary of the noise zones in response to this recommendation.

3.3.2.2 Transit Region

The transit region is primarily in Lauderdale County, but includes Newton, Jasper, and Clarke counties (see **Figure 1-2**). The 2001 National Land Use Cover Dataset shows that land in these counties is predominately rural with a mix of evergreen, deciduous, and mixed forest; shrub habitat; and woody wetlands (USGS 2001).

The transit region encompasses part of Meridian, Mississippi, and extends approximately 20 miles southwest of the city. There is a concentration of low- and medium-intensity development centered on the City of Meridian and Key Field Airport. The City of Meridian is entirely encompassed in Lauderdale County with a population of 39,103. **Table 3-9** shows the cities and towns within the ROI, their locations, and their corresponding 2004 populations. The transit region totals approximately 152 square miles and, with the exception of the City of Meridian, does not include any urban areas, which are defined by the U.S. Census Bureau as areas with populations more than 50,000. TW-1 pilots typically do not fly over urban areas, including the downtown area of the City of Meridian.

Highland Park, approximately 3 miles northeast of Key Field Airport, is the only park within the transit region. The park is on the National Register of Historic Places (NRHP) for the Highland Park Dentzel Carousel and Shelter Building built in the late 1800s (NRHP 2011). The park is also used for various recreational activities. There are no designated Wildlife Management Areas (WMAs) within the transit region.

Table 3-9. Populations within the ROI

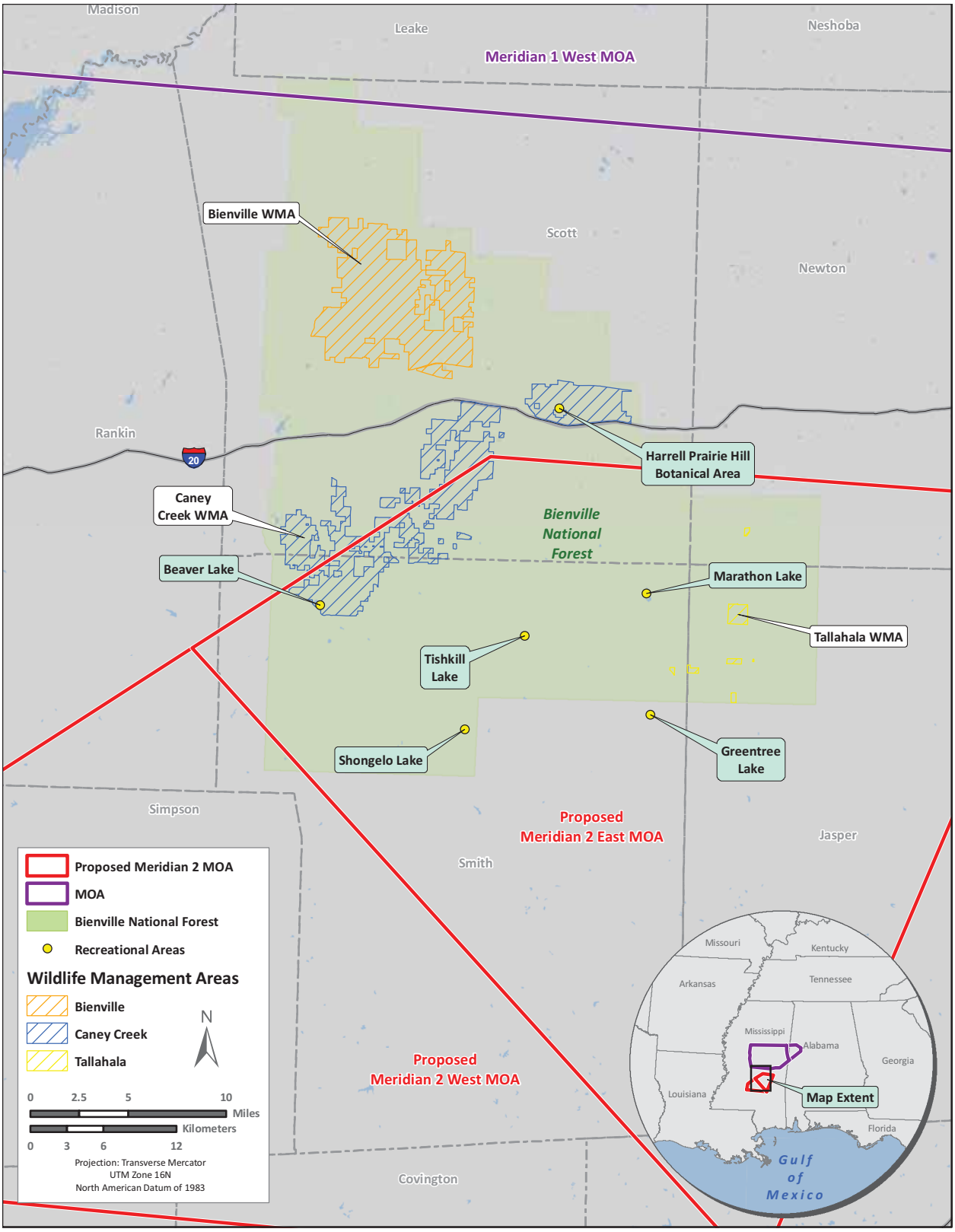
City/Town	County	2004 Population	Location within the ROI
Chunky	Newton	376	Transit region
Meridian	Lauderdale	39,103	Transit region
Nellieburg	Lauderdale	1294	Transit region
Bay Springs	Jasper	2,184	Meridian 2 East
Braxton	Simpson	220	Meridian 2 West
D'Lo	Simpson	394	Meridian 2 West
Lake	Scott	456	Meridian 2 East
Louin	Jasper	348	Meridian 2 East
Magee	Simpson	4,147	Meridian 2 West
Mendenhall	Simpson	2,517	Meridian 2 West
Mize	Smith	279	Meridian 2 West
Montrose	Jasper	133	Meridian 2 East
Mount Olive	Covington	849	Meridian 2 West
Newton	Newton	3,496	Meridian 2 East
Polkville	Smith	120	Meridian 2 East
Puckett	Rankin	361	Meridian 2 West
Raleigh	Smith	1,267	Meridian 2 East
Soso	Jones	372	Meridian 2 East
Sylvarena	Smith	121	Meridian 2 East
Taylorsville	Smith	1,319	Meridian 2 West

Source: Tele Atlas North America Inc. 2005

3.3.2.3 Meridian 2 MOA

The Meridian 2 MOA encompasses all or portions of ten counties in east-central Mississippi: Covington, Jasper, Jefferson Davis, Jones, Lawrence, Newton, Rankin, Scott, Simpson, and Smith (see **Figure 1-1**). The 2001 National Land Use Cover Dataset shows that land in these counties is predominately rural with a mix of evergreen, deciduous, and mixed forest; woody wetlands; and pasture/hay on private and public properties. There are a few small areas that are classified as developed, which include low- and medium-intensity development (USGS 2001). The City of Jackson is approximately 20 miles northwest and the City of Laurel is approximately 15 miles southwest of the proposed Meridian 2 MOA. **Table 3-9** shows the cities and towns within the ROI and their corresponding 2004 populations. The MOA totals 1,926 square miles and does not include any urbanized areas, which are defined by the U.S. Census Bureau as areas with populations above 50,000.

As shown in **Figure 3-6**, a portion of the Bienville National Forest is underneath the MOA. The Forest was established in 1934 and occupies more than 178,000 acres in Jasper, Newton, Scott, and Smith counties. Land in the National Forest was acquired primarily from timber companies and was cut-over land in need of reforestation, soil conservation, and protection from wildfires. The USFS, along with assistance from programs such as the former Civilian Conservation Corps, replanted and reclaimed much of what is now Bienville National Forest. Portions of Bienville National Forest are used for timber harvesting (USFS 2009).



Sources; MOAs: AVDAFIF 2009; Proposed Meridian 2 MOAs: HDR Inc. 2010; Wildlife Management Areas and Recreational Areas: MS Dept. of Wildlife, Fisheries, and Parks, 2009.

Figure 3-6. Bienville National Forest Recreational Areas and WMAs within the ROI

Several recreational areas in the Bienville National Forest are within the MOA, including Marathon Lake, Shongelo Lake, Beaver Lake, Greentree Reservoir, and Tishkill Lake. These recreational areas support various camping, boating, swimming, fishing, and hiking activities (USFS 2009).

WMAs are state wildlife hunting areas, which in the Bienville National Forest are managed cooperatively by the USFS and the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP). WMAs are designated only because of the management regulations required for the special uses of hunting and camping (MDWFP 2011). There are three designated WMAs within Bienville National Forest, including the Bienville, Caney Creek, and Tallahala WMAs. As shown in **Figure 3-6**, the southern portion of the Caney Creek WMA and all of the Tallahala WMA are within the ROI. The Bienville WMA is north of the proposed MOA.

3.4 Fish, Wildlife, and Plants

3.4.1 Definition of the Resource

This resource includes native or naturalized plants and animals and the habitats in which they exist. Protected and sensitive flora and fauna include federally listed (endangered or threatened), proposed, and candidate species; species protected under other Federal laws; species of concern managed under Conservation Agreements or management plans; and state-listed species.

Laws and Regulations

Sikes Act and Sikes Act Improvement Amendment. The Sikes Act (16 U.S.C. 670a–670o, 74 Stat. 1052), as amended, Public Law 86-797, approved September 15, 1960, provides for cooperation by the Departments of Defense and Interior and with state agencies in management of fish and wildlife resources on military reservations throughout the United States. In November 1997, the Sikes Act was amended via the Sikes Act Improvement Amendment (Public Law 105-85, Division B, Title XXIX) to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate this program, the amendments require the Secretaries of the military departments to prepare and implement Integrated Natural Resources Management Plans (INRMPs) for each military installation in the United States unless the absence of significant natural resources on a particular installation makes preparation of a plan for the installation inappropriate. The Navy has developed an INRMP for NAS Meridian, Outlying Field Joe Williams Outlying Field, and Searay Target Range (NAS Meridian 2007c).

Endangered Species Act. The Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.) establishes a Federal program to protect and recover imperiled species and the ecosystems upon which they depend. The USFWS administers the ESA program for terrestrial and freshwater organisms. The ESA protects endangered and threatened species and their habitats by prohibiting the "take" of listed animals and the interstate or international trade in listed plants and animals, including their parts and products, except under Federal permit. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Through regulations, the term "harm" is defined as "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

Under the ESA, an "endangered species" is defined as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. Listed plants are not protected from take, although it is illegal to collect or maliciously harm them on Federal land. Protection from commercial trade and the

effects of Federal actions do apply for plants. In addition, states could have their own laws restricting activity involving listed species.

Critical habitat is a term defined and used in the ESA. It is a specific geographic area that the USFWS has determined to contain features essential for the conservation of a threatened or endangered species and that could require special management and protection. In consultation for those species with critical habitat, Federal agencies are required to ensure that their activities do not adversely modify critical habitat to the point that it will no longer aid in the species' recovery. In many cases, this level of protection is similar to that already provided to threatened and endangered species. However, areas that are currently unoccupied by the species, but which are needed for the species' recovery, are also protected by the prohibition against adverse modification of critical habitat.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act of 1918 (MBTA) is the primary legislation in the United States established to conserve migratory birds. The MBTA prohibits the taking, killing, or possessing of migratory birds unless permitted by regulation. Incidental take of migratory birds during DOD military readiness activities is addressed by the final rule, "Migratory Bird Permits; Take of Migratory Birds by the Armed Forces," issued by the U.S. Department of the Interior, USFWS in the Federal Register (Vol. 72, No. 39) on February 28, 2007 (50 CFR Part 21).

On December 2, 2002, the President signed the 2003 National Defense Authorization Act (Authorization Act). Section 315 of the Authorization Act provides that the Secretary of the Interior shall exercise his or her authority under Section 704(a) of the MBTA to prescribe regulations to exempt the Armed Forces for the incidental taking of migratory birds during military readiness activities authorized by the Secretary of Defense or the Secretary of the military department concerned. The Authorization Act further requires the Secretary of the Interior to promulgate such regulations with the concurrence of the Secretary of Defense. The Secretary has delegated this task to the USFWS. In passing the Authorization Act, Congress itself determined that allowing incidental take of migratory birds as a result of military readiness activities is consistent with the MBTA. With this language, Congress clearly expressed its intention that the Armed Forces give appropriate consideration to the protection of migratory birds when planning and executing military readiness activities, but not at the expense of diminishing the effectiveness of such activities.

As directed by Section 315 of the Authorization Act, the final rule for take of migratory birds by the Armed Forces authorizes such incidental takes, with limitations, that result from military readiness activities of the Armed Forces. If any of the Armed Forces determine that a proposed or an ongoing military readiness activity could result in a significant adverse effect on a population of a migratory bird species, then they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects. The Secretary of the Interior will retain the power to withdraw or suspend the authorization for particular activities in appropriate circumstances.

Executive Order 13186, Conservation of Migratory Birds. EO 13186, *Conservation of Migratory Birds* (January 10, 2001), creates a more comprehensive, international strategy for the conservation of migratory birds by the Federal government. EO 13186 provides a specific framework for the Federal government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. EO 13186 provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). EO 13186 is coordinated and implemented by the USFWS. The MOU between USFWS and DOD outlines how DOD will promote conservation of migratory birds. EO 13186 requires the support of various conservation planning efforts already in progress, incorporation of bird conservation considerations into agency planning, and reporting annually

on the level of take of migratory birds. The MOU does not apply to incidental take of migratory birds during military readiness activities.

Bald and Golden Eagle Protection Act. Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act, which prohibits the "take" of bald or golden eagles in the United States. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." For purposes of these guidelines, "disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause: (1) injury to an eagle; (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" based on the best scientific information available. In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment. The golden eagle's (*Aquila chrysaetos*) range does not include Mississippi or Alabama. Therefore, only the bald eagle (*Haliaeetus leucocephalus*) is discussed in this EA.

Mississippi Nongame and Endangered Species Conservation Act. Mississippi's endangered species law, the Nongame and Endangered Species Conservation Act of 1974, declares, "Species or subspecies of wildlife indigenous to the state should be accorded protection in order to maintain and to the extent possible enhance their numbers." An endangered species, as defined by this law, is any species or subspecies of wildlife whose survival and continued welfare in the state is in jeopardy or is likely to become so in the near future. The law prohibits taking, possessing, transporting, exporting, processing, selling, offering to sell, or offering to ship endangered species. Plants receive no formal legal protection by state law in Mississippi other than that provided for in the trespass laws.

Mississippi's *Comprehensive Wildlife Conservation Strategy* (MDWFP 2005) was developed to address habitat needs of declining wildlife species. The Mississippi Natural Heritage Program, under the support of the MDWFP, maintains a database that ranks native animal species in Mississippi according to the number of occurrences, population trends, and threats. The Natural Heritage Program formally tracks populations of the rarer species. A list of species of greatest conservation need was developed for the purposes of Mississippi's *Comprehensive Wildlife Conservation Strategy.* This list includes the following:

- Those species federally or state-listed as threatened or endangered
- Species tracked by the Mississippi Natural Heritage Program, which includes species ranked as S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable)
- Those species with low population density, low reproductive potential, and narrow geographic distributions that might not be included in endangered, threatened, imperiled, or at-risk classifications (or are thought to be declining rapidly) (MDWFP 2005).

A four-tiered ranking system was developed for *Mississippi's Comprehensive Wildlife Conservation Strategy* in order to determine the species of greatest conservation need in Mississippi. Tier 1 species are defined as species that are in need of immediate conservation action or research because of extreme rarity, restricted distribution, unknown or decreasing population trends, specialized habitat needs, or habitat vulnerability. Some species might be considered critically imperiled and at risk of extinction/extirpation.

Species of greatest conservation need do not have legal protection unless they are protected under other Federal or state laws (e.g., ESA, MBTA, Mississippi Nongame and Endangered Species Conservation

Act of 1974). However, because Tier 1 species are in need of immediate conservation action in Mississippi, additional discussion is included in this EA.

Tier 2 species are defined as species that are in need of timely conservation action or research because of rarity, restricted distribution, unknown or decreasing population trend, specialized habitat needs, or habitat vulnerability or significant threats. Tier 3 species are defined as species that are of less immediate conservation concern, but are in need of planning and effective management due to unknown or decreasing population trends, specialized habitat needs, or habitat vulnerability. Tier 4 species are species that are listed as extirpated from Mississippi, are of historical occurrence only, or are accidental (i.e., infrequent and far outside usual range) (MDWFP 2005).

3.4.2 Description of the Affected Environment

The affected environment for the Proposed Action is described to encompass the ROI and its individual components.

Habitat. The ROI is within the Southern Mixed Forest Province, as defined by Robert Bailey of the USFS in the Ecoregions of the United States classification system (Bailey 1995). Climax vegetation within this province is characterized by medium-tall to tall forests of broadleaf deciduous and needleleaf evergreen trees. Most of the streams in the region are sluggish and marshes, lakes, and swamps are numerous (Bailey 1995). The Nature Conservancy modified the USFS ecoregions for both biological and administrative purposes in 2001 (TNC 2001). Mississippi adopted The Nature Conservancy's modified ecoregions for its *Comprehensive Wildlife Conservation Strategy* (MDWFP 2005). The ROI spans across two of these ecoregions, the East Gulf Coastal Plain (EGCP) and the Upper East Gulf Coastal Plain (UEGCP) ecoregions (MDWFP 2005).

The EGCP has a diversity of ecological systems, including sandhills, rolling pine-dominated uplands, pine flatwoods and savannas, seepage bogs, and bottomland hardwood forests. This ecoregion experiences high species richness; species endemism; and community diversity in terrestrial, freshwater, and aquatic systems. Woodlands dominated by southern pine species (e.g., loblolly pine [*Pinus taeda*], shortleaf pine [*P. echinata*], and longleaf pine [*P. palustris*]) are prevalent over most of the landscape on upland and wetland sites. These pinelands support a tremendous diversity of plant and animal species, most of which are unique to these systems. Specialized patch communities, such as seepage bogs, prairies, and seasonally flooded depression ponds, are situated within these pinelands, providing habitat for other plants, amphibians, and invertebrates. In addition, the EGCP ecoregion supports a range of freshwater aquatic systems including many lakes, natural ponds, streams, bottomland hardwood forests, and cypress-gum swamps.

The UEGCP ecoregion is dominated by southern mixed forests and oak-hickory-pine forests. These forests are characterized by the presence of longleaf pine and shortleaf pine. Although longleaf forests and woodlands were the dominant vegetation type of the southeastern United States coastal plain, they now occur in only limited areas of this region, extending landward into the UEGCP by only about 50 miles. Northward, longleaf pine is replaced naturally by shortleaf pine. Vast acreages of the region are being converted to pine plantations (e.g., loblolly pine), in many cases at the expense of either existing deciduous or mixed forests. The UEGCP region also includes a diverse assemblage of streams (MDWFP 2005). The following habitat types can be found within the area spanning these two ecoregions (MDWFP 2005):

- Dry-Mesic Upland Forests/Woodlands
- Agricultural Fields, Hay and Pasture Lands, Old Fields, Prairies, Cedar Glades, and Pine Plantations

- Mesic Upland Forests
- Bottomland Hardwood Forests
- Riverfront Forest/Herblands/Sandbars
- Spring Seeps
- Bogs
- Inland Freshwater Marshes
- Swamp Forests
- Lacustrine Communities
- Rivers and Streams
- Urban and Suburban Lands
- Rock Outcrops and Caves.

No known federally designated critical habitat occurs within the ROI (USFWS 2011).

Fish. The freshwater aquatic systems of the EGCP ecoregion are among the most significant and at-risk aquatic biodiversity resources in North America, particularly for fish and mussel species (MDWFP 2005). Each of these groups has unique biodiversity resources. Many aquatic animals are endemic to the ecoregion and many are restricted to a single river system and its tributaries. Thus, conservation of aquatic biodiversity in the EGCP region requires conservation of most of the river systems (MDWFP 2005). Rivers and streams in the UEGCP ecoregion provide habitat for more than 206 native fish species, making the majority of the region a high priority for freshwater species conservation (MDWFP 2005). The most popular freshwater game species include largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieui*), striped bass (*Morone saxatilis*), redear sunfish (*Lepomis microlophus*), bluegill (*Lepomis macrochirus*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*) and flathead catfish (*Pylodictis olivaris*) (MDA 2009).

Wildlife. Fauna in the region vary with the age and stocking of timber stands, percent cover of deciduous trees, proximity to openings, and presence of bottomland forest types. Common mammals in the Southern Mixed Forest Province and EGCP and UEGCP ecoregions that would be expected to occur in the ROI include the white-tailed deer (*Odocoileus virginianus*), eastern gray squirrel (*Sciurus carolinensis*), fox squirrel (*Sciurus niger*), southern flying squirrel (*Glaucomys volans*), eastern cottontail rabbit (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), and eastern red bat (*Lasiurus borealis*). The swamp rabbit (*Sylvilagus aquaticus*), North American river otter (*Lontra canadensis*), American mink (*Mustela vison*), and American beaver (*Castor canadensis*) are common in or near aquatic or moist habitats (Bailey 1995, MDWFP 2005).

Common game birds in the region include the northern bobwhite (*Colinus virginianus*), wild turkey (*Meleagris gallopavo*), mourning dove (*Zenaida macroura*), wood duck (*Aix sponsa*), and other migratory waterfowl. The most common nongame bird species in mature forests include the pine warbler (*Dendroica pinus*), northern cardinal (*Cardinalis cardinalis*), summer tanager (*Piranga rubra*), Carolina wren (*Thryothorus ludovicianus*), ruby-throated hummingbird (*Archilochus colubris*), blue jay (*Cyanocitta cristata*), hooded warbler (*Wilsonia citrine*), eastern towhee (*Pipilo erythrophthalmus*), tufted titmouse (*Baeolophus bicolor*), and several species of woodpeckers (Picidae family) (Bailey 1995, U.S. Navy 2007c).

Common forest snakes include the cottonmouth (*Agkistrodon piscivorus*), copperhead (*Agkistrodon contortrix*), rough green snake (*Opheodrys aestivus*), black rat snake (*Elaphe obsolete*), coachwhip (*Masticophis flagellum*), and speckled kingsnake (*Lampropeltis getulus*). The eastern fence lizard

(*Sceloporus undulates*), slender glass lizard (*Ophisaurus attenuates*), slimy salamander (*Plethodon glutinosus*), and several species of frogs (e.g., *Rana* spp. and *Hyla* spp.) are also common (Bailey 1995, U.S. Navy 2007c).

Despite high disturbance (the majority of rivers have been channelized), there are several species of crayfish and freshwater mussels located in the rivers and streams of the EGCP and UEGCP ecoregions (MDWFP 2005).

Plants. Vegetation within the ROI is typical of vegetation occurring within the EGCP and UEGCP ecoregions, as described previously. Forest cover is dominated by loblolly pine with interspersed hardwoods and shortleaf pines. Isolated longleaf pine stands are distributed on sandy ridges. Alluvial floodplains support diverse communities of deciduous hardwood and evergreen broadleaf trees and shrubs.

Protected and Sensitive Species. Four federally listed endangered species and five federally listed threatened species have potential to occur within the ROI. Thirteen state-listed endangered species could currently inhabit the ROI (see **Table 3-10**).

All Tier 1 species as identified in *Mississippi's Comprehensive Wildlife Conservation Strategy* potentially occurring within the ROI and their associated habitat types are shown in **Table 3-11**. The complete listing of species of greatest conservation need (Tiers 1-4) by habitat type is included in the *Mississippi Comprehensive Wildlife Conservation Strategy* (MDWFP 2005).

The bald eagle is state-listed as endangered and is also protected under the Bald and Golden Eagle Protection Act. According to the Mississippi Museum of Natural Sciences, at least 25 breeding pairs of bald eagles were monitored in Mississippi during the 1999 nesting season. Pairs nest along the Gulf Coast and near the Mississippi River in the west-central part of the state (MMNS 2001). Within the counties underlying the ROI, known bald eagle breeding occurs only in Lauderdale and Rankin counties (MMNS 2001). Therefore, it is unlikely that breeding eagles use habitats in the ROI.

3.4.2.1 NAS Meridian

Habitat. NAS Meridian is found entirely within the UEGCP, which is described in **Section 3.4.2**.

Fish. No rivers occur within NAS Meridian; however, smaller streams and lakes are present. Aquatic habitat types at NAS Meridian include swamps, streams, lakes, and ponds. Nine man-made impoundments are managed primarily for recreational fisheries on NAS Meridian. Game fish stocked and managed at NAS Meridian include largemouth bass and bluegill (NAS Meridian 2007c). Nongame fish occur in streams and wetlands within NAS Meridian. Habitats that support aquatic nongame species include recreational fishery lakes; Lake Sylvia; beaver ponds; and Wright's, Big Reed, Seger's, and Ponta creeks (NAS Meridian 2007c).

Wildlife. Eight bat species were documented to occur on the installation. Species recorded in mist net surveys were the eastern red bat (*Lasiurus borealis*), Seminole bat (*Lasiurus seminolis*), big brown bat (*Eptesicus fuscus)*, evening bat (*Nycticeius humeralis*), eastern pipistrelle (*Pipistrellus subflavus*), and southeastern myotis (*Myotis austroriparius*). Additionally, a dead hoary bat (*Lasiurus cinereus*) was found on the North Runway in 2007, and Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) were observed in North Runway culverts during a preliminary reconnaissance survey in 2000. The evening bat was the most common species netted, followed closely by the eastern red bat. Mist net results indicate that a fairly diverse bat fauna occurs on NAS Meridian, but 71 percent of the total capture was represented by only two species (i.e., evening and eastern red bats) (NAS Meridian 2007a). For information on bat species of concern, please see the ***Protected and Sensitive Species*** section.

Table 3-10. Federal- and State-Listed Threatened and Endangered Species with Potential to Occur Within the ROI

Common Name	Scientific Name	Federal Status	State Status *	NAS Meridian	Transit Region	Meridian 2 MOA
Plants						
Price's potato bean	*Apios priceana*	T	None	X		
American chaffseed	*Schwalbea americana*	E	None			X
Invertebrates						
Stirrupshell	*Quadrula stapes*	E	E	X	X	
Fish						
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T	E		X	X
Frecklebelly madtom	*Noturus munitus*	None	E			X
Pearl darter	*Percina aurora*	C	E	X	X	
Birds						
Bald eagle	*Haliaeetus leucocephalus*	None	E	X	X	X
Wood stork	*Mycteria americana*	E	E	X	X	X
Red-cockaded woodpecker	*Picoides borealis*	E	E			X
Bewick's wren	*Thryomanes bewickii*	None	E			X
Mammals						
Louisiana black bear	*Ursus americanus luteolus*	T	E	X	X	X
Reptiles and Amphibians						
Gopher tortoise	*Gopherus polyphemus*	T	E		X	X
Black-knobbed map turtle	*Graptemys nigrinoda*	None	E	X		
Yellow blotched map turtle (sawback)	*Graptemys flavimaculata*	T	E	X		X
Black pine snake	*Pituophis melanoleucus lodingi*	C	E	X		

Sources: MMNS 2001, USFWS 2010, USDA 2010, MDWFP 2005

Note: * Plants receive no formal legal protection by state law in Mississippi other than that provided for in the trespass laws.

Key:

E = Endangered T = Threatened C = Candidate

X = species found in counties surrounding or below components of the ROI

Table 3-11. Tier 1 Species Potentially Occurring in the ROI

Common Name	Scientific Name	Habitat Type
Invertebrates		
Alabama heelsplitter	*Lasmigona complanata alabamensis*	Streams
Alabama creekmussel	*Strophitus connasaugaensis*	Streams
Alabama hickorynut	*Obovaria unicolor*	Streams
Alabama moccasinshell	*Medionidus acutissimus*	Streams
Alabama spike	*Elliptio arca*	Streams
Black sandshell	*Ligumia recta*	Streams
Crested riverlet crayfish	*Hobbseus cristatus*	Streams
Delicate spike	*Elliptio arctata*	Streams
Lagniappe crayfish	*Procambarus lagniappe*	Streams
Mississippi crayfish	*Orconectes mississippiensis*	Streams
Oktibbeha rivulet crayfish	*Hobbseus orconectoides*	Streams
Orange-nacre mucket	*Lamsillis perovalis*	Streams
Ovate clubshell	*Pleuribema perovatum*	Streams
Southern clubshell	*Pleurobema decisum*	Streams
Southern combshell	*Epioblasma penita*	Streams
Southern hickorynut	*Obovaria jacksoniana*	Streams
Tombigbee riverlet crayfish	*Hobbseus petiuls*	Streams
Fish		
Alabama shad	*Alosa alabamae*	Streams
Alabama sturgeon	*Scaphirhynchus suttkusi*	Streams
Backwater darter	*Etheostoma zonifer*	Various stream habitats
Blackmouth shiner	*Notropis melanostomus*	Small stream swamp forest
Crystal darter	*Crystallaria asprella*	Streams
Frecklebelly madtom	*Noturus munitus*	Streams
Freckled darter	*Percina lenticula*	Streams
Ironcolor shiner	*Notropis chalvbaeus*	Lacustrine communities
Birds		
Bewick's wren	*Thryomanes bewickii*	Hardwood forests
Black rail	*Laterallus jamaicensis*	Lacustrine communities
Migrant songbirds	N/A	Bottomland hardwood forests
Mississippi sandhill crane	*Grus Canadensis pulla*	Lacustrine communities
Southeastern American kestrel	*Falco sparverius paulus*	Various pine forest habitat
Yellow rail	*Coturnicops noveboracensis*	Lacustrine communities
Mammals		
Louisiana black bear	*Ursus americanus luteolus*	Various
Southeastern myotis	*Myotis austroriparius*	Various

Common Name	Scientific Name	Habitat Type
Reptiles and Amphibians		
Black pine snake	*Pituophis melanoleucus lodingi*	Various forest habitat
Mimic glass lizard	*Ophisaurus attenuates*	Various pine forest habitat
Mississippi gopher frog	*Rana sevosa*	Various
River frog	*Rana heckscheri*	Small stream swamp forest

Source: NAS Meridian 2007c
Key: N/A = Not available.

A bird/wildlife aircraft strike hazard (BASH) exists at NAS Meridian and within the immediate vicinity due to resident and migratory bird species and other wildlife (NAS Meridian 2007a). A bird/wildlife aircraft strike occurs when an aircraft hits, or is hit by, an animal whether or not there is damage to the aircraft. There is always a possibility of bird/wildlife strike whenever aircraft operate, especially when operating in close proximity to the ground. Vultures, herons, egrets, turkeys, and deer pose the greatest threats at NAS Meridian and management of BASH initiatives focuses on these animals. The Safety and Air Operations Office at NAS Meridian maintains a BASH Plan to mitigate hazards associated with collisions between wildlife and aircraft per Navy guidance (NAS Meridian 2007c). The plan focuses on reducing BASH incidents at NAS Meridian and the surrounding area by the following methods (NAS Meridian 2007a):

1. Minimizing the potential for loss of life and equipment through management and control of wildlife hazards.
2. Increasing awareness among military and civilian personnel of the issues central to the success of the NAS Meridian BASH program.
3. The establishment of Bird/Animal Hazard Working Group.
4. Deterring and managing wildlife hazards based on scientific research, improved wildlife/aircraft strike reporting, and information gathered through communication of wildlife hazards and activity.
5. Using passive techniques to decrease airfield attractiveness to all wildlife
6. Using active/static techniques to disperse/remove birds/animals from the airfield.
7. Creating and implementing procedures to aid supervisors and aircrew in identification and mitigation of high hazard situations.
8. Creating and implementing local procedures for reporting all bird/animal strikes, both damaging and nondamaging.
9. Creating and implementing procedures for collecting bird/animal strike remains.

The NAS Meridian Bird Hazard Working Group meets on a quarterly basis and is responsible for BASH planning, aviation coordination, monitoring, and control. The group consists of the following personnel (NAS Meridian 2007c):

- Wing Safety Officer
- Squadron Safety Officers
- Air Operations Officer
- Airfield Manager
- Environmental Department Supervisor/Installation Natural Resources Manager

- ATC Officer
- Public Works Officer
- Installation Natural Resources Manager/Wildlife Biologist
- U.S. Department of Agriculture Biologist
- Chief of Naval Air Training detachment representative.

This section of the EA discusses how BASH affects wildlife; **Section 3.5** discusses the human health and safety aspect of BASH. A damaging strike event is any damage to an aircraft caused by impact with any species of wildlife. A nondamaging strike event is one where a bird or animal is hit by an aircraft but results in no damage to the aircraft. NAS Meridian records both damaging and nondamaging bird strikes to help identify areas that might have high BASH potential. From 2000 to 2010, NAS Meridian recorded damaging bird/wildlife strikes with the following avian and wildlife species (NAS Meridian 2011):

- Turkey vulture (*Cathartes aura*)
- Barn swallow (*Hirundo rustica*)
- Common nighthawk (*Chordeiles minor*)
- Great blue heron (*Ardea herodias*)
- Wild turkey (*Meleagris gallopavo*)
- Cooper's hawk (*Accipiter cooperii*)
- Red-tailed hawk (*Buteo jamaicensis*)
- White-tailed deer (*Odocoileus virginianus*)
- Coyote (*Canis latrans*)
- Unknown small bird species.

Plants. As stated in the NAS Meridian 2007 INRMP, forested acreage on NAS Meridian totals approximately 5,535 acres (NAS Meridian 2007c). Loblolly pine and mixed loblolly pine-hardwoods dominate nearly 80 percent of this acreage. Deciduous hardwoods occur primarily in riparian slopes, alluvial floodplains, and forested wetlands. Hardwoods also occur intermixed with pine on upland sites. According to the last full forest inventory of NAS Meridian, conducted in 1988, about 64 percent of the 1988 timber volumes were in pines and 36 percent in hardwoods (NAS Meridian 2004b). Hardwood forests at NAS Meridian were devastated by the effects of Hurricane Katrina in August 2006. Large areas of pine forest were also severely damaged by Hurricane Katrina, and between 20 and 80 percent of the forest canopy was impacted based upon the particular forest type and stand (NAS Meridian 2007c).

Common nonnative plants were widely used historically in landscaping, erosion control, and food plot plantings. As stated in the 2007 NAS Meridian INRMP, nonnative plants that are invasive and cause problems occur in localized colonies on NAS Meridian and include Chinese privet (*Ligustrum sinense*), kudzu (*Pueraria lobata*), cogon grass (*Imperata cylindrica*), Chinese wisteria (*Wisteria sinensis*), Japanese climbing fern (*Ligodium japonicum*), Japanese honeysuckle (*Lonicera japonica*), mimosa (*Albizia julibrissin*), Chinese tallow-tree, (*Sapium sebiferum*), and English ivy (*Hedera helix*) (NAS Meridian 2007c).

Protected and Sensitive Species. None of the species listed in **Table 3-10** have been documented on NAS Meridian (NAS Meridian 2007c). However, two federally listed endangered species (the stirrupshell [*Quadrula stapes*], wood stork [*Mycteria americana*]) and three federally listed threatened species (Price's potato bean [*Apios priceana*], Louisiana black bear [*Ursus americanus luteolus*], yellow-blotched map turtle [*Graptemys flavimaculata*]) have potential to occur within NAS Meridian. Eight state-listed endangered species could currently inhabit NAS Meridian (see **Table 3-10**).

The southeastern myotis, listed as a Tier 1 species in Mississippi (MDWFP 2005), has been observed on NAS Meridian within the culvert underneath the south runway (NAS Meridian 2007a). In addition, the

Lagniappe crayfish (*Procambarus lagniappe*) has been recorded within the ROI in Big Reed Creek (NAS Meridian Community Planning 2010).

According to the NAS Meridian 2007 INRMP, there are not enough suitable aquatic habitats at NAS Meridian to support breeding or foraging bald eagles; and bald eagles have not been confirmed at NAS Meridian (NAS Meridian 2007c). However, bald eagles have been reported as transients in the vicinity of the installation. Several lakes occur within or in the vicinity of NAS Meridian, including Lake Martha (within the ROI), Dalewood Shore Lake (southeast of ROI), and Lake Okatibbee (west of ROI). Bald eagles were bred and raised at Lake Okatibbee, approximately 13 miles west of the runways at NAS Meridian, by a USFWS program in the 1990s, and are currently known to nest at the lake (NAS Meridian Community Planning 2010). Bald eagles could use Lake Martha or Dalewood Shore Lake for foraging and could cross the ROI when traveling between foraging and nesting areas.

3.4.2.2 Transit Region

Habitat. The transit region is entirely within the UEGCP, which is discussed in **Section 3.4.2**.

Fish. Rivers in the UEGCP ecoregion provide habitat for more than 206 native fish species, which are discussed in **Section 3.4.2** (MDWFP 2005).

Wildlife. The airspace within the transit region would not be anticipated to contain many avian species. With very few exceptions, resident species would not likely occur at these altitudes (i.e., above 7,000 feet MSL). Some migrating birds could occur within the subject airspace, although occurrences would likely be rare. Most birds migrate within the following ranges of altitudes: songbirds between 500 and 6,000 feet MSL, shorebirds between 1,000 and 13,000 feet MSL, waterfowl between 200 and 4,000 feet MSL, and raptors between 700 and 4,000 feet MSL (Deinlein 2009). Although there is considerable variation, the favored altitude for most small birds appears to be between 500 and 1,000 feet MSL (see **Figure 3-7**). Nocturnal migrants fly slightly higher than diurnal migrants (USGS NPWRC 2006).

Plants. Since the transit region would not be subjected to any ground-disturbing activities under the Proposed Action, vegetation within this area would not be affected. As a result, plant communities, with the exception of the ecoregions discussed in the *Habitat* subsection, are not discussed in detail in this subsection of this EA.

Protected and Sensitive Species. Two federally listed endangered species (the stirrupshell, wood stork) and three federally listed threatened species (Gulf sturgeon [*Acipenser oxyrinchus desotoi*], gopher tortoise [*Gopherus polyphemus*], Louisiana black bear) have potential to occur within the transit region. Seven state-listed endangered species could currently inhabit the transit region see (see **Table 3-10**). Bald eagles could potentially be transients or nest in Lauderdale County within the transit region.

3.4.2.3 Meridian 2 MOA

Habitat. The Meridian 2 MOA is found within the EGCP and the UEGCP ecoregions, which are discussed in **Section 3.4.2**. A portion of the land in the Bienville National Forest is underneath the proposed Meridian 2 MOA. The Bienville National Forest is managed for the use and protection of its natural resources and for a continuing supply of timber.

As discussed in **Section 3.3.2.3**, there are three designated WMAs within Bienville National Forest that are managed for hunting. The land underneath the eastern portion of the Meridian 2 MOA includes two of these WMAs: a portion of Caney Creek WMA and Tallahala WMA. Habitat types found in the management areas include open pine forests, bottomland hardwoods, riparian stream corridors, and a few

ponds or smaller lakes scattered throughout the national forest (National Audubon Society 2009). None of these habitat types are designated as critical or unique.

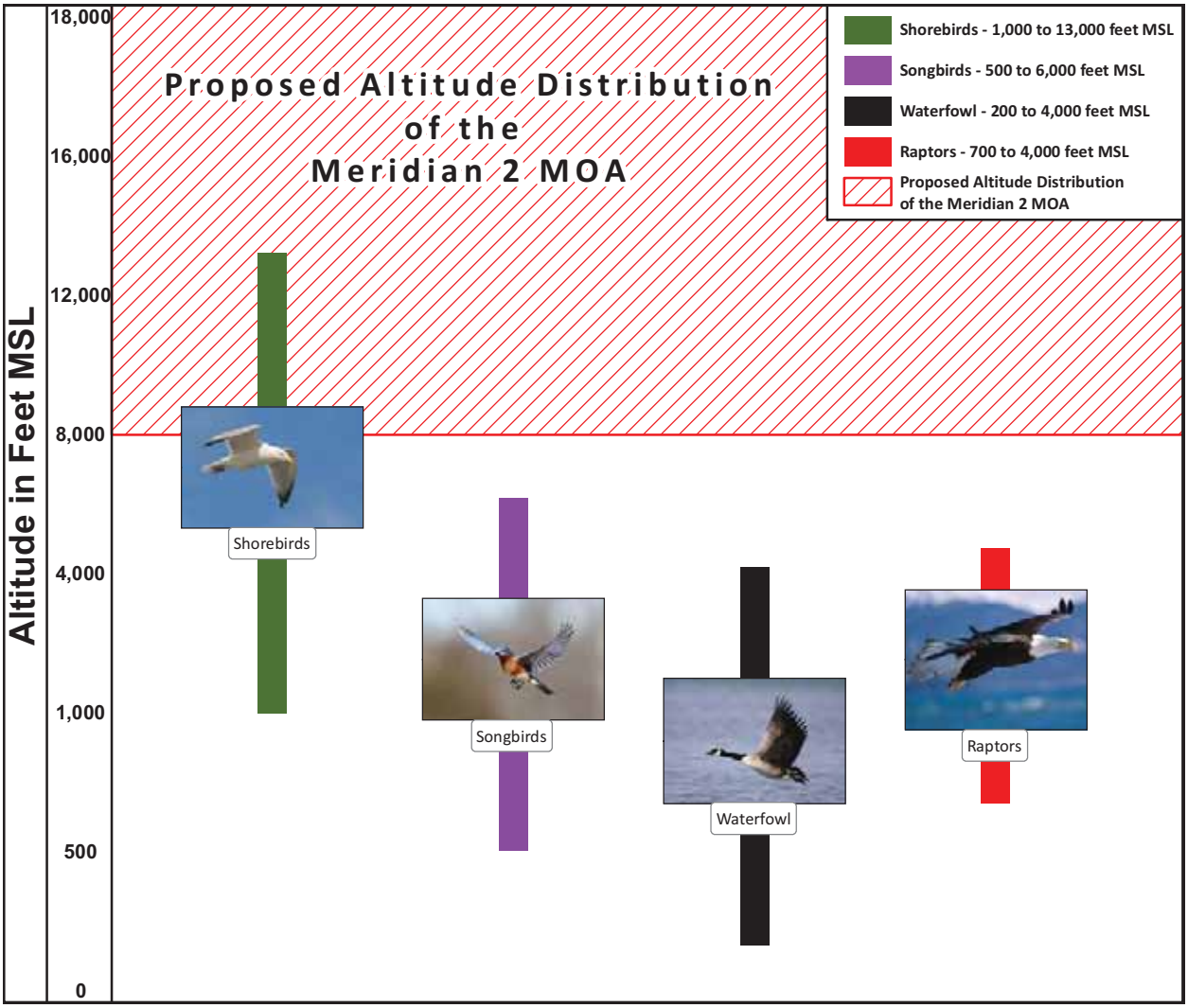


Figure 3-7. Typical Altitude Ranges for Migrating Birds Compared to Meridian 2 MOA

Fish. The freshwater aquatic systems in the EGCP ecoregion are among the most significant and at risk aquatic biodiversity resources in North America. Many aquatic animals are endemic to the ecoregion and many are restricted to a single river system and its tributaries. Thus, conservation of aquatic biodiversity in the EGCP region requires conservation of most of the river systems. Rivers in the UEGCP ecoregion provide habitat for more than 206 native fish species (MDWFP 2005).

Wildlife. The airspace within the Meridian 2 MOA would not be anticipated to contain many avian species. With very few exceptions, resident species likely would not occur at altitudes that the aircraft would maintain. Species that could potentially be found at this altitude are detailed in **Section 3.4.2.2**.

Plants. Since the proposed Meridian 2 MOA would not be subjected to any ground-disturbing activities, vegetation within the Meridian 2 MOA would not be affected. As a result, plant communities, with the exception of the ecoregions discussed in the previous *Habitat* section, are not discussed in detail in this section of this EA.

Protected and Sensitive Species. As shown in **Table 3-10**, three federally endangered species, four federally threatened species, and nine state endangered species could currently inhabit the land under the Meridian 2 MOA.

There are extensive acreages of 70-year-old and older loblolly pine and dense hardwood mid-story in the Bienville National Forest, which is home to the largest red-cockaded woodpecker population in Mississippi (USDA 2005). The Bienville National Forest provides habitat for approximately 94 active groups of the federally endangered red-cockaded woodpecker (National Audubon Society 2009). The majority of these groups are in the area of the Bienville National Forest north of the proposed MOA.

Within the counties underlying the proposed Meridian 2 MOA, known bald eagle breeding occurs only in Rankin County (MMNS 2001), most likely near the Ross R. Barnett Reservoir, an approximately 33-square-mile lake along the northwestern boundary of the county. The Ross R. Barnett Reservoir does not underlie the proposed Meridian 2 MOA. Therefore, it is unlikely that breeding eagles use habitats underlying the proposed Meridian 2 MOA.

3.5 Human Health and Safety

3.5.1 Definition of the Resource

Human health and safety includes consideration for activities that have the potential to affect the safety, well-being, or health of populations. This section of the EA addresses airspace management, aircraft safety, and APZs. These are interrelated topics since airspace management addresses how and in what airspace aircraft fly, and where they land and depart.

3.5.1.1 Airspace Management

Airspace is defined as the space that lies above the land and waters of a nation and comes under its jurisdiction. Although it is generally viewed as being unlimited, airspace is a finite resource that can be defined vertically and horizontally when describing its use for aviation purposes. The scheduling, or time dimension, is a very important factor in airspace management and ATC.

There are two categories of airspace: regulatory and nonregulatory. Within these two categories, there are four airspace types: controlled, uncontrolled, SUA, and Airspace for Special Use (FAA 2008b, FAA 2008a, U.S. Navy 2007b). The ROI includes controlled airspace and the Proposed Action includes the creation of new SUA; therefore, only these categories of airspace are discussed in detail in this EA.

The management of airspace is governed by Federal legislation and by military regulations and procedures. The ultimate authority in assigning and managing airspace is the FAA, which has acknowledged the need for military aircraft to conduct certain training operations within airspace that is separated from civilian aircraft and sets aside such airspace for military use. Training requirements for active-duty and reserve components of the military that involve the use of military airspace are specified in regulations written by their host commands. These regulations specify the type, frequency, and specific components of training that aircrews are required to complete. Specifically, the Navy guidance provides general flight and operating instructions and procedures applicable to the operation of all naval aircraft and related activities (U.S. Navy 2009b).

Since airspace is a finite resource, it must be managed and used equitably to serve civilian and military aviation needs. The FAA has established rules of flight and ATC procedures which correspond to the four airspace types. These procedures are designed to protect aircraft operating near airports or within airspace identified for military training. Military operations are generally conducted within designated

airspace and follow specific procedures to maximize flight safety for nonparticipating civilian or military aircraft. The FAA regulates military operations in the National Airspace System through the implementation of FAA Order 7400.2H, *Procedures for Handling Airspace Matters* (FAA 2011b) and FAA Handbook 7610.4J, *Special Military Operations*. The latter was jointly developed by the DOD and FAA to establish policy, criteria, and specific procedures for ATC planning, coordination, and services during defense activities and special military operations. The FAA *Aeronautical Information Manual* defines and provides the operational requirements for each of the various types or classes of airspace (FAA 2008b).

Controlled Airspace

Controlled airspace is a generic term that encompasses the different airspace classes (Class A, B, C, D, and E). It defines dimensions within which ATC service is provided to flights under instrument meteorological conditions and to flights under visual meteorological conditions as shown on **Figure 3-8**. For the purpose of this generic figure, 0 feet AGL and 0 feet MSL were assumed to be the same.

Class A. Class A airspace includes all operating altitudes of 18,000 feet MSL up to 60,000 feet MSL. Class A airspace is most frequently used by commercial aircraft on Jet Routes using altitudes between 18,000 and 45,000 feet MSL. Jet Routes frequently intersect approach and departure paths from both military and civilian airfields.

Class B. Class B airspace typically composes the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of instrument flights or passenger enplanements (FAA 2008b). The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspace areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace.

Class C. Class C airspace can generally be described as airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding airports that have an operational control tower, are serviced by a radar approach control, and have a certain number of instrument flights or passenger enplanements. Although the configuration of each Class C airspace area is individually tailored, the airspace usually consists of a 5-NM radius core surface area that extends from the surface up to 4,000 feet above the airport elevation, and a 10-NM radius shelf area that extends no lower than 1,200 feet up to 4,000 feet above the airport elevation (FAA 2008b). Class C airspace is designed and implemented to provide additional ATC into and out of primary airports where aircraft operations are periodically at high-density levels, such as Jackson-Evers IAP, Mississippi (approximately 20 miles northwest of the proposed Meridian 2 MOA). All aircraft operating within Class C airspace are required to maintain two-way radio communication with local ATC facilities.

An aeronautical chart is a map designed to assist in navigation of aircraft. Using these charts and other tools, pilots are able to determine their position, safe altitude, airspace boundaries, and other useful information.

Class D. Class D airspace usually encompasses a 5-NM radius of an operating ATC-controlled airport; however, the radius can vary based on several factors, such as runway length. It extends from the ground to 2,500 feet above the airport elevation (charted in MSL) or higher. All aircraft operating within Class D airspace must be in two-way communication with the ATC facility. For example, Tuscaloosa Regional Airport, approximately 11 miles east of the existing Meridian 1 MOA, is encompassed by Class D airspace that has a ceiling of 2,700 feet MSL.

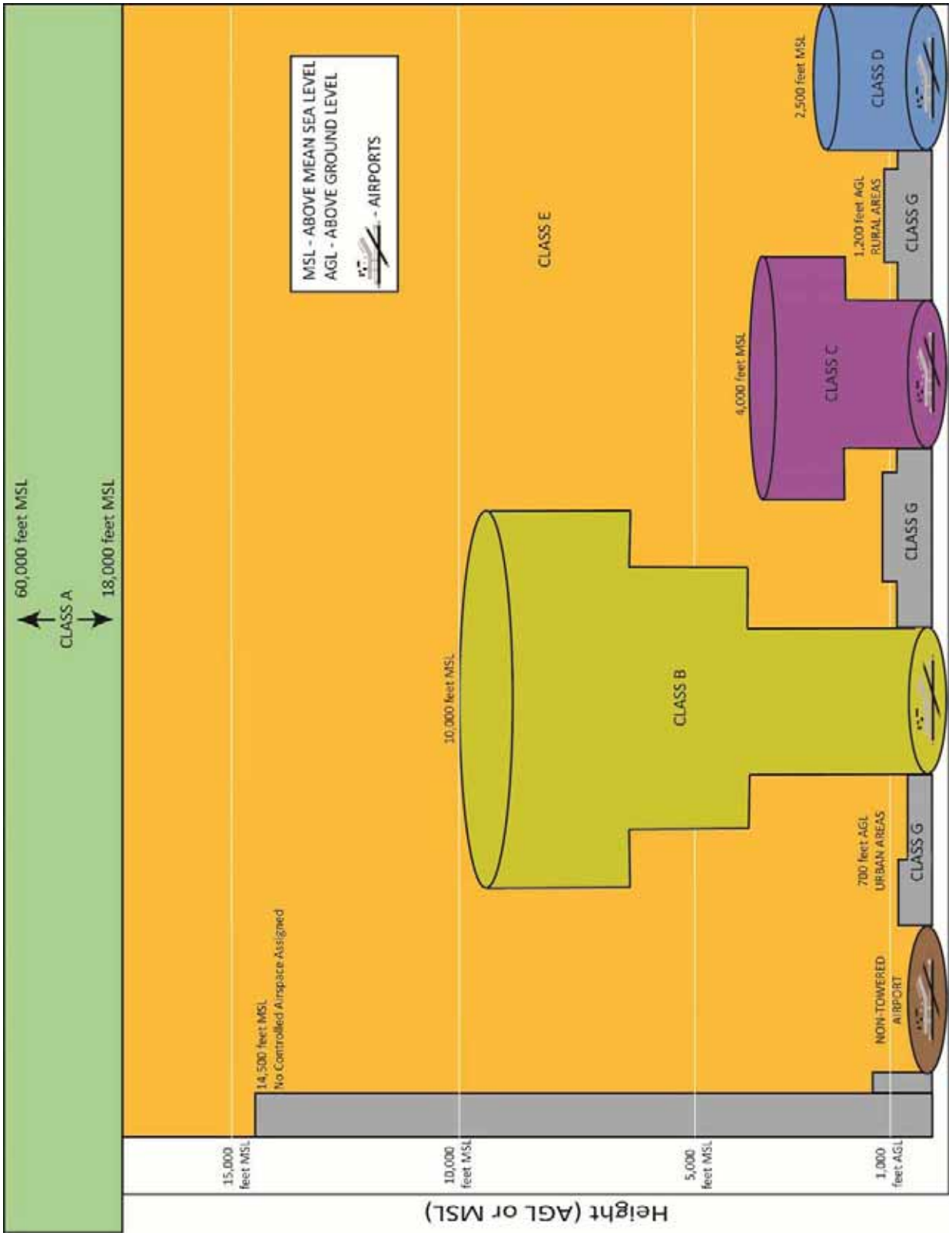


Figure 3-8. FAA Airspace Classifications

Source: FAA 2008b

Class E. Class E airspace can be described as general controlled airspace. The majority of Class E airspace is where more stringent airspace control has not been established. Class E airspace can range from ground level at nontowered airfields up to 18,000 feet MSL. For example, Hesler-Noble Field Airport, approximately 5 miles east of the ROI, and Hattiesburg-Laurel Regional Airport, approximately 15 miles south of the ROI, share Class E airspace that has a floor of 700 feet AGL.

Class E airspace includes low-altitude Victor Routes, as described in **Section 2.1**. Victor Routes frequently intersect approach and departure paths from both military and civilian airfields.

Military Operations Area

A MOA is one type of SUA designated for military training activities. MOAs consist of airspace with defined vertical and lateral limits established for the purpose of separating nonparticipating IFR aircraft from certain military training activities, such as air combat tactics, air intercepts, aerobatics, formation training, and low-altitude tactics (FAA 2008b). These military activities can be dangerous for nonparticipating aircraft. Whenever a MOA is being used, nonparticipating IFR traffic can be cleared through a MOA if aircraft separation can be provided by ATC; otherwise, ATC reroutes or restricts them. The activity status of MOAs can change frequently; therefore, prior to entering an active MOA, pilots should contact the controlling agency for traffic advisories (FAA 2008a).

3.5.1.2 Aircraft Safety

Aircraft safety is based on the physical risks associated with aircraft flight. Military aircraft fly in accordance with Federal Aviation Regulation (FAR) Part 91, *General Operating and Flight Rules*, which governs such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. For example, an installation commander having Navy aircraft assigned to his or her command must prepare and publish local flying rules. These rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. In addition, naval aviators must also adhere to the flight rules, ATC, and safety procedures provided in Navy guidance (U.S. Navy 2004).

The two key aircraft safety concerns under the Proposed Action include mishaps and BASH, as defined in this subsection. A mishap could be the result of one or more hazards, such as obstructions or hazardous weather conditions. Obstructions to flights, which include towers and power transmission lines, represent safety concerns for aircrews, especially those engaged in low-altitude flight training. Obstructions within the NAS Meridian airfield environment are documented in airfield safety waivers granted by Naval Air Systems Command (NAS Meridian 2004a) and would be included in NAS Meridian pre-flight briefings if necessary. Flights within the transit region and proposed Meridian 2 MOA would be above 8,000 feet MSL, well above any obstructions. Therefore, aircraft safety hazards from obstructions to flights are not discussed in this EA. Hazardous weather conditions can pose safety hazards and influence a pilot to alter flight. Adverse weather conditions of concern include tornadoes, thunderstorms, hail, severe turbulence, dust storms, and wind shear. The aviator evaluates weather hazards at his discretion based on knowledge of available information, experience, and the operational limits of the aircraft. Therefore, weather-related safety issues are not discussed in this EA.

The most readily identifiable safety concern for flights under the Proposed Action is BASH, as pilots would spend more time in the airspace around the installation, within the transit area, and within the proposed Meridian 2 MOA. Therefore, BASH is discussed in detail in this EA. This section of the EA discusses where and at what altitudes BASH occurs, and when bird/wildlife strikes result in a mishap. Information about the NAS Meridian BASH Plan and specifics regarding the types of birds and wildlife involved in BASH incidents are discussed in **Section 3.4**.

Aircraft Mishaps. Mishaps are classified according to the severity of resulting injury, occupational illness, or property damage. Safe flying procedures, adherence to flight rules, and knowledge of emergency procedures form consistent and repeated aspects of training for all aircrews. The Navy has defined the following three classifications of aircraft mishaps (U.S. Navy 2009a, U.S. Naval Safety Center 2010b):

- *Class A:* More than $2 million in property damage, DOD aircraft is destroyed, fatality or permanent total disability
- *Class B:* Property damage of $0.5 to $2 million, permanent partial disability, three or more personnel are hospitalized
- *Class C:* Property damage of $50,000 to $0.5 million, or a nonfatal injury resulting in a loss of more than one day's work.

Bird/Wildlife Aircraft Strike Hazards. The goal of the Naval Aviation Safety Program is to identify and eliminate hazards. The safety and mishap program requirements provided in OPNAVINST 3750.6R, *Naval Safety Aviation Program* include the following (U.S. Navy 2009a):

- Mishap and injury classification criteria
- Hazard reporting guidelines including BASH
- Near-midair collision, landing hazards, and ATC hazards
- Risk assessment procedures
- Mishap reporting guidelines
- Mishap investigation types and responsibilities
- Safety investigation reporting procedures
- The mishap and hazard recommendation tracking program.

The Navy devotes considerable attention to detecting and reporting hazards to prevent mishaps from occurring, including BASH. Bird and wildlife strikes are an aircraft safety concern due to the potential damage that a strike might have on the aircraft, injury to aircrews, or injury to persons on the ground from debris. (U.S. Naval Safety Center 2005).

The U.S. Naval Safety Center has recorded information regarding wildlife-strike events with naval aircraft since 1979. According to Naval Safety Center reporting guidelines, all BASH incidents, whether damaging or nondamaging, are recorded even if the BASH strike is below the Class C mishap level (property damage of $50,000 or more) (U.S. Navy 2009a). Strike events exceeding the thresholds for a Class C mishap are reported via a Safety Investigation Report in accordance with the Naval Aviation Safety Program. The Naval Safety Center estimates from its data that 60 percent of all bird/animal strikes occur within the airfield environment (CNIC 2010), but that only 25 percent of bird/animal strikes are reported (U.S. Naval Safety Center 2005).

Birds can be encountered at altitudes of 30,000 feet and higher. However, strike rates rise substantially as altitude decreases. During takeoff and landing, aircraft also face collision dangers from other types of wildlife, such as deer that may wander onto the runways. These BASH data have helped the Navy to develop bird detection and deterrent strategies, harassment techniques, and habitat modification to reduce the incidence of wildlife strikes at Navy airfields around the world.

3.5.1.3 Accident Potential Zones

APZs are areas around an airfield where an aircraft mishap is most likely to happen. APZs are not predictors of accidents nor do they reflect accident probability. The DOD defines an APZ as a planning

tool for local planning agencies. The APZs follow departure, arrival, and flight pattern tracks from an airfield and are based upon historical accident data. These data are used to determine the size of the APZs and suggested land use guidelines for each zone. Land use development should be compatible with APZs around a military airfield. Although the likelihood of an accident is remote, the Navy recommends that certain land uses (i.e., stadiums and schools) that concentrate large numbers of people be avoided in the APZs (NAS Meridian 2004a).

3.5.2 Description of the Affected Environment

3.5.2.1 NAS Meridian

Airspace Management

NAS Meridian has been in operation since 1957; the flying squadrons assumed the Navy's advanced training mission using the T-45C aircraft in 1998. NAS Meridian is currently assigned 84 T-45C aircraft, which typically depart to the north, northwest, south, and west; and arrive from the north, northwest, south, and east.

NAS Meridian is surrounded by Class D airspace that extends from the surface to 2,800 feet MSL with a radius of 5 NM. The NAS Meridian Radar ATC Facility is jointly operated by the FAA and Navy. The facility provides flight planning services and issues clearances and instructions to pilots for all phases of military flight operations within the vicinity of the airfield (NAS Meridian 2004a).

Aircraft Safety

Mishaps. Five Class A mishaps with the T-45C aircraft took place in the vicinity of NAS Meridian from 2000–2010, including two in 2004, one in 2005, and two in 2008 (U.S. Naval Safety Center 2010a). Each of these mishaps occurred adjacent or within the installation boundary. None of these mishaps were the result of bird/wildlife strikes. From 2000 to 2010, there were 11 Class B mishaps and 7 Class C mishaps that took place at or in the vicinity of NAS Meridian. These mishaps included foreign object damage, damage from a bird/wildlife aircraft strike, or damage due to adverse weather (e.g., hail damage) (U.S. Naval Safety Center 2010a).

Bird/Wildlife Aircraft Strike Hazards. Historically, NAS Meridian has had one of the lowest bird/wildlife strike rates in the country. Prior to 2000, the only BASH incidents that were reported were those that met Class C or greater mishap reporting criteria. Since 2000, detailed records have been kept of each BASH incident, whether damage occurred to the aircraft or not. As a result, the number of reported BASH incidents has increased as a result of more thorough record keeping and better cooperation between the departments at NAS Meridian (NAS Meridian 2007c).

Table 3-12 summarizes the 18 recorded damaging BASH incidents that took place in the vicinity of the airfield environment at NAS Meridian from 1998 to 2010. The Naval Safety Center states that approximately 90 percent of reported strike events are nondamaging (CNIC 2010). As shown, the altitude of the recorded strikes ranges from ground level to 2,000 feet. Of the 18 total strikes, 9 occurred on or near the ground, 3 occurred between 100 and 900 feet, and 4 occurred between 1,000 and 2,000 feet (data was not available for 2 of the strikes).

In 2010, there were no BASH incidents at NAS Meridian that caused damage to aircraft. However, there were "near misses" (i.e., the animal came close to striking an aircraft) and dead animals were found in the airfield vicinity (NAS Meridian 2011), which could be the result of strikes that were not noticed by the flight crew. Even though they are not BASH incidents, these events are recorded in the NAS Meridian BASH log to help identify areas that might have high BASH potential.

Table 3-12. Damaging BASH Incidents at NAS Meridian (1998–2010)

Date	Wildlife Type	Aircraft Type	Time of Day	Altitude	Airspace Location and Available Details
Greater Than $25,000 in Damage					
10/02/98	Vulture	TA-4J	Day	N/A	Approach to South Runway, damage to nose cone.
06/11/99	Barn Swallow	TA-4J	10:30 a.m.	N/A	South Runway; damage to rotor.
10/26/01	Eastern Wild Turkey	T-45	10:18 a.m.	Near ground	South Runway, damage to starboard flap.
03/12/03	Eastern Wild Turkey	T-45	6:03 p.m.	4 feet	South Runway; damage to starboard main mount.
10/30/07	Turkey Vulture	T-45	9:00 a.m.	1,400 feet	1.5 miles from NAS Meridian; damage to engine.
$10,000–$25,000 Damage					
07/31/00	Common Night Hawk	T-2	9:30 p.m.	900 feet	Flight pattern of South Runway; damage to port engine.
11/09/00	Great Blue Heron	T-2	1:30 p.m.	2,000 feet	4 miles east of East Runway; damage to port engine.
03/13/02	Cooper's Hawk	T-2	12:15 p.m.	700 feet	Pattern of South Runway; damage to port intake and engine.
10/17/02	White-tailed Deer	T-2	9:15 a.m.	On ground	North Runway; damage to starboard main landing gear.
12/30/08	Deer	N/A	5:00 p.m.	On ground	East Runway.
10/14/09	Red-tailed Hawk	T-45	2:00 p.m.	1,000 feet	Damage to nose.
Less Than $10,000 Damage					
06/27/00	Unknown Small Bird	T-45	2:00 p.m.	2,000 feet	4.5 miles north of NAS Meridian; damage to nose cone.
09/06/00	Turkey Vulture	T-45	3:00 p.m.	On ground	North Runway; damage to starboard intake and fuselage.
08/14/01	Eastern Wild Turkey Hen	T-2	5:35 p.m.	On ground	South Runway; damage to starboard heat exchanger duct.
03/12/03	Eastern Wild Turkey	T-45	6:05 p.m.	5 feet	South Runway; damage to starboard main mount.
09/13/06	Hen Turkey	T-45	5:50 p.m.	100 feet	North Runway; damage to left flap.
09/17/07	Deer	T-45	11:40 a.m.	On ground	South Runway; damage to port pylon, wing, and landing gear.
10/07/09	Coyote	T-45	N/A	On ground	North Runway; damage to wheelbrake assembly.

Source: NAS Meridian 2011
Key: N/A = Not Available.

Accident Potential Zones

APZs are discussed in detail in the *AICUZ Study Update for Naval Air Station Meridian and Outlying Landing Field Joe Williams, Mississippi* (NAS Meridian 2004a). The APZs at NAS Meridian include the following, as shown on **Figure 3-9** (NAS Meridian 2004a):

- *Clear Zone.* The CZ is the trapezoidal area lying immediately beyond the end of the runway and outward along the extended runway centerline for a distance of 3,000 feet. The CZ has the highest potential for accidents. The dimensions of the CZ are 1,500 feet in width at the runway threshold and 2,284 feet in width at the outer edge. The CZ is required for all active runway ends.
- *APZ I.* APZ I is the 3,000-foot-wide, 5,000-foot-long, rectangular area that generally extends 5,000 feet beyond the CZ. APZ I could be curved to conform to the shape of the predominant flight track. APZ I has measurable potential for aircraft accidents, relative to the CZ.
- *APZ II.* APZ II is the 3,000-foot-wide, 7,000-foot-long, rectangular area that extends 7,000 feet beyond APZ I. APZ II could be curved to correspond with the predominant flight track. APZ II has measurable potential for aircraft accidents relative to APZ I or the CZ.

Runways with flight tracks that have fewer than 5,000 annual operations do not have APZs (U.S. Navy 2008). Therefore, as shown on **Figure 3-9**, NAS Meridian's horizontal runway (Runway 10/28) does not have an APZ I or APZ II, only CZs.

The APZs and noise contours form the AICUZ footprint for an air installation. The AICUZ footprint is the area where land use controls are recommended to protect the health, safety, and welfare of those living near a military airfield.

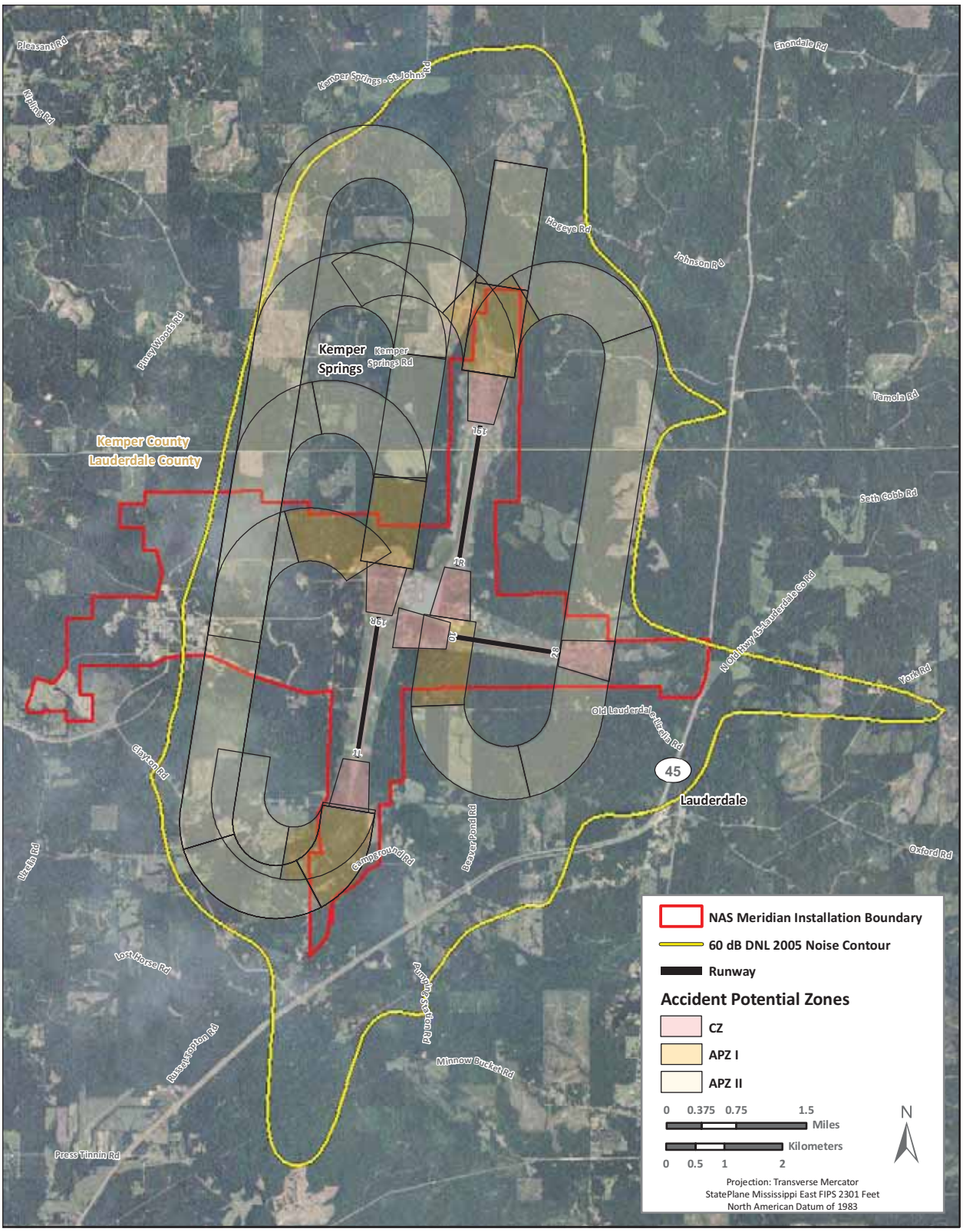
3.5.2.2 Transit Region

Airspace Management

The ROI for the transit region includes a small portion of Federal Airways V-194 and V-543 (see **Figure 3-10**). The Class E airspace within the ROI is controlled by the Memphis ARTCC, as is the airspace within the ROI for the Meridian 2 MOA.

As shown on **Figure 3-11,** Topton Air Estates Airport and Key Field Airport are within the ROI. Topton Air Estates Airport is a private-use airport within the ROI, directly southwest of NAS Meridian. The majority of the flights into Topton Air Estates Airport are completed by single-engine general aviation aircraft (AirNav 2011).

As shown on **Figure 3-11**, Key Field Airport is within the central portion of the transit region. It is encompassed by Class D airspace that has a ceiling of 2,800 feet MSL. Key Field Airport is a public-use airport; flights are conducted primarily by military aircraft, followed by transient general aviation, local general aviation, and commercial aircraft (AirNav 2009b). In FY 2010, a total of 89,057 operations were conducted at Key Field Airport (FAA 2011a), which consisted of based ANG, civilian, and transient (including TW-1) operations. Of this total, approximately 12 percent (10,300 operations) were conducted by T-45C aircraft from NAS Meridian (NGB 2011). T-45C aircraft from NAS Meridian frequently refuel at Key Field Airport; therefore, the eastern portion of the ROI between NAS Meridian and Key Field Airport is already in use by TW-1. However, TW-1 pilots typically do not fly over urban areas, including the downtown area of the City of Meridian. When departing from NAS Meridian, a single T-45 aircraft would typically reach at an altitude of 2,000 feet MSL at a distance of 0.5 NMs from the airfield. When flying in formation (typically four aircraft), the aircraft would reach 2,000 feet MSL at a distance of 2 NMs from the airfield. The aircraft typically climb at a rate of 1,000 feet per NM (e.g., at 5 NMs from the airfield the aircraft would reach at an altitude of 5,000 feet MSL) and would typically be above 7,000 feet MSL by the time it passes to the north of Key Field Airport.



Source: Noise Contours: NAS Meridian 2005; APZs and Installation Boundary: NAS Meridian 2010; Aerial Photography: NAIP 2009

Figure 3-9. Accident Potential Zones at NAS Meridian

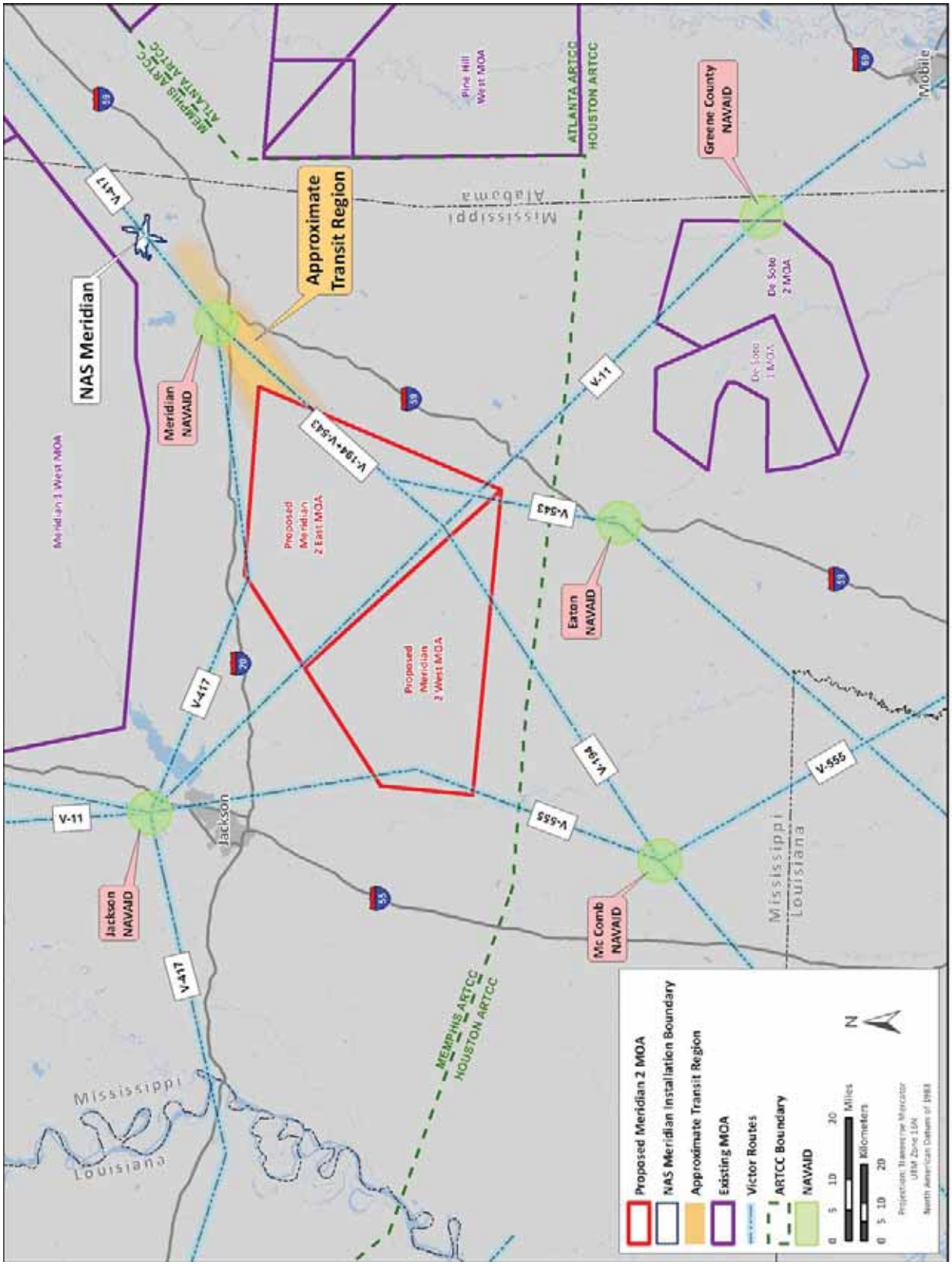


Figure 3-10. Federal Airways and Air Route Traffic Control Center Boundaries near the ROI

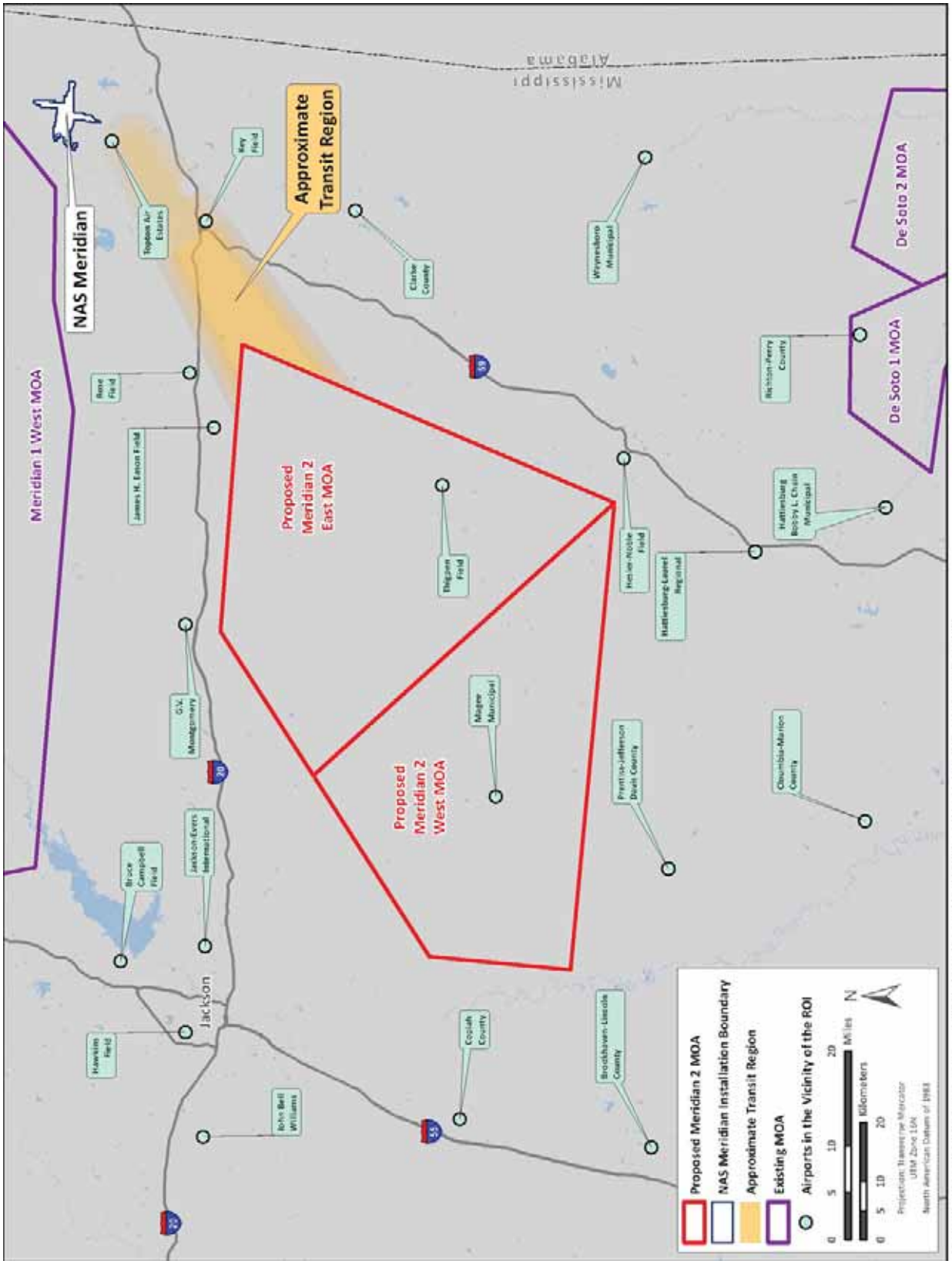


Figure 3-11. Airports in the Vicinity of the ROI

The transit region between Key Field Airport and the proposed Meridian 2 MOA is not currently being flown with the T-45C aircraft. However, the KC-135 military aircraft assigned to the ANG (which leases a portion of Key Field Airport) have previously flown in this region and it is likely that civilian aircraft flying to Key Field Airport have also flown through this area. All aircraft fly in accordance with FAR Part 91, *General Operating and Flight Rules*, which governs such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes.

Aircraft Safety

Aircraft safety associated with the ROI includes aircraft mishaps and hazards. The number of mishaps and the hazards associated with the ROI in the transit region would be expected to be similar to those for the ROI in the Meridian 2 MOA, which is discussed in the following section.

3.5.2.3 Meridian 2 MOA

Airspace Management

The proposed Meridian 2 MOA is an area of Class E airspace in east-central Mississippi, the vast majority of which is not associated with a particular airport. The southeastern corner of the proposed MOA intersects with a small portion of the Class E airspace that surrounds Hesler-Noble Field Airport, directly southwest of Laurel, Mississippi, as shown on **Figure 2-1**. The Class E airspace around Hesler-Noble Field Airport has a floor of 700 feet AGL.

The Class E airspace within the proposed MOA is controlled by the Memphis ARTCC. Memphis ARTCC controls the airspace for western Tennessee, the southeastern corner of Missouri, the southwestern corner of Kentucky, most of Arkansas, and northern and central Mississippi. The Memphis ARTCC provides ATC service to aircraft operating on instrument flight plans within controlled airspace, principally during the en route phase of flight. Memphis ARTCC also provides similar services, controller workload permitting, to aircraft operating under visual flight plans (FAA 2009). The Memphis ARTCC borders the Atlanta ARTCC to the east, Houston ARTCC to the south, and Fort Worth ARTCC to the west. As shown on **Figure 3-10**, the borders of these ARTCCs meet in close proximity to the proposed MOA. The Atlanta ARTCC boundary is approximately 36 miles east of the proposed MOA, and the Houston ARTCC is approximately 8 miles to the south.

The following Federal airways in Mississippi are within the proposed Meridian 2 MOA as shown on **Figure 3-10**. The majority of these airways (V-194, V-417, V-543, and V-555) traverse a small portion of the proposed MOA; V-11 would traverse the entire width.

- ***V-11***: Runs northwest-southeast from the Jackson to Greene County NAVAIDs at an altitude between 3,000 feet MSL to 18,000 feet MSL. The center boundary of the Meridian 2 MOA would be directly west of V-11.
- ***V-194***: Runs northeast-southwest from the Meridian to McComb NAVAIDs at an altitude between 3,000 feet MSL to 18,000 feet MSL. V-194 would traverse the southeastern portion of Meridian 2 East MOA and the southeastern corner of Meridian 2 West MOA.
- ***V-417***: Runs east-west from the Jackson to Meridian NAVAIDs at an altitude between 3,000 feet MSL to 18,000 feet MSL. V-417 would traverse the northern corner of Meridian 2 East MOA.
- ***V-543***: Shares its route with V-194 at an altitude between 3,000 feet MSL to 18,000 feet MSL until it passes over Thigpen Field Airport, where V-543 heads south to the Eaton NAVAID. V-543 would traverse southeastern portion of Meridian 2 East MOA.

- ***V-555***: Runs north-south from the Jackson to McComb NAVAIDs at an altitude between 2,100 feet MSL to 18,000 feet MSL. V-555 would traverse the western corner of the Meridian 2 West MOA.

The 2007 *Aeronautical Study of Meridian 2 MOA* conducted by the Memphis ARTCC estimates that 232 flights occur along V-11, V-194, V-455, V-543, and V-555 per month (Memphis ARTCC 2007). V-455, which runs northeast-southwest from the Meridian to the Eaton NAVAIDs, is east of the proposed MOA so it is not within the ROI; the remaining Victor Routes are within the proposed MOA. V-417, which runs east-west between the Jackson and the Meridian NAVAIDs, is within the proposed MOA; however, it was not included in the average traffic count compiled by the Memphis ARTCC.

Several local, municipal, and county airports are in the vicinity of the ROI (which includes the land underneath the proposed MOA), including Jackson-Evers IAP as shown in **Figure 3-11** and as listed in **Table 3-13**. One local airport, Thigpen Field Airport, is within the eastern portion of the ROI and Magee Municipal Airport is within the western portion of the ROI. Most of the flights into the airports shown are completed by transient general aviation aircraft, followed by local general aviation, military, and commercial aircraft.

Table 3-13. Airports in the Vicinity of the ROI of the Proposed Meridian 2 MOA

Airport Name	Direction from Proposed Meridian 2 MOA	Distance in Miles
Brookhaven-Lincoln County Airport	Southwest	21
Bruce Campbell Field Airport	Northwest	27
Clarke County Airport	East	18
Columbia-Marion County Airport	South	30
Copiah County Airport	West	17
G.V. Montgomery Airport	North	2
Hattiesburg Bobby L. Chain Municipal Airport	South	30
Hattiesburg-Laurel Regional Airport	South	16
Hawkins Field Airport	Northwest	26
Hesler-Noble Field Airport	Southeast	5
Jackson-Evers International Airport	Northwest	19
James H. Easom Field Airport	North	2
John Bell Williams Airport	Northwest	30
Key Field Airport	East	13
Magee Municipal Airport	Underlying Meridian 2 West MOA	--
Prentiss-Jefferson Davis County Airport	South	10
Richton-Perry County Airport	Southeast	32
Topton Air Estates Airport	Northeast	26
Thigpen Field Airport	Underlying Meridian 2 East MOA	--
Rose Field Airport	North	5
Waynesboro Municipal Airport	East	35

As discussed in **Section 2.1**, arrivals and departures from Jackson-Evers IAP, Key Field Airport, and Hesler-Noble Field Airport were identified during creation of the proposed MOA as being the most likely to be affected by the proposal; therefore, their existing flight operations are discussed in this section.

Jackson-Evers IAP. Jackson-Evers IAP is approximately 19 miles northwest of the closest portion of the ROI, and is east of Jackson, Mississippi. Jackson-Evers IAP is a public-use airport; flights are conducted primarily by commercial and military aircraft, followed by general aviation aircraft (AirNav 2009a).

Key Field Airport. Key Field Airport is approximately 13 miles east of the closest portion of the ROI, and is southwest of Meridian, Mississippi. Key Field Airport is a public-use airport; flights are conducted primarily by military aircraft, followed by general aviation, and commercial aircraft (AirNav 2009b).

Hesler-Noble Field Airport. Hesler-Noble Field Airport is approximately 5 miles southeast of the closest portion of the ROI, and is west of Laurel, Mississippi. Hesler-Noble Field Airport is a public-use airport; flights are conducted primarily by general aviation aircraft, followed by military aircraft (AirNav 2009c).

Aircraft Safety

Aircraft safety associated with the ROI includes aircraft mishaps and hazards. The environment for aircraft safety is based on the physical risks associated with aircraft flight and current military operational procedures concerning aircraft safety.

Mishaps. As discussed in **Section 3.5.2.1**, five Class A mishaps with the T-45C aircraft took place in the vicinity of NAS Meridian from 2000 to 2010 (U.S. Naval Safety Center 2010a). Each of these mishaps occurred adjacent or within the installation boundary. NAS Meridian did not record a bird/wildlife strike as the cause of any of these mishaps. No Class A mishaps have occurred within the NAS Meridian local flying area (i.e., Meridian 1, Pine Hill, Camden Ridge, and Birmingham MOAs) or while in transit to these MOAs in the past 10 years (U.S. Naval Safety Center 2010a).

From 2000 to 2010, there were 11 Class B mishaps and 7 Class C mishaps that took place at or in the vicinity of NAS Meridian. Of the 11 Class B mishaps, 2 occurred in the NAS Meridian local flying area. Both were the result of bird strikes. The remainder occurred within the installation boundary, or outside of Mississippi. Of the 7 Class C mishaps, one was recorded in the local flying area and was due to weather damage. However, several Class C mishaps were recorded in unspecified areas of Mississippi.

Bird/Wildlife Aircraft Strike Hazards. There is always a possibility of bird and wildlife strikes whenever aircraft operate, especially when operating in close proximity to the ground. The proposed Meridian 2 MOA is approximately 22 NMs southwest of NAS Meridian, well outside of the NAS Meridian airfield environment. For the purpose of this EA, the NAS Meridian airfield environment is defined (from FAA guidance) as the approach or departure airspace surrounding the airfield within 5 statute miles of an airfield (FAA 2007a). Therefore, only the BASH incidents more than 5 statute miles from the airfield are discussed in this section.

As shown in **Table 3-14**, 11 BASH incidents where the location was known were recorded outside of the airfield environment from 1998 to 2010. Five of the 11 recorded incidents resulted in damage to the aircraft, 2 of these had enough damage to qualify as a Class C mishap (greater than $50,000). No damaging BASH incidents were recorded outside of the airfield environment in 2001, 2003, 2004, 2005, 2008, or 2009 (NAS Meridian 2011). As shown, no BASH incidents outside of the airfield environment were recorded for the altitudes between 8,000 feet MSL to 17,999 feet MSL during this time period.

Information about the NAS Meridian BASH Plan and specifics regarding the types of birds and wildlife involved in BASH incidents are discussed in **Section 3.4**.

Table 3-14. BASH Incidents Recorded by NAS Meridian Outside of the Airfield Environment (1998–2010)

Date	Bird Type	Aircraft Type	Time of Day	Altitude	Airspace Location and Available Details
08/28/98	Vulture	T-4	12:00 p.m.	600 feet	50 miles from Tombigbee River, Alabama. No damage to aircraft.
09/29/00	Large Bird	T-45	1:00 p.m.	3,000 feet	10 miles northwest of NAS Meridian. No damage to aircraft.
12/18/00	Vulture	T-45	1:00 p.m.	500 feet	20 miles southeast of NAS Meridian. Class C mishap.
04/11/01	Vulture	T-45	12:00 p.m.	500 feet	42 miles northwest of Monroeville, Alabama. No damage to aircraft.
03/19/02	Duck	T-45	10:45 a.m.	2,000 feet	10 miles north-northwest of NAS Meridian. Class C mishap.
10/14/02	Warbler	T-2	6:45 p.m.	2,000 feet	8 miles south of NAS Meridian. No damage to aircraft.
05/04/04	Unknown	T-45	11:45 a.m.	1,000 feet	10 miles east of NAS Meridian. No damage to aircraft.
09/26/06	Unknown	T-45	4:00 p.m.	3,500 feet	R-4404 (15 miles north of NAS Meridian). No damage to aircraft.
03/30/10	Swallow	T-45	10:00 a.m.	500 feet	60 miles west of NAS Meridian. Minor (less than Class C) damage to aircraft.
06/10/10	Songbird	T-45	10:00 a.m.	Unknown	Southeast of Birmingham, Mississippi. Minor (less than Class C) damage to aircraft.
06/23/10	Vulture	T-45	12:00 p.m.	500 feet	60 miles northwest of NAS Meridian. Minor (less than Class C) damage to aircraft.

Source: NAS Meridian 2011

3.6 Light Emissions and Visual Impacts

3.6.1 Definition of the Resource

3.6.1.1 Light Emissions

Airport facilities and operations cause light emissions that could affect surrounding residents and other nearby light-sensitive areas such as homes, parks, or recreational areas. As light emissions are only perceivable at nighttime, they are not a daytime concern. The characteristics of many runway lighting systems create potential sources of nighttime annoyance in the airport vicinity if light is directed towards light-sensitive land uses. Intrusive light emissions could emanate from sources such as airfield and apron lighting, visual navigational aids, terminal lighting, employee/customer parking lighting, airborne and ground-based aircraft operations, and roadway lighting. The FAA considers the extent to which any lighting associated with a proposed action will create an annoyance among people in the vicinity or interfere with their normal activities (FAA 2007b).

3.6.1.2 Visual Impacts

The extent to which airport development contrasts with the existing natural, cultural, or architectural settings of an area (or the viewshed) is considered when determining visual impacts. A viewshed is an area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point. In urban planning, for example, viewsheds tend to be areas of particular scenic or historic value that are deemed worthy of preservation against development or other change. Viewsheds are often spaces that are readily visible from public areas such as from public roadways or public parks. Visual impacts on a viewshed could include the construction of a large building that blocks the view of a scenic river. However, visual impacts are inherently difficult to define due to the subjectivity involved, because the value that an observer places on a specific feature varies depending on his/her perspective (FAA 2007b).

3.6.2 Description of the Affected Environment

3.6.2.1 NAS Meridian

Light Emissions

General and specialized lighting systems are essential parts of airport and aircraft operations. Special aircraft and airfield lighting systems are required for safe, efficient aircraft navigation and operations (FAA 2007b).

Aircraft Lighting. T-45C aircraft are equipped with position lights, anti-collision lights, and landing/taxi lights (U.S. Navy 2004). T-45C aircrews at NAS Meridian operate their lighting systems in accordance with Navy guidance, which specifies the operating hours and situations for displaying each type of lighting. T-45C aircraft operate at low altitudes as they arrive and depart from the airfield; therefore, the aircraft lighting is visible to some populations depending on their location and the weather conditions.

Airfield Lighting. No changes to the existing airfield lighting at NAS Meridian would be required under the Proposed Action; therefore it is not discussed in this EA.

Visual Impacts

The local areas surrounding NAS Meridian consist primarily of forests, wetlands, agricultural lands, and low-density residential properties. Due to its rural location and expansive areas of open space on the installation, the surrounding properties are generally compatible (NAS Meridian 2010a). Special interest areas are natural areas that provide opportunities for outdoor recreation and interpretation. Several potential sites for special interest areas are on NAS Meridian, one is in the northwest and the others are in the hardwood forest, along three streams and in the installation's primitive areas (NAS Meridian 2004b). Lake Martha is the largest lake on the installation (96 acres) and is used for boating and fishing activities (NAS Meridian 2007c). The area from Lake Martha eastward to the airfield qualifies as a natural resources area popular for many outdoor recreation activities (e.g., birdwatching, camping, hiking, fishing, hunting, horseback riding, and picnicking) (NAS Meridian 2004b, NAS Meridian 2007c).

3.6.2.2 Transit Region

Light Emissions

As previously discussed military and civilian aircraft have regularly flown through the ROI. Aircraft must be equipped with position lights, anti-collision lights, and landing/taxi lights. However, as discussed in **Section 3.5.2.3**, commercial aircraft operate on these airways at altitudes of 3,000 feet MSL to 18,000 feet MSL. Aircraft lighting at these altitudes is seen from the ground as small twinkling lights

moving across the sky that are only visible on cloudless nights. General aviation aircraft lighting is also seen from the ground as small twinkling lights that become more visible at lower altitudes when arriving and departing from Topton Air Estates Airport or Key Field Airport.

Visual Impacts

The ROI in the transit region does not include any portion of the Bienville National Forest and there are no designated WMAs. Highland Park in the City of Meridian is the only designated park. The park is listed on the NRHP for the Highland Park Dentzel Carousel and Shelter Building built in the late 1800s (NRHP 2011) and is used for various recreational activities.

3.6.2.3 Meridian 2 MOA

Light Emissions

As previously discussed, military and civilian aircraft regularly fly through the ROI and five Federal airways are within this region (V-11, V-194, V-417, V-543, and V-555). Aircraft must be equipped with position lights, anti-collision lights, and landing/taxi lights. However, as discussed in **Section 3.5.2.3**, commercial aviation operates on these airways at altitudes of 3,000 feet MSL to 18,000 feet MSL. Aircraft lighting at these altitudes is seen from the ground as small twinkling lights moving across the sky that are visible on cloudless nights. Aircraft lighting becomes more visible at lower altitudes when aircraft are arriving and departing from an airfield.

Visual Impacts

The ROI consists mainly of rural development, including major portions of Bienville National Forest. It is characterized by low hills, low steep-sided ridges, and gently rolling lowlands (NAS Meridian 2007c). The majority of the ROI is above Jasper, Simpson, and Smith counties; therefore, only the scenic areas within these counties are discussed in further detail.

Bienville National Forest. The Bienville National Forest includes several scenic areas that would be deemed worthy of preservation against development or other change (i.e., viewsheds). As discussed in **Section 3.3.2.3**, several recreational areas of the Bienville National Forest are within the ROI, including Marathon Lake, Shongelo Lake, Beaver Lake, Greentree Reservoir, Tishkill Lake, and Harrell Prairie Botanical Area.

Smith County. Nearly all of Smith County (with the exception of the northwestern corner) is within the ROI (see **Figure 1-1**). Approximately 73,000 acres of Bienville National Forest are within the northern portion of Smith County. Almost all of the Bienville National Forest in Smith County is open to hunting, fishing, camping, hiking, and other outdoor recreation. There are two developed recreational areas in Smith County: Marathon Lake and Shongelo Lake as shown in **Figure 3-3**. The Marathon Recreation Area is a large area composed of 34 campsites and several picnic and hiking areas. The Shongelo Recreation area is a small area composed of 4 campsites and a few picnic and hiking areas (SCEDD 2009).

Jasper County. As shown in **Figure 1-1**, the western portion of Jasper County is within the ROI and includes 17,156 acres of Bienville National Forest. The Tallahala WMA, within both Bienville National Forest and Jasper County, (as shown in **Figure 3-3**) is approximately 28,120 acres in size. Jasper County has an abundance of lakes, creeks, and woodlands that provide a wide variety of recreational activities (e.g., hunting, fishing, and golfing) (JCEDD 2009).

Simpson County. The majority of Simpson County is within the ROI (see **Figure 1-1**). No portion of the Bienville National Forest is within Simpson County. There are five lakes in Simpson County: Martin Lake, Dickerson Lake, Simpson Legion State Fishing Lake, Phillips Lake, and Peacock Lake (City-Data 2008).

3.7 Historical, Architectural, Archaeological, and Cultural Resources

3.7.1 Definition of the Resource

"Cultural resources" include archaeological sites, buildings, structures, districts, objects or any other physical evidence of human activity. Cultural resources can be important to a culture, a subculture, or a community for scientific, traditional, or religious reasons. Such resources can often provide insight into past cultural practices and can retain cultural and religious significance to modern groups.

Cultural resources include prehistoric and historic archaeological sites, architectural resources represented by buildings and structures, and cultural landscapes. In addition, cultural resources can be represented by sites of religious or cultural importance, Traditional Cultural Properties, and sacred sites.

Several Federal laws and regulations govern the consideration of cultural resources, including the National Historic Preservation Act of 1966 (NHPA), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act of 1990.

From the standpoint of cultural resources management, Federal agencies must follow Sections 106 and 110 of the NHPA. Section 106 directs Federal agencies to take into account "historic properties," that include buildings, sites, structures, objects, and districts which have been formally listed in, or have been determined eligible for listing in, the NRHP and to afford the Advisory Council on Historic Preservation and the public a reasonable opportunity to comment. Generally, cultural resources must be more than 50 years old to be considered eligible for listing in the NRHP. In some cases, sites, buildings, and structures that are less than 50 years old, notably Cold War-era resources, might warrant a determination of NRHP eligibility if they exhibit exceptional significance. Under Section 110 of the NHPA, Federal agencies are required to establish programs to inventory cultural resources under their purview and, when feasible, to formally nominate historic properties to the NRHP.

3.7.2 Description of the Affected Environment

3.7.2.1 NAS Meridian

Construction began on the Naval Auxiliary Air Station near Meridian, Mississippi, in 1957. The facility was commissioned in 1961 and the majority of buildings were constructed in the 1960s and 1970s on what is now approximately 8,060 acres in Lauderdale and Kemper counties. Two historic resource surveys have been conducted at NAS Meridian. Because of their recent construction date, the Mississippi SHPO has stated that none of the buildings at NAS Meridian are eligible for listing in the NRHP. The SHPO has recommended, and the Navy has concurred, that the NRHP-eligibility status of the buildings will be reassessed after 2015, when the majority of buildings on the facility will have reached 50 years of age and sufficient time has transpired to assess their significance (NAS Meridian 2007b).

NAS Meridian has been comprehensively surveyed for archaeological resources. A number of sites are "potentially eligible" (these sites were recommended as being "potentially eligible" for the NRHP and the SHPO concurred with this finding, although the NRHP does not recognize the category) (NAS Meridian 2007b). The general locations of these properties are shown on **Figure 3-12.** The Navy, in consultation with the SHPO, has determined that the Wedgeworth Pottery site (22LD658) is eligible for listing in the NRHP. According to NAS Meridian, the Standing Chimney site (22LD670), an early 20th-century house site, might also be eligible for listing in the NRHP. In addition, the Navy has agreed to treat prehistoric archaeological sites 22LD693 and 22LD697 as "historic properties" pending further archaeological investigations designed to accurately evaluate these resources. Any action that threatens to affect these resources will warrant consultation with the SHPO and consulting parties.

3.7.2.2 Transit Region

The transit region to the proposed Meridian 2 MOA includes portions of southwestern Lauderdale, southeastern Newton, northwestern Clarke, and northeastern Jasper counties. According to the National Park Service's National Register Information System, there are 43 historic or archaeological properties within the transit region that have been listed in the NRHP (see **Table 3-15**). The general locations of these properties within the ROI are shown on **Figure 3-13**.

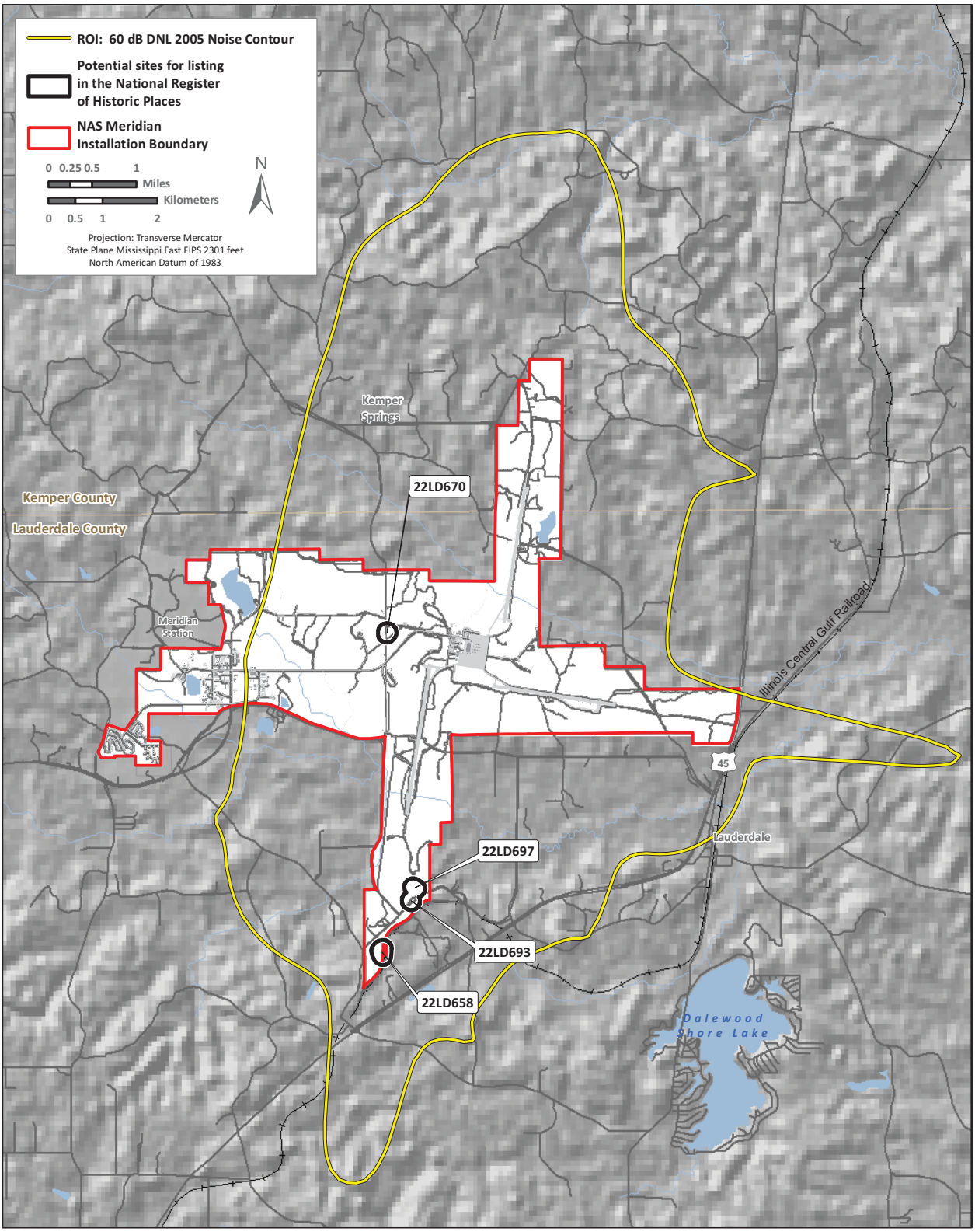
Table 3-15. Historic Properties within the Transit Region

Name	Location	Date Listed	County
Coosha (Frederickson) Site (A)	Lizelia Vicinity	21 Nov 1978	Lauderdale
Beth Israel Cemetery	Meridian	22 Mar 1989	Lauderdale
Cahn-Crawford House (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Carnegie Branch Library (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Dabney-Green House (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Dement Printing Company (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Dial House (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
East End Historic District (Meridian MRA Amendment)	Meridian	21 Aug 1987	Lauderdale
Elson-Dudley House (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
First Presbyterian Church (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Grand Opera House	Meridian	27 Dec 1972	Lauderdale
Highland Park	Meridian	27 Dec 1972	Lauderdale
Highland Part Dentzel Carousel & Shelter Building (National Historic Landmark)	Meridian	27 Feb 1987	Lauderdale
Highlands Historic District (Meridian MRA Amendment)	Meridian	21 Aug 1987	Lauderdale
Lamar Hotel (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Loeb, Alex, Building (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Masonic Temple (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
McLemore Cemetery (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale

Name	Location	Date Listed	County
Meridian Downtown Historic District	Meridian	16 Jan 2007	Lauderdale
Meridian Museum of Art (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Meridian Urban Center Historic District (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Meridian Waterworks Pumping Station	Meridian	26 Jul 1989	Lauderdale
Merrehope	Meridian	9 Dec 1971	Lauderdale
Merrehope Historic District (Meridian MRA)	Meridian	19 Sep 1988	Lauderdale
Mid-Town Historic District (Meridian MRA Amendment)	Meridian	21 Aug 1987	Lauderdale
Municipal Building/City Hall (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Niolon Building (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Pigford Building (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Poplar Springs Road Historic District (Meridian MRA Amendment)	Meridian	21 Aug 1987	Lauderdale
Porter-Crawford House (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
St. Patrick Catholic Church (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Standard Drug Company	Meridian	7 Dec 1989	Lauderdale
Stevenson Primary School (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Temple Theater (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Terminal Building (Old), Hangar, and Powerhouse at Key Field Airport	Meridian	7 Jul 2003	Lauderdale
Threefoot Building (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
U.S. Post Office and Courthouse	Meridian	17 May 1984	Lauderdale
Union Hotel (Meridian MRA)	Meridian	18 Dec 1979	Lauderdale
Union Station Historic District (Meridian MRA)	Meridian	18 Dec 1979, additional documentation 7 Dec 2000	Lauderdale
Wechsler School	Meridian	15 Jul 1991	Lauderdale
West End Historic District (Meridian MRA Amendment)	Meridian	21 Aug 1987, additional documentation 1997	Lauderdale
Stuckey's Bridge	Meridian Vicinity	16 Nov 1988	Lauderdale
U.S. Sugar Crop Field Station	Meridian Vicinity	11 Jan 1991	Lauderdale

Source: NRHP 2011

Key: MRA = Multiple Resource Area.



Source of Archaelogical Sites: NAS Meridian 2010

Figure 3-12. Potential Properties at NAS Meridian Eligible for Listing in the National Register of Historic Places

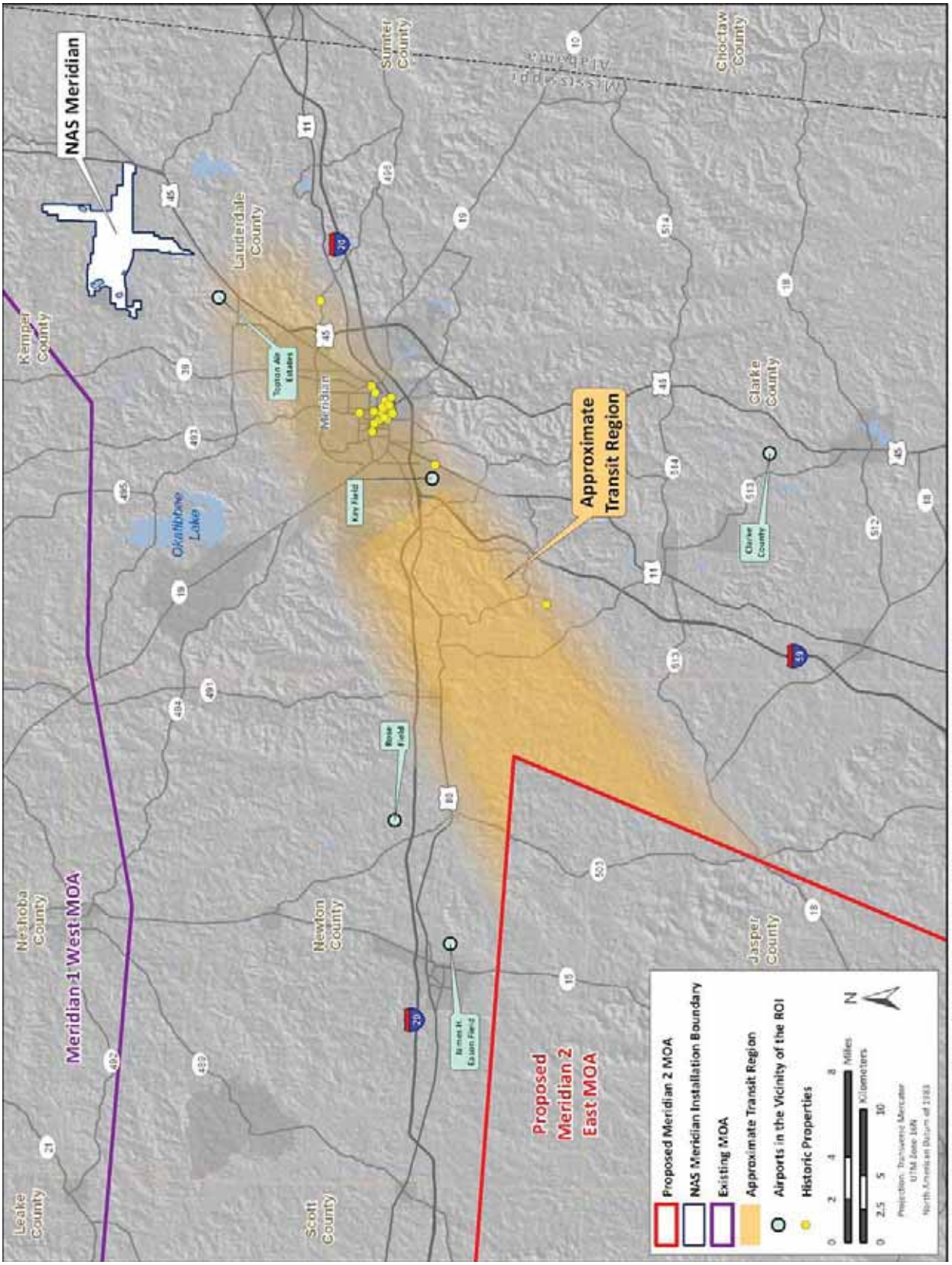


Figure 3-13. Historic Properties within the Transit Region

3.7.2.3 Meridian 2 MOA

According to the National Park Service's National Register Information System, there are three historic or archaeological properties within the ROI (see **Table 3-16**) that have been listed in the NRHP. The general locations of these properties are shown on **Figure 3-14**.

Table 3-16. Historic Properties within the Proposed Meridian 2 MOA

Name	Location	Date Listed	County
Archaeological Site No. 22JS572	Bay Springs Vicinity	10 Nov 1993	Jasper
Archaeological Site No. 22JS587	Bay Springs Vicinity	17 Mar 1994	Jasper
Montrose Presbyterian Church	Montrose	9 May 2003	Jasper

Source: NRHP 2011

3.8 Wastes and Hazardous Materials

3.8.1 Definition of the Resource

Hazardous Materials and Hazardous Waste

Hazardous materials are defined by 49 CFR 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table provided in 49 CFR 172.101, and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR Part 173. Transportation of hazardous materials is regulated by the DOT regulations within 49 CFR Parts 105–180.

The Resource Conservation and Recovery Act (RCRA) of 1976, as amended, (42 U.S.C. Section 6921) defines a hazardous waste in 42 U.S.C. Section 6903, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

EO 12088, *Federal Compliance with Pollution Control Standards*, ensures that necessary actions are taken for the prevention, management, and abatement of environmental pollution from hazardous materials or hazardous waste due to Federal facility activities. The management of hazardous waste is governed by RCRA, which is administered by the USEPA. The regulations require hazardous waste to be handled, stored, transported, disposed of, or recycled in compliance with applicable regulations. Navy guidance identifies requirements and responsibilities for the management of hazardous materials and wastes at Navy shore facilities (U.S. Navy 2007a).

Certain environmental resources and conditions that are often analyzed in this section, specifically asbestos-containing materials, lead-based paint, pesticides, polychlorinated biphenyls, radon, aboveground and underground storage tanks, and the installation Environmental Restoration Program, have been eliminated from detailed analysis because there are no construction, demolition, renovation, or ground-disturbing activities associated with establishing the Meridian 2 MOA.

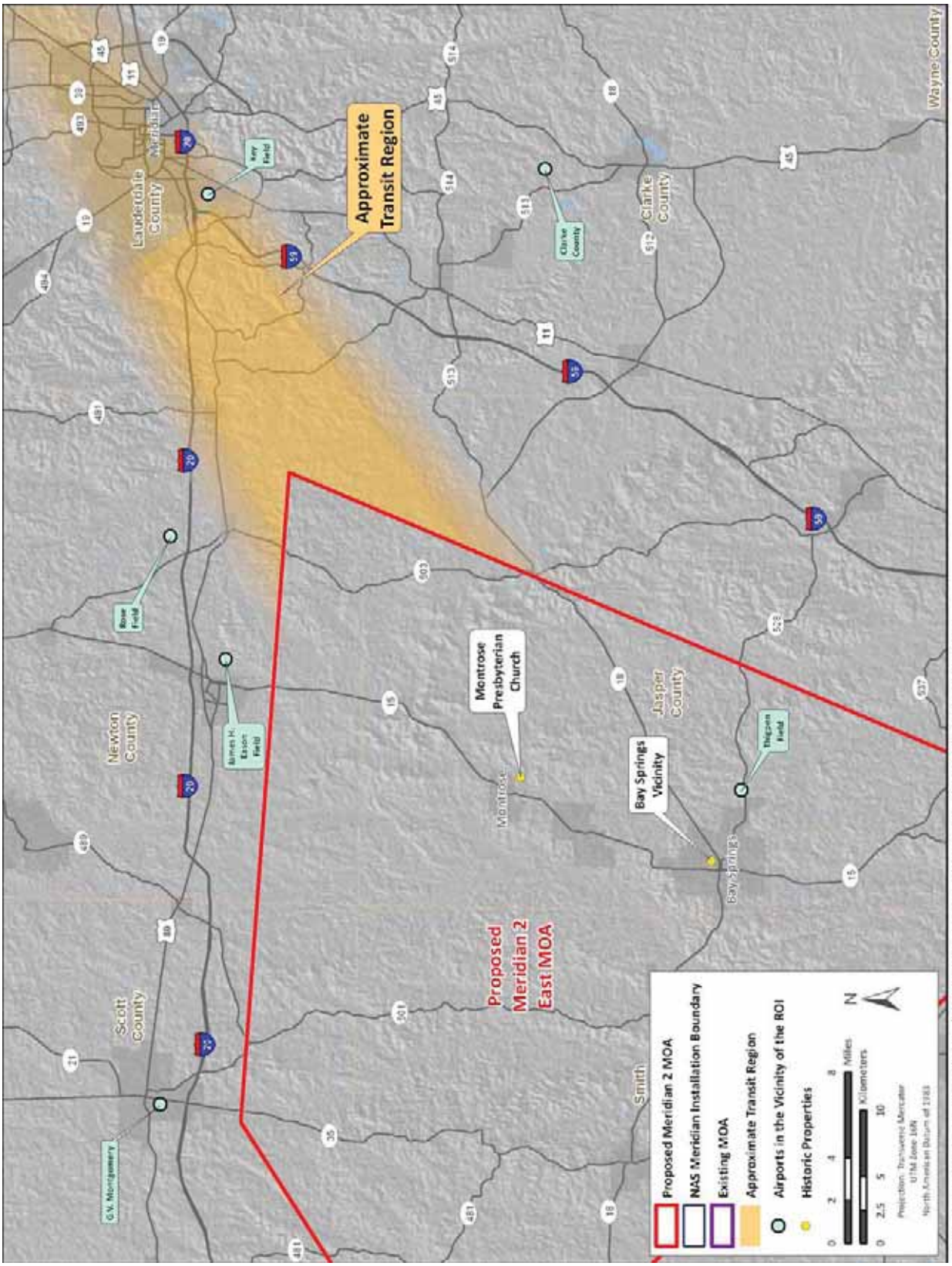


Figure 3-14. Historic Properties within the Proposed Meridian 2 MOA

Pollution Prevention

The Pollution Prevention Act of 1990 establishes the national policy that (1) pollution should be prevented or reduced at the source, (2) pollution that cannot be prevented should be recycled in an environmentally safe manner, (3) pollution that cannot be prevented or recycled should be treated in an environmentally safe manner, and (4) disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner (42 U.S.C. 13101 et seq.). Navy guidance provides pollution prevention policies and procedures applicable to all Navy facility operations (U.S. Navy 2007a).

Petroleum Products. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) definition of "hazardous substance" excludes reporting most releases of petroleum products. The USEPA interprets this provision to exclude crude oil and fractions of crude oil, including hazardous substances (e.g., benzene) that are inherently present in petroleum products. Although the petroleum exclusion exempts releases of petroleum products from CERCLA reporting requirements, it does not exempt a facility from Emergency Planning and Community Right-to-Know Act (EPCRA) or other state or Federal notification reporting requirements. Extremely hazardous substances (EHSs) in petroleum products, whether naturally occurring or normally added during refining, are not reportable under CERCLA. However, a release of a petroleum product containing an EHS is potentially reportable to the State Emergency Response Commission/Local Emergency Planning Committee under EPCRA, depending on the amount released. However, most petroleum products (e.g., gasoline, diesel fuel, jet fuel) typically do not contain EHS (NAS Meridian 2008).

Solid Waste

Solid waste is any discarded material (i.e., solid, liquid, semi-solid, or contained gaseous material), that is not excluded by CFR 261.4(a), 260.30, or 260.31, resulting from any source including industrial, commercial, mining, agricultural, or community activity (40 CFR 261.2). A discarded material is any material that is abandoned, recycled, or inherently waste-like. Abandoned includes being disposed of, burned, incinerated, accumulated, stored, or treated (but not recycled) before or in lieu of, being abandoned by being disposed of, burned, or incinerated (NAS Meridian 2008).

3.8.2 Description of the Affected Environment

This section discusses the existing hazardous materials, hazardous waste, solid waste, and pollution prevention management programs currently in place at NAS Meridian. The establishment of the proposed MOA and the operation of TW-1 aircraft in the transit region and the MOA would not require a change in the hazardous materials, hazardous waste, solid waste, or pollution prevention management programs already in place at NAS Meridian. Therefore, the transit region and the proposed MOA will not be discussed further in this section.

Hazardous Materials and Hazardous Waste

The Regional Hazardous Inventory Control System (RHICS) is an automated chemical tracking system that provides "cradle-to-grave" tracking of hazardous materials used at a facility and the chemical constituents of those materials. The RHICS also provides activities with a tool to analyze the flow of hazardous materials while developing sound pollution prevention management techniques that reduce the amount of hazardous materials procured and used and reduce the amount that becomes waste (U.S. Navy 2007a). The Hazardous Material Minimization Center at NAS Meridian uses the RHICS to manage and control the issuance and accountability of all hazardous materials needed to support aircraft maintenance

activities, tenant activities, and resident and nonresident contractors on the installation (NAS Meridian 2008).

NAS Meridian maintains a Hazardous Waste Management Plan (NAS Meridian 2008) in accordance with Navy guidance (U.S. Navy 2007a). The plan describes the hazardous waste management organization; assigns responsibilities; defines and identifies hazardous waste generation; specifies containerization, collection, labeling, marking, packaging, storage, and transfer operations; describes inspection procedures; defines or references hazardous waste contingency procedures; and provides other important information pertaining to hazardous waste management and minimization. The Public Works Environmental Department is charged with implementing and managing the Hazardous Waste Management Plan at NAS Meridian (NAS Meridian 2008). NAS Meridian is considered a large-quantity generator of hazardous wastes (USEPA ID No. MS1971590012) (NAS Meridian 2008). A large-quantity generator of hazardous waste generates 1,000 kilograms (2,200 pounds) or more of hazardous waste per month, or more than 1 kilogram (2.2 pounds) of acutely hazardous waste per month (USEPA 2008). The primary functions generating hazardous waste at NAS Meridian include aircraft maintenance and flight operation activities (NAS Meridian 2007c). **Table 3-17** summarizes the amount of hazardous waste generated at NAS Meridian for CY 2005 to 2009. A total of 41,555 pounds of hazardous was generated at NAS Meridian in CY 2009. Of the 41,555 pounds generated, 8,284 pounds were recycled offsite (NAS Meridian 2010b).

Table 3-17. Hazardous Waste Generated at NAS Meridian (CY 2005–2009)

CY	Generated (pounds)	Stored Onsite (pounds) *	Recycled Offsite (pounds)	Disposed Offsite (pounds)
2005	50,953	5,341	1,804	48,961
2006	47,394	3,321	3,720	45,694
2007	51,507	2,935	5,360	45,533
2008	134,902	3,735	8,790	125,312
2009	41,555	7,230	8,284	29,706

Source: NAS Meridian 2010b

Note: *Stored onsite refers to hazardous waste that was in storage at the approved 90-day accumulation site when a calendar year changeover occurred. For example, some portion of this stored waste was generated in CY 2008, but was disposed of or recycled in CY 2009. Therefore, the amount of waste disposed of and recycled off site does not add up the total amount generated.

NAS Meridian operates 70 approved accumulation sites (AASs). An AAS is an area at or near the point of waste generation where the generator accumulates small quantities of "total regulated hazardous waste" up to 55 gallons or up to 1 quart of "acutely hazardous waste." The AAS must be under the control of the operator of the process generating the waste. When the volume exceeds these limits, the generator must place the volume in excess of the limit in another container and transfer the full container to the less than 90-day Hazardous Waste Storage Facility within 72 hours for a maximum of 90 days. NAS Meridian operates one less than 90-day Hazardous Waste Storage Facility at Building 190. A less than 90-day Hazardous Waste Storage Facility is a designated area where hazardous waste accumulates before being transported off-installation for ultimate disposal (NAS Meridian 2008). An AAS can also accumulate nonhazardous waste and universal wastes.

Regulatory accumulation limits are not imposed on nonhazardous wastes; however, there are accumulation time limits for universal waste. Universal waste generators are allowed to accumulate waste at their location for no more than 9 months from the accumulation start date. Once the 9-month

time limit has been reached, the universal waste must be moved to the less than 90-day Hazardous Waste Storage Facility. The MDEQ enforces the hazardous waste regulations, including the Universal Waste Rule, which in Mississippi includes the following universal wastes (MDEQ 2005):

- Batteries, including certain lead-acid batteries not recycled under other regulations; button silver-oxide and zinc-air; and 9-volt, C, AA, coin, and button rechargeable lithium
- Pesticides, including those that have been recalled or banned from use, obsolete pesticides, damaged pesticides, and those that are no longer needed
- Mercury-containing devices, including thermostats, switches, and other items where mercury is contained in a capsule or other container and the mercury is used to transmit pressure, temperature, or electricity
- Lamps, including fluorescent tubes, high-intensity discharge lamps, sodium vapor lamps, and mercury vapor lamps.

Pollution Prevention

NAS Meridian maintains a Pollution Prevention Management Plan to ensure compliance with environmental regulations, pursue the reduction and elimination of sources of hazardous materials, advocate for the minimization of hazardous and nonhazardous waste, promote responsible citizenship, and encourage feedback from the installation population on ways to reduce waste (NAS Meridian 2010a). NAS Meridian also maintains an AAS Contingency Plan. A Contingency Plan is required for all large-quantity generators of hazardous waste. The purpose of the plan is to minimize hazards to human health and the environment from fires, explosions, or any unplanned release of hazardous waste or hazardous waste constituents to air, soil, or surface water. The AAS Contingency Plan provides procedures and guidance for NAS Meridian personnel on how to respond to emergency situations to prevent hazardous waste or hazardous waste constituents from reaching the environment. The AAS Contingency Plan also includes the procedures and equipment maintained for an effective response to a hazardous situation at the 90-day AAS (NAS Meridian 2008).

Petroleum Products. NAS Meridian adopted a Spill Prevention Control and Countermeasures (SPCC) Plan that identifies procedures to control and mitigate the release of petroleum products into the environment. The SPCC Plan includes an inventory of the facilities containing petroleum products, a countermeasure plan in the event of the discovery of a petroleum discharge, methods to dispose of recovered discharge materials, emergency response procedures, training requirements, and site security needs (NAS Meridian 2010a).

Table 3-18 summarizes the amount of fuel consumed at NAS Meridian for FY 2006 through 2009. As shown, 7,207,164 gallons of jet propellant-8 (JP-8), a type of jet fuel; 24,591 gallons of mobility gasoline (MOGAS); and 40,622 gallons of Ultra Low Sulfur Diesel No. 2 were consumed during FY 2009. The liquids fuels system at NAS Meridian includes the following (NAS Meridian 2010a):

- *JP-8*. The McCain Pipeline Company delivers JP-8 to NAS Meridian through a contract with the Defense Logistics Agency. The total storage capacity for JP-8 at NAS Meridian is 3.4 million gallons. The JP-8 storage system includes three 1-million-gallon aboveground storage tanks. JP-8 is pumped from the fuel farm, south of Fuller Road, to a dispensing point on the airfield. All refueling and defueling operations are conducted by refueler vehicles.

- *Diesel Fuel and MOGAS*. Diesel fuel and MOGAS are stored at two Fleet and Industrial Supply Center-operated gas stations on NAS Meridian, one of which is at the center of the airfield and the other is at the Public Works Transportation Department. The diesel storage system includes three 10,000-gallon storage tanks. The MOGAS storage system includes three 10,000-gallon storage tanks and two 500-gallon storage tanks (LB&B 2010).
- *Liquid Oxygen and Liquid Nitrogen*. The capacity of liquid oxygen and liquid nitrogen at NAS Meridian is 7,000 and 3,000 gallons, respectively. The liquid oxygen and liquid nitrogen tanks are at the airfield, serviced by a contractor, and are planned for closure.

Table 3-18. Gallons of Fuel Consumed at NAS Meridian (FY 2006–2009)

FY	JP-8	MOGAS (unleaded regular)	Low Sulfur Diesel No. 2	Ultra Low Sulfur Diesel No. 2	Biodiesel
2006 [a]	4,848,742	16,394	16,407	N/A	9,902
2007	7,958,717	30,318	24,529	0	13,453
2008	6,807,396	30,262	35,509 [b]		1,916
2009	7,207,164	24,591	N/A	40,622	0

Source: LB&B 2010
Notes:
a. Amount reported from April 2006 to September 2006.
b. The installation transitioned from Low Sulfur Diesel No. 2 to Ultra Low Sulfur Diesel No. 2 by the end of FY 2008; therefore, gallons recorded were combined during this transition.
Key: N/A = Not available.

Solid Waste

NAS Meridian maintains a Solid Waste Management Plan (NAS Meridian 2004c) in accordance with Navy guidance (U.S. Navy 2007a); Federal laws, regulations, and policies; and the State of Mississippi, Lauderdale County, and the City of Meridian laws, regulations, policies, and ordinances. In accordance with their Solid Waste Management Plan, NAS Meridian implements a solid waste management program to encourage solid waste management practices to promote environmentally sound disposal methods, maximize the reuse of recoverable resources, and foster resource conservation (NAS Meridian 2008). Municipal solid waste (MSW) includes nonhazardous waste generated in households, commercial and business establishments, institutions, light industrial process wastes, agricultural wastes, mining wastes, and sewage sludge. Waste Management Inc., the MSW contractor for NAS Meridian, collects MSW from front-load and roll-off waste collection containers that are distributed throughout NAS Meridian. The Public Works Department Contract Surveillance Representative oversees and monitors the performance of the MSW contractor and adherence to the MSW contract. The MSW contractor transports all MSW collected at NAS Meridian to the Pine Ridge Landfill, 5 miles east of Meridian, Mississippi, in Lauderdale County. The Pine Ridge Landfill is permitted to accept MSW, construction and demolition debris, and natural vegetation (NAS Meridian 2004c).

NAS Meridian participates in a Qualified Recycling Program in compliance with DOD Instruction 4715.4, *Pollution Prevention*. The Qualified Recycling Program is operated by the Environmental Division under the Public Works Department. Recyclable materials currently collected at NAS Meridian include aluminum cans, cooking oil, metals (i.e., scrap metal), tires, batteries, used oil, and antifreeze (NAS Meridian 2004c). **Table 3-19** summarizes the amount of the solid waste generated and recycled at NAS Meridian for FY 2005 through 2009. As shown, a total of approximately 5,754 tons of solid waste were generated at NAS Meridian in FY 2009. Of the 5,754 tons generated, approximately 2,401 tons were recycled off site (NAS Meridian 2009b).

Table 3-19. Summary of Solid Waste Generated at NAS Meridian (FY 2005–2009)

FY	Generated (tons)	Disposed Off Site in Landfill (tons)	Recycled (tons)	Composted (tons)
2005	1,948.16	1,850.45	97.44	0.27
2006	2,362.47	2,185.00	177.47	0.00
2007	2,775.88	2,612.05	163.83	0.00
2008	3,672.89	3,486.32	186.57	0.00
2009	5,753.52	3,353.07	2,400.45	0.00

Source: NAS Meridian 2009b

3.9 Socioeconomic Resources, Environmental Justice, and Children's Environmental Health and Safety Risks

3.9.1 Definition of the Resource

Socioeconomics. Socioeconomics is the relationship between economies and social elements such as population levels and economic activity. Factors that describe the socioeconomic environment represent a composite of several interrelated and nonrelated attributes. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, and employment data. Data on median household income in a region can be used to compare the before and after effects of any jobs created or lost as a result of a proposed action. Employment data can identify gross numbers of employees, unemployment trends, and employment by industry or trade. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region.

Data and analysis pertaining to housing, schools, and community services within the ROI is excluded from the socioeconomic analysis as the alternatives would not likely result in pronounced increases or decreases in demographics or employment characteristics. Subsequently impacts on the housing market, schools, or community services would not be expected under the proposed alternatives. Therefore analysis of the housing market, schools, and community services is omitted further from this section.

Environmental Justice. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, pertains to environmental justice issues and relates to various socioeconomic groups and the disproportionate effects that could be imposed on them. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was enacted to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action.

Children's Environmental Health and Safety Risks. EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each Federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

3.9.2 Description of the Affected Environment

3.9.2.1 NAS Meridian

For NAS Meridian, the socioeconomic baseline conditions are presented using four spatial levels: (1) Census Designated Place (CDP) data (in this case the Meridian Station CDP), (2) county level data for Kemper and Lauderdale counties in Mississippi, (3) state level data for Mississippi, and (4) national level data for the United States. The CDP data are included to provide the baseline conditions of the area around NAS Meridian. County level data are included to provide a larger scale for where socioeconomic and environmental justice changes could occur. Data for Mississippi and the United States are included to provide additional levels for comparison. As shown in **Figure 3-15**, the census tracts surrounding the area around NAS Meridian (Census Tract 301 in Kemper County and Census Tracts 102.01 and 102.02 in Lauderdale County) will be analyzed for the environmental justice section to provide a more detailed spatial scale in addition to the Meridian Station CDP level data used in the socioeconomic analysis.

Demographic Characteristics. Demographics for the CDP, county, and state were examined to display trends in population (U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2009a). In 2000 the population of the Meridian Station CDP was 1,849 persons. Data from the 1990 Census were not analyzed for the Meridian Station CDP because the CDP boundary changed between the 1990 and 2000 Census, this made comparative analysis impracticable. U.S. Census Bureau data for 2009 were unavailable for Meridian Station CDP. In Kemper County, the population grew approximately 1 percent from 10,356 persons in 1990 to 10,453 persons in 2000. From 2000 to 2009 the population decreased 6 percent to a population of 9,833 persons in 2009. In Lauderdale County, the population in 1990 was 75,555 persons, and increased 3 percent to 78,161 in 2000. From 2000 to 2009, the population of Lauderdale County increased another 1 percent to 79,099 persons.

Growth in Mississippi from 1990 to 2000 was approximately 10 percent, greater than the two counties examined but less than the United States growth of 13 percent from 1990 to 2000. From 2000 to 2009, the population in Mississippi increased 4 percent, greater than Kemper County and Lauderdale County, but less than the United States at 9 percent. Complete population data including the number of persons living in each geographic area are presented in **Table 3-20**.

Table 3-20. Population Summary (1990, 2000, and 2009)

Location	1990	2000	2009	Percentage Change	
				1990 to 2000	2000 to 2009
Meridian Station CDP	Unavailable	1,849	Unavailable	N/A	N/A
Kemper County	10,356	10,453	9,833	0.9	-5.9
Lauderdale County	75,555	78,161	79,099	3.4	1.2
Mississippi	2,573,216	2,844,658	2,951,996	10.5	3.8
United States	248,709,873	281,421,906	307,006,550	13.2	9.1

Sources: U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2009a

Note: Data for Meridian Station CDP for the 1990 U.S. Census are not used because the boundaries for the CDP changed from the 1990 to 2000 Census. 2009 data are unavailable for Meridian Station CDP.

Key: CDP = Census Designated Place. N/A = Not available.

As shown in **Figure 3-15**, the Kemper Springs community is just north of the installation within Census Tract 301 and the area around NAS Meridian. The U.S. Census Bureau does not recognize the Kemper Springs community as a town, city, or CDP (U.S. Census Bureau 2000). Therefore, population data for Kemper Springs are not available. Apart from Meridian Station CDP, the area around NAS Meridian does not encompass any other communities.

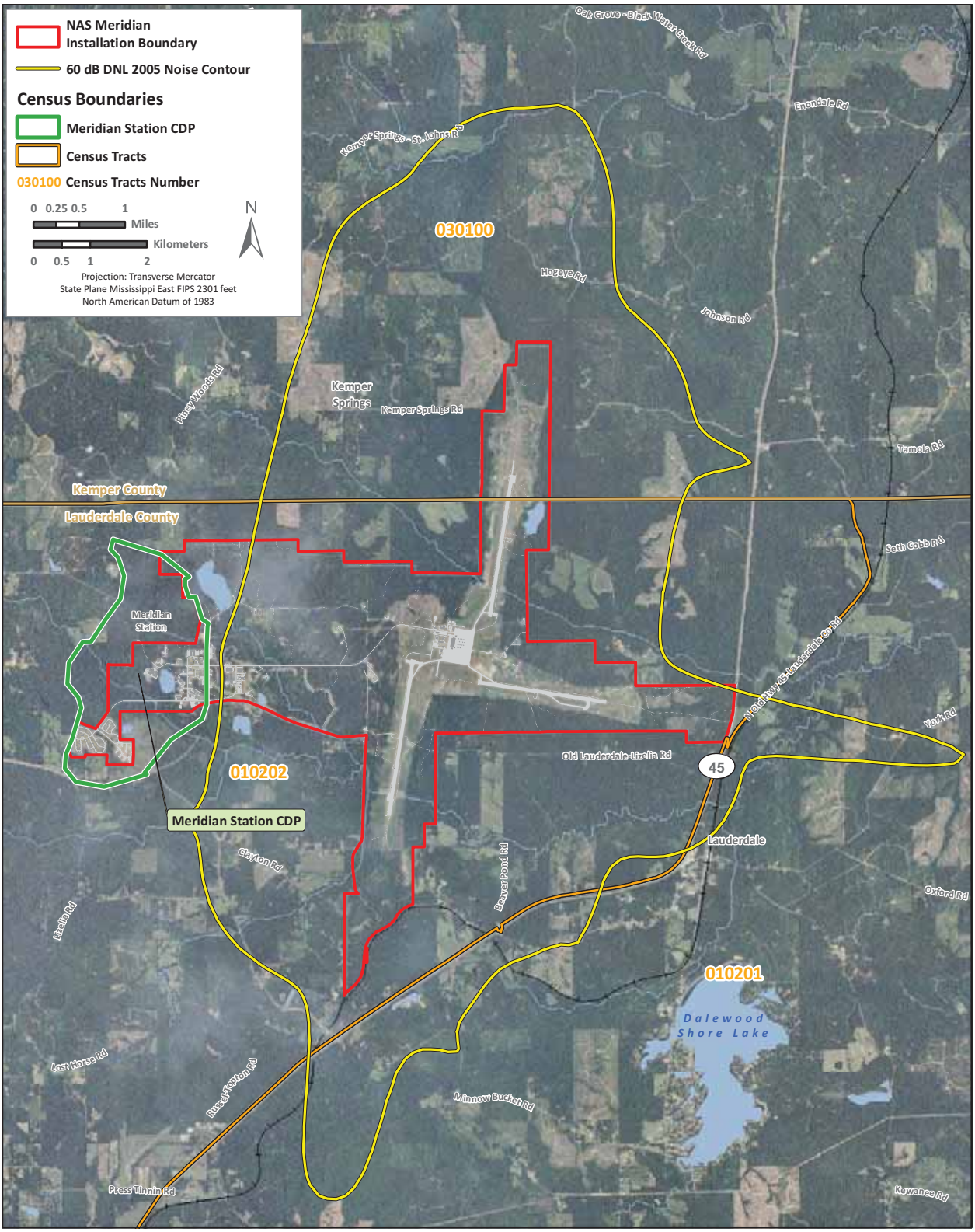
Employment Characteristics. NAS Meridian employs approximately 3,400 people, making it the single largest employer in Meridian and Lauderdale County (City of Meridian 2008). The largest employment category in Lauderdale and Kemper counties, Mississippi, and the United States by percentage was the educational, health and social services industry. In Kemper County, the second largest industry by percentage of those employed was the manufacturing industry (17 percent) and in Lauderdale County the second largest industry was the retail trade industry (12 percent). In Lauderdale County, those in the Armed Forces represent 5 percent of the population compared with 0 percent in Kemper County and less than 1 percent each in Mississippi and the United States (U.S. Census Bureau 2009b). **Table 3-21** provides complete employment data by industry.

Table 3-21. Overview of Employment by Industry (2005–2009)

Industry	Kemper County	Lauderdale County	Mississippi	United States
Population 16 years and over in labor force	4,440	37,339	1,349,864	153,407,584
Percent of population employed within the armed forces	0.0	5.3	0.7	0.5%
Agriculture, forestry, fishing and hunting, and mining	8.7%	1.9%	2.9%	1.8%
Construction	8.5%	7.6%	7.8%	7.4%
Manufacturing	16.9%	10.1%	14.2%	11.2%
Wholesale trade	0.5%	4.2%	3.0%	3.2%
Retail trade	7.3%	12.4%	11.8%	11.5%
Transportation and warehousing, and utilities	7.6%	6.4%	5.7%	5.1%
Information	2.0%	2.1%	1.5%	2.4%
Finance, insurance, real estate, and rental and leasing	1.2%	5.3%	5.0%	7.1%
Professional, scientific, management, administrative, and waste management services	6.0%	5.0%	6.4%	10.3%
Educational, health and social services	21.6%	27.3%	22.6%	21.5%
Arts, entertainment, recreation, accommodation and food services	13.0%	8.1%	8.9%	8.8%
Other services (except public administration)	3.3%	4.4%	4.9%	4.8%
Public administration	3.4%	5.2%	5.3%	4.7%

Source: U.S. Census Bureau 2009b

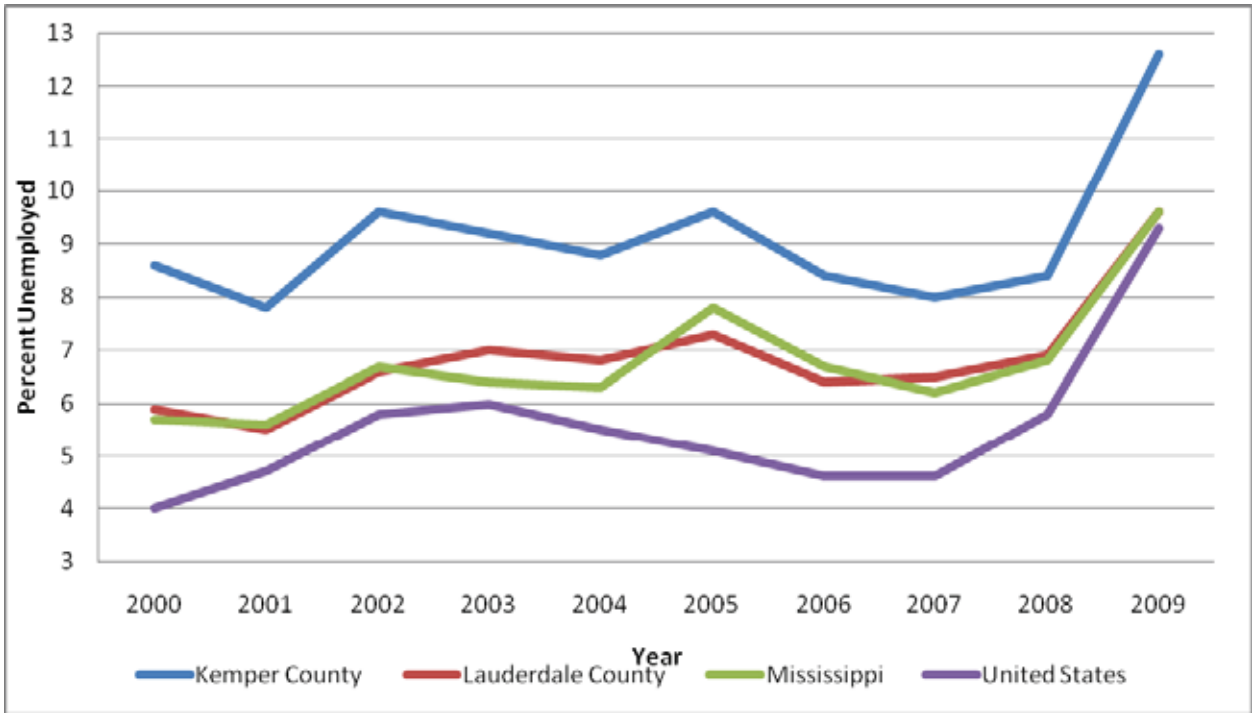
Notes: The data displayed in this table are from the U.S. Census Bureau American Community Survey 5-year estimates, 2005–2009. As part of the American Community Survey, the U.S. Census Bureau surveys people over a 5-year period to obtain estimates for the listed categories.



Source: Noise Contour: NAS Meridian 2005; Aerial Photography: NAIP 2009

Figure 3-15. Census Tract and Meridian Station CDP Map

Figure 3-16 displays the annual unemployment rate for Kemper and Lauderdale counties, the State of Mississippi, and the United States (2000–2009). The unemployment rate in Mississippi and Lauderdale County was greater in comparison to the United States during the 10-year period ending in 2009, but all followed a similar trend. In Kemper County, unemployment was at least 2 percentage points greater than the United States from 2000 until 2009 (BLS 2010).



Source: BLS 2010

Figure 3-16. Annual Unemployment Rate (2000–2009)

Environmental Justice and Protection of Children. Race, ethnicity, and poverty characteristics from U.S. Census Bureau American Community Survey 5-year estimates, 2005–2009 are displayed in **Table 3-22** and summarized below. Census Tract 301, which is within Kemper County (shown on **Figure 3-15**), contains a large African-American population at 68 percent, and a large percentage of families living below the poverty level at 25 percent. Within Kemper County overall, the percentage of African Americans totaled 58 percent and the percentage of families living below the poverty level totaled 20 percent. The African-American population and households living below poverty in both Census Tract 301 and Kemper County are greater than the State of Mississippi. In addition, the median household income in Census Tract 301 was $25,514, and in Kemper County it was $29,833, both of which are lower than Mississippi's median household income of $36,796. The American Indian population in Kemper County was 2 percent, greater than the 0.4 percent reported for Mississippi. The Latino or Hispanic population in Census Tract 102.02 in Lauderdale County was 5 percent, compared to 2 percent for the entire county and 2 percent for the State of Mississippi. The percent of the population under 18 years of age varied from 20 percent in Census Tract 102.01 to 26 percent in Lauderdale County.

Table 3-22. Race, Ethnicity, and Poverty Characteristics by Percent (2005–2009)

Race, Ethnicity, and Poverty Characteristics	Census Tract 301	Kemper County	Meridian Station CDP	Census Tract 102.01	Census Tract 102.02	Lauderdale County	Mississippi	United States
Total Population	5,009	9,998	3,172	4687	10358	77,966	2,922,240	301,461,533
Population 17 and younger	22.8	23.8	8.9	19.9	20.3	25.6	26.1	24.6
White	32.0	37.0	41.2	68.2	58.3	56.0	58.8	65.8
Black or African American	67.7	58.3	35.1	30.3	33.0	40.9	36.9	12.1
American Indian and Alaska Native	0.0	2.2	0.3	0.0	0.3	0.3	0.4	0.7
Asian	0.0	1.1	8.5	0.6	3.5	0.7	0.8	4.3
Native Pacific Islander	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Some Other Race	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
Two or More Races	0.3	1.1	0.2	0.3	0.2	0.4	0.8	1.6
Hispanic or Latino	0.1	0.4	14.7	0.7	4.7	1.7	2.1	15.1
Families below poverty level	25.1	19.7	0.0	13.6	5.2	18.8	17.0	9.9
Median Household Income	$25,514	29,833	$70,045	$38,287	52,668	33,354	36,796	51,425

Source: U.S. Census Bureau 2009b

Notes: The data displayed in this table are from the U.S. Census Bureau American Community Survey 5-year estimates, 2005–2009. As part of the American Community Survey the U.S. Census Bureau surveys people over a 5-year period to obtain estimates for the listed categories.

Percentages might not sum exactly to 100 due to rounding.

Key: CDP = Census Designated Place

3.9.2.2 Transit Region

The transit region overlies portions of Lauderdale, Newton, Jasper, and Clarke counties. The socioeconomics, environmental justice, and protection of children discussion for Lauderdale County is encompassed within the NAS Meridian affected environment previously discussed. The Newton and Jasper county discussions are encompassed within the Meridian 2 MOA affected environment section. Less than 3 percent of the transit region overlies Clarke County; therefore, it was excluded from this analysis.

3.9.2.3 Meridian 2 MOA

The Meridian 2 MOA encompasses 10 counties in Mississippi, which include parts, or all of, Covington, Jasper, Jefferson Davis, Jones, Lawrence, Newton, Rankin, Scott, Simpson, and Smith. These counties are also defined as the area of analysis for the Meridian 2 MOA for socioeconomics, environmental justice, and children's environmental health and safety risks. The State of Mississippi and the United States are included to provide comparison with the area of analysis for the Meridian 2 MOA.

Demographic Characteristics. Within the area of analysis for the Meridian 2 MOA, Covington and Rankin counties experienced robust growth from 1990 to 2009. Scott and Simpson counties experienced growth similar to the State of Mississippi over the same time period. Jefferson Davis County experienced negative growth from 1990 to 2009, and Jasper and Smith counties experienced negative growth from 2000 to 2009. As shown in **Table 3-23**, the remaining counties experienced positive growth from 1990 to 2009, although the rate of growth was less than the State of Mississippi or the United States (U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2009a).

Table 3-23. Population Summary (1990, 2000, and 2009)

Location	1990	2000	2009	Percentage Change	
				1990 to 2000	2000 to 2009
Covington County	16,527	19,407	20,544	17.4	5.9
Jasper County	17,114	18,149	17,940	6.0	-1.2
Jefferson Davis County	14,051	13,962	12,543	-0.6	-10.2
Jones County	62,031	64,958	67,776	4.7	4.3
Lawrence County	12,458	13,258	13,308	6.4	0.4
Newton County	20,291	21,838	22,568	7.6	3.3
Rankin County	87,161	115,327	143,124	32.3	24.1
Scott County	24,137	28,423	29,341	17.8	3.2
Simpson County	23,953	27,639	27,920	15.4	1.0
Smith County	14,798	16,182	15,826	9.4	-2.2
State of Mississippi	2,573,216	2,844,658	2,951,996	10.5	3.8
United States	248,709,873	281,421,906	307,006,550	13.2	9.1

Sources: U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2009a

Employment Characteristics. Employment by industry within the area of analysis for the Meridian 2 MOA differs from county to county. For example, the percentage of workers employed in the agriculture industry varies from 1 percent (Rankin County) to 9 percent (Lawrence County). The most prominent industries across the counties of the area of analysis for the Meridian 2 MOA are the manufacturing industry and the educational, health, and social services industry. **Table 3-24** includes employment information for the area of analysis for the Meridian 2 MOA, the State of Mississippi, and the United States.

Environmental Justice and Protection of Children. Minority and low-income populations were characterized in the counties for the area of analysis for the Meridian 2 MOA, the State of Mississippi, and the United States. The counties underlying the Meridian 2 MOA contain varying levels of minority populations, as shown in **Table 3-25**. The African-American population in Jasper County (52 percent) and Jefferson Davis County (56 percent) is higher than the State of Mississippi (37 percent) and the United States (12 percent). The remaining counties have minority populations that are similar to the State of Mississippi and the United States. All of the counties within the area of analysis for the Meridian 2 MOA, except Rankin County, have a median household income that is less than the median household income for the State of Mississippi and the United States. The number of families living below the poverty level within the area of analysis for the Meridian 2 MOA varies from 8 percent in Rankin County to 30 percent in Jefferson Davis County. There are four counties within the area of analysis for the Meridian 2 MOA (i.e., Covington, Jefferson Davis, Jones, and Scott) that have poverty levels greater than the State of Mississippi (17 percent). The percent of the population under 18 years of age varied from 25 percent in Jefferson Davis County to 28 percent in Scott County.

Table 3-24. Overview of Employment by Industry (2005–2009)

Industry	Counties of the area of analysis for the Meridian 2 MOA										Mississippi	United States
	Covington	Jasper	Jefferson Davis	Jones	Lawrence	Newton	Rankin	Scott	Simpson	Smith		
Population 16 years and over in labor force	8,834	7,767	5,239	29,048	5,608	9,625	71,335	13,152	12,391	7,032	1,349,864	153,407,584
Percent of population employed within the armed forces	0.6	0.0	0.0	0.2	0.3	0.9	0.2	3.5	0.0	0.0	0.7	0.5%
Agriculture, forestry, fishing and hunting, and mining	4.3%	5.1%	6.6%	7.0%	9.0%	3.3%	1.4%	6.6%	5.9%	8.7%	2.9%	1.8%
Construction	11.1%	6.1%	9.7%	8.5%	11.6%	7.5%	8.5%	11.5%	10.9%	9.5%	7.8%	7.4%
Manufacturing	19.6%	25.3%	10.0%	20.2%	17.3%	17.2%	7.8%	25.4%	10.0%	21.8%	14.2%	11.2%
Wholesale trade	2.0%	3.0%	3.4%	2.7%	1.9%	2.3%	4.3%	3.5%	3.5%	2.3%	3.0%	3.2%
Retail trade	11.1%	10.0%	17.1%	10.7%	8.3%	14.2%	11.8%	8.1%	10.4%	7.8%	11.8%	11.5%
Transportation and warehousing, and utilities	6.6%	3.1%	6.1%	3.8%	3.5%	4.4%	5.1%	4.9%	6.3%	5.6%	5.7%	5.1%
Information	0.2%	1.3%	1.4%	1.1%	0.3%	1.0%	3.2%	0.5%	2.0%	1.6%	1.5%	2.4%
Finance, insurance, real estate, and rental and leasing	4.1%	3.3%	3.6%	4.2%	4.2%	3.0%	8.4%	4.3%	3.5%	2.2%	5.0%	7.1%
Professional, scientific, management, administrative, and waste management services	5.4%	4.7%	3.6%	4.6%	4.2%	7.5%	9.9%	2.9%	6.3%	3.3%	6.4%	10.3%
Educational, health and social services	22.1%	24.6%	24.1%	23.8%	28.5%	19.4%	22.1%	18.0%	25.2%	23.8%	22.6%	21.5%
Arts, entertainment, recreation, accommodation and food services	4.1%	4.4%	5.5%	4.3%	3.9%	10.3%	5.9%	4.4%	4.6%	3.1%	8.9%	8.8%
Other services (except public administration)	2.9%	4.3%	4.2%	5.7%	3.3%	4.3%	5.2%	4.0%	5.4%	5.0%	4.9%	4.8%
Public administration	6.4%	5.0%	4.9%	3.3%	3.9%	5.7%	6.4%	5.9%	5.8%	5.2%	5.3%	4.7%

Source: U.S. Census Bureau 2009b

Notes: The data displayed in this table are from the U.S. Census Bureau American Community Survey 5-year estimates, 2005–2009. As part of the American Community Survey, the U.S. Census Bureau surveys people over a 5-year period to obtain estimates for the listed categories.

Table 3-25. Race, Ethnicity, and Poverty Characteristics by Percent (2005–2009)

Race, Ethnicity and Poverty Characteristics	Counties of the area of analysis for the Meridian 2 MOA										Mississippi	United States
	Covington	Jasper	Jefferson Davis	Jones	Lawrence	Newton	Rankin	Scott	Simpson	Smith		
Total Population	20,315	17,944	12,721	66,877	13,258	22,403	137,817	29,137	27,903	15,889	2,922,240	301,461,533
Population 17 and younger	27.4	26.1	25.0	25.6	25.6	25.8	25.3	27.9	26.6	27.0	26.1	24.6
White	62.0	46.5%	41.1%	66.6%	66.3%	63.6%	76.6%	51.8%	62.6%	74.4%	58.8	65.8
Black or African American	35.4	52.4%	56.2%	26.9%	32.6%	30.0%	19.3%	38.1%	36.5%	24.9%	36.9	12.1
American Indian & Alaska Native	0.2	0.2%	0.0%	0.4%	0.1%	4.3%	0.1%	0.0%	0.0%	0.0%	0.4	0.7
Asian	0.6	0.0%	2.3%	0.3%	0.0%	0.0%	1.0%	0.1%	0.1%	0.0%	0.8	4.3
Native Pacific Islander	0.0	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0	0.1
Some Other Race	0.2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1	0.2
Two or More Races	0.6	0.7%	0.2%	0.9%	0.1%	0.6%	0.9%	0.1%	0.2%	0.0%	0.8	1.6
Hispanic or Latino	1.1	0.2	0.2	5.0	0.9	1.4	2.1	9.7	0.7	0.8	2.1	15.1
Families below poverty level	23.3	14.6	29.1	19.0	16.1	13.8	7.7	18.8	16.9	16.8	17.0	9.9
Median Household Income	30,483	29,628	31,517	34,269	34,643	35,527	53,240	32,114	34,187	36,762	36,796	51,425

Source: U.S. Census Bureau 2009b

Notes: The data displayed in this table are from the U.S. Census Bureau American Community Survey 5-year estimates, 2005–2009. As part of the American Community Survey, the U.S. Census Bureau surveys people over a 5-year period to obtain estimates for the listed categories.

4. ENVIRONMENTAL CONSEQUENCES

This section presents an analysis of the potential direct and indirect effects of each alternative on the affected environment. Cumulative and other impacts are discussed in **Chapter 5**. The following discussion elaborates on the nature of the characteristics that might relate to resources. The terms discussed below are used to describe the intensity of effects and to assess significance.

Short-term or long-term. These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term impacts are those that are more likely to be persistent and chronic.

Direct or indirect. A direct impact is caused by and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.

Adverse or beneficial. An adverse impact is one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.

Context. The context of an impact can be localized or more widespread (e.g., regional).

Intensity. The intensity of an impact is determined through consideration of several factors, including whether an alternative might have an adverse impact on the unique characteristics of an area (e.g., historical resources, ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Impacts are also considered in terms of their potential for violation of Federal, state, or local environmental laws; their controversial nature; the degree of uncertainty or unknown effects, or unique or unknown risks; if there are precedent-setting impacts; and their cumulative impacts.

4.1 Air Quality

4.1.1 General Conformity, Ambient Air Quality, PSD, and Title V Requirements

General Conformity. As discussed in **Section 3.1.2.1**, the General Conformity requirements do not apply to the Proposed Action because the ROI is within federally designated attainment areas for all criteria pollutants.

Ambient Air Quality. Under NEPA, there is no existing guidance or regulatory requirement for evaluating the significance of emissions within attainment areas. However, the CAA requires the maintenance of ambient air quality in attainment areas to protect public health. Therefore, since the ROI is within two attainment areas, the Proposed Action was evaluated to determine if the increase in emissions would exceed the AAQS. Based on PSD and state construction air permit requirements for attainment areas (40 CFR 52.21 and MCEQ 2005) and the General Conformity Rule requirements for nonattainment areas (40 CFR 93.158), the following factors were considered in determining the significance of a net increase in emissions from the Proposed Action in these attainment areas:

- Causing or contributing to a violation of any national or state AAQS
- Exposing sensitive receptors to substantially increased pollutant concentrations
- Exceeding any Evaluation Criteria established by a State Implementation Plan.

Impacts on ambient air quality were assessed by comparing the net increase in emissions under the Proposed Action to the county or AQCR emissions inventory and to the air quality permitting criteria discussed as follows.

PSD and Title V Permits. NAS Meridian baseline emissions are currently below the levels where PSD and Title V permits apply. However, the emissions increase from the Proposed Action added to baseline levels, or the Proposed Action increase by itself, could be at a level where PSD and/or Title V permitting would apply. The following factors were considered in determining the significance of air quality impacts from the Proposed Action with respect to PSD permitting requirements:

- If the net increase in stationary source emissions under the Proposed Action qualify as a PSD major source (i.e., 250 tpy emissions per attainment pollutant [40 CFR 52.21(b)(1) and 40 CFR 52.21(a)(2)]
- If the net increase in stationary source emissions under the Proposed Action when added to the baseline stationary source emissions would qualify as a PSD major source (i.e., 250 tpy emissions per attainment pollutant [40 CFR 52.21(b)(1) and 40 CFR 52.21(a)(2)])
- As of July 1, 2011, if the net increase in stationary source GHG emissions under the Proposed Action is 100,000 tpy or more regardless of the level of emissions of other pollutants (75 FR 31514; June 3, 2010)
- As of July 1, 2011, if the net increase in stationary source GHG emissions under the Proposed Action when added to the baseline stationary source GHG emissions is 100,000 tpy or more regardless of the level of emissions of other pollutants (75 FR 31514; June 3, 2010)
- If the Proposed Action occurs within 10 kilometers of a Class I area and if it would it cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more (40 CFR 52.21[b][23][iii] and 40 CFR 52.21[a][2]).

The following factors were considered in determining the significance of air quality impacts from the Proposed Action with respect to Title V permitting requirements (40 CFR 71.2 and 40 CFR 71.3):

- If the net increase in stationary source emissions under the Proposed Action qualify as a Title V major source by themselves (i.e., the potential to emit 100 tpy for any criteria pollutant)
- If the net increase in stationary source emissions under the Proposed Action when added to the baseline stationary source emissions would qualify as a Title V major source (i.e., the potential to emit 100 tpy for any criteria pollutant, or 100,000 tpy emissions of GHGs [75 FR 31514; June 3, 2010]).

4.1.2 Proposed Action

4.1.2.1 NAS Meridian

The additional 5,000 sorties under the Proposed Action would equate to 10,000 operations at NAS Meridian, since each sortie would include an arrival and departure at the airfield. The Proposed Action emissions increases at NAS Meridian from the additional T-45C aircraft operations include stationary source emissions (i.e., aircraft engine test cell emissions) and mobile source emissions (i.e., aircraft

operational emissions). The engine test cell emissions are classified as stationary source emissions since the engines are removed from the aircraft for testing. The aircraft operations are classified as mobile source emissions. Aircraft operations include flying operations and in-frame engine maintenance conducted on the aircraft without removing the aircraft engine. NAS Meridian personnel have indicated that the increase under the Proposed Action would have no appreciable increase in the in-frame engine maintenance schedule. Therefore, it is expected there would be no increase in in-frame engine maintenance emissions.

The background operational data and emissions factors that form the basis of the air quality emissions calculations were provided by the U.S. Navy Aircraft Environmental Support Office in San Diego, California, and are provided in **Appendix F**. The U.S. Navy Aircraft Environmental Support Office conducted interviews and exchanged other correspondence with NAS Meridian personnel to obtain the data necessary to support this analysis. The emissions described in the following paragraphs represent the increases under the Proposed Action over and above the baseline emissions.

Stationary Source Emissions (Aircraft Engine Test Cell). Aircraft engine test cell emissions occur from maintenance testing of the F405-RR-401 engine used in the T-45C aircraft. NAS Meridian personnel have indicated that the operational increase would result in up to six more engine tests per year. The aircraft engine test cell emissions were calculated by multiplying the emissions from one aircraft engine test by the increase in the number of tests, estimated at six. The NAS Meridian stationary source emissions from the Proposed Action are provided in **Table 4-1** in tpy.

Table 4-1. NAS Meridian Stationary Source Emissions from the Proposed Action

	Pollutant						
	NO_X (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2 (tpy)
NAS Meridian Stationary Source Emissions from the Proposed Action	0.08	0.04	0.20	4.34×10^{-3}	0.06	0.06	33.86

The emissions in **Table 4-1** are well below the PSD and Title V major source permitting levels, including those for GHGs, and are not significant enough for the Proposed Action to require changes to or to exceed conditions in the facility's existing synthetic minor source operating permit. Compliance with emissions levels in a synthetic minor source operating permit negates the need for a Title V operating permit. In addition, NAS Meridian is well over 10 kilometers from a Class I area. Therefore, PSD and Title V permitting requirements would not apply to the Proposed Action. In addition, stationary source GHG emissions from NAS Meridian would be well below the USEPA's reporting criteria of 25,000 metric tons of CO_2 equivalents per year. Therefore, no significant impacts from stationary source emissions would be expected.

Mobile Source Emissions (Aircraft Operations). The emissions from the additional aircraft operations were considered to include 5,000 straight-out departures and 5,000 straight-in arrivals for purposes of calculations. Emissions from aircraft flying operations are considered to impact the environment at ground level up to the top of the surface mixing zone or inversion layer thickness (i.e., mixing height). It is assumed that pollutants emitted anywhere within the mixing zone are carried down to ground level (USAF 2003); therefore, only the flight operations that would occur below the mixing layer (3,000 feet AGL) are evaluated for impacts on local and regional air quality. The aircraft flying operations emissions account for departure and arrival emissions that occur below 3,000 feet AGL.

Table 4-2 below provides a summary of the aircraft operational emissions in tpy from the Proposed Action. Fuel throughput, operating time, and emissions from flightline ground support equipment are not tracked because this is not required by MDEQ or the USEPA. The ground support equipment engines are classified as non-road engines.

Table 4-2. NAS Meridian Mobile Source Emissions from the Proposed Action

	Pollutant						
	NO_X (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2 (tpy)
NAS Meridian Mobile Source Emissions from the Proposed Action	3.32	17.57	90.15	0.43	8.03	8.03	3,184.68

Table 4-3 provides a percent comparison of total emissions from the Proposed Action to the AQCR emissions for the two AQCRs that make up NAS Meridian. In addition, it shows a percent comparison of CO_2 emissions from the Proposed Action to the total estimated 2007 CO_2 emissions in the State of Mississippi. There is no regulatory basis for percent emissions comparisons to countywide emissions; therefore, this percentage is not provided. However, because the concern of GHG emissions impacts is on a global nature, their nationwide impacts are discussed as cumulative impacts in **Section 5.3.1**.

Table 4-3. NAS Meridian Total Proposed Action Air Emissions Increases and Percent of Regional/State Emissions

	NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total NAS Meridian Baseline Aircraft-Related Emissions (tpy)	**3.40**	**17.61**	**90.35**	**0.43**	**8.09**	**8.09**	**3,218.54**
Percent of Northeast Mississippi AQCR Emissions[1]	0.005%	0.02%	0.03%	0.003%	0.01%	0.04%	N/A
Percent of Alabama-Florida-Southern Mississippi AQCR Emissions [1]	0.001%	0.01%	0.01%	0.0002%	0.003%	0.01%	N/A
Percent of CO_2 Emissions in State of Mississippi [2]	----	----	----	----	----	----	0.004%

Sources for AQCR and Mississippi emission levels:
1 = USEPA 2010a
2 = EIA 2010
Key: N/A = Not available.

As shown, the emissions from the Proposed Action constitute less than 0.05 percent of the criteria pollutant emissions within the two AQCRs. Based on this level of emissions and their location, the air quality impact from the Proposed Action at NAS Meridian is not expected to (1) cause or contribute to a violation of any national or state ambient air quality standard, (2) expose sensitive receptors to substantially increased pollutant concentrations, or, (3) exceed any evaluation criteria established by the Mississippi State Implementation Plan. Therefore, no significant impacts from mobile source emissions would be expected.

4.1.2.2 Transit Region

Aircraft operations in the transit region would occur above 7,000 MSL, which is above the mixing height of 3,000 feet AGL. Currently, there is no guidance or regulatory requirement to estimate emissions above the mixing height. Therefore, because no aircraft operations within the transit region would occur below the mixing height, no impacts on local or regional air quality would be expected. In addition, the transit region is more than 115 miles (185 kilometers) from the closest Class I area; consequently, Federal PSD regulations would not apply. Therefore, no impacts from aircraft emissions in the transit region would be expected.

An increase in emissions of GHGs would occur in the region where the transit area is located. However, since PSD and Title V permitting requirements and the USEPA GHG reporting requirements only apply to stationary sources, GHG emissions in the transit region do not apply. Since the concern of GHG emissions is on a global nature, their impacts are discussed as cumulative impacts in **Section 5.3.1**.

4.1.2.3 Meridian 2 MOA

The information regarding the air quality impacts from the aircraft operations in the transit region applies in the same manner to the proposed Meridian 2 MOA. Aircraft operations in the proposed Meridian 2 MOA would occur between 8,000 feet MSL and 17,999 feet MSL, which is above the mixing height of 3,000 feet AGL. Therefore, no significant impacts from aircraft emissions in the proposed Meridian 2 MOA would be expected.

An increase in emissions of GHGs would occur in the region where the Meridian 2 MOA is located. However, since PSD and Title V permitting requirements and the USEPA GHG reporting requirements only apply to stationary sources, GHG emissions in the transit region do not apply. Since the concern of GHG emissions is on a more global nature, their impacts are discussed as cumulative impacts in **Section 5.3.1**.

4.1.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, TW-1 would not be able to fly the additional sorties, and there would be no change in baseline conditions. Therefore, no significant impacts from stationary or mobile sources would be expected.

4.2 Noise

The noise impact analysis is evaluated for a potential increase in the existing noise environment and whether effects on humans would occur such as annoyance, speech interference, sleep disturbance, hearing loss, or disruption to children's learning. Land use compatibility with respect to noise is discussed in **Section 4.3**. Noise effects on wildlife are discussed in **Section 4.4**.

4.2.1 Proposed Action

4.2.1.1 NAS Meridian

Navy Analysis. As discussed in **Section 2.2**, T-45C aircraft would depart NAS Meridian using existing flight tracks, profiles, and procedures.

As discussed in **Section 3.2.2.1**, FICON states that a 3 dB DNL increase represents a doubling of noise and that the majority of people characterize a change in aircraft noise exposure of 3 dB DNL as "clearly

noticeable" (FICON 1992). Based on this, FICON considers an increase of 3 dB DNL as an indicator of the need for additional noise analysis (FICON 1992). A 3 dB DNL increase would occur if the number of annual operations at the airfield doubled. The number of operations in 2009 is an increase of approximately 39 percent from the 2005 forecasted scenario. If a doubling of aircraft operations (i.e., a 100 percent increase) equates to a 3 dB DNL increase, then a 39 percent increase in operations would be expected to increase the noise level by 1 to 2 dB DNL. Therefore, the noise levels from 2009 would likely increase by 1 to 2 dB DNL as compared to the 2005 forecasted scenario. It is unlikely that a 1 to 2 dB DNL increase would be noticeable by persons living in the NAS Meridian vicinity.

Under the Proposed Action, an additional 10,000 aircraft operations would take place at NAS Meridian. This would be a 5 percent increase in operations as compared to the 2009 baseline. If a doubling of aircraft operations (i.e., a 100 percent increase) equates to a 3 dB DNL increase, then a 5 percent increase in operations would be expected to increase the DNL by less than 1 dB. Consequently, under the Proposed Action the noise levels would likely increase by less than 1 dB DNL as compared to 2009.

Therefore, according to the FICON guidelines, no additional noise analysis is required. Even though it is unlikely that a 1 to 2 dB DNL increase would be noticeable to persons living in the NAS Meridian vicinity, the noise complaint response program would continue to be implemented at the installation.

FAA Analysis. According to FAA Order 1050.1E, the FAA has approved different types of computer models for estimating noise impacts for different types of situations. The FAA's Area Equivalent Method (AEM) is used to estimate the impacts from an increase in operations at an airfield. It is used to simplify the assessment step in determining the need for further analysis as a part of EAs. AEM is the FAA-designated screening method for proposed actions involving a single airport which result in a general overall increase in daily aircraft operations where there are no changes in flight tracks. Therefore, the AEM is appropriate for the 10,000 operational increase at NAS Meridian included under the Proposed Action. The FAA AEM results concur with the Navy analysis that the 10,000 operations increase at NAS Meridian would not result in significant changes as a result of the Proposed Action and no further noise analysis is required.

Conclusion. The Navy and FAA results concur that there would be no significant changes in the average noise levels around the airfield. Although a small number of people could be annoyed by the 5 percent increase in aircraft operations at NAS Meridian, no significant impact on the environment from noise would be expected.

4.2.1.2 Transit Region

The transit region would continue to be non-military airspace that is not associated with an airfield. The FAA analyzed the transit region for potential noise impacts from aircraft operating between 3,000 and 10,000 feet AGL using their Noise Integrated Routing System Screening Tool (FAA Operations Support Group 2010). The Noise Integrated Routing System Screening Tool requires that an area be examined for noise sensitive receptors if there is a 5 dB DNL or greater projected increase in noise levels for that area. Additional analysis for noise mitigation may be required if noise sensitive receptors are present (FAA Operations Support Group 2010).

The results of the FAA Noise Integrated Routing System Screening Tool analysis indicates that the projected flights of T-45C aircraft to and from the proposed Meridian 2 MOA via the transit region would result in noise increases of less than 5 dB DNL. Therefore, the FAA has determined that no additional analysis for the area under the transit region is needed (FAA Operations Support Group 2010). Therefore, no significant impact on the environment from noise would be expected.

4.2.1.3 Meridian 2 MOA

For the purposes of this EA, the 5,000 sorties per year under the Proposed Action were analyzed using DNL and SEL noise levels.

Aircraft noise generation was modeled using the number of sorties by time of day, aircraft engine power settings, aircraft flight speeds, and altitude distributions that would occur in the proposed airspace as provided in ***Appendix G****.*

Changes in Average Noise Levels. The FAA approves the DOD MOA and Range NOISEMAP (MR_NMAP) computer model used to estimate average noise levels from aircraft operations within a proposed MOA (FAA 2006). Aircraft noise generation was modeled using the number of sorties by time of day, aircraft engine power settings, aircraft flight speeds, and altitude distributions that would occur in the proposed airspace as shown in **Appendix G**. Some of the training conducted by TW-1 would occur above 17,999 feet MSL in an ATC Assigned Airspace as discussed in **Section 2.2**. The FAA analysis published in the *Federal Register Volume 65 No. 235 on December 6, 2000* states that 18,000 feet MSL is the altitude ceiling that is used when screening for potentially controversial noise exposures. Therefore, noise within the Meridian 2 MOA was not modeled above 18,000 feet MSL.

Noise modeling was conducted to estimate the DNL noise levels generated by the proposed flight activities at ground level. Populations underlying the Meridian 2 East MOA would be expected to experience an average estimated noise level of 38 dB DNL from aircraft training activities. Populations underlying the Meridian 2 West MOA would be expected to experience an average estimated noise level of 36 dB DNL from aircraft training activities. These predicted DNL values are lower than the expected ambient noise conditions for both the rural and agricultural areas beneath the proposed airspace, and well below the level at which speech interference or hearing loss would occur. Therefore, the percentage of people annoyed by noise would be insignificant.

Peak Flyover Noise Levels within the Proposed Airspace. Although there would be no significant change in average noise levels for areas underneath the proposed airspace, peak noise levels from aircraft flyovers would at times be audible at locations near an aircraft's flight path. As previously discussed, peak noise levels from aircraft flyovers vary based on changes in aircraft flight profiles such as weight, daily and seasonal weather fluctuations, wind, and power settings. The same aircraft flight profile data used to model the average noise levels (see **Appendix G**) was used to model the peak flyover noise levels.

Noise modeling was used to estimate the number of individual flyovers at 45 dB SEL that would be audible on the ground during a 30-day period.

- Events at 45 dB SEL would occur approximately 8 times per month for populations underlying the Meridian 2 East MOA
- Events at 45 dB SEL would occur approximately 5 times per month for populations underlying the Meridian 2 West MOA.

This is less than one audible aircraft flyover per day. A peak flyover noise level of 45 dB SEL is comparable to a dishwasher running in an adjacent room (FICAN 2009). Outdoor and indoor speech intelligibility would be 100 percent during these flyovers, and sleep interference would be expected for less than 5 percent of persons. Since indoor speech intelligibility would be 100 percent during these flyovers, no impacts on child learning would be expected.

Noise modeling was used to estimate the number of individual flyovers at 65 dB SEL that would be audible on the ground during a 30-day period.

- Events at 65 dB SEL would occur approximately 1 time per month for populations underlying the Meridian 2 East MOA
- Events at 65 dB SEL would occur approximately 1 time per month for populations underlying the Meridian 2 West MOA.

Since approximately 90 percent of the flight activity within the proposed Meridian 2 MOA would occur at altitudes greater than 10,000 feet MSL, peak flyover noise levels of more than 65 dB SEL would be infrequent. A peak flyover noise level of 65 dB SEL is comparable to normal speech at approximately 3 feet (FICAN 2009). Indoor speech intelligibility would be 100 percent during these flyovers, and outdoor speech intelligibility would be approximately 95 percent at approximately 5 feet. Since indoor speech intelligibility would be 100 percent during these flyovers, no impacts on child learning would be expected. Sleep disturbance would be expected for less than 5 percent of persons.

Although peak flyover noise levels would not interfere with speech communication or other activities, and no impacts would be expected, persons accessing the Bienville National Forest could occasionally be annoyed by aircraft flyovers since they are expecting a quiet environment.

Conclusion. The estimated DNL values in the proposed Meridian 2 MOA are lower than the expected ambient noise environment. Therefore, the Proposed Action would not result in a significant change in overall background noise conditions for the area underlying the proposed airspace (including the Bienville National Forest). Infrequent peak noise levels could be expected from the intermittent aircraft flyover events. Therefore, no significant impact on the environment from noise would be expected.

4.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. Implementation of the No Action Alternative would result in a continuation of current noise conditions as discussed in **Section 3.2.2**. Therefore, no significant impact on the environment from noise would be expected.

4.3 Compatible Land Use

The Navy has established recommended land use guidelines for areas exposed to aircraft noise. These recommendations are intended to serve as guidelines for placement of noise zones and for development of land uses around military installations (U.S. Navy 2008). To determine land use compatibility, the type of land use is compared to the Navy recommended guidelines in relation to noise zones. Land uses are defined as compatible, conditionally compatible, or incompatible. Compatible refers to those land uses and related structures that are recommended within the specified noise zone without restriction. Incompatible refers to those land uses and related structures that are not recommended within the specified noise zone and should be prohibited. Conditionally compatible refers to land uses and related structures that are generally recommended within the specified noise zone, with certain restrictions. Restrictions can include limits on densities of people and structures, requirements that noise-level reduction measures be incorporated into the design and construction of structures, or the restriction that personnel should wear hearing protection devices. **Table 4-4** shows existing generalized land use classifications and their associated land use compatibility with noise zones. The generalized land use classifications do not represent the local community's land use designations; rather, these classifications are general categories that illustrate a basic land use compatibility of some common land use types.

Table 4-4. Generalized Land Use Compatibility Guidelines

General Land Use	DNL Noise Zones				
	< 65 dB	65–69 dB	70–74 dB	75–79 dB	80+ dB
Single-family residential					
Multi-family residential					
Assembly areas, churches, auditoriums		(1)			
Schools		(1)	(1)		
Commercial			(1)	(1)	
Industrial					
Recreational			(1)		
Open space/agricultural				(2)	(2)

For additional details on the land use compatibility guidelines presented in this table, please refer to OPNAVINST 11010.36C, *Air Installations Compatible Use Zones Program* (U.S. Navy 2008). This generalized table provides an overview of recommended land use.

Notes:

1. Measures to achieve noise level reduction need to be incorporated into the construction of the portions of these buildings where there are public facilities, office areas, or noise-sensitive areas.
2. Residential buildings not permitted.

Key:

Compatible
Conditionally Compatible
Incompatible

4.3.1 Proposed Action

4.3.1.1 NAS Meridian

There would be no personnel changes or construction activities as part of the Proposed Action. The additional sorties that would be flown at NAS Meridian would use existing flight tracks, profiles, and procedures. The Proposed Action would not involve changes to land use and would not affect the viability of existing land use in the vicinity of NAS Meridian; therefore, the *NAS Meridian Master Plan* would not require modification. No changes to off-installation land use would be required under the Proposed Action; therefore, no changes to land use activities would occur.

As discussed in **Section 4.2.1.1**, minimal acoustic changes in the area around NAS Meridian would be expected under the Proposed Action and no significant changes to the 2005 60 dB DNL noise contour would occur. As shown in **Table 4-4**, noise levels of less than 65 dB DNL are considered to have low or no impact on land use, including residential development (U.S. Navy 2008). Therefore, no significant impact on land use would be expected.

4.3.1.2 Transit Region

The Proposed Action would not involve ground-disturbing activities or changes to existing land use, and would not affect the viability of existing land uses. The FAA has determined that the increase in noise levels from the Proposed Action in the area underneath the transit region would be less than 5 dB DNL,

and that no additional analysis for the area under the transit region is needed (FAA Operations Support Group 2010). No significant changes to the 2005 60 dB DNL noise contour would occur. As shown in **Table 4-4**, noise levels of less than 65 dB DNL are considered to have low or no impact on land use, including residential development (U.S. Navy 2008). Therefore, no significant impact on land use would be expected.

4.3.1.3 Meridian 2 MOA

The Proposed Action would not involve ground disturbance or changes to land use and would not affect the viability of existing land uses.

As discussed in **Section 4.2.1.3**, populations underlying the Meridian 2 East MOA would likely experience an average estimated noise level of 38 dB DNL from T-45C training activities, and populations underlying the Meridian 2 West MOA would likely experience an average estimated noise level of 36 dB DNL. As shown in **Table 4-4**, noise levels of less than 65 dB DNL are considered to have low or no impact on land use, including residential development (U.S. Navy 2008).

Peak flyover noise levels of more than 65 dB SEL would be infrequent, occurring approximately 1 time per month in the Meridian 2 East and Meridian 2 West MOAs. Although peak flyover noise levels would not interfere with speech communication or other activities, persons accessing the Bienville National Forest could occasionally be annoyed by aircraft flyovers since they are expecting a quiet environment.

Therefore, no significant impact on land use would be expected.

4.3.2 No Action Alternative

Under the No Action Alternative, an increase in operations at NAS Meridian would not occur and no aircraft training would take place in the transit region or in the Meridian 2 MOA. Existing land use conditions would remain the same as described in **Section 3.3.2**. Therefore, no significant impact on land use would be expected.

4.4 Fish, Wildlife, and Plants

The factors considered when determining the significance of impacts on fish, wildlife, and plants are based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to proposed activities, and (4) the duration of ecological effects. A habitat perspective is used to provide a framework for analysis of general classes of effects (e.g., noise, human disturbance). Impacts from the Proposed Action on fish and wildlife (including sensitive and protected species) would be related to noise from aircraft training activities and direct collisions between wildlife (e.g., birds and bats) and aircraft within the airspace. Factors to be considered when determining the significance of impacts on fish and wildlife, including federally and state-protected species, from aircraft noise and collisions include the following:

- Aircraft noise is of a sufficient magnitude to result in rendering habitat unsuitable for a particular wildlife species in the long-term
- Aircraft noise disrupts wildlife to a magnitude that causes a substantial reduction in population size (i.e., population-level effect) from an increase in mortality or decrease in reproductive output

- Aircraft strikes and noise from aircraft operations jeopardizes the continued existence of a threatened or endangered species in the area or results in the destruction or adverse modification of federally designated critical habitat in the affected area
- Aircraft strikes with wildlife are so numerous that they result in a decline of a species population in the area.

4.4.1 Proposed Action

Impacts Applicable to the Entire ROI

The impacts and regulations discussed in this section apply to all three components of the Proposed Action (i.e., NAS Meridian, the transit region, and the proposed Meridian 2 MOA). Some of these resources are not discussed further (habitat and plants). A more detailed analysis specific to the fish and wildlife (including protected and sensitive species) that could be impacted by particular segments of the Proposed Action is contained in **Sections 4.4.1.1** through **4.4.1.3**.

Habitat. Since there are no ground-disturbing activities under the Proposed Action, habitat within the ROI would not be impacted by the Proposed Action.

Fish. Generally, fish have not been considered at risk from aircraft overflight disturbance. Since most fish and other aquatic organisms live entirely below the surface of the water, they do not experience the same sound levels that terrestrial animals experience (NPS 1994). Fish have also been found to habituate to disturbances caused by overflights (NAS JRB Fort Worth 2004). Since fish experience lower sound levels than terrestrial animals and because the increase in noise levels under the Proposed Action would be minimal, no significant impacts from aircraft overflights on fish in water bodies within the ROI would be expected.

Wildlife. The *Naval Air Training and Operating Procedures Standardization General Flight and Operating Instructions* (OPNAVINST 3710.7U) states that commanding officers of aviation units will take steps to prevent aircraft from frightening wild birds or driving them from their feeding grounds (U.S. Navy 2009b). When it is necessary to fly over known avian habitat, an altitude of at least 3,000 feet AGL will be maintained, conditions permitting. The response of wildlife to aircraft overflights is generally species-specific (NAS JRB Fort Worth 2004). However, a majority of studies have found that the more substantial wildlife responses (e.g., panic, running/flying from area, disruption of feeding/nesting behavior) occur as a result of low-altitude overflights (e.g., lower than 1,000 feet AGL) (NPS 2004). Under the Proposed Action, flights would generally occur above 7,000 feet MSL within the transit area. In the proposed MOA, the majority of the flight time would occur above 10,000 feet MSL since the transition area (i.e., the airspace between 8,000 and 10,000 feet MSL) would be used less than 10 percent of the time the MOA is active.

Low-altitude aircraft operations (i.e., arrivals and departures) would occur at NAS Meridian; however, similar operations have been occurring at the installation for several years. It is expected that wildlife species have habituated to the noise levels and disturbances caused by aircraft around NAS Meridian. The Proposed Action is not expected to result in chronic stress on animals or disruption of the normal activities of wildlife. Therefore, no significant impacts on wildlife from noise would be expected.

No significant impacts from BASH incidents on wildlife would be expected from the Proposed Action. The increase in sorties under the Proposed Action could increase BASH incidents, though the increase would most likely be very low and would not be expected to result in a decline in a wildlife population

within the ROI. See **Sections 4.4.1.1** through **4.4.1.3** for more detailed analyses specific to the particular components of the Proposed Action.

Protected and Sensitive Species. Potential impacts on threatened and endangered species, migratory birds, and bald eagles are discussed in the following sections.

Threatened and Endangered Species. Similar to the previous discussion for wildlife, noise resulting from the Proposed Action would not be expected to result in a "take" of threatened or endangered species or jeopardize the continued existence of a threatened or endangered species in the ROI. Potential aircraft strikes with threatened or endangered species would be unlikely and very rare, and would not be expected to jeopardize the continued existence of a threatened or endangered species within the ROI. Therefore, no effect on threatened or endangered species within the ROI would be expected from the Proposed Action. No known federally designated critical habitat occurs within the ROI (USFWS 2011). Therefore, no impacts from noise or BASH would be expected on threatened and endangered species.

Migratory Birds. According to the final rule on take of migratory birds by the Armed Forces (50 CFR Part 21) and the 2003 National Defense Authorization Act (see **Section 3.4.1**), the Armed Forces are authorized for the incidental taking of migratory birds, with limitations, that occurs during military readiness activities. If the Navy determined that training flights within the proposed Meridian 2 MOA would result in a significant effect on a population of migratory bird species, it would have to confer and cooperate with the USFWS to develop appropriate conservation measures to minimize or mitigate the identified significant effect. No significant effects on a population of a migratory bird species would be expected from the Proposed Action since no bird/wildlife strikes have been recorded from aircraft at NAS Meridian above 6,500 feet MSL (NAS Meridian 2011) and most species within the ROI would not likely occur at altitudes above 7,000 feet MSL. Furthermore, noise resulting from aircraft overflights would not be expected to increase migratory bird mortality or decrease reproductive output. Therefore, the Navy would not be required to confer with the USFWS to develop conservation measures to minimize impacts on migratory birds. The USFWS concurred with this finding in a letter dated August 30, 2011 (see **Appendix D**).

Bald Eagles. Within the counties underlying the ROI, known bald eagle breeding occurs only in Rankin and Lauderdale counties (MMNS 2001). Potentially disturbing individual aircraft overflights would be infrequent, and thus would not be expected to significantly disturb any potential nesting bald eagles. The Proposed Action would not be expected to disturb bald eagles to a degree that causes injury to an eagle, decreases productivity, or causes nest abandonment. Therefore, no significant impacts on bald eagles would be expected and the Navy would be in compliance with the Bald and Golden Eagle Protection Act.

Plants. Since there are no ground-disturbing activities under the Proposed Action, vegetation within the ROI would not be impacted by the Proposed Action.

Conclusion. Impacts on fish, wildlife, and protected and sensitive species for each of the components under the Proposed Action are discussed in detail in the following sections. No significant impacts on habitat or plants would be expected under the Proposed Action.

4.4.1.1 NAS Meridian

Fish. As discussed in **Section 4.4.1**, fish have been found to habituate to disturbances caused by overflights (NAS JRB Fort Worth 2004) and are assumed to experience lower sound levels than terrestrial animals (NPS 2004). Flights similar to the Proposed Action have occurred at NAS Meridian for several years; therefore, it is expected that fish in the area have habituated to noise and flights. No significant impacts on fish from noise would be expected.

Wildlife. As discussed in **Section 4.2.1.1**, the noise levels at NAS Meridian under the Proposed Action would likely increase by less than 1 dB DNL as compared to baseline conditions. This minimal increase in noise levels would not likely be noticeable to wildlife living in the installation vicinity. Low-altitude aircraft operations (i.e., arrivals and departures) would occur at NAS Meridian under the Proposed Action; however, these types of flights have occurred at the installation for several years. It is expected that wildlife species have habituated to the noise levels and disturbances caused by aircraft. The Proposed Action is not expected to result in chronic stress on animals or disruption of the normal activities of wildlife. No significant impacts on wildlife from noise would be expected.

The NAS Meridian BASH Plan includes procedures to aid supervisors and aircrews in identification and mitigation of high hazard situations.

In 2009, NAS Meridian recorded 83 BASH incidents with various wildlife species (the majority being bird species), which is approximately 0.04 percent of the total number of 2009 operations at NAS Meridian (NAS Meridian 2011). With more than 187,000 operations in 2009, a 10,000-operational increase would have a very low impact on additional BASH incidents. Additionally, the NAS Meridian BASH Plan (NAS Meridian 2007a) has established multiple procedures to minimize the potential for BASH incidents including procedures to aid supervisors and aircrews in identification and mitigation of high hazard situations (see **Section 3.4.2.1**). Minimal impacts on wildlife would be expected as a result of BASH incidents at NAS Meridian. Therefore, no significant impacts on wildlife from BASH incidents would be expected.

Protected and Sensitive Species. Potential impacts on threatened and endangered species and bald eagles are discussed in the following sections.

Threatened and Endangered Species. No threatened or endangered species have been documented on NAS Meridian; however, several species have the potential to occur within the vicinity of the installation (see **Table 3-10**). The noise levels at NAS Meridian would likely increase by less than 1 dB DNL as compared to 2009 baseline conditions. Similar to the previous discussion for wildlife, it is anticipated that any potential threatened or endangered species within the vicinity of NAS Meridian are already habituated to the current noise environment. Noise resulting from the Proposed Action would not be expected to result in a "take" of threatened or endangered species or jeopardize the continued existence of a threatened or endangered species in the vicinity of NAS Meridian. Since no threatened or endangered species have been identified on or directly adjacent to NAS Meridian, BASH incidents with these species would be unlikely. Therefore, no significant impacts on threatened and endangered species would be expected and consultation with the USFWS under Section 7 of the ESA would not be required. The USFWS concurred with this finding in a letter dated August 30, 2011 (see **Appendix D**).

Bald Eagles. No bald eagles have been observed on or in the vicinity of NAS Meridian and there are not enough suitable aquatic habitats at NAS Meridian to support breeding or foraging bald eagles (NAS Meridian 2007c). Therefore, no significant impacts on bald eagles would be expected.

4.4.1.2 Transit Region

Fish. The result of the FAA analysis indicates that average noise levels within the transit region would increase by less than 5 dB DNL as a result of the Proposed Action. As discussed previously, fish experience lower sound levels than terrestrial animals (NPS 1994); consequently, the minimal increase in noise levels would not be expected to be perceivable to fish. Fish have also been found to habituate to disturbances caused by overflights (NAS JRB Fort Worth 2004). Therefore, no significant impacts on fish from noise would be expected.

Wildlife. The minimal increase in average noise levels under the Proposed Action would not likely be noticeable to wildlife living beneath the transit region. Wildlife species are expected to habituate to aircraft individual overflights since these events would be infrequent. The Proposed Action is not expected to result in chronic stress on animals or disruption of the normal activities of wildlife. No significant impacts on wildlife from noise would be expected.

FAA nationwide strike statistics have shown that 95 percent of bird strikes occur below 3,000 feet AGL (CNIC 2010). Therefore, the airspace within the transit region would not be anticipated to contain many avian species itself. With very few exceptions, resident species would not likely occur at altitudes above 7,000 feet MSL. Therefore, very few, if any, birds would be expected to be affected by BASH incidents from the flights within the transit region. No significant impacts on wildlife from BASH incidents would be expected.

Protected and Sensitive Species. Potential impacts on threatened and endangered species and bald eagles are discussed in the following sections.

Threatened and Endangered Species. Noise resulting from the Proposed Action would not be expected to result in a "take" of threatened or endangered species or jeopardize the continued existence of a threatened or endangered species in the ROI. Threatened or endangered species underneath the transit region would be expected to experience minimal acoustic changes. Although individual overflights could potentially disrupt normal activities of threatened and endangered species, loud individual overflights would be infrequent. Since no bird/wildlife strikes have been recorded by NAS Meridian aircraft at altitudes above 6,500 feet MSL, the potential for bird/wildlife strikes within the transit region would be very low since the aircraft would fly at least 7,000 feet MSL after departing the airfield. Therefore, no significant impacts on threatened and endangered species would be expected and consultation with the USFWS under Section 7 of the ESA would not be required. The USFWS concurred with this finding in a letter dated August 30, 2011 (see **Appendix D**).

Bald Eagles. Within the counties underlying the transit region, known bald eagle breeding occurs only in Lauderdale County (MMNS 2001). Potentially nesting bald eagles underneath the transit region would be expected to experience only minimal acoustic changes. Bald eagles can soar to altitudes of 10,000 feet MSL (USFWS 2009); therefore, a potential to strike a bald eagle as a result of the Proposed Action exists within the transit region. However, this potential is anticipated to be very low since no bird/wildlife strikes have been recorded from aircraft at NAS Meridian above 6,500 feet MSL and raptors generally fly between altitudes of 700 and 4,000 feet MSL (see **Figure 3-7**). Operation of aircraft within the transit region would be in compliance with the Bald and Golden Eagle Protection Act. Therefore, no significant impacts on bald eagles would be expected.

4.4.1.3 Meridian 2 MOA

Fish. Fish in water bodies underlying the proposed Meridian 2 MOA would not experience average noise levels from aircraft training activities that exceed the approximate ambient noise level. In addition, peak flyover noise events would be infrequent. Therefore, fish would be expected to habituate to the disturbances caused by overflights. No significant impacts on fish from noise would be expected.

Wildlife. Wildlife living beneath the proposed Meridian 2 MOA would not be expected to be impacted by noise from aircraft training activities, since the ambient noise level would not change under the Proposed Action. As discussed in **Section 4.2.1.3**, the noise modeling estimated that individual aircraft flyover events of 65 dB SEL would occur approximately 1 time per month in the Meridian 2 East and Meridian 2 West MOAs. Such an infrequent event would not be expected to result in stress on animals or

disrupt the normal activities of wildlife. Therefore, no significant impacts on wildlife from noise would be expected.

Since flights within the proposed Meridian 2 MOA would not occur below 8,000 feet MSL, and no bird/wildlife strikes have been recorded from aircraft at NAS Meridian above 6,500 feet MSL, the potential for bird/wildlife strikes within the proposed Meridian 2 MOA would be low. Additionally, the NAS Meridian BASH Plan (NAS Meridian 2007a) has established multiple procedures to minimize the potential for BASH, including procedures to aid supervisors and aircrews in identification and mitigation of high hazard situations. See **Section 3.4.2.1** for further details on the BASH Plan. Therefore, no significant impacts on wildlife from BASH incidents would be expected.

As demonstrated by this catch, the Marathon Lake Recreational Area of the Bienville National Forest is stocked with catfish, bass and crappie.

Protected and Sensitive Species. Potential impacts on threatened and endangered species, migratory birds, and bald eagles are discussed in the following sections.

Threatened and Endangered Species. The potential impacts from aircraft overflights in the proposed Meridian 2 MOA on threatened and endangered species are expected to be similar to those discussed for wildlife. Threatened or endangered species within the ROI would not likely experience average noise levels that exceed the approximate ambient noise levels. Loud individual overflights would be infrequent and would not be expected to disrupt the normal activities of threatened and endangered species. Since no bird/wildlife strikes with aircraft have been recorded by NAS Meridian aircraft above 6,500 feet MSL (NAS Meridian 2011), it is unlikely that a threatened or endangered species would be struck by aircraft within the proposed Meridian 2 MOA airspace.

Studies conducted on the endangered red-cockaded woodpecker behavioral response to military training noises suggest that military aircraft (fixed-wing and helicopters) do not appear to be a significant limitation to red-cockaded woodpecker reproductive success and that training noise is not likely a limiting factor in the recovery of red-cockaded woodpeckers. A 3-year study conducted on red-cockaded woodpecker behavioral response to noise at Fort Stewart in southern Georgia found that red-cockaded woodpeckers did not flush from the nest during the incubation or early brooding phase when fixed-wing aircraft were greater than 600 meters from the nest and peak noise levels were less than 62 dB (USACE 2002). Red-cockaded woodpeckers would not occur within the proposed airspace since they nest and feed in the tree canopy and are year-round residents (i.e., they do not migrate). Therefore, they would not be expected to fly much higher than the tree canopy. The floor of the proposed Meridian 2 MOA is 8,000 feet MSL and 90 percent of the flight time in the proposed MOA would occur above 10,000 feet MSL. Individual aircraft flyover events of 65 dB SEL would occur approximately 1 time per month in the Meridian 2 East and Meridian 2 West MOAs (see **Section 4.2.1.3**). Because individual aircraft flyover events of 65 dB SEL would be infrequent and red-cockaded woodpeckers have been shown to habituate (i.e., did not flush from nest) to fixed-wing aircraft events of a similar noise level, no effect on red-cockaded woodpeckers would be expected. Furthermore, the Proposed Action would not be expected to diminish the red-cockaded woodpeckers' population, reproduction, or distribution.

No significant impacts on threatened or endangered species would be expected and consultation with the USFWS under Section 7 of the ESA would not be required. The USFWS concurred with this finding in a letter dated August 30, 2011 (see **Appendix D**).

Bald Eagles. Since bald eagles can soar to altitudes of 10,000 feet MSL (USFWS 2009), there exists the potential to strike a bald eagle within the proposed Meridian 2 MOA. However, this potential is anticipated to be very low since no bird/wildlife strikes have been recorded from aircraft at NAS Meridian above 6,500 feet MSL (NAS Meridian 2011) and raptors generally fly between altitudes of 700 and 4,000 feet MSL (see **Figure 3-7**). Within the counties underlying the proposed Meridian 2 MOA, known breeding occurs only in Rankin County (MMNS 2001), most likely near the Ross R. Barnett Reservoir, an approximately 33-square-mile lake along the northwestern boundary of the county. The Ross R. Barnett Reservoir is not directly underneath the proposed Meridian 2 MOA. Therefore, it is unlikely that breeding eagles use habitats underlying the proposed Meridian 2 MOA. As previously discussed, noise from individual aircraft overflights would be infrequent, and therefore would not be expected to disturb any potential nesting bald eagles. The Proposed Action would be in compliance with the Bald and Golden Eagle Protection Act. Therefore, no significant impacts on bald eagles would be expected.

4.4.2 No Action Alternative

Under the No Action Alternative, the proposed MOA would not be created, an increase in operations would not occur, and the number of MOAs in the region would remain the same. Therefore, no significant impacts on fish, wildlife, or plants would be expected.

4.5 Human Health and Safety

4.5.1 Proposed Action

Based on the SUA proposal requirements provided in FAA Order 7400.2H*, Procedures for Handling Airspace Matters* (FAA 2011b), the following factors were considered in determining the significance of impacts on airspace management:

- If the Proposed Action would impose major restrictions on air commerce opportunities
- If the Proposed Action would appreciably limit airspace access to a large number of users
- If modifications to ATC systems would be required.

Impacts on airspace use were assessed by comparing the projected military flight operations with existing conditions and civil aviation activities in the ROI.

4.5.1.1 NAS Meridian

Airspace Management

Since NAS Meridian has been in operation for more than 50 years, and T-45C aircraft have been assigned to the installation for more than 10 years, flight procedures are already well-established at the installation. Flights from the installation are coordinated by the joint Radar ATC Facility and are conducted in accordance with established ATC procedures. Approximately 187,841 aircraft operations were conducted at NAS Meridian in 2009. The additional 10,000 T-45C aircraft operations under the Proposed Action would represent a 5 percent increase as compared to the NAS Meridian 2009 baseline operations level shown in **Table 3-8**. The additional operations would be conducted using existing flight tracks, profiles, and procedures. It is expected that this increase would not impair the ability of the NAS Meridian Radar ATC Facility to coordinate flights from the installation or within the Class D airspace surrounding the installation. The additional operations would not be expected to cause problems with congestion at the installation. Therefore, no significant impacts on airspace management would be expected.

Aircraft Safety

Mishaps. T-45C accident incidences at NAS Meridian consist of less than one Class A mishap per year. The destruction of an aircraft where debris could reach the ground is classified as Class A; therefore, there are no impacts outside of the installation boundary associated with Class B and C mishaps. From 2000 to 2010, each of the five Class A mishaps that occurred were within or adjacent to the installation boundary. Therefore, the risk of a mishap where debris could reach the ground in the areas outside of the installation boundary is very low.

A comparison of operational and mishap data indicates that an increase in operations does not directly correlate to an increase in mishaps. For example, as shown in **Table 3-8**, there were approximately 13,119 more operations conducted at the airfield in 2006 than in 2009. No Class A mishaps with NAS Meridian aircraft occurred in 2006. Therefore, the risk of a Class A mishap is very low. NAS Meridian safe flying procedures, flight rules, and emergency procedures would apply to the proposed increase in operations at the airfield. The continued implementation of Navy guidance (OPNAVINSTs 3710.7U and 3750.6R) would also reduce the potential for mishaps. Therefore, no significant impacts on human health and safety from aircraft mishaps would be expected.

Bird/Wildlife Aircraft Strike Hazards. As previously discussed, there were 18 recorded damaging BASH incidents at NAS Meridian in the 12-year period from 1998–2010. In 2009, only 2 percent of the recorded bird/wildlife strikes caused damage to aircraft; none of these strikes resulted in the destruction of the aircraft. In 2010, there were no BASH incidents that caused damage to aircraft. Given the low number of damaging BASH incidents over the past 12 years, and specifically the past 2 years, the 5 percent operational increase under the Proposed Action would not contribute significantly to BASH incidents. The NAS Meridian BASH Plan would continue to be implemented and would minimize the potential for BASH incidents, since the Plan includes procedures to aid supervisors and aircrews in identification and mitigation of high hazard situations (NAS Meridian 2007a). Please see **Section 3.4.2.1** for a description of the NAS Meridian BASH Plan. Therefore, no significant impacts on human health and safety from BASH incidents would be expected.

Accident Potential Zones

As discussed in **Section 3.5.1.3**, APZs follow departure, arrival, and flight pattern tracks and are based upon historical accident data. The size and shape of the APZs are not affected by the number of aircraft operations conducted at an installation. The 10,000 operations included under the Proposed Action would be conducted using existing flight tracks; therefore, there would be no change in the existing APZs. APZs are not predictors of accidents nor do they reflect accident probability. APZs are areas around an airfield where an aircraft mishap is most likely to happen if one occurs. From 2000 to 2010, each of the five Class A mishaps that occurred were within or adjacent to the installation boundary. Therefore, the risk of a Class A mishap within the APZs in the areas outside the installation boundary is very low. No significant impacts on human health and safety from mishaps within the APZs would be expected.

4.5.1.2 Transit Region

Airspace Management

As discussed in **Section 2.2,** the transit region is not proposed to be established as SUA like the Meridian 2 MOA. The size and shape of the transit region was estimated in this EA for the purpose of analyzing the impact of T-45C aircraft operations from NAS Meridian to the Meridian 2 MOA. The transit region airspace would continue to be managed by the Memphis ARTCC.

As discussed in **Section 3.5.2.2**, when departing from NAS Meridian, a T-45C aircraft typically reach an altitude of 5,000 feet MSL about 5 NMs from the airfield. T-45C aircraft would be at an altitude of 7,000 feet MSL by the time they would pass by Key Field Airport on the way to the Meridian 2 MOA. If they refueled at Key Field Airport, the aircraft would reach the same altitudes at the same distances (i.e., 2,000 feet MSL at 0.5 NMs, and 5,000 feet MSL at 5 NMs) as they would when departing from NAS Meridian.

Although TW-1 pilots currently fly between NAS Meridian and Key Field Airport, they do not currently fly between Key Field Airport and the proposed Meridian 2 MOA. TW-1 pilots typically do not fly over urban areas, including the downtown area of the City of Meridian.

In FY 2010, a total of 89,057 operations were conducted at Key Field Airport (FAA 2011a), which consisted of based ANG, civilian, and transient (including TW-1) operations. For the purpose of this EA, it was estimated that T-45C traffic at Key Field Airport would increase by approximately 25 percent after implementation of the proposed Meridian 2 MOA (NGB 2011). This increase in TW-1 flights would be a 3 percent increase in the total number of annual operations at Key Field Airport as compared to 2010 baseline conditions. NAS Meridian ATC procedures governing such things as operating in formation, right-of-way rules, aircraft speed, and minimum safe altitudes would continue to be applied to the flights between NAS Meridian and Key Field Airport. Therefore, no significant impact from the proposed increase in aircraft operations would be expected in the eastern portion of the transit region.

Since the transit region between Key Field Airport and the proposed Meridian 2 MOA would remain non-military airspace, civilian aircraft operating in the area would continue to coordinate their flights with the Memphis ARTCC in accordance with FAR Part 91. As discussed in **Section 2.2**, Memphis ARTCC reviewed and commented on the airspace proposals for the Meridian 2 MOA. Consequently, it is expected that Memphis ARTCC would ensure that T-45C aircraft movements through the transit area would not create any problems with congestion, or restrict the movement of transient general aviation aircraft or commercial aircraft using V-194 or V-543. Therefore, no significant impact from the proposed increase in aircraft operations would be expected in the western portion of the transit region.

FARs are designed to promote safe aviation, thereby protecting pilots, passengers, and the general public from unnecessary risk.

Aircraft Safety

Mishaps. The number of mishaps and the hazards associated with the transit region would be expected to be similar to those for the Meridian 2 MOA, which is discussed in **Section 4.5.1.3**. In addition, T-45C aircraft would not be conducting any training activities within the transit region, this area would be used strictly for movement between NAS Meridian and the proposed MOA. Therefore, the risk of aircraft mishaps is likely to be slightly lower within the transit region than within the Meridian 2 MOA. Therefore, no significant impacts on human health and safety from aircraft mishaps would be expected.

Bird/Wildlife Aircraft Strike Hazards. FAA nationwide strike statistics have shown that 95 percent of bird strikes occur below 3,000 feet AGL and within 5 NMs of an airfield (CNIC 2010). There have not been any bird/wildlife strikes with NAS Meridian aircraft that were recorded at altitudes above 6,500 feet MSL outside of the NAS Meridian airfield environment. The vast majority of strikes occurred under 3,000 feet MSL (NAS Meridian 2007a, NAS Meridian 2011). Therefore, the potential for bird/wildlife strikes within the transit region is relatively low, due to the higher altitude of the aircraft. From 2000–2010, no Class A mishaps as a result of bird strikes occurred within the NAS Meridian local flying area. The continued implementation of Navy procedures (OPNAVINSTs 3710.7U and 3750.6R)

would also reduce the potential for bird/wildlife strikes (U.S. Navy 2009a, NAS Meridian 2007a). Therefore, no significant impacts on human health and safety from BASH incidents would be expected.

4.5.1.3 Meridian 2 MOA

Airspace Management

Memphis ARTCC would be the controlling agency for the proposed Meridian 2 MOA and TW-1 would be the using agency (TW-1 2009). Generally, the controlling agency is the FAA ATC facility that is in charge of the airspace when an SUA is not activated. The using agency is the military unit or other organization whose activity established the requirement for the SUA. The using agency is responsible for ensuring that the airspace is used only for its designated purpose, proper scheduling procedures are established and adhered to, the controlling agency is kept informed of changes in scheduled activity including the completion of activities for the day, and a point-of-contact is made available to enable the controlling agency to verify schedules and coordinate access for emergencies and weather diversions (FAA 2011b). Scheduling of the proposed Meridian 2 MOA would be conducted by the Commander, TW-1, NAS Meridian via a letter of agreement (LOA) and the Weekly Facilities Coordination Plan (TW-1 2009).

It is DOD policy and Navy policy (OPNAVINST 3770.2K) that military airspace will be made available for civilian use when it is not required by the DOD (DOD 2003). In addition, FAA policy states that SUA is released to the controlling agency and made available to nonparticipating aircraft during periods when the airspace is not needed for its designated purpose (FAA 2011b). Therefore, the Meridian 2 MOA would be considered a shared-use MOA even though there are no operations anticipated from other military units at this time.

Shared-use procedures are specified in an LOA between the using agency and the controlling agency. These letters should include provisions for the activation/deactivation of the airspace, where such capabilities exist. They should also provide for the timely notification to the controlling agency when the scheduled activity has changed, been canceled, or was completed for the day.

Coordination between the services over shared use of military airspace and other training assets is an ongoing activity. Significant planning has occurred to anticipate needs, identify potential problems, and develop workable solutions for issues associated with use of these airspace and associated ATC requirements. Such planning, continuing after implementation of the Proposed Action, should ensure that impacts associated with use of airspace and airspace management requirements are minimal. Memphis ARTCC would provide similar services to the Meridian 2 MOA that are currently provided for the Meridian 1 MOA.

Impacts on airspace management are predicated to the extent that the Proposed Action would affect air traffic within the defined ROI, and air traffic within the surrounding ARTCCs and adjacent airports. As discussed in **Section 2.1**, the size of the original proposed Meridian 2 MOA has been reduced by approximately 700 square NM (about 35 percent) and reshaped substantially to accommodate requests from the FAA and civilian aviation. The final design of the proposed MOA is the result of changes that have been made to comply with the requirements of Memphis ARTCC, Houston Center ARTCC, Jackson Approach Control, and Meridian Approach Control so that aircraft can arrive and depart into the adjacent airports with minimal impacts.

Certain sections of the proposed MOA would be activated less than others. As discussed in **Section 2.2**, the Meridian 2 East MOA would be the primary training area. The Meridian 2 West MOA would be activated when it was required, which is anticipated to be less than 25 percent of the time during training

periods. In addition, since the airspace between 8,000 to 10,000 feet MSL would be used for transit and coordination and as a buffer, it would be used approximately 10 percent of the time during training periods (see **Appendix F**). Therefore, the Meridian 2 West MOA and the airspace between 8,000 to 10,000 feet MSL would be open more frequently than the rest of the proposed MOA.

Federal Airways (V-11, V-194, V-417, V-543, and V-555). The majority of the Victor Routes (V-194, V-417, V-543, and V-555) traverse a small portion of the proposed MOA. V-11 would traverse the entire width of the proposed Meridian 2 East MOA. As discussed in **Section 3.5.2.3**, approximately 232 flights per month occur along V-11, V-194, V-455, V-543, and V-555 (Memphis ARTCC 2007). According to the *Aeronautical Study*, realignment of the affected airways would be impractical and would provide no quantifiable benefit (Memphis ARTCC 2007).

Enroute charts provide detailed information useful for instrument flight, such as NAVAIDs, standard airways, airport locations, and minimum altitudes. Enroute charts are divided into high- and low-altitude versions; the division in the United States is 18,000 feet MSL.

VFR traffic is not prohibited from flying through an active MOA; consequently, VFR traffic would be able to transit on Victor Routes at their own risk. Aircraft flying IFR would not be able to transit the portion of the Victor Routes within the MOA if it was active. This would ensure IFR aircraft are separated from military activities, which can be dangerous for nonparticipating aircraft. Aircraft flying IFR would be given alternative routes or altitudes that do not impinge on the Meridian 2 MOA (Memphis ARTCC 2007), in order to ensure safe flying conditions for both military and civilian traffic. Aircraft filed at 8,000 feet MSL and above would either have to accept a lower altitude (7,000 feet MSL and below) or be given a revised route in order to receive clearance to their requested altitude, which equates to possible delays and additional fuel costs. This is expected to be a reasonable method of transitioning aircraft through the area when the MOA is active. The need to use alternative routes during the time of exclusion from the proposed MOA does not constitute a serious disruption to commercial aviation, since the scheduled flight can still occur even with minor increases in time and fuel. The FAA expects that the slight increase in time and fuel for aircraft along the affected Federal airways would not be significant; these impacts would likely be minimal (FAA Military Liaison Officer 2009).

Regional Airports. As discussed in **Section 2.1**, arrivals and departures from Jackson-Evers IAP, Key Field Airport, and Hesler-Noble Field Airport were identified during creation of the proposed MOA as being the most likely to be affected by the proposal; therefore, impacts on these airports are discussed in detail in this section.

Jackson-Evers IAP. Arriving and departing aircraft from Jackson-Evers IAP to and from the east would be compressed into a corridor of airspace between the existing Meridian 1 West MOA and the proposed Meridian 2 MOA. This compression of airspace could delay their climb or descent (Memphis ARTCC 2007), which would be expected to be a minor impact on airspace management. Aircraft departing Jackson-Evers IAP en route to Florida would be issued a revised route to remain clear of the new MOA. Aircraft flying IFR would be given alternative routes or altitudes that do not impinge on the Meridian 2 MOA (Memphis ARTCC 2007). This would ensure a safe operating environment for both civilian and military aircraft. Aircraft filed at 8,000 feet MSL and above headed southeast would either have to accept a lower altitude (7,000 feet MSL and below) or be given a revised route in order to receive clearance to their requested altitude, which would equate to some delays and additional fuel costs. This is expected to be a reasonable method of transitioning aircraft through the area when the MOA was active. As discussed previously, the need to use alternative routes when the MOA was active does not constitute a serious

disruption to commercial aviation, as the scheduled flight can still occur even with minor increases in time and fuel.

Aircraft following the published approach to Runway 34L (the southern end of the eastern runway at Jackson-Evers IAP) are flying at about 2,100 feet MSL approximately 10 NM from the airfield (AirNav 2009a); this is well below the floor of the proposed MOA at 8,000 feet MSL. Therefore, no impact on this approach would be expected.

Key Field Airport. The vast majority of instrument approaches into Key Field Airport would not be affected by the Proposed Action. There are two approaches that would be impacted; these approaches are used on a daily basis by Navy aircraft returning to NAS Meridian (Memphis ARTCC 2007). It is expected that NAS Meridian naval aviators would be able to modify these approaches to Key Field Airport when the MOA is active. Published approaches that would be used by commercial aircraft into Key Field Airport would not be affected by the proposed MOA.

Hesler-Noble Field Airport. The proposed MOA would overlap with the Class E airspace surrounding Hesler-Noble Field Airport; however, the Memphis ARTCC concluded in their 2007 *Aeronautical Study of Meridian 2 MOA* that this overlap would have no effect (Memphis ARTCC 2007) on airspace management.

The elevation of the published southern approach into Hesler-Noble Field Airport at approximately 10 NM from the airfield is 2,300 feet MSL (AirNav 2009c); this is well below the floor of the proposed MOA at 8,000 feet MSL. Therefore, no significant impact on this approach would be expected.

Remaining Airports in the Region. The proposed airspace would cause aircraft arriving at several of the airports listed in **Table 3-13** to begin to descend early. This early descent would be required for the arriving aircraft to be below the floor of the MOA prior to reaching its boundary. The proposed airspace would also impact some of the departures from the airports listed in **Table 3-13**. Departing aircraft could be held under the active airspace or be given a revised route in order to receive clearance to their requested altitude. This is expected to be a reasonable method of transitioning aircraft through the area when the MOA is active. The need to use alternative routes when the MOA was active does not constitute a serious disruption to commercial aviation, since the scheduled flight can still occur even with minor increases in time and fuel. The proposed MOA would have no impact on airport capacity (Memphis ARTCC 2007).

The proposed MOA would not be expected to impact airport access or capacity; airport traffic patterns; or Class C, D, and E surface areas (Memphis ARTCC 2007). The FAA expects that the delays that civilian aircraft would experience as a result of the implementation of the Meridian 2 MOA would not be significant, and would likely be minimal (FAA Military Liaison Officer 2009).

The FAA expects that the delays that civilian aircraft would experience as a result of the establishment of the Meridian 2 MOA would likely be minimal.

Regional Impact on Flight Traffic Flow. Currently, all departures filed to a location southeast of Jackson, are cleared on a course directly to their final destination, often climbing above 8,000 feet MSL. Under the Proposed Action, there would be instances when aircraft cleared on these routes would be given alternative routes or would have to fly at an altitude of 7,000 feet MSL or lower (Memphis ARTCC 2007).

The proposed MOA would affect IFR traffic into airports in Mobile, Alabama. (See **Section 3.5.2.3** for a description of the ARTCC boundaries in proximity to the ROI.) The Memphis ARTCC is obligated via an LOA with

the Houston ARTCC to ensure arriving aircraft into the Mobile area are descending to 11,000 feet MSL and are below 13,000 feet MSL prior to crossing the boundary between the Memphis and Houston ARTCCs. Aircraft departing from or arriving to airports in close proximity to the Memphis/Houston ARTCC boundary could be issued revised routings to avoid the proposed MOA or be held below the active airspace. The same principle would apply to airports in close proximity to the Memphis/Atlanta ARTCC boundary (Memphis ARTCC 2007). The FAA expects that the delays that civilian aircraft would experience as a result of the implementation of the Meridian 2 MOA would not be significant, and would likely be minimal (FAA Military Liaison Officer 2009). Specifically, jet traffic arriving to and departing from airports below the MOA could be impacted since they normally prefer to transit at altitudes above 8,000 feet MSL. It is possible they would have to descend to altitudes below the MOA earlier for arrivals or delay their altitude increase on departures until they were clear of the lateral confines of the MOA.

Conclusion. The proposed MOA could minimally impact arrivals and departures into local airports, Federal airways, and ARTCCs as discussed. No standard terminal arrival routes would be affected by the proposed MOA. In addition, airport traffic patterns, and Class D and E surface areas are not expected to be impacted (Memphis ARTCC 2007). The vast majority of instrument approaches would not be impacted by the proposed MOA due to the floor altitude of 8,000 feet MSL (Memphis ARTCC 2007). Civilian aircraft flights could be affected if there was a serious disruption to commercial aviation. A serious disruption occurs when an aircraft is unable to proceed to its intended destination. However, the need to use alternative routes when the MOA was active does not constitute a serious disruption since the scheduled flight could still occur even with minor increases in time and fuel. Therefore, no significant impact on airspace management would be expected.

Aircraft Safety

Under the Proposed Action, impacts from aircraft flights would be reduced by established ATC procedures and FAA Orders. LOAs would be established between the Memphis ARTCC (the controlling agency) and TW-1 (the using agency) to define responsibilities and procedures to be used in the MOA (Memphis ARTCC 2007). Implementation of the Naval Air Training and Operating Procedures Standardization (NATOPS) Program training rules provided in Navy guidance (OPNAVINST 3710.7U) for the operational activities included under the Proposed Action would also be expected to reduce the potential for impacts from aircraft flights, as a reducing aircraft mishaps is one of the primary goals of the NATOPS Program (U.S. Navy 2009b).

Under the Proposed Action, measures would be taken to ensure containment of the flying activities discussed in **Section 2.2** within the proposed MOA. Standard Operating Procedures for the new airspace would be developed and employed to ensure appropriate airspace management by all participating aircraft, which would reduce the potential for airspace safety issues such as crowding or mishaps. All aircraft experiencing emergencies or malfunctions would handle them in accordance with established aircraft-specific procedures and coordinated all special handling requirements with ATC.

As previously discussed, the airspace between 8,000 to 10,000 feet MSL would be used as a transition area before TW-1 would climb above 10,000 feet MSL to train. TW-1 would not complete the training exercises shown in **Tables 2-1** and **2-2** within the 8,000 to 10,000 feet MSL region. In addition, this airspace would be used as a buffer for students practicing their training activities. This buffer would be expected to reduce the potential for mishaps with civilian aviation because the proposed MOA activities would be separated by non-SUA airspace by approximately 2,000 feet MSL.

Mishaps. The destruction of an aircraft where debris could reach the ground is classified as Class A; therefore, there are no impacts associated with Class B and C mishaps. As discussed in **Section 3.5.2.3**,

no Class A mishaps have occurred within the NAS Meridian local flying area (i.e., Meridian 1, Pine Hill, and Birmingham MOAs) or during transit to these MOAs in the past 10 years (U.S. Naval Safety Center 2010a). Therefore, the risk of a mishap within the proposed Meridian 2 MOA is very low.

As part of the NATOPS Program, implementation of the training rules for the operational activities included under the Proposed Action would be expected to reduce the potential for mishaps (U.S. Navy 2009b). For example, per Navy guidance (OPNAVINST 3710.7U), ACM (the primary MOA activity) must be closely supervised and training rules applied that will provide a high degree of safety for all concerned. ACM training flights would be conducted under a formal training syllabus under direct supervision of flight leaders and after participants have been thoroughly briefed on the conduct of the flight. Navy guidance provides ACM training rules, communication requirements, weather criteria, altitude restrictions, termination procedures, and special considerations, which are intended to provide guidance for conducting effective mishap-free training (U.S. Navy 2009b). ACM training rules for the Meridian 2 MOA would be thoroughly reviewed during aircrew annual NATOPS evaluations. Similar training rules are provided for the other operational activities included under the Proposed Action. Therefore, no significant impacts on human health and safety from aircraft mishaps would be expected.

Bird/Wildlife Aircraft Strike Hazards. The potential for a bird/wildlife strike always exists whenever aircraft operate and implementation of the Proposed Action would increase the number of hours pilots spend in the airspace. However, 95 percent of bird strikes nationwide occur below 3,000 feet AGL (CNIC 2010), and the floor of the proposed MOA is 8,000 feet MSL. As shown in **Table 3-14**, NAS Meridian recorded 11 bird/wildlife strikes outside of their airfield environment since 1998 and no bird/wildlife strikes outside of the NAS Meridian airfield environment were recorded at the altitudes proposed for the Meridian 2 MOA. Therefore, the potential for bird/wildlife strikes within the Meridian 2 MOA is relatively low. The continued implementation of Navy procedures (OPNAVINSTs 3710.7U and 3750.6R) would also reduce the potential for bird/wildlife strikes (U.S. Navy 2009a, NAS Meridian 2007a). Therefore, no significant impacts on human health and safety from BASH incidents would be expected.

4.5.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. TW-1 would not be able to complete the additional sorties that are required as a result of the change in the Navy's training syllabus. Consequently, TW-1 would not be able to meet their training requirements, which would adversely impact their training mission and anticipated future naval needs. Implementation of the No Action Alternative would result in a continuation of current airspace management and aircraft safety conditions as discussed in **Section 3.5.2**. Therefore, no significant impact on airspace management and aircraft safety would be expected.

4.6 Light Emissions and Visual Impacts

4.6.1 Proposed Action

4.6.1.1 NAS Meridian

Light Emissions

Under the Proposed Action persons living in the NAS Meridian vicinity would see aircraft arriving and departing from the installation 5 percent more frequently as compared to 2009 baseline conditions. Since the aircraft type would remain the same, and there would be no change in flight tracks or profiles, this

proposed increase in operations would not be expected to annoy the vast majority of persons and would not interfere with their normal activities. As such, no significant impact from aircraft light emissions would be expected.

Visual Impacts

The Proposed Action would not require construction of any facilities or result in ground-disturbing activities. Therefore, no structures would be erected that could block the view of a scenic area. NAS Meridian T-45C aircraft completed 187,841 aircraft operation in 2009; therefore, persons living in the installation vicinity are already accustomed to the sight of T-45C aircraft arriving and departing from the installation. Consequently, the 5 percent increase in aircraft operations would not be expected to alter an existing visual setting. Therefore, no significant impact on the existing visual setting from the proposed increase in aircraft operations would be expected.

4.6.1.2 Transit Region

Light Emissions

As discussed in **Section 3.5.2.2**, the eastern portion of the transit region between NAS Meridian and Key Field Airport is already in use by T-45C aircraft. A T-45C aircraft that departs NAS Meridian and heads directly to the MOA would be at an altitude of 5,000 feet MSL at a distance of 5 NMs from the airfield and would be above 7,000 feet MSL by the time it passes to the north of Key Field Airport. Normal aircraft lighting at these altitudes lacks the intensity to have significant impacts on human activity. T-45C aircraft lights could be noticeable as the aircraft are arriving and departing from Key Field Airport. However, due to the existing level of aircraft traffic at Key Field Airport, and the fact that T-45C aircraft currently refuel at this Airport, the potential increase in aircraft traffic on the existing flight tracks would not be a noticeable difference from the twinkling lights that are already visible under existing conditions. Therefore, no significant impact from aircraft light emissions would be expected.

Visual Impacts

Aircraft proceeding directly to the proposed MOA via the transit region would be operating at sufficient altitudes as to not be readily visible from the ground. T-45C aircraft do not currently fly between Key Field Airport and the proposed MOA. However, the aircraft would be above 7,000 feet MSL for the majority of the transit region between the proposed MOA and Key Field Airport. TW-1 pilots could fly directly from the proposed Meridian 2 MOA to NAS Meridian or stop at Key Field Airport to refuel and then fly to their destination. Since TW-1 pilots already stop at Key Field Airport to refuel, they would arrive to and depart from Key Field Airport using existing flight patterns.

When T-45C aircraft fly to the north of Key Field Airport at an altitude 7,000 feet MSL, the aircraft lighting would only be visible at night as a small twinkling light in the sky.

The transit region between Key Field Airport and the proposed MOA is rural with scattered residential houses. Visual resources are normally impacted if there would be a substantial alteration to an existing sensitive visual setting. T-45C aircraft operating within the transit area could be visible under certain conditions; however the aircraft would not be prominent. Given that the setting is rural, and the aircraft would not be prominent, it is not likely that the Proposed Action would alter the visual setting. Therefore, no significant impact on the existing visual setting from the proposed increase in aircraft operations would be expected.

4.6.1.3 Meridian 2 MOA

Light Emissions

The floor of the proposed Meridian 2 MOA is 8,000 feet MSL. Normal aircraft lighting at these altitudes lacks the intensity to have significant impacts on human activity. Therefore, no significant impact from aircraft light emissions would be expected.

Visual Impacts

T-45C aircraft at the altitude of the proposed MOA (8,000 to 17,999 feet MSL) could be visible under certain conditions; however the aircraft would not be prominent. Therefore, no significant impact on the existing visual setting from the establishment of the Meridian 2 MOA would be expected.

4.6.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. The anticipated future requirements would not be met under the No Action Alternative. There would be no change in baseline conditions as described in **Section 3.6.2**. Therefore, there no significant impact from aircraft light emissions or on the existing visual setting would be expected.

4.7 Historical, Architectural, Archaeological, and Cultural Resources

36 CFR Part 800 of the NHPA discusses procedures for assessing adverse effects on historic properties. An action would result in adverse effects on a historic property listed or eligible for listing in the NRHP if the action would alter the property's characteristics, including relevant features of its environment or use, which qualifies the property as significant according to NRHP criteria. Effects include physical destruction, damage, or alteration of all or part of the resources; alteration of the character of the surrounding environment that contributes to the resource's qualifications for the NRHP; introduction of visual, audible, or atmospheric elements that are out of character with the resource or alter its setting; or neglect of the resource resulting in its deterioration or destruction. Cultural resources are potentially affected by increased noise levels and vibrations or visual intrusions from overflights.

4.7.1 Proposed Action

There are two historic or archaeological properties at NAS Meridian, 43 properties within the transit region, and three properties within the proposed MOA, respectively, which are listed or eligible for listing in the NRHP. The Proposed Action does not include ground-disturbing activities and acoustic changes to the environment surrounding historic properties from aircraft overflights would be minimal. Therefore, the Proposed Action would have no effect on historic properties or archaeological sites which are listed in or qualify for inclusion in the NRHP.

Currently, the Navy has not identified any resources at NAS Meridian, beneath the transit region, or beneath the proposed MOA that qualify as traditional cultural properties, sacred sites, or sites of religious or cultural significance. Therefore, the Navy has concluded that the Proposed Action would have no significant impact on historic properties, archaeological sites, or Native American sites at NAS Meridian, within the transit region, or within the proposed Meridian 2 MOA. The Choctaw tribe was notified of the Proposed Action in a letter dated 10 March 2011 (see **Appendix C**) and the tribe offered no comments to the Navy.

4.7.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and baseline conditions for cultural resources would remain unchanged. There would be no significant impact on cultural resources as a result of implementation of the No Action Alternative.

4.8 Wastes and Hazardous Materials

The factors considered when determining the significance of impacts on hazardous materials, hazardous waste, and solid waste management, and pollution prevention, are based on (1) compliance with applicable Federal or state regulations, (2) the amounts of hazardous materials, hazardous wastes, and solid waste generated or procured, and (3) compliance with the existing Pollution Prevention program at NAS Meridian.

4.8.1 Proposed Action

An additional 5,000 sorties would be conducted under the Proposed Action, consequently, the potential for a release of hazardous materials or petroleum products from a mishap at NAS Meridian, within the transit region, or within the proposed Meridian 2 MOA would also increase as compared to baseline levels. However, as discussed in **Section 3.5.2**, T-45C accident incidences at NAS Meridian consist of less than one Class A mishap per year. From 2000 to 2010, there were no impacts from Class A mishaps in the transit region, since each of the five Class A mishaps during this time period occurred within or adjacent to the installation boundary. No Class A mishaps have occurred within the NAS Meridian local flying area (i.e., Meridian 1, Pine Hill, Camden Ridge, and Birmingham MOAs) or while in transit to these MOAs in the past 10 years (U.S. Naval Safety Center 2010a). Therefore, the risk of a mishap at NAS Meridian, within the transit region, or within the proposed Meridian 2 MOA is very low.

In the unlikely event that a Class A mishap was to occur at NAS Meridian, within the transit region, or the proposed Meridian 2 MOA, it is anticipated that any hazardous materials or petroleum products released into the environment as a result of a mishap would be minimal and localized. These materials would be cleaned up in accordance with Navy guidance (OPNAVINST 5090.1C, *Environmental Readiness Program Manual*); NAS Meridian's Facility Response Plan and SPCC Plan; and Federal, state, and local regulations. Any unintended material releases at NAS Meridian during refueling or fuel transfer operations would also be cleaned up in accordance with these plans and regulations. Therefore, no significant impact from unintended material release would be expected.

The transit region to the proposed MOA and the establishment of the proposed MOA would not require a change in the hazardous materials, hazardous waste, solid waste, or pollution prevention management programs already in place at NAS Meridian. These management programs are discussed in **Section 3.8.2**. Therefore, the transit region and the proposed MOA will not be discussed further in this section.

The following paragraphs discuss the potential impacts from increased maintenance activities and JP-8 consumption associated with the addition of 5,000 T-45 sorties at NAS Meridian.

T-45C maintenance activities would result in additional generation of hazardous wastes such as used oil, petroleum, and lubricants.

Hazardous Materials and Hazardous Waste

Maintenance activities require the use of hazardous materials such as lubricants, oils, and solvents. The additional 10,000 T-45C aircraft operations under the Proposed Action would represent a 5 percent increase as compared to the 2009 baseline operations level shown in **Table 3-8**. Therefore, it is anticipated that the quantity of products

associated with maintenance activities containing hazardous materials used during maintenance activities would be minimal. Maintenance activities would also result in additional generation of hazardous wastes such as used oil, petroleum, and lubricants. It is anticipated that the quantity of hazardous wastes generated from maintenance activities would be small. Hazardous wastes would be handled under the existing DOD RCRA-compliant waste management programs and, therefore, would not be expected to increase the risks of exposure to workers and installation personnel. As such, no significant impacts from hazardous material and hazardous waste generation would be expected.

Pollution Prevention

Quantities of hazardous materials and off-installation transport of hazardous waste could slightly increase as a result of increased maintenance activities associated with the additional sorties. The Hazardous Material Minimization Center at NAS Meridian will continue to use the RHICS to manage and control the issuance and accountability of any additional hazardous materials needed to support aircraft maintenance activities on the installation. Adherence to the Pollution Prevention Management Plan, Facility Response Plan, and SPCC Plan would minimize or attenuate potential adverse impacts from the Proposed Action.

Petroleum Products. The 5 percent increase in annual operations under the Proposed Action would equate to a slight increase in consumption of JP-8 at NAS Meridian. For purposes of this analysis, it is assumed that the T-45C aircraft, other military aircraft, and general aviation aircraft that operate at NAS Meridian consume the same amount of JP-8 per operation. As shown in **Table 3-8**, more than 99 percent of the 2009 annual operations at NAS Meridian were conducted with T-45C aircraft. Based on the total amount of aircraft operations in 2009 (187,676 operations) and the total amount of JP-8 consumed in 2009 (7,207,164 gallons), it is assumed that approximately 38 gallons of JP-8 was consumed per operation. Therefore, it is assumed that an additional 380,000 gallons of JP-8 would be consumed each year as a result of an increase of 10,000 T-45C operations. This would equate to an approximate 5 percent increase in the total amount of JP-8 consumed at NAS Meridian. Therefore, no significant impacts from increased JP-8 consumption would be expected.

Solid Waste

Maintenance activities would result in additional generation of solid waste at NAS Meridian. However, any increases in solid waste would be minimal since the additional waste would be recycled to the greatest extent possible. Solid waste that could not be recycled would be disposed of in accordance with relevant Federal, state, and local regulations. As a result, no significant impacts from generation of solid waste would be expected.

4.8.2 No Action Alternative

Under the No Action Alternative, the additional sorties would not be flown at NAS Meridian and the proposed Meridian 2 MOA would not be created. There would be no change in or impacts from hazardous materials and wastes at NAS Meridian if the Proposed Action were not implemented. Therefore, no significant impact from hazardous materials and wastes would be expected.

4.9 Socioeconomic Resources, Environmental Justice, and Children's Environmental Health and Safety Risks

Socioeconomics. This section addresses the potential for direct and indirect impacts the Proposed Action could have on local or regional socioeconomics. Impacts on local or regional socioeconomics are evaluated according to their potential to stimulate the economy through the purchase of goods or services and increases in employment. Similarly, impacts are evaluated to determine if overstimulation of the economy (e.g., housing availability is inadequate to accommodate increases in permanently based workforce) could occur as a result of the Proposed Action.

Factors to be considered when determining the significance of impacts on local or regional socioeconomics from aircraft noise include the following, according to FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures* (FAA 2006):

- Aircraft noise is of a sufficient magnitude to result in the extensive relocation of community businesses that would create severe economic hardship for the affected community
- Aircraft noise disrupts neighborhoods and communities to such a degree that fragmentation would occur
- High aircraft noise exposure would disproportionately impact minority or low-income communities
- Disproportionate health and safety impacts on children due to noise exposure
- A substantial loss in community tax base.

Environmental Justice and Children's Environmental Health and Safety Risks. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*; the accompanying Presidential Memorandum; and DOT Order 5610.2, *Environmental Justice* require the FAA to provide for meaningful public involvement by minority and low-income populations. This includes analysis, including demographic analysis, which identifies and addresses potential impacts on these populations that might be disproportionately high and adverse. Pursuant to EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, Federal agencies are directed to ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks (FAA 2006).

For the purposes of this EA, ethnicity and poverty data are considered for the areas examined in **Section 3.9.2** and compared to the State of Mississippi and the United States to determine if a low-income or minority population could be disproportionately affected by the Proposed Action. For this analysis, data from the U.S. Census Bureau were used to define minority populations (individuals who are Black/African-American, Asian, Pacific Islander, American Indian, Eskimo, Aleut, or other non-white persons [a separate distinction has been made for people of Hispanic origin]; low-income populations (individuals and families living below the poverty line); and children (individuals 17 years of age or younger).

Environmental Justice is analyzed to ensure disproportionate impacts on the following groups do not occur:

1. *Minority populations*
2. *Low-income populations*
3. *Children.*

4.9.1 Proposed Action

As discussed in **Section 3.9.2**, minority populations within Jasper and Jefferson Davis counties of the ROI are considerably higher than the rest of the counties underlying the proposed Meridian 2 MOA, state, and region. Seven counties within the ROI: Covington, Jasper, Jefferson Davis, Lawrence, Newton, Scott, and Simpson have poverty levels greater than 16 percent, which is the average percentage of families below the poverty level for the State of Mississippi.

4.9.1.1 NAS Meridian

Demographic Characteristics. The Proposed Action would not result in any changes to the population of the area. Additional employees would not be necessary to support the sorties included under the Proposed Action, resulting in no direct or indirect changes to population demographics. Therefore, no significant impacts from changes in population demographics would be expected.

Employment Characteristics. The Proposed Action would not result in the direct or indirect increase in employment. Although the number of sorties conducted by TW-1 would increase under the Proposed Action, no additional infrastructure or employment would be required. Therefore, no significant impacts from changes in employment would be expected.

Environmental Justice and Children's Environmental Health and Safety Risks. Disproportionate impacts on minority, low-income, and youth populations would not be expected as a result of the Proposed Action. As discussed in **Section 4.2.1**, the estimated average noise levels would not increase significantly under the Proposed Action. Disproportionate impacts on minority, low-income, and youth populations would not be expected to occur. Therefore, no significant impacts on environmental justice, and children's environmental health and safety risks would be expected.

4.9.1.2 Transit Region

Impacts in the transit region would be similar to those described for the Meridian 2 MOA.

4.9.1.3 Meridian 2 MOA

Demographic Characteristics. Implementation of the proposed MOA would not result in any changes to the population of the area. Additional employees would not be necessary to support the sorties included under the Proposed Action, resulting in no direct or indirect changes to population demographics. Therefore, no significant impact from changes in population would be expected.

Employment Characteristics. The Proposed Action would not result in the direct or indirect increase in employment. The implementation of the proposed MOA would not result in additional infrastructure or employment. Therefore, no significant impact from changes in employment would be expected.

Environmental Justice and Children's Environmental Health and Safety Risks. Jasper and Jefferson counties contain elevated minority populations (52 and 56 percent respectively) compared to the State of Mississippi (37 percent). Covington, Jefferson Davis, Jones, and Scott counties have poverty levels greater than that for the State of Mississippi (see **Table 3-19**). As discussed in **Section 4.2.1.3**, the estimated average noise levels under the Proposed Action would be lower than the expected ambient noise environment for both the rural and agricultural areas beneath the proposed airspace, and well below the level at which adverse health effects, such as speech interference or hearing loss, would occur. The percentage of people annoyed by noise never drops to zero, but at levels below 55 dB DNL, it is reduced enough to be insignificant (Finegold et al. 1994).

The noise modeling estimated that peak noise from individual flyover events would be audible (approximately 45 dB SEL) approximately 8 times per month for populations underlying the Meridian 2 East MOA, and approximately 5 times per month for populations underlying the Meridian 2 West MOA. This is approximately two audible aircraft flyover per week. A peak flyover noise level of 45 dB SEL is comparable to a dishwasher running in an adjacent room (FICAN 2009) (see **Section 4.2.1.3** for a complete discussion of noise impacts). Indoor speech intelligibility would be expected to remain at 100 percent during these flyovers; therefore, no impacts on everyday speech or child learning would be expected. A SEL of 45 dB is very low, and would not be disruptive to normal activities. Disproportionate impacts on minority, low-income, or youth populations would not be expected; therefore, no significant impacts would be expected.

4.9.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and NAS Meridian would continue operating under current conditions. No impacts on socioeconomics would be expected since no jobs would be created, expenditures for goods and services would be minimal, and there would be no increase in tax revenue as a result of employee wages or sales receipts. Therefore, no significant impacts on socioeconomics, environmental justice, and children's environmental health and safety risks would be expected.

4.10 Other Regulatory Requirements

Department of Transportation Act: Section 4(f). Section 4(f) of the DOT Act of 1966 (recodified in 1983 to 49 U.S.C. 303) was implemented in an effort to preserve the natural beauty of the countryside and public and recreational lands, wildlife and waterfowl refuges, and historic sites. The FAA, a cooperating agency for this EA, is one of several organizations within the DOT. Designation of airspace for military flight operations is exempt from Section 4(f) (Public Law 105-85, 111 Stat. 1916, Sec. 1079). Although not required under Section 4(f), the FAA has consulted with the U.S. Forest Service regarding possible constructive use impacts.

5. CUMULATIVE IMPACTS

5.1 Cumulative Impacts

The CEQ regulations for implementing NEPA define cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what other agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Consideration of cumulative impacts resulting from projects which are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future are factors of informed decisionmaking.

5.2 Projects Considered for Potential Cumulative Impacts

The ROI, unless otherwise defined for a particular resource category, is defined as the following: the area within the 60 dB DNL noise contour at NAS Meridian, the approximate transit region between NAS Meridian and the Meridian 2 MOA, and the proposed Meridian 2 MOA including the land underneath the Meridian 2 MOA airspace. The Proposed Action does not involve construction work. It is anticipated that the MOA would be established in late 2011.

The Navy investigated other actions and projects for evaluation in the context of the cumulative impacts analysis. This research included a review of public documents and coordination with various applicable agencies. Considering that the geographic scope of the Project Action includes portions of 13 counties in Mississippi (i.e., Clarke, Covington, Jasper, Jefferson Davis, Jones, Kemper, Lauderdale, Lawrence, Newton, Rankin, Scott, Simpson, and Smith), emphasis was placed on identifying other projects that are similar in nature to the Proposed Action or large projects that could affect resources identified in this EA as potentially affected. These various projects are summarized in the sections below.

A search for expansion of or development at airports in the vicinity of the ROI (as shown in **Table 3-13**) was also conducted. Construction and demolition projects conducted by the Air National Guard at Key Field Airport are discussed separately in the transit region **Section 5.2.1.2**. Otherwise, there are several proposed or planned projects at local airports, most of which include minor improvements to hangars, taxiways, access roads, and other similar types of projects. Minor infrastructure improvements would have little potential for cumulative impacts in association with the Proposed Action. Some improvements, such as construction of a new hangar to accommodate additional aircraft, could result in a few additional flights in or out of that airport, but would not be expected to have a significant impact on airspace use. These kinds of projects would have little potential to result in cumulative impacts in association with the Proposed Action and, therefore, are not discussed in more detail.

5.2.1.1 NAS Meridian

Projects discussed in this section were evaluated with respect to cumulative impacts in association with the Proposed Action at NAS Meridian.

NAS Meridian Master Plan. The Master Plan provides a future land use plan designed to consolidate administrative facilities and exclude functions along the airfield that are not directly associated with airfield activities. Projects identified in the Master Plan that are either funded or likely to be funded are identified and summarized in **Table 5-1**; these projects are considered further for potential cumulative impacts. The Master Plan identifies several other capital improvement projects, including new student

barracks, a police station, a fire station, a religious ministry facility, a public works complex, marine barracks, and a youth center (NAS Meridian 2010a). These projects are early in the planning stages and are not considered for inclusion in this cumulative impacts analysis.

Table 5-1. Present and Reasonably Foreseeable Future Projects at NAS Meridian

Project Name (Project Number)	Description	Location	Size (ft^2)	Status
Fitness Center Addition (P-314)	Construct one-story addition to the existing gymnasium with space for an aerobics area, racquetball courts, outdoor swimming pool and associated functions, and an outdoor jogging track	Northwest side of Building 369	3,800	Underway, nearing completion
Galley Replacement (P-317)	Construct new dining facility and demolish existing galley and unused barracks	Northwest corner of Higley Road, north of Building 357 and west of Buildings 358 and 360	21,000	Programmed for FY 2013
Child Development Center (P-319)	Construct new child development center	South of Brown Drive, east of Building 404	8,000	Underway
Consolidated Recreation Facility (P-315)	Construct new recreation facility to accommodate numerous varied recreation activities	Southwest of Building 216	29,900	Programmed for FY 2013

Sources: NAS Meridian 2010a, NAS Meridian Public Works 2011

Generally, construction activities could have short-term impacts on air quality, noise, safety, hazardous materials and wastes, and other resources through the duration of construction activities. The Proposed Action involves no construction activities, so short-term environmental impacts that would occur during construction activities would have little potential for cumulative impacts. In addition, long-term impacts on sensitive resources are not anticipated.

5.2.1.2 Transit Region

Projects discussed in this section were evaluated with respect to cumulative impacts from the Proposed Action within the transit region.

Proposed Aircraft Conversion and Construction and Demolition Projects at the 186th Air Refueling Wing of the Mississippi Air National Guard at Key Field Airport, Meridian, Mississippi (hereafter referred to as the 186th Air Refueling Wing [186 ARW] EA). As part of this project, nine KC-135R aircraft are being replaced by six C-27J aircraft at the 186 ARW at Key Field Airport. The aircraft conversion creates the need for facility and infrastructure improvements. In addition to the C-27J beddown-related improvements, several planned facility projects would be implemented to comply with security and force protection criteria. In total, six projects involving renovation or demolition are proposed (NGB 2011). Renovation or demolition would occur between FY 2012 and FY 2014, and C-27J aircraft would be based in FY 2012 (late 2011).

The KC-135 aircraft currently assigned to the 186 ARW have previously flown in the area of the transit region analyzed in this EA. However, the ANG does not plan to train within the airspace proposed for the Meridian 2 MOA. As discussed in the 186 ARW EA, the ANG train in three Alabama MOAs to the west (Birmingham 1 and 2 and Camden Ridge), and the DeSoto 1 and 2 MOAs directly to the south in Mississippi (NGB 2011).

The final environmental analysis of the 186 ARW projects was completed on 15 April 2011. Renovation and demolition activities could have short-term impacts on air quality, noise, hazardous materials and wastes, and other resources through the duration of construction activities. The Proposed Action in this Meridian 2 MOA EA does not involve construction activities, so short-term environmental impacts that would occur during construction activities would have little potential for cumulative impacts. Long-term impacts on sensitive resources are not anticipated.

5.2.1.3 Meridian 2 MOA

Projects discussed in this section were evaluated with respect to cumulative impacts from the Proposed Action at the proposed Meridian 2 MOA.

Marathon Recreational Area, Bienville National Forest. The Marathon Recreational Area was completed a few years ago within the Bienville National Forest. This area contains Marathon Lake, 34 camping sites with water and electricity, picnic tables and shelters, a swimming area, and a hiking trail. Long-term impacts on sensitive resources are not anticipated.

5.2.1.4 Other Projects

Projects discussed in this section could contribute to cumulative impacts from the Proposed Action within the ROI.

Kemper County Integrated Gasification Combined Cycle (IGCC) Project. The U.S. Department of Energy prepared a Final EIS assessing the environmental impacts for the construction and operation of an advanced power generation plant in southwestern Kemper County, Mississippi (DOE 2010). The facility would convert Mississippi lignite into a synthesis gas, which would fuel the plant's combustion turbine generating units. The new plant would be capable of generating 582 Megawatts of electricity. Construction began in 2010, and the plant is planned for operations beginning in 2014. As a connected action, a lignite mine is also proposed adjacent to the plant, extending south into Lauderdale County, which would supply lignite for the plant over its 40-year planned life. Construction of the mine is planned to begin in 2011 with operations beginning in 2013.

The Final EIS identified short-term impacts that would occur as a result of land-clearing and construction activities for the plant and the mine. Long-term impacts on resources such as air quality (GHG and criteria pollutant emissions) could also occur as a result of operations associated with the plant and mine. Short-term impacts and most long-term impacts would be localized to the plant and mine sites or the immediately surrounding areas. The proposed plant is approximately 10 miles northwest and the proposed mine 7 miles west of NAS Meridian. These projects are well outside the general area of consideration for this cumulative impacts analysis, and, with the exception of air quality (GHG and criteria pollutant emissions), which are discussed in **Section 5.3.1**, there is little potential for cumulative impacts when considered with the Proposed Action in this EA.

Beddown of 59 F-35 Aircraft at Eglin AFB, Florida. An EIS Record of Decision (ROD) was signed in February 2009 authorizing the beddown and operations of up to 59 F-35 aircraft at Eglin AFB at the western end of the Florida panhandle just south of Valparaiso, Florida. That ROD imposed minor

limitations on operations at Eglin's North/South runway until a Supplemental Environmental Impact Statement (SEIS) was completed. The Draft SEIS (hereafter referred to as the "F-35 SEIS") proposal supports the recommendation of the 2005 Base Realignment and Closure Commission to establish the F-35 Initial Joint Training Center at the installation. JSF flight operations could impact air traffic controller workload and contribute to increased congestion. A regional airspace study is being conducted, and subsequent recommendations could be implemented to minimize congestion. Cumulative impacts from noise could occur where proposed JSF flight-training activities overlap with noise impacts resulting from other reasonably foreseeable actions planned to occur at Eglin AFB. While the proposal is not a final decision and the ROD for the SEIS has not been signed, it is the preferred alternative that has been identified in the Draft SEIS published in September 2010 (USAF 2010). The SEIS addresses where the F-35 aircraft may ultimately beddown on the Eglin Reservation, how they might be operated, and the degree to which other mitigation measures are possible. The SEIS is currently on hold while noise profiles are validated (96 ABW/SAF IE 2011).

5.3 Resource Areas Considered for Cumulative Impacts

5.3.1 Air Quality

In order to estimate the cumulative effects on air quality, the projects under this Proposed Action and projects in adjacent areas were analyzed together. The cumulative effects on air quality were not separated into individual regions (i.e., NAS Meridian, the transit region, and the Meridian 2 MOA).

Greenhouse Gas (GHG) Emissions. The cumulative effects for GHG emissions were analyzed for the Proposed Action in this EA, the Proposed Action for the 186 ARW at Key Field Airport, and the Kemper County Lignite Plant IGCC project. The overwhelming majority of GHG emissions, typically 80 percent or more, from these projects are in the form of carbon dioxide (CO_2). Therefore, the values of GHG emissions presented below are based on calculated CO_2 emissions.

It is not required that GHG emissions from military aircraft operations, including training activities, be included in the GHG reduction goals within EO 13514. As stated in Section 19(h) of EO 13514, emissions from any vehicle, vessel, aircraft, or non-road equipment owned or operated by DOD that is used in combat support, combat service support, tactical or relief operations, or training for such operations, are excluded from DOD reduction targets. Although there currently is no regulatory mechanism at the facility level for requiring GHG reductions from military aircraft operations, the Navy recognizes there are opportunities for GHG reductions from such operations, such as implementing alternative fuels and other renewable energy sources where possible. Specific reduction goals will be determined for each region and installation, depending on location and potential for reduction. Navywide, several goals for reducing GHG emissions have been established, including the following:

- Mandate that energy use, efficiency, life-cycle costs, and other such factors be part of the Navy's decision when acquiring new equipment systems, and a part of vendor's efficiency or energy policies
- By 2015 cut petroleum use by half in the Navy's fleet of commercial vehicles by phasing in new hybrid trucks to replace older ones
- By 2020 procure half the power at Navy shore installations from alternative energy sources, and, where possible, supply power back to the grid
- By 2020 half of the total Navy's energy consumption for ships, aircraft, tanks, and vehicles should come from alternative energy sources.

The Proposed Action would slightly increase GHG emissions from aircraft operations locally (i.e., 3,218.54 tpy of CO_2). However, with the expected transfer of training sorties from the F/A-18 to T-45C aircraft, there would be an overall reduction in GHG emissions on a Navywide level. This is based on the Navy using 83 percent less fuel for the proposed 3,600 sorties with T-45C aircraft versus the current fuel used by F/A-18 aircraft flying to other locations. Therefore, because the potential effects of proposed GHG emissions are by nature global and cumulative impacts, the Proposed Action is expected to provide a beneficial cumulative impact on GHG emissions.

The Proposed Action for the 186 ARW at Key Field Airport would result in a slight increase of GHG emissions; however, no GHG emissions were calculated for that Proposed Action since they were considered to have minimal impact. Based on the criteria pollutant emissions, it is estimated the GHG emissions would be on the same order of magnitude as for the Proposed Action at NAS Meridian. As discussed in the *Criteria Pollutant Emissions* section below, the GHG emission increases from these two Proposed Actions combined would not contribute to a significant increase in GHG emissions, (i.e., approximately 0.25 percent) as compared to the Kemper County IGCC Project.

As discussed in the Kemper County IGCC EIS, this proposed power plant would emit an estimated 1.8 to 2.6 million tpy of CO_2 annually, and smaller amounts of other pollutants (e.g., 55 tpy of H_2SO_4 mist and less than 0.1 tpy of mercury (DOE 2010). The GHGs emitted by the Kemper County IGCC Project would add a relatively small increment to emissions of these gases in the United States and the world. Overall CO_2 emissions in the United States during 2008 totaled approximately 6,409.3 million tons (5,814.4 million metric tons). By way of comparison, annual operational emissions of CO_2 from the proposed generating station would equal approximately 0.04 percent of the United State's total 2008 emissions (EIA 2010).

Emissions of GHGs from the proposed power plant by themselves would not have a direct impact on the environment in the proposed plant's vicinity and would not cause appreciable global warming that would lead to climate changes. However, these emissions would increase the atmosphere's concentration of GHGs, and, in combination with past and future emissions from all other sources, contribute incrementally to the global warming that produces the adverse effects of climate change previously described. At present, no methodology exists that would enable estimating the specific impacts (if any) that this increment of warming would produce locally or globally.

Criteria Pollutant Emissions. As discussed in **Section 4.1.2.1**, air quality impacts at NAS Meridian from the Proposed Action would not be significant. Aircraft operations in the transit region and the proposed Meridian 2 MOA would occur above 7,000 feet MSL, which is above the mixing height of 3,000 feet AGL. Currently, no guidance or regulatory requirement exists to estimate emissions above the mixing height. Therefore, no impacts on local or regional air quality would be expected from emissions in these areas.

As discussed in the 186 ARW Final EA, the individual pollutant emissions from the aircraft beddown at Key Field Airport would not exceed 1 percent of the total Lauderdale County emissions for each corresponding pollutant. Therefore, no significant impacts on air quality associated with the Proposed Action at Key Field Airport would be expected.

As discussed in the Kemper County Lignite Plant IGCC EIS, projected emissions from the operation of this proposed power plant would include up to 670 tpy SO_2, 2,090 tpy NO_x, 522 tpy particulate matter less than or equal to 10 micrometers in aerodynamic diameter (PM_{10}), 1,235 tpy CO, and lesser amounts of other pollutants. The impacts estimated from these emissions along with other emissions sources within 50 kilometers of the Lignite Plant would potentially contribute to an increase in pollutant concentrations ranging from approximately 3 to 15 percent of NAAQS and from 12 to 71 percent of

Prevention of Significant Deterioration (PSD) allowable Class II increments. Plant emissions would not have significant impacts on the closest PSD Class I area, which is 225 kilometers (140 miles) away from the power plant site (DOE 2010).

The impacts discussed from the Lignite Plant EIS result in ambient air quality concentrations for SO_2, NO_x, and CO, that are well below the NAAQS. A comparison of the Meridian 2 MOA Proposed Action emissions to the Lignite Plant emissions are as follows, respectively: 0.43 tpy vs. 670 tpy SO_2; 3.40 tpy vs. 2,090 tpy NO_x; and 90.35 tpy vs. 1,235 tpy CO. Based on the much lower level of emissions from the Proposed Action as compared to the Lignite Plant, there would be negligible contribution from the Proposed Action to ambient concentrations for SO_2, NO_x, and CO.

As discussed in the Lignite Plant EIS, the resulting maximum $PM_{2.5}$ ambient air quality concentrations were estimated at 33.4 micrograms per cubic meter ($\mu g/m^3$) (24-hour averaging period) and 13.4 $\mu g/m^3$ (annual averaging period) as compared to the 35 $\mu g/m^3$ and 15 $\mu g/m^3$ NAAQS, respectively. The increase of 8.08 tpy of $PM_{2.5}$ from the Proposed Action at NAS Meridian and 0.27 tpy from the 186 ARW Proposed Action (NGB 2011) are not considered significant enough to result in ambient air quality concentrations that would exceed the 35 $\mu g/m^3$ and 15 $\mu g/m^3$ NAAQS. In addition, NAS Meridian and the 186 ARW are not located within the maximum impact locations of the Lignite Plant, which further reduces the potential to reach the NAAQS. Therefore, no significant cumulative impact on air quality with respect to criteria pollutants from the Proposed Action at NAS Meridian, the 186 ARW Proposed Action, and the Lignite Plant would be expected in the region (DOE 2010).

5.3.2 Noise

5.3.2.1 NAS Meridian

The Fitness Center Addition, identified in **Table 5-1**, is the only ongoing or reasonably foreseeable future project identified in the Master Plan that would be within the 60 to 65 dB DNL noise zone. This project includes some outdoor uses (e.g., swimming pool, jogging track). As discussed in **Section 4.2.1.1**, the noise levels under the Proposed Action would be expected to increase by less than 1 dB DNL, which would not significantly change the 60 dB DNL noise contour. Other than the Proposed Action, no known projects would contribute to the noise environment around NAS Meridian.

Construction of the Fitness Center Addition is underway and nearing completion. The proposed MOA should be implemented in late 2011. Although completion of the new Fitness Center Addition would generate noise from construction, the noise would likely remain within the installation boundary and would be short-term. Therefore, no significant cumulative noise impacts on the environment from this construction project when combined with the Proposed Action would be expected.

5.3.2.2 Transit Region

As stated in the 186 ARW EA, under the C-27J beddown alternatives, average noise levels at Key Field Airport would decrease slightly (NGB 2011). The decrease in noise levels would occur because the relocation of the KC-135R and MC-12T aircraft operations from Key Field Airport would offset increases in average noise resulting from the proposed C-27J operations. As stated in the 186 ARW EA, the increase in T-45C flight operations would not result in a major noise level increase in areas surrounding Key Field Airport (NGB 2011).

The result of the FAA Noise Integrated Routing System Screening Tool analysis in the transit region indicates that the projected flights of T-45C aircraft to and from the proposed Meridian 2 MOA would not increase noise levels significantly (see **Section 4.2.1.2**). The Proposed Action and the C-27J conversion

are anticipated to occur concurrently in late 2011. The C-27J conversion would decrease average noise levels over the baseline at Key Field Airport; therefore, it is assumed that the noise levels surrounding Key Field Airport would also decrease with the C-27J conversion. The Proposed Action in this EA could slightly increase (e.g., less than 5 dB DNL) average noise levels over the baseline in the transit region. Therefore, no significant cumulative impacts on the environment from noise levels at Key Field Airport or other locations in the transit region would be expected.

5.3.2.3 Meridian 2 MOA

The Proposed Action would not result in a significant change in the ambient noise environment in the area underlying the proposed Meridian 2 MOA (including the Bienville National Forest). There are no known projects that would contribute to the noise environment below the Meridian 2 MOA. Therefore, no significant cumulative noise impacts in the Meridian 2 MOA region would be expected.

5.3.3 Compatible Land Use

Land use plans and economic development information for counties and cities in the ROI were evaluated, where available, to identify planned and proposed projects. Various industrial properties are currently available for development, and some counties offer economic incentives for businesses to locate there. Development activities are likely to occur in the ROI over the next few years. The Proposed Action involves no construction activities and would not be expected to affect land use planning in the ROI; therefore, there would be little potential for cumulative effects with development activities.

5.3.3.1 NAS Meridian

The NAS Meridian Master Plan guides overall land use with the goal of consolidating administrative facilities outside areas impacted by the airfield. **Table 5-1** identifies ongoing and reasonably foreseeable future development projects at NAS Meridian, most of which are in the western portion of the installation and well removed from the airfield. The Fitness Center Addition is the only project that would be within the 60 to 65 dB DNL noise zone. This project includes some outdoor uses (e.g., swimming pool, jogging track). As discussed in **Section 4.3.1.1**, no changes in land use on or off NAS Meridian are anticipated as a result of the Proposed Action. Noise levels under the Proposed Action would be expected to increase by less than 1 dB DNL, which would not significantly change the 2005 60 dB DNL noise contour.

Construction of the Fitness Center Addition is underway and nearing completion. The proposed MOA should be implemented in late 2011. Although completion of the new Fitness Center Addition would generate noise from construction, the noise would likely remain within the installation boundary and would be short-term. Therefore, no significant cumulative noise impacts on NAS Meridian community from this construction project when combined with the Proposed Action would be expected.

5.3.3.2 Transit Region

As discussed in the 186 ARW Draft EA, the proposed activities at Key Field Airport would occur on installation property and would not have any impact on land use activities, patterns, or policies in areas surrounding Key Field Airport. As discussed in **Section 4.3.1.2**, the Proposed Action assessed in this EA is not expected to impact land use. The Proposed Action in this EA and the 186 ARW projects at Key Field Airport would not impact land use; therefore, no significant cumulative impacts on land use would be expected.

5.3.3.3 Meridian 2 MOA

The Marathon Recreational Area was developed inside the Bienville National Forest, so no changes to land use occurred under this project. As discussed in **Section 4.3.1.3**, the Proposed Action assessed in this EA is not expected to impact land use. The Proposed Action and the Marathon Recreational Area would not impact land use; therefore, no significant cumulative impacts on land use would be expected.

5.3.4 Fish, Wildlife, and Plants

5.3.4.1 NAS Meridian

Increases in noise levels at NAS Meridian under the Proposed Action are expected to be minimal. Therefore, no significant cumulative impacts on fish, wildlife, and protected and sensitive species from the noise generated by the Proposed Action when combined with existing noise levels would be expected. Although the four present and reasonably foreseeable projects at NAS Meridian identified in **Table 5-1** would generate noise from construction, the noise from these projects would likely remain within the installation boundary and would be short-term. Therefore, no significant cumulative impacts from these construction projects when combined with the Proposed Action on fish, wildlife, and protected and sensitive species would be expected.

5.3.4.2 Transit Region

Increases in noise levels in the areas underneath the proposed transit area from the Proposed Action are expected to be minimal. Therefore, no significant cumulative impacts on fish, wildlife, and protected and sensitive species from the noise generated by the Proposed Action in addition to existing noise levels would be expected. As stated in the 186 ARW EA, under the C-27J beddown alternatives, average noise levels at Key Field Airport would decrease slightly (NGB 2011). Therefore, the reduction in aircraft noise in the vicinity of the Key Field Airport would slightly offset the noise generated by the Proposed Action in the Key Field Airport vicinity. No significant cumulative adverse impacts on fish, wildlife, and protected and sensitive species from aircraft noise would be expected underneath the transit area. Similar to the proposed construction projects at NAS Meridian, the six proposed renovation or demolition projects at Key Field Airport would be localized in nature and would be short-term. No significant cumulative impacts from these construction projects when combined with the Proposed Action on fish, wildlife, and protected and sensitive species would be expected.

5.3.4.3 Meridian 2 MOA

Increases in noise levels in the areas underneath the proposed MOA from the Proposed Action are expected to be minimal. Therefore, no significant cumulative impacts on fish, wildlife, and protected and sensitive species from the noise generated by the Proposed Action when combined with existing noise levels would be expected. There are no known projects that would contribute to the noise environment underneath the proposed MOA; therefore, no significant cumulative impacts on fish, wildlife, and protected and sensitive species underlying the Meridian 2 MOA would be expected.

5.3.5 Human Health and Safety

5.3.5.1 NAS Meridian

The joint Radar ATC Facility coordinates flights from the installation that are conducted in accordance with established ATC procedures. The additional operations included under the Proposed Action would

be conducted using existing flight tracks, profiles, and procedures. Each of the five Class A mishaps that occurred between 2000 and 2010 were within or adjacent to the installation boundary. Therefore, the risk of a Class A mishap outside of the installation boundary is very low, and the additional 10,000 operations would not be expected to significantly increase this risk. There are no other known projects at NAS Meridian that would impact airspace management or airspace safety; therefore, no significant cumulative impacts on human health and safety would be expected.

5.3.5.2 Transit Region

Airspace Management. It is likely that civilian aircraft flying to Key Field Airport fly through the transit region. However, the transit region only includes a small portion of Federal Airways V-194 and V-543. The transit region is not proposed to be established as SUA like the Meridian 2 MOA; therefore, no changes in the Memphis ARTCC's management of this area would be required. No significant cumulative impacts on civilian aircraft would be expected from the T-45C aircraft flights within the transit region.

T-45C aircraft are already conducting operations between NAS Meridian and Key Field Airport. Other than the 186 ARW EA, no other known projects in the transit region would impact airspace management.

In FY 2010, a total of 89,057 operations were conducted at Key Field Airport (FAA 2011a), which consisted of based ANG, civilian, and transient (including TW-1) operations. Of this total, approximately 12 percent (10,300 operations) were conducted by T-45C aircraft from NAS Meridian (NGB 2011). The 186 ARW EA estimated that T-45C traffic at Key Field Airport would increase by approximately 25 percent after implementation of the proposed Meridian 2 MOA (NGB 2011). This increase in TW-1 flights would be a 3 percent increase in the total number of annual operations at Key Field Airport as compared to 2010 baseline conditions. NAS Meridian ATC procedures governing such things as operating in formation, right-of-way rules, aircraft speed, and minimum safe altitudes would continue to be applied to the flights between NAS Meridian and Key Field. Therefore, no significant cumulative impacts from increased TW-1 operations at Key Field Airport would be expected.

Airspace Safety. No Class A mishaps with T-45C aircraft have occurred at Key Field Airport. The 3 percent increase in total aircraft operations at Key Field Airport that would occur under the Proposed Action in this EA would not be expected to significantly increase the risk of a Class A mishap.

The C-27J aircraft that are proposed at Key Field Airport are a relatively new aircraft (2006); therefore, data are not available for Class A mishap rates. However, the 186 ARW EA states that no impacts from aircraft mishaps would be expected as a result of the C-27J beddown at Key Field Airport. Current safety policies and procedures at Key Field Airport ensure that the potential for aircraft mishaps is the lowest possible level (NGB 2011).

As discussed in **Section 4.5.1**, the potential for bird/wildlife strikes within the transit region is relatively low, due to the higher altitude of the aircraft. From 2000–2010, no T-45C Class A mishaps occurred as a result of bird strikes within the NAS Meridian local flying area. According to the 186 ARW EA, the reduction in the number of aircraft by either 10 or 12, coupled with the change in engine configuration (from four-engine aircraft to two-engine aircraft), would likely reduce the BASH potential at the airport.

According to the 186 ARW EA, the proposed T-45C operations increase would correspond to a negligible increase in aircraft mishaps and BASH incidents. Safety procedures currently in place would continue to minimize the overall potential impacts (NGB 2011). Therefore, no significant cumulative impacts on human health and safety from aircraft mishaps and BASH would be expected.

5.3.5.3 Meridian 2 MOA

Airspace Management. The F-35 SEIS concluded that basing the F-35 at Eglin AFB could "intensify congestion in an area already facing many airspace challenges" (USAF 2010). F-35 flight training operations would impact ATC workload and contribute to increased congestion (air and ground delays) for military and civilian aircraft across the region. The number of F-35 aircraft and potential congestion would impact airspace management in the form of flight safety, inefficient movement of aircraft, increased restrictions, and additional controller workloads.

Eglin AFB aircraft occasionally use the MOAs utilized by TW-1 (i.e., Pine Hill and Camden Ridge); this use could increase after the beddown of the 59 F-35 aircraft. A regional airspace study is currently being prepared for inclusion in the next iteration of the SEIS. The study will evaluate all military and civilian requirements, including a determination of the most efficient way to use airspace within 150 NMs of Eglin AFB. This radius would include the MOAs to the east of NAS Meridian. The F-35 SEIS states that implementation of the results of the study could alleviate congestion (USAF 2010).

Planning and coordination with the FAA, Memphis ARTCC, Houston ARTCC, Jackson Approach Control, and Meridian Approach Control has been ongoing during the design and proposal of the Meridian 2 MOA. The Memphis ARTCC estimates that 232 flights per month occur along the Federal Airways that are within the same airspace as the proposed MOA (Memphis ARTCC 2007). The 186 ARW does not plan to train within the airspace proposed for the Meridian 2 MOA; therefore, the civilian flights are expected to be the only on-going flights within the proposed MOA. The FAA expects delays to civilian aircraft would be minimal and would not increase their flying time enough to have negative impacts. Therefore, no significant cumulative impacts on civilian aircraft would be expected.

As discussed in **Section 1.2**, approximately 15 percent of TW-1's sorties that should be flown in the MOAs local to NAS Meridian were not completed as a result of training cycle delays caused in part by congestion of the existing available airspace. The increased use of the MOAs local to NAS Meridian by Eglin AFB aircraft would be expected to increase congestion. The creation of the Meridian 2 MOA is proposed in part to alleviate the existing estimated TW-1 MOA capacity shortfall, thereby maintaining TW-1's mission to ensure naval aviators are mission-trained, qualified, and prepared for deployment to support real-world events. The Meridian 2 MOA would be considered a shared-use MOA; however, no operations anticipated from other military units at this time. Therefore, the beddown of F-35 aircraft at Eglin AFB is not anticipated to impact airspace management within the proposed Meridian 2 MOA. The implementation of the regional airspace study is expected to alleviate congestion in the existing MOAs local to NAS Meridian as a result of the F-35 beddown. Therefore, no significant cumulative impacts on airspace management would be expected.

Aircraft Safety. Eglin AFB-based aircraft are not anticipated to use the Meridian 2 MOA; therefore, there would be no aircraft safety impact from F-35 aircraft operations. At this time, no operations are anticipated from other military units. Therefore, no significant cumulative impacts on aircraft safety would be expected.

5.3.6 Light Emissions and Visual Impacts

5.3.6.1 NAS Meridian

Changes to light emissions or visual impacts that would occur as a result of the implementation of projects in the NAS Meridian Master Plan would include modification to facilities on-installation. Light emissions changes to facilities at NAS Meridian that might be seen by off-installation residences would be in the western portion of the installation.

Under the Proposed Action, the projected 5 percent increase in aircraft operations would not have a significant impact on persons living in the vicinity of NAS Meridian from aircraft light emissions. No visual impacts would be expected.

Since the projects in the Master Plan would be in the western portion of the installation, and the majority of the aircraft at NAS Meridian depart north and south from the eastern side of the installation, cumulative impacts from these projects are not anticipated. Therefore, no significant cumulative impacts from light emissions and to the existing visual setting would be expected.

5.3.6.2 Transit Region

The 186 ARW EA did not identify any impacts on visual settings or discuss any impacts as a result of light emissions. Under the Proposed Action, no impacts on the visual setting were identified at Key Field Airport or other areas in the transit region. T-45C aircraft lights could be noticeable as aircraft arrive and depart from Key Field Airport, but it is not anticipated that the increase in T-45C arrivals and departures would result in a noticeable impact. Therefore, no significant cumulative impacts from light emissions and on the existing visual setting would be expected.

5.3.6.3 Meridian 2 MOA

Under the Proposed Action addressed in this EA, aircraft would be at least 8,000 to 10,000 feet MSL over Marathon Recreational Area. Consequently, the lighting on the T-45C aircraft would only be seen as small twinkling lights during nighttime hours. No significant cumulative impacts from light emissions and on the existing the visual setting would be expected.

5.3.7 Historical, Architectural, Archaeological, and Cultural Resources

5.3.7.1 NAS Meridian

As stated in the NAS Meridian Master Plan and shown on **Figure 3-12**, the four NAS Meridian properties potentially eligible for listing in the NRHP are not in the developed areas of the installation (NAS Meridian 2010a). The four present and reasonably foreseeable projects at NAS Meridian identified in **Table 5-1** are within the administrative area of the installation (see **Figure 3-4**) and are more than 1.5 miles from the closest NRHP-eligible property. Therefore, no significant impacts on historical, architectural, archaeological, and cultural resources would be expected. As discussed in **Section 4.2.1.1**, the noise levels under the Proposed Action addressed in this EA would be expected to increase by less than 1 dB DNL. The Proposed Action addressed in this EA would have no effect on historic properties or archaeological sites that are listed in or quality for inclusion in the NRHP. Therefore, no significant cumulative impacts on cultural resources at NAS Meridian would be expected.

5.3.7.2 Transit Region

As stated in the 186 ARW Final EA (NGB 2011), in 2008 the Mississippi SHPO determined that no cultural resources at the ANG portion of Key Field Airport are eligible for listing in the NRHP. Therefore, the 186 ARW Final EA did not provide an additional assessment of cultural resources (NGB 2011) and no significant impacts on cultural resources from the C-27J beddown or renovation and demolition noise would be expected. There are no other known projects that could impact the 43 historic or archaeological properties within the transit region that have been listed in the NRHP. There would be no effect on cultural resources as a result of the implementation of the Proposed Action addressed in this EA; therefore, no significant cumulative impacts on cultural resources would be expected.

5.3.7.3 Meridian 2 MOA

There would be no effect on cultural resources as a result of the implementation of the Proposed Action addressed in this EA. There are no known projects that could impact the two historic properties within the proposed Meridian 2 MOA. Therefore, no significant cumulative impacts on cultural resources would be expected.

5.3.8 Wastes and Hazardous Materials

Approximately 3,600 sorties are expected to be transferred from the F/A-18 aircraft to the T-45C aircraft at a national level. T-45C aircraft have one engine and a 3,000-pound fuel capacity. F/A-18 aircraft have two engines and an 18,000-pound fuel capacity. To maximize the amount of time available for a training sortie, F/A-18 and T-45C aircraft use in excess of 90 percent of their fuel by the time they return to the airfield. The same training sorties that currently occur with the F/A-18 would occur with the T-45C. Therefore, the T-45C aircraft would consume approximately 83 percent less fuel that the F/A-18 to fly the same sortie. By transferring sorties from the F/A-18 to the T-45C, there would be a Navywide reduction in fuel consumption and a beneficial impact at a national level.

5.3.8.1 NAS Meridian

Any changes to hazardous materials and wastes that would occur under the NAS Master Plan would be in compliance with existing plans. No significant impacts on hazardous materials and wastes would occur under the Proposed Action, and potential projects at NAS Meridian would be in compliance with existing plans; therefore, no significant cumulative impacts would be expected.

5.3.8.2 Transit Region

According to the 186 ARW EA, no change to hazardous waste generator status or management would be required and no major environmental impacts are anticipated. Under the Proposed Action addressed in this EA, activities in the transit region and at Key Field Airport would not require a change in the hazardous materials, hazardous waste, solid waste, or pollution prevention management programs already in place at NAS Meridian. Therefore, no significant cumulative impacts from hazardous materials and wastes at Key Field Airport or other areas in the transit region would be expected.

5.3.8.3 Meridian 2 MOA

As discussed in **Section 4.8.1**, there would be no change in hazardous materials, hazardous waste, solid waste, or pollution prevention management programs in the proposed Meridian 2 MOA, so no impacts on hazardous materials and wastes would occur. Therefore, no significant cumulative impacts would be expected.

5.3.9 Socioeconomic Resources, Environmental Justice, and Children's Environmental Health and Safety Risks

5.3.9.1 NAS Meridian

There are no other ongoing or reasonably foreseeable future projects that would be expected to drastically change population or employment levels at NAS Meridian or in the surrounding community. The Proposed Action would not result in any changes in population or employment levels or disproportionately impact minority, low-income, or youth populations at NAS Meridian.

As discussed in the Kemper County IGCC EIS, employment during operation of the proposed power plant would include 105 full-time employees from the plant and an estimated 189 to 213 employees for the mine. The employees would be hired from a 65-mile-radius area around Meridian and the permanent relocations would likely be in or around the existing municipalities. The small potential increases in housing demand and school population would be accommodated through the existing capacity. As a result, minor, beneficial impacts could be expected.

The Proposed Action at NAS Meridian would not have any impacts on changes in population or employment levels; therefore, no significant cumulative impacts would be expected.

5.3.9.2 Transit Region

As discussed in the 186 ARW EA, noise related to the C-27J conversion alternatives would remain within the norms of past activity and, therefore, would not result in significant impacts on environmental justice areas or pose special risks to children (NGB 2011). In addition, the increase in T-45C flight operations would not result in noise level increases in areas surrounding Key Field Airport. The Proposed Action in this EA would not result in significant changes in the existing noise environment for the area underlying the proposed airspace, so no significant impacts on disproportionate impacts on minority, low-income, and youth populations would be expected to occur. Under the Proposed Action, when TW-1 pilots finish training in the proposed MOA some would fly to Key Field Airport to refuel prior to returning to NAS Meridian. TW-1 pilots could fly directly from NAS Meridian to the proposed Meridian 2 MOA or stop at Key Field Airport to purchase fuel and then fly to their destination. Consequently, beneficial impacts on expenditures could occur if the additional sorties refueled at Key Field Airport. Neither proposed activity would be expected to result in changes in population or employment levels or disproportionately impact minority, low-income, or youth populations. Therefore, no significant cumulative impacts would be expected.

5.3.9.3 Meridian 2 MOA

There are no known ongoing or reasonably foreseeable future projects that would be expected to drastically change population or employment levels in the communities underlying the Meridian 2 MOA. The Proposed Action would not result in any changes in population or employment levels or disproportionately impact minority, low-income, or youth populations at NAS Meridian. Therefore, no significant cumulative impacts would be expected.

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APPENDIX A

FAA COOPERATING AGENCY STATUS

FAA Cooperating Agency Status

A Memorandum of Understanding (MOU) between the Federal Aviation Administration (FAA) and Department of Defense (DoD) was signed on October 4, 2004 to provide for the issuance of environmental documents for the development, designation, modification, and use of Special Use Airspace (SUA). The MOU describes the role of the DoD and the FAA, as cooperating agencies, on SUA proposals, such as the Proposed Action addressed in the Meridian MOA.

The FAA is responsible for managing navigable airspace for public safety and ensuring efficient use for commercial air traffic, general aviation, and national defense, including SUA utilized by the DoD. The FAA established several policies including: Order 1050.1E*, Environmental Impacts: Policies and Procedures*; and Order 7400.2, *Procedures for Handling Airspace Matters*. FAA Order 1050.1E provides the FAA with policies and procedures to ensure agency compliance with NEPA and implementing regulations issued by the Council on Environmental Quality (CEQ) (40 CFR parts 1500-1508). Appendix A in FAA Order 1050.1E identifies 18 impact categories that should be considered during the National Environmental Policy Act (NEPA) process. These sections should be incorporated into the DoD environmental document as needed to satisfy the FAA's NEPA requirements. FAA Order 7400.2, specifically Chapter 32, provides guidance to air traffic personnel to assist in applying the requirements in Order 1050.1E to air traffic actions.

The appropriate FAA Service Area, as identified in response to a request to participate, will act as the point of contact for Cooperating Agency status during the evaluation of the proposal's environmental study. FAA may use documents prepared by the proponent in its environmental process, provided the FAA has independently reviewed the scope and content of the documentation and assumes responsibility.

The FAA may adopt an EA or EIS prepared by DOD if the FAA independently evaluates the information in the document and takes full responsibility for the scope and content that addresses FAA actions. Where the proponent's NEPA documentation is insufficient, additional NEPA documentation will be required before the FAA can make a final decision. The FAA may ask the applicant to correct any deficiencies and re-submit the assessment if the FAA is not satisfied. The FAA must issue its own FONSI and/or ROD. See FAAO 1050.1E, paragraphs 404d and 518h.

SUA proposals are subject to both NEPA and aeronautical processing requirements. These processes are separate but closely related. Since the FAA is the approval authority for SUA actions, the agency cannot make a final decision on any particular SUA proposal prior to the completion of the NEPA and aeronautical processing phases. Any actions by a proponent to mitigate environmental impacts, and/or changes to the proposal to address valid aeronautical objections, may alter the type and extent of environmental analysis required.

FAA shall:

1. Provide to DOD information and technical expertise within the special expertise and jurisdiction of the FAA as it relates to the proposed action.

2. Resolve or respond to environmental issues raised during the NEPA process relating to aeronautical issues.

3. If an EA or EIS is required, identify and evaluate the environmental impacts relating to the proposal.

4. Furnish to DOD the names of organizations, agencies, or other parties the FAA believes may be interested in the DOD proposal.

5. Notify and coordinate FAA proposed airspace actions with DOD components that may be affected.

FAA cannot render a final determination on the environmental effects of the SUA proposal until after completion of the proponent's environmental process, the FAA's aeronautical process, the FAA's independent review of the proponent's environmental documentation, and any additional environmental analyses conducted by the FAA.

AJR-34 Tina Gatewood
Copy

U.S. Department
of Transportation
**Federal Aviation
Administration**

AUG 19 2009

Mr. D.F. Baucom
Assistant Deputy Chief of Staff
U. S. Fleet Forces Command
1562 Mitscher Avenue, Suite 250
Norfolk, VA 23551-2487

Dear Mr. Baucom:

Thank you for your letter of July 31 requesting the Federal Aviation Administration participate as a cooperating agency in the environmental assessment (EA) for the proposed establishment of a military operations area (MOA) to the NAS Meridian military training airspace.

The FAA is pleased to participate in the EA process in accordance with the National Environmental Policy Act of 1969 as amended, and its implementing regulations. Since the proposal contemplates special use airspace (SUA), the FAA will cooperate following the guidelines described in the Memorandum of Understanding between the FAA and the Department of Defense Concerning SUA Environmental Actions, dated October 4, 2005.

Modification of the SUA resides under the jurisdiction of the Eastern Service Center, Operations Support Group, Atlanta, Georgia. The Eastern Service Center will be the primary focal point for matters related to both airspace and environmental matters. Mr. Mark Ward is the Manager of the Operations Support Group. FAA Order 7400.2, Chapter 32 indicates the airspace and environmental processes should be conducted in tandem as much as possible; however, they are separate processes. Approval of either the aeronautical process or the environmental process does not automatically indicate approval of the entire proposal.

A copy of the incoming correspondence and this response is being forwarded to Mr. Ward and Mr. Timothy D. Smith of the Eastern Service Center, Operations Support Group. Mr. Smith can be contacted at (404) 305-5579 for further processing of your proposal.

Sincerely,

Elizabeth L. Ray
Director of System Operations Airspace & Aeronautical Information Management
Air Traffic Organization

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APPENDIX B

FAA Circular: Proposal to Establish the Meridian 2 East and Meridian 2 West Military Operations Areas (MOAs)
and
Public Responses to FAA Circular

U.S. Department
of Transportation
**Federal Aviation
Administration**

Southern Region

P. O. Box 20636
Atlanta, Georgia 30320

**PROPOSAL TO ESTABLISH THE MERIDIAN 2 EAST AND
MERIDIAN 2 WEST MILITARY OPERATIONS AREAS (MOAs)
08-ASO-015-NR
BAY SPRINGS, MS**

TO ALL CONCERNED:

This is a circularization of the proposed establishment of the Meridian 2 East and West Military Operations Areas (MOAs) near Bay Springs, MS. The Federal Aviation Administration (FAA) is providing a comment period to solicit comments regarding the aeronautical impacts of the proposal prior to reaching a final decision. This circularization includes data regarding the specific types of operations/activities planned for the MOA and the expected frequency of use of the proposed airspace.

The Training Air Wing One (TW-1), stationed at Naval Air Station (NAS) Meridian, MS, requires additional special use airspace (SUA) in close proximity to NAS Meridian to properly train student pilots in the T-45C Goshawk jet trainer. Due to recent changes in the Navy's training syllabus, the number of training sorties for TW-1 will increase from 32,000 to more than 37,000 per year. This increase in training sorties will saturate the existing Meridian 1 MOAs and risks TW-1's ability to accomplish the training mission.

In addition to basic training sorties which include Air Combat Maneuvering (ACM), Familiarization Training, Formation Flight, and Instrument Training, a change to the Navy's Strategic Vision will add the requirement for Ground Control Intercepts (GCI), night vision goggle (NVG) training, and an increase in the number of ACM sorties. These additional missions are a result of the Navy's initiative to transfer more of its training syllabus sorties from the more expensive F/A-18 Hornet to the more cost effective T-45C.

Of the two MOAs, the Meridian 2 East MOA will be considered the primary training area due to the proximity to NAS Meridian. While all the missions listed above can take place in the East MOA, the focus will be on ACM training. A suitable and effective ACM training area must meet certain criteria in order to be viable. The airspace must have sufficient lateral and vertical boundaries to contain two or more jet aircraft conducting acrobatic maneuvers. The ideal area would be 35 NM by 25 NM of lateral and 17,000 feet of vertical airspace. Due to several victor and jet routes in the area, the

lateral boundary of the proposed East MOA was reduced to a 30 NM by 25 NM area, and the vertical airspace was reduced to 15,000 feet (with the associated Air Traffic Controlled Assigned Airspace) to accommodate overhead civil traffic.

The proposed Meridian 2 West MOA will be used in conjunction with the East MOA for GCI and NVG training. The GCI mission requires the aircraft to be 40 NM apart at the beginning of the engagement. Once the GCI intercept is complete, the participants will transition to an air-to-air ACM engagement. The combined East/West MOAs, if approved, will provide the 40-NM separation needed to begin the intercept. Additionally, the East/West MOAs will provide additional airspace for NVG training events that include Night Formation, Night Tactical Formation, and Night GCI. The vision is that the West MOA will not be used nearly as much as the East MOA leaving the airspace available for civil use.

The T-45C assigned to TW-1 will be the primary users of the proposed Meridian 2 MOA airspace. Normally, the T-45C aircraft employ in one or two flights of 2-ship and 4-ship formations. However, there may be as many as 16 aircraft in a given mission depending on training sortie type. Typical usage for the East MOA will be an average of nine hours per day (in 30-45 minute periods) on approximately 270 days per year, totaling approximately 2,400 hours per year. For the West MOA, the typical usage will be an average of three hours per day (30-45 minute periods) on approximately 180 days per year, totaling 540 hours per year.

The specifics of these two proposed MOAs are as follows:

<u>Meridian 2 East MOA, MS [NEW]</u>
Boundaries. Beginning at lat. 32°18'00"N., long. 088°58'00"W.;
to lat. 31°42'00"N., long. 089°15'00"W.;
to lat. 32°09'10"N., long. 089°45'14"W.;
to lat. 32°20'30"N., long. 089°25'30"W.;
to the point of beginning.

Altitudes. 8,000 feet MSL to, but not including, FL 180.

Time of Use. 0700-2200, Monday-Friday; other times by NOTAM.

Controlling Agency. FAA, Memphis ARTCC.

Using Agency. Commander, Training Wing One, Naval Air Station, Meridian, MS

<u>Meridian 2 West MOA, MS [NEW]</u>
Boundaries. Beginning at lat. 32°09'10"N., long. 089°45'14"W.;

to lat. 31°42'00"N., long. 089°15'00"W.;
to lat. 31°45'00"N., long. 090°05'30"W.;
to lat. 31°58'00"N., long. 090°04'30"W.;
to the point of beginning.

Altitudes. 8,000 feet MSL to, but not including, FL 180.

Time of Use. 0700-2200, Monday-Friday; other times by NOTAM.

Controlling Agency. FAA, Memphis ARTCC.

Using Agency. Commander, Training Wing One, Naval Air Station, Meridian, MS

Graphic Description

See attachment.

This circularization is intended to provide the public with the opportunity to review and comment to the effect this proposal may have on aeronautical activity prior to making a final determination. Comments regarding the environmental aspects of this proposal are to be addressed to:

NAS Public Works
Environmental Engineer
Attn: Mr. Steve Wade
229 Allen Road
Meridian, MS 39309

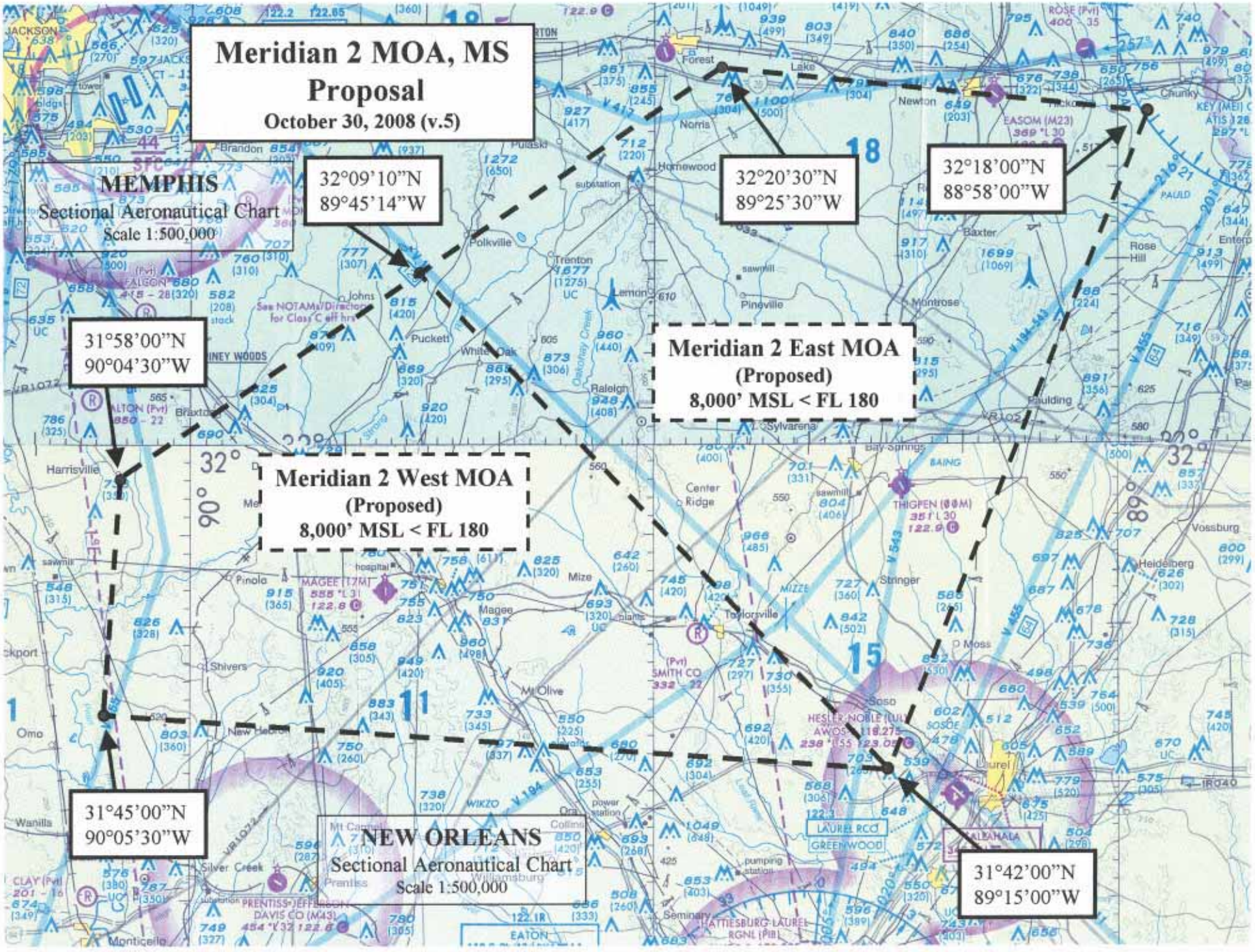
Comments or recommendations regarding the effect that this proposal may have on aeronautical activity should be submitted to:

Federal Aviation Administration
Eastern Service Center
Operations Support Group (AJV-E23.2)
P.O. Box 20636
Atlanta, Georgia 30320

All communications received prior to April 27, 2009, will be considered before final action is taken on this proposal.

Michael Vermutto
for Mark D. Ward
Manager, Operations Support Group
Eastern Service Area

Issued in College Park, GA.
on March 6, 2009


Meridian 2 MOA, MS
Proposal
October 30, 2008 (v.5)
MEMPHIS
Sectional Aeronautical Chart
Scale 1:500,000
32°09'10"N
89°45'14"W
32°20'30"N
89°25'30"W
32°18'00"N
88°58'00"W
31°58'00"N
90°04'30"W
Meridian 2 East MOA
(Proposed)
8,000' MSL < FL 180
Meridian 2 West MOA
(Proposed)
8,000' MSL < FL 180
31°45'00"N
90°05'30"W
NEW ORLEANS
Sectional Aeronautical Chart
Scale 1:500,000
31°42'00"N
89°15'00"W

Public Responses to FAA Circular

Sanderson Farms

Sanderson Farms, Inc.

GENERAL OFFICES
Post Office Box 988 • Laurel, Mississippi 39441-0988
Telephone (601) 649-4030 • Facsimile (601) 426-1461

Federal Aviation Administration
Eastern Service Center
Operations Support Group (AJV-E23.2)
P.O. Box 20636
Atlanta, Georgia 30320

Dear Sir/Madam,

This letter is in comment to the proposed establishment of the Meridian 2 East and West Military Operations Areas (MOAs) near Bay Springs, MS.

Sanderson Farms, Inc. is a company based in Laurel, MS, which is just outside the southeast corner of the proposed special use airspace. We operate corporate jet aircraft out of the Laurel Hesler-Noble airport (LUL). We are not in favor of the establishment of this type airspace in this area for the following reasons:

1. A large part of east central Mississippi is already taken up by the Meridian and Columbus MOAs currently in place, basically from Interstate 20 north to the Tennessee state line. Aircraft traveling north or south through this part of the state, at mid-level altitudes, must now go well east or west of their intended course to stay clear. The addition of the proposed airspace would effectively extend this area at least 50 miles further south.

2. Sanderson Farms had well over 1,500 departures and arrivals at the Laurel Hesler-Noble airport last year. Most departures were to the northwest, in high-performance jet aircraft, which would be quickly approaching the lateral and vertical limits of the proposed special use airspace. This would require long delays at 7,000' or below, and/or significant reroutes to the west. This would also have a measureable impact on the safety and economics of our flight operations.

3. Sanderson Farms certainly believes in a strong military and understands the need for this type airspace for pilot training. However, we also think that Mississippi is currently providing ample support in this area, for both the Navy and Air Force, through the level of special use airspace already in place over the state.

Thank you for your consideration in this matter,

Zane Lambert

Zane Lambert
Manager of Aircraft Operations
Sanderson Farms, Inc.

NBAA

April 16, 2009

Mr. Mark Ward
Manager, Operations Support Group
FAA Eastern Service Area
1701 Columbia Ave
College Park, GA 30337

Reference: Proposal to Establish the Meridian 2 East and Meridian 2 West MOA, 08-ASO-015-NR, March 6, 2009

Dear Mr. Ward,

NBAA objects to the proposal to establish the Meridian 2 West MOA per 08-ASO-015-NR dated March 6, 2009. Meridian 2 West is located in a main area of transition from the state capital, Jackson, to the South and East to Hattiesburg, Gulfport, Mobile and the various southeastern US destinations. It would mean a major reroute of departing aircraft to avoid the MOA or require them to stay at 7000' burning fuel and time. It would appear that V11 also goes through the west side of Meridian 2 East.
With these two MOA's and the existing MOA's in place, it will cause transitioning IFR and most of the VFR traffic to be congested into the V-18 and V-417 airspace east of Jackson which is already stacked up due to separation practices at Jackson approach. As well, the ILS 34L with its DME arc approach, which is the primary northerly approach especially in the winter, looks like it might be impacted, especially for arrivals from the east.

Considering, the FAA's comment in your notice that "The vision is that the West MOA will not be used nearly as much as the East MOA leaving the airspace available for civil use.", NBAA recommends that the West MOA be eliminated. Jackson is a major metropolitan area and the center of activity for Mississippi. Confining the airspace around it would not be planning for the future needs of civil aviation there.

Robert G. Lamond Jr.

Robert G. Lamond, Jr.
Director, Air Traffic Services & Infrastructure

421 Aviation Way
Frederick, Maryland 21701

T. 301-695-2000
F. 301-695-2375

www.aopa.org

May 11, 2008

Mr. Mark D. Ward
Manager, Operations Support Group
Federal Aviation Administration
Eastern Service Center
Operations Support Group (AJV-E23.2)
P.O. Box 20636
Atlanta, GA 30320

Dear Mr. Ward:

RE: Proposal to Establish the Meridian 2 East and Meridian 2 West Military Operations Areas (MOAs) 08-ASO-015-NR

The Aircraft Owners and Pilots Association (AOPA), representing over 416,000 pilots nationwide, is concerned about the impact of the proposed establishment of the Meridian 2 East and Meridian 2 West Military Operations Areas (MOAs) near Bay Springs, Mississippi. The proposal imposes a barrier to both VFR aircraft and IFR traffic transiting the airspace.

MOA Design Should Be Adjusted To Minimize Effect on V11

The FAA does not clear IFR traffic through active MOAs. While viable alternatives exist for the other airways impacted by this proposal, as proposed V11 is located approximately in the middle of the two MOAs and no alternative routes are available that will allow efficient IFR transit. Routing around the MOAs on other airways will add approximately 30 additional minutes for average GA aircraft. As proposed V11 passes through the Meridian 2 East MOA. According to the proposal, the West MOA will not be used as often as the East MOA. AOPA proposes that the MOA boundaries be redefined so that V11 lies entirely within the Meridian 2 West MOA area to minimize the time during which V11 is unavailable. Alternatively, AOPA suggests that a T-route that parallels V11, but is located within the West MOA, be established. Without these changes the proposed MOAs will greatly reduce the efficiency and effectiveness of IFR travel in the region.

Proposed Charted Times of Use Do Not Align with Estimated Use

In the proposal it is estimated that the West MOA will be used 540 hours per year and the East MOA 3900 hours, yet the proposed charted hours for both are 0700-2200 (L) Monday through Friday. AOPA believes the proposed charted hours of use for the West MOA are inflated and will create a huge and unnecessary discrepancy between the charted hours of use and the actual hours of use. A recent AOPA survey showed that 47 percent of AOPA members rely on the charted hours of MOA use for flight planning. A MOA's actual hours of use vary significantly from the charted hours it can cause VFR pilots to unnecessarily fly less direct routes or to fly through the active MOA. The FAA should significantly reduce the charted times for the West MOA to reflect the total amount of time this airspace is actually needed. If operational needs

develop that justify additional use; NOTAMs can effectively be utilized to notify pilots of the changes.

AOPA recognizes the importance of providing the military sufficient SUA to maintain a high level of military preparedness. However, our nation's airspace resources are finite, and the questions of civil aviation safety and access must be mitigated. Modifying the Meridian 2 East and West MOAs as discussed above would mitigate the impacts to civilian traffic in the area.

Sincerely,

Craig Spence
Vice President
Regulatory Affairs

APPENDIX C

AGENCY OUTREACH

INVITATION LIST FOR THE AGENCY OUTREACH MEETING ON AUGUST 20, 2009

Agencies

Mid-Mississippi Development District
Rusty McMillan, Executive Director
P.O. Box 119
Newton, MS 39345
Phone: 601-683-2091
E-mail: rusty@mmdd.org

Mississippi Department of Environmental Quality, Office of Pollution Control
Mr. Jerry Cain, Director
P.O. Box 2261
Jackson, MS 39225
Phone: 601-961-5100
E-mail: jerry_cain@deq.state.ms.us

Mississippi Department of Transportation, Aeronautics Division
Mr. Thomas M. Booth, Jr.
P.O. Box 1850
Jackson, MS 39215-1850
Phone: 601-359-7850

State Historic Preservation Office, Mississippi Department of Archives and History
Mr. H.T. Holmes, SHPO
P.O. Box 571
Jackson, MS 39205-0571
Phone: 601-359-6850
E-mail: jwood@mdah.state.ms.us

U.S. Environmental Protection Agency, Region 4
Mr. A. Stan Meiburg, Acting Regional Administrator
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960
Phone: 404-562-9900
E-mail: meiburg.stan@epa.gov

U.S. Fish and Wildlife Service – Southeast Region
Mr. Sam Hamilton, Regional Director
1875 Century Boulevard
Atlanta, GA 30345
Phone: 404-679-4000
E-mail: tauline_davis@fws.gov

U.S. Forest Service
Ms. Gretta Boley, Supervisor
Supervisor's Office
100 W. Capitol Street, Suite 1141
Jackson, MS 39269-1199
Phone: 601-965-1600
E-mail: mboley@fs.fed.us

U.S. Forest Service
Bienville National Forest
3473 Highway 35 South
South Forest, MS 39074
Phone: 601-469-3811
E-mail: nkittrell@fs.fed.us

Airports

Brookhaven-Lincoln County Airport
Mr. Alan Morrow
1216 Heucks Retreat Road
Brookhaven, MS 39601
Phone: 601-833-0999

Bruce Campbell Field Airport
Mr. Rheese Lincecum
7450 Old Canton Road
Madison, MS 39110
Phone: 601-853-1960
E-mail: madair@madisonaircenter.net

Clarke County Airport
Airport Board
429 County Road NR 153
Quitman, MS 39355
Phone: 601-776-6312
E-mail: clarkecoairport@aol.com

Columbia-Marion County Airport
Mr. Joe Wilson
151 Airport Road
Columbia, MS 39429
Phone: 601-736-9295

Copiah County Airport
Mr. Steve See
1001 Airport Lane
Hazlehurst, MS 39083
Phone: 601-892-0794

G.V. Montgomery Airport
Mr. Randall George
City of Forest
P.O. Box 298
Forest, MS 39074
Phone: 601-469-2921

Hattiesburg Bobby L. Chain Municipal Airport
Mr. Bennie Sellers
P.O. Box 1898
Hattiesburg, MS 39401
Phone: 601-545-4540
E-mail: info@hattiesburgairport.com

Hattiesburg-Laurel Regional Airport
Mr. Thomas Heanue
1002 Terminal Drive
Moselle, MS 39459
Phone: 601-545-3111
E-mail: hlra@c-gate.net

Hawkins Field Airport
Mr. Alvin Beamon
P.O. Box 98109
Jackson, MS 39298-8109
Phone: 601-354-4983
E-mail: JMAA.info@jmaa.com

Hesler-Noble Field Airport
Mr. Daryl Cooper
P.O. Box 2335
Laurel, MS 39442
Phone: 601-425-5121

Jackson-Evers International Airport
Mr. Dirk B. Vanderleest, Chief Executive Officer
P.O. Box 98109
Jackson, MS 39298-8109
Phone: 601-939-5631
E-mail: JMAA.info@jmaa.com

James H. Easom Field Airport
Mr. Ron Davis
P.O. Box 300
Newton, MS 39345
Phone: 601-683-2870
E-mail: amapp@ci.newton.ms.us

John Bell Williams Airport
Ms. Michele Jackson
Hinds Community College
P.O. Box 1100
Raymond, MS 39154
Phone: 601-857-3884
E-mail: mmjackson@hindscc.edu

Key Field Airport
Mr. Tom Williams
P.O. Box 4351
Meridian, MS 39304
Phone: 601-482-0364

Magee Municipal Airport
Mr. Ashley Steele
111 Prine Drive
Magee, MS 39111
Phone: 601-849-3571

Prentiss-Jefferson Davis County Airport
ARPT Board
199 Airport Road
Prentiss, MS 39474
Phone: 601-792-4467

Richton-Perry County Airport
Mr. Joe Blackman
P.O. Box 1500
Richton, MS 39476
Phone: 601-788-6210

Thigpen Field Airport
Mr. Kendrick Blakeney
P.O. Box 307
Bay Springs, MS 39422
Phone: 601-764-4112
E-mail: cityhall@baysprings.net

Waynesboro Municipal Airport
Ms. Janice Wolff
P.O. Box 872
Waynesboro, MS 39367
Phone: 601-735-9682

Counties

Covington County
P.O. Box 1679
Collins, MS 39428
Phone: 601-765-8605
Fax: 601-765-5016

Jasper County
P.O. Box 1047
Bay Springs, MS 39422
Phone: 601-764-3368
E-mail: bravenhorst@co.jasper.ms.us

Jefferson Davis County
Jon Davies
P.O. Box 1137
Prentiss, MS 39474
Phone: 601-792-4204
E-mail: jwdavies53@hotmail.com

Jones County
P.O. Box 1468
Laurel, MS 394441
Phone: 601-428-3139

Lawrence County
P.O. Box 1160
Monticello, MS 39654
Phone: 601-587-7162

Newton County
P.O. Box 68
County Courthouse
Decatur, MS 39327
Phone: 601-635-2367
E-mail: jbridges@ci.newton.ms.us

Rankin County
Board of Supervisors
211 East Government Street, Suite A
Brandon, MS 39042
Phone: 601-825-1475
E-mail: creed@rankincounty.org

Scott County
P.O. Box 630
County Courthouse
Forest, MS 39074
Phone: 601-469-1926
E-mail: kim@scottcountyms.gov

Simpson County
P.O. Box 367
Mendenhall, MS 39114
Phone: 601-847-1418
E-mail: rnvei@co.simpson.ms.us

Smith County
P.O. Box 160
Raleigh, MS 39153
Phone: 601-782-4000
E-mail: ctanner@co.smith.ms.us

Cities and Towns

City of Bay Springs
City Hall
39 South 6th Street
Bay Springs, MS 39422
Phone: 601-764-4112
E-mail: cityhall@baysprings.net

Town of Braxton
City Hall
101 N Oak Avenue
Braxton, MS 39044-9717
Phone: 601-847-1879

Town of D'Lo
P.O. Box 100
D'Lo, MS 39062
Phone: 601-847-7121

Louin Town Hall
P.O. Box 3
Louin, MS 39338
Phone: 601-739-3630

City of Magee
301 Main Avenue N.
Magee, MS 39111
Phone 601-849-3344

City of Mendenhall
City Hall
172 West Maud Avenue
P.O. Box 487
Mendenhall, MS 39114
Phone: 601-847-1212
E-mail: info@ci.mendenhall.ms.us

Town of Mize
P.O. Box 245
208 Highway 28
Mize, MS 39116
Phone: 601 733-2221
E-mail: mize2221@bellsouth.net

City of Montrose
145 CR 1553
Montrose, MS 39338
Phone: 601-739-3205

Town of Mount Olive
P.O. Box 510
Mount Olive, MS 39119
Phone: 601-797-3496
E-mail: mountolivecityhall@bellsouth.net

Town of Polkville
6606 Highway 13 Polkville
Morton, MS 39117
Phone: 601-537-3115

Town of Puckett
P.O. Box 130
Puckett, MS 39151
Phone: 601-825-3298

City of Raleigh
212 Sylvarena Avenue
Raleigh, MS 39153

City of Soso
P.O. Box 99
Soso, MS 39480
Phone: 601-729-2958

City of Sylvarena
SCR 41299
Sylvarena, MS 39422
Phone: 601-789-5134

Town of Taylorsville
P.O. Box 358
Taylorsville, MS 39168
Phone: 601 785-6531
E-mail: tvilleclerk@bellsouth.net

Sample Agency Outreach Meeting Invitation

Dubin, Elaine H

From: Elaine H. Dubin
Sent: Tuesday, August 04, 2009 4:13 PM
To: 'jwood@mdah.state.ms.us'
Cc: Tanya A. Perry; 'Lang, Susan M CIV NAVFAC Atlantic'; 'ffc.record@navy.mil'
Subject: Invitation to Upcoming Meeting to Introduce EA for Meridian 2 MOA, Meridian, MS
Attachments: SHPO Invitation Letter.pdf; Enclosures 1-3.pdf

State Historic Preservation Office, Mississippi Department of Archives and History
Mr. H.T. Holmes, SHPO
PO Box 571
Jackson, MS 39205-0571
Phone: 601-359-6850
E-mail: jwood@mdah.state.ms.us

SUBJECT: UPCOMING MEETING TO INTRODUCE AN ENVIRONMENTAL ASSESSMENT (EA) TO ANALYZE IMPACTS OF MERIDIAN 2 MILITARY OPERATING AREA (MOA), MERIDIAN, MS

The purpose of this letter is to inform you that U.S. Fleet Forces (USFF) will be holding an information meeting for state and federal agencies to introduce an EA to analyze impacts of Meridian 2 MOA, Meridian, MS. The meeting will be held on Thursday, August 20, 2009, 9:00 p.m., at the Eagle Ridge Conference Center at the Raymond Campus of Hinds Community College. A proposed agenda (Enclosure (1)) and directions to the Conference Center (Enclosure (2)) are provided. The purpose of this meeting is to familiarize participants with the proposed action and alternatives in this EA. Enclosure (3) is a Federal Aviation Administration (FAA) circularization outlining the establishment of Meridian 2. This circularization includes data regarding the specific types of operations and activities planned for the MOA and the expected frequency of use in the proposed airspace.

Agency representatives can help focus discussions on the appropriate resources that could be impacted by the context and scope of the proposed action. We look forward to the opportunity to get input early in the EA development process. Accordingly, we request that each agency provide a representative for the August 20th meeting, and forward their reply to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, (757) 322-8498; E-mail: susan.m.lang@navy.mil.

USFF POC is Mr. John Van Name, (757) 836-2943, or E-mail: john.vanname@navy.mil

Sincerely,

G. L. EDWARDS
Environmental Readiness Division
By direction

Enclosures: 1. Proposed Agenda
2. Directions to Conference Center
3. FAA Circularization

DEPARTMENT OF THE NAVY
COMMANDER
U.S. FLEET FORCES COMMAND
1562 MITSCHER AVENUE SUITE 250
NORFOLK, VA 23551-2487

5090
Ser N45/1253
July 31, 2009

Mr. Elbert Hilliard
State Historic Preservation Office
MS Department of Archives & History
P.O. Box 571
Jackson, MS 39205-0571

Dear Mr. Hilliard:

SUBJECT: UPCOMING MEETING TO INTRODUCE AN ENVIRONMENTAL ASSESSMENT (EA) TO ANALYZE IMPACTS OF MERIDIAN 2 MILITARY OPERATING AREA (MOA), MERIDIAN, MS

The purpose of this letter is to inform you that U.S. Fleet Forces (USFF) will be holding an information meeting for state and federal agencies to introduce an EA to analyze impacts of Meridian 2 MOA, Meridian, MS. The meeting will be held on Thursday, August 20, 2009, 9:00 p.m., at the Eagle Ridge Conference Center at the Raymond Campus of Hinds Community College. A proposed agenda (Enclosure (1)) and directions to the Conference Center (Enclosure (2)) are provided.

The purpose of this meeting is to familiarize participants with the proposed action and alternatives in this EA. Currently, the U.S. Navy is training pilots in the T-45C Goshawk jet training the Meridian 1 MOA, which is northeast of Jackson, MS. Due to changes in the U.S. Navy's syllabus, the number of training sorties will increase from 32,000 to 37,000 and saturate the existing Meridian 1 MOA. Consequently, an additional MOA is being proposed in close proximity to the Naval Air Station Meridian and the existing Meridian 1 MOA. Enclosure (3) is a Federal Aviation Administration (FAA) circularization outlining the establishment of Meridian 2. This circularization includes data regarding the specific types of operations and activities planned for the MOA and the expected frequency of use in the proposed airspace.

Agency representatives can help focus discussions on the appropriate resources that could be impacted by the context and scope of the proposed action. We look forward to the opportunity to get input early in the EA development process. Accordingly, we request that each agency provide a representative for the August 20th meeting, and forward their reply to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, (757) 322-8498; E-mail: susan.m.lang@navy.mil.

USFF POC is Mr. John Van Name, (757) 836-2943, or E-mail: john.vanname@navy.mil.

Sincerely,

G. L. Edwards

G. L. EDWARDS
Environmental Readiness Division
By direction

Enclosures:
1. Proposed Agenda
2. Directions to Conference Center
3. FAA Circularization

Agency Outreach Meeting Minutes and Concurrence with the Minutes from the Agencies that Attended

September 21, 2009

Naval Facilities Engineering Command, Atlantic
Attn: Ms. Susan Lang, Code EV22
6506 Hampton Blvd.
LRA Building A
Norfolk, VA 23508-1278
Email: Susan.m.lang@navy.mil

Reference: Contract No.: N62470-09-D-2003, TO 0004
Requisition No.: ACQR1117914
e^2M Project No.: 4394-005

Subject: Agency Outreach Meeting (August 20, 2009)

Dear Ms. Lang:

We are pleased to provide Meeting Minutes from the Agency Outreach Meeting for the Environmental Assessment (EA) to Analyze Impacts of Meridian 2 Military Operating Area (MOA).

Attendees			
Name	**Organization**	**Phone #**	**Email**
CDR Stephen Hartung	NAVREP ATL	404-305-6906 404-931-2151	Stephen.hartung@faa.gov
Tommy Booth	MDOT – Aeronautics	601-359-7850	Tbooth@mdot.state.ms.us
Daryl Cooper	Laurel Airport	601-425-5121	(Hesler-Noble Field)
Annette Pugh	FAA – Air Traffic Representative	850-255-5146	Annette.pugh@faa.gov
B.J. Hailey	MS DEQ	601-961-5783	B.J.hailey@deq.state.ms.us
Kathy Lunceford	USFWS	601-321-1132	Kathy_lunceford@fws.gov
CAPT Charles Gibson	NAS Meridian	601-679-2111	Charles.m.gibson@navy.mil
Tom Williams	Meridian Airport Authority (Key Field)	601-917-4944	twilliams@meridianairport.com
Tanya Perry	e^2M	703-752-7755 (ext. 116)	Tanya.perry@hdrinc.net
Gustin Hare	e^2M	830-980-4702 (ext. 104)	Gustin.hare@hdrinc.net
Brad Bernardy	U.S. Forest Service	601-469-3811	Bbernardy@fs.fed.us
Mike Dueitt	U.S. Forest Service	601-963-1668	Mdueitt@fs.fed.us
Susan Lang	NAVFAC LANT	757-322-8498	Susan.m.lang@navy.mil
Ryan Winz	NAVFAC LANT	757-322-4391	Ryan.winz@navy.mil
Lt. Alan Greer	TW-1	601-679-3367	Alan.greer@navy.mil
CDR Jon Still	TW-1	601-697-2875	Jonathan.still@navy.mil
Michelle Jackson	Hinds Community College John Bell Williams Airport	601-857-3884	Mmjackson@hinds.cc.edu

The Agency Outreach Meeting Agenda

A. Introductions
B. Mission of Training Wing One (e.g., training syllabus) – Captain Charles M. Gibson, Commanding Officer NAS Meridian, or Commander Jonathan Still, Operations Officer of TW-1
C. Evolution of the Meridian 2 MOA – Power Point by Lieutenant Alan Greer, TW-1
D. Federal Aviation Administration (FAA) as a Cooperating Agency and NEPA Process /Project Timeline – FAA Eastern Regional Office Representative and Susan Lang, NAVFAC Atlantic
E. Agency Input
   - MS SHPO – Cultural Resources perspective for area under proposed MOA
   - MS DEQ – Air Quality
   - MS DOT – Aeronautics Division
   - Localities underlying proposed MOA
   - USFS (Bienville National Forest)
   - USFWS
   - Other State, Federal, and Local agencies
F. The results of interagency coordination will be addressed as appropriate through the affected environment discussion and the environmental consequences comparisons in the Environmental Assessment. The FAA is a cooperating agency.
G. Questions

Summary of Meeting Discussions

The meeting began with brief introductions. Captain Gibson, Commander Jonathan Still, Lieutenant Alan Greer, and Ms. Susan Lang gave presentations as listed in the agenda. Ms. Pugh from the FAA was introduced. Once the presentations were finished, input from the agency representatives was requested. The following paragraphs outline the input from the agencies and the discussions that followed.

Mr. Cooper, from Laurel Hesler-Noble Airport, commented that Sanderson Farms operates quite a few aircraft out of Laurel Airport seven days a week. The aircraft consist mainly of Lear 31s and Citations and probably fly Instrument Flight Rules (IFR) most of the time. Mr. Cooper expressed concern that the proposed MOA could adversely affect their flights in and out of the airport. CDR Still informed Mr. Cooper that civilian pilots would be able to communicate with Memphis Center (ATC) to transition below or around the MOA, or through a portion of the MOA that isn't being used during times when the MOA is active. Mr. Cooper indicated that this would be a reasonable method of transiting civilian aircraft through the area when the MOA was active. It is not anticipated that civilian air traffic would be significantly impacted if the proposed MOA was established.

U.S. Forest Service representatives indicated that between January and May, there may be prescribed burns in the national forest underneath the proposed MOA. There were 30 total burn days in 2008. About 1,500 to 3,500 acres can be proposed for a prescribed burn. The mixing layer in the air is about 2,000 to 5,000 feet high (the smoke will be thickest below the mixing layer). However, particulates can be present 6,000 to 12,000 feet high. For aircraft operations, this would mainly impact helicopters. Since the U.S. Forest Service needs to get a permit before the prescribed burn can be started, a temporary flight restriction could be put in place. However, military training operations in the proposed MOA would not impact (or be impacted adversely by) prescibed burns.

USFS heliocoptors are unlikely to fly within the MOA except for brief periods near the floor of the MOA, during which both the U.S Forest Service and TW-1 will operate under positive clearance from Memphis Center. No other resources within the U.S. Forest Service were identified for potential impacts. Consequently, it is not anticipated that the establishment of the proposed MOA would impact the resources within the U.S. Forest Service.

Ms. Lunceford, from the U.S. Fish and Wildlife Service, indicated that there were no species of concern at the MOA's elevation (above 8,000 feet above mean sea level [MSL]), although there are some eagle nests in the region near the ground underneath the MOA. Ms. Lunceford brought up the issue of bird/wildlife aircraft strike hazard (BASH) at the airfield if there are additional operations (take-offs and landings) at NAS Meridian. She indicated that NAS Meridian should address these issues; they have a BASH plan and the issue can be managed through the plan. No other resources within the U.S. Fish and Wildlife Service were identified; therefore, it is not anticipated that the establishment of the proposed MOA would impact the resources within the U.S. Fish and Wildlife Service.

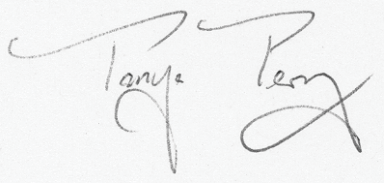
Since the proposed project does not involve construction or development, Mr. Hailey, from the Mississippi Department of Environmental Quality (MS DEQ), indicated that he did not see any issues directly relating to the project. Mr. Hailey did discuss potential air quality issues at NAS Meridian and wanted to ensure that NAS Meridian would still fall under the MS Synthetic Minor Source permit. CDR Hartung pointed out that downloading training in F-18 aircraft to T45 aircraft would also reduce Navy's the carbon footprint nationwide. {Follow-up note: Jamie Brown the AQ Manager at NAS Meridian has just completed a renewal of the Synthetic Minor permit and NAS Meridian will be conducting the next air emission inventory during 2010-11.} It is not anticipated that the establishment of the proposed MOA would increase emissions above those authorized in the existing MS Synthetic Minor permit.

The meeting was adjourned after the discussions with the agency representatives.

If you have any questions concerning this deliverable, please contact Tanya Perry at 703-752-7755, extension 116.

Sincerely,

engineering-environmental Management, Inc.



Tanya Perry
Project Manager

cc: Don Beckham, e²M, Program Manager
Gustin Hare, e²M
Elaine Dubin, e²M
Project File, 4394-005

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Dubin, Elaine H

From: B_Hailey@deq.state.ms.us
Sent: Tuesday, November 10, 2009 9:14 AM
To: Dubin, Elaine H
Subject: Re: FOLLOW-UP: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes
Attachments: Enclosure 1 - Agency Outreach Meeting Minutes.pdf

I apologize for not responding....I thought the previous email indicated that if nothing was received from us then you would assume that we concur with them as written. After reading the minutes I didn't see anything to comment on; therefore, I didn't respond. I apologize for the oversight.

"Dubin, Elaine H" <Elaine.Dubin@hdrinc.com>

11/09/2009 11:14 AM

To "B.J.hailey@deq.state.ms.us" <B.J.hailey@deq.state.ms.us>
cc "Perry, Tanya A" <Tanya.Perry@hdrinc.com>, "Lang, Susan M CIV NAVFAC Atlantic" <susan.m.lang@navy.mil>, ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY <ffc.record@navy.mil>
Subject FOLLOW-UP: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

Mr. B.J. Hailey
Mississippi Department of Environmental Quality
Phone: 601-961-5783

SUBJECT: FOLLOW-UP: Request Concurrence with Meeting Minutes from the August 20, 2009 Agency Outreach Meeting for the Environmental Assessment to Analyze Impacts of the Meridian 2 Military Operations Area (MOA), Meridian, MS.

The purpose of this letter is to inform you that meeting minutes have been prepared from the Agency Outreach Meeting, hosted by U.S. Fleet Forces (USFF), that was held on Thursday, August 20, 2009. This meeting was regarding the Environmental Assessment to analyze impacts of the Meridian 2 MOA. The meeting minutes are provided as enclosure (1). The meeting minutes were sent previously via e-mail on Wednesday, October 21, at that time the USFF requested concurrence or comments on the Agency Outreach Meeting minutes by November 5, 2009. To date, USFF has not received concurrence or comments on the Agency Outreach Meeting minutes from the Mississippi Department of Environmental Quality.

You will also have the opportunity to review and comment on the Draft Final EA once it has been published. It is expected that the Draft Final EA will be ready for review in early December 2009. Please send any comments or questions regarding the agency outreach meeting minutes or the EA to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, E-mail: susan.m.lang@navy.mil.

Sincerely,

Susan Lang

Environmental Planning
NAVFAC Atlantic
6506 Hampton Blvd
Norfolk, VA 23508-1278
757-322-8498

Enclosure: 1. Agency Outreach Meeting Minutes

MERIDIAN 2 MOA EA PROJECT FILE
##CODE.MERIDIAN 2 MOA EA.PF##

Dubin, Elaine H

From: Annette.Pugh@faa.gov
Sent: Thursday, October 22, 2009 12:22 PM
To: Dubin, Elaine H
Cc: ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY; Lang, Susan M CIV NAVFAC Atlantic; Perry, Tanya A
Subject: Re: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes
Attachments: Enclosure 1 - Agency Outreach Meeting Minutes.pdf

Thank you! I concur with the minutes of the meeting.

Annette Pugh

Annette Pugh
FAA Air Traffic Representative (ATREP)
Cell - (850) 255-5146

"Dubin, Elaine H" <Elaine.Dubin@hdrinc.com>

10/21/2009 02:03 PM

To Annette Pugh/ASO/FAA@FAA
cc "Perry, Tanya A" <Tanya.Perry@hdrinc.com>, "Lang, Susan M CIV NAVFAC Atlantic" <susan.m.lang@navy.mil>, ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY <ffc.record@navy.mil>
Subject Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

Ms. Annette Pugh
Federal Aviation Administration - Air Traffic Representative
Phone: 850-255-5146

SUBJECT: Request Concurrence with Meeting Minutes from the August 20, 2009 Agency Outreach Meeting for the Environmental Assessment to Analyze Impacts of the Meridian 2 Military Operations Area (MOA), Meridian, MS.

The purpose of this letter is to inform you that meeting minutes have been prepared from the Agency Outreach Meeting, hosted by U.S. Fleet Forces (USFF), that was held on Thursday, August 20, 2009. This meeting was regarding the Environmental Assessment to analyze impacts of the Meridian 2 MOA. The meeting minutes are provided as enclosure (1). USFF requests concurrence or comments on the Agency Outreach Meeting minutes by November 5, 2009. If a response is not received by that date, USFF will assume that you concur with the Agency Outreach Meeting minutes as written.

You will also have the opportunity to review and comment on the Draft Final EA once it has been published. It is expected that the Draft Final EA will be ready for review in early December 2009. Please send any comments or questions regarding the agency outreach meeting minutes or the EA to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, E-mail: susan.m.lang@navy.mil.

Sincerely,

Susan Lang

Environmental Planning
NAVFAC Atlantic
6506 Hampton Blvd
Norfolk, VA 23508-1278
757-322-8498

Enclosure: 1. Agency Outreach Meeting Minutes

MERIDIAN 2 MOA EA ADMINISTRATIVE RECORD
##CODE.MERIDIAN 2 MOA EA.AR##

Dubin, Elaine H

From: Michael Dueitt [mdueitt@fs.fed.us]
Sent: Tuesday, October 27, 2009 3:51 PM
To: Dubin, Elaine H
Subject: Re: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes
Attachments: Enclosure 1 - Agency Outreach Meeting Minutes.pdf

I concur with the meeting minutes as attached below. Thanks for correctly capturing the meeting proceedings and including us in the process.

Mike Dueitt
Forest FMO
National Forests in Mississippi
Office 601-965-1668
Cell 601-497-0608
mdueitt@fs.fed.us

"Dubin, Elaine H" <Elaine.Dubin@hdrinc.com>

10/21/2009 01:04 PM

To "Bbernardy@fs.fed.us" <Bbernardy@fs.fed.us>, "Mdueitt@fs.fed.us" <Mdueitt@fs.fed.us>
cc "mboley@fs.fed.us" <mboley@fs.fed.us>, "nkittrell@fs.fed.us" <nkittrell@fs.fed.us>, "Perry, Tanya A" <Tanya.Perry@hdrinc.com>, "Lang, Susan M CIV NAVFAC Atlantic" <susan.m.lang@navy.mil>, ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY <ffc.record@navy.mil>
Subject Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

Mr. Brad Bernardy and Mr. Mike Dueitt
U.S. Forest Service
Phone: 601-469-3811 and 601-963-1668

SUBJECT: Request Concurrence with Meeting Minutes from the August 20, 2009 Agency Outreach Meeting for the Environmental Assessment to Analyze Impacts of the Meridian 2 Military Operations Area (MOA), Meridian, MS.

The purpose of this letter is to inform you that meeting minutes have been prepared from the Agency Outreach Meeting, hosted by U.S. Fleet Forces (USFF), that was held on Thursday, August 20, 2009. This meeting was regarding the Environmental Assessment to analyze impacts of the Meridian 2 MOA. The meeting minutes are provided as enclosure (1). USFF requests concurrence or comments on the Agency Outreach Meeting minutes by November 5, 2009. If a response is not received by that date, USFF will assume that you concur with the Agency Outreach Meeting minutes as written.

You will also have the opportunity to review and comment on the Draft Final EA once it has been published. It is expected that the Draft Final EA will be ready for review in early December 2009. Please send any comments or questions regarding the agency outreach meeting minutes or the EA to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, E-mail: susan.m.lang@navy.mil.

Sincerely,

Susan Lang

Environmental Planning
NAVFAC Atlantic
6506 Hampton Blvd
Norfolk, VA 23508-1278
757-322-8498

Enclosure: 1. Agency Outreach Meeting Minutes

MERIDIAN 2 MOA EA ADMINISTRATIVE RECORD
##CODE.MERIDIAN 2 MOA EA.AR##

Dubin, Elaine H

From: Jackson, Michelle M. [MMJackson@hindscc.edu]
Sent: Thursday, October 22, 2009 9:13 AM
To: Dubin, Elaine H
Subject: RE: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

Ms. Elaine Dubin,

I concur with the minutes sent to me regarding the Meridian 2 MOAE meeting held at Eagle Ridge Conference Center on August 20, 2009.

Sincerely,

Michelle Jackson
Hinds Community College
John Bell Williams Airport (M16)
phone 601 857 3884
fax 601 857 3896
-----Original Message-----
From: Dubin, Elaine H [mailto:Elaine.Dubin@hdrinc.com]
Sent: Wednesday, October 21, 2009 1:10 PM
To: Jackson, Michelle M.
Cc: Perry, Tanya A; Lang, Susan M CIV NAVFAC Atlantic; ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY
Subject: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

Ms. Michelle Jackson
Hinds Community College John Bell Williams Airport
Phone: 601-857-3884

SUBJECT: Request Concurrence with Meeting Minutes from the August 20, 2009 Agency Outreach Meeting for the Environmental Assessment to Analyze Impacts of the Meridian 2 Military Operations Area (MOA), Meridian, MS.

The purpose of this letter is to inform you that meeting minutes have been prepared from the Agency Outreach Meeting, hosted by U.S. Fleet Forces (USFF), that was held on Thursday, August 20, 2009. This meeting was regarding the Environmental Assessment to analyze impacts of the Meridian 2 MOA. The meeting minutes are provided as enclosure (1). USFF requests concurrence or comments on the Agency Outreach Meeting minutes by November 5, 2009. If a response is not received by that date, USFF will assume that you concur with the Agency Outreach Meeting minutes as written.

You will also have the opportunity to review and comment on the Draft Final EA once it has been published. It is expected that the Draft Final EA will be ready for review in early December 2009. Please send any comments or questions regarding the agency outreach meeting minutes or the EA to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, E-mail: susan.m.lang@navy.mil.

Sincerely,

Susan Lang

Environmental Planning
NAVFAC Atlantic
6506 Hampton Blvd
Norfolk, VA 23508-1278
757-322-8498

Dubin, Elaine H

From: Booth, Tommy [tbooth@mdot.state.ms.us]
Sent: Monday, November 09, 2009 12:34 PM
To: Dubin, Elaine H
Subject: RE: FOLLOW-UP: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

I apologize for the delay in responding... I concur with the minutes as presented...

Have a great day,
Tommy

Thomas M. Booth, Jr., PE
MDOT - Aeronautics Division

-----Original Message-----
From: Dubin, Elaine H [mailto:Elaine.Dubin@hdrinc.com]
Sent: Monday, November 09, 2009 11:15 AM
To: Booth, Tommy
Cc: Perry, Tanya A; Lang, Susan M CIV NAVFAC Atlantic; ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY
Subject: FOLLOW-UP: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

Mr. Tommy Booth
Mississippi Department of Transportation - Aeronautics
Phone: 601-359-7850

SUBJECT: FOLLOW-UP: Request Concurrence with Meeting Minutes from the August 20, 2009 Agency Outreach Meeting for the Environmental Assessment to Analyze Impacts of the Meridian 2 Military Operations Area (MOA), Meridian, MS.

The purpose of this letter is to inform you that meeting minutes have been prepared from the Agency Outreach Meeting, hosted by U.S. Fleet Forces (USFF), that was held on Thursday, August 20, 2009. This meeting was regarding the Environmental Assessment to analyze impacts of the Meridian 2 MOA. The meeting minutes are provided as enclosure (1). The meeting minutes were sent previously via e-mail on Wednesday, October 21, at that time the USFF requested concurrence or comments on the Agency Outreach Meeting minutes by November 5, 2009. To date, USFF has not received concurrence or comments on the Agency Outreach Meeting minutes from the Mississippi Department of Transportation.

You will also have the opportunity to review and comment on the Draft Final EA once it has been published. It is expected that the Draft Final EA will be ready for review in early December 2009. Please send any comments or questions regarding the agency outreach meeting minutes or the EA to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, E-mail: susan.m.lang@navy.mil.

Sincerely,

Susan Lang

Environmental Planning
NAVFAC Atlantic
6506 Hampton Blvd
Norfolk, VA 23508-1278
757-322-8498

Enclosure: 1. Agency Outreach Meeting Minutes

MERIDIAN 2 MOA EA PROJECT FILE
##CODE.MERIDIAN 2 MOA EA.PF##
CONFIDENTIALITY NOTICE This e-mail and any files or attachments may contain confidential and privileged information.
If you have received this message in error, please notify the sender at the above e-mail address and delete it and all copies from your system.

Mr. Daryl Cooper
Laurel Airport
Phone: 601-425-5121
Fax: 601-428-2047

SUBJECT: FOLLOW-UP: Request Concurrence with Meeting Minutes from the August 20, 2009 Agency Outreach Meeting for the Environmental Assessment to Analyze Impacts of the Meridian 2 Military Operations Area (MOA), Meridian, MS.

The purpose of this letter is to inform you that meeting minutes have been prepared from the Agency Outreach Meeting, hosted by U.S. Fleet Forces (USFF), that was held on Thursday, August 20, 2009. This meeting was regarding the Environmental Assessment to analyze impacts of the Meridian 2 MOA. The meeting minutes were sent previously via fax on Wednesday, October 21. During a follow-up phone call on Monday, November 09, you concurred with the meeting minutes as written. Please sign this correspondence below for our records.

You will also have the opportunity to review and comment on the Draft Final EA once it has been published. It is expected that the Draft Final EA will be ready for review in early December 2009. Please send any comments or questions regarding the agency outreach meeting minutes or the EA to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, E-mail: susan.m.lang@navy.mil.

Sincerely,

Susan Lang

Environmental Planning
NAVFAC Atlantic
6506 Hampton Blvd
Norfolk, VA 23508-1278
757-322-8498

MERIDIAN 2 MOA EA PROJECT FILE
##CODE.MERIDIAN 2 MOA EA.PF##

I concur with the minutes from the Agency Outreach Meeting hosted by USFF on Thursday, August 20, 2009 regarding the Environmental Assessment to analyze impacts of the Meridian 2 MOA.

Mr. Daryl Cooper
Laurel Airport

Dubin, Elaine H

From: Tom Williams [TWilliams@meridianairport.com]
Sent: Monday, November 09, 2009 5:18 PM
To: Dubin, Elaine H
Subject: RE: FOLLOW-UP: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

Tom Williams concurs with the meeting minutes attached! Thank you for your patience.

Tom

-----Original Message-----
From: Dubin, Elaine H [mailto:Elaine.Dubin@hdrinc.com]
Sent: Monday, November 09, 2009 11:16 AM
To: Tom Williams
Cc: Perry, Tanya A; Lang, Susan M CIV NAVFAC Atlantic; ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY
Subject: FOLLOW-UP: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

Mr. Tom Williams
Meridian Airport Authority (Key Field)
Phone: 601-917-4944

SUBJECT: FOLLOW-UP: Request Concurrence with Meeting Minutes from the August 20, 2009 Agency Outreach Meeting for the Environmental Assessment to Analyze Impacts of the Meridian 2 Military Operations Area (MOA), Meridian, MS.

The purpose of this letter is to inform you that meeting minutes have been prepared from the Agency Outreach Meeting, hosted by U.S. Fleet Forces (USFF), that was held on Thursday, August 20, 2009. This meeting was regarding the Environmental Assessment to analyze impacts of the Meridian 2 MOA. The meeting minutes are provided as enclosure (1). The meeting minutes were sent previously via e-mail on Wednesday, October 21, at that time the USFF requested concurrence or comments on the Agency Outreach Meeting minutes by November 5, 2009. To date, USFF has not received concurrence or comments on the Agency Outreach Meeting minutes from the Meridian Airport Authority.

You will also have the opportunity to review and comment on the Draft Final EA once it has been published. It is expected that the Draft Final EA will be ready for review in early December 2009. Please send any comments or questions regarding the agency outreach meeting minutes or the EA to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, E-mail: susan.m.lang@navy.mil.

Sincerely,

Susan Lang

Environmental Planning
NAVFAC Atlantic
6506 Hampton Blvd
Norfolk, VA 23508-1278
757-322-8498

Enclosure: 1. Agency Outreach Meeting Minutes

MERIDIAN 2 MOA EA PROJECT FILE
##CODE.MERIDIAN 2 MOA EA.PF##

Dubin, Elaine H

From: Kathy_Lunceford@fws.gov
Sent: Wednesday, October 21, 2009 1:36 PM
To: Dubin, Elaine H
Cc: Stephen_Ricks@fws.gov
Subject: Re: Request Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes
Attachments: pic21132.gif

Ms Dubin:

The Fish and Wildlife Service has no comments on the Meeting Minutes from the Agency Outreach Meeting for the EA to analyze Impacts of the Meridian 2 Military Operations Area, Meridian, MS.

We will, however, provide comments on the draft EIS when it is available.

Thank you for the opportunity to review this project.

Kathy Lunceford

~~~~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~~~~
Kathy W. Lunceford
Fish and Wildlife Biologist
USFWS
Mississippi Field Office
Jackson, MS
~~~~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~~~~

"Dubin, Elaine H" <Elaine.Dubin@hdrinc.com>

"Dubin, Elaine H"
<Elaine.Dubin@hdrinc.com>

10/21/2009 12:29 PM

To"Kathy_lunceford@fws.gov" <Kathy_lunceford@fws.gov>

cc"tauline_davis@fws.gov" <tauline_davis@fws.gov>, "Perry, Tanya A" <Tanya.Perry@hdrinc.com>, "Lang, Susan M CIV NAVFAC Atlantic" <susan.m.lang@navy.mil>, ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY <ffc.record@navy.mil>

SubjectRequest Concurrence with Meridian 2 MOA EA Agency Outreach Meeting Minutes

Ms. Kathy Lunceford
U.S. Fish and Wildlife Service
Phone: 601-321-1132

SUBJECT: Request Concurrence with Meeting Minutes from the August 20, 2009 Agency Outreach Meeting for the Environmental Assessment to Analyze Impacts of the Meridian 2 Military Operations Area (MOA), Meridian, MS.

The purpose of this letter is to inform you that meeting minutes have been prepared from the Agency Outreach Meeting, hosted by U.S. Fleet Forces (USFF), that was held on Thursday, August

20, 2009. This meeting was regarding the Environmental Assessment to analyze impacts of the Meridian 2 MOA. The meeting minutes are provided as enclosure (1). USFF requests concurrence or comments on the Agency Outreach Meeting minutes by November 5, 2009. If a response is not received by that date, USFF will assume that you concur with the Agency Outreach Meeting minutes as written.

You will also have the opportunity to review and comment on the Draft Final EA once it has been published. It is expected that the Draft Final EA will be ready for review in early December 2009. Please send any comments or questions regarding the agency outreach meeting minutes or the EA to Ms. Susan Lang, Naval Facilities Engineering Command, Atlantic, E-mail: susan.m.lang@navy.mil.

Sincerely,

Susan Lang

Environmental Planning
NAVFAC Atlantic
6506 Hampton Blvd
Norfolk, VA 23508-1278
757-322-8498

Enclosure: 1. Agency Outreach Meeting Minutes

MERIDIAN 2 MOA EA ADMINISTRATIVE RECORD
##CODE.MERIDIAN 2 MOA EA.AR##

[attachment "Enclosure 1 - Agency Outreach Meeting Minutes.pdf" deleted by Kathy Lunceford/R4/FWS/DOI]

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APPENDIX D

PUBLIC INVOLVEMENT

PUBLIC INVOLVEMENT LIST FOR THE RELEASE OF THE MERIDIAN 2 MOA EA, AUGUST 9, 2011

Agencies

Mid-Mississippi Development District
Rusty McMillan, Executive Director
PO Box 119
Newton, MS 39345
Phone: 601-683-2091
E-mail: rusty@mmdd.org

Mississippi Department of Environmental Quality
Ms. Trudy Fisher, Executive Director
PO Box 2261
Jackson, MS 39225
Phone: (601)-961-5171
E-mail: trudy_fisher@deq.state.ms.us

Mississippi Department of Transportation, Aeronautics Division
Mr. Thomas M. Booth, Jr.
PO Box 1850
Jackson, MS 39215-1850
Phone: (601)-359-7850
E-mail: tbooth@mdot.state.ms.us

State Historic Preservation Office, Mississippi Department of Archives and History
Mr. H.T. Holmes, SHPO
PO Box 571
Jackson, MS 39205-0571
Phone: 601-359-6850
E-mail: kppool@mdah.state.ms.us

U.S. Environmental Protection Agency, Region 4
Mr. A. Stan Meiburg, Acting Regional Administrator
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960
Phone: (404) 562-9900
E-mail: meiburg.stan@epa.gov

U.S. Fish and Wildlife Service – Southeast Region
Ms. Cynthia Dohner, Regional Director
1875 Century Boulevard
Atlanta, GA 30345
Phone: (404)-679-4000
E-mail: cynthia_dohner@fws.gov

U.S. Forest Service
Ms. Margrett Boley, Supervisor
Supervisor's Office
100 W. Capitol Street, Suite 1141
Jackson, MS 39269-1199
Phone: 601-965-1600
E-mail: mboley@fs.fed.us

U.S. Forest Service
Bienville National Forest
Ms. Nefisia Kittrell
3473 Highway 35 South
South Forest, MS 39074
Phone: 601-469-3811
E-mail: nkittrell@fs.fed.us

Airports

Brookhaven-Lincoln County Airport
Mr. Alan Morrow
1216 Heucks Retreat Road
Brookhaven, MS 39601
Phone: 601-833-2362
E-mail: brookhavenair@bellsouth.net

Bruce Campbell Field Airport
Mr. Rheese Lincecum
7450 Old Canton Road
Madison, MS 39110
Phone: 601-853-1960
E-mail: madair1@madisonaircenter.net

Clarke County Airport
Airport Board
429 County Road NR 153
Quitman, MS 39355
Phone: 601-776-6312
E-mail: clarkecoairport@aol.com

Columbia-Marion County Airport
Mr. Joe Wilson
151 Airport Road
Columbia, MS 39429
Phone: 601-736-9295

Copiah County Airport
Mr. Thomas Elliot
1001 Airport Lane
Hazlehurst, MS 39083
Phone: 601-281-8497

G.V. Montgomery Airport
Mr. Randall George
City of Forest
PO Box 298
Forest, MS 39074
Phone: 601-469-2921

Hattiesburg Bobby L. Chain Municipal Airport
Mr. Chip Gibson
29 Academy Drive
Hattiesburg, MS 39401
Phone: 601-544-8661
E-mail: info@hattiesburgairport.com

Hattiesburg-Laurel Regional Airport
Mr. Thomas Heanue
1002 Terminal Drive
Moselle, MS 39459
Phone: 601-545-3111

Hesler-Noble Field Airport
Mr. Daryl Cooper
PO Box 2335
Laurel, MS 39442
Phone: 601-425-5121

Jackson-Evers International Airport
Hawkins Field Airport
Mr. Dirk B. Vanderleest, Chief Executive Officer
100 International Drive, Suite 300
Jackson, MS 39208
Phone: 601-939-5631
E-mail: JMAA.info@jmaa.com

James H. Easom Field Airport
Mr. Jerry Bounds
PO Box 300
Newton, MS 39345
Phone: 601-683-6181
E-mail: amapp@ci.newton.ms.us

John Bell Williams Airport
Ms. Michele Jackson
Hinds Community College
4100 Airport Road
Bolton, MS 39041
Phone: 601-857-3884
E-mail: mmjackson@hindscc.edu

Key Field Airport
Mr. Tom Williams
PO Box 4351
Meridian, MS 39302
Phone: 601-482-0364

Magee Municipal Airport
Mr. Ashley Steele
111 Prine Drive
Magee, MS 39111
Phone: 601-382-5752

Prentiss-Jefferson Davis County Airport
ARPT Board
199 Airport Road
Prentiss, MS 39474
Phone: 601-792-4467

Richton-Perry County Airport
Mr. Jimmy Walters
PO Box 1649
Richton, MS 39476
Phone: 601-788-7770

Thigpen Field Airport
Mr. Kendrick Blakeney
PO Box 307
Bay Springs, MS 39422
Phone: 601-764-4112
E-mail: cityhall@baysprings.net

Waynesboro Municipal Airport
Ms. Janice Wolff
PO Box 872
Waynesboro, MS 39367
Phone: 601-735-9682

Counties

Lauderdale County
Joe McCraney, County Administrator
410 Constitution Avenue, 11th Floor
Meridian, MS 39301
E-mail: jmccraney@lauderdalecounty.org

Covington County
PO Box 1679
Collins, MS 39428
Phone: 601-765-8605
Fax: (601)-765-5016

Jasper County
PO Box 1047
Bay Springs, MS 39422
Phone: 601-764-3368
E-mail: bravenhorst@co.jasper.ms.us

Jefferson Davis County
Jon Davies
1025 3rd St.
Prentiss, MS 39474
Phone: 601-792-5903
E-mail: jwdavies53@hotmail.com

Jones County
PO Box 1468
Laurel, MS 394441
Phone: 601-428-3139

Lawrence County
PO Box 996
Monticello, MS 39654
Phone: 601-587-3007

Newton County
PO Box 68
County Courthouse
Decatur, MS 39327
Phone: 601-635-2367

Rankin County
Board of Supervisors
211 East Government Street, Suite A
Brandon, MS 39042
Phone: 601-825-1475
E-mail: creed@rankincounty.org

Scott County
Mr. Billy Frank Alford, County Clerk
PO Box 630
Forest, MS 39074
Phone: 601-469-1926
E-mail: Balford@hotmail.com

Simpson County
PO Box 367
Mendenhall, MS 39114
Phone: 601-847-1418

Smith County
PO Box 160
Raleigh, MS 39153
Phone: 601-782-4000
E-mail: charlesw@co.smith.ms.us

Cities

City of Meridian
Mr. Don Farrar
Community Development Director
PO Box 1430
Meridian, MS 39302
E-mail: donfarrar@meridianms.org

City of Bay Springs
City Hall
39 South 6th Street
Bay Springs, MS 39422
Phone: 601.764.4112
E-mail: cityhall@baysprings.net

Town of Braxton
City Hall
101 N Oak Avenue
Braxton, MS 39044-9717
Phone: (601) 847-1879

Town of D'Lo
PO Box 100
D'Lo, MS 39062
Phone: 601-847-7121

Louin Town Hall
PO Box 3
Louin, MS 39338
Phone: 601-739-3630

City of Magee
123 Main Street
Magee, MS 39111
Phone (601) 849-3344
E-mail: jclyde@cityofmagee.com

City of Mendenhall
City Hall
172 West Maud Avenue
PO Box 487
Mendenhall, MS 39114
Phone: 601-847-1212

Town of Mize
208 Highway 28
Mize, MS 39116
Phone: 601 733-2221
E-mail: mize2221@bellsouth.net

City of Montrose
145 CR 1553
Montrose, MS 39338
Phone: 601-739-3205

Town of Mount Olive
PO Box 510
Mount Olive, MS 39119
Phone: 601-797-3496
E-mail: mtolivecityhall@bellsouth.net

Town of Polkville
6606 Highway 13 Polkville
Morton, MS 39117
Phone: 601-537-3115

Town of Puckett
PO Box 130
Puckett, MS 39151
Phone: 601-825-3298

City of Raleigh
City Hall
150 Martin Drive
Raleigh, MS 39153
Phone: 601-782-4672

City of Soso
PO Box 99
Soso, MS 39480
Phone: 601-729-2958

City of Sylvarena
SCR 41299
Sylvarena, MS 39422
Phone: 601-789-5134

Town of Taylorsville
PO Box 358
Taylorsville, MS 39168
Phone: 601 785-6532
E-mail: mitziford@taylorsvillems.com

SUBJECT: ANNOUNCEMENT OF A COMMENT REVIEW PERIOD FOR THE PUBLIC REVIEW DRAFT ENVIRONMENTAL ASSESSMENT ADDRESSING THE ESTABLISHMENT OF THE MERIDIAN 2 MILITARY OPERATIONS AREA, MERIDIAN, MISSISSIPPI

The purpose of this notice is to inform you that U.S. Fleet Forces (USFF) has prepared a Public Review Draft Environmental Assessment (EA) addressing the establishment of the Meridian 2 MOA at Meridian, Mississippi (Miss.). The Draft EA was prepared to evaluate the potential environmental consequences of establishing a new MOA, called the Meridian 2 MOA, near Naval Air Station (NAS) Meridian in east-central Miss. The establishment of this new MOA would result in the transit of Training Air Wing One (TW-1) aircraft between NAS Meridian and the proposed MOA. The Draft EA also evaluates a proposed increase in sorties at NAS Meridian. The location of NAS Meridian, the proposed MOA, and the transit region is shown in Enclosure (1). There would be no personnel changes or construction activities as part of the Proposed Action.

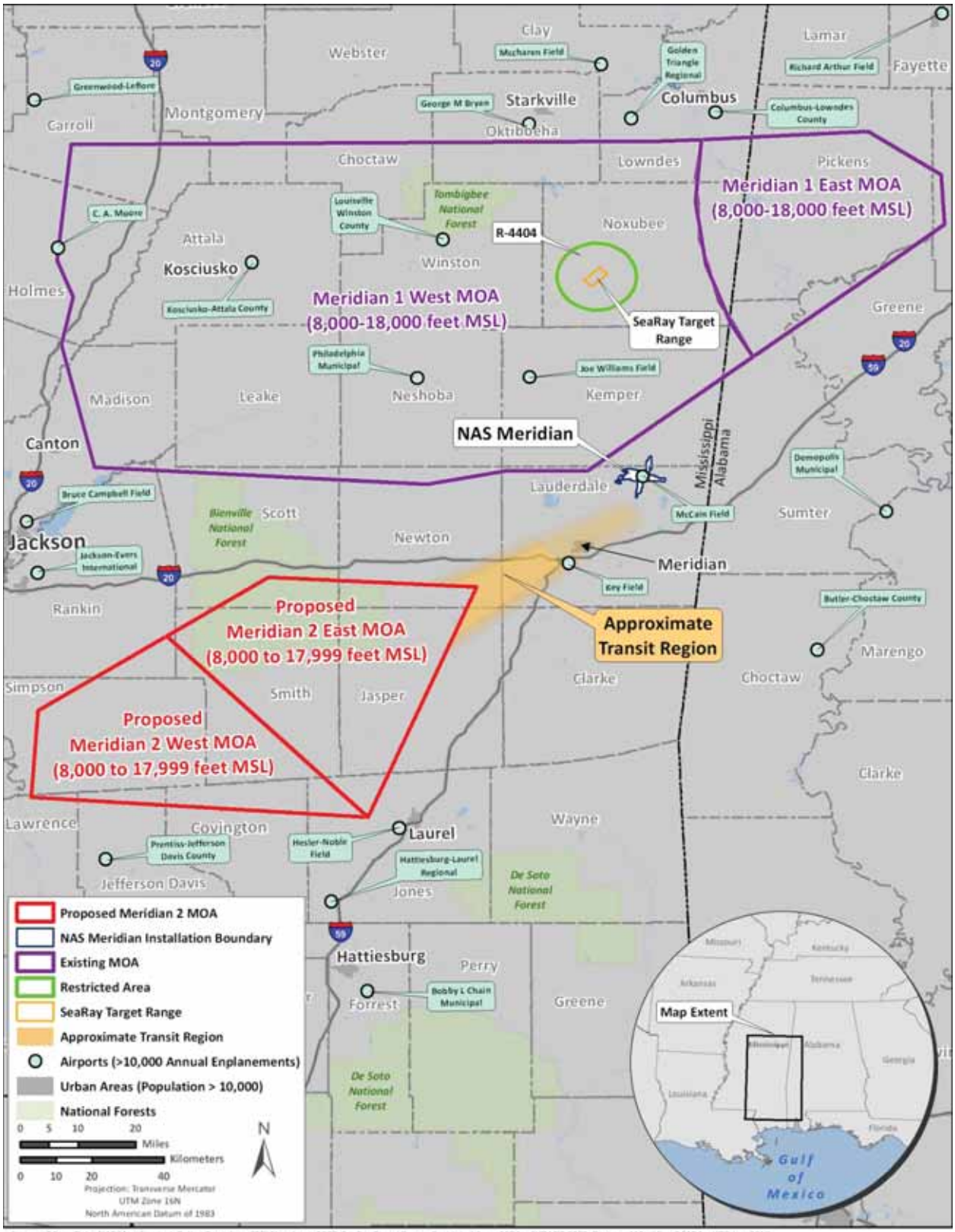
An Agency Outreach meeting on the Proposed Action was held in Jackson, Miss., on August 20, 2009. The minutes of that meeting and the invitation list are included in the Public Review Draft EA.

Copies of the Public Review Draft EA are available for review online at both http://www.cnic.navy.mil/meridian and http://www.public.navy.mil/airfor/facsfacjax, and at the Eudora Welty Library, Jackson, Miss.; Meridian-Lauderdale County Public Library, Meridian, Miss.; and the Evon A. Ford Library, Taylorsville, Miss. from August 9 to September 9, 2011. Comments received from the public and other Federal, state, and local agencies will be addressed in the Final EA. All written comments must be postmarked by September 12, 2011 to be considered during the public review period. Please address written comments to:

Naval Facilities Engineering Command, Atlantic
Code EV22 - SML
6506 Hampton Blvd
Norfolk, VA 23508-1278

Enclosure: 1. NAS Meridian, Meridian 1 MOA, and Proposed Meridian 2 MOA and Transit Region Vicinity Map

ENCLOSURE 1:



Source of Base Data, NAS Meridian Installation Boundary: ESRI Streetmap 2007, SeaRay Target Range, Restricted Area, MOAs: AVDAFIF 2009; Proposed Meridian 2 MOAs: HDR Inc. 2010.

NAVY MERIDIAN

NEWS RELEASE

Public Affairs Office
Naval Air Station
255 Rosenbaum Avenue, Suite 201
Meridian, MS 39309-5003
(601) 679-2318/2602

PRESREL #33-11 Release Date: August 4, 2011

ANNOUNCEMENT OF PUBLIC COMMENT REVIEW PERIOD FOR THE DRAFT ENVIRONMENTAL ASSESSMENTADDRESSING THE ESTABLISHMENT OF THE MERIDIAN 2 MILITARY OPERATIONS AREA MERIDIAN, MISSISSIPPI

The U.S. Navy invites the public to comment on the Meridian 2 Military Operations Area (MOA) draft Environmental Assessment (EA). (See attached map.)

The draft EA evaluates potential environmental effects of establishing this new MOA near Naval Air Station Meridian in east central Mississippi. The Federal Aviation Administration (FAA) is a cooperating agency in this project.

Training Air Wing One (TW-1) aircraft would transit between NAS Meridian and the proposed MOA. MOA's are established to contain certain military activities such as air combat maneuvers, air intercepts, acrobatics, etc. The draft EA also evaluates a proposed increase in flight activity at NAS Meridian. No personnel changes or construction activities are being proposed.

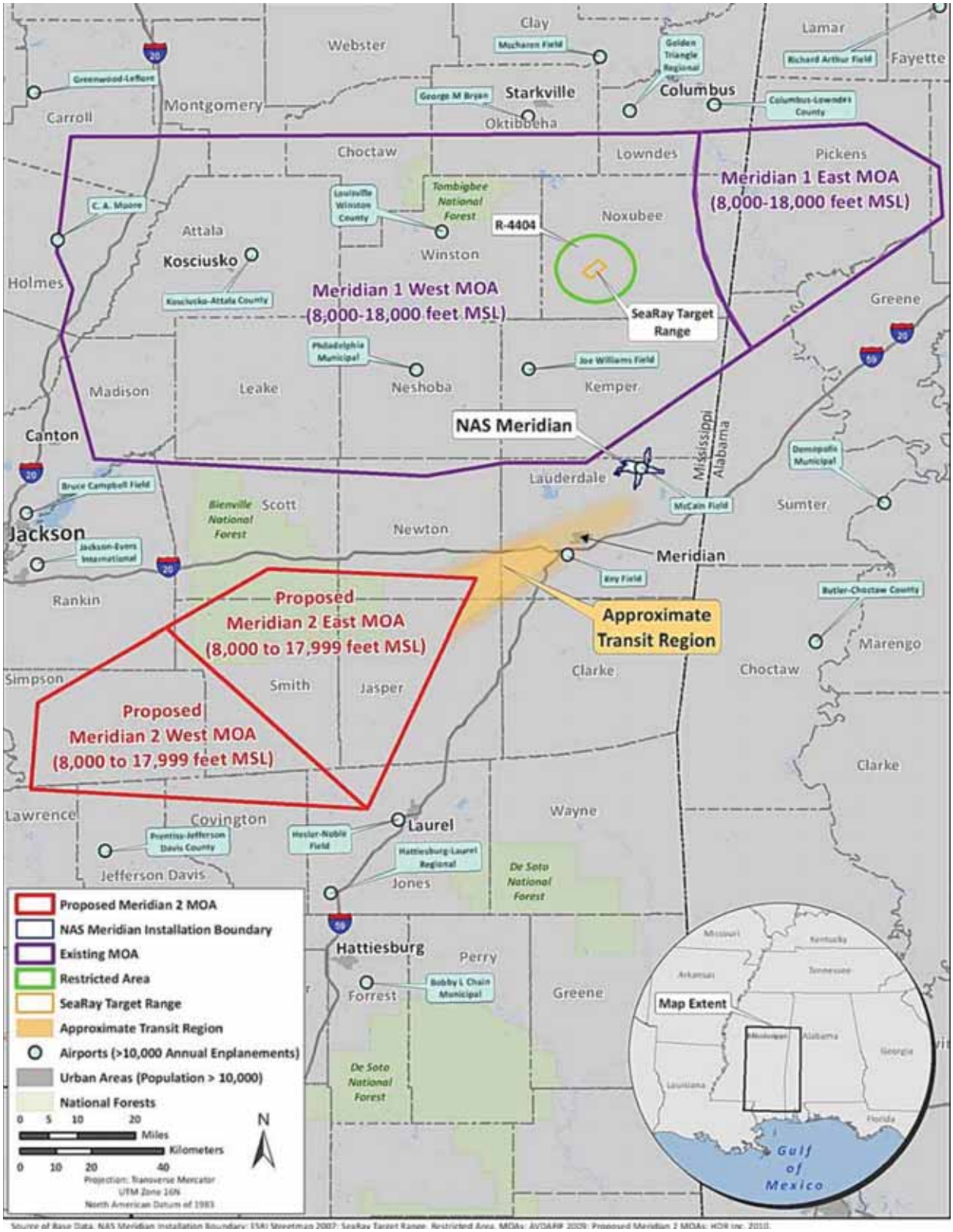
An agency outreach meeting was held in Jackson, Miss., on Aug. 20, 2009, to solicit information on possible impacts to the environmental and aeronautical communities. The minutes of that meeting are included in the public review draft EA.

Copies of the draft EA are available for review online at: http://www.cnic.navy.mil/meridian and http://www.public.navy.mil/airfor/facsfacjax. Copies are also available at the Eudora Welty Library, Jackson, Miss.; Meridian-Lauderdale County Library, Meridian, Miss.; and the Evon A. Ford Library, Taylorsville, Miss., from August 9, 2011, to September 9, 2011. Comments received from the public and other federal, state, and local agencies will be addressed in the Final EA.

To be considered, comments must be postmarked by September 12, 2011. Please address comments to:

Naval Facilities Engineering Command, Atlantic
Code EV22-SML
6506 Hampton Blvd.
Norfolk, VA 23508-1278

-end-



Source of Base Data: NAS Meridian Installation Boundary: USAI Streetman 2007; SeaRay Target Range, Restricted Area, MOAs: AVDARF 2009; Proposed Meridian 2 MOAs: HDR Inc. 2010.

Responses Received During Comment Review Period

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Mississippi Field Office
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

August 30, 2011

Naval Facilities Engineering Command, Atlantic
Code EV22 - SML
6506 Hampton Blvd
Norfolk, VA 23508-1278
Attn: Elaine Dubin

Dear Ms. Dubin:

The Fish and Wildlife Service (Service) has reviewed the August 2011 draft Finding of No Significant Impact (FONSI), along with the Environmental Assessment (EA) for the Meridian 2 Military Operations Area (MOA) at Naval Air Station (NAS) Meridian, Mississippi. The establishment of this new MOA would result in the transit of Training Air Wing One (TW-1) aircraft between NAS Meridian and the proposed MOA. The proposed MOA would be approximately 22 Nautical Miles (NM) southwest of NAS Meridian. The following comments are provided in accordance with the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e) and the Endangered Species Act (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 et seq.).

The purpose of the proposed action is to establish an additional MOA, from 8,000 feet Mean Sea Level (MSL) to 17,999 feet MSL, where student naval aviators based at NAS Meridian can complete their required training sorties, alleviate the MOA capacity shortfall, and ensure that mission capabilities are sustained. Adequate airspace to accommodate realistic training is required to ensure naval aviators are mission-trained, qualified, and prepared for deployment to support real-world events.

According to the EA, no significant effects on migratory bird species would be expected from the proposed action since no bird/wildlife strikes have been recorded from aircraft at NAS Meridian above 6,500 feet MSL and most species within the Region of Influence (ROI) would not likely occur at altitudes above 7,000 feet MSL. Furthermore, noise resulting from aircraft overflights would not be expected to increase migratory bird mortality or decrease reproductive output.

Regarding the ESA, the Service concurs with the EA findings that the Proposed Action would not be expected to result in a "take" of threatened or endangered species or jeopardize the continued existence of a threatened or endangered species in the ROI. Potential aircraft strikes with threatened or endangered species would be unlikely and very rare, and would not be expected to jeopardize the continued existence of a threatened or endangered species within the ROI.

The Service also concurs that no significant effects on migratory bird species would be expected from the proposed action since no bird/wildlife strikes have been recorded from aircraft at NAS Meridian above 6,500 feet MSL and most species within the ROI would not likely occur at altitudes above 7,000 feet MSL. Furthermore, noise resulting from aircraft overflights would not be expected to increase migratory bird mortality or decrease reproductive output.

We appreciate the opportunity to comment on the draft EA, and look forward to working with your agency as you implement the additional MOA.

If you have any questions, please contact this office at: (601) 321-1136.

Sincerely,

For Stephen Ricks
Field Supervisor

APPENDIX E

U.S. Navy Endorsement: Revised Proposal for New Military Operations Area (MOA)

DEPARTMENT OF THE NAVY
COMMANDER NAVAL AIR FORCE ATLANTIC
1279 FRANKLIN ST.
NORFOLK, VIRGINIA 23511-2494

3700
Ser N00/416
12 Aug 11

THIRD ENDORSEMENT ON COMTRAWING ONE ltr 3700 Ser 00/182 of 22 Mar 11

From: Commander, Naval Air Force Atlantic
To: Navy Representative, FAA Southern Region (ASO-930)
Via: Commander, U.S. Fleet Forces Command

Subj: REVISED PROPOSAL FOR NEW MILITARY OPERATING AREA (MOA)

1. Forwarded, recommending approval.

T. N. BRANCH

Copy to:
COMTRAWING ONE
USFF N3

DEPARTMENT OF THE NAVY
FLEET AREA CONTROL AND SURVEILLANCE FACILITY
P. O. BOX 40
NAVAL AIR STATION
JACKSONVILLE, FLORIDA 32212-0040

3700
Ser 00/066
13 May 2011

SECOND ENDORSEMENT on COMTRAWING ONE ltr 3700 Ser 00/182 of 22 Mar 11

From: Commanding Officer, Fleet Area Control and Surveillance Facility, Jacksonville
To: Navy Representative, FAA Southern Region (ASO-930)
Via: (1) Commander, Naval Air Forces
(2) Commander, U.S. Fleet Forces Command (N3/5/7)

Subj: REVISED PROPOSAL FOR NEW MILITARY OPERATING AREA (MOA)

1. Fowarded.

Copy to:
COMTRAWING ONE
CNAF (N3, N7)

T. A. ABRAHAMSON

DEPARTMENT OF THE NAVY
CHIEF OF NAVAL AIR TRAINING
250 LEXINGTON BLVD SUITE 102
CORPUS CHRISTI TX 78419-5041

3700
Ser N3/0402
9 May 11

FIRST ENDORSEMENT on COMTRAWING ONE ltr 3700 Ser 00/182 of 22 Mar 11

From: Chief of Naval Air Training
To: Navy Representative, FAA Southern Region (ASO-930)
Via (1) Commanding Officer, Fleet Area Control and Surveillance Facility, Jacksonville, FL
(2) Commander, Naval Air Forces
(3) Commander, U.S. Fleet Forces Command (N3/5/7)

Subj: REVISED PROPOSAL FOR NEW MILITARY OPERATING AREA (MOA)

1. Forwarded.

THOMAS E. BRODERICK
Chief of Staff

Copy to:
COMTRAWING ONE
CNAF (N3, N7)

DEPARTMENT OF THE NAVY
COMMANDER TRAINING AIR WING ONE
101 FULLER ROAD SUITE 250
MERIDIAN MS 39309-5403

IN REPLY REFER
3700
Ser 00/182
22 Mar 11

From: Commander, Training Air Wing ONE
To: Navy Representative, FAA Southern Region (ASO-930)
Via: (1) Chief of Naval Air Training
(2) Commanding Officer, Fleet Area Control and Surveillance Facility, Jacksonville, FL
(3) Commander, Naval Air Forces
(4) Commander, United States Fleet Forces (N3/5/7)
(5) Navy Representative, FAA Southern Region (ASO-930)

Subj REVISED PROPOSAL FOR NEW MILITARY OPERATING AREA (MOA)

Ref: (a) OPNAVINST 3710.7U
(b) OPNAVINST 3770.2K
(c) OPNAVINST 5090.1C
(d) FAA Order 7400.2H
(e) Aeronautical Study of Meridian 2 MOA/ATCCA Memphis ARTCC System Support of 27 Mar 07

Encl (1) Special Use Airspace Proposal
(2) Aeronautical Chart Depicting Proposed Military Operating Area

1. Training Air Wing ONE (TW-1), based at Naval Air Station (NAS) Meridian, MS, conducts a large volume of military undergraduate pilot training in the T-45C Goshawk jet trainer. The T-45C is an airspace intensive, fuel-limited aircraft that is constrained by the current airspace available to TW-1 for training. This greatly impacts TW-1's operational flexibility to accomplish the core mission of producing quality tactical naval pilots for the fleet.

2. Airspace utilization will expand due to recent changes in the training syllabus that have increased the number of required sorties from 32,000 to more than 37,000 per year. The Navy's Strategic Vision includes "downloading" training sorties from the more costly F-18 Hornet variants to the T-45C which will further increase sortie and airspace requirements.

3. The Pinehills MOA is used extensively by TW-1 and is generally available for use. However, when the Joint Strike Fighter (JSF) begins training operations at Eglin AFB, FL, the Pinehills MOA may be utilized by the JSF as necessary to avoid the saturated airspace around the gulf area MOAs and Warning Areas. Additionally, the United States Air Force's (USAF) Combat System Officer training is being relocated to NAS Pensacola and will further saturate the gulf coast MOAs, pushing more military training into MOAs historically used primarily by TW-1 aircraft.

4. Based on requirements established in reference (a) and in accordance with references (b) through (e), TW-1 requests that a new Meridian 2 MOA be designated as outlined in enclosures (1) and (2).

5. TW-1 point of contact is LCDR Stephen Hazzard. He can be reached at DSN: 637-2317 or Comm (601) 679-2317 or by email at Stephen.hazzard@navy.mil.

KEITH T. TAYLOR

Copy to:
CNAF (N3, N7)

Special Use Airspace Proposal

1. Area Description:

a. Title - Meridian 2 Military Operating Area (MOA)

b. Boundaries - Meridian 2 MOA will consist of two areas:

(1) Meridian 2 MOA East will begin at:

(a) 32°18'00"N 088°58'00"W
(b) 31°42'00"N 089°15'00"W
(c) 32°09'10"N 089°45'14"W
(d) 32°20'30"N 089°25'30"W
(e) To the point of beginning

(2) Meridian 2 MOA West will begin at:

(a) 31°42'00"N 089°15'00"W
(b) 31°45'00"N 090°05'30"W
(c) 31°58'00"N 090°04'30"W
(d) 32°09'10"N 089°45'14"W
(e) To the point of beginning.

(3) The revised area is approximately 38NM north-to-south on its eastern side, 23NM along the north border, 39NM along the north-western border, 12NM along the western border and 41NM along the south border. It is 65NM from the northeast corner to the southwest corner.

c. Designated Altitudes – Meridian 2 MOA East and West will be from 8,000 feet MSL up to but not including FL 180.

d. Times of use – 0700 – 2200 Local, Monday – Friday. Other times by NOTAM.

e. Controlling Agency – FAA, Memphis ARTCC.

f. Using Agencies – U.S. Navy, Training Air Wing One, Meridian, MS. Scheduling will be controlled by Commander, TW-1, Meridian, MS via Letter of Agreement and the Weekly Facilities Coordination Plan.

2. Airspace Statement of Need and Justification

a. A suitable and effective ACM training range for Navy and Marine Corps aircraft operating from NAS Meridian must meet certain criteria:

(1) The airspace must have sufficient lateral and vertical boundaries that allow ACM training between two or more military jet aircraft (e.g. T-45) to be conducted per reference (a) and a 40 nautical mile straight tactical run in line as required by the proposed GCI syllabus.

(2) The airspace must be within an effective ACM training mission radius from NAS Meridian. The ideal distance is no greater than 25 NM, with the center of the range no greater than 50NM from NAS Meridian.

(3) The proposed area is divided into a northeastern block, referred to as east, as well as a southwestern block, referred to as west. The proposed east block will be the primary working area allowing the western block to provide for controlled IFR vectoring of approximately 50 non-participating aircraft per month, as indicated in the referenced Airspace study. When required the western block will be activated requiring vectoring of non-participating IFR aircraft around the lateral or vertical boundaries of the Meridian 2 West MOA.

(4) TW-1 will execute as many as 800 sorties per month in this currently underutilized airspace to be designated as Meridian 2 MOA.

b. The proposed Meridian 2 MOA will be designated as joint use

c. The 186th ARW, an Air National Guard unit based at Meridian's Key Field, will also use this MOA. The 186th ARW flies 8 KC-135 Tankers and will transition to 15 C-27 aircraft in 2011.

d. Current MOAs available for use by TW-1 NAS Meridian based squadrons are insufficient for current and projected Navy and Marine Corps training requirements for the following reasons:

(1) Syllabus and production requirement changes for tactical aviators will increase the number of sorties from 32,000 to more than 37,000 per year.

(2) Other airspace available for operations require excessive transit time (fuel consumption) at the expense of required training. This further exacerbates the airspace problem because additional, unplanned sorties must be flown to complete training.

(3) Air Force Combat System Officer training will be co-located with Naval Flight Officer training in Pensacola, FL in 2010. The increasing utilization of airspace around Pensacola will require the Joint Strike Fighters (JSF) at Eglin AFB to frequently use the Pine Hills MOA in training over 200 pilots per year.

(4) Operational flight schedules maximize efficient use of airspace, but periods of inclement weather and delays associated with air traffic control or maintenance issues constrain operations, decrease separation under MARSA, reduce quality of training, and result in incomplete or cancelled flights.

(5) Airspace intensive training requirements will be "downloaded" from the F-18 to T-45C including Ground Control Intercept (GCI) with VMTS (synthetic radar), Night Vision Goggle (NVG), and Air Combat Maneuvering (ACM) training increasing sortie requirements by an additional 3,600 per year.

e. Current MOA utilization issues:

(1) Meridian 1 West MOA: Meets all criteria but is not sufficient in size to accommodate the capacity of both VT-7 and VT-9. Airspace capacity is insufficient for surge operations. Geographical layout does not provide expansive access to take advantage of clear areas when isolated severe weather moves through the local area. Area is often subdivided beyond what optimal training and safety margins would dictate, reducing training effectiveness while increasing risk.

(2) Birmingham MOA: The Birmingham MOA is not located close enough to NAS Meridian to support all stages of jet training. Altitude restrictions imposed by Atlanta Center during periods of high volume of civilian traffic make ACM training impossible. Historically, these restrictions are not imposed until the aircraft are airborne leading to incomplete sorties and inefficient use of limited training resources and instructors. Long range planning indicates an increase in the use of this MOA by Columbus AFB further reducing availability for TW-1 assets.

(3) Pine Hills MOA: Conveniently located and meets the desired criteria, but utilization is shared with several other DOD units operating from Maxwell AFB and Eglin AFB. When JSF training begins at Eglin AFB, gulf coast MOA congestion will likely force a large portion of the training to the northern MOAs including the Pine Hills MOA.

3. Air Traffic Control Assigned Airspace (ATCAA): An ATCAA is requested for FL 180 – FL 230. This airspace will be scheduled via the Weekly Facilities Coordination Plan.

4. Activities:

a. Area will be used by up to 16 T-45 aircraft at a time depending on sortie types. Normal airspace operations will consist of one or two flights of two to four aircraft. Meridian 2 East MOA will be the primary working airspace. Meridian 2 West MOA will not be activated unless needed and under normal circumstances will be activated concurrently with Meridian 2 East MOA. For the Meridian 2 East MOA, actual usage is expected to be approximately nine hours per day (30-45 minute periods), on approximately 270 days per year, totaling approximately 2400 hours per year. For the Meridian 2 West MOA, actual usage is expected to be approximately three hours per day (30-45 minute periods), on approximately 180 days per year, totaling approximately 540 hours per year.

b. Specific activities and altitudes:

Activity (T-45 Specific)	Normal Working Airspace	Minimum Airspace required
Air Combat Maneuvering (Primary MOA activity)	8,000MSL-FL230 Meridian 2 East	8,000MSL-FL230 Meridian 2 East
Familiarization	8,000MSL-FL230 Meridian 2 East	8,000MSL-FL190 Meridian 2 East
Cruise/Tactical Formation	8,000MSL-FL230 Meridian 2 East	8,000MSL-FL190 Meridian 2 East
Basic/Division Formation	8,000MSL-17,999MSL Meridian 2 East	10,000MSL-16,000MSL Meridian 2 East
Instruments	8,000MSL-17,999MSL Meridian 2 East	10,000MSL-16,000MSL Meridian 2 East
Maintenance Check Flights	8,000MSL-FL230 Meridian 2 East	8,000MSL-FL230 Meridian 2 East
Ground Control Intercepts	8,000MSL-FL230 East and West MOA	8,000MSL-FL230 East and West MOA
Night Vision Goggles	8,000MSL-17,999MSL East and West MOA	8,000MSL-17,999MSL East and West MOA
In-Flight Refueling	8,000MSL-17,999MSL Meridian 2 East	10,000MSL-16,000MSL Meridian 2 East
186th ARW C-27 Training (Estimated)	8,000MSL-17,999MSL Meridian 2 East	10,000MSL-16,000MSL Meridian 2 East

c. Expected utilization rates:

Activity (T-45 Specific)	Expected utilization rate	Duration per flight
Air Combat Maneuvering (Primary MOA activity)	320 missions/month	50 minutes
Familiarization	50 missions /month	40 minutes
Cruise/Tactical Formation	150 missions /month	50 minutes
Basic/Division Formation	50 missions /month	50 minutes
Instruments	50 missions /month	1 hour
Maintenance Check Flights	50 missions /month	40 minutes
Ground Control Intercepts	150 missions /month (future need)	40 minutes
Night Vision Goggles	150 missions /month (future need)	40 minutes
In-Flight Refueling	150 missions /month (future need)	40 minutes
186th ARW C-27 Training (Estimated)	Unknown at this time	Unknown at this time

Note: Night Vision Goggle training will be conducted in accordance with the requirements of 14 CFR Part 91.209. This training will be conducted as Night Formation, Night Tactical Formation and Night Ground Control Intercept events with the use of NVGs.

d. No supersonic flight will be conducted.

e. No ordnance training will be conducted.

5. Environmental Information:

a. Mr. Steve Wade, Environmental Engineer, NAS Public Works, 229 Allen Road, Meridian, MS 39309-5403, Phone (601) 679-2922.

b. Floor below 1200 AGL over private property: N/A

c. Controlling the floor of a Restricted or Prohibited Area: N/A

6. Communications and Radar:

a. Request communications and radar monitoring through Memphis Center. TW-1 and NAS Meridian have requested two designated frequency pairs for operations within the Meridian 2 MOA.

b. Military to be designated Controlling Agency: N/A

7. Safety Considerations:

a. Measures taken to ensure containment of the activity within the proposed area: Standard Operating Procedures will be developed and employed to ensure appropriate airspace management by all participating aircraft.

b. Procedures for handling malfunctions: All aircraft experiencing emergencies and/or malfunctions will handle them in accordance with established aircraft specific procedures and coordinate all special handling requirements with ATC.

c. Ordnance trajectory envelopes: N/A

d Activity that may affect the safety of persons on the surface: N/A

8. Coordination summary: This airspace proposal is under the direction of Commander, Training Air Wing ONE (TW-1), Meridian, MS. Over the past several years, TW-1 has coordinated with the following entities:

FAA
Eastern Service Center, Military Liaison Officer
Eastern Service Center, Operations Support Specialist for Memphis ARTCC
Air Traffic Representative, NAS Meridian, MS
Memphis ARTCC
Houston ARTCC
Meridian ATCT
Jackson ATCT

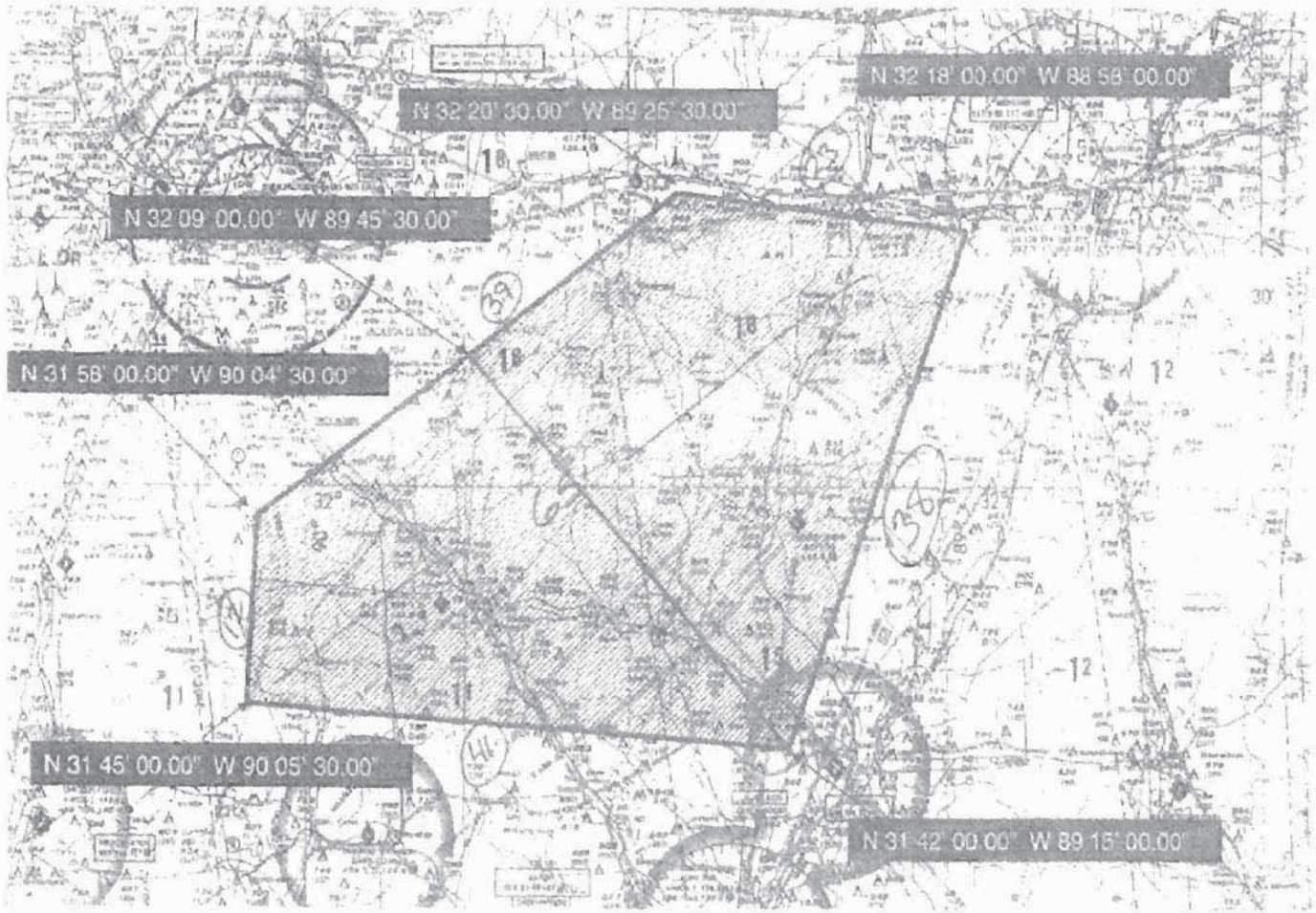
Department of Defense
Commander Naval Air Forces, San Diego, CA
Commander Naval Air Training, Corpus Christi, TX
Fleet Area Control and Surveillance Facility, Jacksonville, FL
NAS Meridian, MS
186th Air Refueling Wing, Meridian, MS

The current modified proposal no longer overlaps with Houston ARTCC airspace and provides the Memphis ARTCC requested buffer between the proposed MOA and Houston's ARTCC. The construct of the proposed MOA has been modified to eliminate or reduce impact of the following US Federal airways: J-31, V-111, V-455 and V-555. Additional modifications have been made to eliminate impact on arrival and departure traffic corridors for Jackson-Evers International and Meridian Key Field airports.

9. Area Chart: Included as enclosure (2).

10. Environmental Documents: In work.

11. Graphic Notice Information: N/A


N 32 18' 00.00" W 88 58' 00.00"
N 32 20' 30.00" W 89 25' 30.00"
N 32 09' 00.00" W 89 45' 30.00"
N 31 58' 00.00" W 90 04' 30.00"
N 31 45' 00.00" W 90 05' 30.00"
N 31 42' 00.00" W 89 15' 00.00"

APPENDIX F

CALCULATIONS TO SUPPORT THE AIR QUALITY EMISSIONS ANALYSIS

NAS Meridian 2 MOA Air Emissions Increases from T-45 Flight Operations and In-Frame Maintenance (Mobile Source Emissions)
NAS Meridian 2 MOA Internal Environmental Assessment Report

	Meridian 2 MOA Emissions (tons/yr)						
Flight Operation or Maintenance Operation	**NO_X**	**VOC**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Regular Departures	2.76	10.24	50.86	0.25	4.17	4.17	1,863.52
Straight-In Arrivals	0.56	7.33	39.29	0.18	3.86	3.86	1,321.16
In-Frame Engine Maintenance Run-Ups	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	**3.32**	**17.57**	**90.15**	**0.43**	**8.03**	**8.03**	**3,184.68**

CO = Carbon Monoxide; NOx = Nitrogen Oxides; VOC = Volatile Organic Compounds; SO_2 = Sulfur Dioxide; PM_{10} = Particulate Matter less than 10 microns.
Note: NAS Meridian personnel indicated their would be no appreciable increase in the in-frame engine maintenance schedule due to the 5,000 sorite increase.

NAS Meridian 2 MOA Air Emissions Increases from T-45 Engine Test Cell (Stationary Source Emissions)
NAS Meridian 2 MOA Internal Environmental Assessment Report

Meridian 2 MOA Emissions (tons/yr)						
NO_X	**VOC**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
0.08	0.04	0.2	4.34E-03	0.06	0.06	33.86

Note: Emissions are based on increase of 6 engine tests per year.

County and AQCR 2002 Air Emissions Inventories

County or Region	**NO_x**	**VOC**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
	(tpy)	**(tpy)**	**(tpy)**	**(tpy)**	**(tpy)**	**(tpy)**	**(tpy)**
Kemper County	723	840	4,448	104	1,857	245	Not Available
Northeast Mississippi AQCR	67,682	92,039	330,513	13,938	119,209	20,007	Not Available
Lauderdale County	5,035	7,727	33,551	354	5,834	1,064	Not Available
Alabama-Florida-Southern Mississippi AQCR	338,587	339,121	1,478,543	277,876	270,386	78,256	Not Available

Note: County and AQCR 2002 Emissions Inventory data obtained from a USEPA website: http://www.epa.gov/air/data/geosel.html

NAS Meridian Total 2 MOA Air Emissions from Aircraft Related Operations and Percent of Regional/State Emissions

	NO_X	**VOC**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Total 2 MOA Aircraft Related Emissions (tpy)	3.40	17.61	90.35	0.43	8.09	8.09	3,218.54
Percent of Northeast Mississippi AQCR Emissions	0.005%	0.02%	0.03%	0.003%	0.01%	0.04%	Not Available
Percent of Alabama-Florida-Southern Mississippi AQCR Emissions	0.001%	0.01%	0.01%	0.0002%	0.003%	0.01%	Not Available
Percent of CO_2 Emissions in State of Mississippi, based on 2007 CO_2 data.	----	----	----	----	----	----	0.004%

Note: The Mississippi 2007 CO2 emissions data was obtained from a USEPA website: http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html

Meridian 2 MOA T-45 Flight Operations

Number of T-45 Aircraft	Total Number of Flight Operations	Regular Departures [1]	Straight-In Arrivals [1]
84	10,000	5,000	5,000

Note:

1. It was assumed that all of the 5,000 new sorties for the Meridian 2 MOA operations consist of Regular Departures and Straight-In Arrivals.

Emissions from one F405-RR-401 test cell run at NAS Meridian

Engine & Test	Time (mins)	Fuel (gals)	Fuel (lbs)	Emissions (lbs)					
				CO	CO_2	NO_X	HC	SO_2	PM_{10}
Engine: F405-RR-401									
Performance Test	108.3	531.81	3,616.33	67.49	11,286.14	25.01	12.12	1.45	20.36

Annual Emissions Increases from F405-RR-401 test cell runs at NAS Meridian due to Meridian 2 MOA Operations

Engine & Test	Time (mins)	Fuel (gals)	Fuel (lbs)	Emissions (lbs)					
				CO	CO_2	NO_X	HC	SO_2	PM_{10}
Engine: F405-RR-401									
Performance Test	649.5	3,190.9	21,698.0	404.9	67,716.8	150.1	72.7	8.7	122.1

Note:

1. NAS Meridian personnel indicated an increase of up to 6 F405-RR-401 test cell runs due to 5,000 sortie increase.

NAS Meridian Baseline Air Emissions from T-45 Flight Operations and In-Frame Maintenance (Mobile Source Emissions) Environmental Baseline Report

Flight Operation or Maintenance Operation	Baseline Emissions (tons/yr)						
	NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Regular Departures	13.03	48.42	240.40	1.19	19.69	19.69	8,807.35
Straight-In Arrivals	0.53	6.93	37.14	0.17	3.65	3.65	1,248.76
Overhead Break Arrivals	0.32	1.73	9.26	0.05	1.11	1.11	408.67
Carrier Break Arrivals	4.80	26.01	138.98	0.82	16.63	16.63	6,133.44
Touch and Go's	150.99	10.90	145.61	8.55	118.17	118.17	67,480.11
FCLPs	31.02	2.24	29.91	1.76	24.28	24.28	13,863.89
GCAs	7.51	1.66	20.53	0.53	8.39	8.39	4,178.71
Interfacilities	7.10	37.55	192.60	0.92	17.14	17.14	6,803.12
In-Frame Engine Maintenance Run-Ups	5.49	5.02	24.65	0.27	3.12	3.12	2,092.19
TOTALS	**220.79**	**140.46**	**839.08**	**14.26**	**212.18**	**212.18**	**111,016.24**

CO = Carbon Monoxide; NOx = Nitrogen Oxides; VOC = Volatile Organic Compounds; SO_2 = Sulfur Dioxide; PM_{10} = Particulate Matter less than 10 microns.
FCLP = Field Carrier Landing Practice; GCA = Ground Controlled Approach; AGL = Above Ground Level
Note: Emissions are based on actual CY2009 operational data. In addition, $PM_{2.5}$ emission are conservatively assumed to be equivalent to PM_0 emissions.

NAS Meridian Baseline Air Emissions from T-45 Engine Test Cell (Stationary Source Emissions) Environmental Baseline Report

Baseline Emissions (tons/yr)						
NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
1.20	0.58	3.24	0.07	0.98	0.98	541.73

Note: Emissions are based on actual FY2010 operational data: Sept. 2009 to Sept. 2010.

County and AQCR 2002 Air Emissions Inventories

County or Region	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2 (tpy)
Kemper County	723	840	4,448	104	1,857	245	Not Available
Northeast Mississippi AQCR	67,682	92,039	330,513	13,938	119,209	20,007	Not Available
Lauderdale County	5,035	7,727	33,551	354	5,834	1,064	Not Available
Alabama-Florida-Southern Mississippi AQCR	338,587	339,121	1,478,543	277,876	270,386	78,256	Not Available

Note: County and AQCR 2002 Emissions Inventory data obtained from a USEPA website: http://www.epa.gov/air/data/geosel.html

NAS Meridian Total Baseline Air Emissions from Aircraft Related Operations and Percent of Regional/State Emissions

	NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Baseline Aircraft Related Emissions (tpy)	221.99	141.04	842.32	14.33	213.16	213.16	111,557.97
Percent of Northeast Mississippi AQCR Emissions	0.33%	0.15%	0.25%	0.10%	0.18%	1.07%	Not Available
Percent of Alabama-Florida-Southern Mississippi AQCR Emissions	0.07%	0.04%	0.06%	0.01%	0.08%	0.27%	Not Available
Percent of CO_2 Emissions in State of Mississippi, based on 2007 CO_2 data.	----	----	----	----	----	----	0.15%

Note: The Mississippi 2007 CO2 emissions data was obtained from a USEPA website: http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html

CY2005 T-45 Flight Operations

Total Number of Flight Operations	Regular Departures	Hold Down Departures	Straight-In Arrivals	Overhead Break Arrivals	Carrier Break Arrivals	Touch and Go	FCLP	GCA	SFO	Interfacility
132,603	15,851	831	3,336	834	12,513	72,612	15,048	3,408	630	7,540

CY2009 T-45 Flight Operations[1]

Number of T-45 Aircraft	Total Number of Flight Operations [2]	Regular Departures	Hold Down Departures [3]	Straight-In Arrivals	Overhead Break Arrivals	Carrier Break Arrivals	Touch and Go	FCLP	GCA	SFO [4]	Interfacility [5]
84	187,841	23,631	0	4,726	1,181	17,725	103,752	21,316	4,828	0	10,681

Notes:

1. CY2009 breakdown of individual Flight Operations was assumed to occur in the same proportion as CY2005 Flight Operations.
2. Total CY2009 Flight Operations assume the 165 operations conducted by Other Military and Civilian aircraft are T-45 operations due to the lack of operational data regarding these other aircraft.
3. Hold Down Departures did not occur in 2009; however, the fraction of their occurrence in 2005 was applied to Regular Departures for 2009.
4. Simulated Flame-Outs did not occur in 2009; however, the fraction of their occurrence in 2005 was applied to Touch and Go for 2009.
5. An Interfacility operation is assumed to be equivalent to a Straight-in Arrival and Regular Departure combined.

Flight Operations	Emissions in Pounds (lbs)					
	CO	CO_2	NO_X	HC	SO_2	PM_{10}
Departure	20.346	745.407	1.103	4.098	0.101	1.667
Overhead Break Arrival	15.682	692.067	0.542	2.935	0.092	1.877
Straight In Arrival	15.717	528.466	0.225	2.934	0.072	1.544
Touch and Go	2.807	1300.796	2.911	0.210	0.165	2.278
FCLP	2.807	1300.796	2.911	0.210	0.165	2.278
GCA Box	8.506	1731.033	3.111	0.690	0.221	3.476

In-Frame Engine Maintenance Run-Ups	Emissions in Pounds per Aircraft per Year (lbs/AC-yr)					
	CO	CO_2	NO_X	HC	SO_2	PM_{10}
Test Emissions from a Single T-45 Aircraft per Year	586.80	49,814.02	130.82	119.47	6.49	74.17

T-45A/C Goshawk with an F405-RR-401/-402 Engine

Flight Operations and Mode	Engine Power Setting	minutes	seconds	Time in Mode (minutes)	Fuel Flow (lbs/hr)	Fuel Used (lbs)	EI CO	EI CO_2	EI NO_X	EI HC	EI SO_2	EI PM_{10}	LBS CO	LBS CO_2	LBS NO_X	LBS HC	LBS SO_2	LBS PM_{10}
Departure																		
APU (GTS) Use	On	1		1.00	197.0	3.283	2.000	3,170.000	6.250	0.250	0.400	0.220	0.007	10.408	0.021	0.001	0.001	0.001
Start engine	55% N2	1		1.00	498.1	8.302	151.210	2,747.370	0.270	34.020	0.400	8.940	1.255	22.808	0.002	0.282	0.003	0.074
Close Bleed Valve	70% N2		30	0.50	697.2	5.810	88.286	2,972.581	0.752	12.375	0.400	8.814	0.513	17.271	0.004	0.072	0.002	0.051
System Checks	55% N2	10		10.00	498.1	83.017	151.210	2,747.370	0.270	34.020	0.400	8.940	12.553	228.077	0.022	2.824	0.033	0.742
Unstick	80% N2		6	0.10	1,154.6	1.924	34.249	3,106.689	1.859	2.847	0.400	8.443	0.066	5.978	0.004	0.005	0.001	0.016
Taxi Out	70% N2	4		4.00	697.2	46.482	88.286	2,972.581	0.752	12.375	0.400	8.814	4.104	138.170	0.035	0.575	0.019	0.410
Hold Short	55% N2	1		1.00	498.1	8.302	151.210	2,747.370	0.270	34.020	0.400	8.940	1.255	22.808	0.002	0.282	0.003	0.074
Unstick	80% N2		6	0.10	1,154.6	1.924	34.249	3,106.689	1.859	2.847	0.400	8.443	0.066	5.978	0.004	0.005	0.001	0.016
Taxi Onto Runway	70% N2		15	0.25	697.2	2.905	88.286	2,972.581	0.752	12.375	0.400	8.814	0.256	8.636	0.002	0.036	0.001	0.026
Engine Check	101.8% N2		5	0.08	4,997.0	6.940	3.003	3,161.841	11.161	0.154	0.400	2.840	0.021	21.944	0.077	0.001	0.003	0.020
Takeoff (brake release to gear up)	101.8% N2		30	0.50	4,997.0	41.642	3.003	3,161.841	11.161	0.154	0.400	2.840	0.125	131.664	0.465	0.006	0.017	0.118
Climb out (200 to 3,000 feet AGL)	101.8% N2		30	0.50	4,997.0	41.642	3.003	3,161.841	11.161	0.154	0.400	2.840	0.125	131.664	0.465	0.006	0.017	0.118
				19.03		**252.172**							**20.346**	**745.407**	**1.103**	**4.098**	**0.101**	**1.667**
Overhead Break Arrival																		
Initial (3,000 feet AGL to Break)	90% N2	2		2.00	2,307.7	76.922	7.358	3,154.060	4.651	0.604	0.400	7.165	0.566	242.616	0.358	0.046	0.031	0.551
Break (Speed Brakes, Flaps, Gear)	85% N2		10	0.17	1,601.9	4.450	16.700	3,138.722	2.942	1.279	0.400	7.999	0.074	13.967	0.013	0.006	0.002	0.036
Abeam/180 Degree Position	90% N2		20	0.33	2,307.7	12.820	7.358	3,154.060	4.651	0.604	0.400	7.165	0.094	40.436	0.060	0.008	0.005	0.092
90 Degree Position	90% N2		10	0.17	2,307.7	6.410	7.358	3,154.060	4.651	0.604	0.400	7.165	0.047	20.218	0.030	0.004	0.003	0.046
45 Degree Position	85% N2		10	0.17	1,601.9	4.450	16.700	3,138.722	2.942	1.279	0.400	7.999	0.074	13.967	0.013	0.006	0.002	0.036
Final	75% N2		15	0.25	874.1	3.642	59.125	3,051.718	1.180	6.277	0.400	8.682	0.215	11.115	0.004	0.023	0.001	0.032
Touchdown/Rollout	55% N2		30	0.50	498.1	4.151	151.210	2,747.370	0.270	34.020	0.400	8.940	0.628	11.404	0.001	0.141	0.002	0.037
Taxi to Hot Refuel	70% N2	2	30	2.50	697.2	29.051	88.286	2,972.581	0.752	12.375	0.400	8.814	2.565	86.356	0.022	0.360	0.012	0.256
Hot Refuel	55% N2	5		5.00	498.1	41.508	151.210	2,747.370	0.270	34.020	0.400	8.940	6.276	114.039	0.011	1.412	0.017	0.371
Unstick	80% N2		6	0.10	1,154.6	1.924	34.249	3,106.689	1.859	2.847	0.400	8.443	0.066	5.978	0.004	0.005	0.001	0.016
Taxi in	70% N2	2	30	2.50	697.2	29.051	88.286	2,972.581	0.752	12.375	0.400	8.814	2.565	86.356	0.022	0.360	0.012	0.256
Shut/Cool Down	55% N2	2		2.00	498.1	16.603	151.210	2,747.370	0.270	34.020	0.400	8.940	2.511	45.615	0.004	0.565	0.007	0.148
				15.68		**230.983**							**15.682**	**692.067**	**0.542**	**2.935**	**0.092**	**1.877**
Straight In Arrival																		
Initial (3,000 feet AGL to Final)	85% N2	2		2.00	1,601.9	53.398	16.700	3,138.722	2.942	1.279	0.400	7.999	0.892	167.602	0.157	0.068	0.021	0.427
Final	75% N2		15	0.25	874.1	3.642	59.125	3,051.718	1.180	6.277	0.400	8.682	0.215	11.115	0.004	0.023	0.001	0.032
Touchdown/Rollout	55% N2		30	0.50	498.1	4.151	151.210	2,747.370	0.270	34.020	0.400	8.940	0.628	11.404	0.001	0.141	0.002	0.037
Taxi to Hot Refuel	70% N2	2	30	2.50	697.2	29.051	88.286	2,972.581	0.752	12.375	0.400	8.814	2.565	86.356	0.022	0.360	0.012	0.256
Hot Refuel	55% N2	5		5.00	498.1	41.508	151.210	2,747.370	0.270	34.020	0.400	8.940	6.276	114.039	0.011	1.412	0.017	0.371
Unstick	80% N2		6	0.10	1,154.6	1.924	34.249	3,106.689	1.859	2.847	0.400	8.443	0.066	5.978	0.004	0.005	0.001	0.016
Taxi in	70% N2	2	30	2.50	697.2	29.051	88.286	2,972.581	0.752	12.375	0.400	8.814	2.565	86.356	0.022	0.360	0.012	0.256
Shut/Cool Down	55% N2	2		2.00	498.1	16.603	151.210	2,747.370	0.270	34.020	0.400	8.940	2.511	45.615	0.004	0.565	0.007	0.148
				14.85		**179.329**							**15.717**	**528.466**	**0.225**	**2.934**	**0.072**	**1.544**
Touch and Go																		
Approach	85% N2	2		2.00	1,601.9	53.398	16.700	3,138.722	2.942	1.279	0.400	7.999	0.892	167.602	0.157	0.068	0.021	0.427
Climb out	101.8% N2	2		2.00	4,997.0	166.566	3.003	3,161.841	11.161	0.154	0.400	2.840	0.500	526.655	1.859	0.026	0.067	0.473
Level Flight (<3,000 ft. AGL)	90% N2	5		5.00	2,307.7	192.304	7.358	3,154.060	4.651	0.604	0.400	7.165	1.415	606.539	0.894	0.116	0.077	1.378
				9.00		**412.268**							**2.807**	**1,300.796**	**2.911**	**0.210**	**0.165**	**2.278**
FCLP																		
Approach	85% N2	2		2.00	1,601.9	53.398	16.700	3,138.722	2.942	1.279	0.400	7.999	0.892	167.602	0.157	0.068	0.021	0.427
Climb out	101.8% N2	2		2.00	4,997.0	166.566	3.003	3,161.841	11.161	0.154	0.400	2.840	0.500	526.655	1.859	0.026	0.067	0.473
Level Flight (<3,000 ft. AGL)	90% N2	5		5.00	2,307.7	192.304	7.358	3,154.060	4.651	0.604	0.400	7.165	1.415	606.539	0.894	0.116	0.077	1.378
				9.00		**412.268**							**2.807**	**1,300.796**	**2.911**	**0.210**	**0.165**	**2.278**
GCA Box																		
Approach	90% N2	5		5.00	2,307.7	192.304	7.358	3,154.060	4.651	0.604	0.400	7.165	1.415	606.539	0.894	0.116	0.077	1.378
Climb out	101.8% N2	2		2.00	4,997.0	166.566	3.003	3,161.841	11.161	0.154	0.400	2.840	0.500	526.655	1.859	0.026	0.067	0.473
Level Flight (<3,000 ft. AGL)	80% N2	10		10.00	1,154.6	192.436	34.249	3,106.689	1.859	2.847	0.400	8.443	6.591	597.839	0.358	0.548	0.077	1.625
				17.00		**551.306**							**8.506**	**1,731.033**	**3.111**	**0.690**	**0.221**	**3.476**

Note:

1. CO = Carbon Monoxide; NOx = Nitrogen Oxides; HC = Hydrocarbons (also called Volatile Organic Compounds, VOCs); SO2 = Sulfur Dioxide; PM10 = Particulate Matter less than 10 microns.
   All PM from turbine engines is smaller than 2.5 microns, therefore the values for PM10 are the same as the values for PM2.5.
2. FCLP = Field Carrier Landing Practice; GCA = Ground Controlled Approach; AGL = Above Ground Level
3. A carrier break begins at an altitude 300' lower than a regular break, but is essentially the same as a regular break approach. Therefore emissions are assumed to be the same.
4. Hold down departures are not done at NAS Meridian.
5. The SO_2 emission index of 0.40 lbs/1,000 lbs JP-5 is from AESO Report 6-90. The EPA uses a SO_2 emission index of 0.54 lbs/1000 lbs.
6. Emission indexes and fuel flow for the Gas Turbine Starter (GTS or APU) are not available. Data for the GTC36-200 from AESO Memo Report 2003-09 are substituted.

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Desalination Compressor Washing (water wash)																		
APU Use	On	1.90	1	1.00	197.0	6.3	2.00	3170.00	6.25	0.25	0.40	0.22	0.013	19.825	0.039	0.002	0.003	0.001
Main eng start	55% N2	1.90	1	2.00	498.1	31.6	151.21	2747.37	0.27	34.02	0.40	8.94	4.782	86.888	0.009	1.076	0.013	0.283
Close bleed valve	65% N2	1.90	1	0.50	568.8	9.0	117.24	2878.24	0.48	20.83	0.40	8.89	1.059	25.987	0.004	0.188	0.004	0.080
Water wash	55% N2	1.90	1	5.00	498.1	79.1	151.21	2747.37	0.27	34.02	0.40	8.94	11.955	217.221	0.021	2.690	0.032	0.707
Speed increase	70% N2	1.90	1	5.00	697.2	110.7	88.29	2972.58	0.75	12.37	0.40	8.81	9.771	328.972	0.083	1.369	0.044	0.975
Cool down, stabilize	55% N2	1.90	1	1.00	498.1	15.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.391	43.444	0.004	0.538	0.006	0.141
Desalination Compressor Washing Totals						**252.46**							**29.971**	**722.338**	**0.161**	**5.862**	**0.101**	**2.188**
Performance Recovery Wash																		
APU Use	On	0.24	1	1.00	197.0	0.8	2.00	3170.00	6.25	0.25	0.40	0.22	0.002	2.478	0.005	0.000	0.000	0.000
Main eng start	55% N2	0.24	1	2.00	498.1	4.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.598	10.861	0.001	0.134	0.002	0.035
Close bleed valve	65% N2	0.24	1	0.50	568.8	1.1	117.24	2878.24	0.48	20.83	0.40	8.89	0.132	3.248	0.001	0.024	0.000	0.010
Solution wash	55% N2	0.24	1	4.66	498.1	9.2	151.21	2747.37	0.27	34.02	0.40	8.94	1.393	25.306	0.002	0.313	0.004	0.082
Shut down/10 mins soak	Off	0.24	0	10.00	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000
APU Use	On	0.24	1	1.00	197.0	0.8	2.00	3170.00	6.25	0.25	0.40	0.22	0.002	2.478	0.005	0.000	0.000	0.000
Main eng start	55% N2	0.24	1	2.00	498.1	4.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.598	10.861	0.001	0.134	0.002	0.035
Close bleed valve	65% N2	0.24	1	0.50	568.8	1.1	117.24	2878.24	0.48	20.83	0.40	8.89	0.132	3.248	0.001	0.024	0.000	0.010
Water wash	55% N2	0.24	1	7.00	498.1	13.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.092	38.014	0.004	0.471	0.006	0.124
Speed increase	70% N2	0.24	1	5.00	697.2	13.8	88.29	2972.58	0.75	12.37	0.40	8.81	1.221	41.122	0.010	0.171	0.006	0.122
Cool down, stabilize	55% N2	0.24	1	1.00	498.1	2.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.299	5.431	0.001	0.067	0.001	0.018
Performance Recovery Wash Totals						**50.58**							**6.469**	**143.047**	**0.030**	**1.339**	**0.020**	**0.437**
Engine Control Amplifier Test Set (ECATS) Run																		
Engine prestart tests																		
APU (Wet Motor)	On	1.86	1	1.00	197.0	6.1	2.00	3170.00	6.25	0.25	0.40	0.22	0.012	19.329	0.038	0.002	0.002	0.001
APU (Dry Motor)	On	1.86	1	1.00	197.0	6.1	2.00	3170.00	6.25	0.25	0.40	0.22	0.012	19.329	0.038	0.002	0.002	0.001
Starting and operation at idle																		
APU Use	On	1.86	1	1.00	197.0	6.1	2.00	3170.00	6.25	0.25	0.40	0.22	0.012	19.329	0.038	0.002	0.002	0.001
Main eng start/scan	55% N2	1.86	1	4.00	498.1	61.7	151.21	2747.37	0.27	34.02	0.40	8.94	9.325	169.425	0.017	2.098	0.025	0.551
Close bleed valve/scan	65% N2	1.86	1	4.00	568.8	70.4	117.24	2878.24	0.48	20.83	0.40	8.89	8.256	202.689	0.034	1.467	0.028	0.626
Vibration test																		
Record vibes	65% N2	1.86	1	0.50	568.8	8.8	117.24	2878.24	0.48	20.83	0.40	8.89	1.032	25.336	0.004	0.183	0.004	0.078
Record vibes	70% N2	1.86	1	0.50	697.2	10.8	88.29	2972.58	0.75	12.37	0.40	8.81	0.953	32.073	0.008	0.133	0.004	0.095
Record vibes	80% N2	1.86	1	0.50	1,154.6	17.9	34.25	3,106.69	1.86	2.85	0.40	8.44	0.612	55.512	0.033	0.051	0.007	0.151
Stabilize & Scan	95% N2	1.86	1	4.00	3,340.5	413.6	4.17	3,159.75	7.15	0.27	0.40	5.70	1.724	1,306.797	2.957	0.112	0.165	2.356
Maximum operating condition test																		
MRT & Scan & Stabilize	102% N2	1.86	1	5.00	4,997.0	773.3	3.00	3,161.84	11.16	0.15	0.40	2.84	2.322	2,445.129	8.631	0.119	0.309	2.196
Ground Idle	55% N2	1.86	1	2.00	498.1	30.8	151.21	2747.37	0.27	34.02	0.40	8.94	4.662	84.713	0.008	1.049	0.012	0.276

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402					APU (GTS) Type: 096 Mk II (Saphir (10)													
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Engine installed performance check																		
Install different ECATS	55% N2	1.86	1	4.00	498.1	61.7	151.21	2747.37	0.27	34.02	0.40	8.94	9.325	169.425	0.017	2.098	0.025	0.551
95% N1, stabilize, scan	98% N2	1.86	1	4.00	4,074.4	504.4	3.56	3,160.98	8.93	0.18	0.40	4.50	1.797	1,594.513	4.503	0.089	0.202	2.271
Ground Idle	55% N2	1.86	1	2.00	498.1	30.8	151.21	2747.37	0.27	34.02	0.40	8.94	4.662	84.713	0.008	1.049	0.012	0.276
Idle rpm test																		
Warm up	80% N2	1.86	1	2.00	1,154.6	71.5	34.25	3,106.69	1.86	2.85	0.40	8.44	2.448	222.049	0.133	0.203	0.029	0.603
Stabilize & Scan	55% N2	1.86	1	4.00	498.1	61.7	151.21	2747.37	0.27	34.02	0.40	8.94	9.325	169.425	0.017	2.098	0.025	0.551
Acceleration and decel tests																		
Ground Idle	55% N2	1.86	1	1.00	498.1	15.4	151.21	2747.37	0.27	34.02	0.40	8.94	2.331	42.356	0.004	0.524	0.006	0.138
MRT	102% N2	1.86	1	0.50	4,997.0	77.3	3.00	3,161.84	11.16	0.15	0.40	2.84	0.232	244.513	0.863	0.012	0.031	0.220
Ground Idle	55% N2	1.86	1	3.00	498.1	46.3	151.21	2747.37	0.27	34.02	0.40	8.94	6.994	127.069	0.012	1.573	0.019	0.413
Slam to MRT	102% N2	1.86	1	0.50	4,997.0	77.3	3.00	3,161.84	11.16	0.15	0.40	2.84	0.232	244.513	0.863	0.012	0.031	0.220
Ground Idle	55% N2	1.86	1	3.00	498.1	46.3	151.21	2747.37	0.27	34.02	0.40	8.94	6.994	127.069	0.012	1.573	0.019	0.413
Slam to MRT & scan	102% N2	1.86	1	2.00	4,997.0	309.3	3.00	3,161.84	11.16	0.15	0.40	2.84	0.929	978.052	3.452	0.048	0.124	0.879
Ground Idle	55% N2	1.86	1	3.50	498.1	54.0	151.21	2747.37	0.27	34.02	0.40	8.94	8.159	148.247	0.015	1.836	0.022	0.482
Slam to MRT	102% N2	1.86	1	1.00	4,997.0	154.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.464	489.026	1.726	0.024	0.062	0.439
Ground Idle	55% N2	1.86	1	3.50	498.1	54.0	151.21	2747.37	0.27	34.02	0.40	8.94	8.159	148.247	0.015	1.836	0.022	0.482
Slam to MRT	102% N2	1.86	1	1.50	4,997.0	232.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.697	733.539	2.589	0.036	0.093	0.659
Ground Idle	55% N2	1.86	1	3.50	498.1	54.0	151.21	2747.37	0.27	34.02	0.40	8.94	8.159	148.247	0.015	1.836	0.022	0.482
Slam to MRT	102% N2	1.86	1	1.00	4,997.0	154.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.464	489.026	1.726	0.024	0.062	0.439
Ground Idle	55% N2	1.86	1	3.50	498.1	54.0	151.21	2747.37	0.27	34.02	0.40	8.94	8.159	148.247	0.015	1.836	0.022	0.482
Slam to MRT	102% N2	1.86	1	0.50	4,997.0	77.3	3.00	3,161.84	11.16	0.15	0.40	2.84	0.232	244.513	0.863	0.012	0.031	0.220
Slam to Ground Idle	55% N2	1.86	1	0.25	498.1	3.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.583	10.589	0.001	0.131	0.002	0.034
Slam to MRT	102% N2	1.86	1	0.25	4,997.0	38.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.116	122.256	0.432	0.006	0.015	0.110
Throttle back	70% N2	1.86	1	1.00	697.2	21.6	88.29	2972.58	0.75	12.37	0.40	8.81	1.905	64.147	0.016	0.267	0.009	0.190
Back up fuel system (BUFS) test																		
Verify 70% NH	70% N2	1.86	1	1.00	697.2	21.6	88.29	2972.58	0.75	12.37	0.40	8.81	1.905	64.147	0.016	0.267	0.009	0.190
Switch to Manual FC	64% N2	1.86	1	0.50	570.7	8.8	122.53	2,859.30	0.45	22.65	0.40	8.90	1.082	25.254	0.004	0.200	0.004	0.079
Throttle up	92% N2	1.86	1	0.25	2,681.8	20.8	5.55	3,157.13	5.56	0.44	0.40	6.66	0.115	65.516	0.115	0.009	0.008	0.138
Throttle back	55% N2	1.86	1	0.25	498.1	3.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.583	10.589	0.001	0.131	0.002	0.034
Throttle up	65% N2	1.86	1	0.25	586.8	4.5	117.24	2,878.24	0.48	20.83	0.40	8.89	0.532	13.069	0.002	0.095	0.002	0.040
Switch to Normal FC	65% N3	1.86	1	0.25	586.8	4.5	117.24	2,878.24	0.48	20.83	0.40	8.89	0.532	13.069	0.002	0.095	0.002	0.040
Ground Idle	55% N2	1.86	1	2.00	498.1	30.8	151.21	2747.37	0.27	34.02	0.40	8.94	4.662	84.713	0.008	1.049	0.012	0.276
Approach idle - set throttle position																		
Throttle up	85% N2	1.86	1	0.08	1,601.9	4.1	16.70	3,138.72	2.94	1.28	0.40	8.00	0.069	12.969	0.012	0.005	0.002	0.033
Throttle back - Approach	75% N2	1.86	1	0.25	874.1	6.8	59.13	3,051.72	1.18	6.28	0.40	8.68	0.400	20.641	0.008	0.042	0.003	0.059
Ground Idle	55% N2	1.86	1	0.25	498.1	3.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.583	10.589	0.001	0.131	0.002	0.034
Hot engine reslam acceleration tests																		
MRT	102% N2	1.86	1	0.25	4,997.0	38.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.116	122.256	0.432	0.006	0.015	0.110
Slam to Approach Idle	75% N2	1.86	1	0.08	874.1	2.3	59.13	3,051.72	1.18	6.28	0.40	8.68	0.133	6.880	0.003	0.014	0.001	0.020

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402					APU (GTS) Type: 096 Mk II (Saphir (10)												
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Slam to MRT	102% N2	1.86	1	3.00	4,997.0	464.0	3.00	3,161.84	11.16	0.15	0.40	2.84	1.393	1,467.077	5.179	0.071	0.186	1.318
Slam to Approach Idle	75% N2	1.86	1	0.08	874.1	2.3	59.13	3,051.72	1.18	6.28	0.40	8.68	0.133	6.880	0.003	0.014	0.001	0.020
Slam to MRT	102% N2	1.86	1	3.00	4,997.0	464.0	3.00	3,161.84	11.16	0.15	0.40	2.84	1.393	1,467.077	5.179	0.071	0.186	1.318
Slam to Approach Idle	75% N2	1.86	1	0.08	874.1	2.3	59.13	3,051.72	1.18	6.28	0.40	8.68	0.133	6.880	0.003	0.014	0.001	0.020
Slam to MRT	102% N2	1.86	1	0.25	4,997.0	38.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.116	122.256	0.432	0.006	0.015	0.110
Throttle back - Approach	75% N2	1.86	1	0.25	874.1	6.8	59.13	3,051.72	1.18	6.28	0.40	8.68	0.400	20.641	0.008	0.042	0.003	0.059
Ground Idle - Cool down	55% N2	1.86	1	3.00	498.1	46.3	151.21	2747.37	0.27	34.02	0.40	8.94	6.994	127.069	0.012	1.573	0.019	0.413
Second engine run																		
APU (Wet Motor)	On	1.86	1	1.00	197.0	6.1	2.00	3170.00	6.25	0.25	0.40	0.22	0.012	19.329	0.038	0.002	0.002	0.001
APU (Dry Motor)	On	1.86	1	1.00	197.0	6.1	2.00	3170.00	6.25	0.25	0.40	0.22	0.012	19.329	0.038	0.002	0.002	0.001
APU Use	On	1.86	1	1.00	197.0	6.1	2.00	3170.00	6.25	0.25	0.40	0.22	0.012	19.329	0.038	0.002	0.002	0.001
Main eng start	55% N2	1.86	1	1.00	498.1	15.4	151.21	2747.37	0.27	34.02	0.40	8.94	2.331	42.356	0.004	0.524	0.006	0.138
Close bleed valve	65% N2	1.86	1	1.00	568.8	17.6	117.24	2878.24	0.48	20.83	0.40	8.89	2.064	50.672	0.008	0.367	0.007	0.157
Ground Idle	55% N2	1.86	1	1.00	498.1	15.4	151.21	2747.37	0.27	34.02	0.40	8.94	2.331	42.356	0.004	0.524	0.006	0.138
Hydraulic and flying controls test																		
GI, verify RAT	55% N2	1.86	1	2.00	498.1	30.8	151.21	2747.37	0.27	34.02	0.40	8.94	4.662	84.713	0.008	1.049	0.012	0.276
Cabin air conditioning test																		
Ground Idle	55% N2	1.86	1	0.25	498.1	3.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.583	10.589	0.001	0.131	0.002	0.034
Fuel suction feed/electrical tests																		
WOW targets, GEN off	55% N2	1.86	1	1.00	498.1	15.4	151.21	2747.37	0.27	34.02	0.40	8.94	2.331	42.356	0.004	0.524	0.006	0.138
Throttle up	90% N2	1.86	1	0.25	2,307.7	17.9	7.36	3,154.06	4.65	0.60	0.40	7.16	0.131	56.320	0.083	0.011	0.007	0.128
GI, GEN reset	55% N2	1.86	1	1.00	498.1	15.4	151.21	2747.37	0.27	34.02	0.40	8.94	2.331	42.356	0.004	0.524	0.006	0.138
Approach idle setting test																		
Throttle up	85% N2	1.86	1	0.25	1,601.9	12.4	16.70	3,138.72	2.94	1.28	0.40	8.00	0.207	38.907	0.036	0.016	0.005	0.099
Verify approach idle stop	75% N2	1.86	1	0.50	874.1	13.5	59.13	3,051.72	1.18	6.28	0.40	8.68	0.800	41.282	0.016	0.085	0.005	0.117
GI, verify finger lift	55% N2	1.86	1	0.25	498.1	3.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.583	10.589	0.001	0.131	0.002	0.034
Engine stopping																		
Cool/shtudown	55% N2	1.86	1	3.00	498.1	46.3	151.21	2747.37	0.27	34.02	0.40	8.94	6.994	127.069	0.012	1.573	0.019	0.413
Engine final run																		
APU (Wet Motor)	On	1.86	1	1.00	197.0	6.1	2.00	3170.00	6.25	0.25	0.40	0.22	0.012	19.329	0.038	0.002	0.002	0.001
APU (Dry Motor)	On	1.86	1	1.00	197.0	6.1	2.00	3170.00	6.25	0.25	0.40	0.22	0.012	19.329	0.038	0.002	0.002	0.001
GI, leak checks	55% N2	1.86	1	3.00	498.1	46.3	151.21	2747.37	0.27	34.02	0.40	8.94	6.994	127.069	0.012	1.573	0.019	0.413
Full ECATS Test - Totals						**5065.5**							**164.97**	**15610.30**	**40.91**	**33.22**	**2.03**	**23.43**
Adour engine control amplifier (ECA) and vibration test set (UNICATS) Run																		
Engine prestart tests																		
APU (Wet Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
APU (Dry Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Starting and operation at idle condition																		
APU Use	On	0.89	1		197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402					APU (GTS) Type: 096 Mk II (Saphir (10)												
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Main eng start	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Close bleed valve	65% N2	0.89	1	5.00	568.8	42.3	117.24	2878.24	0.48	20.83	0.40	8.89	4.962	121.817	0.020	0.882	0.017	0.376
Vibration test																		
Ground Idle, record vibes	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Throttle up, record vibes	65% N2	0.89	1	0.50	568.8	4.2	117.24	2878.24	0.48	20.83	0.40	8.89	0.496	12.182	0.002	0.088	0.002	0.038
Throttle up, record vibes	70% N2	0.89	1	0.50	697.2	5.2	88.29	2972.58	0.75	12.37	0.40	8.81	0.458	15.421	0.004	0.064	0.002	0.046
Throttle up, record vibes	80% N2	0.89	1	0.50	1,154.6	8.6	34.25	3,106.69	1.86	2.85	0.40	8.44	0.294	26.691	0.016	0.024	0.003	0.073
Throttle up, record vibes	95% N2	0.89	1	1.00									0.000	0.000	0.000	0.000	0.000	0.000
Maximum operating condition test																		
Throttle up	102% N2	0.89	1	4.00	4,997.0	297.5	3.00	3,161.84	11.16	0.15	0.40	2.84	0.893	940.501	3.320	0.046	0.119	0.845
ECA dynamic safety tests																		
MRT (max rated thrust)	102% N2	0.89	1	1.00	4,997.0	74.4	3.00	3,161.84	11.16	0.15	0.40	2.84	0.223	235.125	0.830	0.011	0.030	0.211
Engine installed performance check																		
Ground Idle	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
95% N1 (NL)	98% N2	0.89	1	4.00									0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Idle rpm test																		
Ground Idle	55% N2	0.89	1	5.00	498.1	37.1	151.21	2747.37	0.27	34.02	0.40	8.94	5.604	101.825	0.010	1.261	0.015	0.331
Acceleration and deceleration tests																		
MRT (max rated thrust)	102% N2	0.89	1	2.00	4,997.0	148.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.447	470.251	1.660	0.023	0.059	0.422
Ground Idle	55% N2	0.89	1	5.00	498.1	37.1	151.21	2747.37	0.27	34.02	0.40	8.94	5.604	101.825	0.010	1.261	0.015	0.331
Slam to max	102% N2	0.89	1	0.50	4,997.0	37.2	3.00	3,161.84	11.16	0.15	0.40	2.84	0.112	117.563	0.415	0.006	0.015	0.106
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max & repeat test	102% N2	0.89	1	1.00	4,997.0	74.4	3.00	3,161.84	11.16	0.15	0.40	2.84	0.223	235.125	0.830	0.011	0.030	0.211
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max	102% N2	0.89	1	0.50	4,997.0	37.2	3.00	3,161.84	11.16	0.15	0.40	2.84	0.112	117.563	0.415	0.006	0.015	0.106
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max & repeat test	102% N2	0.89	1	1.00	4,997.0	74.4	3.00	3,161.84	11.16	0.15	0.40	2.84	0.223	235.125	0.830	0.011	0.030	0.211
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max	102% N2	0.89	1	0.50	4,997.0	37.2	3.00	3,161.84	11.16	0.15	0.40	2.84	0.112	117.563	0.415	0.006	0.015	0.106
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max	102% N2	0.89	1	2.00	4,997.0	148.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.447	470.251	1.660	0.023	0.059	0.422
Slam to Idle	55% N2	0.89	1	0.25	498.1	1.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.280	5.091	0.001	0.063	0.001	0.017
Slam to max	102% N2	0.89	1	0.25	4,997.0	18.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.056	58.781	0.207	0.003	0.007	0.053
Throttle down	70% N2	0.89	1	0.50	697.2	5.2	88.29	2972.58	0.75	12.37	0.40	8.81	0.458	15.421	0.004	0.064	0.002	0.046
Back up fuel system (BUFS) test																		
Verify 70% NH	70% N2	0.89	1	1.00	697.2	10.4	88.29	2972.58	0.75	12.37	0.40	8.81	0.916	30.842	0.008	0.128	0.004	0.091
Switch to Manual FC	64% N2	0.89	1	0.50	570.7	4.2	122.53	2,859.30	0.45	22.65	0.40	8.90	0.520	12.142	0.002	0.096	0.002	0.038
Throttle up	92% N2	0.89	1	0.25	2,681.8	10.0	5.55	3,157.13	5.56	0.44	0.40	6.66	0.055	31.500	0.055	0.004	0.004	0.066
Ground Idle	55% N2	0.89	1	0.25	498.1	1.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.280	5.091	0.001	0.063	0.001	0.017

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402					APU (GTS) Type: 096 Mk II (Saphir (10)												
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Throttle up	65% N2	0.89	1	0.25	586.8	2.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.256	6.284	0.001	0.045	0.001	0.019
Switch to Normal FC	65% N3	0.89	1	0.25	586.8	2.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.256	6.284	0.001	0.045	0.001	0.019
Ground Idle	55% N2	0.89	1	2.00	498.1	14.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.242	40.730	0.004	0.504	0.006	0.133
Approach idle - throttle position																		
Install WOW targets	55% N2	0.89	1	2.00	498.1	14.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.242	40.730	0.004	0.504	0.006	0.133
Throttle up	85% N2	0.89	1	0.25	1,601.9	6.0	16.70	3,138.72	2.94	1.28	0.40	8.00	0.100	18.706	0.018	0.008	0.002	0.048
Throttle down	75% N2	0.89	1	0.50	874.1	6.5	59.13	3,051.72	1.18	6.28	0.40	8.68	0.385	19.849	0.008	0.041	0.003	0.056
Ground Idle	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Hot engine reslam acceleration tests																		
MRT (max rated thrust)	102% N2	0.89	1	0.25	4,997.0	18.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.056	58.781	0.207	0.003	0.007	0.053
Slam to approach	75% N2	0.89	1	0.08	874.1	1.1	59.13	3,051.72	1.18	6.28	0.40	8.68	0.064	3.308	0.001	0.007	0.000	0.009
Slam to max	102% N2	0.89	1	3.00	4,997.0	223.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.670	705.376	2.490	0.034	0.089	0.634
Slam to approach	75% N2	0.89	1	0.08	874.1	1.1	59.13	3,051.72	1.18	6.28	0.40	8.68	0.064	3.308	0.001	0.007	0.000	0.009
Slam to max	102% N2	0.89	1	3.00	4,997.0	223.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.670	705.376	2.490	0.034	0.089	0.634
Slam to approach	75% N2	0.89	1	0.08	874.1	1.1	59.13	3,051.72	1.18	6.28	0.40	8.68	0.064	3.308	0.001	0.007	0.000	0.009
Slam to max	102% N2	0.89	1	3.00	4,997.0	223.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.670	705.376	2.490	0.034	0.089	0.634
Approach & remove targets	75% N2	0.89	1	1.00	874.1	13.0	59.13	3,051.72	1.18	6.28	0.40	8.68	0.769	39.698	0.015	0.082	0.005	0.113
Engine shutdown																		
Cool down, verify RAT	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Engine second run																		
APU (Wet Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
APU (Dry Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
APU Use	On	0.89	1		197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22						
Main eng start	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Close bleed valve	65% N2	0.89	1	5.00	586.8	43.7	117.24	2,878.24	0.48	20.83	0.40	8.89	5.119	125.672	0.021	0.910	0.017	0.388
Hydraulic and flying controls test																		
GI, verify RAT	55% N2	0.89	1	2.00	498.1	14.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.242	40.730	0.004	0.504	0.006	0.133
Cabin air conditioning test																		
Ground Idle	55% N2	0.89	1	0.25	498.1	1.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.280	5.091	0.001	0.063	0.001	0.017
Fuel suction feed/electrical tests																		
WOW targets, GEN off	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Throttle up	90% N2	0.89	1	0.25	2,307.7								0.000	0.000	0.000	0.000	0.000	0.000
GI, GEN reset	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Approach idle setting test																		
Throttle up	85% N2	0.89	1	0.25	1,601.9	6.0	16.70	3,138.72	2.94	1.28	0.40	8.00	0.100	18.706	0.018	0.008	0.002	0.048
Verify approach idle stop	75% N2	0.89	1	0.50	874.1	6.5	59.13	3,051.72	1.18	6.28	0.40	8.68	0.385	19.849	0.008	0.041	0.003	0.056
GI, finger lift, rem targets	55% N2	0.89	1	0.25	498.1	1.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.280	5.091	0.001	0.063	0.001	0.017
Engine stopping																		
Cool/shtudown	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Engine final run																		
APU (Wet Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
APU (Dry Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
GI, leak checks	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Full UNICATS Test - Totals						**2225.8**							**80.074**	**6838.851**	**18.680**	**16.173**	**0.890**	**9.713**
Ground Running Tests Using FADEC (Full Authority Digital Engine [or Electronics] Control) Test Set - F405-RR-402 Engine																		
Engine prestart tests																		
APU (Wet Motor)	On	2.38	1	1.00	197.0	7.8	2.00	3170.00	6.25	0.25	0.40	0.22	0.016	24.782	0.049	0.002	0.003	0.002
APU (Dry Motor)	On	2.38	1	1.00	197.0	7.8	2.00	3170.00	6.25	0.25	0.40	0.22	0.016	24.782	0.049	0.002	0.003	0.002
GI, record data, leak checks	55% N2	2.38	1	5.00	498.1	98.8	151.21	2747.37	0.27	34.02	0.40	8.94	14.944	271.526	0.027	3.362	0.040	0.884
Engine vibration and max power tests																		
GI	55% N2	2.38	1	2.00	498.1	39.5	151.21	2747.37	0.27	34.02	0.40	8.94	5.978	108.611	0.011	1.345	0.016	0.353
Throttle up	60% N2	2.38	1	2.00	523.0	41.5	140.38	2,791.46	0.33	29.42	0.40	8.93	5.827	115.864	0.014	1.221	0.017	0.371
Throttle up	65% N2	2.38	1	2.00	586.8	46.6	117.24	2,878.24	0.48	20.83	0.40	8.89	5.460	134.046	0.023	0.970	0.019	0.414
Throttle up	70% N2	2.38	1	2.00									0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	80% N2	2.38	1	2.00	1,154.6	91.6	34.25	3,106.69	1.86	2.85	0.40	8.44	3.138	284.691	0.170	0.261	0.037	0.774
Throttle up	95% N2	2.38	1	2.00									0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	102% N2	2.38	1	3.00	4,997.0	594.9	3.00	3,161.84	11.16	0.15	0.40	2.84	1.786	1,880.949	6.640	0.092	0.238	1.690
GI	55% N2	2.38	1	3.00	498.1	59.3	151.21	2747.37	0.27	34.02	0.40	8.94	8.967	162.916	0.016	2.017	0.024	0.530
Acceleration and deceleration test																		
GI	55% N2	2.38	1	0.50	498.1	9.9	151.21	2747.37	0.27	34.02	0.40	8.94	1.494	27.153	0.003	0.336	0.004	0.088
Slam to MRT	102% N2	2.38	1	0.25	4,997.0	49.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.149	156.746	0.553	0.008	0.020	0.141
Slam to GI	55% N2	2.38	1	0.25	498.1	4.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.747	13.576	0.001	0.168	0.002	0.044
Manual fuel control (MFC)																		
Throttle up, FC to M	70% N2	2.38	1	0.25	697.2	6.9	88.29	2972.58	0.75	12.37	0.40	8.81	0.611	20.561	0.005	0.086	0.003	0.061
Throttle down, scan	55% N2	2.38	1	1.00	498.1	19.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.989	54.305	0.005	0.672	0.008	0.177
Manual throttle up, scan	96% N2	2.38	1	1.00									0.000	0.000	0.000	0.000	0.000	0.000
Throttle down, FC to NORM	70% N2	2.38	1	0.25	697.2	6.9	88.29	2972.58	0.75	12.37	0.40	8.81	0.611	20.561	0.005	0.086	0.003	0.061
GI	55% N2	2.38	1	1.00	498.1	19.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.989	54.305	0.005	0.672	0.008	0.177
Approach idle - throttle position																		
Install WOW targets	55% N2	2.38	1	2.00	498.1	39.5	151.21	2747.37	0.27	34.02	0.40	8.94	5.978	108.611	0.011	1.345	0.016	0.353
Throttle up	85% N2	2.38	1	0.08	1,601.9	5.3	16.70	3,138.72	2.94	1.28	0.40	8.00	0.088	16.628	0.016	0.007	0.002	0.042
Throttle down, mark tape	75% N2	2.38	1	1.00	874.1	34.7	59.13	3,051.72	1.18	6.28	0.40	8.68	2.051	105.857	0.041	0.218	0.014	0.301
Engine slam/reslam tests																		
Throttle up	102% N2	2.38	1	0.25	4,997.0	49.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.149	156.746	0.553	0.008	0.020	0.141
Slam to idle	55% N2	2.38	1	0.08	498.1	1.6	151.21	2747.37	0.27	34.02	0.40	8.94	0.249	4.525	0.000	0.056	0.001	0.015
Slam to MRT	102% N2	2.38	1	0.25	4,997.0	49.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.149	156.746	0.553	0.008	0.020	0.141
Slam to idle	55% N2	2.38	1	0.17	498.1	3.3	151.21	2747.37	0.27	34.02	0.40	8.94	0.498	9.051	0.001	0.112	0.001	0.029
Slam to MRT	102% N2	2.38	1	0.08	4,997.0	16.5	3.00	3,161.84	11.16	0.15	0.40	2.84	0.050	52.249	0.184	0.003	0.007	0.047

Aircraft: T-45A/C Goshawk **Engine: F405-RR-401/-402** **APU (GTS) Type: 096 Mk II (Saphir (10)**

Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Slam to idle	55% N2	2.38	1	1.00	498.1	19.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.989	54.305	0.005	0.672	0.008	0.177
Engine shutdown																		
GI, leak check, rundown	55% N2	2.38	1	3.00	498.1	59.3	151.21	2747.37	0.27	34.02	0.40	8.94	8.967	162.916	0.016	2.017	0.024	0.530
Engine second run																		
APU (Wet Motor)	On	2.38	1	1.00	197.0	7.8	2.00	3170.00	6.25	0.25	0.40	0.22	0.016	24.782	0.049	0.002	0.003	0.002
APU (Dry Motor)	On	2.38	1	1.00	197.0	7.8	2.00	3170.00	6.25	0.25	0.40	0.22	0.016	24.782	0.049	0.002	0.003	0.002
GI, record data, leak checks	55% N2	2.38	1	5.00	498.1	98.8	151.21	2747.37	0.27	34.02	0.40	8.94	14.944	271.526	0.027	3.362	0.040	0.884
Close bleed valve	65% N2	2.38	1	0.25	586.8	5.8	117.24	2,878.24	0.48	20.83	0.40	8.89	0.683	16.756	0.003	0.121	0.002	0.052
Hydraulic and flying controls test																		
GI, verify RAT	55% N2	2.38	1	2.00	498.1	39.5	151.21	2747.37	0.27	34.02	0.40	8.94	5.978	108.611	0.011	1.345	0.016	0.353
Engine air supplies: cabin air conditioning flow																		
Ground Idle	55% N2	2.38	1	0.25	498.1	4.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.747	13.576	0.001	0.168	0.002	0.044
Fuel suction feed/electrical tests																		
WOW targets, GEN off	55% N2	2.38	1	1.00	498.1	19.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.989	54.305	0.005	0.672	0.008	0.177
Throttle up	90% N2	2.38	1	0.25	2,307.7	22.9	7.36	3,154.06	4.65	0.60	0.40	7.16	0.168	72.208	0.106	0.014	0.009	0.164
GI, GEN reset	55% N2	2.38	1	1.00	498.1	19.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.989	54.305	0.005	0.672	0.008	0.177
Approach idle setting test																		
Throttle up	85% N2	2.38	1	0.25	1,601.9	15.9	16.70	3,138.72	2.94	1.28	0.40	8.00	0.265	49.883	0.047	0.020	0.006	0.127
Verify approach idle stop	75% N2	2.38	1	0.50	874.1	17.3	59.13	3,051.72	1.18	6.28	0.40	8.68	1.025	52.929	0.020	0.109	0.007	0.151
GI, finger lift, rem targets	55% N2	2.38	1	0.25	498.1	4.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.747	13.576	0.001	0.168	0.002	0.044
Engine stopping																		
Cool/shtudown, RAT	55% N2	2.38	1	3.00	498.1	59.3	151.21	2747.37	0.27	34.02	0.40	8.94	8.967	162.916	0.016	2.017	0.024	0.530
Engine final run																		
APU (Wet Motor)	On	2.38	1	1.00	197.0	7.8	2.00	3170.00	6.25	0.25	0.40	0.22	0.016	24.782	0.049	0.002	0.003	0.002
APU (Dry Motor)	On	2.38	1	1.00	197.0	7.8	2.00	3170.00	6.25	0.25	0.40	0.22	0.016	24.782	0.049	0.002	0.003	0.002
GI, leak checks	55% N2	2.38	1	3.00	498.1	59.3	151.21	2747.37	0.27	34.02	0.40	8.94	8.967	162.916	0.016	2.017	0.024	0.530
Full FADEC Test - Totals						**1784.5**							**125.420**	**5315.640**	**9.411**	**26.441**	**0.714**	**10.783**
Engine Performance Adjustments (SIFCU and FCU) - F405-RR-401 Engine																		
Ground idle speed setting																		
Ground Idle, warm up	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Close bleed valve	80% N2	0.89	1	0.25	1,154.6	4.3	34.25	3,106.69	1.86	2.85	0.40	8.44	0.147	13.345	0.008	0.012	0.002	0.036
Ground Idle, stabilize	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Adj SIFCU/FCU, shut down	55% N2	0.89	1	10.00	498.1	74.1	151.21	2747.37	0.27	34.02	0.40	8.94	11.209	203.650	0.020	2.522	0.030	0.663
Dry motor (GTS)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22						
Start engine (GTS)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Start engine	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Throttle up, close bleed	80% N2	0.89	1	0.25	1,154.6	4.3	34.25	3,106.69	1.86	2.85	0.40	8.44	0.147	13.345	0.008	0.012	0.002	0.036
GI, stabilize, shut down	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
SIFCU/FCU (Idle) Adjustments - Totals						**162.7**							**22.717**	**443.285**	**0.074**	**5.069**	**0.064**	**1.399**

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Oil Consumption Test Run																		
Engine prerun test																		
APU (Wet Motor)	On	0.12	1	1.00	197.0	0.4	2.00	3170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
APU (Dry Motor)	On	0.12	1	1.00	197.0	0.4	2.00	3170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
Engine start (GTS)	On	0.12	1	1.00	197.0	0.4	2.00	3170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
Engine start	55% N2	0.12	1	1.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Throttle up	90% N2	0.12	1	2.00	2,307.7	9.2	7.36	3,154.06	4.65	0.60	0.40	7.16	0.067	28.871	0.043	0.006	0.004	0.066
GI, shutdown, fill oil	55% N2	0.12	1	4.00	498.1	4.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.598	10.856	0.001	0.134	0.002	0.035
Oil consumption run																		
Engine start (GTS)	On	0.12	1	1.00	197.0	0.4	2.00	3170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
Engine start	55% N2	0.12	1	1.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Throttle up	65% N2	0.12	1	10.00	586.8	11.6	117.24	2,878.24	0.48	20.83	0.40	8.89	1.364	33.497	0.006	0.242	0.005	0.103
Throttle up	75% N2	0.12	1	10.00	874.1	17.3	59.13	3,051.72	1.18	6.28	0.40	8.68	1.025	52.906	0.020	0.109	0.007	0.151
Throttle up	85% N2	0.12	1	10.00	1,601.9	31.8	16.70	3,138.72	2.94	1.28	0.40	8.00	0.531	99.723	0.093	0.041	0.013	0.254
Throttle up	95% N2	0.12	1	10.00	3,340.5	66.3	4.17	3,159.75	7.15	0.27	0.40	5.70	0.276	209.344	0.474	0.018	0.027	0.378
Throttle up	90% N2	0.12	1	10.00	2,307.7	45.8	7.36	3,154.06	4.65	0.60	0.40	7.16	0.337	144.356	0.213	0.028	0.018	0.328
Throttle up	102% N2	0.12	1	10.00	4,997.0	99.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.298	313.360	1.106	0.015	0.040	0.281
Throttle down	80% N2	0.12	1	4.00	1,154.6	9.2	34.25	3,106.69	1.86	2.85	0.40	8.44	0.314	28.457	0.017	0.026	0.004	0.077
Cool/shut down, check oil	55% N2	0.12	1	4.00	498.1	4.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.598	10.856	0.001	0.134	0.002	0.035
Oil Consumption Test Run - Totals						**301.6**							**5.709**	**942.611**	**1.984**	**0.821**	**0.121**	**1.727**
Test After Component Change - Air System																		
Engine start (GTS)	On	0.60	1	1.00	197.0	2.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.004	6.195	0.012	0.000	0.001	0.000
Engine start	55% N2	0.60	1	0.50	498.1	2.5	151.21	2747.37	0.27	34.02	0.40	8.94	0.374	6.788	0.001	0.084	0.001	0.022
Throttle up, close bleed	65% N2	0.60	1	0.25	586.8	1.5	117.24	2,878.24	0.48	20.83	0.40	8.89	0.171	4.189	0.001	0.030	0.001	0.013
GI, leak check, shutdown	55% N2	0.60	1	5.00	498.1	24.7	151.21	2747.37	0.27	34.02	0.40	8.94	3.736	67.876	0.007	0.840	0.010	0.221
Component Change - Air System Test Run - Totals						**30.6**							**4.284**	**85.047**	**0.020**	**0.955**	**0.012**	**0.256**
Test After Component Change - Engine Control Amplifier Test -401 Engine																		
Engine start (GTS)	On	1.86	1	1.00	197.0	6.1	2.00	3170.00	6.25	0.25	0.40	0.22	0.012	19.329	0.038	0.002	0.002	0.001
Engine start	55% N2	1.86	1	0.50	498.1	7.7	151.21	2747.37	0.27	34.02	0.40	8.94	1.166	21.178	0.002	0.262	0.003	0.069
Throttle up, close bleed	65% N2	1.86	1	0.25	586.8	4.5	117.24	2,878.24	0.48	20.83	0.40	8.89	0.532	13.069	0.002	0.095	0.002	0.040

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Engine operation at idle condition																		
Check ground idle	55% N2	1.86	1	4.00	498.1	61.7	151.21	2747.37	0.27	34.02	0.40	8.94	9.325	169.425	0.017	2.098	0.025	0.551
Maximum operating condition test																		
MRT	102% N2	1.86	1	4.00	4,997.0	618.7	3.00	3,161.84	11.16	0.15	0.40	2.84	1.858	1,956.103	6.905	0.095	0.247	1.757
ECA (engine control amplifier) lane failure tests																		
Ground idle	55% N2	1.86	1	1.00	498.1	15.4	151.21	2747.37	0.27	34.02	0.40	8.94	2.331	42.356	0.004	0.524	0.006	0.138
MRT - scan & record	102% N2	1.86	1	3.00	4,997.0	464.0	3.00	3,161.84	11.16	0.15	0.40	2.84	1.393	1,467.077	5.179	0.071	0.186	1.318
MRT - lane 1 fail	102% N2	1.86	1	1.00	4,997.0	154.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.464	489.026	1.726	0.024	0.062	0.439
MRT - lane 2 fail	102% N2	1.86	1	1.00	4,997.0	154.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.464	489.026	1.726	0.024	0.062	0.439
MRT - lane 1 fail	102% N2	1.86	1	1.00	4,997.0	154.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.464	489.026	1.726	0.024	0.062	0.439
Ground idle	55% N2	1.86	1	1.00	498.1	15.4	151.21	2747.37	0.27	34.02	0.40	8.94	2.331	42.356	0.004	0.524	0.006	0.138
Verify ground idle speed																		
Stabilize & Scan	55% N2	1.86	1	4.00	498.1	61.7	151.21	2747.37	0.27	34.02	0.40	8.94	9.325	169.425	0.017	2.098	0.025	0.551
Acceleration and deceleration test																		
GI	55% N2	1.86	1	0.50	498.1	7.7	151.21	2747.37	0.27	34.02	0.40	8.94	1.166	21.178	0.002	0.262	0.003	0.069
Slam to MRT	102% N2	1.86	1	0.25	4,997.0	38.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.116	122.256	0.432	0.006	0.015	0.110
Slam to GI, cool down	55% N2	1.86	1	3.00	498.1	46.3	151.21	2747.37	0.27	34.02	0.40	8.94	6.994	127.069	0.012	1.573	0.019	0.413
Component Change - Air System Test Run - Totals						**1811.8**							**37.942**	**5637.900**	**17.792**	**7.683**	**0.725**	**6.474**
Test After Component Change - Fuel Metering Unit (FMU) Test -402 Engine																		
Engine start (GTS)	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Engine start	55% N2	0.00	1	0.50	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up, close bleed	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Engine operation at idle condition																		
Check ground idle	55% N2	0.00	1	4.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Engine vibration and max power tests																		
GI	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	60% N2	0.00	1	2.00	523.0	0.0	140.38	2,791.46	0.33	29.42	0.40	8.93	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	2.00	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	70% N2	0.00	1	2.00	697.2	0.0	88.29	2972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	80% N2	0.00	1	2.00	1,154.6	0.0	34.25	3,106.69	1.86	2.85	0.40	8.44	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	95% N2	0.00	1	2.00	3,340.5	0.0	4.17	3,159.75	7.15	0.27	0.40	5.70	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	102% N2	0.00	1	3.00	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
GI	55% N2	0.00	1	3.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Acceleration and deceleration test																		
GI	55% N2	0.00	1	0.50	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to GI, cool down	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Back up fuel system (BUFS) test																		
Verify 70% NH	70% N2	0.00	1	1.00	697.2	0.0	88.29	2972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Switch to Manual FC	64% N2	0.00	1	0.50	570.7	0.0	122.53	2,859.30	0.45	22.65	0.40	8.90	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	92% N2	0.00	1	0.25	2,681.8	0.0	5.55	3,157.13	5.56	0.44	0.40	6.66	0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.00	1	0.25	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Switch to Normal FC	65% N3	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Engine slam/reslam tests																		
Throttle up	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	0.08	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	0.17	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.08	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	3.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Component Change - FMU Test -402 Engine - Totals						**0.0**							**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Test After Component Change - Tailpipe Test																		
APU (Wet Motor)	On	0.36	1	1.00	197.0	1.2	2.00	3170.00	6.25	0.25	0.40	0.22	0.002	3.717	0.007	0.000	0.000	0.000
APU (Dry Motor)	On	0.36	1	1.00	197.0	1.2	2.00	3170.00	6.25	0.25	0.40	0.22	0.002	3.717	0.007	0.000	0.000	0.000
Starting and operation at idle													0.000	0.000	0.000	0.000	0.000	0.000
APU Use	On	0.36	1	1.00	197.0	1.2	2.00	3170.00	6.25	0.25	0.40	0.22	0.002	3.717	0.007	0.000	0.000	0.000
Main eng start/scan	55% N2	0.36	1	1.00	498.1	3.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.448	8.145	0.001	0.101	0.001	0.027
Close bleed valve	65% N2	0.36	1	0.25	586.8	0.9	117.24	2,878.24	0.48	20.83	0.40	8.89	0.102	2.513	0.000	0.018	0.000	0.008
GI, inspect joint for leaks	55% N2	0.36	1	3.00	498.1	8.9	151.21	2747.37	0.27	34.02	0.40	8.94	1.345	24.434	0.002	0.303	0.004	0.080
Component Change - Tailpipe Test - Totals						**16.2**							**1.902**	**46.242**	**0.026**	**0.422**	**0.006**	**0.115**
Test After Component Change - Fuel System Component Tests																		
Fuel Control Unit (FCU) change -401 eng																		
APU (Wet Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
APU (Dry Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Starting and operation at idle																		
APU Use	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Main eng start/leak check	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Close bleed valve	65% N2	0.89	1	0.25	586.8	2.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.256	6.284	0.001	0.045	0.001	0.019
Ground idle	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Maximum operating condition test																		
MRT (max rated thrust)	102% N2	0.89	1	4.00	4,997.0	297.5	3.00	3,161.84	11.16	0.15	0.40	2.84	0.893	940.501	3.320	0.046	0.119	0.845

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
ECA dynamic safety tests																		
MRT (max rated thrust)	102% N2	0.89	1	1.00	4,997.0	74.4	3.00	3,161.84	11.16	0.15	0.40	2.84	0.223	235.125	0.830	0.011	0.030	0.211
Engine installed performance check																		
Ground Idle	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
95% N1 (NL)	98% N2	0.89	1	4.00	4,074.4	242.5	3.56	3,160.98	8.93	0.18	0.40	4.50	0.864	766.647	2.165	0.043	0.097	1.092
Ground Idle	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Idle rpm test																		
Ground Idle	55% N2	0.89	1	5.00	498.1	37.1	151.21	2747.37	0.27	34.02	0.40	8.94	5.604	101.825	0.010	1.261	0.015	0.331
Acceleration and deceleration tests																		
MRT (max rated thrust)	102% N2	0.89	1	2.00	4,997.0	148.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.447	470.251	1.660	0.023	0.059	0.422
Ground Idle	55% N2	0.89	1	5.00	498.1	37.1	151.21	2747.37	0.27	34.02	0.40	8.94	5.604	101.825	0.010	1.261	0.015	0.331
Slam to max	102% N2	0.89	1	0.50	4,997.0	37.2	3.00	3,161.84	11.16	0.15	0.40	2.84	0.112	117.563	0.415	0.006	0.015	0.106
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max & repeat test	102% N2	0.89	1	1.00	4,997.0	74.4	3.00	3,161.84	11.16	0.15	0.40	2.84	0.223	235.125	0.830	0.011	0.030	0.211
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max	102% N2	0.89	1	0.50	4,997.0	37.2	3.00	3,161.84	11.16	0.15	0.40	2.84	0.112	117.563	0.415	0.006	0.015	0.106
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max & repeat test	102% N2	0.89	1	1.00	4,997.0	74.4	3.00	3,161.84	11.16	0.15	0.40	2.84	0.223	235.125	0.830	0.011	0.030	0.211
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max	102% N2	0.89	1	0.50	4,997.0	37.2	3.00	3,161.84	11.16	0.15	0.40	2.84	0.112	117.563	0.415	0.006	0.015	0.106
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max	102% N2	0.89	1	2.00	4,997.0	148.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.447	470.251	1.660	0.023	0.059	0.422
Slam to Idle	55% N2	0.89	1	0.25	498.1	1.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.280	5.091	0.001	0.063	0.001	0.017
Slam to max	102% N2	0.89	1	0.25	4,997.0	18.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.056	58.781	0.207	0.003	0.007	0.053
Throttle down	70% N2	0.89	1	0.50	697.2	5.2	88.29	2972.58	0.75	12.37	0.40	8.81	0.458	15.421	0.004	0.064	0.002	0.046
Hot engine reslam acceleration tests																		
MRT (max rated thrust)	102% N2	0.89	1	0.25	4,997.0	18.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.056	58.781	0.207	0.003	0.007	0.053
Slam to approach	75% N2	0.89	1	0.08	874.1	1.1	59.13	3,051.72	1.18	6.28	0.40	8.68	0.064	3.308	0.001	0.007	0.000	0.009
Slam to max	102% N2	0.89	1	3.00	4,997.0	223.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.670	705.376	2.490	0.034	0.089	0.634
Slam to approach	75% N2	0.89	1	0.08	874.1	1.1	59.13	3,051.72	1.18	6.28	0.40	8.68	0.064	3.308	0.001	0.007	0.000	0.009
Slam to max	102% N2	0.89	1	3.00	4,997.0	223.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.670	705.376	2.490	0.034	0.089	0.634
Slam to approach	75% N2	0.89	1	0.08	874.1	1.1	59.13	3,051.72	1.18	6.28	0.40	8.68	0.064	3.308	0.001	0.007	0.000	0.009
Slam to max	102% N2	0.89	1	3.00	4,997.0	223.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.670	705.376	2.490	0.034	0.089	0.634
Approach & remove targets	75% N2	0.89	1	1.00	874.1	13.0	59.13	3,051.72	1.18	6.28	0.40	8.68	0.769	39.698	0.015	0.082	0.005	0.113
Fuel Control Unit (FCU) change -401 eng Totals						**2127.8**							**40.254**	**6634.287**	**20.562**	**7.885**	**0.851**	**7.885**
Fuel LP Warning Switch Change -401 Engine																		
APU Use	On	0.12	1	1.00	197.0	0.4	2.00	3170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.12	1	1.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Close bleed valve	65% N2	0.12	1	0.25	586.8	0.3	117.24	2,878.24	0.48	20.83	0.40	8.89	0.034	0.837	0.000	0.006	0.000	0.003

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402					APU (GTS) Type: 096 Mk II (Saphir (10)												
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Ground idle	55% N2	0.12	1	3.00	498.1	3.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.448	8.142	0.001	0.101	0.001	0.026
Fuel LP Warning Switch Change -401 Engine Totals						**4.6**							**0.632**	**12.932**	**0.004**	**0.141**	**0.002**	**0.038**
HP Fuel Pump Change -401 Engine																		
APU (Wet Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
APU (Dry Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Starting and operation at idle																		
APU Use	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Main eng start/leak check	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Close bleed valve	65% N2	0.89	1	0.25	586.8	2.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.256	6.284	0.001	0.045	0.001	0.019
Ground idle	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Maximum operating condition test																		
MRT (max rated thrust)	101.8% N2	0.89	1	4.00	4,997.0	297.5	3.00	3,161.84	11.16	0.15	0.40	2.84	0.893	940.501	3.320	0.046	0.119	0.845
Engine installed performance check																		
Ground Idle	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
95% N1 (NL)	98% N2	0.89	1	4.00	4,074.4	242.5	3.56	3,160.98	8.93	0.18	0.40	4.50	0.864	766.647	2.165	0.043	0.097	1.092
Ground Idle	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Idle rpm test																		
Ground Idle	55% N2	0.89	1	5.00	498.1	37.1	151.21	2747.37	0.27	34.02	0.40	8.94	5.604	101.825	0.010	1.261	0.015	0.331
Acceleration and deceleration tests																		
MRT (max rated thrust)	102% N2	0.89	1	2.00	4,997.0	148.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.447	470.251	1.660	0.023	0.059	0.422
Ground Idle	55% N2	0.89	1	5.00	498.1	37.1	151.21	2747.37	0.27	34.02	0.40	8.94	5.604	101.825	0.010	1.261	0.015	0.331
Slam to max	102% N2	0.89	1	0.50	4,997.0	37.2	3.00	3,161.84	11.16	0.15	0.40	2.84	0.112	117.563	0.415	0.006	0.015	0.106
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max & repeat test	102% N2	0.89	1	1.00	4,997.0	74.4	3.00	3,161.84	11.16	0.15	0.40	2.84	0.223	235.125	0.830	0.011	0.030	0.211
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max	102% N2	0.89	1	0.50	4,997.0	37.2	3.00	3,161.84	11.16	0.15	0.40	2.84	0.112	117.563	0.415	0.006	0.015	0.106
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max & repeat test	102% N2	0.89	1	1.00	4,997.0	74.4	3.00	3,161.84	11.16	0.15	0.40	2.84	0.223	235.125	0.830	0.011	0.030	0.211
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max	102% N2	0.89	1	0.50	4,997.0	37.2	3.00	3,161.84	11.16	0.15	0.40	2.84	0.112	117.563	0.415	0.006	0.015	0.106
Ground Idle	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
Slam to max	102% N2	0.89	1	2.00	4,997.0	148.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.447	470.251	1.660	0.023	0.059	0.422
Slam to Idle	55% N2	0.89	1	0.25	498.1	1.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.280	5.091	0.001	0.063	0.001	0.017
Slam to max	102% N2	0.89	1	0.25	4,997.0	18.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.056	58.781	0.207	0.003	0.007	0.053
Throttle down	70% N2	0.89	1	0.50	697.2	5.2	88.29	2972.58	0.75	12.37	0.40	8.81	0.458	15.421	0.004	0.064	0.002	0.046
Hot engine reslam acceleration tests																		
MRT (max rated thrust)	102% N2	0.89	1	0.25	4,997.0	18.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.056	58.781	0.207	0.003	0.007	0.053
Slam to approach	75% N2	0.89	1	0.08	874.1	1.1	59.13	3,051.72	1.18	6.28	0.40	8.68	0.064	3.308	0.001	0.007	0.000	0.009
Slam to max	102% N2	0.89	1	3.00	4,997.0	223.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.670	705.376	2.490	0.034	0.089	0.634

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Slam to approach	75% N2	0.89	1	0.08	874.1	1.1	59.13	3,051.72	1.18	6.28	0.40	8.68	0.064	3.308	0.001	0.007	0.000	0.009
Slam to max	102% N2	0.89	1	3.00	4,997.0	223.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.670	705.376	2.490	0.034	0.089	0.634
Slam to approach	75% N2	0.89	1	0.08	874.1	1.1	59.13	3,051.72	1.18	6.28	0.40	8.68	0.064	3.308	0.001	0.007	0.000	0.009
Slam to max	102% N2	0.89	1	3.00	4,997.0	223.1	3.00	3,161.84	11.16	0.15	0.40	2.84	0.670	705.376	2.490	0.034	0.089	0.634
Approach & remove targets	75% N2	0.89	1	1.00	874.1	13.0	59.13	3,051.72	1.18	6.28	0.40	8.68	0.769	39.698	0.015	0.082	0.005	0.113
HP Fuel Pump Change -401 Engine Totals						**2053.4**							**40.031**	**6399.162**	**19.732**	**7.873**	**0.821**	**7.674**
LP/HP Fuel Pump Change -402 Engine																		
APU (Wet Motor)	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
APU (Dry Motor)	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Starting and operation at idle																		
APU Use	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Close bleed valve	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground idle/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Engine vibration and max power tests																		
GI	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	60% N2	0.00	1	2.00	523.0	0.0	140.38	2,791.46	0.33	29.42	0.40	8.93	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	2.00	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	70% N2	0.00	1	2.00	697.2	0.0	88.29	2972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	80% N2	0.00	1	2.00	1,154.6	0.0	34.25	3,106.69	1.86	2.85	0.40	8.44	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	95% N2	0.00	1	2.00	3,340.5	0.0	4.17	3,159.75	7.15	0.27	0.40	5.70	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	102% N2	0.00	1	3.00	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
GI	55% N2	0.00	1	3.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Acceleration and deceleration test																		
GI	55% N2	0.00	1	0.50	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to GI, cool down	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Back up fuel system (BUFS) test																		
Verify 70% NH	70% N2	0.00	1	1.00	697.2	0.0	88.29	2972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Switch to Manual FC	64% N2	0.00	1	0.50	570.7	0.0	122.53	2,859.30	0.45	22.65	0.40	8.90	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	92% N2	0.00	1	0.25	2,681.8	0.0	5.55	3,157.13	5.56	0.44	0.40	6.66	0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.00	1	0.25	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Switch to Normal FC	65% N3	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000

Aircraft: T-45A/C Goshawk **Engine: F405-RR-401/-402** **APU (GTS) Type: 096 Mk II (Saphir (10)**

Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Approach idle - throttle position																		
Install WOW targets	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	85% N2	0.00	1	0.08	1,601.9	0.0	16.70	3,138.72	2.94	1.28	0.40	8.00	0.000	0.000	0.000	0.000	0.000	0.000
Throttle down, mark tape	75% N2	0.00	1	1.00	874.1	0.0	59.13	3,051.72	1.18	6.28	0.40	8.68	0.000	0.000	0.000	0.000	0.000	0.000
Engine slam/reslam tests																		
Throttle up	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	0.08	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	0.17	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.08	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Engine shutdown																		
GI, leak check, rundown	55% N2	0.00	1	3.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
LP/HP Fuel Pump Change -402 Engine Totals						**0.0**							**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
LP Fuel Pump Change -401 Engine																		
APU (Wet Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
APU (Dry Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Starting and operation at idle																		
APU Use	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Main eng start/leak check	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Close bleed valve	65% N2	0.89	1	0.25	586.8	2.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.256	6.284	0.001	0.045	0.001	0.019
Ground idle/leak check	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Engine shutdown																		
GI, leak check, rundown	55% N2	0.89	1	3.00	498.1	22.2	151.21	2747.37	0.27	34.02	0.40	8.94	3.363	61.095	0.006	0.757	0.009	0.199
LP Fuel Pump Change -401 Engine Totals						**48.0**							**5.878**	**135.989**	**0.066**	**1.309**	**0.019**	**0.353**
Sub-idling Fuel Control Unit (SIFCU) Change -401 Engine																		
APU (Wet Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
APU (Dry Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Starting and operation at idle																		
APU Use	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Main eng start/leak check	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Close bleed valve	65% N2	0.89	1	0.25	586.8	2.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.256	6.284	0.001	0.045	0.001	0.019
Ground idle/leak check	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Stop engine/restart	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
GI/note 40-49% rpm time	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Sub-idling Fuel Control Unit (SIFCU) Change -401 Engine Totals						**36.1**							**3.642**	**104.553**	**0.080**	**0.805**	**0.014**	**0.221**

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Backup Fuel Control Unit (BUFCU) Change -401 Engine																		
APU (Wet Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
APU (Dry Motor)	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Starting and operation at idle																		
APU Use	On	0.89	1	1.00	197.0	2.9	2.00	3170.00	6.25	0.25	0.40	0.22	0.006	9.293	0.018	0.001	0.001	0.001
Main eng start/leak check	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Close bleed valve	65% N2	0.89	1	0.25	586.8	2.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.256	6.284	0.001	0.045	0.001	0.019
Ground idle/leak check	55% N2	0.89	1	1.00	498.1	7.4	151.21	2747.37	0.27	34.02	0.40	8.94	1.121	20.365	0.002	0.252	0.003	0.066
Back up fuel system (BUFS) test																		
Verify 70% NH	70% N2	0.89	1	1.00	697.2	10.4	88.29	2972.58	0.75	12.37	0.40	8.81	0.916	30.842	0.008	0.128	0.004	0.091
Switch to Manual FC	64% N2	0.89	1	0.50	570.7	4.2	122.53	2,859.30	0.45	22.65	0.40	8.90	0.520	12.142	0.002	0.096	0.002	0.038
Throttle up	92% N2	0.89	1	0.25									0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.89	1	0.25	498.1	1.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.280	5.091	0.001	0.063	0.001	0.017
Throttle up	65% N2	0.89	1	0.25	586.8	2.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.256	6.284	0.001	0.045	0.001	0.019
Switch to Normal FC	65% N2	0.89	1	0.25	586.8	2.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.256	6.284	0.001	0.045	0.001	0.019
Ground Idle	55% N2	0.89	1	2.00	498.1	14.8	151.21	2747.37	0.27	34.02	0.40	8.94	2.242	40.730	0.004	0.504	0.006	0.133
Backup Fuel Control Unit (BUFCU) Change -401 Engine Totals						**61.5**							**6.985**	**176.267**	**0.076**	**1.435**	**0.025**	**0.471**
Differential Fuel Pressure Switch -401 Engine																		
APU Use	On	0.24	1	1.00	197.0	0.8	2.00	3170.00	6.25	0.25	0.40	0.22	0.002	2.478	0.005	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.24	1	1.00	498.1	2.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.299	5.431	0.001	0.067	0.001	0.018
Close bleed valve	65% N2	0.24	1	0.25	586.8	0.6	117.24	2,878.24	0.48	20.83	0.40	8.89	0.068	1.676	0.000	0.012	0.000	0.005
Ground idle/leak check	55% N2	0.24	1	1.00	498.1	2.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.299	5.431	0.001	0.067	0.001	0.018
Differential Fuel Pressure Switch -401 Engine Totals						**5.3**							**0.668**	**15.015**	**0.006**	**0.147**	**0.002**	**0.041**
Engine Electronic Control (EEC) -402 Engine																		
APU (Wet Motor)	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
APU (Dry Motor)	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Starting and operation at idle																		
APU Use	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Close bleed valve	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground idle/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Engine vibration and max power tests																		
GI	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	60% N2	0.00	1	2.00	523.0	0.0	140.38	2,791.46	0.33	29.42	0.40	8.93	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	2.00	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	70% N2	0.00	1	2.00	697.2	0.0	88.29	2972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	80% N2	0.00	1	2.00	1,154.6	0.0	34.25	3,106.69	1.86	2.85	0.40	8.44	0.000	0.000	0.000	0.000	0.000	0.000

Aircraft: T-45A/C Goshawk **Engine: F405-RR-401/-402** **APU (GTS) Type: 096 Mk II (Saphir (10)**

Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Throttle up	95% N2	0.00	1	2.00	3,340.5	0.0	4.17	3,159.75	7.15	0.27	0.40	5.70	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	102% N2	0.00	1	3.00	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
GI	55% N2	0.00	1	3.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Acceleration and deceleration test																		
GI	55% N2	0.00	1	0.50	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to GI, cool down	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Back up fuel system (BUFS) test																		
Verify 70% NH	70% N2	0.00	1	1.00	697.2	0.0	88.29	2972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Switch to Manual FC	64% N2	0.00	1	0.50	570.7	0.0	122.53	2,859.30	0.45	22.65	0.40	8.90	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	92% N2	0.00	1	0.25	2,681.8	0.0	5.55	3,157.13	5.56	0.44	0.40	6.66	0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.00	1	0.25	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Switch to Normal FC	65% N3	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Approach idle - throttle position																		
Install WOW targets	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	85% N2	0.00	1	0.08	1,601.9	0.0	16.70	3,138.72	2.94	1.28	0.40	8.00	0.000	0.000	0.000	0.000	0.000	0.000
Throttle down, mark tape	75% N2	0.00	1	1.00	874.1	0.0	59.13	3,051.72	1.18	6.28	0.40	8.68	0.000	0.000	0.000	0.000	0.000	0.000
Engine slam/reslam tests																		
Throttle up	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	0.08	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	0.17	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.08	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	3.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Engine Electronic Control (EEC) -402 Engine Totals						**0.0**							**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Dedicated Generator -402 Engine																		
APU (Wet Motor)	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
APU (Dry Motor)	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Starting and operation at idle																		
APU Use	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Close bleed valve	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground idle/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Engine vibration and max power tests																		
GI	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	60% N2	0.00	1	2.00	523.0	0.0	140.38	2,791.46	0.33	29.42	0.40	8.93	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	2.00	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	70% N2	0.00	1	2.00	697.2	0.0	88.29	2972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	80% N2	0.00	1	2.00	1,154.6	0.0	34.25	3,106.69	1.86	2.85	0.40	8.44	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	95% N2	0.00	1	2.00	3,340.5	0.0	4.17	3,159.75	7.15	0.27	0.40	5.70	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	102% N2	0.00	1	3.00	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
GI	55% N2	0.00	1	3.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Acceleration and deceleration test																		
GI	55% N2	0.00	1	0.50	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to GI, cool down	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Back up fuel system (BUFS) test																		
Verify 70% NH	70% N2	0.00	1	1.00	697.2	0.0	88.29	2972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Switch to Manual FC	64% N2	0.00	1	0.50	570.7	0.0	122.53	2,859.30	0.45	22.65	0.40	8.90	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	92% N2	0.00	1	0.25	2,681.8	0.0	5.55	3,157.13	5.56	0.44	0.40	6.66	0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.00	1	0.25	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Switch to Normal FC	65% N3	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground Idle	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Approach idle - throttle position																		
Install WOW targets	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	85% N2	0.00	1	0.08	1,601.9	0.0	16.70	3,138.72	2.94	1.28	0.40	8.00	0.000	0.000	0.000	0.000	0.000	0.000
Throttle down, mark tape	75% N2	0.00	1	1.00	874.1	0.0	59.13	3,051.72	1.18	6.28	0.40	8.68	0.000	0.000	0.000	0.000	0.000	0.000
Engine slam/reslam tests																		
Throttle up	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	0.08	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.25	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	0.17	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Slam to MRT	102% N2	0.00	1	0.08	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
Slam to idle	55% N2	0.00	1	3.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Dedicated Generator -402 Engine Totals						**0.0**							**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
NH Speed Probe -402 Engine																		
Starting and operation at idle																		
APU Use	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Close bleed valve	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground idle/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
NH Speed Probe -402 Engine Totals						**0.0**							**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
T3 Probe -402 Engine																		
Starting and operation at idle																		
APU Use	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Close bleed valve	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground idle/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
T3 Probe -402 Engine Totals						**0.0**							**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Wet Drains Line and Check Valve																		
APU (Wet Motor)	On	0.06	1	1.00	197.0	**0.2**	2.00	3170.00	6.25	0.25	0.40	0.22	**0.000**	**0.619**	**0.001**	**0.000**	**0.000**	**0.000**
Test After Component Change - Indicating System Component Tests																		
Fuel LP Warning Switch Change -401 Engine																		
APU Use	On	0.06	1	1.00	197.0	0.2	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.619	0.001	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Close bleed valve	65% N2	0.06	1	0.25	586.8	0.1	117.24	2,878.24	0.48	20.83	0.40	8.89	0.017	0.419	0.000	0.003	0.000	0.001
Ground idle/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Fuel LP Warning Switch Change -401 Engine Totals						**1.3**							**0.167**	**3.752**	**0.002**	**0.037**	**0.001**	**0.010**
HP Shaft Tach Gen and rpm Indicators																		
APU Use	On	0.06	1	1.00	197.0	0.2	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.619	0.001	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Close bleed valve	65% N2	0.06	1	0.25	586.8	0.1	117.24	2,878.24	0.48	20.83	0.40	8.89	0.017	0.419	0.000	0.003	0.000	0.001
Ground idle/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Engine vibration and max power tests																		
GI	55% N2	0.06	1	2.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Throttle up	60% N2	0.06	1	2.00	523.0	1.0	140.38	2,791.46	0.33	29.42	0.40	8.93	0.146	2.895	0.000	0.031	0.000	0.009
Throttle up	65% N2	0.06	1	2.00	586.8	1.2	117.24	2,878.24	0.48	20.83	0.40	8.89	0.136	3.350	0.001	0.024	0.000	0.010
Throttle up	70% N2	0.06	1	2.00	697.2	1.4	88.29	2972.58	0.75	12.37	0.40	8.81	0.122	4.110	0.001	0.017	0.001	0.012
Throttle up	80% N2	0.06	1	2.00	1,154.6	2.3	34.25	3,106.69	1.86	2.85	0.40	8.44	0.078	7.114	0.004	0.007	0.001	0.019
Throttle up	95% N2	0.06	1	2.00	3,340.5	6.6	4.17	3,159.75	7.15	0.27	0.40	5.70	0.028	20.934	0.047	0.002	0.003	0.038
Throttle up	102% N2	0.06	1	3.00	4,997.0	14.9	3.00	3,161.84	11.16	0.15	0.40	2.84	0.045	47.004	0.166	0.002	0.006	0.042

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402					APU (GTS) Type: 096 Mk II (Saphir (10)												
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
GI	55% N2	0.06	1	3.00	498.1	1.5	151.21	2747.37	0.27	34.02	0.40	8.94	0.224	4.071	0.000	0.050	0.001	0.013
HP Shaft Tach Gen and rpm Indicators Totals						**31.2**							**1.095**	**95.946**	**0.222**	**0.203**	**0.012**	**0.163**
Oil Low Pressure Warning Switch																		
APU Use	On	0.12	1	1.00	197.0	0.4	2.00	3170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.12	1	1.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Close bleed valve	65% N2	0.12	1	0.25	586.8	0.3	117.24	2,878.24	0.48	20.83	0.40	8.89	0.034	0.837	0.000	0.006	0.000	0.003
Ground idle/leak check	55% N2	0.12	1	1.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Oil Low Pressure Warning Switch Totals						**2.7**							**0.334**	**7.504**	**0.003**	**0.073**	**0.001**	**0.020**
T6/T2 Thermocouple Junction Box -401 Engine																		
APU Use	On	0.12	1	1.00	197.0	0.4	2.00	3170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
Main eng start	55% N2	0.12	1	1.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Close bleed valve	65% N2	0.12	1	0.25	586.8	0.3	117.24	2,878.24	0.48	20.83	0.40	8.89	0.034	0.837	0.000	0.006	0.000	0.003
Ground idle	55% N2	0.12	1	1.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Maximum operating condition test																		
MRT (max rated thrust)	102% N2	0.12	1	4.00	4,997.0	39.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.119	125.344	0.442	0.006	0.016	0.113
T6/T2 Thermocouple Junction Box -401 Engine Totals						**42.3**							**0.453**	**132.848**	**0.446**	**0.079**	**0.017**	**0.133**
T6 Thermocouple Junction Box -402 Engine																		
APU Use	On	0.00	1	1.00	197.0	0.0	2.00	3170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Main eng start	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Close bleed valve	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground idle	55% N2	0.00	1	1.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Engine vibration and max power tests																		
GI	55% N2	0.00	1	2.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	60% N2	0.00	1	2.00	523.0	0.0	140.38	2,791.46	0.33	29.42	0.40	8.93	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	2.00	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	70% N2	0.00	1	2.00	697.2	0.0	88.29	2972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	80% N2	0.00	1	2.00	1,154.6	0.0	34.25	3,106.69	1.86	2.85	0.40	8.44	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	95% N2	0.00	1	2.00	3,340.5	0.0	4.17	3,159.75	7.15	0.27	0.40	5.70	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	102% N2	0.00	1	3.00	4,997.0	0.0	3.00	3,161.84	11.16	0.15	0.40	2.84	0.000	0.000	0.000	0.000	0.000	0.000
GI	55% N2	0.00	1	3.00	498.1	0.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
T6 Thermocouple Junction Box -402 Engine Totals						**0.0**							**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
EGT Indicators																		
Engine prestart tests																		
APU (Wet Motor)	On	0.12	1	1.00	197.0	0.4	2.00	3170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
APU (Dry Motor)	On	0.12	1	1.00	197.0	0.4	2.00	3170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
GI, record data, leak checks	55% N2	0.12	1	5.00	498.1	4.9	151.21	2747.37	0.27	34.02	0.40	8.94	0.747	13.571	0.001	0.168	0.002	0.044

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402					APU (GTS) Type: 096 Mk II (Saphir (10)												
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Engine vibration and max power tests																		
GI	55% N2	0.12	1	2.00	498.1	2.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.299	5.428	0.001	0.067	0.001	0.018
Throttle up	60% N2	0.12	1	2.00	523.0	2.1	140.38	2,791.46	0.33	29.42	0.40	8.93	0.291	5.791	0.001	0.061	0.001	0.019
Throttle up	65% N2	0.12	1	2.00	586.8	2.3	117.24	2,878.24	0.48	20.83	0.40	8.89	0.273	6.699	0.001	0.048	0.001	0.021
Throttle up	70% N2	0.12	1	2.00	697.2	2.8	88.29	2972.58	0.75	12.37	0.40	8.81	0.244	8.221	0.002	0.034	0.001	0.024
Throttle up	80% N2	0.12	1	2.00	1,154.6	4.6	34.25	3,106.69	1.86	2.85	0.40	8.44	0.157	14.229	0.009	0.013	0.002	0.039
Throttle up	95% N2	0.12	1	2.00									0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	102% N2	0.12	1	3.00	4,997.0	29.7	3.00	3,161.84	11.16	0.15	0.40	2.84	0.089	94.008	0.332	0.005	0.012	0.084
GI	55% N2	0.12	1	3.00	498.1	3.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.448	8.142	0.001	0.101	0.001	0.026
Acceleration and deceleration test																		
GI	55% N2	0.12	1	0.50	498.1	0.5	151.21	2747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Slam to MRT	102% N2	0.12	1	0.25	4,997.0	2.5	3.00	3,161.84	11.16	0.15	0.40	2.84	0.007	7.834	0.028	0.000	0.001	0.007
Slam to GI	55% N2	0.12	1	0.25	498.1	0.2	151.21	2747.37	0.27	34.02	0.40	8.94	0.037	0.679	0.000	0.008	0.000	0.002
Manual fuel control (MFC)																		
Throttle up, FC to M	70% N2	0.12	1	0.25	697.2	0.3	88.29	2972.58	0.75	12.37	0.40	8.81	0.031	1.028	0.000	0.004	0.000	0.003
Throttle down, scan	55% N2	0.12	1	1.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Manual throttle up, scan	96% N2	0.12	1	1.00	3,580.5	7.1	3.92	3,160.26	7.73	0.23	0.40	5.32	0.028	22.442	0.055	0.002	0.003	0.038
Throttle down, FC to NORM	70% N2	0.12	1	0.25	697.2	0.3	88.29	2972.58	0.75	12.37	0.40	8.81	0.031	1.028	0.000	0.004	0.000	0.003
GI	55% N2	0.12	1	1.00	498.1	1.0	151.21	2747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Approach idle - throttle position																		
Install WOW targets	55% N2	0.12	1	2.00	498.1	2.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.299	5.428	0.001	0.067	0.001	0.018
Throttle up	85% N2	0.12	1	0.08									0.000	0.000	0.000	0.000	0.000	0.000
Throttle down, mark tape	75% N2	0.12	1	1.00	874.1	1.7	59.13	3,051.72	1.18	6.28	0.40	8.68	0.103	5.291	0.002	0.011	0.001	0.015
Engine slam/reslam tests																		
Throttle up	102% N2	0.12	1	0.25	4,997.0	2.5	3.00	3,161.84	11.16	0.15	0.40	2.84	0.007	7.834	0.028	0.000	0.001	0.007
Slam to idle	55% N2	0.12	1	0.08	498.1	0.1	151.21	2,747.37	0.27	34.02	0.40	8.94	0.012	0.226	0.000	0.003	0.000	0.001
Slam to MRT	102% N2	0.12	1	0.25	4,997.0	2.5	3.00	3,161.84	11.16	0.15	0.40	2.84	0.007	7.834	0.028	0.000	0.001	0.007
Slam to idle	55% N2	0.12	1	0.17	498.1	0.2	151.21	2,747.37	0.27	34.02	0.40	8.94	0.025	0.452	0.000	0.006	0.000	0.001
Slam to MRT	102% N2	0.12	1	0.08	4,997.0	0.8	3.00	3,161.84	11.16	0.15	0.40	2.84	0.002	2.611	0.009	0.000	0.000	0.002
Slam to idle	55% N2	0.12	1	1.00	498.1	1.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Engine shutdown																		
GI, leak check, rundown	55% N2	0.12	1	3.00	498.1	3.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.448	8.142	0.001	0.101	0.001	0.026
Engine second run																		
APU (Wet Motor)	On	0.12	1	1.00	197.0	0.4	2.00	3,170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
APU (Dry Motor)	On	0.12	1	1.00	197.0	0.4	2.00	3,170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
GI, record data, leak checks	55% N2	0.12	1	5.00	498.1	4.9	151.21	2,747.37	0.27	34.02	0.40	8.94	0.747	13.571	0.001	0.168	0.002	0.044
Close bleed valve	65% N2	0.12	1	0.25	586.8	0.3	117.24	2,878.24	0.48	20.83	0.40	8.89	0.034	0.837	0.000	0.006	0.000	0.003
Hydraulic and flying controls test																		
GI, verify RAT	55% N2	0.12	1	2.00	498.1	2.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.299	5.428	0.001	0.067	0.001	0.018

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Engine air supplies: cabin air conditioning flow																		
Ground Idle	55% N2	0.12	1	0.25	498.1	0.2	151.21	2,747.37	0.27	34.02	0.40	8.94	0.037	0.679	0.000	0.008	0.000	0.002
Fuel suction feed/electrical tests																		
WOW targets, GEN off	55% N2	0.12	1	1.00	498.1	1.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Throttle up	90% N2	0.12	1	0.25	2,307.7	1.1	7.36	3,154.06	4.65	0.60	0.40	7.16	0.008	3.609	0.005	0.001	0.000	0.008
GI, GEN reset	55% N2	0.12	1	1.00	498.1	1.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.149	2.714	0.000	0.034	0.000	0.009
Approach idle setting test																		
Throttle up	85% N2	0.12	1	0.25	1,601.9	0.8	16.70	3,138.72	2.94	1.28	0.40	8.00	0.013	2.493	0.002	0.001	0.000	0.006
Verify approach idle stop	75% N2	0.12	1	0.50	874.1	0.9	59.13	3,051.72	1.18	6.28	0.40	8.68	0.051	2.645	0.001	0.005	0.000	0.008
GI, finger lift, rem targets	55% N2	0.12	1	0.25	498.1	0.2	151.21	2,747.37	0.27	34.02	0.40	8.94	0.037	0.679	0.000	0.008	0.000	0.002
Engine stopping																		
Cool/shtudown, RAT	55% N2	0.12	1	3.00	498.1	3.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.448	8.142	0.001	0.101	0.001	0.026
Engine final run																		
APU (Wet Motor)	On	0.12	1	1.00	197.0	0.4	2.00	3,170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
APU (Dry Motor)	On	0.12	1	1.00	197.0	0.4	2.00	3,170.00	6.25	0.25	0.40	0.22	0.001	1.239	0.002	0.000	0.000	0.000
GI, leak checks	55% N2	0.12	1	3.00	498.1	3.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.448	8.142	0.001	0.101	0.001	0.026
EGT Indicators Totals						**98.8**							**6.536**	**295.502**	**0.527**	**1.357**	**0.040**	**0.599**
Test After Component Change - Oil System Component Tests																		
Low Oil Pressure Warning Switch																		
APU Use	On	0.06	1	1.00	197.0	0.2	2.00	3,170.00	6.25	0.25	0.40	0.22	0.000	0.619	0.001	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2,747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Close bleed valve	65% N2	0.06	1	0.25	586.8	0.1	117.24	2,878.24	0.48	20.83	0.40	8.89	0.017	0.419	0.000	0.003	0.000	0.001
Ground idle/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2,747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Oil Low Pressure Warning Switch Totals						**1.3**							**0.167**	**3.752**	**0.002**	**0.037**	**0.001**	**0.010**
Oil Tank Sight Glass																		
APU Use	On	0.06	1	1.00	197.0	0.2	2.00	3,170.00	6.25	0.25	0.40	0.22	0.000	0.619	0.001	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2,747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Close bleed valve	65% N2	0.06	1	0.25	586.8	0.1	117.24	2,878.24	0.48	20.83	0.40	8.89	0.017	0.419	0.000	0.003	0.000	0.001
Ground idle/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2,747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Oil Tank Sight Glass Totals						**1.3**							**0.167**	**3.752**	**0.002**	**0.037**	**0.001**	**0.010**
Oil Tank Filler Connection																		
APU Use	On	0.06	1	1.00	197.0	0.2	2.00	3,170.00	6.25	0.25	0.40	0.22	0.000	0.619	0.001	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2,747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Close bleed valve	65% N2	0.06	1	0.25	586.8	0.1	117.24	2,878.24	0.48	20.83	0.40	8.89	0.017	0.419	0.000	0.003	0.000	0.001
Ground idle/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2,747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Oil Tank Filler Connection Totals						**1.3**							**0.167**	**3.752**	**0.002**	**0.037**	**0.001**	**0.010**

Aircraft: T-45A/C Goshawk	Engine: F405-RR-401/-402						APU (GTS) Type: 096 Mk II (Saphir (10)											
Maintenance Operation and Engine Mode	Engine Power Setting[5,6]	No. of Maint. Test per AC per yr[7]	No. of Engines in Use[5,6,7]	Time-in-mode per Eng[5,6,7] (min)	Fuel Flow Rate per Engine[1] (lb/hr)	Fuel Used (lbs/AC/yr)[3]	Emission Indexes[1,2] (lbs/1,000 lbs fuel)						Air Emissions[4] (lbs /AC /yr)					
							CO	CO_2	NO_x	HC	SO_2	PM_{10}	CO	CO_2	NO_x	HC	SO_2	PM_{10}
Oil Pump																		
APU Use	On	0.06	1	1.00	197.0	0.2	2.00	3,170.00	6.25	0.25	0.40	0.22						
Main eng start/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2,747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Close bleed valve	65% N2	0.06	1	0.25	586.8	0.1	117.24	2,878.24	0.48	20.83	0.40	8.89	0.017	0.419	0.000	0.003	0.000	0.001
Ground idle/leak check	55% N2	0.06	1	1.00	498.1	0.5	151.21	2,747.37	0.27	34.02	0.40	8.94	0.075	1.357	0.000	0.017	0.000	0.004
Oil Pump Totals						**1.3**							**0.166**	**3.133**	**0.000**	**0.037**	**0.000**	**0.010**
Test After Component Change - Airborne Data Recording System Tests -401 Engine																		
Vibration Transducer/Charge Amplifier																		
APU Use	On	0.00	1	1.00	197.0	0.0	2.00	3,170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Main eng start	55% N2	0.00	1	1.00	498.1	0.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Close bleed valve	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground idle	55% N2	0.00	1	1.00	498.1	0.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	65% N2	0.00	1	2.00	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	70% N2	0.00	1	2.00	697.2	0.0	88.29	2,972.58	0.75	12.37	0.40	8.81	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	80% N2	0.00	1	2.00	1,154.6	0.0	34.25	3,106.69	1.86	2.85	0.40	8.44	0.000	0.000	0.000	0.000	0.000	0.000
Throttle up	95% N2	0.00	1	2.00	3,340.5	0.0	4.17	3,159.75	7.15	0.27	0.40	5.70	0.000	0.000	0.000	0.000	0.000	0.000
GI	55% N2	0.00	1	3.00	498.1	0.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Vibration Transducer/Charge Amplifier Totals						**0.0**							**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
P3 Pressure Transducer																		
APU Use	On	0.00	1	1.00	197.0	0.0	2.00	3,170.00	6.25	0.25	0.40	0.22	0.000	0.000	0.000	0.000	0.000	0.000
Main eng start/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
Close bleed valve	65% N2	0.00	1	0.25	586.8	0.0	117.24	2,878.24	0.48	20.83	0.40	8.89	0.000	0.000	0.000	0.000	0.000	0.000
Ground idle/leak check	55% N2	0.00	1	1.00	498.1	0.0	151.21	2,747.37	0.27	34.02	0.40	8.94	0.000	0.000	0.000	0.000	0.000	0.000
P3 Pressure Transducer Totals						**0.0**							**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Maintenance Fuel Usage and Test Emissions from a Single T-45 Aircraft per Year						**16,220.3**							**586.8**	**49,814.0**	**130.8**	**119.5**	**6.5**	**74.2**

Note:

1. Source for all non APU fuel flow and emission indexes: *F405-RR-401 Engine Emission Indexes Using JP-5* ;
   Aircraft Environmental Support Office; San Diego, CA., September 2010; AESO Memorandum Report No. 2006-03, Revision A.
2. Fuel flow and emission indexes are not available for the Turbomecca 096 Mk II (Saphir 10) Gas Turbine Starter (GTS). GTC36-200 data was substituted.
   The GTC36-200 APU fuel flow and emission index data is manufacturer information provided by the GTC36-200 Project Engineer. See AESO Report 2003-09.
3. Fuel used = fuel flow x time-in-mode / 60 x no. of engines in use x maint. test per AC per yr.
4. Emissions = fuel used / 1,000 x emission index.
5. Dry motoring, wet motoring, engine starting, engine shut down, ECATS, UNICATS, FADEC, SIFCU,
   ground run and test procedures are detailed in NAVAIRSYSCOM Technical Manual A1-T45AB-270-010 Chapter 71 *Power Plant.*
6. Water Wash, and Performance Recovery Wash procedures are detailed in NAVAIRSYSCOM Technical Manual A1-T45AC-270-020 Chapter 72 *Basic Engine* , Pages 27 and 28.
7. Run-up data provided by NAS Meridian maintenance personnel was for 84 T-45C aircraft.

F405-RR-401 Emission Indexes Using JP-5

Percent Core	Fuel Flow		Emission Index (lbs/1,000 lbs JP-5)				
rpm (%N2)	(lbs/hr)	CO	CO2	NOX	HC	SO2	PM10
55%	498.06	151.21	2,747.37	0.27	34.02	0.40	8.94
56%	499.91	150.37	2,750.88	0.27	33.65	0.40	8.94
57%	503.37	148.81	2,757.36	0.28	32.97	0.40	8.94
58%	508.39	146.58	2,766.49	0.29	32.01	0.40	8.94
59%	514.92	143.75	2,777.96	0.31	30.81	0.40	8.93
60%	522.97	140.38	2,791.46	0.33	29.42	0.40	8.93
61%	532.54	136.52	2,806.65	0.35	27.87	0.40	8.92
62%	543.65	132.22	2,823.22	0.38	26.20	0.40	8.92
63%	556.36	127.54	2,840.87	0.41	24.45	0.40	8.91
64%	570.71	122.53	2,859.30	0.45	22.65	0.40	8.90
65%	586.80	117.24	2,878.24	0.48	20.83	0.40	8.89
66%	604.71	111.72	2,897.44	0.53	19.03	0.40	8.88
67%	624.57	106.02	2,916.67	0.58	17.26	0.40	8.86
68%	646.50	100.18	2,935.72	0.63	15.55	0.40	8.85
69%	670.66	94.26	2,954.41	0.69	13.92	0.40	8.83
70%	697.22	88.29	2,972.58	0.75	12.37	0.40	8.81
71%	726.39	82.31	2,990.10	0.82	10.93	0.40	8.79
72%	758.39	76.37	3,006.85	0.90	9.60	0.40	8.77
73%	793.48	70.50	3,022.74	0.99	8.38	0.40	8.74
74%	831.95	64.74	3,037.72	1.08	7.27	0.40	8.71
75%	874.11	59.13	3,051.72	1.18	6.28	0.40	8.68
76%	920.34	53.69	3,064.72	1.29	5.39	0.40	8.64
77%	971.03	48.45	3,076.71	1.41	4.62	0.40	8.60
78%	1,026.63	43.45	3,087.69	1.55	3.94	0.40	8.56
79%	1,087.64	38.71	3,097.67	1.70	3.35	0.40	8.50
80%	1,154.62	34.25	3,106.69	1.86	2.85	0.40	8.44
81%	1,228.16	30.09	3,114.77	2.04	2.42	0.40	8.37
82%	1,308.92	26.24	3,121.96	2.23	2.06	0.40	8.30
83%	1,397.62	22.72	3,128.32	2.45	1.75	0.40	8.21
84%	1,495.03	19.54	3,133.88	2.68	1.49	0.40	8.11
85%	1,601.94	16.70	3,138.72	2.94	1.28	0.40	8.00
86%	1,719.20	14.20	3,142.89	3.23	1.10	0.40	7.87
87%	1,847.63	12.02	3,146.45	3.54	0.95	0.40	7.73
88%	1,988.05	10.17	3,149.46	3.88	0.81	0.40	7.56
89%	2,141.19	8.62	3,151.98	4.25	0.70	0.40	7.37
90%	2,307.65	7.36	3,154.06	4.65	0.60	0.40	7.16
91%	2,487.83	6.34	3,155.76	5.09	0.52	0.40	6.93
92%	2,681.81	5.55	3,157.13	5.56	0.44	0.40	6.66
93%	2,889.27	4.95	3,158.22	6.06	0.38	0.40	6.37
94%	3,109.33	4.50	3,159.08	6.59	0.32	0.40	6.05
95%	3,340.50	4.17	3,159.75	7.15	0.27	0.40	5.70
96%	3,580.53	3.92	3,160.26	7.73	0.23	0.40	5.32
97%	3,826.42	3.72	3,160.66	8.33	0.20	0.40	4.92
98%	4,074.39	3.56	3,160.98	8.93	0.18	0.40	4.50
99%	4,320.08	3.41	3,161.24	9.52	0.16	0.40	4.08
100%	4,558.80	3.27	3,161.46	10.10	0.15	0.40	3.65
101%	4,785.84	3.14	3,161.66	10.65	0.15	0.40	3.24
101.8%	4,996.98	3.00	3,161.84	11.16	0.15	0.40	2.84

Notes:

1. Fuel Flow, rpm, CO, CO2, NOX, and HC data are derived from Reference 1 - Alpha Gamma Report F405-RR-401 Engine Emission Test dated July 1995.
2. SO2 emission index of 0.40 lbs/1000 lbs is from Reference 2 - AESO Report 6-90.
3. PM10 emission index is derived from TF30-P-414 data from Reference 2 - AESO Report 6-90.
4. N2 is also referred to as NH, it is the core (not fan, i.e. N1 or NL) rpm.
5. 55%N2 is Ground Idle as per Reference 3 - NAVAIRSYSCOM Technical Manual Chapter 71 Power Plant, Navy Model T-45A and T-45C 163599 and Up - dated 15 May 2009.
6. Flight Idle corresponds to 75% N2 as stated in Reference 4 - Janes Aero Engines, Issue 25 dated 2009, page 242.
7. 100% N2 rpm is 15,512 rpm as stated in Reference 5 - A1-T45AB-NFM-000 NATOPS Flight Manual Navy Model T45A Before AFC 279 Aircraft - with Change 6, dated 15 March 2010.
8. 101.8% N2 is Max Rated Thrust (MRT).

T-45A/C with F405-RR-401/-402 Engine, Maintenance Tests

NEED:
Number of engine run-ups per aircraft per year
(or info to allow calculation on a "per-aircraft" basis)

Example 1: A pool of 31 aircraft gets about 80 Water Wash runs in a year.
80/31 equals 2.58 Water Washes per aircraft per year.

Example 2: A pool of 31 aircraft gets about 45 Performance Recovery Wash runs per year.
45/31 equals 1.45 Performance Recovery Washes per aircraft per year.

INSERT 84 Number of T-45 aircraft in pool	Approx. Minutes Per Run	INSERT Runs Per Year	Runs/ AC-yr
Desalination Compressor Washing (water wash)	14	160	1.9048
Performance Recovery Wash	35	20	0.2381
Engine Control Amplifier Test Set (ECATS) Run	100	156	1.8571
Adour engine control amplifier (ECA) and vibration test set (UNICATS) Run	97	75	0.8929
Ground Running Tests Using FADEC Test Set - F405-RR-402 Engine	52	200	2.3810
Engine Performance Adjustments (SIFCU and FCU) - F405-RR-401 Engine	22	75	0.8929
Oil Consumption Test Run	78	10	0.1190
Test After Component Change - Air System	7	50	0.5952
Test After Component Change - Engine Control Amplifier Test -401 Engine	26	156	1.8571
Test After Component Change - Fuel Metering Unit (FMU) Test -402 Engine	13		0.0000
Test After Component Change - Tailpipe Test	7	30	0.3571
Test After Component Change - Fuel System Component Tests		75	
Fuel Control Unit (FCU) change -401 eng	60	75	0.8929
Fuel LP Warning Switch Change -401 Engine	5	10	0.1190
HP Fuel Pump Change -401 Engine	59	75	0.8929
LP/HP Fuel Pump Change -402 Engine	37		0.0000
LP Fuel Pump Change -401 Engine	11	75	0.8929
Sub-idling Fuel Control Unit (SIFCU) Change -401 Engine	7	75	0.8929
Backup Fuel Control Unit (BUFCU) Change -401 Engine	10	75	0.8929
Differential Fuel Pressure Switch -401 Engine	3	20	0.2381
Engine Electronic Control (EEC) -402 Engine	36		0.0000
Dedicated Generator -402 Engine	36		0.0000
NH Speed Probe -402 Engine	3		0.0000
T3 Probe -402 Engine	3		0.0000
Wet Drains Line and Check Valve	1	5	0.0595
Test After Component Change - Indicating System Component Tests			
Fuel LP Warning Switch Change -401 Engine	2	5	0.0595
HP Shaft Tach Gen and rpm Indicators	21	5	0.0595
Oil Low Pressure Warning Switch	3	10	0.1190
T6/T2 Thermocouple Junction Box -401 Engine	7	10	0.1190
T6 Thermocouple Junction Box -402 Engine	21		0.0000
EGT Indicators	58	10	0.1190
Test After Component Change - Oil System Component Tests			
Low Oil Pressure Warning Switch	3	5	0.0595
Oil Tank Sight Glass	3	5	0.0595
Oil Tank Filler Connection	3	5	0.0595
Oil Pump	3	5	0.0595
Test After Component Change - Airborne Data Recording System Tests -401 Engine			
Vibration Transducer/Charge Amplifier	14		0.0000
P3 Pressure Transducer	3		0.0000

Emissions from one F405-RR-401 test cell run at NAS Meridian

Engine & Test	Time (mins)	Fuel (gals)	Fuel (lbs)	CO	Emissions (lbs) CO_2	NO_X	HC	SO_2	PM_{10}
Engine: F405-RR-401									
Performance Test	108.3	531.81	3,616.33	67.49	11,286.14	25.01	12.12	1.45	20.36

Note:

1. NAS Meridian performed 96 F405 test cell runs from Sept 2009 to Sept 2010.

Annual (FY2010) Emissions from F405-RR-401 test cell runs at NAS Meridian

Engine & Test	Time (mins)	Fuel (gals)	Fuel (lbs)	CO	Emissions (lbs) CO_2	NO_X	HC	SO_2	PM_{10}
Engine: F405-RR-401									
Performance Test	10,392.0	51,054.1	347,167.6	6,478.7	1,083,469.0	2,401.0	1,163.9	138.9	1,954.2

Engine: F405-RR-401

Test Power Setting	%N2	Time-in-Mode (mins)	Fuel Flow Rate (lb/hr)	Fuel Used (gals)	Fuel Used (lbs)	Emission Indexes (pounds per 1,000 pounds fuel) CO	CO_2	NO_X	HC	SO_2	PM_{10}	Emissions (lbs) CO	CO_2	NO_X	HC	SO_2	PM_{10}
Performance Curve																	
Dry Motor (Huffer)		2.00															
Wet Motor (Huffer)		2.00															
Dry Motor (Huffer)		2.00															
ECU Start - GI	55% N2	1.00	498.1	1.22	8.3	151.21	2,747.37	0.27	34.02	0.40	8.94	1.26	22.81	0.00	0.28	0.00	0.07
Close Bleed Valve	65% N2	0.25	586.8	0.36	2.4	117.24	2,878.24	0.48	20.83	0.40	8.89	0.29	7.04	0.00	0.05	0.00	0.02
Leak Check - GI	55% N2	3.00	498.1	3.66	24.9	151.21	2,747.37	0.27	34.02	0.40	8.94	3.77	68.42	0.01	0.85	0.01	0.22
ECU Start - GI	55% N2	2.00	498.1	2.44	16.6	151.21	2,747.37	0.27	34.02	0.40	8.94	2.51	45.62	0.00	0.56	0.01	0.15
Close Bleed Valve	65% N2	0.25	586.8	0.36	2.4	117.24	2,878.24	0.48	20.83	0.40	8.89	0.29	7.04	0.00	0.05	0.00	0.02
GI	55% N2	3.00	498.1	3.66	24.9	151.21	2,747.37	0.27	34.02	0.40	8.94	3.77	68.42	0.01	0.85	0.01	0.22
Slow Accel to Max	90% N2	0.25	2,307.7	1.41	9.6	7.36	3,154.06	4.65	0.60	0.40	7.16	0.07	30.33	0.04	0.01	0.00	0.07
Slow Accel to Max	102% N2	0.25	4,997.0	3.06	20.8	3.00	3,161.84	11.16	0.15	0.40	2.84	0.06	65.83	0.23	0.00	0.01	0.06
Scan 1 - GI	55% N2	3.00	498.1	3.66	24.9	151.21	2,747.37	0.27	34.02	0.40	8.94	3.77	68.42	0.01	0.85	0.01	0.22
Scan 2 - 75%NL	93% N2	3.00	2,889.3	21.24	144.5	4.95	3,158.22	6.06	0.38	0.40	6.37	0.72	456.25	0.88	0.05	0.06	0.92
Scan 3 - 90%NL	98% N2	3.00	4,074.4	29.96	203.7	3.56	3,160.98	8.93	0.18	0.40	4.50	0.73	643.95	1.82	0.04	0.08	0.92
Scan 4 - 100%NL	99% N2	3.00	4,320.1	31.77	216.0	3.41	3,161.24	9.52	0.16	0.40	4.08	0.74	682.84	2.06	0.03	0.09	0.88
Scan 5 - MaxNL	95% N2	3.00	3,340.5	24.56	167.0	4.17	3,159.75	7.15	0.27	0.40	5.70	0.70	527.76	1.19	0.05	0.07	0.95
Scan 6 - 95%NL	90% N2	3.00	2,307.7	16.97	115.4	7.36	3,154.06	4.65	0.60	0.40	7.16	0.85	363.93	0.54	0.07	0.05	0.83
Scan 7 - 85%NL	85% N2	3.00	1,601.9	11.78	80.1	16.70	3,138.72	2.94	1.28	0.40	8.00	1.34	251.40	0.24	0.10	0.03	0.64
Cool Down - GI	55% N2	2.00	498.1	2.44	16.6	151.21	2,747.37	0.27	34.02	0.40	8.94	2.51	45.62	0.00	0.56	0.01	0.15
ECU Start - GI	55% N2	1.00	498.1	1.22	8.3	151.21	2,747.37	0.27	34.02	0.40	8.94	1.26	22.81	0.00	0.28	0.00	0.07
Close Bleed Valve	65% N2	0.25	586.8	0.36	2.4	117.24	2,878.24	0.48	20.83	0.40	8.89	0.29	7.04	0.00	0.05	0.00	0.02
GI	55% N2	1.00	498.1	1.22	8.3	151.21	2,747.37	0.27	34.02	0.40	8.94	1.26	22.81	0.00	0.28	0.00	0.07
Block 3 Data																	
Scan 1 - GI	55% N2	3.00	498.1	3.66	24.9	151.21	2,747.37	0.27	34.02	0.40	8.94	3.77	68.42	0.01	0.85	0.01	0.22
Scan 2 - 75%NL	93% N2	3.00	2,889.3	21.24	144.5	4.95	3,158.22	6.06	0.38	0.40	6.37	0.72	456.25	0.88	0.05	0.06	0.92
Scan 3 - 90%NL	98% N2	3.00	4,074.4	29.96	203.7	3.56	3,160.98	8.93	0.18	0.40	4.50	0.73	643.95	1.82	0.04	0.08	0.92
Scan 4 - 100%NL	99% N2	3.00	4,320.1	31.77	216.0	3.41	3,161.24	9.52	0.16	0.40	4.08	0.74	682.84	2.06	0.03	0.09	0.88
Scan 5 - MaxNL	95% N2	3.00	3,340.5	24.56	167.0	4.17	3,159.75	7.15	0.27	0.40	5.70	0.70	527.76	1.19	0.05	0.07	0.95
Scan 6 - 95%NL	90% N2	3.00	2,307.7	16.97	115.4	7.36	3,154.06	4.65	0.60	0.40	7.16	0.85	363.93	0.54	0.07	0.05	0.83
Scan 7 - 85%NL	85% N2	3.00	1,601.9	11.78	80.1	16.70	3,138.72	2.94	1.28	0.40	8.00	1.34	251.40	0.24	0.10	0.03	0.64
Cool Down - GI	55% N2	2.00	498.1	2.44	16.6	151.21	2,747.37	0.27	34.02	0.40	8.94	2.51	45.62	0.00	0.56	0.01	0.15
ECU Start - GI	55% N2	1.00	498.1	1.22	8.3	151.21	2,747.37	0.27	34.02	0.40	8.94	1.26	22.81	0.00	0.28	0.00	0.07
Close Bleed Valve	65% N2	0.25	586.8	0.36	2.4	117.24	2,878.24	0.48	20.83	0.40	8.89	0.29	7.04	0.00	0.05	0.00	0.02
GI	55% N2	1.00	498.1	1.22	8.3	151.21	2,747.37	0.27	34.02	0.40	8.94	1.26	22.81	0.00	0.28	0.00	0.07
Block 4 Data																	
Scan 1 - GI	55% N2	3.00	498.1	3.66	24.9	151.21	2,747.37	0.27	34.02	0.40	8.94	3.77	68.42	0.01	0.85	0.01	0.22
Scan 2 - 75%NL	93% N2	3.00	2,889.3	21.24	144.5	4.95	3,158.22	6.06	0.38	0.40	6.37	0.72	456.25	0.88	0.05	0.06	0.92
Scan 3 - 90%NL	98% N2	3.00	4,074.4	29.96	203.7	3.56	3,160.98	8.93	0.18	0.40	4.50	0.73	643.95	1.82	0.04	0.08	0.92
Scan 4 - 100%NL	99% N2	3.00	4,320.1	31.77	216.0	3.41	3,161.24	9.52	0.16	0.40	4.08	0.74	682.84	2.06	0.03	0.09	0.88
Scan 5 - MaxNL	95% N2	3.00	3,340.5	24.56	167.0	4.17	3,159.75	7.15	0.27	0.40	5.70	0.70	527.76	1.19	0.05	0.07	0.95
Scan 6 - 95%NL	90% N2	3.00	2,307.7	16.97	115.4	7.36	3,154.06	4.65	0.60	0.40	7.16	0.85	363.93	0.54	0.07	0.05	0.83
Scan 7 - 85%NL	85% N2	3.00	1,601.9	11.78	80.1	16.70	3,138.72	2.94	1.28	0.40	8.00	1.34	251.40	0.24	0.10	0.03	0.64
Cool Down - GI	55% N2	2.00	498.1	2.44	16.6	151.21	2,747.37	0.27	34.02	0.40	8.94	2.51	45.62	0.00	0.56	0.01	0.15
ECU Start - GI	55% N2	2.00	498.1	2.44	16.6	151.21	2,747.37	0.27	34.02	0.40	8.94	2.51	45.62	0.00	0.56	0.01	0.15
Close Bleed Valve	65% N2	0.25	586.8	0.36	2.4	117.24	2,878.24	0.48	20.83	0.40	8.89	0.29	7.04	0.00	0.05	0.00	0.02
Stabilize at Idle	55% N2	2.00	498.1	2.44	16.6	151.21	2,747.37	0.27	34.02	0.40	8.94	2.51	45.62	0.00	0.56	0.01	0.15
Slam Accel to Max	102% N2	0.50	4,997.0	6.12	41.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.12	131.66	0.46	0.01	0.02	0.12
Slam Accel to Idle	55% N2	0.50	498.1	0.61	4.2	151.21	2,747.37	0.27	34.02	0.40	8.94	0.63	11.40	0.00	0.14	0.00	0.04
Slam Accel to Max	102% N2	0.50	4,997.0	6.12	41.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.12	131.66	0.46	0.01	0.02	0.12
Slam Accel to Idle	55% N2	0.50	498.1	0.61	4.2	151.21	2,747.37	0.27	34.02	0.40	8.94	0.63	11.40	0.00	0.14	0.00	0.04
Slam Accel to Max	102% N2	0.50	4,997.0	6.12	41.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.12	131.66	0.46	0.01	0.02	0.12
Slam Accel to Idle	55% N2	0.50	498.1	0.61	4.2	151.21	2,747.37	0.27	34.02	0.40	8.94	0.63	11.40	0.00	0.14	0.00	0.04
Stabilize at 74%	74% N2	1.00	831.9	2.04	13.9	64.74	3,037.72	1.08	7.27	0.40	8.71	0.90	42.12	0.01	0.10	0.01	0.12
Slam Accel to Max	102% N2	0.50	4,997.0	6.12	41.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.12	131.66	0.46	0.01	0.02	0.12
Slam Decel to 74%	74% N2	0.50	831.9	1.02	6.9	64.74	3,037.72	1.08	7.27	0.40	8.71	0.45	21.06	0.01	0.05	0.00	0.06
Slam Accel to Max	102% N2	0.50	4,997.0	6.12	41.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.12	131.66	0.46	0.01	0.02	0.12
Slam Decel to 74%	74% N2	0.50	831.9	1.02	6.9	64.74	3,037.72	1.08	7.27	0.40	8.71	0.45	21.06	0.01	0.05	0.00	0.06
Slam Accel to Max	102% N2	0.50	4,997.0	6.12	41.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.12	131.66	0.46	0.01	0.02	0.12
Slam Decel to 74%	74% N2	0.50	831.9	1.02	6.9	64.74	3,037.72	1.08	7.27	0.40	8.71	0.45	21.06	0.01	0.05	0.00	0.06
Stabilize at 87%	87% N2	1.00	1,847.6	4.53	30.8	12.02	3,146.45	3.54	0.95	0.40	7.73	0.37	96.89	0.11	0.03	0.01	0.24
Slam Accel to Max	102% N2	0.50	4,997.0	6.12	41.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.12	131.66	0.46	0.01	0.02	0.12
Slam Decel to 87%	87% N2	0.50	1,847.6	2.26	15.4	12.02	3,146.45	3.54	0.95	0.40	7.73	0.19	48.44	0.05	0.01	0.01	0.12
Slam Accel to Max	102% N2	0.50	4,997.0	6.12	41.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.12	131.66	0.46	0.01	0.02	0.12
Slam Decel to 87%	87% N2	0.50	1,847.6	2.26	15.4	12.02	3,146.45	3.54	0.95	0.40	7.73	0.19	48.44	0.05	0.01	0.01	0.12
Slam Accel to Max	102% N2	0.50	4,997.0	6.12	41.6	3.00	3,161.84	11.16	0.15	0.40	2.84	0.12	131.66	0.46	0.01	0.02	0.12
Slam Decel to 87%	87% N2	0.50	1,847.6	2.26	15.4	12.02	3,146.45	3.54	0.95	0.40	7.73	0.19	48.44	0.05	0.01	0.01	0.12
Final Leak Check - GI	55% N2	3.00	498.1	3.66	24.9	151.21	2,747.37	0.27	34.02	0.40	8.94	3.77	68.42	0.01	0.85	0.01	0.22
Cool Down - GI	55% N2	0.50	498.1	0.61	4.2	151.21	2,747.37	0.27	34.02	0.40	8.94	0.63	11.40	0.00	0.14	0.00	0.04
		108.25		**531.81**	**3,616.33**							**67.49**	**11,286.14**	**25.01**	**12.12**	**1.45**	**20.36**

Notes:
1. Fuel flows and emission indexes are from AESO Memorandum Report No. 2006-03 Revision A.
2. Power settings and Time-in-Mode values are from three sources: The faxed test cell run sheets from the Rolls-Royce Engine Service department at NAS Meridian, A1-F405B-750-000 Technical Manual - Intermediate Maintenance - Propulsion Unit Servicing Manual - Testing and Fault Diagnosis - Turbofan Engine Model F405-RR-401, and emails and phone cons with the Rolls-Royce Engine Service department at NAS Meridian.
3. GI is Ground Idle.

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APPENDIX G

CALCULATIONS TO SUPPORT THE NOISE ANALYSIS

Airspace Operations Data Request

Aircraft Type	Training Activity	Meridian 2 East MOA												
		Annual Sorties			Flight Profile			Altitude Distribution (in Percent)						
		Day (0700-2200)	Night (2200-0700)	Total	Typical/Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	8,000-9,000 ft above MSL	9,000-10,000 ft above MSL	10,000-12,000 ft above MSL	12,000-14,000 ft above MSL	14,000-16,000 ft above MSL	16,000-17,999 ft above MSL	Total
T-45	ACM	1500	0	1500	92 % RPM	350	0.7	5%	5%	10%	20%	40%	20%	100%
T-45	TAC FORM	700	0	600	90 % RPM	325	0.8	5%	5%	10%	20%	40%	20%	100%
T-45	BASIC/DIV FORM	600	0	600	85 % RPM	250	1	5%	5%	10%	60%	10%	10%	100%
T-45	CRUISE FORM	250	0	250	87 % RPM	300	0.9	5%	5%	10%	40%	20%	20%	100%
T-45	NFORM	274	26	300	85 % RPM	250	1	5%	5%	10%	60%	10%	10%	100%
T-45	BI	91	9	100	85 % RPM	250	0.6	5%	5%	10%	60%	10%	10%	100%
TOTAL		3415	35	3450										

Aircraft Type	Training Activity	Meridian 2 West MOA												
		Annual Sorties			Flight Profile			Altitude Distribution (in Percent)						
		Day (0700-2200)	Night (2200-0700)	Total	Typical/Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	8,000-9,000 ft above MSL	9,000-10,000 ft above MSL	10,000-12,000 ft above MSL	12,000-14,000 ft above MSL	14,000-16,000 ft above MSL	16,000-17,999 ft above MSL	Total
T-45	ACM	800	0	800	92 % RPM	350	0.7	5%	5%	10%	20%	40%	20%	100%
T-45	TAC FORM	300	0	300	90 % RPM	325	0.8	5%	5%	10%	20%	40%	20%	100%
T-45	BASIC/DIV FORM	200	0	200	85 % RPM	250	1	5%	5%	10%	60%	10%	10%	100%
T-45	CRUISE FORM	150	0	150	87 % RPM	300	0.9	5%	5%	10%	40%	20%	20%	100%
T-45	NFORM	42	8	50	85 % RPM	250	1	5%	5%	10%	60%	10%	10%	100%
T-45	BI	42	8	50	85 % RPM	250	0.6	5%	5%	10%	60%	10%	10%	100%
TOTAL		1534	16	1550										

Source: Still, Jonathan. 2009. Email Correspondence between Mr. Jonathan Still (Operations Officer, TW-1) and Ms. Tanya Perry (HDR|e²M) regarding the Meridian 2 MOA Airspace Data Collection (Excel File). 17 August 2009.

Notes:

1. Assumed 245 flying days (2010). Additional 25 days considered as aggregate of Sunday flying (largely ACM + instrument). Adjusted downward to 200 days of MOA usage to account for average weather cancellation and sortie availability.
2. Standard sortie percentages for ACM, all formation, and BI events was applied. Familiarization sorties were not considered due to absence of outlying field.

Key:
ACM = Air Combat Maneuvering
BASIC/DIV FORM = Basic/Division Formation
BI = Battlefield Interdiction
CRUISE FORM = Cruise Formation
NFORM = Night Formation
RPM = Revolutions Per Minute
TAC FORM = Tactical Formation

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