Final

ENVIRONMENTAL ASSESSMENT SEARCH AND RESCUE TRAINING

HH-60 AND HC-130 RESCUE SQUADRONS MOODY AFB, GEORGIA

United States Air Force
Headquarters Air Combat Command

December 1999

ACRONYMS AND ABBREVIATIONS

ACC	Air Combat Command
AFB	Air Force Base
AFI	Air Force Instruction
AFR	Air Force Range
AGL	above ground level
AP	Aquatic Preserve
AP-AR1	proposed Avon Park helicopter air refueling track
AP-AR2	alternative Avon Park helicopter air refueling track
AQCR	Air Quality Control Region
AR	air refueling
ARTCC	Air Route Traffic Control Center
ATC	air traffic control
BAM	Bird Avoidance Model
BASH	bird-aircraft strike hazard
BMDO	Ballistic Missile Defense Organization
CAA	Clean Air Act
CARL	Conservation and Recreational Lands
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMC	Center for Marine Conservation
CO	carbon monoxide
CSAR	combat search and rescue
CV	coefficient of variation
CWA	Clean Water Act
dB	decibel
dBA	A-weighted sound level
dB re 1 µPa	decibels reference 1 micropascal
DNL	day-night average sound level
DoD	Department of Defense
DOE	Department of Energy
DOT	U.S. Department of Transportation
EA	environmental assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FACSFAC	Fleet Area Control and Surveillance Facility
FCZMA	Florida Coastal Zone Management Act
FDEP	Florida Department of Environmental Protection
FDNR	Florida Department of Natural Resources
FGFC	Florida Game and Fresh Water Fish Commission
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FJSIM	Fuel Jettison Simulation
FNAI	Florida Natural Areas Inventory
FONSI	Finding of No Significant Impact
FS	Fighter Squadron
FS-AR1	proposed Fort Stewart helicopter air refueling track
FS-AR2	alternative Fort Stewart helicopter air refueling track
g	gram
GDNR	Georgia Department of Natural Resources
GMFMC	Gulf of Mexico Fisheries Management Council
GNHP	Georgia Natural Heritage Program
GSMFC	Gulf States Marine Fisheries Commission
HAP	hazardous air pollutant
HUD	U.S. Department of Housing and Urban Development
IFR	instrument flight rules
IR	instrument route
KIAS	knots indicated air speed
LATN	Low Altitude Tactical Navigation
Lmax	maximum sound level
m	meter
m^3	cubic meter
MAILS	Multiple Aircraft Instantaneous Line Source
ML	Martel Laboratories, Inc.
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MOA	military operations area
MR_NMAP	MOA and Range Noise Model
MSL	mean sea level
MTR	Military Training Route
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NEPA	National Environmental Policy Act
NM	nautical mile
NOAA	National Oceanographic and Atmospheric Administration
NO_2	nitrogen dioxide
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
NSWC	Naval Surface Warfare Center
NWR	National Wildlife Refuge
O_3	ozone
OCS	Outer Continental Shelf
OFW	Outstanding Florida Waters
OG	Operations Group
OSS	Operations Support Squadron
oz/ft^2	ounces per square foot
PAA	primary aircraft assigned
PAI	primary aircraft inventory
Pb	lead
% HA	percent highly annoyed
PM_{10}	particulate matter $\leq$ 10 micrometers in diameter
PSD	Prevention of Significant Deterioration
QDR	Quadrennial Defense Review
RCRA	Resource Conservation and Recovery Act
RNM	Rotocraft Noise Model
ROI	region of influence
RQS	Rescue Squadron
SEL	sound exposure level
SENEL	single event noise exposure level
SHCA	Strategic Habitat Conservation Area
SIP	State Implementation Plan
SO_2	sulfur dioxide
SRWMD	Suwannee River Water Management District
SULMA	Special Use Land Management Area
STSSN	Sea Turtle Stranding and Salvage Network
TFW	Tactical Fighter Wing
µg	micro-gram
$\mu g/m^3$	micro-gram per cubic meter
µPa	micropascal
USACOE	U.S. Army Corps of Engineers
USBC	U.S. Bureau of the Census
USFWS	U.S. Fish and Wildlife Service
USC	United States Code
USGS	U.S. Geological Survey
VFR	visual flight rules
VOC	volatile organic compound
VR	visual route
WG	Wing
WMA	Wildlife Management Area
WMD	Water Management District
WTA	water training area
WTA1	proposed water training area
WTA2	alternative water training area
WTA-AR1	proposed water training area helicopter air refueling track
WTA-AR2	alternative water training area helicopter air refueling track

FINAL
FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT
SEARCH AND RESCUE TRAINING
HH-60 AND HC-130 RESCUE SQUADRONS
MOODY AIR FORCE BASE, GEORGIA

Proposed Action: The United States Air Force (Air Force), Headquarters Air Combat Command proposes the following three actions which are being considered jointly: (1) establish a water training area (WTA) in the Gulf of Mexico for combat search and rescue (CSAR) training; (2) create three helicopter air refueling (AR) tracks for training and operational refueling with HC-130 aircraft; and (3) use an existing airfield in the vicinity of the WTA for helicopter crew swaps.

Enhanced training is necessary to maintain the CSAR capability of the 41st Rescue Squadron (41 RQS) and 71 RQS. Establishing a new WTA in the Gulf of Mexico would increase the efficiency of water-based CSAR training. The three AR tracks would enhance mission capability by allowing more efficient use of the WTA and existing training ranges. A landing area in close proximity to the WTA would maximize training opportunities for the 41 RQS by allowing two aircrews to train in the WTA without having to return to Moody AFB.

Alternatives to the Proposed Action: Alternatives to the proposed action that were carried forward for analysis include: (1) the WTA Alternative, under which the Air Force would establish a WTA in a different location in the Gulf of Mexico; (2) the Helicopter AR Track Alternatives, under which the Air Force would establish helicopter AR tracks at different locations but within the same general vicinity as the proposed helicopter AR tracks; (3) the Crew Swap Alternative, under which the Air Force would use a different airfield to support crew swaps; and (4) the No-Action Alternative, under which no new AR tracks or WTA would be established, and HH-60 aircrew swaps would not occur.

Summary of Environmental Effects: The environmental assessment (EA) provides an analysis of the potential environmental impacts resulting from implementation of the proposed action or alternatives. Eleven resource categories were evaluated: airspace, noise, waste management, safety, air quality, cultural resources, environmental justice, land use, recreation, terrestrial biological resources, and marine biological resources. Implementation of the proposed action or alternatives would not result in significant impacts to any resources.

No significant impacts to airspace use or general aviation would occur upon implementation of the proposed action or alternatives. The affected airspace consists of air traffic operating under visual flight rules (VFR). Under the proposed action or alternatives, aircraft would operate as VFR air traffic at or below 2,000 feet above ground level (AGL). No special use airspace (SUA) designation would be required for the WTA; however, SUA would be designated for the AR tracks and sortie-operations would be scheduled to avoid any airspace conflict. The addition of helicopter crew swaps would not significantly increase the level of activity currently experienced at either the proposed or alternative crew swap facility, Perry-Foley Airport and Cross City Airport, respectively.

Under the proposed action or alternatives, day-night average noise levels (DNL) beneath the affected airspace would range between 40 and 45 decibels. These levels are compatible with the current land uses and would not significantly affect cultural resources, land use, recreational and visual settings, terrestrial biological or marine biological resources.

Implementation of the proposed or alternative WTA would slightly increase the potential for bird-strikes. Due to the slow speeds of HH-60s and HC-130s, the low number of proposed annual sortie-operations, and implementation of Bird Aircraft Strike Hazard (BASH) reduction procedures, the proposed action would not pose a significant risk to aircrew safety or terrestrial biological resources. Due to the high reliability rate (90-95 percent) for the type of flares used in association with WTA activities and the large area in which flare drops would occur the likelihood of a person encountering an unexpended flare is very low and no significant safety mishaps would occur.

Under the proposed or alternative AR tracks, there would be an increase in sortie-operations in which fuel would be transferred and there is a remote possibility for a fuel spill. If this were to occur, approximately 13 gallons of fuel could reach the ground; however, it would be spread over a relatively large area. At the most concentrated point within this area, the maximum expected concentration of fuel striking the surface would only be about 2/10,000th of an ounce (1/10th of a drop) per square foot. Impacts of an accidental spill during refueling activities would not have significant impacts on safety, terrestrial biological, or marine biological resources.

Implementation of the proposed action or alternatives would result in an increase in mobile source emissions; however, they would not produce long-term air quality degradation. An air emissions conformity analysis determination is not required since this action would not exceed *de minimis* levels for National or Florida Ambient Air Quality Standards and would be implemented in areas that are classified as in attainment.

Training activities associated with the proposed action or alternatives would potentially affect some marine biological resources within the WTA. Use of sea dye packs and lightsticks may result in the incidental take of threatened and endangered sea turtles. Formal Endangered Species Act consultation with the National Marine Fisheries Service was completed and an incidental take permit obtained that addresses use of the proposed WTA. (The terms and conditions, and consultation-derived reasonable and prudent measures within the incidental take statement will be implemented.) Therefore, impacts to marine biological resources would not be significant.

Implementation of the proposed action or alternatives would not result in adverse impacts in any resource area that would, in turn, be expected to disproportionately affect minority and low-income communities or children.

The EA reviewed cumulative impacts from federal, state, and local projects which could result from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions. Review of potential environmental impacts of these programs, combined with the proposed action or alternatives, indicate that no significant cumulative impacts would occur from these actions.

Although no significant impacts were identified for any of the alternatives addressed in this EA, WTA1 (the preferred water training area alternative), WTA-AR2 (the alternative water training area helicopter AR track), and AP-AR2 (the alternative Avon Park helicopter AR track) are the environmentally preferred alternatives.

Findings: On the basis of the findings of the EA conducted in accordance with the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations, and Air Force Instruction (AFI) 32-7061, and after careful review of the potential impacts of the proposed action or alternatives, I conclude that implementation of the proposed action or alternatives would not have a significant impact on the quality of the human or natural environment or generate significant controversy in respect to the level of impacts. Therefore, issuance of a Finding of No Significant Impact (FONSI) is warranted, and an environmental impact statement (EIS) is not required.

Michael R Patrick — 30 Dec 99

MICHAEL R. PATRICK, Colonel, USAF — Date
Chairperson, ACC Environmental Leadership Board

EXECUTIVE SUMMARY

The United States Air Force (Air Force) has proposed three actions for the 41st Rescue Squadron (41 RQS) HH-60 helicopter and 71 RQS HC-130 fixed-wing aircraft stationed at Moody Air Force Base (AFB), Georgia. The first action would establish a water training area (WTA) in the Gulf of Mexico for combat search and rescue (CSAR) training. The second action would create three helicopter air refueling (AR) tracks in Georgia and Florida for training and AR operations. The third action would involve the use of an existing airfield for helicopter aircrew swaps to provide enhanced aircrew training capability in the WTA. The proposed action analyzed in this environmental assessment (EA) consists of the establishment of a WTA, the creation of three helicopter AR tracks, and the use of an existing airfield by Moody-based squadrons.

ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EA was prepared by the U.S. Air Force, Headquarters Air Combat Command in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA, and Air Force Instruction (AFI) 32-7061. The environmental impact analysis process for the proposed action and alternatives includes the following steps:

- Collect data for the existing environment and assess the potential impacts of the proposed action and alternatives;
- Prepare and distribute a Draft EA for public and agency review and comment;
- Prepare and distribute a Final EA, incorporating comments received on the Draft EA; and
- Publish a Finding of No Significant Impact (FONSI), if appropriate, which summarizes the results of the EA analysis.

DECISION TO BE MADE AND THE DECISION-MAKER

Based on the analysis documented in this EA, the Air Force will make one of the following decisions regarding the proposed establishment of a WTA, creation of three helicopter air refueling (AR) tracks, and use of an existing airfield to support CSAR training for Moody AFB aircrews:

1) choose the proposed action or one of the alternatives and sign a FONSI, allowing implementation of the proposed action or alternatives;
2) initiate the preparation of an environmental impact statement (EIS) if it is determined that significant impacts to the affected environment would occur upon implementation of the proposed action or alternatives; or
3) select the No-Action Alternative, in which no action would be implemented.

PURPOSE AND NEED FOR THE ACTION

The proposed action includes the establishment of a water operations training area in the Gulf of Mexico as well as three helicopter AR tracks in Georgia and Florida for Moody AFB squadron training operations. The proposed action is necessary to maintain the CSAR capability of the 41 RQS and 71 RQS. Establishing a new WTA in the Gulf of Mexico would increase the efficiency of water-based CSAR training. To further maximize training efficiency, the 41 RQS would require an onshore landing area in close proximity to the WTA for mid-sortie crew swaps. Use of this landing site would allow aircrews to maximize training opportunities in the WTA without having to fly back to Moody AFB. In addition, the helicopter AR tracks would allow access to, and increased use of training resources that would be far superior to those currently in use by the 41 RQS and 71 RQS.

The primary mission of the 41 RQS is to provide worldwide, deployable long-range combat search and rescue of downed aircrew members. Secondary missions include providing air rescue capability for Moody AFB and long-range civilian search and rescue capability for the region. These complex missions require distinct tasks and skills that involve frequent, repetitive training to maintain combat proficiency. The training areas currently in use by the 41 RQS and 71 RQS are inadequate for maintaining and enhancing skills in water operations and aerial refueling.

Successful combat employment of CSAR assets requires proficiency in numerous training events. Aerial refueling is critical to achieving the extended ranges required for combat rescue missions on today's battlefield. Water operations, whether conducted during day or night, are vital to both combat and peacetime rescue capabilities. Areas currently used to train for these missions do not meet all of the training requirements, most notably day and night water operations.

PROPOSED ACTION AND ALTERNATIVES

The proposed action analyzed in this EA would:

- establish a WTA in the Gulf of Mexico for CSAR training;
- create three helicopter AR tracks for training and operational helicopter aerial refueling with HC-130 aircraft; and
- use an existing airfield for helicopter aircrew swaps to provide enhanced aircrew training capability in the WTA.

The proposed action would not require any new facility construction or renovation, and there would be no requirement for additional aircraft or personnel for Moody-based squadrons. Alternatives to the proposed action include:

- The WTA alternative, under which the Air Force would establish a WTA in a different location in the Gulf of Mexico;

- The helicopter AR tracks alternatives, under which the Air Force would establish helicopter AR tracks at different locations but within the same general vicinity as the proposed helicopter AR tracks;
- The crew swap facility alternative, under which the Air Force would use a different airfield to support HH-60 aircrew swaps; and
- The No-Action Alternative, under which no new helicopter AR tracks or WTA would be established, and an existing airfield would not be used to support HH-60 aircrew swaps.

SUMMARY OF ENVIRONMENTAL IMPACTS

This EA provides an analysis of the potential environmental impacts resulting from implementation of the proposed action or alternatives. Eleven resource categories were thoroughly evaluated to identify potential environmental impacts. Table ES-1 summarizes the results of the analysis of the proposed action and alternatives for each resource category. As shown in the table, implementation of the proposed action, or implementation of any of the alternatives, would not result in significant impacts to any resource area. Overall, implementing the proposed action or alternatives would not substantially change baseline environmental conditions at Moody AFB or the region of influence associated with the proposed action and alternatives.

Training activities associated with the proposed action or alternatives would potentially affect some marine biological resources within the WTA. Use of sea dye packs and lightsticks may result in the incidental take of threatened and endangered sea turtles. Incidental take is defined as take that results from, but is not the purpose of, carrying out an otherwise lawful activity. To minimize chances of such take, formal Endangered Species Act consultation with the National Marine Fisheries Service was completed and an incidental take permit was obtained that addresses use of the proposed WTA. The terms and conditions, and consultation-derived reasonable and prudent measures within the incidental take statement will be implemented. These include the development of a program aimed at helping to understand the effects of marine debris ingestion by sea turtles and implementation of a program to monitor the effects of debris. Impacts to marine biological resources would not be significant.

Table ES-1. Potential Impacts of the Proposed Action or Alternatives

EA Section	*Resource*	*Proposed Action*	*WTA2 Alternative*	*FS-AR2 Alternative*	*AP-AR2 Alternative*	*Crew Swap Facility Alternative*	*No-Action Alternative*
4.1	Airspace	❍	❍	❍	❍	❍	❍
4.2	Noise	❍	❍	❍	❍	❍	❍
4.3	Waste Management	❍	❍	❍	❍	❍	❍
4.4	Safety	❍	❍	❍	❍	❍	❍
4.5	Air Quality	❍	❍	❍	❍	❍	❍
4.6	Cultural Resources	❍	❍	❍	❍	❍	❍
4.7	Environmental Justice	❍	❍	❍	❍	❍	❍
4.8	Land Use	❍	❍	❍	❍	❍	❍
4.9	Recreation	❍	❍	❍	❍	❍	❍
4.10	Terrestrial Biological Resources	❍	❍	❍	❍	❍	❍
4.11	Marine Biological Resources	❍	❍	❍	❍	❍	❍

Classifications:
❍ No significant impacts
● Significant impacts

FINAL
RESCUE SQUADRON TRAINING EA
MOODY AFB

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1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

This environmental assessment (EA) evaluates potential environmental impacts of proposed United States Air Force (Air Force) training operations for HH-60 helicopters and HC-130 fixed-wing aircraft stationed at Moody Air Force Base (AFB), Georgia. The proposed action would:

- establish a water training area (WTA) in the Gulf of Mexico for combat search and rescue (CSAR) training;
- create three helicopter air refueling (AR) tracks for training and operational helicopter aerial refueling with HC-130 aircraft; and
- involve the use of an existing airfield for helicopter aircrew swaps to provide enhanced aircrew training capability in the WTA.

This EA has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations of 1978, and Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process*.

1.2 BACKGROUND

Moody AFB is located in south-central Georgia on approximately 11,000 acres of federally owned land. The base is 10 miles northeast of the city of Valdosta in Lowndes and Lanier counties (Figure 1.2-1). The installation consists of the main base (5,039 acres), Grand Bay Range (5,874 acres), and the Grassy Pond Recreation Area "annex" (489 acres), located 25 miles southwest of the main base. Moody AFB is home to the 347th Wing (347 WG), which has four primary groups. The 347th Operations Group is the primary flying organization, with three tactical fighter squadrons (the 68th Fighter Squadron [68 FS], 69 FS, and 70 FS) and two CSAR squadrons (the 41st Rescue Squadron [41 RQS] and 71 RQS). The other three groups are the 347th Logistics Group, 347th Support Group, and 347th Medical Group.

Numerous force structure changes have occurred over the years at Moody AFB. The 347th Tactical Fighter Wing (347 TFW) was activated as the host unit at Moody AFB in 1975, relocating from Korat Royal Thai AFB, Thailand. In that same year the 347 TFW began to transition from T-37 and T-38 aircraft to the F-4E. In 1987, the 347 TFW began the conversion from F-4s to the F-16 Fighting Falcon. Two years later, the unit transitioned from the F-16 A/B to the F-16C/D. In 1991 the 347 TFW lost the "Tactical" designation and became the 347 FW. The unit was redesignated the 347 WG in 1994, one of three composite wings in the Air Force.

In 1996, a decision was made to move two CSAR squadrons of six HH-60 helicopters (41 RQS) and nine HC-130 air refueling aircraft (71 RQS) from Patrick AFB, Florida to Moody AFB. This realignment of geographically separated units reduced manpower requirements, placed the relocated units under a single commander, and improved deployability in support of the Air Combat Command (ACC) mission.

Figure

1.2-1 Location Map Moody Air Force Base

In September 1998, the 41 RQS was assigned additional aircraft (bringing the Primary Aircraft Assigned [PAA] total to 14 HH-60s) in accordance with Quadrennial Defense Review (QDR) recommendations. The purpose of this action was to consolidate overhead, produce manpower savings, make more efficient use of support equipment, and provide a viable CSAR squadron structure in the U.S. while supporting expeditionary operations outside the continental U.S. (CONUS).

The 71 RQS has maintained a PAA of nine HC-130s. 71 RQS aircrews and pararescue personnel are trained in search and rescue operations, as well as air refueling to support the 41 RQS mission. The primary mission of both the 41 RQS and 71 RQS is to provide support for long-range rescue operations. In addition, these squadrons provide peacetime search and rescue capability under the national search and rescue plan.

1.2.1 Airspace Training Areas for Moody AFB

The 41 RQS and 71 RQS currently conduct overwater CSAR training in Warning Area 158E (W-158E), located over the Atlantic Ocean off the coast of northeast Florida. "Wet" air refueling (a refueling operation in which fuel is transferred) between HC-130s and HH-60s are conducted within Moody 2 South Military Operations Area (MOA), Moody 2 North MOA, and W-158E (Figure 1.2-2). "Dry" air refueling training (a refueling operation in which no fuel is transferred between aircraft) can occur anywhere within the Low Altitude Tactical Navigation (LATN) area used by Moody AFB aircrews.

Land-based CSAR training by the 41 RQS currently occurs within the Moody LATN area at six established landing zones (LZs), varying between 1.6 and 3.5 acres in size, and four limited-use hover areas. Four of the established LZs are located in Echols County, Georgia, on property leased from private landowners. Another LZ is located at Hazlehurst Airport and one is located at Valdosta Regional Airport (see Figure 1.2-1 for the regional location of these airports). The four limited-use hover areas are located on the Grand Bay Range (R-3008). In addition, the 71 RQS trains in Moody 1 and 3 MOAs, instrument route (IR)-015, and visual route (VR)-1065 (see Figure 1.2-2). Both Avon Park Air Force Range (AFR) (R-2901) in Florida and Fort Stewart (R-3005) in Georgia are also used by Moody AFB squadrons for land-based CSAR training.

1.3 PURPOSE AND NEED

Enhanced training is necessary to maintain the CSAR capability of the 41 RQS and 71 RQS. The proposed action would best meet that need by establishing a water operations training area in the Gulf of Mexico, three helicopter AR tracks in Georgia and Florida, and using an existing airfield in Florida for crew swaps. Establishing a new WTA in the Gulf of Mexico would increase the efficiency of water-based CSAR training. To further maximize training efficiency, the 41 RQS would require an onshore landing area in close proximity to the WTA for mid-sortie crew swaps. Use of this landing site would allow aircrews to maximize training opportunities in the WTA without having to fly back to Moody AFB. In addition, the helicopter AR tracks would allow access to, and increased use of training resources that would be far superior to those currently in use by the 41 RQS and 71 RQS.

The primary mission of the 41 RQS is to provide worldwide, deployable long-range combat search and rescue of downed aircrew members. Secondary missions include providing air rescue capability for Moody AFB and long-range civilian search and rescue capability for the region. These complex missions require distinct tasks and skills that involve frequent, repetitive training to maintain combat proficiency.

Figure

1.2-2 Affected Airspace

The training areas currently in use by the 41 RQS and 71 RQS are inadequate for maintaining and enhancing skills in water operations and aerial refueling.

Successful combat employment of CSAR assets requires proficiency in numerous events. Aerial refueling is critical to achieving the extended ranges required for survivable combat rescue missions on today's battlefield. Water operations, whether conducted during day or night, are vital to both combat and peacetime rescue capability due to the vast expanse of water and guaranteed U.S. control of any contested area. Areas currently used to train for these missions do not meet all of the training requirements, most notably day and night water operations. The recurring training requirements for these events are contained in AFI 11-2HH-60, Volume 1, Chapter 5.

AFI 11-2HH-60, Volume 1 states "units will design training programs to achieve the highest degree of combat readiness consistent with flight safety and resource availability." Both Fort Stewart and Avon Park AFR, as well as the Gulf of Mexico, are available resources offering training opportunities far superior to those currently in use. Limitations of current training areas frequently leave the 41 RQS with numerous aircrew members non-current, as well as non-proficient, in one or more required events. These limitations are discussed below.

1.3.1 Water Operations

The EA completed for the beddown of the 41 RQS at Moody AFB (Air Force 1998) discussed water operations, both day and after dark, in W-470 and W-158E. W-470 is rarely available due to its control and heavy usage by other agencies, rendering it virtually unusable as a training area. W-158E is usable, but training time is reduced to the bare minimum due to refueling concerns. This, combined with its control and use by other agencies, prevents continuity and decreases efficiency in training.

1.3.2 Aerial Refueling

In-flight refueling of HH-60s is critical to long-range rescue capability. There is currently a single AR track used for wet refueling training by Moody AFB search and rescue assets. The track is located 15 miles east of the base in Moody 2 MOA. Its proximity to the base, combined with the track's north/south orientation, does not extend the range of the HH-60s enough to reach suitable training areas. Because of this, the 41 RQS cannot train at Avon Park AFR without landing for ground refueling, and training time at Fort Stewart cannot be maximized. Training time at W-158E is also severely limited and mid-sortie crew swaps are usually not feasible for training in the warning area. There are no other published AR tracks within 200 nautical miles (NM) of Moody AFB. Establishment of additional AR tracks is critical to allow the 41 RQS to reach training areas that meet the needs of a worldwide deployable combat rescue squadron.

Establishment of a water training area in the Gulf of Mexico and three helicopter aerial refueling tracks, combined with access to the superior training resources available at Fort Stewart and Avon Park AFR, would greatly improve the combat capability of the 41 RQS and 71 RQS.

1.4 REGULATORY COMPLIANCE

A variety of laws, regulations, executive orders (EOs), and other types of requirements apply to federal actions and form the basis of the analysis presented in this EA. NEPA requires federal agencies to consider potential environmental consequences of proposed actions and enhance the environment through well-informed federal decisions. CEQ was established under NEPA to implement and oversee federal policy in this process. Other related federal regulations include AFI 32-7061, *The Environmental Impact Analysis Process*; EO 11514, *Protection and Enhancement of Environmental Quality;* and the Endangered Species Act.

1.5 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

This EA assesses the impacts of the proposed action and alternatives, including the No-Action Alternative, on potentially affected environmental resource areas. Chapter 1.0 (this chapter) provides background information relevant to the proposed action and discusses its purpose and need. Chapter 2.0 describes the proposed action and alternatives. Chapter 3.0 describes baseline conditions (i.e., the conditions against which the potential impacts of the proposed action or alternatives are measured) for each of the resource areas, while Chapter 4.0 describes environmental impacts of the proposed action or alternatives on these resources. Chapter 5.0 includes an analysis of potential cumulative impacts of the proposed action, and Chapter 6.0 describes any irreversible or irretrievable (permanent) commitments of resources. Chapter 7.0 contains references used for the preparation of this EA, including correspondence. Chapter 8.0 lists persons contacted and Chapter 9.0 lists the preparers.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The United States Air Force (Air Force) proposes to establish a water training area (WTA) in the northeast Gulf of Mexico and three helicopter air refueling (AR) tracks over the central gulf coast of Florida, the Florida panhandle, and southeast Georgia (Figure 2.1-1). These would be used for training aircrews and associated personnel of the 41st Rescue Squadron (41 RQS) and 71 RQS based at Moody Air Force Base (AFB), Georgia. In addition, proposed helicopter training activities would involve the use of the Perry-Foley Airport in Perry, Florida, for a crew swap and then return to the WTA for training. The proposed action is discussed in Section 2.1 (pages 2-1 through 2-12). Alternatives to the proposed action, including the No-Action Alternative, are described in Section 2.2 (pages 2-13 through 2-21). The proposed action would not require any new facility construction or renovation, and there would be no requirement for additional aircraft or personnel for either the 41 RQS or the 71 RQS.

2.1.1 Aircraft Operations Terminology

Throughout this environmental assessment (EA), three terms are used to describe aircraft operations: *sortie, airfield operation*, and *sortie-operation*. Each has a distinct meaning and commonly applies to a specific set of aircraft activities in particular airspace areas.

- A *sortie* consists of a single military aircraft flight from takeoff through landing.
- An *airfield operation* represents the single movement or individual portion of a flight in the base airfield airspace environment, such as one departure or one arrival. Aircraft practicing multiple approaches (i.e., closed patterns) accounts for two operations – one arrival, one departure. Thus, a single sortie generates a minimum of two airfield operations (takeoff and landing).
- A *sortie-operation* is defined as the use of one airspace unit (such as a military operations area [MOA], restricted area, or helicopter AR track) by one aircraft. Sortie-operation applies to flight activities outside the airfield airspace environment. Each time a single aircraft conducting a sortie flies in a different airspace unit, one sortie-operation is counted for that unit.

Since there would be no change to airfield operations resulting from implementation of the proposed action or alternatives, the following discussion focuses on sortie-operations in potentially affected airspace.

2.1.2 Affected Airspace

The 41 RQS and 71 RQS currently conduct sortie-operations within Moody 2 North MOA, Moody 2 South MOA, a Low Altitude Tactical Navigation (LATN) area, Grand Bay Range (Restricted Area 3008 [R-3008]), Avon Park Air Force Range (AFR) in Florida, and Warning Area W-158E (refer to Figure 1.2-2). The 41 RQS also conducts air-to-ground training at Fort Stewart (R-3005) in Georgia and the Avon Park AFR in Florida. In addition, the 71 RQS uses Moody 1 MOA, Moody 3 MOA, instrument

Figure

2.1-1 Proposed Action

route (IR)-015, visual route (VR)-1065, and Warning Area 470A (W-470A) (refer to Figure 1.2-2). Current annual airspace use is summarized in Table 2.1-1.

Table 2.1-1. Current Annual Airspace Use for the 41 RQS and 71 RQS

	Annual Scheduled Sortie-Operations	
Airspace Unit	*41 RQS (HH-60)*	*71 RQS (HC-130)*
Moody 1 MOA	0	8
Moody 2 (N/S) MOA	302	513
Moody 3 MOA	0	36
Moody LATN Area	1140	575
Grand Bay Range (R-3008)	266	510
W-158E	400	24
Fort Stewart (R-3005)	12	0
Avon Park AFR (R-2901)	12	75
IR-015	0	6
VR-1065	0	4
W-470A	0	10

Source: Air Force 1999a.

Implementing combat search and rescue (CSAR) training operations in a new WTA located in the Gulf of Mexico would reduce the number of HH-60 and HC-130 sortie-operations in W-158E. Establishing new helicopter AR tracks would result in more efficient use of Fort Stewart and Avon Park AFR, with enhanced capability to fulfill exercise flight profiles. Aircrews would be able to reach Avon Park AFR with adequate time for quality training and then return to Moody AFB without the need to stop for time-consuming ground refueling. The average time for training activities at Avon Park AFR and Fort Stewart would be approximately 40 minutes. Training would consist of defensive maneuvers while practicing simulated search and rescue operations to locate downed aircrew members in hostile environments.

2.1.3 Selection Criteria

A number of selection criteria were applied to identify reasonable WTA, helicopter AR track, and crew swap facility alternatives to carry forward for analysis in the EA. For the WTA, the following criteria were used to assess alternatives that meet the purpose and need for the proposed action:

- The WTA must be located in close proximity to Moody AFB to allow for efficient transit time and to maximize overwater training time.
- The size of the WTA must allow simultaneous operations by two helicopters at two different locations, with proper deconfliction for safety purposes.
- The shape of the WTA must allow aircraft operations to be flown in any direction due to requirements to fly water patterns into the wind.
- The WTA must be sufficiently dark (i.e., the area must not have excessive illumination) in order to train for operations after dark.
- The WTA must be located a sufficient distance (1 NM minimum) from shore to prevent pilots from using the shoreline as a navigational aid.

For helicopter AR track alternatives, the following criteria were applied:

- The helicopter AR track must be located over areas with low population density and a minimum number of potentially sensitive receptors.
- The helicopter AR track must be located to minimize conflicts with civil, commercial, or other military flight operations.
- The helicopter AR track must be oriented to maximize training efficiency and minimize transit time from Moody AFB to the proposed WTA, Fort Stewart, and Avon Park AFR.

For crew swap facility alternatives, the following criteria were used:

- The landing area must be onshore and located within close proximity to the proposed WTA.
- The airfield must be capable of accommodating helicopter operations.
- Airfield operators must allow use of the airfield for HH-60 landings and takeoffs.
- The landing site should be located in an area of low population density to minimize potential noise impacts.

Sections 2.1.4 through 2.2.3 describe the proposed action and alternatives that were found to meet the identified selection criteria and were therefore carried forward for analysis within this EA.

2.1.4 Proposed Water Training Area (WTA1)

Under the proposed action, a WTA approximately 175 square nautical miles (NM) in size would be established in the Gulf of Mexico off the coast of northern Florida (Figure 2.1-2). 41 RQS and 71 RQS aircrews would use WTA1 for CSAR training. The closest point of approach to land would be 4 NM. While CSAR regulations specify that overwater training must take place at least 100 yards offshore, training benefits are maximized at farther distances where pilots cannot use landmarks for visual orientation. Approximately one-quarter of the proposed WTA would be located within the southern portion of the Moody LATN area. Both HH-60 and HC-130 operations in the WTA would be conducted at altitudes of 500 feet above mean sea level (MSL) and below.

2.1.4.1 PROPOSED 41 RQS WTA OPERATIONS

41 RQS operations would consist of helicopters flying to the WTA and performing search and rescue training operations over a specific location within the WTA. Proposed use of the WTA by HH-60 aircrews would be an average of 9, 1-hour sortie-operations per week (approximately 37 per month, or 449 per year). Approximately 242 annual WTA sortie-operations would be after dark. While daytime training may involve the use of either one or two helicopters, flight operations after dark require the use of two helicopters to maximize flight safety. The helicopters would transit to the WTA from Moody AFB at 500 feet above ground level (AGL) within the Moody LATN area. A LATN area covers large areas of uncontrolled airspace and facilitates operational flexibility (flight patterns are not confined to narrow flight corridors and direction of flight is not restricted). Once within WTA boundaries, the helicopters would operate between 10 and 200 feet MSL during the entire search and rescue training operation. While a typical HH-60 sortie-operation would consist of a helicopter entering the WTA and dropping to 100 feet MSL, an HH-60 would conduct search and rescue operations at varying altitudes during the maximum

Figure

2.1-2 Proposed Water Training Area (WTA1)

sortie-operation time of 1 hour. The helicopter would spend approximately 5 minutes at 10 feet MSL, 15 minutes at 30 to 50 feet MSL, and the remainder (40 minutes) at 150 feet MSL. Flares would be dropped during CSAR training exercises in the WTA. Smoke from the flares would be used to check wind direction. Daytime CSAR training in the proposed WTA would involve the use of sea dye markers dropped from the helicopter to mark the location of a survivor. The markers would also provide a navigational aid for the helicopter aircrew.

Since HH-60 aircrews would train with night-vision goggles after dark, WTA training operations would also involve the use of lightsticks. Lightsticks would be dropped from the helicopter to monitor the survivor's position relative to the helicopter. Lightsticks would be used instead of flares because flares can blind pilots who are using night-vision goggles, and flares also mark for the enemy both the survivor's and the rescuer's location in a hostile environment. Proposed use of flares, sea dye markers, and lightsticks is summarized in Section 2.1.4.4. A description of these items is provided in Section 3.3.1.1.

During some of the training operations, pararescuers would jump out of the helicopter to perform simulated search and rescue operations; the pararescuers would be dropped at an altitude of approximately 10 feet MSL. Personnel drops and pickups associated with pararescue training operations would be practiced using rope, rappel, and ladders while the helicopter hovers at 15 to 50 feet MSL. In all circumstances, HH-60 aircrews would attempt to avoid boats and other watercraft by a minimum of 1 NM. In addition, aircrews would make every reasonable effort to avoid contact or interaction with marine fauna in the WTA.

2.1.4.2 PROPOSED WTA CREW SWAP FACILITY

Approximately 69 annual HH-60 day sortie-operations and 104 annual after dark sortie-operations would involve a mid-sortie crew swap. The swap would involve landing the HH-60s at the same time, and being on the ground for approximately 5 to 10 minutes so that the pilots could switch positions (for example, a pilot riding in the back of the helicopter could move into the front seat). This would allow for a timely return to the WTA for training by another pilot without having to fly back to Moody AFB. To facilitate the transfer of mid-sortie crew swaps, a suitable landing area would be needed in close proximity to the WTA. Due to its close location relative to the proposed WTA and capability to support helicopter landings and takeoffs, Perry-Foley Airport in Perry, Florida has been identified as the proposed site for crew swaps (see Figure 2.1-1). Other than the helicopter landing and taking off at the airfield, no ground facilities at Perry-Foley Airport would be used. There would be no construction activities or other surface disturbances. Aircraft maintenance and ground refueling would continue to be conducted at Moody AFB.

2.1.4.3 PROPOSED 71 RQS WTA OPERATIONS

The 71 RQS would also use the WTA for performing search and rescue training operations. Proposed use of the WTA by HC-130s is estimated at 2 sortie-operations a week (8 per month, or approximately 100 per year). All HC-130 sorties would be performed during the day; no operations after dark are planned. A typical HC-130 sortie-operation within the WTA would consist of one aircraft operating between 150 and 500 feet MSL for approximately 30 minutes. After initial entrance into the WTA, a surveillance circle would be flown at 300 to 500 feet MSL to check for vessels operating in the area. Once a clear area is identified, one flare would be dropped to mark the position of a “survivor.” Subsequent drops of smaller flares would then be conducted to simulate the dropping of survivor kits to the person being rescued. The flares are typically dropped at altitudes of 250 to 350 feet MSL. Sea dye markers would also be used to serve as navigational aids during the search and rescue training operations. Pararescuers would not be dropped from the HC-130 aircraft.

2.1.4.4 PROPOSED WTA SEA DYE, FLARE, AND LIGHTSTICK USE

Both 41 RQS and 71 RQS WTA operations would involve the use of sea dye and two types of flares, known as the MK6 and MK25, as marine location markers. During night operations, the 41 RQS would also use lightsticks. These markers are described in more detail in Sections 3.3 (Affected Environment, Waste Management) and 4.3 (Environmental Consequences, Waste Management). Estimated annual usage rates for these items are shown in Table 2.1-2.

Table 2.1-2. Annual Lightstick, Flare, and Sea Dye Usage in the Proposed WTA

		Flares		
	Lightsticks	*MK25*	*MK6*	*Sea Dye Markers*
41 RQS	11,006	173	172	690
71 RQS	NA	1606	594	500
Total	11,006	2,545		1,190

Source: Air Force 1999a.

Since lightsticks float and they are not biodegradable, every practicable effort would be made to retrieve them at the completion of CSAR training operations in the WTA. While in the water and prior to being retrieved by the HH-60 helicopter, the pararescuers would attempt to recover any lightsticks within the immediate vicinity.

2.1.5 Helicopter AR Tracks

Three helicopter AR tracks would be established if the proposed action were implemented (see Figure 2.1-1). The helicopter AR tracks would be 1,000 to 4,000 feet AGL and would be bi-directional (i.e., aircraft would enter from either end of the track). The tracks would range from approximately 25 to 37 NM long and would be 4 NM wide on either side of the track centerline (i.e., the total width would equal 8 NM). The helicopter AR tracks would be used for air refueling training consisting of a combination of dry and wet hookups. Refueling operations would take place at 2,000 feet AGL except when limited by weather conditions, such as low clouds, in which case the aircraft would drop to altitudes between 1,000 and 1,500 feet AGL. Since all refueling operations are performed under visual flight rules (VFR) and require at least 1 mile of visibility, refueling would not take place when visibility is limited.

HC-130 and HH-60 refueling operations would occur for a maximum of 1 hour on any one track, with 5 to 6 dry hookups and 1 to 2 wet hookups per hour. Refueling operations would consist of an HH-60 approaching an HC-130 approximately 300 feet below the aircraft (typically at 1,700 feet AGL), and climbing to the same altitude (2,000 feet AGL) as the HC-130 when cleared in to refuel. Once the HH-60 and HC-130 are hooked up, fuel would pass from the HC-130 to the helicopter during an approximate 2.5-minute period. An estimated 70 percent of the refueling sorties would involve two helicopters (the second helicopter would follow, keeping out of the way until its turn to refuel). Consequently, 70 percent of the refueling sorties would involve 5 to 10 minutes of refueling time (typically 2.5 minutes per helicopter). The remainder of the time spent along the track would be used to perform additional dry hookups to meet training requirements. The proposed helicopter AR tracks would be used for limited air refueling of other helicopters by the HC-130s. Table 2.1-3 shows the proposed annual number of wet and dry sortie-operations per helicopter AR track.

Table 2.1-3. Annual Refueling Operations on Proposed Helicopter AR Tracks

Proposed Helicopter AR Track	*Total HH-60 Sortie-Operations[1]*	*Total HC-130 Sortie-Operations[1]*	*Number of "Wet" Sortie-Operations[1]*
Fort Stewart Helicopter AR Track	92	54	28
WTA Helicopter AR Track	243	143	24
Avon Park Helicopter AR Track	31	18	31

Note: [1] During one HC-130 sortie-operation, two HH-60s can be refueled.
Source: Air Force 1999a.

2.1.5.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

FS-AR1 would be located northeast of Moody AFB, halfway between Fort Stewart and Moody AFB over portions of Appling, Bacon, and Coffee counties, Georgia (Figure 2.1-3). The Fort Stewart helicopter AR track would be used for approximately 92 annual HH-60 sortie-operations and 54 annual HC-130 sortie-operations. It would provide the 41 RQS and 71 RQS opportunities to satisfy their air refueling training requirements and to support HH-60 flight and CSAR training operations at Fort Stewart.

2.1.5.2 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

WTA-AR1 would be located above Madison and Taylor counties in northern Florida (Figure 2.1-4). The WTA helicopter AR track would be used for approximately 243 annual HH-60 sortie-operations and 143 annual HC-130 sortie-operations. In addition to providing refueling training opportunities, WTA-AR1 would allow for additional training time in the WTA.

2.1.5.3 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

AP-AR1 would be located offshore of Citrus County in northern Florida (Figure 2.1-5), and would be used for approximately 31 annual HH-60 sortie-operations and 18 annual HC-130 sortie-operations. In addition to satisfying refueling training requirements, the Avon Park helicopter AR track would allow HH-60 helicopters to train at Avon Park AFR with adequate training flight time without having to fly extended distances to land and refuel. Refueling could be accomplished either going to Avon Park AFR or on the return flight to Moody AFB from Avon Park AFR.

2.1.5.4 SUMMARY OF PROPOSED OPERATIONS

Estimated weekly and annual use of proposed airspace by the 41 RQS and 71 RQS is summarized in Table 2.1-4. Sortie-operations and flight profiles (average minutes in airspace, average power settings,

Figure

2.1-3 Proposed Fort Stewart Helicopter AR Track (FS-AR1)

Figure

2.1-4 Proposed Water Training Area Helicopter AR Track (WTA-AR1)

Figure

2.1-5 Proposed Avon Park Helicopter AR Track (AP-AR1)

average knots indicated airspeed [KIAS], and altitude profile in feet above ground/water level) for HH-60s and HC-130s within the affected airspace are presented in Tables 2.1-5 and 2.1-6, respectively. The proposed annual airspace utilization is summarized in Table 2.1-7.

Table 2.1-4. Use of Proposed Airspace by the 41 RQS and 71 RQS

Airspace	*Sortie-Operations (Week/Year)*	
	HH-60	*HC-130*
Water Training Area	9.0/449	2.0/100
Fort Stewart Helicopter AR Track	1.8/92	1.1/54
WTA Helicopter AR Track	4.9/243	2.9/143
Avon Park Helicopter AR Track	0.6/31	0.4/18

Source: Air Force 1999a.

Table 2.1-5. HH-60 Flight Profiles and Annual Sortie-Operations within Proposed Airspace

Flight Profiles	*Water Training Area*	*Fort Stewart Helicopter AR Track*	*WTA Helicopter AR Track*	*Avon Park Helicopter AR Track*
Annual Sortie-Operations	449	92	243	31
Avg. Minutes/Sortie-Operation	60	60	60	60
Avg. % Power (RPM)	60	60	60	60
Avg. KIAS	90	115	115	115
% of Time at Altitudes (feet AGL)				
10 – 29	8	-	-	-
30 – 49	25	-	-	-
50 – 149	67	-	-	-
150 – 299	0	-	-	-
300 – 999	-	-	-	-
1,000 – 1,999	-	5	5	5
2,000 – 4,000	-	95	95	95

Source: Air Force 1999a.
RPM = Revolutions per minute.

Table 2.1-6. HC-130 Flight Profiles and Annual Sortie-Operations within Proposed Airspace

Flight Profiles	*Water Training Area*	*Fort Stewart Helicopter AR Track*	*WTA Helicopter AR Track*	*Avon Park Helicopter AR Track*
Annual Sortie-Operations	100	54	143	18
Avg. Minutes/Sortie-Operation	30	60	60	60
Average % Power (RPM)	45	45	45	45
Average KIAS	125	115	115	115
% of Time at Altitudes (ft AGL/MSL)				
10 – 29	-	-	-	-
30 – 49	-	-	-	-
50 – 99	-	-	-	-
100 – 499	100	-	-	-
500 – 999	-	-	-	-
1,000 – 1,999	-	5	5	5
2,000 – 5,000	-	95	95	95

Source: Air Force 1999a.
RPM = Revolutions per minute

2.2 ALTERNATIVES

In compliance with the National Environmental Policy Act (NEPA) and Air Force Instruction (AFI) 32-7061, which implements the NEPA process, the Air Force must consider reasonable alternatives to the proposed action. Only those alternatives determined reasonable relative to their ability to fulfill the need for the action warrant detailed analysis. Alternatives carried forward for analysis in this EA are shown in Figure 2.2-1.

2.2.1 Water Training Area Alternative (WTA2)

Under this alternative, the Air Force would establish a water training area in a different location in the Gulf of Mexico near the northern Florida coastline (Figure 2.2-2). WTA2 would be located within the existing Moody LATN boundary, with the northern boundary of WTA2 approximately 1 NM from the coastline (see Figure 2.2-1). It would be smaller than the proposed WTA (121 square NM versus 175 square NM) and training would be more constrained due to the smaller size. As originally configured, portions of WTA2 would lie within the offshore boundaries of the St. Marks National Wildlife Refuge (NWR). However, during the analysis process conducted for this EA, it was determined that proposed CSAR operations would not be compatible with the refuge's existing management practices. Consequently, the 10.6 square NM of WTA2 that encompass the NWR (see Figure 2.2-2) would not be used for training activities, and WTA2 was reconfigured such that the northern boundary parallels, but does not overlap the St. Marks NWR. The deletion of this portion of WTA2 results in a total training area of approximately 110 square NM. The analysis of potential impacts included in the EA addresses the reconfigured WTA2. The number of sortie-operations would be the same as for the proposed action.

Table 2.1-7. Current and Proposed Annual Use of Airspace by the 41 RQS and 71 RQS

Airspace Unit	*Current Sortie-Operations*		*Changes in Sortie-Operations*[1]		*Resulting Sortie-Operations*[2]	
	41 RQS	*71 RQS*	*41 RQS*	*71 RQS*	*41 RQS*	*71 RQS*
Moody 1 MOA	0	8	0	0	0	8
Moody 2 (N/S) MOA	302	513	0	0	302	513
Moody 3 MOA	0	36	0	0	0	36
Grand Bay Range (R-3008)	266	510	-83	-83	183	427
W-158E	400	24	-200	0	200	24
Moody LATN Area	1,140	575	0	0	1,140	575
Fort Stewart (R-3005)	12	0	71	0	83	0
Avon Park AFR (R-2901)	12	75	16	0	28	75
IR-015	0	6	0	0	0	6
VR-1065	0	4	0	0	0	4
W-470A	0	10	0	0	0	10
Proposed WTA	-	-	449	143	449	143
Proposed Fort Stewart Helicopter AR Track	-	-	92	54	92	54
Proposed WTA Helicopter AR Track	-	-	243	100	243	100
Proposed Avon Park Helicopter AR Track	-	-	31	18	31	18

Notes: [1] Changes in annual use of airspace units upon implementation of the proposed action.
[2] Number of sortie-operations for each airspace unit after implementation of the proposed action.
Source: Air Force 1999a.

2.2.2 Helicopter AR Track Alternatives

2.2.2.1 FORT STEWART HELICOPTER AR TRACK ALTERNATIVE (FS-AR2)

FS-AR2 would be located northeast of Moody AFB halfway between Fort Stewart and Moody AFB (see Figure 2.2-1) over portions of Appling, Bacon, Atkinson, and Ware counties, Georgia. Running southwest to northeast (Figure 2.2-3), FS-AR2 would be oriented at an approximate 45-degree angle compared to FS-AR1. This alternative helicopter AR track would offer the same capability for refueling and access to Fort Stewart as FS-AR1. The number of sortie-operations would be the same as for the proposed action.

2.2.2.2 WATER TRAINING AREA HELICOPTER AR TRACK ALTERNATIVE (WTA-AR2)

WTA-AR2 would be oriented in an east-west direction compared to the proposed track, parallel to Interstate 10 (I-10) in northern Florida (Figure 2.2-4). While it would provide helicopter AR capability, its orientation would preclude a direct flight path into the WTA. The number of sortie-operations would be the same as for the proposed action.

Figure

2.2-1 Alternatives

Figure

2.2-2 Alternative Water Training Area (WTA2)

Figure

2.2-3 Alternative Fort Stewart Helicopter AR Track (FS-AR2)

Figure

2.2-4 Alternative Water Training Area Helicopter AR Track (WTA-AR2)

Figure

2.2-5 Alternative Avon Park Helicopter AR Track (AP-AR2)

2.2.2.3 Avon Park AR Track Alternative (AP-AR2)

AP-AR2 would be situated approximately 10 NM offshore from the north-central Florida coastline (Figure 2.2-5). It would be located farther offshore compared to AP-AR1. Air refueling and access to the Avon Park AFR would be accomplished without having to land and refuel. The number of sortie-operations would be the same as for the proposed action.

2.2.3 Crew Swap Facility Alternative

In order to facilitate the transfer of mid-sortie crew swaps, the Cross City Airport located in Dixie County, Florida, would be used as an alternative location (see Figure 2.2-1). This airport lies just outside of the southern tip of the Moody LATN area and is farther from either WTA1 or WTA2 compared to the Perry-Foley Airport, requiring longer transit time between crew swaps. The number of airport operations would be the same as for the proposed action.

2.2.4 No-Action Alternative

Under the No-Action Alternative, no new WTA or helicopter AR tracks would be established. Perry-Foley Airport would not be used as a helicopter-landing site to facilitate mid-sortie crew swaps, and there would be no change in the number of sortie-operations in the airspace currently used by the 41 RQS and 71 RQS. Moody AFB's CSAR squadrons would not increase training efficiency through increased training operations at Fort Stewart and Avon Park AFR. Dry refueling training would continue at current levels, and there would be no approved helicopter AR tracks that could be used by CSAR squadron aircrews for wet refueling. Aircrews would not be able to meet minimum training requirements and pilot proficiency training would continue to be inadequate. Crew proficiency in combat employment of the HH-60 is already low due to a lack of experience in all crew positions. This is at a time when these crews are deployed to an increasing number of worldwide locations to support combat operations. The recent combat rescue missions in the former Yugoslavia, both of which met resistance, are examples of situations these crews may find themselves facing in the future. The continued lack of realistic training in dealing with such situations may soon put mission success and crew survivability in jeopardy.

2.2.5 Alternatives Considered but Not Carried Forward

The Air Force considered several alternatives to the proposed action. Each alternative was evaluated based on its ability to meet the identified selection criteria (see Section 2.1.3). The following sections describe alternatives considered but eliminated from further analysis due to their inability to meet one or more of the selection criteria.

2.2.5.1 Deployment

Under this alternative, the aircraft and pilots would deploy to another location, such as Nellis AFB, NV, to conduct training. This alternative was eliminated from further analysis because a large percentage of allocated flying hours would be spent flying en route to the deployed location, eliminating the reinforcement of repetitive, daily training in low-level tactical flying and aerial refueling. Also, deploying to conduct such training would incur large temporary duty costs. Lastly, this option would increase the time spent away from home by aircrews who already exceed the ACC target for maximum number of temporary duty days per year.

increase the time spent away from home by aircrews who already exceed the ACC target for maximum number of temporary duty days per year.

2.2.5.2 INLAND FRESHWATER AREAS

Under this alternative, a WTA would be established over inland freshwater bodies. This alternative was eliminated from further analysis because lakes and other inland freshwater bodies in the region do not provide a large enough area to enable training with no land references for navigation. In addition, these areas are not dark enough to facilitate effective training with night-vision goggles. Most of these areas are also frequently used for recreational purposes, and CSAR training would potentially create conflicts with the general public.

2.2.5.3 WARNING AREA W-470A

Under this alternative, overwater training would occur within existing Warning Area W-470A in the Gulf of Mexico. This alternative was eliminated because of high use and conflicts with clearance and scheduling through Eglin AFB due to higher priority users for jet fighter training.

2.2.5.4 TYNDALL AFB MOA

Under this alternative, the WTA would underlie existing airspace (Tyndall G MOA) scheduled by Tyndall AFB. This alternative was eliminated because of conflicts over use of the airspace with users who have higher priority status. In addition, this area is located closer to public beaches and recreation areas.

2.2.5.5 OVERLAND AVON PARK HELICOPTER AR TRACK

A proposed helicopter AR track located overland in central Florida was eliminated from further consideration due to its location relative to areas with high population concentrations. In addition, use of this track for helicopter refueling operations would be constrained due to conflicts with other aviation activities in the area.

2.2.5.6 FORT STEWART HELICOPTER AR TRACKS

Several Fort Stewart helicopter AR track alternatives were considered but not carried forward. These tracks were located and oriented such that cost-effective refueling operations and training efficiency could not be maximized. In addition, these tracks were situated above areas with higher population density and sensitive resources.

2.2.5.7 CREW SWAP FACILITIES

Several small civil and general aviation airports along the northwest Florida coastline were evaluated for their suitability as crew swap facilities. Most of these airports were not close enough to the proposed WTA to allow efficient crew-swap operations and maximize training efficiency. Others were not suitable for accommodating military aircraft operations, or were located in areas of potentially sensitive noise-receptors.

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3.0 AFFECTED ENVIRONMENT

This chapter describes the existing conditions for resources potentially affected by the proposed action and alternatives described in Chapter 2.0. Analysis of the affected environment provides a framework for understanding the direct, indirect, and cumulative effects of the proposed actions and alternatives.

In the environmental impact analysis process (EIAP), the expected geographic scope of potential impacts, known as the region of influence (ROI), is defined. The ROI for the proposed and alternative water training areas and helicopter air refueling (AR) routes would include areas in the Gulf of Mexico, southeast Georgia, and northern Florida. Because implementation of the proposed action and alternatives would occur off base in these areas, potential impacts at Moody Air Force Base (AFB) were not assessed. In addition, impacts at Fort Stewart, Georgia, and Avon Park Air Force Range (AFR), Florida, were also not addressed since neither facility would experience any measurable change to existing conditions resulting from implementation of the proposed action or alternatives. Proposed training operations at Fort Stewart and Avon Park AFR would constitute only a small proportion of the total activity at these facilities. HH-60 operations within these areas would be short-term and they would be counted as “transient aircraft” during their temporary use of either Fort Stewart or Avon Park AFR. This level of proposed search and rescue training operations would not result in any increases in environmental impacts beyond those already experienced at these ranges.

Under the National Environmental Policy Act (NEPA), the analysis of environmental conditions should address only those resources with the potential to be affected by the proposed action or alternatives; locations and resources with no potential to be affected need not be analyzed. Based upon examination of the potential environmental effects of direct and indirect actions, the U.S. Air Force (Air Force) determined that the following resource areas were likely to have a potential for impact and needed to be analyzed in detail: airspace, noise, waste management, safety, air quality, cultural resources, environmental justice, land use, recreation, terrestrial biological resources (including freshwater resources), and marine biological resources. The following sections present definitions of each resource, a description of the associated ROI that may be affected, and current conditions within the ROI.

3.1 AIRSPACE

The Federal Aviation Administration (FAA) has the overall responsibility for managing airspace through a system of flight rules and regulations, airspace management actions, and air traffic control (ATC) procedures. The FAA accomplishes this through close coordination with state aviation and airport planners, military airspace managers, and other entities to determine how airspace can be used most effectively to serve all interests.

There are two categories of airspace or airspace areas: regulatory and non-regulatory. Within these two categories, further classifications include the FAA designation of four types of airspace above the U.S.: controlled, uncontrolled, special use, and other. The categories and types of airspace are dictated by the complexity or density of aircraft movements, the nature of the operations conducted within the airspace, the level of safety required, and national and public interest in the airspace. The affected environment for the proposed action and alternatives includes controlled, uncontrolled and special use airspace. These form the ROI encompassing the proposed water training area (WTA) and helicopter AR tracks for aircrew training flights in southern Georgia and northern Florida. Affected airspace is shown in Figures 3.1-1a through c.

Controlled Airspace

Controlled airspace is a generic term that encompasses the different classifications of airspace (Class A, B, C, D, and E airspace and defines dimensions within which ATC service is provided for both instrument flight rules (IFR) and visual flight rules (VFR) flights (FAA 1994). All military and civilian aircraft are subject to Federal Aviation Regulations (FARs).

Controlled airspace is also categorized by ATC service provided to aircraft operating VFR and IFR. VFR aircraft fly below 18,000 feet above mean sea level (MSL) using visual references such as towns, highways, and railroads as means of navigation. VFR pilots may also follow federal airways at altitudes not used by aircraft on instrument flight. VFR operations rely heavily on “see-and-avoid” flight that requires pilots to be visually alert for and maintain safe distances from other aircraft, populated areas, obstacles, or clouds. Most other air traffic, including air passenger carriers, business aircraft, and military aircraft, operate under IFR that require pilots to be trained and appropriately certified in instrument navigational procedures and ATC clearance requirements that provide separation between all aircraft operating under IFR. The respective procedures established under VFR and IFR for airspace use and flight operations help segregate aircraft operating under each set of rules. Military pilots train in both VFR and IFR conditions.

Class A Airspace

Class A airspace includes all flight levels or operating altitudes from 18,000 feet MSL up to and including 60,000 feet MSL. Formerly referred to as a Positive Control Area, Class A airspace is dominated by commercial aircraft using routes between 18,000 and 45,000 feet MSL.

Class B Airspace

Class B airspace typically comprises layers of airspace, stacked one upon another, extending from the surface up to 10,000 feet MSL surrounding the nation’s busiest airports. To operate in Class B airspace, pilots must contact appropriate controlling authorities and receive clearance to enter the airspace. Additionally, aircraft operating within Class B airspace must be equipped with specialized electronics which allows ATC to accurately track aircraft speed, altitude, and position. Class B airspace is typically associated with major metropolitan airports such as Tampa International Airport.

Class C Airspace

Airspace designated as Class C can generally be described as controlled airspace that extends from the surface up to 4,000 feet above ground level (AGL) above the airport elevation. Class C airspace is designated and implemented to provide additional control into and out of primary airports where aircraft operations are periodically at high density levels such as Savannah International Airport or Tallahassee Regional Airport. All aircraft operating within Class C airspace are required to maintain two-way radio communication with local ATC entities.

Figure

3.1-1a Ranges/Restricted Areas and MOA Airspace in the Region of Influence

Figure

3.1-1b MTRs in the Region of Influence

Figure

3.1-1c Victor Routes in the Region of Influence

Class D Airspace

Class D airspace consists of airspace from the surface to 2,500 above ground level (AGL) around airports with an operational control tower. All aircraft operating within Class D airspace must be in two-way radio communications with the ATC facility. The airspace in the immediate vicinity of Valdosta Regional Airport is an example of Class D airspace.

Class E Airspace

Class E airspace can be described as general controlled airspace. If the airspace is not Class A, B, C, or D, and is controlled airspace, it is designated as Class E. Included in Class E airspace are Federal Airways (Victor Routes) that extend upward from 700 or 1,200 feet AGL to transition from the terminal or en route environment (refer to Figure 3.1-1c). Class E airspace does not include airspace at or above 18,000 feet MSL. These airways frequently intersect approach and departure paths from both military and civilian airfields.

Special Use Airspace

Special use airspace consists of airspace within which specific activities must be confined, or where limitations are imposed on aircraft not participating in those activities. With the exception of Controlled Firing Areas, special use airspace is depicted on aeronautical charts. These charts include hours of operation, altitudes, and the agency controlling the airspace. All special use airspace descriptions are contained in FAA Order 7400.8E and published in the *Department of Defense Flight Information Publication AP/1A (Special Use Airspace North and South America)* and *AP/1B (Area Planning Military Training Routes North and South America).*

Helicopter AR tracks are considered special use airspace that are designated by number and contain an entry point, control point, navigation checkpoints, and exit point. They are defined by a centerline encompassed by the complete width of a defined corridor. Military planners try to align routes so that disturbances to people, property, and other potentially sensitive land areas are minimized. In addition, individual bases that control and schedule helicopter AR tracks commonly define other avoidance areas where appropriate.

Uncontrolled Airspace

Uncontrolled airspace is not subject to the same restrictions that apply to controlled airspace. Limits of uncontrolled airspace typically extend from the ground surface to 700 feet AGL in urban areas and from the ground surface to 1,200 feet AGL in rural areas. Uncontrolled airspace can extend above these altitudes to as high as 14,500 MSL if no other types of controlled airspace have been assigned. ATC does not have the authority to exercise control over aircraft operations within uncontrolled airspace. Primary users of uncontrolled airspace are general aviation aircraft operating in accordance with VFR.

Airspace associated with low-speed and low altitude training conducted by military aircrews is commonly identified as a Low Altitude Training Navigation (LATN) area. Altitudes within the Moody LATN area are limited to between 100 feet and 1,500 feet AGL, with airspeed restrictions not to exceed 250 knots indicated airspeed (KIAS). A LATN area covers large areas of uncontrolled airspace and facilitates operational flexibility (flight patterns are not confined to narrow flight corridors and direction of flight is not restricted). The purpose of LATN areas is to conduct random VFR low-altitude navigation training.

Military aircraft are required to follow all existing FARs while flying within a LATN area. Other nonparticipating civil and military aircraft may fly within a LATN area, but are required to maintain visual separation from other aircraft in visual meteorological conditions. Both military and civil pilots are responsible "to see and avoid" each other while operating in a LATN area. The FAA does not consider a LATN area to be special use airspace; therefore, formal airspace designation in accordance with FAA Handbook 7400.2 is not required. For the same reason, LATN areas are not included on FAA charts, or publications.

The Moody LATN area encompasses more than 85,000 square miles and is defined by the coordinates 34˚ 20' North / 83˚ 12' West, 30˚ 57' North / 79˚ 20' West, 29˚ 38' North / 83˚ 12' West, and 30˚ 57' North / 87˚ 04' West. This LATN area generally covers portions of southeastern Alabama, northern Florida, most of the state of Georgia, and a small area of southern South Carolina (refer to Figure 1.2-2).

3.1.1 Water Training Areas

Airspace located off the coast of Florida's Big Bend area is under the control of the Jacksonville Air Route Traffic Control Center (ARTCC). Low altitude activities in the area are also coordinated with the Tallahassee Approach Control located at the Tallahassee Regional Airport about 35 NM north of the proposed water training area (WTA1). The airspace consists of Class E controlled airspace extending from the surface upward to 18,000 feet MSL. Class E airspace represents the larger area in which ATC radar services are provided to base air traffic as well as to other pilots (military and civilian) transiting the area. General aviation pilots fly VFR through this area using the coastline as a navigational aid as well as IFR flights on federal airways ("V" and "J" routes). Special use airspace is located to the south and west of WTA1 over the Gulf of Mexico, including Warning Area 470 (W-470). This warning area is used for air-to-air combat training and for test and evaluation of weapons systems. Due to the high volume of military traffic in this area, civilian aircraft traffic is curtailed west of WTA1. WTA1 would require no special use airspace designation since activities would be at low altitudes and low airspeeds (below 2,000 feet AGL and slower than 250 knots) in accordance with FAA Handbook 7400.2.

3.1.1.1 PROPOSED WATER TRAINING AREA (WTA1)

There are two low-level Victor Routes overlying WTA1: V521 runs northwest to southeast and V97 runs north to south. There are also two Jet Routes that provide high altitude airways for northbound and southbound air traffic. J41 crosses over WTA1 and J73 is located to the east. Three military training routes (MTRs) lie to the north and east of WTA1. Instrument Route 015 (IR-015) is scheduled by the 347th Operations Support Squadron (347 OSS) at Moody AFB, and has a published altitude of 500-1,000 feet AGL. IR-019 runs northwest to southeast adjacent to the eastern edge of WTA1 and is scheduled by Naval Air Station (NAS) Jacksonville, Florida. This IR is assigned an altitude block of 4,000 to 7,000 feet AGL. Visual Route 1002 (VR-1002) lies to the north of WTA1 with an altitude structure of 200-1,500 feet AGL and is also scheduled by NAS Jacksonville. The Tyndall G Military Operations Area (Tyndall G MOA) is located approximately 23 NM to the west of WTA1 with an altitude structure of 1,000 feet AGL up to but not including 18,000 feet MSL. The southern boundary of the Moody LATN area is located just north of WTA1.

The airspace surrounding the region has one scheduled commercial air service airport, Tallahassee Regional Airport, approximately 35 NM to the north of the proposed WTA. There are two general aviation airports used by civilian pilots, Perry-Foley Airport and Cross City Airport, within approximately 40 NM to the east and south.

3.1.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

WTA2 would be located to the north of WTA1 closer to the coast. Its nearest point would be within approximately 25 NM of both the Tallahassee Regional Airport and Perry-Foley Airport. V521, V97, J41, and J73 cross over WTA2. IR-015 runs east to west along the northern boundary, and IR-019 crosses the eastern boundary. IR-019 would cross WTA2 on its northern boundary and VR-1002 would cross the southern corner. WTA2 would be located entirely within the Moody LATN area.

3.1.2 Fort Stewart Helicopter AR Tracks

Airspace within the areas of the proposed and alternative Fort Stewart helicopter AR tracks contains both uncontrolled and controlled airspace. Both tracks would be located within the Moody LATN area over a primarily rural area in east-central Georgia. The Savannah International Airport is the closest commercial air service airport, approximately 70 NM to the northeast. There are small general aviation airfields in the area with local VFR traffic. Hazlehurst, Baxley Municipal, Douglas Municipal, and Waycross-Ware County airports are all within 30 NM of the proposed and alternative Fort Stewart helicopter AR tracks. To the east is the Quick Thrust MOA, which incorporates Gator 1 MOA and Restricted Areas R-3007 (Townsend Air-to-Ground Gunnery Range) and R-3005 (Fort Stewart).

3.1.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

The FS-AR1 centerline would be located between 29˚ 05’ North / 83˚ 00’ West to 28˚ 30’ North / 82˚ 45’ West with 4 NM of protected airspace on either side of centerline. There are four Jet Routes located above FS-AR1: J75, J53, J85, and J45. These routes provide high altitude north-south airways along the east coast. There are also five low altitude Victor Routes adjacent to and crossing over FS-AR1: V362, V51, V243, V578, and V157. These routes provide airway traffic for primary north-south travel. There are three MTRs within 20 NM of FS-AR1. VR-094 is located to the west of centerline with an altitude block of 100 to 3,000 feet MSL and is scheduled and operated by the 20 OSS at Shaw AFB in South Carolina. IR-018 (block altitude 5,000 to 7,000 feet MSL scheduled by Fleet Area Control and Surveillance Facility (FACSFAC), NAS Jacksonville, Florida) and IR-023 (block altitude 100 feet to 4,000 feet MSL or as assigned, scheduled by Cherry Point Marine Corps Air Station, North Carolina) are located to the east of FS-AR1. The Moody 2 North MOA is located to the west and the Quick Thrust MOA is located within 10 NM of FS-AR1. Hazlehurst (one of 10 established landing zone (LZ) training areas), Baxley Municipal, Douglas Municipal, and Waycross-Ware County airports (used primarily for VFR traffic) are all within 35 NM of FS-AR1.

3.1.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

FS-AR2 would be located on an east-west axis in the same area as FS-AR1 and cross the proposed FS-AR1. The same four Jet Routes and five Victor Routes would be adjacent to, or would cross over FS-AR2. The three MTRs are also within 25 NM of the proposed AR track (10-15 NM), and the Quick Thrust MOA is at the eastern end point of FS-AR2. The Moody 2 North MOA is located on the western edge of FS-AR2.

3.1.3 Water Training Area Helicopter AR Tracks

The airspace surrounding the proposed and alternative WTA helicopter AR tracks, WTA-AR1, and WTA-AR2, is controlled by Jacksonville ARTCC in coordination with Tallahassee Approach Control.

The airspace consists of Class E controlled airspace extending from the surface upward to 18,000 feet MSL. General aviation pilots fly VFR through this area using the coastline as a navigational aid and also fly IFR flights on federal airways ("V" and "J" routes). Several small general aviation VFR airports are located within 50 NM. Apalachicola Municipal, Carrabelle-Thompson, Cairo-Grady County, Thomasville Municipal, Perry-Foley, Suwannee County, Cross City, Tallahassee Commercial, and Quincy airports are county or municipal airfields that generate local VFR traffic in the surrounding areas. There are two private airfields (White Farms and Cannon Creek) also located within 50 NM. Tallahassee Regional (with a 10 NM circle of Class C airspace) is located approximately 30 NM west of WTA-AR1, and Valdosta Regional (with a 5 NM circle of Class D airspace) is located approximately 35 NM northeast of WTA-AR1. Both of these airports are sized to accommodate commercial air traffic. The airspace in this area has moderate to high congestion with general aviation aircraft paralleling Interstate 10 (used by small VFR aircraft for navigation). WTA-AR1 and WTA-AR2 are located within the Moody LATN area.

3.1.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

The WTA-AR1 centerline would be located between 30˚ 30' North / 83˚ 35' West to 30˚ 04' North / 83˚ 50' West with 4 NM of protected airspace on either side of centerline. There are five Jet Routes that cross over or are adjacent to WTA-AR1: J2, J91, J151, J20, and J3. All of these high altitude airways are major northwest to southeast routes for commercial and civilian aircraft. There are five low-level Victor Routes that cross over or are adjacent to WTA-AR1: V537, V35/159, V7/295, V198, and V97. These low-level airways provide east-west and north-south travel in northern Florida. Two MTRs cross to the south and west of WTA-AR1. IR-015 is located approximately 10 NM to the west with a block altitude of 500 to 7,000 feet MSL or as assigned by ATC and is operated and scheduled by the 347 OSS at Moody AFB. IR-019 is located to the south with a block altitude of 4,000 to 7,000 feet MSL and is operated and scheduled by FACSFAC, NAS Jacksonville. Live Oak MOA is located approximately 13 NM east of WTA-AR1. Two VR routes (VR-1001 and VR-1002) are located north of WTA-AR1 at 200-1,500 feet AGL and are scheduled and operated by FACSFAC, NAS Jacksonville.

3.1.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

The airspace associated with WTA-AR2 is similar to WTA-AR1. There are also five Jet Routes that cross over or are adjacent to WTA-AR2: J2, J91, J151, J20, and J3. All of these high altitude airways are major northwest to southeast routes for commercial and civilian aircraft. There are five low-level Victor Routes that cross over or are adjacent to WTA-AR2: V537, V35/159, V7/295, V198, and V97. These low-level airways provide east-west and north-south travel in northern Florida. Two MTRs cross to the south and west of the WTA-AR2. IR-015 is located approximately 10 NM to the west with a block altitude of 500 to 7,000 feet MSL or as assigned by ATC and is operated and scheduled by the 347 OSS at Moody AFB. IR-019 is located to the south with a block altitude of 4,000 to 7,000 feet MSL and is operated and scheduled by FACSFAC, NAS Jacksonville. Live Oak MOA is located approximately 13 NM east of WTA-AR1. Two VR routes (VR-1001 and VR-1002) are located north of WTA-AR2 at 200 to 1,500 feet AGL and are scheduled and operated by FACSFAC, NAS Jacksonville.

3.1.4 Avon Park Helicopter AR Tracks

The Avon Park helicopter AR tracks would be located over the Gulf, running parallel to the west coast of central Florida between Cedar Key and Spring Hill. The surrounding airspace is controlled by Jacksonville ARTCC in coordination with Tampa International Approach Control. The airspace consists of Class E controlled airspace extending from the surface upward to 18,000 feet MSL. The area is approximately 20 NM north of the Class B airspace that surrounds Tampa International Airport. General aviation pilots fly VFR through this area using the coastline as a navigational aid as well as IFR flights on federal airways ("V" and "J" routes). There are general aviation and private VFR airports located within a radius of 40 NM, and Tampa International Airport is located approximately 50 NM to the southeast.

3.1.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

The AP-AR1 centerline would be located between 29˚ 05' North / 83˚ 00' West to 28˚ 30' North / 82˚ 45' West with 4 NM of protected airspace on either side of centerline. AP-AR1 is located approximately 12 NM west of the coast of Florida. There are very few published airways adjacent to AP-AR1; however, two Jet Routes (J73 and J119) cross over the track and one Jet Route (J41) is located to the west of the track. These high altitude routes are heavily used for north-south airline traffic. One low-level Victor Route (V35) between Cross City and St. Petersburg crosses the middle of AP-AR1 and two Victor Routes (V97 and V521) parallel the track (one to the west and one to the east). General aviation pilots fly VFR along the coastline; this area also receives heavy commercial traffic out of the Tampa International and St. Petersburg/Clearwater Airports to the east. Several general aviation VFR civilian airports are located inland within approximately 20 NM of AP-AR1. They include Cedar Key, Crystal River, Inverness, and Williston Municipal airports and generate VFR low-level traffic in the surrounding areas. One MTR (IR-046) is located approximately 12 NM to the south of AP-AR1 and is controlled by the 347th Operations Group (347 OG) at Moody AFB. IR-046 has a published altitude block of 500 to 3,000 feet AGL or as assigned by Jacksonville ARTCC. The route is used for entry into the Avon Park AFR and is scheduled and controlled by the 347 OG.

3.1.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

AP-AR2 is located approximately 5 NM west and parallel to AP-AR1. The airspace that surrounds AP-AR2 is the same as identified for the proposed AR track.

3.1.5 Crew Swap Facilities

The proposed crew swap facilities have an approved Department of Defense (DoD) Low Altitude Instrument Approach Procedure and/or a DoD RADAR MINIMA with pilot controlled lighting. There is no scheduled air service out of either of the proposed or alternative airfield locations.

3.1.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

Perry-Foley Airport is located approximately 20 NM northwest of the proposed and alternative WTAs. It is located in a predominantly rural area of north-central Florida. The north-central Florida region has two airports with scheduled commercial air service: Tallahassee Regional Airport and Gainesville Regional Airport. Other general aviation airports within this area include Cross City, Crystal River, Dunnellon Municipal, George T. Lewis, and Williston Municipal airports. While there are no active military facilities in this region, there are low-level MTRs that cross the area. Perry-Foley Airport has one low altitude approach into the airport that is published in the DoD Low Altitude Instrument Approach Book. Perry-Foley Airport has three runways; the largest is 4,986 feet long and 150 feet wide. Aircraft traffic in and out of the Perry-Foley Airport consists of general civil, federal and state agency aircraft. The normal traffic averages approximately 10-12 general aviation aircraft a day; on rare occasions, state and federal fire-suppression aircraft use the airport as a base of operations for fighting forest fires in north-central Florida.

Perry-Foley Airport has no control tower and is an unmonitored facility with mainly VFR traffic (Perry-Foley Airport 1999).

3.1.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

The Cross City Airport is located 37 NM south of Perry-Foley Airport in north-central Florida and approximately 50 NM from WTA1. The type of air traffic at this airport is similar in nature to Perry-Foley Airport, with general aviation VFR activity. Florida Army National Guard helicopters and state and local law enforcement aircraft also use the airfield. The Cross City Airport has one low altitude approach into the airport that is published in the DoD Low Altitude Instrument Approach Book. It has two runways: one is 5,001 feet long and 100 feet wide, and the other 5,005 feet long and 75 feet wide. There is no manned control tower (Cross City Airport 1999).

3.2 NOISE

Noise is defined as sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to noise varies according to the type and characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day.

Sound is measured with instruments that record instantaneous sound levels in decibels (dB). A-weighted sound level measurements (often denoted dBA) are used to characterize sound levels that are heard especially well by the human ear. A-weighted sound measurements de-emphasize low and high frequencies and emphasize mid-range frequencies. Various other weighting protocols may be more appropriate when assessing potential effects on marine mammals since they are sensitive to a different range of frequencies. Alternative measurement procedures such as C-weighting or flat-weighting (unweighted), which do not de-emphasize lower frequencies, are typically used for marine mammals. The assessment of potential noise effects on marine mammals, discussed in Section 4.11, Marine Biological Resources, uses alternative measures to characterize sound levels. However, for the purpose of assessing potential noise effects on humans and terrestrial wildlife, A-weighted sound level measures are used. All sound levels discussed in this section are A-weighted; thus, the term dB implies dBA unless otherwise noted.

The region of influence (ROI) for HH-60 and HC-130 aircrew training includes local environs and military training airspace. In this EA, single-event noise such as an overflight is described by the sound exposure level (SEL); airfield, water training area (WTA), and helicopter air refueling (AR) track noise levels are also measured in day-night average sound level (DNL). DNL incorporates a "penalty" for nighttime noise events to account for increased annoyance. The nighttime penalty is applied between 10 p.m. and 7 a.m. Maximum sound levels (L_{max}) indicates the highest sound level occurring during an acoustical event. This noise metric does not include any information about the duration of the event, but only the highest level experienced. This metric can be given for different frequency weightings. A general discussion of noise metrics is provided below; a more detailed discussion is provided in Appendix A.

Sound Exposure Level

The SEL measurement describes a noise event such as an aircraft overflight comprising; 1) a period of time when an aircraft is approaching a receptor and noise levels are increasing; 2) the instant when the aircraft is closest to the receptor and the maximum noise level is experienced; and 3) the period of time when the aircraft moves away from the receptor resulting in decreased noise levels. SEL is a measure which takes into account both magnitude and duration of a noise event.

Noise generated by aircraft overflights is often assessed in terms of single events that are incorporated into the SEL metric. The frequency, magnitude, and duration of single noise events vary according to aircraft type, engine type, power setting, and airspeed. Therefore, individual aircraft noise data are collected for various types of aircraft and engines at different power settings at various phases of flight. These values form the basis for the individual-event noise descriptors at any location and are adjusted to the location by applying appropriate corrections for temperature, humidity, altitude, power settings, and airspeed. The single event noise exposure level (SENEL) refers to the combined noise exposure from a single event (e.g., the combined noise exposure when three aircraft fly together in tight formation during refueling operations).

Day-Night Average Sound Levels

DNL is 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. DNL values are obtained by summing the total acoustical energy represented by the individual SELs for a given 24 hour time period and dividing by 86,400 seconds (the number of seconds in a day). The time average is not simply the numerical average of the SEL values since the SEL are logarithms. The time average is accomplished by converting the SEL values to energy values by dividing by 10 and taking the antilog of their dB value. Once the energy values are summed and averaged, the DNL value is determined by taking the logarithm and multiplying by 10. DNL is the preferred noise metric of the U.S. Department of Housing and Urban Development (HUD), Federal Aviation Administration (FAA), the U.S. Environmental Protection Agency (EPA), and the Department of Defense (DoD).

Most people are exposed to sound levels of DNL 50 to 55 dB or higher on a daily basis. Studies specifically conducted to determine noise impacts on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below 65 dB (DNL) (Schultz 1978; Fields and Powell 1985; Federal Interagency Committee on Noise [FICON] 1992; Finegold et al. 1994).

Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments and that there is a consistent relationship between DNL and the level of annoyance. The "Schultz Curve" (included in Appendix A) shows the relationship between DNL noise levels and the percentage of population predicted to be highly annoyed.

Baseline Noise

Since the proposed action includes the establishment of new airspace, there are currently no scheduled aircraft flight operations within the WTAs or along the helicopter AR tracks. However, aircraft are authorized to operate in the Moody Low Altitude Tactical Navigation (LATN) area that covers all or part of the project areas (with the exception of the Avon Park AR tracks). The area underneath and around the Avon Park AR tracks is exposed to general aviation aircraft as they fly along the coastal airspace. Table 3.2-1 shows some representative SEL values for aircraft currently operating in these areas. General aviation aircraft operate at both the Perry-Foley Airfield and Cross City Airport.

3.2.1 Water Training Areas

3.2.1.1 Proposed Water Training Area (WTA1)

In the area of the proposed WTA1, there are currently no scheduled aircraft flight operations within or around the airspace. Portions of the proposed WTA1 airspace coincide with the Moody LATN airspace. Therefore, the area beneath WTA1 does experience some aircraft noise. Representative noise levels for offshore areas with low sea states are estimated at 40-45 dBA, with occasional higher events due to natural and aircraft noise (U.S. Coast Guard 1960). The ambient noise background in coastal areas is influenced strongly by surf noise. Sound levels of 60-70 dBA are considered representative of beaches with surf (U.S. Coast Guard 1960). Since the offshore region of WTA1 is fairly remote and characterized by low sea states and generally calm conditions (with the exception of storm events), background noise levels would be approximately 45 dB with occasional higher events due to natural sounds and military and civilian aviation. Representative noise levels from civilian aviation are shown in Table 3.2-1.

Table 3.2-1. Comparison of SELs for Direct Overflights

Aircraft	*Altitude (feet)*	*Airspeed (knots)*	*Engine Power*	*SEL[1] (dB)*
HC-130H	250	170	970 CTIT[2]	101.2
HC-130H	500	170	970 CTIT	96.5
HC-130H	1,000	170	970 CTIT	91.4
HH-60	250	115	100% RPM[3]	96.6
HH-60	500	115	100% RPM	93.0
HH-60	1,000	115	100% RPM	89.2
Single engine general aviation aircraft with variable pitch	250	120	100% RPM	95.4
Single engine general aviation aircraft with variable pitch	500	120	100% RPM	90.0
Single engine general aviation aircraft with variable pitch	1,000	120	100% RPM	86.1
Single engine general aviation aircraft with fixed pitch	250	120	100% RPM	87.9
Single engine general aviation aircraft with fixed pitch	500	120	100% RPM	83.4
Single engine general aviation aircraft with fixed pitch	1,000	120	100% RPM	78.6

Notes: [1] SEL = Sound exposure level
[2] CTIT = Turbine Inlet Temperature (degrees centigrade)
[3] RPM = Revolutions per minute
Source: U.S. Air Force NOISEFILE Database

3.2.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

Ambient noise levels in the area of alternative WTA2 would be the same as those described for the proposed WTA1.

3.2.2 Fort Stewart Helicopter AR Tracks

3.2.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

FS-AR1 falls completely within the Moody LATN airspace. Noise levels are expected to be 45 to 60 dB since the area beneath FS-AR1 is primarily rural with some small towns (EPA 1972). Occasional higher noise events from military and civilian aviation occur due to existing aircraft operating within the LATN area. Representative noise levels from these current operations are shown in Table 3.2-1.

3.2.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

Ambient noise levels in the area of the alternative FS-AR2 would be similar to those described for the proposed FS-AR1 (i.e., 45-60 dB with occasional higher noise events).

3.2.3 Water Training Area Helicopter AR Tracks

3.2.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

Ambient noise levels in the area of the proposed WTA-AR1 would be similar to those described for the proposed FS-AR1 (i.e., 45-60 dB with occasional higher noise events).

3.2.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Ambient noise levels in the area of the Alternative WTA-AR2 would be similar to those described for the proposed FS-AR1 (i.e., 45-60 dB with occasional higher noise events).

3.2.4 Avon Park Helicopter AR Tracks

3.2.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

Due to the offshore location of AP-AR1, ambient noise levels in the area would be the same as those described for the proposed WTA1 (approximately 45 dB with occasional higher events). The area also experiences military and general aviation noise as aircraft fly along the coast in this region. Representative noise levels from general aviation aircraft are provided in Table 3.2-1.

3.2.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

Due to the offshore location of AP-AR2, ambient noise levels in the area would be approximately 45 dB, the same as those described under AP-AR1. This area also receives some noise from military and general aviation, resulting in occasional higher noise events.

3.2.5 Crew Swap Facilities

3.2.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

Noise levels at the Perry-Foley Airport currently result from general aviation aircraft operations. No published levels have been documented. The noise levels for single-engine general aviation aircraft are shown in Table 3.2-1. Normal traffic at this airport averages approximately 10 to 12 general aviation aircraft a day. The DNL levels from current airport operations are estimated to be below 60 dB within airport boundaries.

3.2.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

Noise levels at the Cross City Airport currently result from general aviation aircraft operations. No published levels have been documented. The noise levels for single-engine general aviation aircraft are shown in Table 3.2-1. Because operations at Cross City Airport are assumed to be similar to Perry-Foley

Airport (i.e., 10 to 12 general aviation aircraft a day), current DNL levels are expected to be similar to those of Perry-Foley Airport (below 60 dB).

3.3 WASTE MANAGEMENT

The proposed action would generate various types of waste materials within the region of influence (ROI). Specifically, this would include the following training materials used within the water training area (WTA): sea dye packs, flares, and lightsticks. This section describes existing waste generation within the ROI, with an emphasis on items similar to those that would be generated by the proposed action.

Sea dye packs, flares, and lightsticks are not considered hazardous wastes. However, in sufficient numbers they can present a marine debris issue and have potential aesthetic impacts on marine and coastal environments. While these materials are not considered to be hazardous to humans, sea dye packs have the potential to affect some marine organisms (refer to Section 4.11, Marine Biological Resources).

The ROI for waste management includes the ocean environment in the WTA, marine waters beneath the Avon Park helicopter AR tracks, the terrestrial environment beneath the Fort Stewart and WTA helicopter AR tracks, and two regional airport locations proposed to support crew swaps. Proposed WTA activities and operations within the Avon Park helicopter AR tracks would be conducted on and over the ocean surface. Therefore, the ROI has been expanded beyond the proposed operational boundaries to include the surrounding marine environment and nearby stretches of coastline.

Waste materials in the Gulf of Mexico are generated by a variety of sources. However, this section focuses on the ROI described above and on materials similar to those that would be generated by the proposed activities. Although this represents only a fraction of the total waste streams generated within the ROI, comprehensive background information for all wastes is not readily available. The identified sources below contribute the majority of current wastes similar to those that would be generated by the proposed action.

3.3.1 Water Training Areas

3.3.1.1 PROPOSED WATER TRAINING AREA (WTA1)

Materials Overview

Marine location dye markers (sea dye packs), marine location markers (flares), and lightsticks are currently used by regional military operating groups (Navy and Air Force), Coast Guard groups, and civilians, within the Gulf of Mexico for training, rescue, recreational, or commercial activities. Regional military operating groups use some or all three of the items for training and rescue operations. Some Coast Guard groups use the items in their training and rescue operations. Lightsticks are used by fishermen to attract fish and by recreational divers to enhance visibility both at night and in deep-water conditions. Efforts are sometimes made to recover these items, either at sea or during beach cleanups. Depending on local marine and atmospheric conditions, some waste materials generated outside the ROI can be moved into the area via ocean currents. The eventual fate of the items depends on oceanographic conditions, the physical properties of the items, and the state of the items in the marine environment at a given time.

Within the Gulf of Mexico, commercial shipping and recreational boating are also responsible for adding debris to the marine environment.

Marine Location Dye Markers (Sea Dye Packs)

Sea dye contained within marine location markers is a liquid that does not persist in the marine environment for more than 2 hours. However, the plastic bag that contains the sea dye is constructed of a molded, phenolic material. Even after a decade of weathering, the biodegradation of polyethylene (plastic) occurs very slowly (Albertsson 1992 as cited in Notarian 1999). The 1997 International Coastal Cleanup effort in Florida resulted in the recovery of 3,061 plastic bags or pieces of plastic from the five coastal counties within the ROI (Franklin, Wakulla, Jefferson, Taylor, and Levy) (Center for Marine Conservation [CMC] 1999). Some plastic bags and pieces of plastic bags have been found on the ocean bottom, or partially buried in the ocean sediments (CMC 1999).

Recreational and commercial activities generate large amounts of debris (including plastic bags and other plastic pieces) in the Gulf on an annual basis. At times during the course of training and rescue operations, military (Navy and Air Force) and Coast Guard groups within the Gulf use marine location dye markers.

Marine Location Markers (Flares)

During the course of training and rescue operations, military operating groups (Navy and Air Force), Coast Guard groups, and mariners within the Gulf at times use flares. When deployed, the materials within the flare ignite and burn, emitting smoke and thereby marking the desired location. The MK6 flare is designed to completely incinerate its wooden housing and internal contents. The smaller MK25 flare is composed of an aluminum housing containing the flare materials. Upon combustion of the internal flare materials, the aluminum housing would sink.

When flares work to performance specifications, they do not present a hazard to humans or to the marine environment. In the instances when the flares fail to ignite or do not burn completely, they can float on the ocean surface and eventually get washed onshore. When unused marine location flares wash onto beaches within the ROI, they can present a hazard to humans due to their explosive components. Marine location flares used by the Air Force and the Navy are marked with warning language and instructions to contact an appropriate safety officer. Only one such report has been received in the last 11 years (Naval Surface Warfare Center [NSWC] 1999). Minimal information is available regarding the number of flares that reach Florida beaches.

Lightsticks

Military (Navy and Air Force) and Coast Guard groups within the Gulf use lightsticks and their derivatives (chemlights, cyalumes) at times during the course of training and rescue operations. Fishermen use lightsticks for attracting fish (lightsticks are attached to the nets and lines), and recreational divers use lightsticks for illumination and safety purposes. Where feasible, some users attempt to recover a portion of the used lightsticks. In addition, cleanups have been sponsored by various organizations to clean up marine debris (including lightsticks) that washes up on beaches. The 1997 International Coastal Cleanup effort in Florida reported the recovery of 61 lightsticks from the five coastal counties within the ROI (Franklin, Wakulla, Jefferson, Taylor, and Levy) (CMC 1999). Oceanographic conditions within the Gulf concentrate the majority of lightsticks in certain areas offshore (Florida Sea Grant Program 1999). Lightsticks are constructed of high-density polyethylene and are not considered to be easily biodegradable; therefore, they can persist for long periods of time in the marine environment. Due to their physical properties, lightsticks rarely sink to the ocean bottom (this usually only occurs if they are punctured and subsequently filled with water).

3.3.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

WTA2 is somewhat smaller than WTA1, and is located closer to shore (1 versus 5 nautical miles [NM]). Therefore, depending on local marine and atmospheric conditions, there exists the potential for more waste materials to reach the coastline. Otherwise, baseline waste generation within the ROI of the WTA2 is similar to WTA1.

3.3.2 Fort Stewart Helicopter AR Tracks

3.3.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

FS-AR1 is located in Georgia halfway between Fort Stewart and Moody Air Force Base (AFB) and overlies portions of Appling, Bacon, Jeff Davis, and Coffee counties. These counties consist primarily of rural areas with relatively low population densities (refer to Section 3.8, Land Use). Waste materials are likely to be generated from a variety of sources within these counties.

3.3.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

FS-AR2 is located in the same general area as FS-AR1, so wastes generated in FS-AR2 are similar to those described for FS-AR1.

3.3.3 Water Training Area Helicopter AR Tracks

3.3.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

WTA-AR1 is located in northwest Florida, and overlies portions of Madison and Taylor counties. These counties consist primarily of rural areas with relatively low population densities (refer to Section 3.8, Land Use). Waste materials are generated from a variety of sources within these counties.

3.3.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

WTA-AR2 is located in the same general area as WTA-AR1, so wastes generated in WTA-AR2 are similar to those described for WTA-AR1.

3.3.4 Avon Park Helicopter AR Tracks

3.3.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

AP-AR1 is located over the Gulf near northern Florida, just offshore of Citrus, Levy, and Hernando counties. All portions of AP-AR1 overlie the water, ranging from 1 to 9 NM offshore at its closest point. Within this ROI, wastes similar to those described for WTA1 are generated from various sources (see Section 3.3.1.1).

3.3.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

AP-AR2 would be located to the west (i.e., farther offshore) of AP-AR1, ranging from 5 to 13 NM offshore at its closest point. Given their similar locations in the northeastern portion of the Gulf, baseline waste generation within the ROI of the AP-AR2 is similar to AP-AR1.

3.3.5 Crew Swap Facilities

3.3.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

Perry-Foley Airport is located south of Moody AFB in Perry, Florida. Since proposed activities at this location would be very minimal (involving only HH-60 landings and takeoffs), a description of waste material generated at Perry-Foley Airport is not included here.

3.3.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

Cross City Airport is located south of Moody AFB in Dixie County, Florida. Since proposed activities at this location would be minimal (involving only HH-60 landings and takeoffs), a description of waste material generated at Cross City Airport is not included here.

3.4 SAFETY

The primary safety topics considered in this environmental assessment (EA) include safety risks associated with potential fuel spills resulting from in-flight refueling operations, flight risks associated with military flight operations, and materials expended during training within the water training area (WTA). Issues associated with materials used during WTA operations are discussed in Section 3.3, Waste Management. Flight risks apply to all aircraft; they are not limited to the military. Flight safety is summarized in the context of aircraft mishaps, bird-aircraft strike hazard (BASH), and in-flight refueling.

Aircraft Mishaps

The Air Force defines four categories of aircraft mishaps: Classes A, B, and C, and High Accident Potential. Class A mishaps are those that result in either loss of life or permanent total disability, a total cost in excess of $1 million, destruction of an aircraft, or damage to an aircraft beyond economical repair. Class B mishaps do not result in fatalities but result in permanent partial disability or cause damage costing between $200,000 and $1 million. Class C mishaps involve costs of $10,000 to $200,000 or the loss of worker productivity of more than 8 hours. High Accident Potential mishaps represent minor incidents not meeting any of the criteria for Class A, B, or C; they involve minor damage, minor injuries, and little or no property or public interactions.

Based on historical data of mishaps at all military installations and under all conditions of flight, DoD calculates a Class A mishap rate per 100,000 flying hours for each type of aircraft in the inventory. The lifetime Class A mishap rate for the HH-60 helicopter is 3.57 per 100,000 flying hours, and the HC-130 lifetime Class A mishap rate is 0.31 per 100,000 hours (Air Force 1999e). No Class A mishaps have occurred involving HH-60 helicopters or HC-130 aircraft based at Moody Air Force Base (AFB).

Bird-Aircraft Strike Hazard

Another major concern with regard to flight safety is BASH. Aircraft may encounter birds at altitudes up to 30,000 feet. However, most birds fly close to the ground; over half of all reported bird-strikes occur below 500 feet above ground level (AGL), and over 75 percent occur below 2,000 feet AGL. Of these strikes, approximately 50 percent occur in the airfield environment, and 25 percent occur during low altitude training (Air Force 1999e).

The Air Force BASH program was established to minimize the risk for collisions of birds and aircraft and the subsequent loss of life and property. For airspace used by Moody AFB aircrews, the risk of bird-aircraft strikes varies throughout the year. As a result, pilots and safety officers continually evaluate BASH potential. The Moody AFB BASH Plan (347th Wing [347 WG] Safety Office 1999) addresses measures that must be followed when bird-strike conditions are deemed moderate or severe. During severe bird-strike conditions, flight restrictions are imposed. The Air Force Safety Center BASH team has developed a Bird Avoidance Model (BAM) that quantifies risk levels for bird-aircraft strike potential. Based on the BAM, three BASH levels have been identified: low, moderate, and severe (Air Force 1999f).

HH-60 and HC-130 aircraft commonly train at lower altitudes, which makes them more likely to experience bird-aircraft strikes. Aircrews based at Moody AFB have experienced bird-strike incidents ranging from 7 to 38 per year. Over 50 percent of these occurred along low-level training routes involving high-speed F-16 aircraft and the Moody Low Altitude Tactical Navigation (LATN) area. There were 21 bird strikes involving HH-60 and HC-130 aircraft between 1997 and May 1999 (347 WG Safety Office 1999).

In-Flight Refueling

HH-60 and HC-130 aircraft operating within the proposed WTA and helicopter AR tracks would use JP-8 fuel. JP-8 is a complex mixture of volatile alkanes and aromatics and when released onto surface water, quickly evaporates. JP-8 is a kerosene-based fuel, and is designated as a hazardous material. JP-8 fuel would not be intentionally released to the environment. Only in the event of an accident would a small amount of JP-8 fuel be released to the atmosphere, with the potential for a small proportion to reach the surface.

Hazardous materials and wastes are regulated by the U.S. Environmental Protection Agency (EPA), in accordance with the Water Pollution Control Act; the Clean Water Act; the Solid Waste Disposal Act; the Toxic Substance Control Act; RCRA; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and the Clean Air Act (CAA). The federal government is required to comply with these acts and all applicable state regulations under Executive Order (EO) 12088, Department of Defense (DoD) Directive 4165.60, Air Force Instruction (AFI) 32-7042, AFI 32-7086, and Air Force Pamphlet 32-7043, the Hazardous Wastes Management Guide.

In-flight refueling is not considered to be a high-risk flying activity. In-flight refueling activities and associated flight risks would primarily be associated with two or more aircraft flying in proximity to each other. There are minimum separation requirements for flying visual flight rules (VFR) in uncontrolled airspace. Since helicopter air refueling (AR) training distances are less than these requirements, the military assumes responsibility for separation of aircraft (MARSA) flying closer than what the Federal Aviation Administration (FAA) would approve. The Air Force has established helicopter AR procedures that provide guidance and directions for these situations. Air Force procedures are contained in *Technical Order T.O. 1-1C-1-20, Section III, Rendezvous and Join-Up Procedures*. This technical order dictates closure rates, visual conditions, and other restrictions to ensure safety.

Fuel spills can potentially occur during in-flight refueling. Such an event could affect public safety if large enough amounts of fuel reached the ground. The Air Force has conducted in-flight refueling of helicopters for many years, and no documented fuel spills have occurred (Air Force 1999e).

Moody AFB aircrews currently follow all established procedures for in-flight refueling operations, and required separation is maintained between aircraft to minimize flight risks. In addition, the number of current HH-60 and HC-130 wet-refueling operations is minimal, with associated low safety risks resulting from fuel spills. Since baseline in-flight refueling conditions are the same for each of the proposed and alternative areas described below, no additional discussion of these issues is presented in this section.

3.4.1 Water Training Areas

3.4.1.1 PROPOSED WATER TRAINING AREA (WTA1)

Some VFR civilian aircraft activity occurs in the region within which WTA1 would be located, but generally at altitudes higher than 2,000 feet AGL. Military training in the area is currently confined to the W-470A complex located to the southwest of WTA1. Commercial aircraft traffic is above the altitudes proposed for use in WTA1. Flight risks and flight safety issues in this area are minimal.

A total of 1,261 civilian bird-aircraft strikes occurred in Florida between 1991 and 1997, the third highest reported for any state in the continental U.S. The majority of these bird-aircraft strikes occurred below 2,000 feet AGL (FAA 1999b). The HH-60 and HC-130 commonly train at these lower altitudes, resulting in a higher probability for BASH events. The BAM risk factor for WTA1 is identified as Moderate year-round.

Various types of materials (including marine location flares) are expended into the marine environment as a result of military, commercial, and recreational activities. In the instances when marine location flares fail to ignite or do not completely burn, they can float on the ocean surface and eventually get washed onshore. When unused marine location flares wash onto beaches, they can present a hazard to humans due to their explosive components (refer to Sections 3.3 and 4.3, Waste Management). Therefore, marine location flares used by the Air Force and the Navy are marked with warning language and instructions to contact an appropriate safety officer. Only one such report has been received in the last 11 years (Naval Surface Warfare Center [NSWC] 1999a).

3.4.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

Located within the existing Moody LATN area, WTA2 is in the same general area as WTA1 but closer to the shoreline. While BASH potential for aircraft operating in this area would be greater due to the proximity to birds along the coastline, no reported bird-strike events have occurred in the area where WTA2 would be located (347 WG Safety Office 1999).

3.4.2 Fort Stewart Helicopter AR Tracks

3.4.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

FS-AR1 would be located above a rural area of east-central Georgia. Minimal VFR civilian aircraft activity occurs in this area, and no large metropolitan areas are located within 60 nautical miles (NM) of the proposed track. Most of the activity that does occur is at a higher altitude than the proposed FS-AR1. The BASH team has identified the Atlantic Flyway of North America as a major bird migratory path located to the east of FS-AR1. The BAM risk factors are identified as Moderate for fall, spring, and winter, and Low for summer. There have been no reported BASH incidents in this area. Moody AFB has had one report of a bird-aircraft strike by an HH-60 to the south of FS-AR1 in the Okefenokee National Wildlife Refuge (NWR).

3.4.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

FS-AR2 would be located in the same general airspace environment as FS-AR1. Flight hazards in this area would be similar to those discussed for FS-AR1.

3.4.3 Water Training Area Helicopter AR Tracks

3.4.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

WTA-AR1 would be located east of Tallahassee, Florida in the portion of the Moody LATN area in which HH-60 and HC-130 aircraft are vulnerable to BASH. HH-60 and HC-130 aircraft commonly train at lower altitudes, resulting in a higher probability for BASH events. The BAM risk factor for this area has been identified as Moderate year-round.

Although much VFR civilian aircraft activity occurs in this region, WTA-AR1 would be located north of the coastline at an altitude below most VFR traffic in the area. Military training in the area occurs at W-470A southwest of WTA1 and poses no threat for potential aircraft mishaps.

3.4.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

WTA-AR2 would be located in the same general airspace environment as WTA-AR1. Flight risks and BASH potential are similar to those discussed for WTA-AR1. Civilian VFR aircraft use Interstate 10 (I-10, which runs parallel to WTA-AR2) for navigation checks, generating moderate to high levels of low-altitude air traffic.

3.4.4 Avon Park Helicopter AR Tracks

3.4.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

AP-AR1 would be located off the coast of west-central Florida. There are several general aviation airports with heavy VFR civilian aircraft in this area, and potential flight risks due to possible conflicts with general aviation activity and bird-aircraft strikes. The BAM risk factor for this area has been identified as Moderate year-round.

3.4.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

AP-AR2 would be located in the same general airspace environment as AP-AR1, approximately 10 NM offshore. Flight risks from VFR civilian traffic in this area would be lower than the proposed AP-AR1 since it would be located farther offshore. BASH would also be less than AP-AR1 because AP-AR2 would be located farther from the coastline and bird activity.

3.4.5 Crew Swap Facilities

3.4.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

Perry-Foley Airport is a small airfield that accommodates mostly small civilian VFR aircraft. Army National Guard helicopters and state and local law enforcement aircraft use the field. There is no air traffic congestion, and flight activity is minimal, with 10 to 12 aircraft transiting daily (refer to Section 3.1, Airspace). Flight risks associated with operations at this airport are low.

There is a potential risk from bird-aircraft strikes. The BAM risk factor for this area has been identified as Moderate year-round.

3.4.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

Cross City Airport is a small airfield that accommodates mostly small civilian VFR aircraft. There is no air traffic congestion, and flight activity is relatively minimal (refer to Section 3.1, Airspace). BASH and overall flight risks are the same as for the Perry-Foley Airport area.

3.5 AIR QUALITY

Air quality in a given location is described by the concentrations of various pollutants present in the atmosphere. National Ambient Air Quality Standards (NAAQS) have been established by the U.S. Environmental Protection Agency (EPA) for six criteria air pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal to or less than 10 micrometers in diameter (PM_{10}), ozone (O_3), and lead (Pb). NAAQS represent the maximum levels of background pollutants that are considered safe, with an adequate margin of safety to protect public health and welfare. Short-term standards (1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, while long-term standards (annual averages) have been established for pollutants contributing to chronic health effects.

The Clean Air Act (CAA) of 1990 places the responsibility on individual states to achieve and maintain NAAQS. The primary mechanism for states to achieve and maintain NAAQS is the EPA-required State Implementation Plan (SIP). The SIP identifies goals, strategies, schedules, and enforcement actions that will lead each state into compliance with NAAQS. Each state has the authority to adopt standards stricter than those established under the federal program.

The EPA designates all areas of the U.S. as having air quality better than (attainment) or worse than (non-attainment) the NAAQS. When there is insufficient ambient air quality data for the EPA to form a basis for attainment status, the area is designated "unclassified". The criteria for non-attainment designation varies by pollutant: 1) an area is in non-attainment for O_3 if NAAQS have been exceeded more than three discontinuous times in 3 years, and 2) an area is in non-attainment for any other pollutant if NAAQS have been exceeded more than once per year.

As defined by the EPA in Title III of the CAA, chemical pollutants include hazardous air pollutants (HAPs) and toxic chemical air pollutants for which occupational exposure limits have been established. Included in this definition are volatile organic compounds (VOCs) which include any organic compound involved in atmospheric photochemical reactions except those designated by the EPA as having negligible photochemical reactivity. VOCs are considered to be precursors to O_3 formation. HAPs are not subject to ambient air quality standards, but may present a threat of adverse human health effects or adverse environmental effects under certain conditions.

In addition to NAAQS, the CAA establishes a national goal of preventing any further degradation or impairment of visibility within federally designated attainment areas. Attainment areas are classified as Class I, II, or III and are subject to the Prevention of Significant Deterioration (PSD) program. Mandatory Class I status was assigned by Congress to national wilderness areas, national memorial parks larger than 5,000 acres, national parks larger than 6,000 acres, and all international parks. Class III status is assigned to attainment areas to allow maximum growth while maintaining compliance with NAAQS. All other attainment areas are designated Class II.

In Class I areas, a visibility impairment is defined as a reduction in regional visual range, atmospheric discoloration, or plume blight (such as emissions from a smokestack). Determination of the significance of an impact on visibility within a PSD Class I area is typically associated with stationary emission sources.

The CAA Section 176(c), General Conformity, established certain statutory requirements for federal agencies with proposed federal activities to demonstrate conformity of the proposed activities with the SIP for attainment of the NAAQS. In 1993, the EPA issued the final rules for determining air quality conformity. Under these rules, certain actions are exempted from conformity determinations, while others are presumed to be in conformity if total project emissions are below *de minimis* levels established under 40 Code of Federal Regulations (CFR) Section 93.153. Total project emissions include both direct and indirect emissions that can be controlled by a federal agency. Any new project that may lead to nonconformance or contribute to a violation of the NAAQS requires a conformity analysis before initiating the action. As defined in the Final Rule (40 CFR Parts 6, 51, and 93), "conformity to a SIP is defined in the Act, as amended in 1990, as meaning conformity to a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards." The U.S. Air Force has published its own guidance, the *US Air Force Conformity Guide* (Air Force 1995), to implement the conformity requirement. The general conformity requirements apply only to nonattainment and maintenance areas.

Federal regulations (40 CFR 81) have created defined Air Quality Control Regions (AQCRs), or airsheds, for the entire U.S. AQCRs are based on population and topographic criteria for groups of counties within a state, or counties from multiple states that share a common geographical or pollutant concentration characteristic.

Region of Influence (ROI)

Air Quality Control Regions. The ROI for air quality includes the associated airspace of the proposed and alternative water training areas (WTA), helicopter air refueling (AR) tracks, and crew swap facilities. The project areas would be located within (or offshore) of AQCRs 49, 52, and 54 (Figure 3.5-1). The proposed and alternative WTAs are located offshore of AQCR 49. In addition, the proposed and alternative WTA helicopter AR tracks and the majority of the Fort Stewart helicopter AR tracks are located in AQCR 49; a small portion of the proposed Fort Stewart AR track is located in AQCR 54. The Avon Park helicopter AR tracks would be located offshore of AQCR 52.

Air quality monitoring sites are typically located near metropolitan areas where air quality is of concern. Air quality in urban areas is very different from the predominately rural areas of the ROI, and does not provide a reasonable estimate of baseline conditions. Therefore, for the purpose of characterizing baseline air quality in the ROI, air quality data taken from the nearest representative Air Force base (AFB) were used to best approximate conditions. Specific assumptions are provided within this section in the discussion of baseline air quality

Mandatory Class I Areas. Three mandatory Class I areas are found in AQCR 49: the Okefenokee National Wildlife Refuge (NWR) in Charlton County, Georgia; Wolf Island NWR in McIntosh County, Georgia; and St. Marks NWR in Wakulla and Jefferson Counties, Florida. Of these three, only the St. Marks NWR could be affected by the proposed action. Chassahowitzka NWR, located in Citrus and Hernando Counties, Florida, is the only Class I area located in AQCR 52. No Class I areas are located in AQCR 54.

Figure

3.5-1 Air Quality Control Regions in Georgia and Florida

Regional Climate

Water Training Areas and Avon Park Helicopter AR Tracks. The climate of the northern region of the Gulf of Mexico is subject to an abundance of sunshine and rainfall. Winters are usually mild, and summers are warm and humid. Average summer high temperatures are usually around 87 degrees Fahrenheit (º F), with days above 90º F occurring frequently. Average winter low temperatures range in the low to mid 40sº F, with a few days below 40º F. Annual rainfall averages approximately 57 to 60 inches, the majority of which falls in the late winter and early spring. Most summer rain is in the form of frequent scattered showers of short duration and high intensity. Prevailing winds are usually from the north in the winter and from the south in the summer. Afternoon sea breezes less than 15 knots blowing towards the land (onshore) are common. March is the windiest month, while August is typically the calmest. Strong thunderstorms and tropical systems affect the region, leading to strong, gusty winds and high rainfall intensities for short periods of time.

Fort Stewart Helicopter AR Tracks. Climate within the Fort Stewart helicopter AR tracks is characterized as being humid subtropical. During the summer months, the area is often influenced by long spells of warm and humid weather. Average afternoon high temperatures range from the upper 80s to low 90sº F. Temperatures during winter months are more variable, with stretches of mild weather alternating with cold spells. Winter high temperatures average in the 50sº F, with temperatures below freezing occurring between 50 and 70 days a year. The average dates of first freeze in the autumn range from late October to mid-November. The average dates of last freeze in the spring range from mid-March to early April. Precipitation averages between 46 and 50 inches a year, with measurable amounts of rain expected to fall on about 120 days a year. Thunderstorms are most common in the spring and summer months. Snowfall does occur, usually only for one or two days out of the year. Winds usually fluctuate between 6 and 10 miles per hour, with winds coming out of the north in the winter and out of the south in the summer.

Water Training Area Helicopter AR Tracks and Crew Swap Facilities. Climate within the WTA helicopter AR tracks and the crew swap facilities is characterized as being warm and wet. During the summer months, average high temperatures can be expected to be around 88º F, with days above 90º F common. During the winter months, average high temperatures can be expected around 55º F. Temperatures below freezing, while possible, occur infrequently. Precipitation in the area is high, averaging approximately 65 inches per year. Most rainfall occurs during the spring and summer months, with the majority being associated with thunderstorm activity. However, a significant portion of rainfall occurs as a result of continental low-pressure systems bringing in long periods of cloudiness and rain. Winds in the area are usually from the east, southeast and northeast during the fall and early spring. Prevailing winds are usually from the north in the winter and from the south in the summer.

Baseline Air Quality

Under the CAA, the EPA has delegated authority for regulating pollution sources to each individual state. The Georgia Department of Natural Resources (GDNR) has adopted the NAAQS for every criteria pollutant. The Florida Department of Environmental Protection (FDEP) has adopted NAAQS for every criteria pollutant except for SO_2. FDEP has adopted more stringent primary 24-hour and annual SO_2 standards of 0.10 parts per million (ppm) and 0.02 ppm, respectively (FDEP 1999c). Primary and secondary ambient air quality standards are presented in Table 3.5-1. All of the counties in the affected areas of Florida (Madison, Taylor, Jefferson, Levy, Citrus, Hernando, and Wakulla counties) and Georgia

(Appling, Bacon, Coffee, Ware, and Jeff Davis counties) are designated as being in attainment or unclassified for all six criteria pollutants (see Table 3.5-1) (EPA 1999).

Table 3.5-1. National and State (Georgia[1] and Florida) Ambient Air Quality Standards

Air Pollutant	*Averaging Time*	*Florida AAQS*	*Federal (NAAQS)*	
			Primary[2]	*Secondary*[3]
CO	1-hour 8-hour	35 ppm 9 ppm	35 ppm 9 ppm	35 ppm 9 ppm
NO_2	Annual	0.053 ppm	0.053 ppm	0.053 ppm
SO_2	3-hour 24-hour Annual	0.50 ppm 0.10 ppm 0.02 ppm	- 0.14 ppm 0.03 ppm	0.50 ppm - -
$PM_{2.5}$[4]	24-hour Annual		65 $\mu g/m^3$ 15 $\mu g/m^3$	150 $\mu g/m^3$ 50 $\mu g/m^3$
PM_{10}	24-hour Annual	150 $\mu g/m^3$ 50 $\mu g/m^3$	150 $\mu g/m^3$ 50 $\mu g/m^3$	150 $\mu g/m^3$ 50 $\mu g/m^3$
O_3	1-hour[5] 8-hour	0.12 ppm 0.08 ppm	0.12 ppm 0.08 ppm	0.12 ppm 0.08 ppm
Pb	Quarterly average	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$

Notes: [1] Georgia has adopted all NAAQS.
[2] Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly.
[3] Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.
[4] $PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
New standards for $PM_{2.5}$ and 8-hour ozone standards were established in 1997; implementation guidelines have not been adopted.
[5] The ozone 1-hour standard applies only to designated nonattainment areas.
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter.
Sources: EPA 1999; FDEP 1999c.

Florida. Air quality in Florida is monitored by the FDEP. Monitoring sites for the six criteria pollutants are widely dispersed throughout the state, typically near urban areas. As described previously, baseline air quality data have been taken from the nearest available sampling sites that best approximate conditions within the ROI. For the WTA, the WTA helicopter AR tracks, the Avon Park helicopter AR tracks, and the crew swap facilities, 1997 air quality data from Tyndall AFB (Air Force 1999c) have been used for characterizing baseline conditions. Tyndall AFB, situated on the Gulf (Bay County, Florida), provides the best available representative air quality for these ROIs. Bay County and Tyndall AFB are currently in attainment for all six criteria pollutants. Table 3.5-2 presents representative baseline air quality in the ROIs for Florida.

Table 3.5-2. Representative Baseline Ambient Air Quality Emissions for Tyndall AFB[1] (tons/year)				
CO	*SO_x*	*NO_x*	*PM_{10}*	*VOCs*
1,094.8	173.8	1,044.9	146.3	339.6

Notes [1] Air emissions include aircraft operations.
Lead is not included because under the proposed action, no additional lead emissions would occur.
Source: Air Force 1999c.

Georgia. The GDNR monitors air quality in Georgia. The majority of sampling sites in Georgia are concentrated in the Atlanta area. Since Atlanta is a developed urban area, air quality is dramatically different from air quality in the ROI of the Fort Stewart helicopter AR tracks, which is mostly rural. Therefore, baseline air quality data has been taken from the nearest sampling location that is similar in nature. For the Fort Stewart helicopter AR tracks, 1997 air quality data from Moody AFB (Air Force 1999a) has been used for characterizing baseline conditions. Moody AFB is currently in attainment for all six criteria pollutants. Table 3.5-3 presents representative baseline ambient air quality data for the Fort Stewart helicopter AR tracks.

Table 3.5-3. Representative Baseline Ambient Air Quality Emissions for Moody AFB[1] (tons/year)				
CO	*SO_x*	*NO_x*	*PM_{10}*	*VOCs[3]*
1,037.4	21.7	333.5	35.1	130.9

Notes [1] Air emissions include aircraft operations.
Lead is not included because under the proposed action, no additional lead emissions would occur.
Source: Air Force 1998a.

3.5.1 Water Training Areas

3.5.1.1 PROPOSED WATER TRAINING AREA (WTA1)

WTA1 is located offshore of AQCR 49. This area is considered to be in attainment with NAAQS because the adjacent counties within AQCR 49 are in attainment for the six criteria pollutants. Representative ambient air quality data are presented in Table 3.5-2.

3.5.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

WTA2 is located offshore of AQCR 49. This area is considered to be in attainment with NAAQS because the adjacent counties within AQCR 49 are in attainment for the six criteria pollutants. Representative ambient air quality conditions are provided in Table 3.5-2.

3.5.2 Fort Stewart Helicopter AR Tracks

3.5.2.1 Proposed Fort Stewart Helicopter AR Track (FS-AR1)

FS-AR1 is located within AQCR 49 and AQCR 54, both of which are in attainment with NAAQS. Representative ambient air quality data are presented in Table 3.5-3.

3.5.2.2 Alternative Fort Stewart Helicopter AR Track (FS-AR2)

FS-AR2 is located within AQCR 49 and AQCR 54, both of which are in attainment with NAAQS. Representative ambient air quality data are presented in Table 3.5-3.

3.5.3 Water Training Area Helicopter AR Tracks

3.5.3.1 Proposed Water Training Area Helicopter AR Track (WTA-AR1)

WTA-AR1 is located within AQCR 49, which is in attainment with NAAQS. Representative ambient air quality data are presented in Table 3.5-2.

3.5.3.2 Alternative Water Training Area Helicopter AR Track (WTA-AR2)

WTA-AR2 is located within AQCR 49, which is in attainment with NAAQS. Representative ambient air quality data are presented in Table 3.5-2.

3.5.4 Avon Park Helicopter AR Tracks

3.5.4.1 Proposed Avon Park Helicopter AR Track (AP-AR1)

AP-AR1 is located offshore of AQCR 52. For analysis purposes, this area is considered to be in attainment with NAAQS because the adjacent counties in AQCR 52 are in attainment for all six criteria pollutants. Representative ambient air quality data are presented in Table 3.5-2.

3.5.4.2 Alternative Avon Park Helicopter AR Track (AP-AR2)

AP-AR2 is located offshore of AQCR 52. For analysis purposes, this area is considered to be in attainment with NAAQS because the adjacent counties in AQCR 52 are in attainment for all six criteria pollutants. Representative ambient air quality data are presented in Table 3.5-2.

3.5.5 Crew Swap Facilities

3.5.5.1 Proposed Crew Swap Facility (Perry-Foley Airport)

Perry-Foley Airport is located within AQCR 49, which is in attainment with NAAQS. Representative ambient air quality data are presented in Table 3.5-2.

3.5.5.2 Alternative Crew Swap Facility (Cross City Airport)

Cross City Airport is located within AQCR 49, which is in attainment with NAAQS. Representative ambient air quality data are presented in Table 3.5-2.

3.6 CULTURAL RESOURCES

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, or any other physical evidence of human activities considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources can be divided into three major categories: archaeological resources (prehistoric and historic), architectural resources, and traditional cultural resources.

Archaeological resources are locations where human activity measurably altered the earth or left deposits of physical remains (e.g., tools, arrowheads, or bottles). "Prehistoric" refers to resources that predate the advent of written records in a region. These resources can range from a scatter composed of a few artifacts to village sites and rock art. "Historic" refers to resources that postdate the advent of written records in a region. These resources can include campsites, roads, fences, trails, dumps, battlegrounds, mines, and a variety of other features. *Architectural resources* include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for protection under existing cultural resource laws. *Traditional cultural resources* can include archaeological resources, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals that Native Americans or other groups consider essential for the persistence of traditional cultures.

Only significant cultural resources warrant consideration with regard to potential impacts resulting from a proposed action. To be considered significant, archaeological or architectural resources must meet one or more of the criteria (as defined in 36 Code of Federal Regulations [CFR] 60.4) for inclusion on the National Register of Historic Places (NRHP).

There are no legally established criteria for assessing the importance of a traditional cultural resource. These criteria must be established primarily through consultation with Native Americans, according to the requirements of the National Historic Preservation Act of 1966. When applicable, consultation with other affected groups provides the means to establish the importance of their traditional resources. They may also be derived from 36 CFR 60.4 and from Advisory Council on Historic Preservation Guidelines. The Native American Graves Protection and Repatriation Act (1990) defines the procedures for consultation and treatment of Native American burials and burial artifacts.

Although aircraft operations associated with the proposed action would largely affect only airspace and airspace-related resources, aircraft overflights have the potential to affect existing or potentially occurring archaeological, architectural, or traditional resources. The noise and visual presence from such overflights may have indirect impacts to cultural resources; the significance of such impacts is based on the integrity and characteristics of the setting. In contrast, direct impacts (e.g., ground disturbance) would not result from overflights. Therefore, this EA examines only those resources whose setting might be affected: NRHP-listed archaeological and architectural resources (e.g., historic structures) and traditional resources (e.g., Native American sacred ceremonial sites).

3.6.1 Water Training Areas

3.6.1.1 Proposed Water Training Area (WTA1)

WTA1 encompasses approximately 175 square nautical miles (NM) offshore of Taylor and Jefferson counties in northern Florida.

Archaeological and Architectural Resources. Since WTA1 is located offshore, no NRHP-listed sites are located in this area. Also, no known shipwrecks have been documented in this portion of the Gulf (Florida Department of Environmental Protection [FDEP] 1999).

Traditional Resources. No traditional or sacred resources of interest to Native Americans have been identified in WTA1.

3.6.1.2 Alternative Water Training Area (WTA2)

WTA2 encompasses approximately 110 square NM offshore of Taylor and Jefferson counties in northern Florida.

Archaeological and Architectural Resources. Since the WTA2 is located offshore, no NRHP-listed sites are located in this area. Also, no known shipwrecks have been documented in this portion of the Gulf (FDEP 1999).

Traditional Resources. No traditional or sacred resources of interest to Native Americans have been identified in WTA2.

3.6.2 Fort Stewart Helicopter AR Tracks

3.6.2.1 Proposed Fort Stewart Helicopter AR Track (FS-AR1)

The proposed Fort Stewart helicopter air refueling (AR) track is located in Georgia halfway between Fort Stewart and Moody AFB. The proposed track overlies portions of Appling, Bacon, Jeff Davis, and Coffee counties.

Archaeological and Architectural Resources. Estimates of cultural resources underlying the proposed Fort Stewart helicopter AR track gathered from the NRHP and state archaeological files could number in the hundreds. Table 3.6-1 shows documented historic sites and buildings listed in the NRHP for all areas underlying airspace affected by the proposed action and alternative. No NRHP-listed properties underlie the FS-AR1.

Traditional Resources. No Native American reservations underlie FS-AR1. In addition, no traditional or sacred resources of interest to Native Americans have been identified underneath this track.

3.6.2.2 Alternative Fort Stewart Helicopter AR Track (FS-AR2)

FS-AR2 is located in Georgia halfway between Fort Stewart, Georgia and Moody Air Force Base (AFB). This alternative track overlies portions of Appling, Bacon, Coffee, and Ware counties.

Table 3.6-1. NRHP-listed Properties underneath Affected Airspace in Georgia and Florida

County	*Properties*	*Overlying Airspace*
Georgia		
Bacon	Bacon Almo Depot Bacon County Courthouse Rabinowitz Building	FS-AR2
Jeff Davis	None	FS-AR1
Ware	None	FS-AR2
Appling	Appling County Courthouse Citizens Banking Company C.W. Deen, House	FS-AR2
Coffee	None	FS-AR1 FS-AR2
Florida		
Jefferson	None	WTA-AR2
Taylor	None	WTA-AR1 WTA-AR2
Suwannee	Elmwood Place	WTA-AR2
Madison	Bishop Andrews Hotel	WTA-AR1
Lafayette	None	WTA-AR2

Source: NPS 1999.

Archaeological and Architectural Resources. Estimates of cultural resources underlying FS-AR2 gathered from the NRHP and state archaeological files could number in the thousands. However, only six historic NRHP-listed structures (three in Bacon County and three historic structures in Appling County) occur underneath this track (see Table 3.6-1).

Traditional Resources. No Native American reservations underlie FS-AR2. In addition, no traditional or sacred resources of interest to Native Americans have been identified underneath this track.

3.6.3 Water Training Area Helicopter AR Tracks

3.6.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

WTA-AR1 is located along a northeast/southwest track in Madison and Taylor counties in northern Florida.

Archaeological and Architectural Resources. Estimates of cultural resources underlying WTA-AR1 gathered from the NRHP and state archaeological files could number in the hundreds. However, only one NRHP-listed historic structure (located in Madison County) occurs underneath this track (see Table 3.6-1).

Traditional Resources. No Native American reservations underlie WTA-AR1. In addition, no traditional or sacred resources of interest to Native Americans have been identified underneath this track.

3.6.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

WTA-AR2 is located perpendicular to the proposed track, parallel to Interstate 10, in Madison, Taylor, Jefferson, Suwannee, and Lafayette counties in northern Florida.

Archaeological and Architectural Resources. Estimates of cultural resources underlying WTA-AR2 gathered from the NRHP or state archaeological files could be in the hundreds. However, only one NRHP-listed historic structure (located in Suwannee County) occurs underneath this track (see Table 3.6-1).

Traditional Resources. No Native American reservations underlie WTA-AR2. In addition, no traditional or sacred resources of interest to Native Americans have been identified underneath this track.

3.6.4 Avon Park Helicopter AR Tracks

The proposed and alternative Avon Park AR tracks are located offshore of Citrus, Levy, and Hernando counties in northern Florida.

3.6.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

Archaeological and Architectural Resources. Since AP-AR1 is located offshore, no NRHP-listed sites are located in this area. Also, no known shipwrecks have been documented in this portion of the Gulf (FDEP 1999).

Traditional Resources. No Native American reservations underlie AP-AR1. In addition, no traditional or sacred resources of interest to Native Americans have been identified underneath this track.

3.6.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

Archaeological and Architectural Resources. Since AP-AR2 is located offshore, no NRHP-listed sites are located in this area. Also, no known shipwrecks have been documented in this portion of the Gulf (FDEP 1999).

Traditional Resources. No Native American reservations underlie AP-AR2. In addition, no traditional or sacred resources of interest to Native Americans have been identified underneath this track.

3.6.5 Crew Swap Facilities

3.6.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

Archaeological and Architectural Resources. Perry-Foley Airport is located in Taylor County, Florida, approximately 0.5 mile south of the city of Perry. The airport is located within a developed industrial park. A search of the Florida Master Site File identified three archaeological sites. However, since the area has not been completely surveyed, other unrecovered archaeological sites or historic structures may exist (Florida Department of State 1999). None of the three sites are considered significant cultural resources.

Traditional Resources. No Native American reservations are located near the Perry-Foley Airport. In addition, no traditional or sacred resources of interest to Native Americans have been identified within the vicinity of the airport.

3.6.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

Archaeological and Architectural Resources. Cross City Airport is located in Dixie County, Florida, approximately one-half mile east of the town of Cross City. The area is located within a developed industrial park. A search of the Florida Master Site File showed no significant cultural resources in the vicinity of the proposed action.

Traditional Resources. No Native American reservations are located near the Cross City Airport. In addition, no traditional or sacred resources of interest to Native Americans have been identified within the vicinity of the airport.

3.7 ENVIRONMENTAL JUSTICE

In 1994, Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations,* was issued to focus the attention of federal agencies on human health and environmental conditions in minority and low-income communities. This EO was also established to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. This section focuses on the distribution of race and poverty status in areas potentially affected by implementation of the proposed action and alternatives. This approach is in accordance with the *Interim Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process* (Air Force 1997a).

For purposes of this analysis, minority and low-income populations are defined as:

- *Minority Populations*: Persons of Hispanic origin of any race, Blacks, American Indians, Eskimos, Aleuts, Asians, or Pacific Islanders.

- *Low-Income Populations:* Persons living below the poverty level, based on a total annual income of $12,674 for a family of four persons as reported in the 1990 census.

Estimates of these two population categories were developed based on data from the *1990 Census of Population and Housing* (U.S. Bureau of the Census [USBC] 1993). The census does not report minority population but does report population by race and by ethnic origin. These data were used to estimate minority populations potentially affected by implementation of the proposed action and alternatives. Although these census data are now eight years old, they represent the most complete, detailed, and accurate statistics available addressing population distribution and income in rural areas. Further, there are no indications that regional trends since 1990 have altered general population characteristics.

In 1997, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks (Protection of Children)* was issued to ensure the protection of children. Socioeconomic data specific to the distribution of population by age and the proximity of youth-related developments (e.g., day care centers and schools) that could potentially be incompatible with the proposed action and alternatives are presented. Data used for the protection of children analysis were also collected from the 1990 *Census of Population and Housing* (USBC 1993).

The region of influence (ROI) is defined separately for each element of the proposed action and alternatives. For the proposed Fort Stewart helicopter air refueling track (FS-AR1), the alternative Fort Stewart helicopter AR track (FS-AR2), the proposed water training area helicopter AR track (WTA-AR1), and the alternative WTA helicopter AR track (WTA-AR2), each ROI is made up of all of the block groups directly beneath each airspace unit. A block group is a basic unit of estimated population used by the USBC to define areas. Block groups are composed of clusters of 1 to 4 city blocks, generally 550 housing units. In rural areas, where population densities are smaller, block groups are larger areas defined by physical features such as rivers, political boundaries (such as city limits or county lines), and other reasonable criteria.

In an attempt to more accurately present the data underlying each airspace unit, the percentage of each block group actually covered by the airspace is calculated and then multiplied with each census variable of concern (total population, total below poverty, total minority). In an attempt to analyze populations potentially impacted by proposed activities within WTA1, WTA2, the proposed and alternative Avon Park helicopter AR tracks (AP-AR1 and AP-AR2, respectively) (which are all located over water), the ROI is defined to include all block groups that fall within a 1-mile buffer that is extended landward from the coastline of the nearest training area (these being WTA2 and AP-AR1). In addition, WTA1, WTA2, AP-AR1, and AP-AR2 were combined and expanded even further in order to analyze those census tracts that are directly inland of the proposed training areas.

Table 3.7-1 presents the 1990 census data for minority and low-income populations within the ROI and Table 3.7-2 summarizes data for population of children. These data form the basis for the environmental justice and protection of children impact analysis presented in Section 4.7.

Table 3.7-1. Environmental Justice Data for the ROI (1990)

Geographic Area	*Total Population*	*Minority Populations*		*Low-Income Populations*	
		Number	*% of Total Population*	*Total Number*	*% of Total Population*
Proposed Action					
FS-AR1	5,213	271	5.2	728	14.0
WTA-AR1	2,501	976	39.0	636	25.4
AP-AR1[1]	5,465	129	2.4	587	10.7
WTA1[2]	92	21	22.8	14	15.2
Alternatives					
FS-AR2	12,464	2,145	17.2	2,574	20.7
WTA-AR2	4,128	384	9.3	633	15.3
AP-AR2[1]	5,465	129	2.4	587	10.7
WTA2[2]	92	21	22.8	14	15.2

Notes: [1] The same census block groups were used for the analysis of both AP-AR1 and AP-AR2.
[2] The same census block groups were used for the analysis of both WTA1 and WTA2.
Source: USBC 1993.

Table 3.7-2. Number of Children in the ROI (1990)

Geographic Area	*Total Population*	*Number of Children*	*% of Total Population*
Proposed Action			
FS-AR1	5,213	1,426	27.4
WTA-AR1	2,501	845	33.8
AP-AR1[1]	5,465	833	15.2
WTA1[2]	92	22	23.9
Alternatives			
FS-AR2	12,464	3,517	28.2
WTA-AR2	4,128	867	21.0
AP-AR2[1]	5,465	833	15.2
WTA2[2]	92	22	23.9

Notes: [1]The same census block groups were used for the analysis of both AP-AR1 and AP-AR2.
[2]The same census block groups were used for the analysis of both WTA1 and WTA2.
Source: USBC 1993.

3.8 LAND USE

Land use generally refers to human modification of land, often for residential or economic purposes. It also refers to the use of land for preservation or protection of natural resources such as wildlife habitat, vegetation, or unique features. Human land uses include residential, commercial, industrial, agricultural, or recreational uses, while unique natural features are often designated as national parks, national forests, wilderness areas, or national wildlife refuges.

Attributes of land use include general land use and ownership, land management plans, and special use areas. Land ownership is a categorization of land according to type of owner; the major land ownership categories include federal, Indian, state, and private. Federal lands are further described by the managing agency, which may include the U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), or Department of Defense (DoD). Land uses are frequently regulated by management plans, policies, ordinances, and regulations that determine the types of activities that are allowable or that protects specially designated or environmentally sensitive uses. Special Use Land Management Areas (SULMAs) are identified by agencies as being worthy of more rigorous management.

The following discussion addresses lands that underlie the proposed and alternative airspace. The emphasis is on special use areas and the primary land uses. Also addressed are other sensitive noise receptors underlying the airspace (such as schools) that could be affected by the proposed action.

3.8.1 Water Training Areas

3.8.1.1 PROPOSED WATER TRAINING AREA (WTA1)

Located approximately 4 nautical miles (NM) from the Florida shoreline, WTA1 encompasses approximately 152 square NM and is located in an area of the Gulf of Mexico known as the "Big Bend" (refer to Figure 2.1-1). This area is habitat for a large and diverse population of aquatic wildlife (refer to Section 3.11, Marine Biological Resources); it is valued as a commercial fishery as well as a recreation area for activities such as sport fishing and diving. In addition, WTA1 also overlies several interconnected shipping lanes used for maritime commerce by the local population (Florida Department of Environmental Protection [FDEP] 1999a).

WTA1 overlies two parts of a SULMA within the Gulf of Mexico known as the Big Bend Seagrasses Aquatic Preserve (Figure 3.8-1 and Table 3.8-1). This aquatic preserve extends approximately 8 NM out from the coast of Florida and overlaps approximately 42 square NM of WTA1. Areas designated as aquatic preserves within Florida waters are managed by FDEP primarily to ensure the maintenance of natural conditions, facilitate the propagation of fish and wildlife, and allow for public recreation within the area (fishing, boating, and hunting). The 70,000-acre St. Marks National Wildlife Refuge (NWR) is located along the coast of the Big Bend area of Florida and extends from the coastline into the Gulf of Mexico (see Figure 3.8-1). Its nearest point on land is about 5 NM from WTA1.

Figure

3.8-1 Special Use Land Management Areas in the Vicinity of the Proposed and Alternative WTAs and WTA Helicopter AR Tracks

Table 3.8-1. Special Use Land Management Areas under Affected Airspace		
Land Use Area	*Associated Airspace(s)*	*Area of SULMA beneath Airspace (acres)*
Aucilla River Wildlife Management District (WMD)	WTA-AR1 WTA-AR2	26 1,150
Big Bend Seagrasses Aquatic Preserve	WTA1 WTA2 AP-AR1 AP-AR2	35,537 67,008 32,122 7,539
Econfina River WMD	WTA-AR1 WTA-AR2	8,198 4,194
Hickory Mound Unit Wildlife Management Area (WMA)	WTA-AR1	525
Hixtown Swamp Conservation and Recreation Land (CARL)	WTA-AR1 WTA-AR1	8,672 1,523
Mill Creek South WMD	WTA-AR2	1,997
St. Marks National Wildlife Refuge	WTA2	8,960[1]
Suwannee River WMD	WTA-AR2	4,027
U.S. Army Corps of Engineers-Owned Land	FS-AR2	33
[1] Contained entirely within offshore areas.		

3.8.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

WTA2 encompasses approximately 110 square NM and is shifted slightly north of WTA1 (the boundaries of WTA1 and WTA2 partially overlap; see Figure 3.8-1). Similar to WTA1, WTA2 is also considered a valuable commercial fishery and recreational resource. It also overlaps several shipping lanes in the Gulf of Mexico used for commercial activities (FDEP 1999a).

The northern portion of WTA2 lies adjacent to the southern boundary of the St. Marks NWR. The St. Marks NWR was established by an Executive Closure Order implemented to protect winter habitat for ducks (primarily redheads [*Aythya americana*]). The northern portion of WTA2 overlaps the Big Bend Seagrasses Aquatic Preserve. Approximately 72 percent of the training area overlaps this aquatic preserve (see Figure 3.8-1).

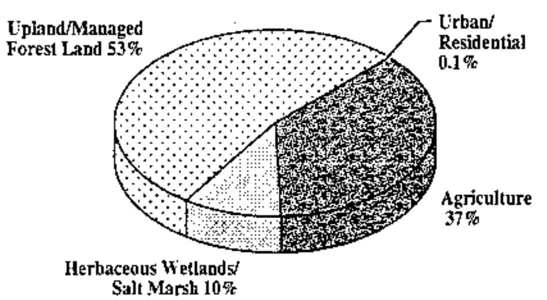
3.8.2 Fort Stewart Helicopter AR Tracks

3.8.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

The proposed Fort Stewart helicopter air refueling (AR) track is located in southeastern Georgia and is approximately 265 square miles in size. It overlies 105 square miles of Appling County, 120 square miles of Bacon County, 18 square miles of Jeff Davis County, and 22 square miles of Coffee County. Figure 3.8-2 shows the types of vegetation and land use categories found beneath FS-AR1.

Figure

3.8-2 Vegetation and Land Use Categories Underlying the Proposed and Alternative Fort Stewart Helicopter AR Tracks



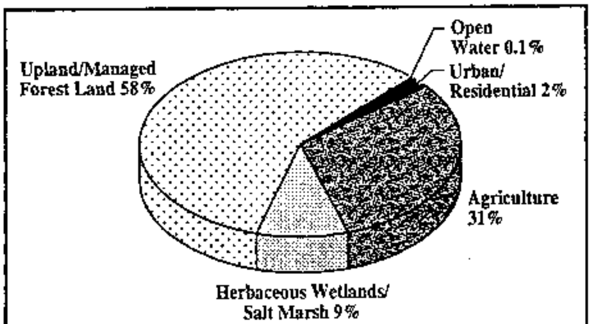
Major Land Use Categories Beneath FS-AR1

The majority of land coverage (53 percent) beneath FS-AR1 is classified as upland/managed forest land and includes deciduous forest and mixed forest areas. The second most dominant land coverage is classified as agriculture (37 percent). Approximately 10 percent of the land coverage consists of wetlands and salt marsh. Less than 1 percent consists of other developed land uses such as residential, urban, transportation, and commercial uses.

There are no SULMAs or sensitive noise receptors known to exist beneath the boundaries of FS-AR1.

3.8.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

FS-AR2 is also located in southeastern Georgia and is approximately 265 square miles in size. It overlies 118 square miles of Appling County, 130 square miles of Bacon County, 11 square miles of Coffee County, and 7 square miles of Ware County. Under FS-AR2 are the towns of Alma (population 3,833), Baxley (population 3,789), and Nicholls (population 1,159; U.S. Bureau of the Census [USBC] 1996).



Major Land Use Categories Beneath FS-AR2

The majority of land coverage (58 percent) beneath the airspace is classified as forest upland/managed forest land. The second most dominant land coverage is agriculture which comprises approximately 31 percent. About 9 percent of the area beneath FS-AR2 consists of wetlands and salt marsh, while urban and residential use comprise about 2 percent of the land area beneath the airspace.

Only one small SULMA is located within FS-AR2 in the northeastern portion of the track. This area is about 30 acres in size and characterized as a special use area because the U.S. Army Corps of Engineers has placed a restrictive covenant upon the land; however, the exact nature of the parcel is unknown.

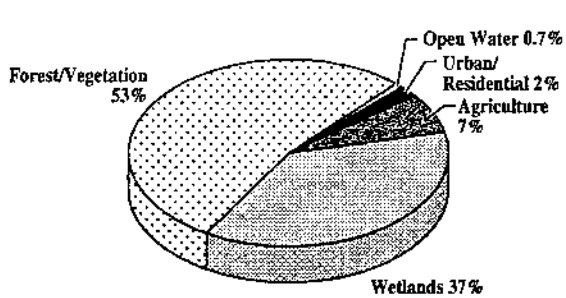
A number of sensitive noise receptors (i.e., 9 schools) are located beneath FS-AR2. Table 3.8-2 provides the average daily populations for each of these receptors.

Table 3.8-2. Schools Located beneath Affected Airspace		
Name	*County*	*Average Daily Population*
FS-AR2		
SCHOOLS		
Appling County Elementary School	Appling	594
Appling County Primary School	Appling	735
Appling County Junior High School	Appling	544
Appling County High School	Appling	1,004
Bacon County Elementary School	Bacon	453
Bacon County Middle School	Bacon	635
Bacon County High School	Bacon	472
Nicholls Elementary School	Coffee	343
Nicholls High School	Coffee	1,670
WTA-AR1		
SCHOOLS		
Greenville Primary School	Madison	228
Greenville Middle School	Madison	220
Sources: USGS (1995); Market Data Retrieval (1998).		

3.8.3 Water Training Area Helicopter AR Tracks

3.8.3.1 Proposed Water Training Area Helicopter AR Track (WTA-AR1)

Located in northern Florida, WTA-AR1 is approximately 300 square miles in size; it overlies 140 square miles of Madison County and 160 square miles of Taylor County in northern Florida. The small towns of Stern and Greenville are within the portion of Madison County beneath WTA-AR1.



Major Land Use Categories Beneath WTA-AR1

The two largest land uses beneath WTA-AR1 are forest/vegetation and wetlands, 53 and 37 percent, respectively. Approximately 7 percent consists of agriculture. Urban and residential use comprise about 2 percent of the land area beneath the airspace.

Figure 3.8-1 displays the type and location of known SULMAs underlying WTA-AR1. Approximately 36 percent (14 square miles) of the Hixtown Swamp Conservation and Recreation Land (CARL) underlies WTA-AR1. A CARL is land that has been purchased by the State of Florida to preserve an ecosystem determined to be of environmental significance to the state. CARL lands are usually managed by a state government agency

Figure

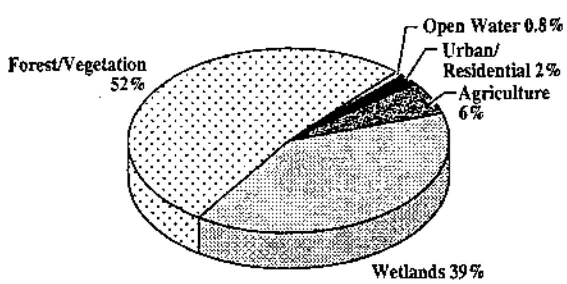
3.8-3 Vegetation and Land Use Categories Underlying the Proposed and Alternative Water Training Area Helicopter AR Tracks

after purchase. The Econfina River Water Management District (WMD) (approximately 13 square miles in size) is located completely inside this track. WMDs are regional governmental agencies within Florida that are tasked with preserving and protecting state water resources. WMDs often purchase riparian lands surrounding key water resources or other important areas in a watershed to preserve and maintain water quality in the area. The Econfina River WMD consists primarily of riparian area immediately surrounding the Econfina River. The Hixtown Swamp CARL is comprised of approximately 2.4 square miles of WMD. Small portions of both the Aucilla River WMD and the Hickory Mound Unit WMA are also within WTA-AR1.

Two schools are located beneath WTA-AR1: Greenville Primary School and Greenville Middle School (see Table 3.8-2). Both schools are located beneath the northern portion of the track near the towns of Stern and Greenville.

3.8.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

WTA-AR2 is also located in northern Florida and is approximately 363 square miles in size. It overlies 0.9 square miles of Jefferson County, 38 square miles of Lafayette County, 75 square miles of Madison County, 38 square miles of Suwannee County, and 211 square miles of Taylor County.



Major Land Use Categories Beneath WTA-AR2

The two largest major land uses beneath WTA-AR2 are forest/vegetation and wetlands, 52 and 39 percent, respectively. Approximately 6 percent consists of agriculture. Urban and residential use account for about 2 percent of the land area beneath the airspace.

Portions of four SULMAs consisting of WMD-owned lands are located beneath WTA-AR2 and are associated with the Econfina River, Suwannee River, Mill Creek South, and Aucilla River (see Figure 3.8-1). The 7 square mile portion of the Econfina WMD beneath WTA-AR2 is located on the western side of the track. Approximately 4 percent (or 6 square miles) of the 146-square mile Suwannee River WMD is located in the eastern portion of the track and consists primarily of riparian area along the Suwannee River. Nearly all (99 percent) of the 3 square mile Mill Creek South WMD is located beneath the eastern portion of the track and is comprised of riparian area that surrounds Mill Creek. The Aucilla River WMD consists of riparian land surrounding the Aucilla River and a small portion is located beneath the western side of WTA-AR2.

3.8.4 Avon Park Helicopter AR Tracks

3.8.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

AP-AR1 is located off the Gulf Coast of Florida and is approximately 300 square NM in size. The southeastern corner of the track is only 0.5 NM from the coast of Florida. Similar to the areas beneath WTA1 and WTA2, the area beneath the helicopter AR track is habitat for a large and diverse population of aquatic wildlife (refer to Section 3.11, Marine Biological Resources); it is valued as a commercial fishery as well as a recreation area for activities such as sport fishing and diving. AP-AR1 overlies several interconnected shipping lanes used for maritime commerce and for general purposes by the local population (FDEP 1999a).

Approximately 38 square NM of AP-AR1 overlay the Big Bend Seagrasses Aquatic Preserve. Also, numerous other SULMAs exist along the coast near AP-AR2 (Figure 3.8-4).

3.8.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

AP-AR2 is the same size as AP-AR1 (300 square NM) and its centerline is located one mile west of AP-AR1. At its nearest point, AP-AR2 is approximately 2.5 NM from Seahorse Key Island. Activities that occur beneath this track are similar to those identified for AP-AR1. In addition, there are at least four artificial reefs in this area, making it popular with divers and fisherman (FDEP 1999a). Approximately 9 square NM of AP-AR2 overly the Big Bend Seagrasses Aquatic Preserve (see Figure 3.8-4).

3.8.5 Crew Swap Facilities

3.8.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

The Perry-Foley Airport is located approximately 2 miles south of the city of Perry, Florida. The airport contains three runways oriented in a triangle shape and is part of a larger industrial park consisting of light industrial and heavy commercial uses. A vocational education school is located at the entrance to the industrial park. A small rescue response facility is located on-site. The airport is located within a predominantly rural setting; land use categories consist of a mix of residential, agriculture, and forested land. The residential component of the surrounding land use is very low density and would be characterized as farms or dispersed mobile homes.

3.8.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

The Cross City Airport is located approximately one mile east of Cross City, Florida. This airport is also located within an industrial park, although both the airport and the industrial park itself are larger than the Perry-Foley Airport. Land use in the vicinity of the airport is predominantly rural with a mix of residential, agriculture, and forest land. The residential component of the land use surrounding Cross City Airport is similar to Perry-Foley Airport in character and density.

Figure

3.8-4 Special Use Land Management Areas in the Vicinity of the Proposed and Alternative Avon Park Helicopter AR Tracks

3.9 RECREATION

This section addresses natural resources and man-made facilities designated or available for public recreational use. The setting, activity, and other elements that characterize affected recreational areas are considered in order to assess potential impacts.

Visual resources, defined as the natural and manufactured features that constitute the aesthetic qualities of an area, are also considered in this section. These features form the overall impression that an observer receives of an area or its landscape character. Landforms, water surfaces, vegetation, and manufactured features are considered characteristic of an area if they are inherent to the structure and function of the landscape.

The region of influence (ROI) for recreation and visual resources is defined to include the areas most likely to be affected by an increase in aircraft activity and training. For this analysis, the ROI is limited to the land under the affected airspace for the proposed action and alternatives, with the exception of the proposed and alternative water training areas (WTAs) and Avon Park helicopter air refueling (AR) tracks, which also include a discussion of relevant recreational and visual resources in the water areas along the affected coastline.

Many of the following descriptions of recreational and visual characteristics are based on previous discussions of land use activities beneath the proposed and alternative WTAs and helicopter AR tracks (refer to Section 3.8, Land Use).

3.9.1 Water Training Areas

3.9.1.1 PROPOSED WATER TRAINING AREA (WTA1)

WTA1 is located in an area of the Gulf of Mexico known as the Big Bend. This area is habitat for a large and diverse population of aquatic wildlife (refer to Section 3.11, Marine Biological Resources); it is valued as a recreational area for activities such as sport fishing, diving, and boating.

WTA1 overlaps 42 square nautical miles (NM) of the Big Bend Seagrasses Aquatic Preserve (refer to Figure 3.8-1). Florida aquatic preserves are managed by the Florida Department of Environmental Protection (FDEP) primarily to ensure maintenance of natural conditions, facilitate the propagation of fish and wildlife, and allow for public recreation in the area (e.g., fishing, boating, and hunting).

At its closest point, WTA1 is about 4 NM southeast of the 70,000-acre St. Marks National Wildlife Refuge (NWR). The U.S. Fish and Wildlife Service (USFWS) manages the NWR and provides compatible wildlife-oriented recreational opportunities to visitors. These include environmental education, wildlife observation, hunting, fishing, hiking, biking, boating, horseback riding, and picnicking.

Topographic features of the coastline are relatively minimal. Visual resources in the WTA are also limited. A portion of the coastline viewable from within WTA1 is considered special use managed land. As such, the viewshed from WTA1 along the shoreline has undergone little disturbance or development and remains in a relatively natural condition. The shoreline in this area is comprised predominately of rush and cord grass species, with few sandy beaches.

3.9.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

WTA2 is located in the immediate vicinity of WTA1 and is also considered a key recreational area in terms of fishing, diving, and boating. One artificial reef is located in the southwest corner of WTA2 (FDEP 1999a). Artificial reefs provide habitat for aquatic wildlife and are popular locations for diving and fishing. Approximately 72 percent of WTA2 overlaps the Big Bend Seagrasses Aquatic Preserve. This area is considered a valuable recreational resource in terms of fishing, diving, and boating.

WTA2 is located 1 NM from the coast of Florida, so coastal features are more visible than they are from WTA1. However, visual resources are still relatively limited. A large portion of the coastline viewable from within WTA2 is considered special use managed land. As such, the viewshed has undergone little disturbance or development and remains in a relatively pristine and natural condition.

3.9.2 Fort Stewart Helicopter AR Tracks

3.9.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

No specifically designated recreation areas are located beneath FS-AR1. The area underlying FS-AR1 is mostly rural (refer to Section 3.8-2); consequently, man-made recreational resources are limited.

The visual landscape of the area beneath FS-AR1 is mostly rural in character, with the majority of land use dominated by forestland, cropland, and pasture. No unique visual features are known to exist in the area.

3.9.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

The recreational and visual characteristics of the area beneath FS-AR2 are identical to those described for FS-AR1.

3.9.3 Water Training Area Helicopter AR Tracks

3.9.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

Three properties owned by the Water Management District (WMD), a Wildlife Management Area (WMA), and areas classified as conservation and recreation lands (CARL) are located beneath WTA-AR1 (refer to Figure 3.8-1). The Econfina River and the Hixtown Swamp WMD-owned lands consist of riparian land surrounding rivers and creeks, as well as large parcels set aside for conservation. Use intensities for WMD-owned lands vary; however, each parcel offers some combination of recreational activities for visitors such as hunting, fishing, hiking, biking, camping, and horseback riding. The Hixtown Swamp CARL is managed by the State of Florida and is available to the public for similar recreational activities. The Hickory Mound Unit WMA is managed by FDEP for the purpose of recreation; it offers hunting, fishing, hiking, and camping.

The visual landscape of the area underlying WTA-AR1 is mostly rural in character, with the dominant land cover being managed forestland and forested wetland.

3.9.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Four WMD-owned land parcels are located beneath WTA-AR2. These are associated with the Econfina River, Suwannee River, Mill Creek South, and Aucilla River (refer to Figure 3.8-1). These areas offer some or all of the following recreational activities for visitors: hunting, fishing, hiking, biking, camping, and horseback riding. The visual landscape of the area underlying WTA-AR2 is mostly rural in character, with the dominant land cover being managed forestland and forested wetland.

3.9.4 Avon Park Helicopter AR Tracks

3.9.4.1 Proposed Avon Park Helicopter AR Track (AP-AR1)

AP-AR1 is located off the Gulf coast of Central Florida. Almost the entire coastline nearest to the eastern boundary of AP-AR1 is considered a Special Use Land Management Area (SULMA) (refer to Figure 3.8-4), and is available to the public for various recreational activities. Examples of these activities include wildlife observation, hunting, fishing, hiking, biking, diving, and boating.

Although AP-AR1 is located off the coast of Central Florida, its nearest boundary (the southeast corner) overlies a point only 0.5 NM from shore. Consequently, the coastline is the most dominant visual feature. A vast majority of the coastline viewable from beneath AP-AR1 is considered special use managed land. As such, the viewshed has undergone little disturbance or development and remains in a relatively pristine and natural condition.

3.9.4.2 Alternative Avon Park Helicopter AR Track (AP-AR2)

The waters underlying AP-AR2 provide recreational activities such as fishing, boating, and diving. Four artificial reefs are located along the length of this track (FDEP 1999a). These reefs provide habitat for aquatic wildlife and are popular locations for diving and fishing.

AP-AR2 is located approximately 10 NM off the coast of Florida. A vast majority of the coastline east of AP-AR2 is considered special use managed land. As such, the viewshed has undergone little disturbance or development and remains in a relatively natural condition.

3.9.5 Crew Swap Facilities

3.9.5.1 Proposed Crew Swap Facility (Perry-Foley Airport)

Although typically not considered a recreational facility, the Perry-Foley Airport is used by pilots for recreational flying. No recreational resources were identified surrounding the airport complex.

This airport is part of a larger industrial park consisting of light industrial and heavy commercial uses. A vocational education school is located at the entrance to this park as well as an on-site emergency rescue facility. The visual landscape consists of warehouses and other industrial style structures arranged in a campus-type layout.

3.9.5.2 Alternative Crew Swap Facility (Cross City Airport)

The Cross City Airport is larger than Perry-Foley Airport and is also used by pilots for recreational flying. Similar to Perry-Foley, the visual landscape consists of the airfield, supporting structures, and surrounding forest and agricultural land. No recreational resources are located within the general vicinity of the airport.

3.10 TERRESTRIAL BIOLOGICAL RESOURCES

Biological resources include living, native, or naturalized plant and animal species and the habitats within which they occur. Plant associations are referred to as vegetation and animal species are referred to as wildlife. Habitat can be defined as the resources and conditions present in an area that produces occupancy of a plant or animal (Hall et al. 1997). Although the existence and preservation of biological resources are intrinsically valuable, these resources also provide aesthetic, recreational, and socioeconomic values to society. This analysis focuses on terrestrial species or vegetation types that are important to the function of the ecosystem, of special societal importance, or are protected under federal or state law or statute. For purposes of the EA, these resources are divided into four major categories: vegetation; wetlands and freshwater resources; wildlife; and threatened, endangered, or sensitive species. Marine biological resources are discussed in Section 3.11, Marine Biological Resources.

Vegetation includes all existing terrestrial plant communities with the exception of wetlands or threatened, endangered, or sensitive species.

Wetlands are considered sensitive habitats and are subject to federal regulatory authority under Section 404 of the Clean Water Act (CWA) and Executive Order (EO) 11990, *Protection of Wetlands*. Jurisdictional wetlands are defined by the U.S. Army Corps of Engineers (USACOE) as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (U. S. Department of the Army 1987). Areas meeting the federal wetland definition are under the jurisdiction of the USACOE. In Florida, state regulated jurisdictional wetlands also include areas that meet specific criteria for soils, hydrology, and plant species that are defined by the unified wetland delineation methodology contained in Chapter 62-340, Florida Administrative Code (State of Florida 1994; Gilbert et al. 1995).

Wildlife includes all vertebrate animals with the exception of those identified as threatened, endangered, or sensitive. Wildlife includes fish, amphibians, reptiles, birds, and mammals.

Threatened, endangered, or sensitive species are defined as those plant and animal species listed as threatened, endangered, or proposed as such, by the U. S. Fish and Wildlife Service (USFWS) or state fish and wildlife agencies. Since the proposed operations do not include any ground-disturbance activities beneath the airspace of the proposed and alternative helicopter air refueling (AR) tracks, threatened or endangered plant species are not discussed. The Endangered Species Act (ESA) protects federally listed threatened and endangered plant and animal species. Federal species of concern, formerly Category 2 candidate species, are not protected by law; however, these species could become listed and, therefore, protected at any time. Their consideration early in the planning process may avoid future conflicts that could otherwise occur. For the proposed action and alternatives, the Florida Fish and Wildlife Conservation Commission (FWCC, formerly the Game and Fresh Water Fish Commission [FGFC]), Florida Department of Environmental Protection (FDEP), and Georgia Department of Natural Resources (GDNR) through the Georgia Natural Heritage Program (GNHP) also protect state-listed plant and animal species through their respective state fish and wildlife and administrative codes. Additionally, the Florida Natural Areas Inventory (FNAI), a non-government organization, maintains databases of state species of concern, many of which are not afforded legal protection.

The region of influence (ROI) for terrestrial biological resources for the proposed and alternative locations consists of all lands under the affected airspace (i.e., helicopter AR tracks).

3.10.1 Water Training Areas

There is no terrestrial biological resource component directly applicable to the proposed or the alternative water training area (WTA). However, the coastal environment represents the nearest terrestrial community to the proposed and alternative WTA. The coastal region in the vicinity of the WTA is primarily salt marsh dominated by black needle rush (*Juncus roemerianus*) and salt-marsh cord grass (*Spartina alterniflora*). Tidal mud flats are present, but reduced because of the low tidal range and low wave energy within the Big Bend area of the Florida Gulf Coast. Sand beaches are not a part of the coastal ecosystem in this area of the Big Bend. Small tidal creeks drain the salt marshes along the coast. The main river drainage basins in this area are the St. Marks River, Aucilla/Wacissa River complex, Econfina River, and Fenholloway River.

St. Marks National Wildlife Refuge (NWR) is located north and west of the proposed and alternative WTAs, and the federal jurisdiction boundary extends to 1 mile offshore. Coincident with this regulatory area is the state regulated Big Bend Seagrasses Aquatic Preserve whose boundaries extend from the shoreline to 9 miles offshore. The aquatic preserve includes coastal and offshore areas of Wakulla, Taylor, Jefferson, Dixie, and Levy counties (State of Florida 1996).

3.10.2 Fort Stewart Helicopter AR Tracks

3.10.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

Vegetation. This area of Georgia is considered to be within the Coastal Plain province and historically was dominated by the rolling wiregrass community (Wharton 1978). The area beneath FS-AR1 is primarily rural with evergreen forest (52 percent) and agriculture (38 percent) as the two major vegetation types (refer to Section 3.8, Land Use). The evergreen forest in the area is primarily pine plantation in various stages of harvest. There are no areas lying beneath FS-AR1 that are designated as environmentally sensitive.

Wetlands and Freshwater Resources. Approximately 10 percent of the lands underlying FS-AR1 are forested wetlands found along riverine corridors. The terrestrial environment underlying FS-AR1 is within the Satilla and Altamaha drainage basins. Both major drainage basins are classified as fishing waters (State of Georgia 1998).

Wildlife. Due to the manipulated environments associated with agricultural and silvicultural operations, wildlife diversity is limited beneath FS-AR1. Generalized southeastern species found within the existing habitats have adjusted to living in open agricultural fields or within manipulated forestlands. The wetland forested areas are refugia for species that are dependent on wetlands and the river and stream systems.

Common mammals found in this area would primarily be ruderal species including white-tailed deer (*Odocoileus virginianus*), Virginia opossum (*Didelphis virginiana)*, nine-banded armadillo (*Dasypus novemcinctus*), eastern gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), and grey fox (*Urocyon cinereoargenteus*). Additional wildlife found in the area include common amphibians such as various species of frogs, tree frogs, toads, and salamanders. Reptile species in the area include various lizard species such as the green anole (*Anolis carolinensis*), and the southeastern assemblage of snake species associated with old fields and disturbed woodlands.

Threatened, Endangered, or Sensitive Species. There is only one federally listed species (eastern indigo snake [*Drymarchon corais couperi*]) that potentially occurs on lands beneath FS-AR1 (Table 3.10-1). No bald eagle (*Haliaeetus leucocephalus*) or wood stork (*Mycteria americana*) nesting sites are located within 25 miles of FS-AR1 (USFWS 1999a). Portions of FS-AR1 intersect the 40-mile foraging radius for wood storks as determined by USFWS. While red-cockaded woodpecker (*Picoides borealis*) is recorded to be potentially present in Appling county beneath FS-AR1, GNHP species occurrence records at the quarter-quad level contained no occurrences in the area underlying FS-AR1 (GNHP 1999).

The flatwoods salamander (*Ambystoma cingulatum*) was listed by the USFWS as a threatened species in April 1999 (USFWS 1999c). Historically, the flatwoods salamander inhabited the lower Southeastern Coastal Plain from southern South Carolina, southward to Marion County, Florida, and westward through southern Georgia to extreme southwestern Alabama. Flatwood salamander habitat consists of fire-maintained, open-canopied, mesic woodlands of longleaf/slash pine (*Pinus palustris/P. elliottii*) flatwoods and savannas (Palis 1997). Over 80 percent of flatwoods salamander habitat have been lost due to the degradation and loss of its pine flatwoods habitat from silvicultural practices, agriculture, and urbanization. Recent surveys in Georgia have not found flatwoods salamanders at any of the 33 historical sites in 19 counties. Only 11 populations are currently known from Georgia with 5 of those populations occurring on Fort Stewart Military Installation (USFWS 1999c). A 1974 record from the Okefenokee NWR, approximately 40 miles to the south of FS-AR1, is the only historical occurrence of flatwoods salamander within the vicinity of the ROI (GNHP 1999). Although ongoing surveys may discover new populations in Georgia, due to the low percentage of wetland communities (10 percent) and high percentage of agricultural and silvicultural areas (90 percent) beneath FS-AR1, it is unlikely that flatwoods salamander would occur beneath the proposed Fort Stewart AR track.

3.10.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

Vegetation. This area of Georgia is considered to be within the Coastal Plain province and was historically dominated by the rolling wiregrass community (Wharton 1978). The area beneath FS-AR2 is primarily rural with evergreen forest (58 percent) and agriculture (31 percent) as the two major vegetation types (refer to Section 3.8, Land Use). The evergreen forest in the area is primarily pine plantation in various stages of harvest. There are no areas lying beneath FS-AR2 that are designated as environmentally sensitive.

Wetlands and Freshwater Resources. Approximately 9 percent of the lands underlying FS-AR2 are forested wetlands found along riverine corridors. The terrestrial environment underlying FS-AR2 is within the Satilla and Altamaha drainage basins. Both major drainage basins are classified as fishing waters (State of Georgia 1998).

Wildlife. Due to the manipulated environments associated with agricultural and silvicultural operations, wildlife diversity is limited beneath FS-AR2. Southeastern species found within the existing habitats have adjusted to living in open agricultural fields or within manipulated forestlands. The wetland forested areas are refugia for species that are dependent on wetlands and the river and stream systems.

Table 3.10-1. Sensitive Wildlife Species Potentially Occurring in Florida and Georgia Counties under the Proposed and Alternative Helicopter AR Tracks (Page 1 of 3)											
Common Name	**Status**[1]	**Florida Counties**[2]					**Georgia Counties**[2]				
Scientific Name	**Fed/FL/GA**	**Jef**	**Laf**	**Mad**	**Suw**	**Tay**	**App**	**Bac**	**Cof**	**JD**	**Ware**
FISH											
Gulf sturgeon *Acipenser oxyrhynchus desotoi*	T/SSC/		X	X	X						
Suwannee bass *Micropterus notius*	- /SSC/		X	X	X						
AMPHIBIANS											
Flatwoods salamander *Ambystoma cingulatum*	T/ - /R										
Gopher frog *Rana capito*	- /SSC/	X	X	X	X	X					
REPTILES											
American alligator *Alligator mississippiensis*	T(S/A)/SSC/	X	X	X	X	X					
Eastern indigo snake *Drymarchon corais couperi*	T/T/T	X	X	X	X	X				X	
Gopher tortoise *Gopherus polyphemus*	- /SSC/T	X	X	X	X	X	X				
Alligator snapping turtle *Macroclemys temminckii*	- /SSC/	X	X	X	X	X					
Florida pine snake *Pituophis melanoleucus mugitus*	- /SSC/		X	X	X	X					
Suwannee cooter *Pseudemys concinna suwanniensis*	- /SSC/	X	X	X	X	X					
Short-tailed snake *Stilosoma extenuatum*	- /T/				X						
BIRDS											
Bachman's sparrow *Aimophila aestivalis*	- / - /R						X				
Scott’s seasided sparrow *Ammodramus maritimus peninsulae*	- /SSC/	X				X					
Limpkin *Aramus guarauna*	- /SSC/	X	X	X	X	X					
Piping plover *Charadrius melodus*	T/T/	X				X					
Marian’s marsh wren *Cistothorus palustris marianae*	- /SSC/	X				X					

Table 3.10-1. Sensitive Wildlife Species Potentially Occurring in Florida and Georgia Counties under the Proposed and Alternative Helicopter AR Tracks (Page 2 of 3)

Common Name *Scientific Name*	Status[1] Fed/FL/GA	Florida Counties[2]					Georgia Counties[2]				
		Jef	Laf	Mad	Suw	Tay	App	Bac	Cof	JD	Ware
BIRDS (cont)											
Little blue heron *Egretta caerulea*	- /SSC/	X	X	X	X	X					
Reddish egret *Egretta rufescens*	- /SSC/					X					
Snowy egret *Egretta thula*	- /SSC/	X	X	X	X	X					
Tricolored heron *Egretta tricolor*	- /SSC/	X	X	X	X	X					
White ibis *Eudocimus albus*	- /SSC/	X	X	X	X	X					
Peregrine falcon *Falco peregrinus*	E/E/	X	X	X	X	X					
Southeastern American kestrel *Falco sparverius paulus*	- /T/	X	X	X	X	X					
Florida sandhill crane *Grus canadensis pratensis*	- /T/			X		X					
Bald eagle *Haliaeetus leucocephalus*	T/T/	X			X	X					
Wood stork *Mycteria americana*	E/E/	X	X	X	X	X					
Osprey *Pandion haliaetus*	- /SSC/	X	X	X	X	X					
Brown pelican *Pelecanus occidentalis*	- /SSC/	X				X					
Red-cockaded woodpecker *Picoides borealis*	E/T/E	X		X			X				
Black skimmer *Rynchops niger*	- /SSC/	X				X					
Florida burrowing owl *Speotyto cunicularia floridana*	- /SSC/		X	X	X						
Least tern *Sterna antillarum*	- /T/	X				X					

Table 3.10-1. Sensitive Wildlife Species Potentially Occurring in Florida and Georgia Counties under the Proposed and Alternative Helicopter AR Tracks (Page 3 of 3)

Common Name	**Status**[1]	**Florida Counties**[2]					**Georgia Counties**[2]				
Scientific Name	**Fed/FL/GA**	**Jef**	**Laf**	**Mad**	**Suw**	**Tay**	**App**	**Bac**	**Cof**	**JD**	**Ware**
MAMMALS											
Florida mouse *Podomys floridanus*	- /SSC/		X	X	X	X					
Sherman's fox squirrel *Sciurus niger shermani*	- /SSC/	X		X	X						
Florida black bear *Ursus americanus floridanus*	C/T/	X		X	X	X					

Notes: [1]C = Federal Candidate for Listing
E = Endangered
S/A = Similarity of appearance
SSC = State Species of Concern
T = Threatened
[2]Jef = Jefferson App = Appling
Laf = Lafayette Bac = Bacon
Mad = Madison Cof = Coffee
Suw = Suwannee JD = Jeff Davis
Tay = Taylor

Sources: GNHP 1999, FNAI 1999, USFWS 1999a.

Figure

3.10-1 Wood Stork and Bald Eagle Nest Sites within the Vicinity of the Proposed and Alternative WTAs, and WTA and Fort Stewart Helicopter AR Tracks

Common mammals found in this area would primarily be ruderal species including white-tailed deer, Virginia opossum, nine-banded armadillo, eastern gray squirrel, raccoon, and grey fox. Common amphibians include various species of frogs, tree frogs, toads, and salamanders. Reptile species in the area include various lizard types such as the green anole and the southeastern assemblage of snake species associated with old fields and disturbed woodlands.

Threatened, Endangered, or Sensitive Species. The eastern indigo snake is the only federally listed species that potentially occurs on lands beneath FS-AR2 (see Table 3.10-1). No bald eagle or wood stork nesting sites are located within 25 miles of FS-AR2 (USFWS 1999a). Portions of FS-AR2 intersect the 40-mile foraging radius for wood storks as determined by USFWS. While the red-cockaded woodpecker is recorded to be potentially present in Appling county beneath FS-AR1, GNHP species occurrence records at the quarter-quad level contained no occurrences in the area underlying FS-AR2 (GNHP 1999).

Although flatwoods salamander are known to occur in Georgia, a 1974 record from the Okefenokee NWR, approximately 40 miles to the south of FS-AR1, is the only historical occurrence of flatwoods salamander within the vicinity of the ROI (GNHP 1999). Due to the low percentage of wetland communities (9 percent) and high percentage of agricultural and silvicultural areas (89 percent) beneath FS-AR2, it is unlikely that flatwoods salamander would occur beneath the alternative Fort Stewart AR track.

3.10.3 Water Training Area Helicopter AR Tracks

3.10.3.1 Proposed Water Training Area Helicopter AR Track (WTA-AR1)

Vegetation. WTA-AR1 overlies a primarily rural area of Taylor and Madison counties. Vegetation underlying the track is 35 percent wetland community and 45 percent upland or managed forest. Agriculture (7 percent) is located in the upper third of the corridor and within a small band along the Madison/Taylor county line. In general, the southern portion of the track overlies the hydric hammock community type in addition to managed forestland and forested wetland.

Wetlands and Freshwater Resources. The terrestrial environment underlying WTA-AR1 is all contained within the Suwannee River Water Management District (WMD) (Fernald and Patton 1984). A large portion of the Econfina River corridor is owned by the Suwannee River WMD as a means of protecting the water quality within the basin.

Hydric hammock accounts for approximately 8 percent of the total wetland area of WTA-AR1. This habitat type is considered to be a plant community of concern in Florida but has no designated state or global ranking (FNAI and Florida Department of Natural Resources [FDNR] 1990; FNAI 1999). The Gulf Coastal hammocks strand, the largest example of the hydric hammock community, is located in the ROI and extends south to the Withlacooche River basin in Levy County.

There are no Class I (potable) water bodies beneath WTA-AR1. All of the rivers in the ROI are designated for Class III use. Class III use of surface waters is defined as supporting recreation, and propagation and maintenance of a healthy, well-balanced population of fish and wildlife. Classification of the Fenholloway River was recently upgraded from Class V to Class III. This provides for increased protection of water quality within the basin. All of the river drainage basins (Aucilla, Suwannee and Econfina) and the entire coastline in this area are designated as Outstanding Florida Waters (OFW) with the exception of the Fenholloway River. Water bodies designated as OFW are afforded the highest protection of water quality under state statutes. This statutory protection is structured to ensure that there is no degradation of water quality within the basin or individual water body (State of Florida 1996).

Wildlife. The terrestrial environment underlying WTA-AR1 is primarily rural and historically dominated by pine flatwoods and swamps. With the advent of silvicultural management the dominant plant species changed, but the basic wildlife assemblage remained somewhat constant. Upland flatwoods commonly support several species of small birds, small mammals, and twenty to thirty species of reptiles and amphibians (FNAI and FDNR 1990; Myers and Ewel 1990). White-tailed deer, Virginia opossum, nine-banded armadillo, eastern gray squirrel, raccoon, grey fox, and bobcat (*Lynx rufus*) is likely to occur throughout this community. The wildlife assemblage in wet pine flatwoods is similar in makeup to the upland pine flatwoods, with the addition of more aquatically dependent species usually associated with adjacent swamp habitat, particularly wading birds.

The hydric hammock community maintains high species diversity for reptiles and amphibians, birds, and mammals. Additionally, hydric hammocks are important to numerous butterfly species and to seasonal bird populations, especially overwintering and migratory passerine species (Vince et al. 1989).

Threatened, Endangered, or Sensitive Species. A total of 32 species listed by the USFWS and the State of Florida have the potential to occur within the counties underlying the airspace for WTA-AR1 (see Table 3.10-1). There are three animal species in these counties that are federally listed as endangered and five that are considered threatened.

The eastern indigo snake is found in sandhill habitat in association with populations of gopher tortoise (*Gopherus polyphemus*), particularly because they are linked by their shared habitat, the gopher tortoise burrow.

In Florida, only 23 percent of the historical flatwoods salamander sites contained flatwoods salamanders. Additional survey work resulted in the discovery of 81 new breeding sites, 69 percent of which were found on the Apalachicola National Forest and Eglin AFB. Some of the best remaining pine flatwoods habitat in the Southeast occurs in the Panhandle of Florida, especially on the Apalachicola National Forest and Eglin AFB, and over 42 percent of the extant flatwoods salamander populations occur on these two areas (USFWS 1999c). Although approximately 35 percent of the land beneath WTA-AR1 consists of wetland communities, the FNAI contains no records of flatwoods salamander in any of the counties underlying the proposed WTA AR track (FNAI 1999).

Six sensitive species that are not likely to occur within the area below WTA-AR1 due to the lack of suitable habitat include piping plover (*Charadrius melodus*), Scott's seaside sparrow (*Ammodramus maritimus peninsulae*), Marian's marsh wren (*Cistothorus palustris mariana*), black skimmer (*Rynchops niger*), brown pelican (*Pelecanus occidentalis*), and least tern (*Sterna antillarum*).

The nearest wood stork nest is located approximately 10 miles north of WTA-AR1 (see Figure 3.10-1). Associated with each wood stork nest is a 40-mile foraging zone designated by the USFWS. Five foraging zones overlap WTA-AR1.

There are several bald eagle nests along the coast south of WTA-AR1. The distance to these nests from WTA-AR1 ranges from 3.5 miles to 9.5 miles. The peregrine falcon (*Falco peregrinus*) is known to be a rare or uncommon visitor to the area and would be present under WTA-AR1 airspace only as a transient visitor migrating through the area. No nest sites or suitable habitat for the red-cockaded woodpecker are found beneath WTA-AR1 (FGFC 1996).

State owned and regional water management district lands account for approximately 10 percent of the total land beneath WTA-AR1 (Figure 3.10-2). In the northern third of the track, a large expanse of herbaceous and forested wetland and open water make up the Hixtown Swamp complex. This area is recognized as an important habitat by the State of Florida and has been purchased under the Conservation and Recreational Lands (CARL) program. Through the CARL program, areas that are considered unique for endangered species, plant communities, geologic features, or archaeological importance are purchased and managed by the state for conservation and protection. The FGFC has designated a portion of the Hixtown Swamp Complex as a Strategic Habitat Conservation Area (SHCA) for Eight Species of Wading Birds (see Figure 3.10-2) (Cox et al. 1994). In the area below WTA-AR1, six of the wading birds considered in the SHCA are state-listed species: wood stork, white ibis (*Eudocimus albus)*, little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), reddish egret (*Egretta rufescens*), and snowy egret (*Egretta thula*).

The Florida Sandhill crane (*Grus canadensis pratensis*) is listed as potentially occurring in both Madison and Taylor counties; however, suitable habitat for this species does not exist in the ROI (Cox et al. 1994). Since there are no known populations within the Aucilla/Wacissa or the Econfina river basins (USFWS and Gulf States Marine Fisheries Commission [GSMFC] 1995), the Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is not expected to occur within the ROI for WTA-AR1. The American alligator *(Alligator mississippiensis)* can be found throughout the ROI for WTA-AR1 in coastal marshes, rivers, and swamps. The Florida black bear (*Ursus americanus floridanus*) is listed as a candidate for federal protection. Conservation areas with stable populations of black bear are located further west in Wakulla and Liberty counties. The areas underlying WTA-AR1 in Taylor and Madison counties are considered to have potential habitat for the Florida black bear (Cox et al. 1994).

3.10.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Vegetation. WTA-AR2 encompasses a primarily rural area of Jefferson, Taylor, Madison, Lafayette, and Suwannee counties in Florida. Vegetation underlying the track is 47 percent managed forestland and upland forest. Commercial silviculture interests primarily own the managed pine forest lands beneath the WTA-AR2 airspace. Agriculture underlies approximately 6 percent of the track and is concentrated primarily in the eastern portion.

Of the total land beneath WTA-AR2, less than 1 percent contains Florida plant communities of concern: hydric hammock (0.4 percent) and Florida sandhill (0.4 percent) (FNAI and FDNR 1990; FNAI 1999). Florida sandhill habitat is state ranked as a natural community that is vulnerable to extinction throughout its range. In the area underlying WTA-AR2, the sandhills are small areas of pineland and scrub within the agricultural area to the east of the Suwannee River.

Wetlands and Freshwater Resources. Forested wetlands account for 37 percent of the total acreage beneath WTA-AR2. The large central forested wetland expanse located in Taylor, Madison, and Lafayette counties is part of a larger wetland feature named San Pedro Bay that is drained by the Steinhatchee River. In addition, approximately 5 percent of the total land under WTA-AR2 is managed by the Suwannee River WMD (see Figure 3.10-2). This represents the only protected lands within the corridor.

Figure

3.10-2 Conservation Lands and Proposed SHCAs for Wading Birds Underlying the Proposed and Alternative WTAs and WTA Helicopter AR Tracks

There are no Class I (potable) water bodies beneath WTA-AR2. All of the rivers in the ROI are designated for Class III use. Class III use of surface waters is defined as supporting recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife. All of the river drainage basins and the entire coastline in this area are designated as OFW with the exception of the Fenholloway River. Water bodies designated as OFW are afforded the highest protection of water quality under state statutes. This statutory protection is structured to ensure that there is no degradation of water quality within the basin or individual water body (State of Florida 1996).

Wildlife. The terrestrial environment underlying WTA-AR2 is primarily rural and historically was dominated by pine flatwoods and swamps. With the advent of silvicultural management the dominant plant species changed, but the basic wildlife assemblage remained somewhat constant. Upland flatwoods commonly support several species of small birds, small mammals, and twenty to thirty species of reptiles and amphibians (FNAI and FDNR 1990; Myers and Ewel 1990). White-tailed deer, Virginia opossum, nine-banded armadillo, eastern gray squirrel, raccoon, grey fox, and bobcat are likely to occur throughout this community.

The wildlife assemblage in wet pine flatwoods is similar in makeup to the upland pine flatwoods, with the addition of more aquatically dependent species usually associated with adjacent swamp habitat, particularly wading birds.

Threatened, Endangered, or Sensitive Species. A total of 33 species listed by the USFWS and the State of Florida have the potential to occur within the counties underlying the airspace for WTA-AR2 (see Table 3.10-1). There are three animal species in these counties that are federally listed as endangered and five that are considered threatened.

The Eastern indigo snake can be found in sandhill habitat in association with populations of gopher tortoise, particularly because they are linked by their shared habitat, the gopher tortoise burrow. Six species that are not likely to occur under WTA-AR2 airspace due to the lack of suitable habitat include piping plover, Scott's seaside sparrow, Marian's marsh wren, black skimmer, brown pelican, and least tern. No wood stork nest sites are within 20 miles of WTA-AR2 (see Figure 3.10-1). No nest sites or suitable habitat for the red-cockaded woodpecker are found beneath WTA-AR2 (FGFC 1999). The Florida Sandhill crane is listed as potentially occurring in both Madison and Taylor counties; however, suitable habitat for this species does not exist in the ROI (Cox et al. 1994).

The nearest bald eagle nest is located approximately 7 miles from the western edge of WTA-AR2. The peregrine falcon is known to be a rare or uncommon visitor to the area and would be present under WTA-AR2 airspace only as a transient visitor migrating through the area.

Underlying the eastern end of WTA-AR2, the Suwannee River supports the most viable population of gulf sturgeon among the coastal rivers of the Gulf of Mexico. This anadromous fish spends the late spring and summer months in the river and migrates downstream in late fall (USFWS and GSMFC 1995).

As with WTA-AR1, the area beneath WTA-AR2 contains extensive wetland areas but no occurrences of flatwoods salamander have been recorded by the FNAI in any of the counties underlying WTA-AR2 (FNAI 1999).

The American alligator can be found throughout the ROI for WTA-AR2 in coastal marshes, rivers, and swamps. The Florida black bear is listed as a candidate for federal protection. Conservation areas with stable populations of black bear are located further west in Wakulla and Liberty counties. The areas underlying WTA-AR2 in Taylor, Madison, Lafayette, and Suwannee counties are considered to have potential habitat for the Florida black bear (Cox et al. 1994).

3.10.4 Avon Park Helicopter AR Tracks

The Avon Park helicopter AR tracks are located offshore of the west coast of Florida. While there is no terrestrial component to either of the AR tracks, there are significant biological resources in the nearshore and coastal region adjacent to the track locations (Figures 3.10-3 and 3.10-4). This portion of the west Florida coast contains several significant federal and state managed lands. Two NWRs are adjacent to the tracks: Chassahowitzka and Cedar Key. Both NWRs support similar species of wildlife. Cedar Keys NWR consists primarily of wilderness islands and supports a greater diversity of birds than other wildlife and contains the largest colonial bird nesting site in North Florida. The wading bird species present include white ibis, great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), snowy egret, and great egret (*Ardea alba*). Bald eagles are the primary raptor species within Cedar Keys NWR.

Chassahowitzka NWR supports a large over-wintering population of water birds including: red-breasted merganser (*Mergus serrator*), blue (*Anas discors*) and green-winged teal (*Anas crecca*), wood duck (*Aix sponsa*), and Northern pintail (*Anas acuta*). Numerous species of wading birds are resident in the Cedar Keys NWR as well as raptors such as the bald eagle and the peregrine falcon. Wildlife includes raccoon, bobcat, and white-tailed deer. Additionally, otter (*Lutra canadensis*) and coyote (*Canis latrans*) are common mammals. Healthy populations of Florida cottonmouth (*Akistrodon piscivorus conanti*), Eastern diamondback rattlesnake (*Crotalus adamanteus*), and diamondback terrapin (*Malaclemys terrapin*) also reside in the refuge.

The airspace for both tracks overlies the southern boundary of the Big Bend Seagrasses Aquatic Preserve (see Figure 3.10-4) (refer to Section 3.11, Marine Biological Resources). The Crystal River empties into the Gulf of Mexico east of and midway along the AR tracks.

3.10.5 Crew Swap Facilities

3.10.5.1 Proposed Crew Swap Facility (Perry-Foley Airport)

Most of the area at Perry-Foley Airport is actively landscaped or paved, with little natural vegetation or habitat remaining. Areas surrounding the airport consist primarily of rural residential, agricultural, and forested land. Wildlife species present are those commonly found in urban and human-disturbed environments.

3.10.5.2 Alternative Crew Swap Facility (Cross City Airport)

Most of the area at Cross City Airport is actively landscaped or paved, with little natural vegetation or habitat remaining. Areas surrounding the airport consist primarily of rural residential, agricultural, and forested land. Wildlife species are those commonly found in urban and human-disturbed environments.

Figure

3.10-3 Wood Stork and Bald Eagle Nest Sites within the Vicinity of the Proposed and Alternative Avon Park Helicopter AR Tracks

Figure

3.10-4 Conservation Lands and Proposed SHCAs for Wading Birds in the Vicinity of the Proposed and Alternative Avon Park Helicopter AR Tracks

3.11 MARINE BIOLOGICAL RESOURCES

The purpose of this section is to describe the marine environment and marine biological resources associated with the proposed and alternative project areas. This section is comprised of three major subsections: 1) characterization of the marine environment; 2) invertebrates, fish, and sea turtles; and 3) marine mammals. The description of marine biological resources is based on a review of the available scientific literature and a field investigation of the water training area (WTA) region conducted 18-20 April 1999. The field investigation was conducted to verify the distribution and extent of locally important bottom features.

Marine Environment

The distribution of bottom sediments from Apalachee Bay to Tampa Bay is characterized by a narrow band of quartz sand from the shore out to a depth of 33 to 66 feet (Darnell and Kleypas 1987) (Figure 3.11-1). The outer half to two-thirds of the shelf is covered with biogenic carbonate sand—the hard shell remains of calcareous fauna such as mollusks, sponges, coral, algae, and formanifera. Between the offshore carbonate and nearshore quartz is a band of mixed carbonate/quartz sand. While there are scattered, low-relief rock outcrops in the Apalachee Bay area, there are no large-scale areas of coral reefs or high-relief topographic features in either the proposed or alternative WTAs or in the waters beneath the proposed and alternative Avon Park helicopter air refueling (AR) tracks (Lynch 1954; Darnell and Kleypas 1987).

Oceanographic Conditions

This subsection includes a description of marine water quality; depth; temperature and salinity characteristics; and general and local circulation based on previously published data. Temperature and salinity would not be affected by any project activity but are important to the later descriptions of marine animal distribution and also for the purposes of modeling noise propagation through the water. Currents are important in determining the dispersal pattern of lightsticks and other project-related debris.

Water Quality. Marine water quality in the region is considered to be excellent. The overwhelming proportion of contaminants in the Gulf marine environment is attributed to river discharge. Because of its size, the Mississippi/Atchafalaya system is the major source of contaminants to the Gulf. Most of this flow is carried to the west, diverting contaminants away from the eastern Gulf. The rivers discharging into Apalachee Bay carry relatively low concentrations of contaminants which, when combined with their level of discharge, results in very low contaminant levels in the marine environment. In addition, coastal zone sources of pollution in the study are greatly diminished due to the low human population in the region.

Depth. Depth in the proposed WTA (WTA1) ranges from approximately 6 feet along the north east boundary to over 24 feet along the western and southwest margin of the quadrant (Figure 3.11-2). Patchy shoals as shallow as 16 feet can be found along the western margin of WTA1 amid surrounding depths of 20 to 24 feet. For the most part, the alternative WTA (WTA2) lies within the 12-foot contour with waters as shallow as 3 feet occurring along the northeast boundary.

Figure

3.11-1 Distribution of Significant Bottom Features of the Northwest Florida Shelf

Figure

3.11-2 Bathymetry in the Vicinity of the Proposed and Alternative Water Training Areas

The proposed Avon Park helicopter AR track (AP-AR1) is predominantly over waters within the 12-foot contour (Figure 3.11-3). Waters beneath the lower third of AP-AR1 are generally less than 6 feet but deepen to nearly 20 feet along the northern third of the track which passes over the seaward end of the Florida Barge Canal. Water depth decreases along the northern limits of the track near Cedar Key. Depths beneath the alternative Avon Park helicopter AR track (AP-AR2) are 3 to 4 feet near its shallowest northern end near Seahorse Reef. The remainder of the track ranges from 9 feet near the southern end to over 30 feet seaward of the Florida Barge Canal. The majority of AP-AR2 overlies waters greater than 18 feet deep.

Temperature and Salinity. Sea surface temperatures in the northeastern Gulf of Mexico undergo seasonal cycles with highs of 84-86°F occurring in summer (July-August) and dropping to 55-57°F by mid-winter (January-February) (National Oceanographic and Atmospheric Association [NOAA]) 1985; Harkema et al. 1991; 1992; 1993; 1994a, b). Surface temperatures in the Apalachee Bay-Cedar Key area are some of the highest reported for the entire Gulf of Mexico in summer and among the lowest in winter (NOAA 1985). These values may fluctuate by several degrees depending upon particular climatic and oceanic conditions for any given year. Year-to-year variations in minimal winter surface temperatures along the coast, for example, are directly related to the intensity and frequency of winter storms. Stratification in coastal waters within the 66-foot contour is minimal year-round with bottom temperatures generally being several degrees cooler than surface values (Leipper 1954; NOAA 1985; Harkema et al. 1991; 1992; 1993; 1994a, b).

As compared to temperature, salinities in the upper 165 feet of the water column of the offshore Gulf are quite stable throughout the year at about 36 parts per million (Leipper 1954). Most of the deviation from this norm comes in nearshore coastal areas that are influenced by seasonally variable freshwater discharges. Freshwater input to the Big Bend area comes primarily from the Apalachicola and Suwannee Rivers, with secondary input from the Ochlockonee River, discharging into western Apalachee Bay, and the Withlacoochee River, discharging just south of Cedar Key. Peak discharge occurs primarily in April and May with the lowest levels of discharge occurring from August through November (NOAA 1985).

Currents. Circulation in the Gulf of Mexico is controlled by global rotation, topography, wind, freshwater runoff, and the Loop Current. The Loop Current is the dominant feature affecting surface currents in the eastern Gulf of Mexico and almost all currents throughout the Gulf are affected to some degree by its eddy currents. The Loop Current is generated when Caribbean oceanic water flows northward into the Gulf of Mexico via the Yucatan Channel. After penetrating the Gulf, the current turns east and then flows south to exit the Gulf via the Straits of Florida. As both the openings are in the southeastern sector of the Gulf, this flow pattern results in an anticyclonic (clockwise) loop configuration that causes surface water to generally flow to the south along the mid and outer continental shelf of western Florida (NOAA 1985). This southerly flow is assumed to be also characteristic of shallower areas, such that there would be a net southerly flow all along the coast, including nearshore flows from west to east and then south in the Apalachee Bay area. These southerly currents are typically strongest during winter. In summer, the Loop Current typically does not penetrate as far north as during winter. Under these conditions, flows along the west Florida coast from Tampa Bay northward are to the north along the Florida peninsula, and from east to west in Apalachee Bay. However, these flows are very weak.

Figure

3.11-3 Bathymetry in the Vicinity of the Proposed and Alternative Avon Park Helicopter AR Tracks

Marine Flora

Marshes and mud flats typical of low-energy areas in the eastern and northern Gulf of Mexico characterize most of the shoreline from Apalachee Bay to Tampa Bay. The exceptions are sandy beaches located at the points of land on each side of the mouth of Ochlochkonee Bay and in the Cedar Key area. This same stretch of coastline contains vast beds of turtle grass (*Thalassia testudinum*), as well as manatee grass (*Syringodium filiforme*) and shoal grass (*Halodule wrightii*), that extend from the shore out to a depth of about 33 feet (NOAA 1985; Darnell and Kleypas 1987). The seagrass beds support high standing crops of plants and high primary production rates as well as providing food and shelter to numerous invertebrate and fish species.

One of the dominate features of the Florida Big Bend area is the seagrass beds that stretch from Ochlockonee Bay south to Tarpon Springs. Within the 66-foot contour approximately 16 percent of the area can be described as dense seagrass beds, 33 percent as sparse beds and 19 percent as patchy (Continental Shelf Associates, Inc. and Martel Laboratories, Inc. [CSA and ML 1985]). As is the case with most Caribbean seagrass beds, the composition of the Big Bend coverage varies with depth. Turtle grass and, to a lesser extent, manatee grass and shoal grass, are found in waters less than 33 feet deep (CSA and ML 1985; NOAA 1985; Darnell and Kleypas 1987). The densest beds are formed by turtle and manatee grasses which support high primary production rates and provide food and shelter to numerous invertebrate and fish species.

Approximately 72 percent of WTA2 falls within the Big Bend Seagrasses Aquatic Preserve extending approximately 2 miles into the nearshore Conservation Area of Northern Apalachee Bay (Figure 3.11-4). Situated farther offshore, only 25-30 percent of WTA1 extends into the aquatic preserve and none extends into the nearshore conservation area. Only 10-15 percent of AP-AR1 and about 5 percent of AP-AR2 extend into the aquatic preserve, and neither extends into nearshore conservation areas (Figure 3.11-5).

3.11.1 Invertebrates, Fish, and Sea Turtles

Primary marine fauna in the study area include shellfish, finfish, sea turtles, and marine mammals (discussed in Section 3.11.3). The principal offshore commercial fisheries in Apalachee Bay are directed at stone crabs, blue crabs, and shrimp; oysters are harvested from area bays. The dominant commercial and recreational finfish fisheries are directed at the gag grouper (*Mycteroperca microlepis*). Rare and endangered marine/estuarine species include the Gulf sturgeon, five species of sea turtles, and one marine mammal (Table 3.11-1).

3.11.1.1 WATER TRAINING AREAS

Shellfish

Penaeid Shrimp. Commercial shrimp in the Gulf of Mexico belong to the genus *Penaeus* and are represented by three species: brown shrimp (*P. aztecus*), white shrimp (*P. setiferus*), and pink shrimp (*P. duorarum*). Brown shrimp are found west of Pensacola year round with the exception of fall when concentrations extend as far east as Cape St. George at depths greater than or equal to 200 feet. The western continental slope off Florida is inhabited by adult brown shrimp year-round and the nearshore coastal areas from Apalachee Bay to Tampa Bay are classified as major year-round nursery areas (NOAA 1985). Darnell and Kleypas (1987) suggest that the presence of brown shrimp on the west Florida shelf

Insert Figure

3.11-4 Distribution of the Big Bend Seagrasses Aquatic Preserve within the Proposed and Alternative WTAs

Insert Figure

3.11-5 Distribution of the Big Bend Seagrasses Aquatic Preserve within the Proposed and Alternative Avon Park Helicopter AR Tracks

Table 3.11-1. Sensitive Species Potentially Occurring in the Gulf of Mexico under the Proposed and Alternative Avon Park Helicopter AR Tracks and within the WTA	
Common Name *Scientific Name*	*Status*[1] *Federal/Florida*
FISH	
Gulf sturgeon *Acipenser oxyrinchus desotoi*	T/SSC
REPTILES	
Loggerhead turtle *Caretta caretta*	T/T
Green turtle *Chelonia mydas*	E/E
Leatherback turtle *Dermochelys coriacea*	E/E
Hawksbill turtle *Eretmochelys imbricata*	E/E
Kemp's ridley turtle *Lepidochelys kempii*	E/E
MAMMALS	
West Indian manatee *Trichechus manatus*	E/E
Note: [1] E = Endangered T = Threatened SSC = State Species of Concern	

are based on misidentifications or isolated incidences, and that brown shrimp are not predominant in Florida waters. Brown shrimp are rare on the west Florida Shelf.

White shrimp are rare throughout the eastern Gulf of Mexico except for isolated populations, one west of the Alabama-Florida border and the other associated with Apalachicola Bay (NOAA 1985; Darnell and Kleypas 1987). White shrimp are not found along the western Florida coast south of Cape St. George. A distinct population of pink shrimp is associated with the west Florida Shelf from Cape St. George to the Florida Keys. In winter, they are widely distributed inside the 200-foot contour at low densities (Darnell and Kleypas 1987). In spring and summer, the population separates into a northern and southern component. In the north, the heaviest concentrations are associated with coastal seagrass beds with peak concentrations west of Tampa Bay. In fall, pink shrimp again occupy most of the shelf from Apalachee Bay southward with the heaviest concentrations offshore of Tampa Bay.

The commercial shrimp fishery operates year-round with greatest effort expended in late spring and summer (Figure 3.11-6). During the peak season, nearly twice the effort is expended in Northern Statistical Area 7 compared to Southern Statistical Area 6. The fishery operates primarily within the 80-foot contour with the greatest effort between 25 and 80 feet.

Figure

3.11-6 Nominal Pink Shrimp Fishing Effort (1990-1997) by Month and Depth for NMFS Statistical Areas 6 and 7

American Oyster. Populations of the American oyster (*Crassostrea virginica*) are found in the large estuarine bays and sounds of the Gulf of Mexico including most of the Florida coast. The species is sedentary and attaches to hard substrates such as firm mud/shell bottoms and reefs. Rapid changes in water temperature trigger mass spawning which may occur several times a season. Oyster larvae drift for several weeks before attaching to hard substrates. Oysters are commercially and recreationally harvested under state regulations in almost every location where they occur. The fishery for this species is the fourth largest in the Gulf of Mexico (NOAA 1985). There is a commercial oyster fishery that operates in Apalachee Bay from September to May.

Stone Crab. Stone crab (*Menippe mercenaria*) are found in nearshore waters throughout the Gulf of Mexico including the Florida coast from Apalachee Bay to Tampa Bay. Juveniles live in estuaries among rock and shell substrates while mature crabs may move offshore. Stone crabs are commercially harvested from Tampa Bay south to the Florida Keys and in Apalachee Bay. The stone crab fishery is the largest of the commercial fisheries in the WTA with as many as 11,000 crab pots being distributed throughout Apalachee Bay. Harvested crabs have a single claw removed and then are released. The missing claw eventually regenerates. The recreational fishery for this species is limited to the Florida Keys.

Blue Crab. Blue crab (*Callinectes sapidus*) are found in the Gulf of Mexico from Florida to the Yucatan. It inhabits most coastal shores and estuaries and offshore areas to a depth of 115 feet. Blue crabs are omnivorous, feeding on benthic invertebrates, fish, carrion, and detritus. The blue crab commercial fishery is one of the largest (by volume) in the Gulf of Mexico, and this species is considered to be among the most valuable crabs in the western Atlantic (NOAA 1985). They support important recreational fisheries throughout estuarine areas. There are major commercial blue crab fisheries in Apalachee Bay.

Finfish

Demersal Fish. Demersal fish inhabit shallow freshwater and estuarine environments and benthic areas in deeper offshore shelf waters. They are distinguished from more mobile oceanic species that occupy deep-water columns such as adult tuna, billfish, and jacks. Demersal fish habitat is varied and related to a number of environmental factors such as primary production, bottom type, and local hydrography. There can be distinct changes in community makeup as one moves from shallow brackish-water embayments to deeper, more marine, offshore waters; from sandy bottom to mud bottom to hard-rock or coral substrate; and from denuded areas to zones rich in sessile plant life. This section deals primarily with the estuarine and inshore shelf populations (less than 50 feet deep) of western Florida, consistent with the proposed and alternative WTAs and AR tracks. Darnell and Kleypas (1987) reported a total of 347 identifiable demersal fish species representing 80 families from the eastern Gulf of Mexico continental shelf. Total fish catches in the Apalachee Bay area were some of the highest reported for the eastern Gulf of Mexico (Figure 3.11-7). A subset of surveys made on the seagrass beds of Apalachee Bay to Cedar Key at depths of less than 36 feet reported densities of greater than 13,000 fish per hour, year-round and spring densities of greater than 22,000 fish per hour. This latter catch rate was the highest reported in any survey in the eastern and northwestern Gulf of Mexico.

Much of the high demersal fish density in Apalachee Bay can be attributed to the 12 most abundant species (Table 3.11-2). In most cases, the densities of these 12 species in the Apalachee Bay/Cedar Key area were higher than anywhere else in the eastern Gulf of Mexico. Much of the high density reported farther south from Cedar Key to Tarpon Springs was attributable to these same species. In contrast, the areas of high

Figure

3.11-7 Numbers of Demersal Fish Taken per Hour of Standardized Trawl Effort by Season for the WTA1 and AP-AR1 Study Area

fish density in other areas of the Gulf of Mexico—near the margin of the continental shelf, off Cape St. George, in the waters of Mississippi and Alabama, and in waters south of Tampa Bay were primarily associated with species other than the 12 found in the Apalachee Bay/Tarpon Springs area. Collectively, these data suggest that the seagrass beds unique to the Apalachee Bay/Tarpon Springs region may represent an important habitat at supporting select fish species.

Table 3.11-2. Abundant Demersal Fish Species Collected in WTA1 and AP-AR1

Family	*Common Name*	*Scientific Name*
Syngnathidae	Dusky pipefish	*Syngnathus floridae*
Serranidae	Black sea bass	*Centropristis striata*
Gerreidae	Silver jenny	*Eucinostomus gula*
Haemulidae	White grunt Pigfish	*Haemulon plumieri* *Orthopristis chrtysoptera*
Sparidae	Spottail pinfish Pinfish	*Diplodus holbrooki* *Lagodon rhomboides*
Sciaenidae	Silver perch Spot	*Bairdiella chrysoura* *Leiostomus xanthurus*
Balistidae	Fringed filefish Planehead filefish	*Monacanthus ciliatus* *Monacanthus hispidus*
Diodontidae	Striped burrfish	*Chilomycterus schoepfi*

Source: Darnell and Kleypas (1997).

The most abundant species reported for the eastern Gulf of Mexico was the pinfish (*Lagodon rhomboides*), being twice as abundant as the second most encountered species. The extreme abundance was largely due to high densities observed in the nearshore seabeds of Apalachee Bay where densities were never below 5,000 fish per hour in any season and greater than 14,000 fish per hour in spring. The pinfish is one of the most common inshore fishes in the Gulf except in the highly turbid brackish waters of western Louisiana (Hoese and Moore 1998).

While all demersal fish species are an integral part of the Gulf of Mexico ecosystem and, more specifically, the seabeds of the western Florida coast, none of the 12 abundant species reported for the WTA are of significant commercial or recreational value. All 12 species are widespread along the Atlantic and Gulf of Mexico coasts and their high densities in the WTA likely do not represent isolated populations or area-specific subspecies.

Gulf Sturgeon. The Gulf sturgeon is the only threatened or endangered fish in the Gulf of Mexico (Minerals Management Service [MMS] 1991). Listed by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) as threatened in September 1991, it is a geographically disjunct subspecies of the Atlantic sturgeon (*A. mitchill*). Gulf sturgeon and other members of the family Acipenseridae have virtually disappeared throughout their ranges at the turn of the 20th century (USFWS and Gulf States Marine Fisheries Commission [GSMFC] 1995). Population declines were primarily due to heavy commercial and recreational fishing for their eggs and meat, and habitat destruction including the damming of rivers (Huff 1975; Birstein 1993).

Gulf sturgeon occur in most major river systems from the Mississippi River to the Suwannee River, Florida, including the Apalachicola River and the Ochlockonee River in western Apalachee Bay (Wooley and Crateau 1985). While population estimates throughout its range are presently unknown, there are an estimated 2,250 to 3,300 sturgeon inhabiting the Suwannee River (USFWS and GSMFC 1995); this is believed to be the largest Gulf sturgeon population among coastal rivers in the Gulf of Mexico (Huff 1975).

Gulf sturgeon less than 2 years old remain within river and estuarine systems year-round while sub-adults and adults venture out into estuaries in winter. There is considerable evidence of sturgeon inhabiting estuarine habitats, and tagging studies in the Apalachicola and Suwannee rivers generally demonstrate a high probability of recapture in the same river in which fish were tagged (USFWS and GSMFC 1995). Nevertheless, limited catch and tag recovery data also indicate some intra-riverine movement within Florida coastal waters. Four radio-tracked sturgeon spent a week 3 miles offshore of the Suwannee River in October 1991 (S. Carr, unpublished data as cited in USFWS and GSMFC 1995). Of 3,700 Gulf sturgeon tagged in the Suwannee River, all but 2 of the nearly 700 recaptured fish were recovered in the Suwannee River.

Mud and sand bottoms and seagrass communities are believed to be important marine habitats for sturgeon (Mason and Clugston 1993). Sturgeon feed on a variety of benthic invertebrate fauna including amphipods, polychaete and oliogochaete annelids, brachiopods, crustacea, and lancelets.

Gag Grouper. The gag grouper occurs abundantly in the Gulf of Mexico, and is the target of directed commercial and recreational fisheries. Adults reach lengths of 3 feet and can exceed 55 pounds (Gulf of Mexico Fisheries Management Council 1981). Adults are normally taken at reefs and areas of rock outcroppings, with most caught at depths ranging from 66 to 262 feet. They also occur at rock outcroppings as shallow as 23 feet. Juveniles are found in estuaries, bays, and seagrass beds that constitute nursery grounds.

Gag grouper landings from the combined commercial and recreational fisheries in the U.S. waters of the Gulf of Mexico from 1990 to 1996 ranged from 3.3 to 4.0 million pounds, with the recreational sector accounting for over half of total landings (Schirripa and Legault 1997). Landings in the eastern Gulf of Mexico are markedly higher than in the western Gulf. Historically, fish taken from the project area (Statistical areas 6 and 7 [see Figure 3.11-7]) dominate the total landings (Schirripa and Legault 1997).

Sea Turtles

Six species of sea turtles are found in U.S. waters and are all currently listed as either endangered or threatened under the Endangered Species Act [ESA] (see Table 3.11-1) (NMFS and USFWS 1995). Of these, five occur in the Gulf of Mexico including the Kemp's ridley (*Lepidochelys kempii*), loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*).

Kemp's Ridley Turtle. The Kemp's ridley is the most endangered of the sea turtles. The population declined sharply between the 1940s and 1980s, and it was only conservation efforts initiated in the 1980s that halted the downward trend. Currently, the Gulf of Mexico population appears to be in the early stages of exponential expansion (Turtle Expert Working Group 1998). In addition to being listed as endangered under the ESA, Kemp's ridley is also listed as endangered under state regulations throughout its U.S. range.

Kemp's ridley sea turtles nest primarily along 12 miles of shoreline near Rancho Nuevo, Tamaulipas, Mexico, with incidental nesting occurring as far north as Padre Island, Texas (National Research Council [NRC] 1990). The nesting season extends from April to July with eggs taking about 50 days to hatch.

Newly hatched turtles are epipelagic and typically associate themselves with Sargassum weed and other flotsam and drift for an indeterminate period of time (Collard and Ogden 1989). Although some young may be carried up the U.S. East Coast via the Florida current and the Gulf Stream (Carr 1980; Collard 1987), adults are found almost entirely in the Gulf of Mexico (NRC 1990). In the northern Gulf of Mexico, juveniles and subadults are most common in shallow coastal waters of the western Gulf, but they occur throughout the Gulf, including Florida (NOAA 1985; NRC 1990). In the eastern Gulf, the northwest coast of Florida from just north of Tampa Bay to Cape St. George is considered a major year-round nursery area (NOAA 1985) (Figure 3.11-8). The NMFS Sea Turtle Stranding and Salvage Network (STSSN) reports about two Kemp's ridley strandings a year between Cape St. George and Cedar Key within Statistical Area 7 (Table 3.11-3; NMFS 1998).

Juveniles, sub-adults, and adults feed on various species of crabs and other invertebrates (Dobie et al. 1961). In the northern Gulf of Mexico, the blue crab is a common food. The feeding habits of pelagic post-hatchling turtles are poorly understood.

Due to their occurrence throughout the Gulf of Mexico and the presence of a year-round nursery in the area, Kemp's ridley sea turtles may be encountered in small numbers within WTA1 and WTA2.

Loggerhead Turtle. The state and federally listed threatened loggerhead sea turtle is distributed throughout subtropical waters along the margins of the Atlantic, Pacific, and Indian Oceans and is rarely encountered far from mainland shores (NRC 1990). In the western hemisphere they range throughout the Gulf of Mexico and are found as far north as Newfoundland and as far south as Argentina (Squires 1954; Frazier 1984). Nesting occurs in north and south temperate zones on sandy barrier islands and insular beaches throughout their range. Newly hatched turtles swim offshore and associate with Sargassum and flotsam drift lines (Carr 1986; 1987). Juveniles eventually move into nearshore estuarine waters and inhabit areas with hard bottoms such as rocks, reefs, and wrecks that provide protection.

The area of greatest nesting in the western Atlantic is in the southeast U.S. (NOAA 1985). The major nesting area is in eastern Florida (90 percent of all U.S. nesting) and this region is considered the second most-important nesting area for this species in the world (Dodd 1988; NRC 1990). Minor nesting occurs from May to September along all parts of the west Florida coast except between Tampa Bay and Apalachee Bay (Figure 3.11-9). Their absence in this area coincides with the presence of mud flats and marshes and the absence of sandy beaches. Despite the absence of nesting in this area, about three strandings are reported each year between Cape St. George and Cedar Key (see Table 3.11-3).

Adult loggerhead turtles eat fish and a wide variety of benthic invertebrates associated with hard bottom habitats: cnidarians, cephalopods, gastropods, pelycepods, decapods, and echinoderms (Dodd 1988). Plants are occasionally taken. Since their range extends throughout the Gulf of Mexico, loggerhead sea turtles may be encountered in small numbers within WTA1 and WTA2.

Green Turtle. The green sea turtle is listed as threatened under the ESA except for the breeding populations in Florida, which are classified as endangered. The green sea turtle is a circumglobal species found in tropical waters at temperatures above 68° F. The genus *Chelonia* is often divided into two

Figure

3.11-8 Distribution of Kemp's Ridley Sea Turtles Along Coastal Northwest Florida

Figure

3.11-9 Distribution of Loggerhead Sea Turtles Along Coastal Northwest Florida

species: the East Pacific green turtle (*C. agassizi*), also known as the black sea turtle, which is found in the eastern Pacific Basin from Baja California south to Peru and west to the Galapagos Islands; and the green turtle (*C. mydas,*) in the remainder of the global range.

Table 3.11-3. Sea Turtle Strandings within NMFS Statistical Areas 6 and 7 (1986-1997)[1]

	Species / Statistical Area									
	Kemp's ridley		Loggerhead		Green		Leatherback		Hawksbill	
Year	*6*	*7*	*6*	*7*	*6*	*7*	*6*	*7*	*6*	*7*
1986	1	0	2	4	1	0	0	0	0	0
1987	1	1	1	4	3	0	0	0	0	0
1988	0	0	9	1	2	0	0	0	0	0
1989	3	1	7	1	5	1	0	0	0	0
1990	0	0	1	3	6	0	0	0	0	0
1991	0	2	3	2	4	1	0	0	0	0
1992	3	3	1	3	3	0	2	0	0	0
1993	2	1	1	3	7	1	0	0	0	0
1994	5	2	3	1	7	0	1	0	4	0
1995	6	0	4	1	17	0	0	0	0	0
1996	1	7	4	7	23	2	0	0	0	0
1997	3	4	2	3	11	0	0	0	0	0
Totals	25	21	38	33	89	5	3	0	4	0
	46		71		94		3		4	

Note: [1] Statistical areas are depicted on Figure 3.11-6.
Source: NMFS (1998).

In U.S. Atlantic waters, small numbers of green sea turtles nest in the U.S. Virgin Islands and in Puerto Rico and in somewhat larger numbers in Florida primarily along the southeast coast in Brevard, Indian River, St. Lucie, Palm Beach, and Broward counties (NRC 1990). Upon hatching, young green turtles move offshore and occupy drift convergence zones (Carr 1986). At about 8 to 10 inches, turtles leave the pelagic stage and enter benthic feeding grounds. They forage most commonly in seagrass beds although they are also found over reefs and rocky bottoms. Important feeding areas for green turtles in Florida include the seagrass beds near Crystal River, Cedar Key, and Homossassa Bay (Figure 3.11-10).

The green sea turtle is the only genera of sea turtle that is mostly herbivorous (Mortimer 1995). Throughout most of its range the green turtle forages primarily on sea grasses, but will feed on green, red, or brown algae when seagrasses are absent (Carr 1952; Pritchard 1971; Wershoven and Wershoven 1991 Burke et al. 1992; Balazs et al. 1994: Forbes 1994; Mortimer 1995). Occasionally green turtles will consume macrozooplankton, including jellyfish (Bustard 1976; Mortimer 1995), kelp and sponges (Carr 1952), and mangrove leaves (Pritchard 1971).

Between 1986 and 1997, 94 green sea turtle strandings were reported between Cape St. George and Tarpon Springs, the most of any species; only five (5 percent) of these were from the statistical area where the WTA would be located. (see Table 3.11-3). Due to their occurrence throughout western Florida, green sea turtles may be encountered in small numbers within WTA1 and WTA2.

Figure

3.11-10 Distribution of Green Sea Turtles Along Coastal Northwest Florida

Leatherback Turtle. The leatherback is the largest of all sea turtles, attaining a carapace length of 5 to 6 feet and weighing up to 1,100 pounds. Nesting occurs primarily in the tropics although there is some low-density nesting in southern Florida and South Africa. While the leatherback is sometimes seen in coastal waters, it essentially lives a pelagic existence diving to deep depths (NRC 1990). Aerial surveys of California, Oregon, and Washington have shown that most leatherbacks occur in slope waters, while few occur over the continental shelf (Eckert 1993). Tracking studies have shown that migrating leatherback turtles often parallel deepwater contours ranging from depths of 600 to 11,500 feet (Morreale et al. 1994).

Information concerning the diets of leatherback turtles is based mostly upon studies conducted in the western Atlantic. The pelagic leatherback turtle appears to feed primarily on jellyfish, siphonphores, and tunicates, and obtains additional nutrition from the parasitic crustaceans and symbiotic fish that are associated with jellyfish (Bleakney 1965; Brongersma 1969 as cited in NMFS and USFWS 1996b; den Hartog and van Nierop 1984; Eckert 1993). Surface feeding of jellyfish has been observed off the U.S. east (Grant and Ferrell 1993 cited in Grant et al. 1995) and west (Eisenberg and Frazier 1983) coasts. Feeding is also likely to occur at depth (Eckert 1995).

Leatherback turtles may be encountered within the WTA1 and WTA2 region; however, their occurrence is expected to be rare due to their preference for pelagic waters. In the 12 years from 1986 to 1997, only three stranded leatherback sea turtles have been reported between Cape St. George and Tarpon Springs by the STSSN (see Table 3.11-3; NMFS 1998). No leatherback strandings have been reported from the statistical area where the WTA would be located.

Hawksbill Turtle. The hawksbill turtle nests on tropical islands and uninhabited continental shores throughout the Caribbean, but nesting within the continental U.S. is rare with scattered nests having been observed mostly in southeastern Florida (NRC 1990). They forage on encrusting organisms near rock or reef habitats in clear shallow tropical waters, particularly sponges (Witzell 1983 as cited in NRC 1990). Because of their tropical and reef-oriented distribution, hawksbills are infrequent in the northern Gulf of Mexico (MMS 1991). From 1986 to 1997, only four stranded Hawksbill sea turtles were reported between Cape St. George and Tarpon Springs; none have been reported from Statistical Area 7 (see Table 3.11-3; NMFS 1998). The occurrence of hawksbill turtles in the WTA would be extremely rare.

3.11.1.2 FORT STEWART HELICOPTER AR TRACKS

The proposed and alternative Fort Stewart helicopter AR tracks are located entirely over land and no marine biological resources occur beneath these tracks.

3.11.1.3 WATER TRAINING AREA HELICOPTER AR TRACKS

The proposed and alternative Water Training Area helicopter AR tracks are located entirely over land and no marine biological resources occur beneath these tracks.

3.11.1.4 AVON PARK HELICOPTER AR TRACKS

Shellfish

Penaeid Shrimp. A general description of the commercial shrimp fishery, including a description of those species likely to occur beneath the Avon Park helicopter AR tracks, is provided in Section 3.11.2.1. As previously discussed, a distinct population of pink shrimp is associated with the west Florida Shelf from

Cape St. George to the Florida Keys. The commercial shrimp fishery operates year-round with greatest effort expended in late spring and summer (see Figure 3.11-6). Some of the most intense shrimp fishing effort is expended south of Cedar Key in the AP-AR1 area (NOAA 1985; Darnell and Kleypas 1987).

American Oyster. As described in Section 3.11.2.1, populations of the American oyster are found in the large estuarine bays and sounds of the Gulf of Mexico, including most of the Florida coast. Oysters are commercially and recreationally harvested under state regulations in almost every location where they occur. The fishery for this species is the fourth largest in the Gulf of Mexico (NOAA 1985).

Stone Crab. As described in Section 3.11.2.1, stone crabs are found in nearshore waters throughout the Gulf of Mexico and are commercially harvested from Tampa Bay south to the Florida Keys. The recreational fishery for this species is limited to the Florida Keys.

Blue Crab. As discussed in Section 3.11.2.1, the blue crab is found throughout the western Atlantic and in the Gulf of Mexico from Florida to the Yucatan. The blue crab commercial fishery is one of the largest (by volume) in the Gulf of Mexico, and this species is considered to be among the most valuable crabs in the western Atlantic (NOAA 1985). They support important recreational fisheries throughout estuarine areas. Major commercial blue crab fisheries extend from Cedar Key to the Crystal River area.

Finfish

Demersal Fish. A general discussion of demersal fish is provided in Section 3.11.2.1, including a description of those species likely to occur beneath the Avon Park helicopter AR tracks. As previously discussed, none of the 12 abundant species reported for the Avon Park AR track areas are of significant commercial or recreational value.

Sea Turtles

As discussed in Section 3.11.1.1, five species of sea turtles occur in the Gulf of Mexico including the Kemp's ridley, loggerhead, green, leatherback, and hawksbill. Because hawksbill sea turtles are considered extremely rare in the temperate waters of the northern Gulf of Mexico, this species will not be discussed further.

Kemp's Ridley Turtle. As discussed in Section 3.11.2.1, juveniles and subadults, in the northern Gulf of Mexico, are most common in shallow coastal waters of the western Gulf, but they occur throughout the Gulf, including Florida (NOAA 1985; NRC 1990). In the eastern Gulf of Mexico, the northwest coast of Florida from just north of Tampa Bay to Cape St. George is considered a major year-round nursery area for the Kemp's ridley (NOAA 1985) (see Figure 3.11-8). Due to their occurrence throughout the Gulf of Mexico and the presence of a major year-round nursery in the area, Kemp's ridley sea turtles may be encountered beneath AP-AR1 and AP-AR2.

Loggerhead Turtle. As discussed in Section 3.11.2.1, the major nesting area for the loggerhead is in eastern Florida (90 percent of all U.S. nesting) and this region is considered the second most important nesting area for this species in the world (Dodd 1988; NRC 1990). Minor nesting occurs from May to September along all parts of the west Florida coast except between Tampa Bay and Apalachee Bay (see Figure 3.11-9). Since their range extends throughout the Gulf of Mexico, loggerhead sea turtles may be encountered in small numbers beneath AP-AR1 and AP-AR2.

Green Turtle. As discussed in Section 3.11.2.1, important feeding areas for green turtles in Florida include the seagrass beds near Crystal River, Cedar Keys, and Homossassa Bay (see Figure 3.11-10). Between 1986 and 1997, 94 green sea turtle strandings were reported between Cape St. George and Tarpon Springs, the most of any species; 89 (95 percent) of these were south of Cedar Key (see Table 3.11-3) (NMFS 1998). Due to their occurrence throughout western Florida, and the location of important feeding grounds in the area, green sea turtles may be encountered beneath AP-AR1 and AP-AR2.

Leatherback Turtle. As discussed in Section 3.11.2.1, although the leatherback is sometimes seen in coastal waters, it essentially lives a pelagic existence (NRC 1990). In the 12 years from 1986 to 1997, only three stranded leatherback sea turtles have been reported between Cape St. George and Tarpon Springs by the STSSN (see Table 3.11-3; NMFS 1998). Leatherback turtles may be encountered beneath AP-AR1 and AP-AR2; however, their occurrence is expected to be rare due to their preference for pelagic waters.

3.11.1.5 CREW SWAP FACILITIES

The proposed and alternative crew swap facilities are located on land and no marine biological resources are associated with these locations.

3.11.2 Marine Mammals

Marine mammals known to occur in the Gulf of Mexico include members of three distinct taxa: *Cetecea*, which includes whales and dolphins; *Pinnipedia*, which includes seals and sea lions, and *Sirenia*, which includes manatees and dugongs. At least 28 species of cetaceans (21 species of toothed whales [odontocetes] and 7 species of baleen whales [mysticetes]), 1 introduced pinniped species (California sea lion [*Zalophus californianus*]), and 1 sirenian species (West Indian manatee [*Trichechus manatus*]) have been identified from sightings or strandings in the Gulf of Mexico.

Only one cetacean species, the bottlenose dolphin (*Tursiops truncatus*), is known to occur regularly in the region of influence (ROI) of the WTA and Avon Park AR tracks. With the exception of the Atlantic spotted dolphin (*Stenella frontalis*), which is not expected to frequent the WTA or waters beneath the Avon Park AR tracks, all other cetacean species in the Gulf of Mexico occur mainly in deeper, offshore waters (Fertl et al. 1998). In addition to the bottlenose dolphin, the West Indian manatee is the only other marine mammal known to occur within the project areas. Both cetaceans and sirenians spend their lives entirely at sea.

All marine mammals are protected by the Marine Mammal Protection Act (MMPA) of 1972 (amended 1994 – 16 United States Code [USC] § 1431 *et seq*.). Many marine mammal species are also listed as endangered or threatened and protected by the ESA of 1973 (16 USC § 1531). The West Indian manatee is listed as an endangered species under the ESA and is also protected under the Florida Manatee Sanctuary Act of 1978. Although several species of cetaceans occurring in the Gulf of Mexico are listed as endangered under the ESA, none of these species are known to occur in the ROI of the WTA and Avon Park AR tracks.

3.11.2.1 WATER TRAINING AREAS

Proposed Water Training Area (WTA1)

Only two species of marine mammals are known to occur regularly within WTA1: the bottlenose dolphin and the West Indian manatee. The low species diversity is most likely due to the lack of prey species within WTA1; as described in Section 3.11.1, Marine Environment, the WTA1 consists of sandy, flat bottom with no known coral reefs or major rock outcrops to provide suitable fish habitat. In addition, WTA1 is located over the continental shelf in relatively shallow water (the maximum depth within the proposed WTA is approximately 30 feet). The majority of marine mammal species found in the Gulf of Mexico prefer deeper waters further offshore (Fertl et al. 1998). Additional information on the occurrence of bottlenose dolphins and manatees within the proposed WTA1 is provided below.

Bottlenose Dolphin. Bottlenose dolphins are opportunistic feeders that forage regularly near the sea bottom on a wide variety of fish and invertebrates. Two distinct types of bottlenose dolphins have been identified for the Gulf of Mexico: a coastal form and an offshore form. The latter are reported to be larger and darker in color than bottlenose dolphins that inhabit shallow coastal waters, including WTA1. As required by the MMPA, NMFS is responsible for preparing stock assessment reports for each stock of marine mammal that occurs in U.S. waters. For management purposes within the Gulf of Mexico, NMFS has subdivided the coastal and offshore forms of bottlenose dolphins into separate geographic stocks that include: a continental edge and continental slope stock; an outer continental shelf stock; three coastal stocks (western, northern, and eastern); and numerous discrete bay, sound, and estuarine stocks. Stocks may overlap in some areas and the coastal forms may be genetically indistinguishable from each other. Bottlenose dolphins most likely to be found within WTA1 include members of the Apalachee Bay stock, although members of the eastern Gulf of Mexico coastal stock may occasionally be found in this area (NMFS 1997b).

Coastal stocks of bottlenose dolphins are typically found in smaller groups (i.e., less than 20 individuals) than the stocks that inhabit deeper offshore waters. In addition to smaller group sizes, the population levels of bottlenose dolphins in coastal areas fluctuate, possibly due to the seasonal influx of migrants. The abundance and distribution of both "residents" (individuals that stay in an area year-round) and "transients" (individuals that travel along the coastline) contribute to the varying population levels of a particular coastal area. The movements of both resident and transient populations are most likely related to fish movements which, in turn, are probably due to fluctuating water temperatures (Fertl et al. 1998).

Analyses of line-transect data collected during NMFS surveys of the Florida panhandle region in September-October 1993 (Blaylock and Hoggard 1994 as cited in NMFS 1997b) indicate that the Apalachee Bay coastal bottlenose dolphin stock has a population size of 491 (coefficient of variation [CV][1] = 0.39). The minimum population estimate for this stock is 358 animals. Although photo-identification and radiotracking studies of other Gulf of Mexico coastal stocks indicate that some individuals remain in the same general area throughout the year (Lynn 1995 as cited in NMFS 1997b), this situation has not been confirmed for the resident bottlenose dolphin stocks that occur in the Florida panhandle region. However, although movement patterns are not currently known, it is reasonable to

[1] The CV is an index of uncertainty. It can range upward from zero, indicating no uncertainty, to high values. When the CV exceeds 1.0, the estimate is very uncertain—actual values could range from zero to more than twice the "best" estimate.

assume that there is some seasonal difference in bottlenose abundance in the Apalachee Bay area. Therefore, the number of bottlenose dolphins occurring within WTA1 at any one time can range from 0 to approximately 500, the latter assuming that the entire Apalachee Bay stock is present as well as some transients from other Gulf of Mexico coastal stocks. Since coastal stocks typically occur in small groups, it is more likely that, at any one time, fewer than 20 individuals may be present in WTA1.

West Indian Manatee. Manatees are herbivores that feed opportunistically on a wide variety of (listed in order of preference) submerged, emergent, and floating vegetation including rooted seagrasses, emergent vascular plants, benthic algae, and floating plants. Their preference for submerged vegetation is probably due to the orientation of the manatee mouth, which is particularly adapted to bottom feeding (Domning 1980 as cited in Florida Power and Light [FPL] 1999).

During the January 1998 Florida manatee aerial survey, a total of 2,022 individuals (1,112 east coast, 910 west coast) were counted (Florida Department of Environmental Protection [FDEP] 1999a). Although the east and west coast populations of manatees do not exhibit any genetic differences, there is no documented evidence that they move from one coast of Florida to the other (McClenaghan and O'Shea in press as cited in FPL 1999).

The general manatee distribution pattern is characterized by typically larger numbers of animals concentrating at warm water sites during the winter, and dispersing in smaller groups during the summer. When water temperatures drop below about 70 to 72^{O} F, manatees migrate to southern Florida or form large aggregations near warm waters such as natural springs and power plant outfalls. During warmer summer months they disperse, appearing to choose areas based on an adequate food supply, water depth, and proximity to fresh water. Travel thus occurs seasonally as manatees move between winter gathering sites and summer dispersal areas. Repeated sightings of individuals show that many manatees travel over 100 miles to return to preferred summer and winter grounds (O'Shea in press as cited in FPL 1999).

Throughout their range manatees inhabit both salt and freshwater areas at depths of 5 to 20 feet. Manatees tend to travel in waters 10 to 16 feet deep along the coast and are rarely sighted in areas deeper than 20 feet. They may be encountered in canals, rivers, estuarine habitats, saltwater bays, and on occasion have been observed as much as 3.7 miles offshore of the Florida Gulf coast (USFWS 1999d). However, in the Gulf of Mexico manatees are rarely observed farther than 0.6 mile from the mouth of a river (Powell and Rathbun 1984 as cited in FPL 1999). Shallow grass beds with ready access to deep channels are preferred feeding areas. Manatees often use secluded canals, creeks, embayments, and lagoons, particularly near the mouths of coastal rivers and sloughs, for feeding, resting, mating, and calving (Reeves et al. 1992).

During the winter, the U.S. manatee population is confined to the coastal waters of the southern half of peninsular Florida and to natural springs and warm water outfalls farther north. On the west coast of Florida, the most important manatee wintering areas in the northern part of their range are the headwaters of the Crystal and Homosassa rivers in Citrus County (east of the Avon Park helicopter AR tracks; see Section 3.11.2.4 below). However, most of the manatee population moves further south in the winter. During aerial surveys of western peninsular Florida conducted from July through November in 1979, 50 to 75 percent of the manatees sighted were offshore of Collier and Monroe counties located in the southern portion of the peninsula (Irvine et al. 1981 as cited in FPL 1999).

During summer months, manatees are observed in small groups throughout southern Florida, occurring in coastal waters, estuaries, bays, and rivers of both the Gulf and Atlantic coasts. Although manatees are sighted in the Panhandle area in the summer, the majority of the western Florida population typically occurs south of the Suwannee River (FPL 1999).

The majority (approximately 85 percent) of the waters beneath WTA1 are at depths greater than 20 feet; only 15 percent of WTA1 occurs in water between 12-18 feet deep. During the winter months, the manatee population within the waters adjacent to the St. Mark's Power Plant, near the St. Marks NWR, usually consists of less than 10 individuals. Up to 30 manatees can be expected in the waters adjacent to St. Marks NWR during the summer months (USFWS 1999d). The proposed WTA is located approximately 4 miles offshore and south of the St. Marks NWR. Given the proposed WTA's distance from shore, the absence of sea grass beds in this offshore area, and its water depth (i.e., the majority of WTA1 is greater than 20 feet deep), manatees are expected to be rare in WTA1 waters. The USFWS conducts regular aerial surveys in this region within 1 mile from shore since they consider the likelihood of encountering a manatee further offshore to be low (USFWS 1999d). Therefore, it is unlikely that manatees would be found within the waters of WTA1.

Alternative Water Training Area (WTA2)

As described above for WTA1, the only two species of marine mammals known to occur regularly within the alternative WTA are the bottlenose dolphin and West Indian manatee. General information about both of these species is included above in Section 3.11.2. Additional information on the occurrence of bottlenose dolphins and manatees within the WTA2 is provided below.

Bottlenose Dolphin. Analyses of line-transect data collected during NMFS surveys of the Florida panhandle region in September-October 1993 (Blaylock and Hoggard 1994 as cited in NMFS 1997) indicate that the Apalachee Bay coastal bottlenose dolphin stock has a population size of 491 (CV = 0.39). The minimum population estimate for this stock is 358 animals. Therefore, the number of bottlenose dolphins occurring within WTA2 at any one time can range from 0 to approximately 500, the latter assuming that the entire Apalachee Bay stock is present as well as some transients from other Gulf of Mexico coastal stocks. Since coastal stocks typically occur in small groups (Mullin et al. 1994), it is more likely that, at any one time, fewer than 20 individuals may be present in the alternative WTA.

West Indian Manatee. As previously described for WTA1, the manatee population within the waters near the St. Marks NWR usually consists of less than 10 individuals during the winter and up to 30 individuals during the summer months (USFWS 1999d). WTA2 is located approximately 1 mile offshore and south of the St. Marks NWR. Aerial surveys conducted in this region are limited to waters within 1 mile from shore since manatees typically do not occur further offshore (USFWS 1999d). However, although WTA2 lies 1 mile offshore, water depth is usually less than 20 feet and seagrass beds occur within this area. These two factors suggest that manatees may occur in WTA2 waters. Relative to other Florida Gulf coast areas further south, the total number of manatees sighted in this area is relatively low (i.e., 10 to 30 individuals). In addition, manatees are considered "semi-social" animals, meaning that they typically do not travel in large numbers unless they are part of a mating herd, and usually are not sighted in groups of more than 10 individuals unless aggregating at a particular site. Summer groups of manatees are generally composed of fewer than 10 individuals (USFWS 1999d). Since manatees occurring in the St. Marks area are most likely to be found inshore of WTA2, it is expected that the number of manatees occurring within WTA2 would be few (i.e., less than 10) to none.

3.11.2.2 FORT STEWART HELICOPTER AR TRACKS

The proposed and alternative Fort Stewart helicopter AR tracks are located entirely over land and no marine biological resources occur beneath these tracks.

3.11.2.3 WATER TRAINING AREA HELICOPTER AR TRACKS

The proposed and alternative Water Training Area helicopter AR tracks are located entirely over land and no marine biological resources occur beneath these tracks.

3.11.2.4 AVON PARK HELICOPTER AR TRACKS

Proposed Avon Park Helicopter AR Track (AP-AR1)

Only two species of marine mammals are known to occur regularly in the waters under AP-AR1, the bottlenose dolphin and the West Indian manatee. General information on these species is included in Section 3.11.3 of this EA. Information specific to their distribution and abundance in waters below the proposed Avon Park helicopter AR track is provided below.

Bottlenose Dolphin. The population of bottlenose dolphins most likely to be found in the waters beneath AP-AR1 include members of the eastern Gulf of Mexico coastal stock, as well as members of the Waccasassa Bay/Withloacoochee Bay/Crystal Bay stock (NMFS 1997). For management purposes, NMFS has defined the eastern Gulf of Mexico coastal stock as those individuals occupying an area that extends from Key West, Florida, north to the southern portion of Apalachee Bay, and encompasses waters from the shore, barrier islands, or bay boundaries, west to 5.8 miles seaward of the 60-foot isobath. The seaward demarcation for this stock represents a management boundary rather than an ecological boundary as it corresponds to aerial survey strata used by NMFS.

Analyses of sighting data collected during aerial line-transect surveys of the west coast of Florida in September – November 1994 (NMFS unpublished data as cited in NMFS 1997) indicate that the eastern Gulf of Mexico coastal stock has a population size of 9,912 dolphins (CV = 0.12). The minimum population estimate for this stock is 8,963 animals. Portions of this stock may overlap with the Gulf of Mexico outer continental shelf (OCS) stock and the two stocks may be genetically indistinguishable. The abundance of the Gulf of Mexico OCS stock, thought to occur further offshore and in deeper waters than the eastern Gulf of Mexico coastal stock, is estimated at 50,247 dolphins (CV = 0.18).

Analyses of line-transect data collected during NMFS surveys of the west coast of Florida in September – November 1994 (NMFS unpublished data as cited in NMFS 1997) indicate that the Waccasassa Bay/Withloacoochee Bay/Crystal Bay stock of bottlenose dolphins has a population size of 100 (CV = 0.85). The minimum population estimate for this stock is 54 animals. Based on the management boundaries identified by NMFS, members of this stock are more likely to be found inshore of AP-AR1.

Based on NMFS population estimates, the number of bottlenose dolphins occurring beneath AP-AR1 could range from none to thousands of animals; however, since coastal stocks typically occur in small groups (Mullin et al. 1994), it is more likely that, at any one time, fewer than 20 individuals may be present in the waters underlying AP-AR1.

West Indian Manatee. Manatees are generally found in shallow waters greater than 70^{o} F and less than 20 feet deep. The majority of AP-AR1 overlies shallow waters less than 20 feet deep. In the summer months, as the water temperature rises, manatees become more spatially distributed throughout the shallow nearshore waters adjacent to AP-AR1. Conversely, manatees congregate around warm water sources such as freshwater springs and power plant outfalls during winter months. Designated critical manatee habitat, the Crystal River Critical Habitat, is located approximately 10 miles due east of the midpoint of AP-AR1. Approximately 360 to 365 manatees can be found near warm springs and power plants of the Crystal River Critical Habitat (which includes King's Bay, the headwaters of the Crystal River, and the Homosassa River) during the winter months. During the summer, the population of manatees in this area usually declines to fewer than 100 individuals (USFWS 1999d).

At its nearest point to the coast (the southeast end), AP-AR1 is located approximately 1 mile offshore. As noted in Section 3.11.3, manatees are typically found within 0.6 mile of the coast. Therefore, most of the manatees occurring in the Crystal River area are expected to be found east of AP-AR1, closer to the coast and within the river habitats. However, anecdotal reports indicate that manatees are sighted further offshore in the Crystal River area, possibly due to shallow water, extensive sea grass beds, and naturally-occurring offshore springs (USFWS 1999d). Therefore, it is probable that some individuals may occur beneath AP-AR1, especially in those portions of the track that are closer to shore (i.e., the southeast and northern portions). As described in Section 3.11.3, manatees usually are not sighted in groups of more than 10 individuals unless aggregating at a particular site. Since manatees occurring in the Crystal River area are most likely to be found inshore of AP-AR1, it is expected that the number of manatees occurring beneath the proposed track would be few (i.e., less than 10) to none.

Alternative Avon Park Helicopter AR Track (AP-AR2)

The only species of marine mammal known to occur regularly in the waters under AP-AR2 is the bottlenose dolphin. AP-AR2 is located more than 9 miles offshore at its closest point and, given the distance to shore and relatively deep water (greater than 20 feet), it is unlikely that manatees would occur in this area. General information on the bottlenose dolphin is included in Section 3.11.3 of this EA. Information specific to their distribution and abundance in waters below AP-AR2 is provided below.

Bottlenose Dolphin. As described in Section 3.11.3, bottlenose dolphins most likely to be encountered in the waters below AP-AR2 include members of the eastern Gulf of Mexico stock. Analyses of sighting data collected during aerial line-transect surveys of the west coast of Florida in September – November 1994 (NMFS unpublished data as cited in NMFS 1997) indicate that the eastern Gulf of Mexico coastal stock has a population size of 9,912 dolphins (CV = 0.12). The minimum population estimate for this stock is 8,963 animals. Portions of this stock may overlap with the Gulf of Mexico OCS stock and the two stocks may be genetically indistinguishable. The abundance of the Gulf of Mexico OCS stock, thought to occur further offshore and in deeper waters than the eastern Gulf of Mexico coastal stock, is estimated at 50,247 dolphins (CV = 0.18).

Based on NMFS population estimates, the number of bottlenose dolphins occurring beneath AP-AR2 could range from none to thousands of animals; however, since coastal stocks typically occur in small groups, it is more likely that, at any one time, fewer than 20 individuals may be present in the waters underlying the alternative Avon Park helicopter AR track.

3.11.2.5 Crew Swap Facilities

The proposed and alternative crew swap facilities are located on land and no marine biological resources are associated with these locations.

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4.0 ENVIRONMENTAL IMPACTS

This chapter presents an assessment of the potential environmental impacts of establishing a proposed water training area (WTA) and helicopter air refueling (AR) tracks to support Moody Air Force Base (AFB) training operations. The analysis presented in this chapter is based on an examination of effects of the proposed action and alternatives (refer to Chapter 2.0) on baseline conditions (refer to Chapter 3.0). Cumulative effects of the proposed action with other past, present, and reasonably foreseeable future actions are presented in Chapter 5.0.

The region of influence (ROI) for the proposed and alternative water training areas and helicopter air refueling routes would include areas in the Gulf of Mexico, southeast Georgia, and northern Florida. Because implementation of the proposed action and alternatives would occur off base in these areas, potential impacts to Moody AFB were not assessed. In addition, impacts at Fort Stewart, Georgia and Avon Park Air Force Range (AFR) were also not addressed since neither facility would experience any measurable change to existing conditions.

4.1 AIRSPACE

The following section presents environmental impacts of the proposed action and alternatives on the structure, management, and use of the affected airspace. This evaluation focuses on whether the proposed action or alternatives would require alteration of airspace management procedures and assesses the capability of the airspace to accommodate the proposed use.

Impacts could occur if the proposed action and alternatives affect: movement of other air traffic in the area; air traffic control systems or facilities; or accident potential for mid-air collisions between military and non-participating civilian operations. Potential impacts were assessed to determine the extent that the proposed airspace changes would change existing relationships with federal airways, uncharted visual flight routes, transition areas, and airport related air traffic operations. Effects to instrument flight rules (IFR) and visual flight rules (VFR) air traffic were also considered.

4.1.1 Water Training Areas

4.1.1.1 PROPOSED WATER TRAINING AREA (WTA1)

WTA1 would be located approximately 4 nautical miles (NM) offshore with the northern portion of the WTA contained within the Moody Low Altitude Tactical Navigation (LATN) area. Sortie-operations by HH-60 and HC-130 aircraft would be flown VFR throughout the WTA. WTA1 would require no special use airspace designations since activities would be at low altitudes and low air speeds (below 2,000 feet above ground level [AGL] and slower than 250 knots). There are two low-level Victor Routes overlying WTA1: V521 runs northwest to southeast and V97 runs north to south. There are also two high-altitude Jet Routes that are airways for northbound and southbound commercial and civilian air traffic. The Air Force and Navy also have military training routes (MTRs), military operations areas (MOAs), and Warning Areas located in and around WTA1.

The airspace surrounding the region has one scheduled commercial air service airport, Tallahassee Regional Airport, approximately 35 NM to the north of the proposed WTA. There are two general aviation airports, Perry-Foley Airport and Cross City Airport, within approximately 40 NM to the east and south, used by civilian pilots.

Existing see-and-avoid procedures and avoidance measures for civil aviation airports would remain unchanged. Scheduling coordination, processes, and procedures currently used to manage the existing military airspace are well established and would need no modification to support implementation of the proposed action.

Although published federal airways and military airspace are adjacent to and traverse WTA1, there would be a minimal increase in airspace use. Therefore, implementation of the proposed action would not significantly impact general aviation in the region.

4.1.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

WTA2 would be located closer to shore than WTA1 and would be located entirely within the existing Moody LATN area. All operational components of this alternative would be identical to WTA1. Therefore, proposed aircraft activities in WTA2 would not significantly impact general aviation in the region.

4.1.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue operations by HH-60 and HC-130 aircrews. Therefore, airspace use and management, as described in Section 3.1, would remain unchanged.

4.1.2 Fort Stewart Helicopter AR Tracks

4.1.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

FS-AR1 would be located entirely within the existing Moody LATN area. HH-60s and HC-130s currently fly VFR within the Moody LATN area. During proposed refueling activities, these aircraft would continue to fly VFR in FS-AR1. The only changes in operations would be the capability to conduct in-flight wet refueling as well as an increased concentration of HH-60 and HC-130 sortie-operations within FS-AR1 boundaries. These sortie-operations would be conducted at low altitudes (typically 2,000 feet AGL) and would not affect the Jet Routes and Victor Routes that overlie FS-AR1 at higher altitudes. The 347th Operations Support Squadron (347 OSS/OSTA) would coordinate with Jacksonville Air Route Traffic Control (ARTCC) and have responsibility for scheduling air refueling (AR) track use. Existing see-and-avoid procedures followed for the Moody LATN area and avoidance measures for civil aviation airports would remain unchanged. Proposed aircraft activities in FS-AR1 would not significantly impact general aviation in the region.

4.1.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

FS-AR2 would be located in the same general airspace environment as FS-AR1, and all operational components of this alternative would be similar to the proposed FS-AR1. Therefore, proposed aircraft activities in FS-AR2 would not significantly impact general aviation in the region.

4.1.2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Fort Stewart helicopter AR track would be established. Therefore, airspace use and management, as described in Section 3.1, would remain unchanged.

4.1.3 Water Training Area Helicopter AR Tracks

4.1.3.1 PROPOSED WATER TRAINING AREA AR TRACK (WTA-AR1)

WTA-AR1 would be located entirely within the Moody LATN area. HH-60s and HC-130s currently fly VFR within the Moody LATN area. During proposed refueling activities, these aircraft would continue to fly VFR in WTA-AR1. The changes in operations would be the added capability to conduct in-flight wet refueling as well as an increased concentration of HH-60 and HC-130 sortie-operations within WTA-AR1 boundaries. These sortie-operations would be conducted at low altitudes (typically 2,000 feet AGL) and would not affect the Jet Routes and Victor Routes that overlie WTA-AR1 at higher altitudes. Low-level MTRs (Instrument Route [IR]-015, Visual Route [VR]-1001, VR-1002 and VR-1005) cross or are adjacent to the southern end of the track. To avoid airspace conflicts, the 41st Rescue Squadron [41 RQS] and 71 RQS would plan operations to avoid scheduled use times of these MTRs. Proposed aircraft activities in WTA-AR1 would not significantly impact general aviation in the region.

4.1.3.2 ALTERNATIVE WATER TRAINING AREA AR TRACK (WTA-AR2)

WTA-AR2 would be located in the same general airspace environment as WTA-AR1 with an east-west alignment. MTRs are located to the south and west of WTA-AR2. Operational components of this alternative would be similar to the proposed action. WTA-AR2 would parallel to the south of Interstate 10. This area is typically used by general VFR aircraft for navigation. Therefore, proposed aircraft activities in WTA-AR2 would not significantly impact general aviation in the region. Existing scheduling procedures to de-conflict military airspace use would not change.

4.1.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative WTA helicopter AR track would be established. Therefore, airspace use and management, as described in Section 3.1, would remain unchanged.

4.1.4 Avon Park Helicopter AR Tracks

4.1.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

HH-60s and HC-130s currently fly VFR in uncontrolled airspace over Florida. During proposed refueling activities, these aircraft would fly VFR in AP-AR1. The only changes in operations would be the added capability to conduct in-flight wet refueling as well as an increased concentration of HH-60 and HC-130 sortie-operations in the offshore airspace within AP-AR1 boundaries. These sortie-operations would be conducted at low altitudes (typically 2,000 feet AGL) and would not affect the Victor Route and heavily used Jet Routes that overlie AP-AR1 at higher altitudes. In addition, sortie-operations would occur relatively infrequently, typically about once every other week. There are two MTRs (VR-1097 to the west of AP-AR1 and IR-046 to the south) that would require prior scheduling and coordination to de-conflict airspace use. Proposed aircraft activities in AP-AR1 would not significantly impact general aviation in the region.

4.1.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

AP-AR2 would be located in the same airspace environment as AP-AR1, and all operational components of this alternative would be similar to AP-AR1. VR-1097 overlies AP-AR2 and would have to be scheduled and coordinated prior to use. The 347 OSS/OSTA would coordinate with Jacksonville ARTCC and have responsibility for scheduling VR-1097 and the AR track use. Therefore, proposed aircraft activities in AP-AR2 would also not significantly impact general aviation in the region.

4.1.4.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Avon Park helicopter AR tracks would be established. Therefore, airspace use and management, as described in Section 3.1, would remain unchanged.

4.1.5 Crew Swap Facilities

4.1.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

Perry-Foley Airport is located approximately 20 NM northwest of the proposed and alternative WTAs. It is located in a predominantly rural area of north-central Florida just outside of the city of Perry, Florida. It underlies the existing Moody LATN area which is currently used by HH-60s and HC-130s flying VFR. During proposed crew swap activities, these aircraft would land and take off one time, on average, in a typical training day. Aircraft activity at this airport does not currently result in congestion of access to and from the airport. The addition of two helicopter crew swaps on an occasional basis would not appreciably increase this level of activity that is currently experienced at this airport. Therefore, crew swap activities at the Perry-Foley Airport would not significantly impact general aviation at the airport.

4.1.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

Cross City Airport (located 37 NM south of Perry-Foley Airport) also underlies the Moody LATN area. Air traffic is similar to Perry-Foley Airport. Crew swap activities at Cross City Airport would not significantly impact general aviation at the airport.

4.1.5.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the Perry-Foley nor Cross City airports would be used to support HH-60 aircrew swaps. Therefore, airspace use and management, as described in Section 3.1, would remain unchanged.

4.2 NOISE

Noise contributions from helicopter and fixed-wing aircraft operations at the proposed and alternative water training areas (WTAs), helicopter air refueling (AR) tracks, and crew swap facilities were calculated using various noise models as appropriate. The Rotocraft Noise Model (RNM) (Lucas 1998) and Military Operations Area (MOA) and Range Noise Model (MR_NMAP) were used to model noise levels in the WTA and each of the helicopter AR tracks. The noise metrics used for the WTA and helicopter AR tracks are the day-night average sound level (DNL) measure, Sound Exposure Level (SEL), and the single event noise exposure level (SENEL) (refer to Section 3.2, Noise, as well as Appendix A). In this document, the SENEL estimated for each AR track refers to the combined noise exposure of one HC-130 and two HH-60s during refueling operations. DNL is the composite daily noise average with a 10 decibel (dB) penalty for nighttime events (nighttime is defined as the period from 10:00 p.m. to 7:00 a.m.). SEL is the sound exposure level that relates the noise energy occurring during an event to a 1-second average sound level. This metric is used to compare noise events with different durations. This metric can be either unweighted, A-weighted (dBA), or C-weighted. For assessing potential effects on humans, an A-weighted SEL is used. NOISEMAP, the standard noise estimation methodology used for military airfields, was used to calculate the DNL sound levels at the Perry-Foley and Cross City airfields. Approach, landing, and takeoff operations of the HH-60 during aircrew swaps were modeled to calculate the DNL levels around the airfield. Noise data for the HH-60 were derived from controlled measurements. HC-130 noise data are contained in the U.S. Air Force NOISEFILE database.

For this analysis, the operations are separated into three time groups: day, evening, and nighttime. Day occurs between 7:00 a.m. to sunset. Evening is defined as occurring between after sunset to 10:00 p.m. Nighttime is defined to occur between 10:00 p.m. to 7:00 a.m. For purposes of this noise analysis, the day and evening operations are grouped together.

Discussion of land use compatibility and noise impacts of the proposed action and alternatives is presented in Section 4.8, Land Use, and Section 4.9, Recreation. Potential noise impacts on biological resources are discussed in Section 4.10, Terrestrial Biological Resources, and Section 4.11, Marine Biological Resources. This section addresses potential noise impacts on humans and therefore uses A-weighted metrics in the following discussions.

4.2.1 Water Training Areas

4.2.1.1 PROPOSED WATER TRAINING AREA (WTA1)

A total of 549 annual sortie-operations would be conducted in WTA1 under the proposed action, of which nearly 82 percent, or 449, would be by HH-60 aircraft. HC-130 aircraft would conduct the remaining 18 percent, or 100 sortie-operations. Table 4.2-1 presents the total number of annual sortie-operations by aircraft type.

Using the MR_NMAP and the RNM computer programs, noise levels in DNL and SEL were calculated for random flight operations in the proposed WTA1 for the total number of sortie-operations and aircraft types (see Table 4.2-1). Table 4.2-2 shows the calculated noise levels for each airspace component.

Table 4.2-1. HH-60 and HC-130 Annual Sortie-Operations for Proposed Use of the Water Training Area and Helicopter AR Tracks

	HH-60			*HC-130*		
Area	*Day*	*Night*	*Total*	*Day*	*Night*	*Total*
Water Training Area (WTA)	389	60	449	100	0	100
Fort Stewart Helicopter AR Track	77	15	92	45	9	54
WTA Helicopter AR Track	204	39	243	120	23	143
Avon Park Helicopter AR Track	26	5	31	15	3	18
Perry-Foley Airport Crew Swap[1]	147	26	173	NA	NA	NA

[1] Designates sortie rather than sortie-operation.
NA = Not applicable.

Table 4.2-2. Proposed Action Noise Levels

Airspace Component	*DNL (dB)*	*SEL (dB)*
WTA1	45	98
FS-AR1	<40	92[1]
WTA-AR1	<40	92[1]
AP-AR1	<40	92[1]
Perry-Foley Airport[2]	<40	NA

Note: [1] For the AR tracks, this value represents the SENEL for all three aircraft operating within the track.
[2] HH-60 airfield operations only
NA = Not applicable.

Under the proposed WTA1, the HH-60 would perform hover operations from 10 to 50 feet above the surface of the water. For hover operations, airborne noise levels are not expected to increase greatly for points laterally closer than 250 feet because of the downwash of the rotor. The DNL values from aircraft operations within the proposed WTA1 would be 45 dB. These DNL levels would be similar to the ambient noise levels occurring within this area. The SEL from an overflight of an HH-60 operation at 500 feet above mean sea level (MSL) at 115 knots is expected to be 93 dB. The maximum SEL of an overflight of an HH-60 operating at 100 feet MSL at 115 knots would be 101 dB. For the HC-130, when the aircraft is operating at an altitude of 300 feet MSL the SEL would be 98 dB, with a maximum of 104 dB when the aircraft is at its minimum altitude of 150 feet MSL. These operations would result in higher noise excursions than currently experienced in the area, although they would occur only a few times a day. Thus, operations associated with HH-60 and HC-130 training activities within the WTA1 would result in relatively few noise intrusions. No significant noise impacts would occur as a result of the establishment and use of WTA1.

4.2.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

Under the alternative WTA2, sortie-operations and training activities would be similar to those described under WTA1. The calculated DNL for this airspace is 47 dB, which represents a 2-dB increase above estimated noise levels occurring in WTA1 (Table 4.2-3). This increase results from a reduction in the size of the WTA2 airspace (i.e., the same sound levels are averaged over a smaller area). The single event values would remain the same since no change would occur in the operations. Operations associated with HH-60 and HC-130 training activities within WTA2 would result in relatively low noise levels. Therefore, no significant noise impacts would occur as a result of implementation of the alternative WTA2.

Table 4.2-3. Comparison of Proposed Action and Alternative Noise Levels

	Proposed Action		*Alternatives*	
Airspace Component	DNL (dB)	*SEL (dB)*	*DNL (dB)*	*SEL (dB)*
WTA1	45	98	-	-
WTA2	-	-	47	98
FS-AR1	<40	92[1]	-	-
FS-AR2	-	-	<40	92[1]
WTA-AR1	<40	92[1]	-	-
WTA-AR2	-	-	<40	92[1]
AP-AR1	<40	92[1]	-	-
AP-AR2	-	-	<40	92[1]
Perry-Foley Airport	<40	-	-	-
Cross City Airport	-	-	<40	-
Sensitive Receptors				
WTA1 and WTA2[2]				
FS-AR1[3]				
FS-AR2				
Appling Cty Elem Sch	-	-	<40	83[1]
Appling Cty High Sch	-	-	<40	81[1]
Appling Cty Jr High Sch	-	-	<40	75[1]
Appling Cty Primary Sch	-	-	<40	83[1]
Bacon Cty Elem Sch	-	-	<40	82[1]
Bacon Cty High Sch	-	-	<40	83[1]
Bacon Cty Middle Sch	-	-	<40	75[1]
Nicholls Elem Sch	-	-	<40	55[1]
Nicholls High Sch	-	-	<40	55[1]
WTA-AR1				
Greenville Middle Sch	<40	73[1]	-	-
Greenville Primary Sch	<40	77[1]	-	-
WTA-AR2[3]				
AP-AR1 and AP-AR2[4]				
Cedar Keys NWR (centroid)	<40	<45[1]	<40	<45[1]
Chassahowitzka NWR (centroid)	<40	<45[1]	<40	<45[1]
Cedar Keys NWR (closest)	<40	76[1]	<40	<45[1]
Chassahowitzka NWR (closest)	<40	82[1]	<40	<45[1]

Note: [1] For the AR tracks, this value represents the SENEL for all three aircraft Operating within the track.
[2] St. Marks NWR is not included in this table since the portion adjacent to WTA2 is entirely water; potential noise impacts to marine resources are addressed in Section 4.11.
[3] No sensitive receptors directly underlie this airspace.
[4] Although no sensitive receptors directly underlie this airspace, exposure levels were estimated for land-based locations (center point and closest point) within nearby NWRs.

4.2.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue training operations by HH-60 and HC-130 aircrews. Baseline noise levels, as described in Section 3.2, would remain unchanged.

4.2.2 Fort Stewart Helicopter AR Tracks

4.2.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

Under the proposed FS-AR1, a helicopter AR track would be established to allow for refueling operations and training. A total of 92 HH-60 and 54 HC-130 annual sortie-operations would be conducted in the proposed FS-AR1 track. Each sortie-operation would result in three to four passes along the track as the aircraft train for 1 hour.

Using RNM and MR_NMAP, proposed FS-AR1 sortie-operations for the HH-60 and HC-130 aircraft were modeled. DNL and SENEL were calculated with 95 percent of the operations at an altitude of 2,000 feet above ground level (AGL) and 5 percent at an altitude of 1,500 feet AGL. Under the proposed FS-AR1, DNL noise levels associated with these sortie-operations would be less than 40 dB. It should be noted that each noise event (reported in terms of SENEL) would be composed of three aircraft (two HH-60 and one HC-130) since they would be flying together in a tight formation required by the refueling training. Therefore, the SENEL reported for each AR track refers to the combined noise exposure of the three aircraft operating during refueling activities along the center of track. An SENEL of 90 dB would be generated under the track for the three aircraft operating at 2,000 feet AGL, and an SENEL of 92 dB would occur when the aircraft operate at an altitude of 1,500 feet AGL. These values are comparable to other aircraft operations that currently occur within and around the proposed airspace. The DNL levels would be similar to the existing ambient noise levels in the area. Noise levels associated with operations in the proposed FS-AR1 would be well within the range of the accepted guidelines for aircraft noise compatibility. No sensitive noise receptors are located directly beneath FS-AR1.

Implementation of the proposed FS-AR1 would result in relatively low noise levels associated with HH-60 and HC-130 training activities. Therefore, no significant noise impacts would occur as a result of implementation of FS-AR1.

4.2.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

Under the alternative FS-AR2, sortie-operations and noise levels would be similar to those described under the proposed FS-AR1 (see Table 4.2-3).

As shown in Table 4.2-3, nine sensitive receptors (schools) are located directly beneath FS-AR2. Point source modeling was performed at these sensitive noise receptor locations. Results from the modeling indicate that DNL noise levels at all sensitive receptors would be below 40 dB (see Table 4.2-3). As shown in Table 4.2-3, Appling County Elementary School, Appling County High School, and Appling County Primary School would experience SENELs of 72 dB, 66 dB, and 72 dB, respectively, from the proposed operations. These levels would occur 3 to 4 times during an hour when the airspace is being used. If flight operations coincided with school hours, these levels would not interrupt communication even if the classroom windows were open. The building would reduce the noise levels by 15 dB with windows open and by 25 dB with windows closed. Discussion of land use effects associated with noise resulting from aircraft operations is presented in Section 4.8, Land Use and Section 4.9, Recreation.

Implementation of this alternative would result in relatively low noise levels associated with HC-130 and HH-60 training activities. Therefore, no significant noise impacts would occur as a result of implementation of the alternative FS-AR2.

4.2.2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a Fort Stewart helicopter AR track would not be established for use by HH-60 and HC-130 aircraft. Baseline noise levels, as described in Section 3.2, would remain unchanged.

4.2.3 Water Training Area Helicopter AR Tracks

4.2.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

Under the proposed WTA-AR1, a total of 243 HH-60 and 143 HC-130 sortie-operations would be conducted annually (see Table 4.2-1). As shown in Table 4.2-3, Greenville Primary and Middle schools would experience SENELs of 77 dB and 73 dB, respectively. These noise events would occur three to four times during the hour in which flight operations occurred in the airspace. If flight operations coincided with school hours, these levels would not interrupt communication even if the classroom windows were open. The building would reduce the noise levels by 15 dB with windows open and by 25 dB with windows closed. Discussion of land use effects associated with noise resulting from aircraft operations is presented in Section 4.8, Land Use and Section 4.9, Recreation.

Noise levels associated with operations in the proposed WTA-AR1 would be well within the accepted guidelines for aircraft noise compatibility. Implementation of the proposed WTA-AR1 would result in relatively low noise levels associated with HC-130 and HH-60 training activities. Therefore, no significant noise impacts would occur as a result of implementation of the proposed WTA-AR1.

4.2.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Under the alternative WTA-AR2, sortie-operations and noise levels would be similar to those described under the proposed WTA-AR1 (see Table 4.2-3). No sensitive receptors are located directly beneath WTA-AR2. Implementation of this alternative would result in relatively low noise levels associated with HC-130 and HH-60 training activities. Therefore, no significant noise impacts would occur as a result of implementation of the alternative WTA-AR2.

4.2.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA helicopter AR track would not be established for use by HH-60 and HC-130 aircraft. Baseline noise levels, as described in Section 3.2, would remain unchanged.

4.2.4 Avon Park Helicopter AR Tracks

4.2.4.1 Proposed Avon Park Helicopter AR Track (AP-AR1)

Under the proposed AP-AR1, a total of 31 HH-60 and 18 HC-130 sortie-operations would be conducted annually (see Table 4.2-1). As shown in Table 4.2-3, the areas of both Cedar Key National Wildlife Refuge (NWR) and Chassahowitzka NWR closest to the airspace would experience SENELs of 76 dB and 82 dB, respectively. These levels would occur three to four times during the hour in which flight operations occurred in the airspace. Noise levels associated with operations in the proposed AP-AR1 would be well within accepted guidelines for aircraft noise compatibility. Implementation of the proposed AP-AR1 would result in relatively low noise levels associated with HH-60 and HC-130 training activities. Therefore, no significant noise impacts would occur as a result of implementation of the proposed AP-AR1.

4.2.4.2 Alternative Avon Park Helicopter AR Track (AP-AR2)

Under the alternative AP-AR2, sortie-operations and noise levels would be similar to those described under the proposed WTA1 (see Table 4.2-3). As shown in Table 4.2-3, no areas in Cedar Key NWR or Chassahowitzka NWR would experience SENELs greater than 45 dB from flights operating within the alternative AP-AR2 airspace. Implementation of this alternative would result in relatively low noise levels associated with HH-60 and HC-130 training activities. Therefore, no significant noise impacts would occur as a result of implementation of the alternative AP-AR2.

4.2.4.3 No-Action Alternative

Under the No-Action Alternative, an Avon Park helicopter AR track would not be established for use by HH-60 and HC-130 aircraft. Baseline noise levels, as described in Section 3.2, would remain unchanged.

4.2.5 Crew Swap Facilities

4.2.5.1 Proposed Crew Swap Facility (Perry-Foley Airport)

Perry-Foley Airport is proposed as a landing area for HH-60 helicopters to perform aircrew swaps during training activities. Under the proposed action, HH-60 helicopters would use the airfield approximately 173 times a year (see Table 4.2-1). Currently, general aviation aircraft are operating at this airfield. These aircraft generate SEL values of 79 to 86 dB at a distance of 1,000 feet whereas the HH-60 would generate SEL values of 89 dB at this distance. Thus, the HH-60 operations would generate higher noise levels than are currently experienced at this airfield. Based on HH-60 sortie-operations, NOISEMAP was used to calculate the DNL associated with HH-60 operations at the airfield. Noise levels associated with HH-60 operations at the proposed crew swap facility would be below 40 dB DNL and are well within the range of the accepted guidelines for aircraft noise compatibility. Therefore, no significant noise impacts would occur as a result of establishing an aircrew swap facility at Perry-Foley Airport.

4.2.5.2 Alternative Crew Swap Facility (Cross City Airport)

Under this alternative, Cross City Airport would be used to support HH-60 aircrew swaps during training activities. Annual operations would be the same as those under the proposed crew swap facility.

Impacts associated with this alternative would be similar to those described under the proposed crew swap facility at Perry-Foley Airport. Therefore, no significant noise impacts would occur as a result of establishing an aircrew swap facility at Cross City Airport.

4.2.5.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the Perry-Foley nor Cross City airports would be used to support HH-60 aircrew swaps. Baseline noise levels at these airfields, as described in Section 3.2, would remain unchanged.

4.3 WASTE MANAGEMENT

The proposed action would generate various types of waste materials within the region of influence (ROI). Specifically, this would include the following materials used within the water training area (WTA): sea dye packs, flares, and lightsticks. These items are not considered hazardous wastes. However, in sufficient numbers they could present a marine and shoreline debris issue, in addition to potential aesthetic considerations.

4.3.1 Water Training Areas

4.3.1.1 PROPOSED WATER TRAINING AREA (WTA1)

Implementation of the proposed action would result in the generation of waste within WTA1. Table 4.3-1 summarizes the proposed annual use of lightsticks, marine location markers, and marine location dye markers. Under the proposed action, the 41 RQS and 71 RQS would use 11,006 lightsticks, 2,545 marine location markers (flares), and 1,190 marine location dye markers (sea dye packs) per year within the WTA. Lightsticks would be retrieved when search and rescue training personnel are in the water and whenever environmental conditions (e.g., sea state, wind speed, and ocean currents) allow. A detailed description of each of these components is presented below.

Table 4.3-1. Annual Lightstick, Flare, and Sea Dye Usage in the Proposed WTA

		Flares		
	Lightsticks	*MK25*	*MK6*	*Sea Dye Packs*
41 RQS	11,006	173	172	690
71 RQS	NA	1606	594	500
Total	11,006	2,545		1,190

NA = Not applicable
Source: Air Force 1999a.

M59 Sea Dye Packs

The M59 is a marine location dye marker consisting of a heat-sealed plastic laminate bag (about 34” x 17” x 15”) filled with 22 ounces of uranine, a non-hazardous liquid dye composed of soluble sodium salt of fluorescein. The dye, which is not toxic or hazardous, is designed to mark the location of objects in the water. The plastic bag is dropped into the water from a minimum height of 50 feet at static or moving speeds. Upon hitting the water, the bag ruptures, scattering the enclosed dye to form a brilliant, fluorescent emerald green slick approximately 20 feet in diameter. The slick is visible within a 10-mile radius at an altitude of 3,000 feet above mean sea level (MSL) for an average of 2 hours. While the dye disappears within 2 hours, the plastic bag or pieces thereof, could remain suspended in the water column, sink to the bottom, or wash onshore.

Marine Location Markers (Flares)

Descriptions

The MK6 Mod 3 Marine Location Marker consists of four pyrotechnic candles contained in a square wooden block (about 18” x 17” x 26”) with a flat metal nose plate attached. There are four flame and smoke escape holes in the forward end of the signal; each hole is capped and sealed with tape. The MK6

Mod 3 uses a pull friction igniter, covered by adhesive tape, and is located in the center of the tail end of the body. The friction and igniter are launched by a sharp pull, either by hand or by a lanyard attached to the structure of the aircraft. The igniter charge initiates a delay fuse, which, after a 90-second interval, ignites the first candle. When the candle begins to burn, the resulting gas pressure forces the metal cap out of the escape hole and breaks the adhesive tape seal, allowing gases to escape and burn. As the first candle burns out, a fuse is ignited which ignites the next candle unit. The successive ignition is repeated until all four candle-units have burned out. The total burning time is approximately 40 minutes.

The MK25 Mod 3 Marine Location Marker consists of an aluminum body (about 55” x 55” x 41”) containing a pyrotechnic composition, an electric squib, and a saltwater-activated battery. The base of the marker contains a battery, a safety arm feature that seals the battery cavity, and battery cavity ports. The MK25 marine marker is launched by rotating base plates from the “safe” to the “armed” position to expose the battery cavity ports. When saltwater enters the battery cavity through the ports, water acts as an electrolyte, activating the saltwater battery. The battery develops sufficient current to initiate an electric squib. The squib ignites a starter mix, which in turn ignites the pyrotechnic composition. Gas pressure forces a valve from the nose of the marker and emits a yellow flame and white smoke for 13 to 18 minutes.

Toxicity

Both the MK6 and the MK25 ignition compositions contain small amounts of lead dioxide. Lead dioxide is a recognized poison and a powerful oxidizer that is a severe eye, skin, and mucous membrane irritant. When the ignition composition is heated, it emits toxic fumes of lead. The MK25 also contains phosphorous, a substance that is explosive, flammable, and toxic. Combustion products from the MK6 and MK25 are considered to be severely toxic, and inhalation of the fumes should be avoided (Naval Surface Warfare Center [NSWC] 1999b; refer to Section 4.5, Air Quality). As the flares would be deployed in a dynamic environment, possible impacts associated with deployment would not be hazardous. This is because the pollutants would be quickly and effectively reduced to insignificant concentrations through dispersion and advection. Dispersion is a physical process by which pollutants are diffused as they move downwind or downgradient, and results in an associated decrease in contamination. Advection is a physical process by which pollutants are transported away from the source area by physical processes, in this case, wind. The potential for exposure to smoke generated by the flares would be minimal due to the remoteness of the WTA. Should a flare fail to deploy and be encountered by someone, instructions printed on the flares instruct the finder to contact appropriate authorities to remove the item (refer to Section 4.4, Safety).

Reliability Rates

The reliability rate (a percentage of the time successful deployment of the marine location markers occurs) for the MK6 and MK25 marine location markers is between 90 and 95 percent (NSWC 1999b). Every 3 years, the flares undergo lot reliability tests in order to ensure a high reliability rate. Should a lot reliability test result in a reliability rate less than 88 percent, the flares are removed from service (NSWC 1999b). At the current reliability rate (90-95 percent), it is estimated that WTA activities could potentially result in the deposition of 127 to 254 unexpended marine location markers into the marine environment annually. A small percentage of MK6 and MK25 flares could fail to deploy, and could remain on the surface of the ocean. Depending on oceanographic conditions, the state of the flare, and the distance from shore that they are deployed, marine location markers that do not deploy successfully could reach the beach environment. Generally, as marine location markers are used closer to shore, the potential for failed marine location markers to end up at a beach environment increases (NSWC 1999b). Due to the chemical and physical properties comprising the marine location markers, failed marine location markers are considered "unexploded ordnance." Marine location flares used by the Air Force and the Navy are marked with warning language and instructions to contact an appropriate safety officer. Only one such report has been received in the last 11 years (NSWC 1999b). Section 4.4, Safety, addresses the potential safety issues associated with such an event.

Potential impacts associated with the use of marine location markers for WTA activities are summarized in Sections 4.4, Safety; 4.5, Air Quality; 4.10, Terrestrial Biological Resources; and 4.11, Marine Biological Resources.

Lightsticks

Illumination provided by lightsticks is generated by a chemical reaction that takes place when two solutions are allowed to mix. To prevent the reaction from occurring prematurely, one of the solutions is stored in a very thin glass capsule that is easily broken by flexing or bending the tube. Once the tube is broken, the two chemicals are allowed to mix, and illumination occurs. Cyalume is the active ingredient that creates the illumination associated with lightstick activation. Dimethyl phthalate is a component of cyalume and possesses a moderate potential to affect some aquatic organisms (Eastman 1999). However, it is not considered to be toxic to humans. Although it does not meet the criteria for a hazardous waste, hydrogen peroxide, one of the lightstick constituents, is an irritant to mammalian skin and mucous membranes at high concentrations. Due to the high-density plastic used to seal the lightsticks, it is unlikely that the materials contained within the lightstick would ever be discharged to the environment. However, should this ever occur, no harmful effects to aquatic organisms would result, due to the fact that when diluted with a large amount of water, neither dimethyl phthalate nor hydrogen peroxide are expected to have significant impacts (refer to Section 4.11, Marine Biological Resources).

When conditions allow, personnel involved in training operations within the proposed WTA would attempt to recover lightsticks within their immediate vicinity at the completion of each exercise. Using a recovery rate of 1 percent, it is estimated that WTA activities would result in approximately 10,896 lightsticks entering the marine environment annually. The estimated recovery rate is based on the assumption that, when search and rescue training personnel are in the water, they would be able to retrieve groups of five lightsticks (i.e., the cluster nearest to their drop point).

Potential impacts associated with the use of lightsticks during WTA activities are summarized in Sections 4.8, Land Use; 4.9, Recreation; 4.10, Terrestrial Biological Resources; and 4.11, Marine Biological Resources.

4.3.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

WTA2 would be located closer to shore than WTA1 and is somewhat smaller. Being closer to shore than WTA1, there would exist a greater potential for more marine debris to reach the shoreline, particularly within the St. Marks National Wildlife Refuge (NWR). The general waste management issues, however, are similar. Consequently, waste generation associated with this alternative would be similar to that described for WTA1.

4.3.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue training operations by HH-60 and HC-130 aircrews. Therefore, waste generation, as described in Section 3.3, would remain unchanged. No additional waste streams would be added to the ROI.

4.3.2 Fort Stewart Helicopter AR Tracks

4.3.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

Use of FS-AR1 would not involve the use of sea dye packs, flares, or lightsticks. Therefore, no additional waste streams would be added to the ROI and there would be no significant impacts to waste management.

4.3.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

Use of FS-AR2 would not involve the use of sea dye packs, flares, or lightsticks. Therefore, no additional waste streams would be added to the ROI and there would be no significant impacts to waste management.

4.3.2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Fort Stewart helicopter AR tracks would be established. Therefore, waste generation, as described in Section 3.3, would remain unchanged.

4.3.3 Water Training Area Helicopter AR Tracks

4.3.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

Use of WTA-AR1 would not involve the use of sea dye packs, flares, or lightsticks. Therefore, no additional waste streams would be added to the ROI and there would be no significant impacts to waste management.

4.3.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Use of WTA-AR2 would not involve the use of sea dye packs, flares, or lightsticks. Therefore, no additional waste streams would be added to the ROI and there would be no significant impacts to waste management.

4.3.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative WTA helicopter AR tracks would be established. Therefore, waste generation, as described in Section 3.3, would remain unchanged.

4.3.4 Avon Park Helicopter AR Tracks

4.3.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

Use of AP-AR1 would not involve the use of sea dye packs, flares, or lightsticks. Therefore, no additional waste streams would be added to the ROI and there would be no significant impacts to waste management.

4.3.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

Use of AP-AR2 would not involve the use of sea dye packs, flares, or lightsticks. Therefore, no additional waste streams would be added to the ROI and there would be no significant impacts to waste management.

4.3.4.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Avon Park helicopter AR tracks would be established. Therefore, waste generation, as described in Section 3.3, would remain unchanged.

4.3.5 Crew Swap Facilities

4.3.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

Mid-sortie aircrew swaps would be conducted under the proposed action. The aircrew swaps would consist of landing the HH-60 for a brief time in a landing area so that the pilots could switch positions. Other than the HH-60 helicopters occasionally landing at the airfield, no ground facilities at Perry-Foley Airport would be used. HH-60 maintenance and ground refueling would continue to be conducted at Moody AFB. Therefore, the generation of waste during proposed crew swap operations is not expected, and no significant impacts would occur.

4.3.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

All operational elements under this alternative are similar to those addressed in the Perry-Foley Airport discussion. Therefore, the generation of waste during proposed crew swap operations is not expected, and there would be no significant impacts.

4.3.5.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the Perry-Foley nor Cross City airports would be used to support HH-60 aircrew swaps. Therefore, waste generation, as described in Section 3.3, would remain unchanged.

4.4 SAFETY

An analysis of potential safety issues was performed for the proposed and alternative water training areas (WTAs), helicopter air refueling (AR) tracks, and aircrew swap facilities. Elements of the proposed action with the potential to affect safety have been evaluated relative to the degree to which they could increase or decrease safety risks to aircrews and the general public. Potential safety issues analyzed in this section include increased bird-aircraft strike hazard (BASH) potential, aircraft mishaps, accidental fuel spills during in-flight refueling operations, and unretrieved items expended in the marine environment (e.g., lightsticks and flares).

4.4.1 Water Training Areas

4.4.1.1 PROPOSED WATER TRAINING AREA (WTA1)

Flight Risks

Based on the Bird Avoidance Model (BAM), the BASH risk factor for WTA1 is identified as Moderate year-round. Proposed WTA aircraft activities would only slightly increase the potential for bird-strikes in WTA1. BASH potential is typically higher for high-speed fixed wing aircraft (e.g., jets) at low altitudes or in the vicinity of airfields. HH-60s would be hovering over the open ocean and flying relatively slowly (about 90 nautical miles [NM] per hour) within WTA1. This type of activity has a very low BASH risk. The HC-130s would be flying faster in WTA1 (about 125 NM per hour), but BASH would not pose a significant flight risk to these aircrews since concentrations of birds would be less over WTA1 than along the shoreline.

The increase in flight activities would result in negligible increases in potential aircraft mishaps. Based on Class A mishap data for each aircraft type (refer to Section 3.4), the estimated mishap rate for the amount of annual sortie-operations in WTA1 under the proposed action is approximately one Class A mishap per 63 years for the HH-60s and one per 6,452 years for the HC-130s. These mishap rates are extremely low. Therefore, proposed aircraft activity in WTA1 would not significantly increase flight risks and would not result in significant impacts to safety.

Unretrieved Materials

An estimated 9,905 lightsticks would be deposited annually into the marine environment if the proposed action were implemented. Lightsticks would not represent a safety risk to the public because they are not considered to be toxic to humans (refer to Section 4.3, Waste Management). Search and rescue training operations in the WTA would also include the use of MK25 and MK6 flares. As described in Section 3.3.1, these flares are relatively safe and are intended to mark the location of downed personnel. Procedures for handling, storing, and maintenance of flares are found in *Air Force Technical Manual T.O. 11A10-26-7*. However, flares do present certain safety hazards. The flares are made of explosive and flammable materials, and if they are mishandled or unexpended they could create unintended fires or cause injury to the handler. Approximately 5 percent (or about 127 annually) of the flares would be unexpended. These flares could meet one of three fates: wash onshore, sink to the ocean bottom, or remain at sea. Any of these three scenarios could result in a potential public safety risk. Marine location flares used by the Air Force and the Navy are marked with warning language and instructions to contact an appropriate safety officer. Only one such report has been received in the last 11 years (NSWC

1999b). In addition, given the small quantity of potentially unexpended flares used and the large area in which flare drops would occur, the likelihood of a person encountering an unexpended flare is very low. No significant impacts would occur.

4.4.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

All operational elements under this alternative are similar to the proposed action. Although the northern boundary of WTA2 is located slightly closer to shore than the northern boundary of WTA1, the increased probability of unretrieved materials washing onshore would be minimal since winds and ocean current patterns in the two areas are similar. Also, while BASH potential for aircraft operating in this area would be greater due to the proximity to birds along the coastline, no reported bird-strike events have occurred in the area where WTA2 would be located (347th Wing Safety Office 1999). Therefore, use of WTA2 would not have significant impacts on safety.

4.4.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue training operations by HH-60 and HC-130 aircrews. Therefore, safety, as described in Section 3.4, would remain unchanged.

4.4.2 Fort Stewart Helicopter AR Tracks

4.4.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

Flight Risks

HH-60s and HC-130s currently fly visual flight rules (VFR) within the Moody Low Altitude Tactical Navigation (LATN) area at altitudes between 500 and 2,000 feet above ground level (AGL). The BASH risk factors are identified as Moderate for fall, spring, and winter, and Low for summer. Potential bird strikes in FS-AR1 (which would be located to the west of the North Atlantic Flyway) would remain the same for proposed aircraft activities.

The small increase in flight activities in the area comprising FS-AR1 would result in negligible increases in the potential for aircraft mishaps. Based on Class A mishap data for each aircraft type (refer to Section 3.4), the estimated mishap rate for the amount of annual sortie-operations in FS-AR1 under the proposed action would be approximately one Class A mishap per 310 years for the HH-60s and one per 5,974 years for the HC-130s. These mishap rates are extremely low. Therefore, proposed aircraft activity would not have significant impacts to flight risks in FS-AR1.

Refueling Risks

While there would be an increase in sortie-operations in which fuel would be transferred during AR operations, there would not be an increase in the overall number of AR training sorties for practicing AR rendezvous and join-up procedures, and this in itself would not increase flight risks. In-flight refueling activities and associated flight risks would primarily be associated with two or more aircraft flying in proximity to each other. There are minimum separation requirements for flying VFR in uncontrolled airspace. Since helicopter AR training distances are less than these requirements, the military assumes responsibility for separation of aircraft (MARSA) flying closer than what the Federal Aviation

Administration (FAA) would approve. The U.S. Air Force (Air Force) has established helicopter AR procedures that provide guidance and directions for these situations. The procedures are contained in *Technical Order T.O. 1-1C-1-20, Section III, Rendezvous and Join-Up Procedures*. This technical order dictates closure rates, visual conditions, and other restrictions to ensure safety. Using these procedures, HH-60 and HC-130 aircraft currently perform practice rendezvous and join-up procedures and dry air refueling connections without transferring fuel. Under the proposed action, fuel would actually be transferred between aircraft on the proposed helicopter AR tracks.

The typical AR training profile consists of two HH-60s joining up, with one HC-130 following. After joinup, the HH-60s fly in formation behind the HC-130 in an observation position (approximately 200-500 feet behind on the left or right side of the HC-130). After the HH-60s are stabilized in the observation position, one moves closer to the HC-130 to the pre-contact position (100-150 feet behind the refueling hose, stabilizes then moves to the contact position for contact with the refueling hose). Practice dry contacts and wet refueling contacts are then accomplished. After multiple practice hookups, the HH-60 backs away to the observation position and the other HH-60 then moves into the pre-contact position described above and accomplishes dry and wet refueling contacts with the refueling hose. The HH-60s alternate during air refueling. Once they have completed the training run, the HC-130s and HH-60s fly separate flight plans at differing altitudes.

Similarly, the actual transfer of fuel during the AR process is not considered a high flight risk. All appropriate Air Force procedures would be followed during the refueling operations to ensure safety. In addition, the proposed helicopter AR tracks would be published in *AP/1B Department of Defense Flight Information Publication Planning Military Training Routes North and South America*. This publication provides information to ensure that pilots of other aircraft in the vicinity are aware of special activities such as helicopter AR operations. A published helicopter AR track would benefit local civilian and commercial aircraft by providing improvements to low-level airspace management from Savannah Approach Control and Jacksonville Air Traffic Control (ATC).

About 95 percent of all refueling operations between HC-130s and HH-60s would take place at 2,000 feet above ground level (AGL; refer to Tables 2.1-5 and 2.1-6). Only during times of limiting weather conditions (such as low clouds) would refueling operations be conducted at altitudes between 1,000 and 1,500 feet AGL. Within the proposed hour-long sortie-operation, four runs would take place. Of these four, three would not involve the transfer of fuel; only one run per hour per helicopter would include a fuel transfer.

Fuel shut-off valves are located in both the HC-130s and HH-60s to reduce the potential for fuel spills. Potential impacts of accidental fuel spills during normal refueling operations within the proposed and alternative helicopter AR tracks were modeled using the Fuel Jettison Simulation (FJSIM) model (Air Force 1996a). The Air Force developed the FJSIM model to estimate surface fuel densities resulting from accidental or emergency fuel jettisoning by military aircraft. Although the model was designed with the purpose of modeling large spill events, it can also be used to model small accidental spills that could potentially occur during wet refueling sortie-operations.

For the accident scenario used in this analysis, it was assumed that the helicopter blade severs the fuel hose, releasing all contents from the hose (34 gallons of JP-8 fuel). This assumption reflects the maximum amount of fuel that could spill out of a refueling hose (i.e., 34 gallons is the volume of the hose). In the event of an accidental hose cut, emergency shut off valves would be activated at each aircraft, precluding any further fuel spillage. While this scenario could potentially occur, the Air Force has no documentation of this type of event occurring during HH-60 refueling operations (Air Force 1999a). The key assumptions used in the model are listed below:

- Fuel Amount = 34 gallons
- Altitude = 2,000 feet AGL
- Aircraft Speed = 115 knots
- Wind Speed = 15 knots
- Wind Direction = 45° headwind

The results of an accidental fuel spill were modeled at 2,000 feet AGL because 95 percent of the operations would be at this altitude.

For an accidental release of 34 gallons at an elevation of 2,000 feet AGL, the FJSIM model results indicate that the maximum expected concentration of fuel striking the surface would be 0.0008 ounce per square foot. Only 38.5 percent of the initial spill (or 13.1 gallons) would be expected to reach the surface and would be spread out over an area of approximately 1,350,000 square feet (roughly 31 acres). The estimated average fuel concentration in this area is approximately equal to 0.0002 ounce per square foot, or roughly one-fourth of the maximum expected concentration. This amount would be virtually imperceptible to a person on the ground as it would be much less than the equivalent of a fine mist. Furthermore, FS-AR1 would overlie a predominantly rural area with relatively low population densities.

While this scenario could potentially occur, the Air Force has no record of this type of event occurring during HH-60 refueling operations (Air Force 1999a). Therefore, impacts of an accidental spill during refueling activities at FS-AR1 would not have significant impacts on safety.

During each airborne refueling operation, a small amount (less than 1 gallon) of fuel could potentially be released to the atmosphere during hookup and disconnection procedures. Calculations were not made to address this scenario since this amount is much too small for the model to address accurately. However, it is assumed that if this small amount of fuel would be released to the atmosphere, 100 percent would dissipate in the air before reaching the ground.

Potential impacts associated with these results are also addressed in Section 4.6, Cultural Resources; Section 4.8, Land Use; Section 4.10, Terrestrial Biological Resources; and Section 4.11, Marine Biological Resources.

4.4.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

All operational elements under this alternative are similar to those described under the proposed action. FS-AR2 would be located in the same airspace environment as FS-AR1. Therefore, use of FS-AR2 would not have significant impacts on safety.

4.4.2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Fort Stewart helicopter AR track would be established. Therefore, safety, as described in Section 3.4, would remain unchanged.

4.4.3 Water Training Area Helicopter AR Tracks

4.4.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

Flight Risks

The BASH risk factor for WTA-AR1 has been identified as Moderate year-round. Flight risks for this area are similar to those previously identified for FS-AR1 (see Section 4.4.2.1), with the exception of estimated mishap rates. The estimated mishap rate for the amount of annual sortie-operations in WTA-AR1 under the proposed action would be approximately one Class A mishap per 117 years for the HH-60s and one per 2,256 years for the HC-130s. These mishap rates are extremely low. Therefore, proposed aircraft activity and associated flight risks would not have significant impacts on safety in WTA-AR1.

Refueling Risks

Refueling risks would be similar to those described earlier for FS-AR1 (see Section 4.4.2.1). Therefore, refueling activities at WTA-AR1 would not have significant impacts on safety.

4.4.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

All operational elements under this alternative are similar to the proposed action, and WTA-AR2 would be located in the same airspace environment as WTA-AR1. WTA-AR2 is aligned to be parallel and south of Interstate 10 to reduce visual distractions to automobile traffic and to remain south of general aviation that uses Interstate 10 for navigation. Therefore, use of WTA-AR2 would not have significant impacts on safety.

4.4.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative WTA helicopter AR track would be established. Therefore, safety, as described in Section 3.4, would remain unchanged.

4.4.4 Avon Park Helicopter AR Tracks

4.4.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

Flight Risks

Flight risks for this area would be similar to those previously identified for FS-AR1 (see Section 4.4.2.1), with the exception of estimated mishap rates and BASH potential. The BASH risk factor for AP-AR1 has been identified as Moderate year-round. The estimated mishap rate for the amount of annual sortie-operations in AP-AR1 under the proposed action would be approximately one Class A mishap per 919 years for the HH-60s and one per 17,921 years for the HC-130s. These mishap rates are extremely low. Potential BASH risks are greater along the coast, and AP-AR1 parallels the coast approximately 10 NM offshore. The proposed aircraft activity and associated flight risks would not have significant impacts on safety in AP-AR1.

Refueling Risks

Refueling risks are similar to those described earlier for FS-AR1 (see Section 4.4.2.1). Therefore, impacts of an accidental spill during refueling activities at AP-AR1 would not have significant impacts on safety.

4.4.4.2 ALTERNATIVE AVON PARK AR TRACK (AP-AR2)

All operational elements under this alternative would be similar to the proposed action, and AP-AR2 would be located in the same general airspace environment as AP-AR1. Therefore, use of AP-AR2 would not have significant impacts on safety.

4.4.4.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Avon Park helicopter AR track would be established. Therefore, safety, as described in Section 3.4, would remain unchanged.

4.4.5 Crew Swap Facilities

4.4.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

During proposed crew swap activities, two HH-60s would land and take off once, on average, in a typical training day. These operations would not affect air traffic congestion at Perry-Foley Airport (refer to Section 4.1, Airspace) and would not result in increased flight risks. No significant impacts would occur.

There is a potential risk from bird-aircraft strikes. HH-60 and HC-130 aircraft commonly train at lower altitudes, resulting in a higher probability for BASH events. The BASH risk factor for this area has been identified as Moderate year-round. However, given the small number of proposed operations at Perry-Foley Airport, the frequency of bird strikes resulting from implementation of the proposed action would be low. No significant impacts are expected.

4.4.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

Flight operations would be similar to the proposed activities at Perry-Foley Airport. Cross City Airport is located in a similar airspace environment and surrounding land use adjacent to the airport. BASH risk factors are similar to these for Perry-Foley Airport. Crew swap activities would not have significant impacts to safety at the Cross City Airport.

4.4.5.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the Perry-Foley nor Cross City airports would be used to support HH-60 aircrew swaps. Therefore, safety, as described in Section 3.4, would remain unchanged.

4.5 AIR QUALITY

Air emissions resulting from aircraft operations associated with the proposed action and alternatives have been evaluated in accordance with applicable air quality laws and standards. Estimated emissions from the proposed action were compared with National Ambient Air Quality Standards (NAAQS) and Florida Ambient Air Quality Standards (AAQS) to assess potential increases in pollutant concentrations. The analysis included the calculation of emissions from HH-60 and HC-130 aircraft in the proposed and alternative Water Training Area (WTA) and the proposed and alternative helicopter air refueling (AR) tracks. Emissions associated with the proposed use of an existing airfield to support HH-60 crew swaps were also estimated. Since all of the project areas potentially affected by implementation of the proposed action are designated as being in attainment for all criteria pollutants, a conformity analysis is not required.

The approach to the air quality impact analysis was twofold. First, emissions associated with the proposed action and alternatives were estimated and compared with baseline emissions to determine if an exceedance of NAAQS and/or Florida AAQS would result. Second, an air dispersion model was used to predict the change in ambient concentrations resulting from aircraft emissions. The Multiple Aircraft Instantaneous Line Source (MAILS) dispersion model (Air Force 1992) was used to estimate air pollutant concentrations for potentially affected Air Quality Control Regions (AQCRs). MAILS is an air quality model that provides conservative estimates of ground-level air pollutant concentrations from low-altitude (less than 3,000 feet AGL) military aircraft operations along Military Training Routes (MTRs). Estimated emission concentrations have been compared to existing NAAQS, Florida AAQS, and Prevention of Significant Deterioration (PSD) Class I increments (where applicable for regulated pollutants) to assess potential air quality impacts. An analysis of PSD and visibility effects is not required since no new stationary sources of air emissions are associated with the proposed action or alternatives.

Calculation Assumptions

The mixing layer (or mixing height) is defined as the altitude below which the most vigorous initial mixing of air takes place. The mixing height can vary and is generally a function of weather, seasonal variation, and topography present within a parcel of air. Mixing heights within the region of influence (ROI) can fluctuate throughout the day and throughout the season; however, the commonly accepted mixing height is 3,000 feet above ground level (AGL). Therefore, aircraft emissions above the average mixing height (3,000 feet AGL) are unlikely to contribute to ground-level pollutant concentrations. Emissions released above this altitude can be inhibited, and effectively blocked from mixing beneath a surface-based temperature inversion. Since all proposed operations would be below 3,000 feet AGL, potential air quality impacts were assessed for all emissions.

The number of events for each aircraft within each airspace have been multiplied by the amount of time per event (sortie-operation) and by the emission factors associated with appropriate power settings (refer to Section 2.1, Proposed Action). Aircraft emissions were calculated using emission factors obtained primarily from Air Force 1988). The majority of all sortie-operations within the proposed WTA would occur at 100 feet MSL for the HH-60s and at 300 feet MSL for the HC-130s. Approximately 95 percent of the sortie-operations within the helicopter AR tracks would occur at 2,000 feet AGL for the HH-60s and HC-130s. Only at times of poor weather and visibility would operations be conducted at lower altitudes (1,000 to 1,500 feet AGL). Therefore, to best approximate emissions, proposed actions within the WTA have been modeled at 100 feet MSL for the HH-60s and at 300 feet MSL for the HC-130s. Operations within the helicopter AR tracks have been modeled at 1,000 and 2,000 feet AGL for both aircraft.

Emissions Calculations

The aircraft emissions database in the MAILS model was modified by adding revised emissions data for the aircraft engines operating at the average power settings (average percent power) described in Tables 2.1-5 (HH-60) and Table 2.1-6 (HC-130). The MAILS model was used to estimate 1-hour, 3-hour, 8-hour, 24-hour, and annual ground-level concentrations for four air quality criteria pollutants: carbon monoxide (CO); sulfur oxides (SO_x), which include SO_2 and other compounds; nitrogen oxides (NO_x), which include NO_2 and other compounds; and particulate matter less than 10 microns in diameter (PM_{10}). The estimated concentrations were then compared to NAAQS to assess air quality impacts.

4.5.1 Water Training Areas

4.5.1.1 Proposed Water Training Area (WTA1)

Table 4.5-1 presents estimated annual aircraft emissions (tons/year) in the proposed WTA and resulting estimated pollutant concentrations. Emissions were calculated for CO, SO_x, NO_x, PM_{10}, and volatile organic compounds (VOCs).

Table 4.5-1. Estimated Annual Airspace Emissions in WTA1[1] and WTA2

Condition	*Emissions (tons/year)*				
	CO	*SO_x*	*NO_x*	*PM_{10}*	*VOCs*
Proposed Action	2.4	2.6	1.9	0.2	1.0
Baseline	1,094.8	173.7	1,044.9	146.3	339.6
TOTAL	1,097.2	176.3	1,046.8	146.5	340.6

Notes: [1] All sortie-operations are modeled to occur below 3,000 feet MSL.

Table 4.5-2 presents estimated emissions from aircraft operating within WTA1 at 100 and 300 feet MSL for HH-60s and HC-130s, respectively. Table 4.5-2 presents expected criteria pollutant concentrations within WTA1 under the proposed action.

As shown in Tables 4.5-1 and 4.5-2, aircraft emissions associated with proposed search and rescue training operations in WTA1 would not cause an exceedance of the NAAQS or Florida AAQS. While Florida has enacted stricter primary SO_2 standards than NAAQS (refer to Table 3.5-1), estimated SO_2 emissions within WTA1 resulting from the proposed action would be well below Florida AAQS.

Table 4.5-2. Estimated Criteria Pollutant Concentrations in WTA1 and WTA2

Criteria Pollutant	*Averaging Period*	*Concentration* *NAAQS*	*Florida AAQS*	*Projected Increment*	*Impact as a Percentage of the NAAQS (%)*
CO	1-hour 8-hour	35 ppm 9 ppm	35 ppm 9 ppm	< 0.01 ppm < 0.01 ppm	< 0.01 < 0.01
NO_x	Annual	0.053 ppm	0.053 ppm	< 0.01 ppm	< 0.01
SO_x	3-hour 24-hour Annual[1]	0.50 ppm 0.14 ppm 0.03 ppm	0.50 ppm 0.10 ppm 0.02 ppm	< 0.01 ppm < 0.01 ppm < 0.01 ppm	< 0.01 < 0.01 < 0.01
PM_{10}	24-hour Annual	150 $\mu g/m^3$ 50$\mu g/m^3$	150 $\mu g/m^3$ 50$\mu g/m^3$	0.01 < 0.01	< 0.01 < 0.01

Notes: [1] NAAQS secondary standard.

Proposed sortie-operations in the WTA by the 41st Rescue Squadron (41 RQS) and 71 RQS would include the use of MK6 and MK25 flares. The MK6 and MK25 flares contain identified hazardous and toxic constituents. These chemical pollutants include identified hazardous air pollutants (HAPs) defined by the EPA in Title III of the CAA. Smoke generated by the MK6 and MK25 flares is considered toxic in high concentrations. However, the large area in which the smoke would be released would reduce any impacts to air quality to insignificant levels through dispersion and advection (refer to Section 4.3, Waste Management). Additionally, the likelihood of exposure to smoke generated by the flares would be minimal due to the remoteness of the WTA and the proposed low-density use of the flares. Impacts to air quality within the WTA as result of normal deployment of MK6 and MK25 flares would not be significant.

Under the proposed action, aircraft emissions associated with the use of WTA1 would not cause an exceedance of the NAAQS or Florida AAQS. The proposed action would not occur in a non-attainment or maintenance area, would not be subject to PSD review, and would not expose the public or operational personnel to hazardous levels of HAPs. Air quality impacts would not be significant.

4.5.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

Potential air quality impacts within WTA2 would be similar to those discussed under WTA1 (see Tables 4.5-1 and 4.5-2). Therefore, use of WTA2 would have no significant impacts to air quality.

4.5.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue training operations by HH-60 and HC-130 aircrews. Therefore, air quality, as described in Section 3.5, would remain unchanged. Since there would not be an increase in emissions in the ROI, there would be no significant air quality impacts.

4.5.2 Fort Stewart Helicopter AR Tracks

4.5.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

Table 4.5-3 presents estimated annual aircraft emissions (tons/year) in the proposed Fort Stewart helicopter AR track under the proposed action. Table 4.5-4 presents estimated annual pollutant concentrations what would result from aircraft operations within FS-AR1 at 2,000 feet AGL.

Table 4.5-3. Estimated Annual Airspace Emissions in FS-AR1 and FS-AR2[1]

Condition	*Emissions (tons/year)*				
	CO	*SQ*	*NO_x*	*PM_{10}*	*VOCs*
Proposed Action	0.9	0.7	2.0	0.1	0.3
Baseline	1,037.4	21.7	333.5	35.1	130.9
TOTAL	1,038.3	22.4	335.5	35.2	131.2

Notes: [1] All sortie-operations are expected to occur below 3,000 feet AGL.

As shown in Table 4.5-4, the proposed action is estimated to contribute negligible amounts of emissions to the FR-AR1 ROI. The proposed action would occur in an attainment area and would not cause an exceedance of the NAAQS. Therefore, air quality impacts associated with the use of FS-AR1 would not be significant.

In order to assess potential impacts as a result of the 5 percent of operations that could occur between 1,000 and 1,500 feet AGL, the MAILS model was used to estimate emissions at 1,000 feet AGL. Aircraft emissions as a result of aircraft operating at 1,000 feet AGL were approximately double that of aircraft operating at 2,000 feet AGL. However, since estimated aircraft emissions would still be well below the established standard, no significant impacts would occur.

4.5.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

Estimated emissions for FS-AR2 would be identical to those presented for FS-AR1 (see Tables 4.5-3 and 4.5-4. Therefore, use of FS-AR2 would have no significant impacts to air quality.

4.5.2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a Fort Stewart helicopter AR track would not be established. There would be no change to the airspace used by the HH-60 and the HC-130 aircraft based at Moody AFB. All emissions would remain unchanged from baseline conditions described in Section 3.5. Since no new emissions would be added to the ROI, no significant impacts to air quality would occur.

Table 4.5-4. Criteria Pollutant Concentrations in the Proposed and Alternative Helicopter AR Tracks

Helicopter AR Track	*Criteria Pollutant*	*Concentration*			
		Averaging Period	*NAAQS*	*Florida AAQS*	*Projected Increment*
FS-AR1 *FS-AR2*	CO	1-hour	35 ppm	35 ppm	< 0.01 ppm
		8-hour	9 ppm	9 ppm	< 0.01 ppm
	NO_x	Annual	0.053 ppm	0.053 ppm	< 0.01 ppm
	SO_x	3-hour	0.03 ppm	0.02 ppm	< 0.01 ppm
		24-hour	0.14 ppm	0.10 ppm	< 0.01 ppm
		Annual[1]	0.50 ppm	0.50 ppm	< 0.01 ppm
	PM_{10}	24-hour	150 $\mu g/m^3$	150 $\mu g/m^3$	< 0.01 $\mu g/m^3$
		Annual	50 $\mu g/m^3$	50 $\mu g/m^3$	< 0.01 $\mu g/m^3$
WTA-AR1 *WTA-AR2*	CO	1-hour	35 ppm	35 ppm	< 0.01 ppm
		8-hour	9 ppm	9 ppm	< 0.01 ppm
	NO_x	Annual	0.053 ppm	0.053 ppm	< 0.01 ppm
	SO_x	3-hour	0.50 ppm	0.02 ppm	< 0.01 ppm
		24-hour	0.14 ppm	0.10 ppm	< 0.01 ppm
		Annual	0.50 ppm	0.50 ppm	< 0.01 ppm
	PM_{10}	24-hour	150 $\mu g/m^3$	150 $\mu g/m^3$	< 0.01 $\mu g/m^3$
		Annual	50 $\mu g/m^3$	50 $\mu g/m^3$	< 0.01 $\mu g/m^3$
AP-AR1 *AP-AR2*	CO	1-hour	35 ppm	35 ppm	< 0.01 ppm
		8-hour	9 ppm	9 ppm	< 0.01 ppm
	NO_x	Annual	0.053 ppm	0.053 ppm	< 0.01 ppm
	SO_x	3-hour	0.50 ppm	0.02 ppm	< 0.01 ppm
		24-hour	0.14 ppm	0.10 ppm	< 0.01 ppm
		Annual	0.50 ppm	0.50 ppm	< 0.01 ppm
	PM_{10}	24-hour	150 $\mu g/m^3$	150 $\mu g/m^3$	< 0.01 $\mu g/m^3$
		Annual	50 $\mu g/m^3$	50 $\mu g/m^3$	< 0.01 $\mu g/m^3$

Notes: [1] NAAQS secondary standard.

4.5.3 Water Training Area Helicopter AR Tracks

4.5.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

Table 4.5-5 presents estimated annual aircraft emissions (tons/year) in WTA-AR1. Estimated pollutant concentrations from aircraft operating within the WTA-AR1 track at 2,000 feet AGL are provided in Table 4.5-4.

The proposed action would not cause an exceedance of the NAAQS or Florida AAQS and would not occur in a non-attainment or maintenance area. Therefore, implementation and use of WTA-AR1 would have no significant impact to air quality

Table 4.5-5. Estimated Annual Airspace Emissions in WTA-AR1 and WTA-AR2[1]					
Condition	*Emissions (tons/year)*				
	CO	*SO_x*	*NO_x*	*PM_{10}*	*VOCs*
Proposed Action	2.3	1.9	5.3	0.4	0.7
Baseline	1,094.8	173.8	1,044.9	146.3	339.6
TOTAL	1,097.1	175.7	1,050.2	146.7	340.3

Notes: [1] All sortie-operations are expected to occur below 3,000 MSL.
Source: Air Force 1999c.

4.5.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Estimated emissions for WTA-AR2 would be identical to those presented for WTA-AR1 (see Tables 4.5-4 and 4.5-5). Therefore, use of WTA-AR2 would have no significant impacts to air quality.

4.5.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a water training area AR track would not be established. There would be no change to the airspace used by the HH-60 and the HC-130 aircraft based at Moody AFB. All emissions would remain unchanged from baseline conditions described in Section 3.5. Since no new emissions would be added to the ROI, no significant impacts to air quality would occur.

4.5.4 Avon Park Helicopter AR Track

4.5.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

Table 4.5-6 presents estimated annual aircraft emissions (tons/year) in the proposed Avon Park helicopter AR track under the proposed action. Estimated pollutant concentrations from aircraft operating within the WTA-AR1 track at 2,000 feet AGL are provided in Table 4.5-4.

Table 4.5-6. Estimated Annual Airspace Emissions in AP-AR1[1] and AP-AR2[1]					
Condition	*Emissions (tons/year)*				
	CO	*SO_x*	*NO_x*	*PM_{10}*	*VOCs*
Proposed Action	0.3	0.2	0.7	0.1	0.1
Baseline	1,094.8	173.8	1,044.9	146.3	339.6
TOTAL	1,095.1	174.0	1,045.6	146.4	339.7

Notes: [1] All sortie-operations are expected to occur below 3,000 MSL.

The proposed action would not cause an exceedance of the NAAQS or Florida AAQS and would not occur in a non-attainment or maintenance area. Therefore, implementation of the proposed action would have no significant impact to air quality.

4.5.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

Estimated emissions for AP-AR2 would be identical to those presented for AP-AR1 (see Tables 4.5-4 and 4.5-6). Therefore, use of AP-AR2 would have no significant impacts to air quality.

4.5.4.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, an Avon Park helicopter AR track would not be established. There would be no change to the airspace used by the HH-60 and the HC-130 aircraft based at Moody AFB. All emissions would remain unchanged from baseline conditions described in Section 3.5. Since no new emissions would be added to the ROI, no significant impacts to air quality would occur.

4.5.5 Crew Swap Facilities

4.5.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

Table 4.5-7 presents estimated annual aircraft emissions (tons/year) at the proposed crew swap facility under the proposed action. Table 4.5-8 provides estimated criteria pollutant concentrations that would result from aircrew swap activities at Perry-Foley Airport.

Table 4.5-7. Estimated Annual Airspace Emissions at Perry-Foley Airport[1]

Condition	*Emissions (tons/year)*				
	CO	*SO_x*	*NO_x*	*PM_{10}*	*VOCs*
Proposed Action	0.2	0.2	0.01	0.01	0.1
Baseline	1,094.8	173.8	1,044.9	146.3	339.6
TOTAL	1,095.0	174.0	1,044.9	146.3	339.7

Notes: [1] All sortie-operations are expected to occur below 3,000 feet AGL.

Table 4.5-8. Predicted Criteria Pollutant Concentrations at Perry-Foley Airport

Criteria Pollutant	*Averaging Period*	*Concentration*		
		NAAQS	*Florida AAQS*	*Projected Increment*
CO	1-hour	35 ppm	35 ppm	0.02 ppm
	8-hour	9 ppm	9 ppm	< 0.01 ppm
NO_2	Annual	0.053 ppm	0.053 ppm	< 0.01 ppm
SO_2	3-hour	0.50 ppm	0.50 ppm	0.02 ppm
	24-hour	0.14 ppm	0.14 ppm	0.01 ppm
	Annual[1]	0.50 ppm	0.50 ppm	< 0.01 ppm
PM_{10}	24-hour	150 $\mu g/m^3$	150 $\mu g/m^3$	5 $\mu g/m^3$
	Annual	50 $\mu g/m^3$	50 $\mu g/m^3$	2 $\mu g/m^3$

Notes: [1] NAAQS secondary standard.

As shown in Tables 4.5-7 and 4.5-8, estimated increases in emissions at the proposed crew swap facility would not be significant. The proposed action would not cause an exceedance of the NAAQS or Florida AAQS, and would not occur in a non-attainment or maintenance area. Therefore, use of the proposed crew swap facility would have no significant impacts to air quality.

4.5.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

Estimated emissions at the Cross City Airport would be identical to those described for Perry-Foley Airport (see Section 4.5.5.1). Therefore, use of the alternative crew swap facility would have no significant impacts to air quality.

4.5.5.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither Perry-Foley nor Cross City airports would be used to support HH-60 aircrew swap operations. There would be no change to the airspace used by the HH-60 and the HC-130 aircraft based at Moody AFB. All emissions would remain unchanged from baseline conditions described in Section 3.5. Since no emissions would be added to the ROI, no significant impacts to air quality would occur.

4.6 CULTURAL RESOURCES

The methodology for identifying, evaluating, and mitigating impacts to cultural resources has been established through federal laws and regulations including the National Historic Preservation Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.

A proposed action or alternative affects a significant resource when it alters the property's characteristics, including relevant features of its environment or use that qualify it as significant according to National Register criteria. Effects may 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 National Register of Historic Places (NRHP); introduction of visual, audible, or atmospheric elements that are out of character with the resource or alter its setting; and neglect of the resource resulting in its deterioration or destruction.

Potential impacts are assessed by: 1) identifying project activities that could directly or indirectly affect a significant resource; 2) identifying the known or expected significant resources in areas of potential impact; and 3) determining whether a project activity would have no effect, no adverse effect, or an adverse effect on significant resources (36 Code of Federal Regulations [CFR] 800.9). Impacts to cultural resources may occur from changes in the setting caused by visual or audible intrusions; ground disturbing activities such as construction or the use of ordnance; or modifications to structures.

The primary issues and concerns arising from the effects of the proposed action on cultural resources are:

- Potential degradation of the settings of significant architectural and other similar resources due to aircraft noise, overflights, and visual intrusions.
- Potential noise and visual intrusions on the sacred or traditional sites of Native Americans or other cultural groups as a result of aircraft overflights.
- Potential fuel spillage affecting cultural resources.
- Potential degradation to submerged archaeological resources (including shipwrecks) as a result of debris from proposed training activities.

Since aircraft noise and overflights represent the primary consequences of the proposed action, this analysis focuses on how these effects might impact the setting of significant cultural resources. To be adversely affected, the setting of a resource must be an integral part of the characteristics that qualify that resource for listing on or eligibility to the NRHP. If, however, the setting is fundamental to the resource's significance, the nature and magnitude of the potential impact from audible or visual intrusions on that setting can be evaluated. Intrusions sufficient enough to alter the setting can adversely affect that resource.

Studies have established that noise-related vibratory damage to structures, even historic buildings, requires high decibel levels generated in close proximity to structures (Battis 1988). Aircraft must generate 120 dB at a distance of no more than 150 feet to result in structural damage. Therefore, for this analysis, the identification of potentially significant structural impacts uses the sound level and proximity criteria as defined above.

4.6.1 Water Training Areas

4.6.1.1 PROPOSED WATER TRAINING AREA (WTA1)

Aircraft noise and visual intrusions from overflights represent the primary potential consequences of the proposed action. However, since WTA1 would be located offshore (approximately 4 nautical miles [NM]), there is little likelihood that any cultural resources would be disturbed from noise or visual intrusion associated with proposed action.

Other potential effects are limited to debris from the flares and lightsticks falling into the ocean and affecting shipwrecks and/or submerged archaeological resources. However, no documented shipwrecks occur in the area (Florida Department of Environmental Protection [FDEP] 1999c). In the remote case that debris from training activities settled on the surface of an underwater archaeological resource, damage to the resource would not be likely due to the small amount and size of the debris. Further, it is likely that submerged resources would already be covered with at least some sediment because of settling processes and shifting sand movement over time. If debris were to fall on a resource, the minimal effect on the scientific potential of these resources would result in impacts that would be less than significant.

WTA1 would not be located within or near traditional or sacred Native American sites; therefore, implementation of the proposed action would not affect traditional cultural resources.

4.6.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

Establishment and use of WTA2 would have similar impacts to cultural resources as previously discussed for WTA1. No significant impacts to cultural resources would occur as a result of implementation of the WTA alternative.

4.6.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for HH-60 and HC-130 search and rescue operations. No impacts to cultural resources would occur.

4.6.2 Fort Stewart Helicopter AR Tracks

4.6.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

Calculated day-night average sound level (DNL) values associated with HH-60 and HC-130 operations beneath FS-AR1 would be less than 40 decibels (dB). Sound levels would not be sufficient in intensity or duration to degrade the setting of cultural resources. Sound exposure level (SEL) values would be 92 dB; however, these SEL values would be less than 120 dB (the threshold for damage to structures). No NRHP sites or buildings exist beneath the airspace of FS-AR1. However, even if portions of the airspace were over or near any cultural resources, Federal Aviation Administration (FAA) requirements to avoid structures by 500 feet would preclude aircraft affecting architectural resources through vibration.

Noise-induced vibrations from overflights would be unlikely to result in physical damage to cultural resources. It is highly unlikely that surface artifact scatters and subsurface archaeological deposits would be significantly affected by vibrations resulting from aircraft overflight. Eligible or currently undocumented resources would be subject to the same limited (i.e., not significant) and transitory effects from aircraft noise as NRHP-listed properties that lie near or under FS-AR1.

During proposed refueling activities, there would be a remote but potential scenario in which a helicopter blade would sever the fuel hose, releasing all its contents from the hose (about 34 gallons of JP-8 fuel) into the air. Approximately 13 gallons of the fuel would actually reach the ground, and this would be spread over a relatively large area. At the most concentrated point within this area, the maximum expected concentration of fuel striking the surface would only be about 0.0002 ounce per square foot (refer to Section 4.4, Safety). This amount would be virtually imperceptible to a person on the ground as it would be much less the equivalent of a fine mist. Furthermore, FS-AR1 would overlie a predominantly rural area with relatively low population densities. Therefore, impacts of an accidental spill during refueling activities at FS-AR1 would not have significant impacts to cultural resources.

Since aircraft associated with the proposed action would be traveling at an altitude of 2,000 feet above ground level (AGL) at approximately 115 knots, refueling activities in relation to an observer on the ground would have only a brief duration, thus having a transitory effect on the visual environment. These brief and temporary effects would be insufficient to alter the setting and degrade the NRHP characteristics of a site. Based on the factors outlined above, impacts to cultural resources underlying the affected airspace would be considered negligible.

No Native American tribes are located in this area, and no known traditional cultural properties have been identified under the airspace. Therefore, no significant impacts to traditional resources would occur as a result of implementation of FS-AR1.

4.6.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

Under this alternative, noise levels would be similar to those identified under the proposed FS-AR1 (less than 40 dB DNL and SEL values below 120 dB). Sound levels would not be sufficient in intensity or duration to degrade the setting of cultural resources. Three historic structures in Bacon County, Georgia and three historic structures in Appling County, Georgia are located beneath the potentially affected airspace. However, the FAA requirement to avoid structures by 500 feet would preclude aircraft from affecting architectural resources through vibration. Other issues associated with aircraft overflights would be the same as those identified for FS-AR1. Therefore, use of FS-AR2 would have no significant impacts to cultural resources.

4.6.2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Fort Stewart helicopter AR track would be established. Therefore, cultural resources as described in Section 3.6, would remain unchanged.

4.6.3 Water Training Area Helicopter AR Tracks

4.6.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

Calculated DNL values associated with HH-60 and HC-130 operations within WTA-AR1 would be less than 40 dB. Since sound levels would not be sufficient in intensity or duration to degrade the setting of cultural resources, use of WTA-AR1 would have no significant impacts to cultural resources. SEL values would be 92 dB; however, the SEL values would be below 120 dB (the threshold for damage to structures). One historic structure within Madison County, Florida is located beneath the proposed airspace. However, the FAA requirement to avoid structures by 500 feet would preclude aircraft affecting architectural resources through vibration.

Impacts associated with aircraft overflights would be similar to those identified under the proposed FS-AR1. Therefore, no significant impacts would occur as a result of implementation of WTA-AR1.

4.6.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Calculated DNL values associated with HH-60 and HC-130 operations within WTA-AR2 would be less than 40 dB, and SEL values would be less than 120 dB (the threshold for damage to structures) (refer to Section 4.2, Noise). Sound levels would not be sufficient in intensity or duration to degrade the setting of cultural resources. One historic structure within Suwannee County, Florida is located beneath the proposed airspace. However, the FAA requirement to avoid structures by 500 feet would preclude aircraft affecting architectural resources through vibration. Impacts associated with aircraft overflights would be similar to those identified for FS-AR1. Therefore, use of WTA-AR2 would have no significant impacts to cultural resources.

4.6.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative WTA helicopter AR track would be established. Therefore, cultural resources, as described in Section 3.6, would remain unchanged.

4.6.4 Avon Park Helicopter AR Tracks

4.6.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

Aircraft noise and visual intrusions from overflights represent the primary potential impacts of the proposed action. However, since AP-AR1 is located offshore, there is little likelihood that any cultural resources would be disturbed from noise or visual intrusion associated with the proposed action.

AP-AR1 would not be located within or near traditional or sacred Native American sites; therefore, implementation of the proposed action would not affect traditional cultural resources.

4.6.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

Establishment and use of AP-AR2 would have similar impacts to cultural resources as AP-AR1. No significant impacts to cultural resources would occur as a result of implementation of this alternative.

4.6.4.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Avon Park helicopter AR track would be established. Therefore, cultural resources, as described in Section 3.6, would remain unchanged.

4.6.5 Crew Swap Facilities

4.6.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

The proposed crew swap at Perry-Foley Airport would consist of landing the HH-60 for a brief time in an existing landing area. No construction or ground disturbance would be required for implementation of the proposed crew swap at the airport. In addition, no NRHP-listed structures are within the general vicinity of the airport. Since the Perry-Foley Airport is an existing facility and would only be used for takeoffs and landings to accommodate the crew swaps, no impacts to cultural resources would occur.

4.6.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

All operational elements of this alternative are similar to those discussed for Perry-Foley airport. Therefore, no impacts to cultural resources would occur.

4.6.5.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the Perry-Foley nor Cross City airports would be used to support HH-60 aircrew swaps. No impact to cultural resources would occur.

4.7 ENVIRONMENTAL JUSTICE

Executive Orders 12898 and 13045 require federal agencies to identify and address, as appropriate, the potential for disproportionately adverse human health or environmental effects of federal programs, policies, and activities on minority and low-income populations or children. These requirements were met by analyzing environmental justice data in accordance with regulatory guidance from the Council on Environmental Quality (CEQ) (1997), U.S. Environmental Protection Agency (EPA) (1998), and Air Force guidelines for assessing environmental justice impacts (Air Force 1997a).

Three criteria must be met for impacts to minority and low income communities or children to be considered significant: 1) there must be one or more populations within the region of influence (ROI), 2) there must be adverse (or significant) impacts from the proposed action; and 3) the environmental justice populations within the ROI must bear a disproportionate burden of those adverse impacts. If any of these criteria are not met, then impacts with respect to environmental justice or protection of children would not be significant.

4.7.1 Water Training Areas

4.7.1.1 PROPOSED WATER TRAINING AREA (WTA1)

Implementation of the proposed action would not significantly impact any resource area that would, in turn, be expected to disproportionately affect minority populations, low-income communities, or children. Training activities associated with WTA1 would occur at least 4.8 nautical miles (NM) offshore and would not affect any coastal areas with minority or low-income population concentrations. Implementation of WTA1 would not result in disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice and protection of children would not be significant.

4.7.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

Although training activities for this alternative would occur closer to the coastline (at least 1 NM offshore) compared to the proposed action, effects associated with use of WTA2 would be similar to those described for WTA1. Therefore, training activities at WTA2 would not result in disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice and protection of children would not be significant.

4.7.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for HH-60 and HC-130 search and rescue operations. Therefore, baseline conditions, as described in Section 3.7 would remain unchanged.

4.7.2 Fort Stewart Helicopter AR Tracks

4.7.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

Populations of minorities, low-income communities, and children occur beneath the proposed Fort Stewart helicopter air refueling (AR) track (refer to Tables 3.7-1 and 3.7-2). However, since implementation of the proposed action would not significantly impact any resource area, these populations would not be disproportionately affected. Areas beneath FS-AR1 would experience only minimal noise levels associated with aircraft activities (less than 40 decibels [dB] day-night average sound level [DNL]) which are well below the thresholds for noise compatibility impacts. In addition, the aircraft would typically not fly the same path or route within the track and thus would not necessarily overfly a specific location on a regular basis. Therefore, training activities beneath FS-AR1 would not have disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice and protection of children would not be significant.

4.7.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

Populations of minorities, low-income communities, and children occur beneath FS-AR2 (refer to Tables 3.7-1 and 3.7-2). Effects associated with use of FS-AR2 would be similar to those described for FS-AR1. Therefore, training activities at FS-AR2 would not result in disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice and protection of children would not be significant.

4.7.2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Fort Stewart helicopter AR track would be established. Therefore, baseline conditions, as described in Section 3.7 would remain unchanged.

4.7.3 Water Training Area Helicopter AR Tracks

4.7.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

Populations of minorities, low-income communities, and children occur beneath WTA-AR1 (refer to Tables 3.7-1 and 3.7-2). Environmental justice issues for this element of the proposed action are similar to those discussed for FS-AR1 (see Section 4.7.2.1). Therefore, training activities beneath WTA-AR1 would not have disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice and protection of children would not be significant.

4.7.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Populations of minorities, low-income communities, and children occur beneath WTA-AR2 (refer to Tables 3.7-1 and 3.7-2). Effects associated with use of WTA-AR2 would be similar to those described for WTA-AR1. Therefore, there would be no disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice and protection of children would not be significant.

4.7.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative WTA helicopter AR track would be established. Therefore, baseline conditions, as described in Section 3.7 would remain unchanged.

4.7.4 Avon Park Helicopter AR Tracks

4.7.4.1 Proposed Avon Park Helicopter AR Track (AP-AR1)

Populations of minorities, low-income communities, and children occur beneath AP-AR1 (refer to Tables 3.7-1 and 3.7-2). Environmental justice issues for this element of the proposed action are identical to those discussed for FS-AR1 (see Section 4.7.2.1). Therefore, training activities beneath AP-AR1 would not have disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice and protection of children would not be significant.

4.7.4.2 Alternative Avon Park Helicopter AR Track (AP-AR2)

Although training activities for this alternative would occur farther from the coastline (at least 2.9 NM offshore at its nearest point), effects associated with use of AP-AR2 would be similar to those described for AP-AR1. Therefore, training activities at AP-AR2 would not result in disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice and protection of children would not be significant.

4.7.4.3 No-Action Alternative

Under the No-Action Alternative, neither the proposed nor alternative WTA helicopter AR track would be established. Therefore, baseline conditions, as described in Section 3.7 would remain unchanged.

4.7.5 Crew Swap Facilities

4.7.5.1 Proposed Crew Swap Facility (Perry-Foley Airport)

Since implementation of the proposed action would not significantly impact any resource area, children, minorities, and low-income communities would not be disproportionately affected. Areas surrounding Perry-Foley Airport would experience only minimal noise levels associated with aircraft activities (less than 40 dB DNL) which are well below the thresholds for noise compatibility impacts. Therefore, crew swap activities at Perry-Foley Airport would not have disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice would not be significant.

4.7.5.2 Alternative Crew Swap Facility (Cross City Airport)

Effects associated with use of Cross City Airport for crew swap activities would be similar to those described for Perry-Foley Airport. Therefore, crew swap activities at Cross City Airport would not result in disproportionate impacts to minority populations, low-income communities, or children. Impacts with respect to environmental justice would not be significant.

4.7.5.3 No-Action Alternative

Under the No-Action Alternative, neither the Perry-Foley nor Cross City airports would be used to support HH-60 aircrew swaps. Therefore, baseline conditions, as described in Section 3.7 would remain unchanged.

4.8 LAND USE

Analysis of potential impacts to land use is interrelated with other resource areas discussed in this chapter, including Noise (Section 4.2), Environmental Justice (Section 4.7), Recreation and Visual Resources (Section 4.9), Terrestrial Biological Resources (Section 4.10), and Marine Biological Resources (Section 4.11). Full analyses of the impacts on these resources are discussed in their respective sections. The primary effect of HH-60 and HC-130 sortie-operations relative to land use is noise generated by aircraft overflights and associated training activities. This section focuses on the impacts of the proposed action and alternatives on land ownership or land status, general land use patterns, and land management. Noise exposure greater than 65 decibels (dB) day-night average sound level (DNL) over residential areas, public services, cultural, or recreational areas is considered generally unacceptable (Federal Interagency Committee on Urban Noise [FICUN] 1980). Discussions of noise characteristics and estimated noise levels from proposed aircraft activities are presented in Sections 3.2 and 4.2, respectively.

4.8.1 Water Training Areas

4.8.1.1 PROPOSED WATER TRAINING AREA (WTA1)

Establishment and use of WTA1 would not directly change the ownership, use, or management of the Special Use Land Management Areas (SULMAs) or any other area beneath WTA1. The proposed action does not include construction, land acquisition, or land withdrawal that could potentially result in such changes.

The proposed action would result in HH-60 and HC-130 aircraft overflights of offshore waters not previously subject to these types of activities. The primary change resulting from implementation of WTA1 would be the introduction of noise intrusions to areas currently not affected under existing conditions. However, noise levels associated with WTA1 operations would be less than 45 dB DNL (refer to Section 4.2, Noise). Noise levels associated with sortie-operations and training activities in WTA1 are well below the 65-dB threshold for compatibility with recreational areas (FICUN 1980). Prior to any training activities in WTA1, HH-60 and HC-130 aircrews would conduct a reconnaissance flyover within WTA1 to select a training site that is a minimum distance of 1 nautical mile (NM) from the nearest boat. Temporary noise levels generated from the proposed action would not be high enough to disrupt activities taking place within WTA1 or adjacent SULMAs. Therefore, with respect to noise, implementation of WTA1 would not result in significant impacts to land use.

As a result of the training proposed for WTA1, a number of MK25 and MK6 flares, sea dye plastic wrappers, and lightsticks could be generated as waste and abandoned in WTA1 annually (refer to Section 4.3, Waste Management). The use of these products and unrecovered items in the marine environment has the potential to be a safety concern, and affect the aesthetic quality of the environment. However, this quantity of waste would not result in significant impacts to land ownership or land status, general land use patterns, or land management practices in WTA1 or adjacent SULMAs as these materials would be quickly dispersed throughout the training area and beyond. Furthermore, lightsticks would be retrieved when search and rescue training personnel are in the water and whenever environmental conditions allow.

4.8.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

Estimated noise levels associated with sortie-operations and training activities in WTA2 would be slightly higher than WTA1 by a difference of only 2 dB DNL; however, generated noise levels would still be well below accepted guidelines. This increase results from a reduction in the size of the WTA2 airspace (refer to Section 4.2, Noise).

Although WTA2 is located closer to shore than WTA1 and encompasses more of the Big Bend Seagrasses Aquatic Preserve (an additional 33 square NM), implementation of this alternative would not directly change the ownership of the WTA2 area or adjacent SULMAs. Therefore, use of WTA2 would not result in significant land use impacts.

4.8.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for HH-60 and HC-130 search and rescue training operations. Therefore, land use, as described in Section 3.8, would remain unchanged.

4.8.2 Fort Stewart Helicopter AR Tracks

4.8.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

Establishment and use of the proposed Fort Stewart air refueling (AR) track would not directly change the ownership, use, or management of the area beneath FS-AR1, nor would it include activities such as construction, land acquisition, or land withdrawal that could potentially result in such changes.

Under the proposed action, establishment and use of FS-AR1 would result in HH-60 and HC-130 aircraft overflights of lands not previously subject to these types of activities. The primary change would be the introduction of noise intrusions to areas currently not affected under existing conditions. However, noise levels associated with FS-AR1 operations would be less than 40 dB DNL (refer to Section 4.2, Noise). Therefore, given the minor change in noise levels, implementation of FS-AR1 would not result in significant impacts to land use with respect to noise effects.

Under normal operations, wet sortie-operations associated with FS-AR1 would take place at an altitude of 2,000 feet above ground level (AGL). Although no cases have been documented, there is a very remote possibility that up to 34 gallons of JP-8 aircraft fuel could be spilled should the fuel hose be cut during a wet refueling attempt. The Fuel Jettison Simulation (FJSIM) model was used to predict the dissipation rate of the fuel before reaching the ground and also predict the quantity and dispersion of JP-8 that might reach the ground surface. Modeling results indicate that approximately 13 gallons of the initial 34 gallons spilled would reach the ground surface (refer to Section 4.4, Safety). Fuel would begin to reach the surface at a distance of approximately 600 horizontal feet from the site of the fuel spill and cover a total area of 31 acres (0.024 square miles). The estimated average fuel concentration in this area would be approximately equal to 0.0002 ounce per square foot. A fuel spill of this nature would not result in significant impacts. While this scenario could potentially occur under the most remote of circumstances, the Air Force has no record of this type of event occurring during HH-60 refueling operations (Air Force 1999a).

4.8.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

Under this alternative, sortie-operations and training activities would be the same as FS-AR1. Although several towns are located below FS-AR2, general land use patterns beneath FS-AR2 are similar to those beneath FS-AR1. Consequently, effects and impacts under this alternative would be similar to those described under FS-AR1. Sensitive noise receptors underlying FS-AR2 include nine schools. However, noise levels associated with FS-AR2 operations would be less than 40 dB DNL (refer to Section 4.2, Noise). At most, only minor and short-term disruptions would occur as a result of a direct overflight of a sensitive noise receptor. Therefore, implementation of this alternative would not result in significant impacts to land use or any identified sensitive receptors.

4.8.2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Fort Stewart helicopter AR tracks would be established. Therefore, land use beneath these tracks, as described in Section 3.8, would remain unchanged.

4.8.3 Water Training Area Helicopter AR Tracks

4.8.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

Establishment and use of WTA-AR1 would not directly change the ownership, use, or management of the SULMAs or any area beneath WTA-AR1, nor would it include activities such as construction, land acquisition, or land withdrawal that could potentially result in such changes.

Under the proposed action, establishment and use of WTA-AR1 would result in HH-60 and HC-130 aircraft overflights of lands not previously subject to these types of activities. The primary change would be the introduction of noise intrusions to areas currently not affected under existing conditions. Sensitive noise receptors underlying WTA-AR1 include two schools. However, noise levels associated with WTA-AR1 operations would be less than 40 dB DNL (refer to Section 4.2, Noise). At most, only minor and short-term disruptions would occur as a result of a direct overflight of a sensitive noise receptor. Therefore, given the minor change in noise level, establishment and use of WTA-AR1 would not result in significant impacts to land use with respect to noise effects.

There is a very remote possibility that up to 34 gallons of JP-8 fuel could be spilled during a wet sortie-operation. While this scenario could potentially occur under the most remote of circumstances, the Air Force has no record of this type of event occurring during HH-60 refueling operations (Air Force 1999a). As discussed in Section 4.8.2.1, a fuel spill of this nature would not result in significant impacts.

4.8.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Under this alternative, sortie-operations and training activities would be the same as WTA-AR1. Land use patterns beneath WTA-AR2 are similar to those beneath WTA-AR1, although no sensitive noise receptors are located beneath the airspace. Impacts under this alternative would be similar to those described under WTA-AR1. Therefore, implementation of this alternative would not result in significant impacts to land use.

4.8.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative water training area helicopter AR tracks would be established. Therefore, land use beneath these tracks, as described in Section 3.8, would remain unchanged.

4.8.4 Avon Park Helicopter AR Tracks

4.8.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

Establishment and use of AP-AR1 would not directly change the ownership, use, or management of the SULMAs or any area beneath AP-AR1, nor would it include activities such as construction, land acquisition, or land withdrawal that could potentially result in such changes.

Under the proposed action, establishment and use of AP-AR1 would result in HH-60 and HC-130 aircraft overflights of lands not previously subject to these types of activities. The primary change would be the introduction of noise intrusions to areas currently not affected under existing conditions. Sensitive receptors in the vicinity include the Cedar Keys and Chassahowitzka NWRs. To assess potential noise impacts on these NWRs, noise levels were modeled at their centerpoints, as well as the closest point from the AR track. Noise levels associated with AP-AR1 operations would be less than 40 dB DNL (refer to Section 4.2, Noise). At most, only minor and short-term disruptions would occur as a result of a direct overflight of a sensitive noise receptor. The AR-AR1 is proposed to be used 18 times per year. Therefore, given the minor change in noise levels, implementation and use of AP-AR1 would not result in significant impacts to land use with respect to noise effects.

Because HH-60 refueling would take place in AP-AR1 as part of the proposed action, there is a very remote possibility that up to 34 gallons of JP-8 could be spilled. The fuel spill model results generated for such an event (see Section 4.8.2.1) also apply to AP-AR1. If a spill of this nature were to occur within AP-AR1, the fuel would disperse quickly in coastal waters and impacts would not be significant. While this scenario could potentially occur under the most remote of circumstances, the Air Force has no record of this type of event occurring during HH-60 refueling operations (Air Force 1999a). Therefore, land use would not be significantly impacted.

4.8.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

Under this alternative, sortie-operations and training activities would be the same as AP-AR1. Land use patterns beneath AP-AR2 are similar to those beneath AP-AR1, including sensitive noise receptors. Consequently, impacts under this alternative would be similar to those described under AP-AR1. Therefore, implementation of this alternative would not result in significant impacts to land use.

4.8.4.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Avon Park helicopter AR tracks would be established. Therefore, land use beneath these tracks, as described in Section 3.8, would remain unchanged.

4.8.5 Crew Swap Facilities

4.8.5.1 Proposed Crew Swap Facility (Perry-Foley Airport)

Use of the Perry-Foley Airport for HH-60 aircrew swaps would not directly change the ownership, use, or management of the airport, nor would it include activities such as construction, land acquisition, or land withdrawal that could potentially result in such changes. In addition, no ground facilities other than the airfield would be used.

Under the proposed action, HH-60 landings and takeoffs at Perry-Foley Airport would result in average noise levels of less than 40 dB DNL and thus would not increase current noise levels (refer to Section 4.2, Noise). Therefore, implementation of the proposed action would not result in significant impacts to land use.

4.8.5.2 Alternative Crew Swap Facility (Cross City Airport)

Use of the Cross City Airport for HH-60 aircrew swaps would not directly change the ownership, use, or management of the airport, nor would it include activities such as construction, land acquisition, or land withdrawal that could potentially result in such changes. Under this alternative, crew swap activities would be the same as those at Perry-Foley Airport. Consequently, impacts under this alternative would be similar to those described for the proposed action. Therefore, implementation of this alternative would not result in significant impacts to land use.

4.8.5.3 No-Action Alternative

Under the No-Action Alternative, neither the Perry-Foley nor Cross City airports would be used to support HH-60 aircrew swaps. Therefore, land use, as described in Section 3.8, would remain unchanged.

4.9 RECREATION

This section addresses potential effects of the proposed action and alternatives on the use and characteristics of recreational areas and the visual qualities of the landscape and surrounding environment. The analysis addresses the potential for: 1) changes in recreation use and access due to increased sortie-operations in specific areas; 2) changes to the visual qualities of the landscape as a result of introducing training operations in specific areas; and 3) changes to the visual setting under affected airspace resulting from aircraft noise and overflights associated with the proposed action and alternatives.

Impacts of aircraft overflights to the visual environment of an area are difficult to quantify due to the inability to separate such impacts from the noise of aircraft overflights. In most instances, aircraft are not noticed because of visual cues, but rather are noticed after being heard. The nature of the impact depends on the sensitivity of the resource affected, the distance from which it is viewed, and the length of time it is visible. Altitude and screening relative to the viewer also play a key role in determining impacts from aircraft overflights.

4.9.1 Water Training Areas

4.9.1.1 PROPOSED WATER TRAINING AREA (WTA1)

Proposed aircraft activities associated with WTA1 would result in average noise levels of 45 dB DNL (refer to Section 4.2, Noise). These levels would be similar to estimated ambient noise levels, which are well below accepted guidelines for noise compatibility in associated recreational areas and Special Use Land Management Areas (SULMAs) located landward of WTA1. Therefore, noise levels associated with HH-60 and HC-130 operations would not be high enough to disrupt recreational activities taking place within WTA1 or adjacent SULMAs. In addition, the HH-60s would conduct reconnaissance flyovers to select a training site within WTA1 at least 1 mile from the nearest boat. This would help minimize any effects on recreational activities. Therefore, implementation of WTA1 would not result in significant impacts to recreational resources with respect to noise effects.

As a result of the training proposed for WTA1, MK25 and MK6 flares, sea dye plastic wrappers, and lightsticks could be generated as waste and abandoned in WTA1 annually (refer to Section 4.3, Waste Management). Unrecovered items in the marine environment have the potential to be a safety concern, and affect the aesthetic quality of the environment. However, this quantity of waste would not result in significant impacts to the recreational or visual resources in WTA1 or adjacent SULMAs as these materials would be quickly dispersed throughout the training area and beyond. Furthermore, lightsticks would be retrieved when search and rescue training personnel are in the water and whenever environmental conditions allow.

In general, aircraft are more visible in open water than in heavily wooded areas. Within WTA1, training activities would take place at altitudes below 500 feet above ground level (AGL); however, the resulting effect of overflights in WTA1 would be temporary. In addition, WTA1 would be located approximately 4 nautical miles (NM) from the Florida coastline at its closest point, so aircraft activities would not be a visually dominant feature when seen from shore. Therefore, aircraft activities associated with the establishment and use of WTA1 would not result in significant impacts to visual resources.

4.9.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

WTA2 would be located closer to shore and overlie more of the Big Bend Seagrasses Aquatic Preserve than WTA1 (an additional 33 square NM). The visual and recreational character of the area is similar to WTA1; however, training activities would be more visible to viewers along the coastline since it is closer to shore. Sortie-operations and training activities would be the same as those identified under WTA1 although estimated noise levels would be slightly higher (47 dB DNL, a difference of only 2 dB DNL). This increase results from a reduction in size of the WTA2 airspace (refer to Section 4.2, Noise). The increase in noise levels would still be well below accepted guidelines for noise compatibility in recreational areas. Impacts associated with implementation of this alternative would be the same as those described under WTA1. Therefore, implementation of this alternative would not result in significant impacts on recreational or visual resources.

4.9.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue operations by HH-60 and HC-130 aircrews. Therefore, recreational and visual resources, as described in Section 3.9, would remain unchanged.

4.9.2 Fort Stewart Helicopter AR Tracks

4.9.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

No specifically designated recreation areas or unique natural features are located beneath the proposed Fort Stewart helicopter air refueling (AR) track. Therefore, sortie-operations and training activities associated with FS-AR1 would not result in significant impacts to recreational resources.

Aircraft overflights would be temporary, and an average of only three sortie-operations per week would occur in FS-AR1. Proposed sortie-operations would take place over predominantly rural land, and no unique visual features are known to exist in the area. Furthermore, overflights of military and general aviation aircraft already occur in the region at a variety of altitudes. Therefore, establishment and use of FS-AR1 would not result in significant impacts to visual resources.

4.9.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

Under this alternative, sortie-operations would be the same as those described under FS-AR1, and land use patterns beneath the two tracks are similar (with the exception of the three small towns [Alma, Baxley, and Nicholls] located beneath FS-AR2). Impacts associated with establishment and use of FS-AR2 would be similar to those described under FS-AR1. Therefore, implementation of this alternative would not result in significant impacts to recreational or visual resources.

4.9.2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative Fort Stewart helicopter AR tracks would be established. Therefore, recreational and visual resources, as described in Section 3.9, would remain unchanged.

4.9.3 Water Training Area Helicopter AR Tracks

4.9.3.1 PROPOSED WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR1)

WTA-AR1 overlies areas classified as conservation and recreational lands (CARLs) and land owned by various Water Management Districts (WMDs); these areas are used for a variety of recreational activities. Under WTA-AR1, sortie-operations and training activities would result in noise levels less than 40 dB DNL (refer to Section 4.2, Noise). These levels would be similar to existing ambient noise levels in the area and are well below accepted guidelines for noise compatibility in recreational areas. Therefore, establishment and use of WTA-AR1 would not result in significant impacts to recreational resources with respect to noise effects.

In the event of an accidental fuel hose rupture, up to 34 gallons of JP-8 fuel could be spilled during a wet refueling sortie-operation. As described in Section 4.8.2.1, a fuel spill of this nature would not result in significant adverse impacts. While this scenario could potentially occur under the most remote of circumstances, the Air Force has no record of this type of event occurring during HH-60 refueling operations (Air Force 1999a). Therefore, recreational resources would not be significantly impacted.

Proposed sortie-operations would occur over predominantly rural land, which includes a CARL and several WMDs. Observers can be more sensitive to visual elements of aircraft overflights when in recreational settings such as a CARL or WMD. However, because the majority of the land underlying WTA-AR1 is forested, visual identification of aircraft overflights, regardless of their frequency, would be somewhat limited from the ground due to tree cover. Furthermore, overflights of military and general aviation aircraft already occur in the region at a variety of altitudes. Therefore, aircraft overflights within WTA-AR1 would not result in significant impacts to visual resources.

4.9.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

Under this alternative, sortie-operations would be the same as those described under WTA-AR1, and land use patterns beneath the two tracks are similar. Impacts associated with establishment and use of WTA-AR2 would be similar to those described under WTA-AR1. Therefore, implementation of this alternative would not result in significant impacts to recreational or visual resources.

4.9.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the proposed nor alternative WTA helicopter AR tracks would be established. Therefore, recreational and visual resources, as described in Section 3.9, would remain unchanged.

4.9.4 Avon Park Helicopter AR Tracks

4.9.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

AP-AR1 overlies an offshore area adjacent to a variety of SULMAs along the Gulf coast of central Florida (refer to Section 3.8-4). Sortie-operations and training activities would result in noise levels less than 40 dB DNL (refer to Section 4.2, Noise). These levels would be similar to existing ambient noise levels in the area. The change in noise levels would not affect existing ocean-based activities beneath the track nor land-based activities in SULMAs along the coast (refer to Section 4.8, Land Use). Therefore, implementation of AP-AR1 would not result in significant impacts to recreational resources.

Because HH-60 refueling would take place in AP-AR1 as part of the proposed action, there is a very remote possibility that up to 34 gallons of JP-8 could be spilled in the event of an accidental fuel hose rupture. As described in Section 4.8.2.1, a fuel spill of this nature would not result in significant adverse impacts. While this scenario could potentially occur under the most remote of circumstances, the Air Force has no record of this type of event occurring during HH-60 refueling operations (Air Force 1999a). Therefore, recreational resources would not be significantly impacted.

In general, aircraft are more visible in open water than in heavily wooded areas. Aircraft operations within AP-AR1 would typically occur at 2,000 feet AGL and would be visible from several locations along the coast. However, in most cases, these sortie-operations would take place over 1 NM offshore in the Gulf of Mexico and would not significantly impact the visual landscape. Training activities associated with AP-AR1 would be relatively infrequent, occurring only once every other week. Therefore, establishment and use of AP-AR1 would not result in significant impacts to visual resources.

4.9.4.2 Alternative Avon Park Helicopter AR Track (AP-AR2)

Under this alternative, sortie-operations and training activities would be the same as those under AP-AR1, although AP-AR2 is located farther offshore. Recreational uses and visual character under this alternative are similar to the AP-AR1 area. Impacts associated with implementation of this alternative would be similar to those described under AP-AR1. Therefore, implementation of this alternative would not result in significant impacts to recreational or visual resources.

4.9.4.3 No-Action Alternative

Under the No-Action Alternative, neither the proposed nor alternative Avon Park helicopter AR tracks would be established. Therefore, recreational and visual resources, as described in Section 3.9, would remain unchanged.

4.9.5 Crew Swap Facilities

4.9.5.1 Proposed Crew Swap Facility (Perry-Foley Airport)

Under the proposed action, HH-60 crew swaps would be performed at Perry-Foley Airport. The Perry-Foley Airport is used by some pilots for recreational flying; however, it is not currently overburdened with air traffic, and the occasional landing of an HH-60 would not preclude other aircraft from using the airfield. No other recreational areas are located in the vicinity of the airport. Also, each crew swap would be brief, taking approximately 5 minutes each time they land. Therefore, implementation of HH-60 crew swaps at Perry-Foley Airport would not result in significant impacts to recreational resources.

Aircraft activity is already part of the visual landscape of the airport. Therefore, implementation of crew swap activities at Perry-Foley Airport would not result in significant impacts to visual resources.

4.9.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

Under this alternative, crew swap activities at the Cross City Airport would be the same as those under the proposed action. Recreational resources and the visual landscape at Cross City Airport are similar to those described at Perry-Foley Airport. Impacts associated with implementation of this alternative would be similar to those described for the proposed crew swap facility. Therefore, implementation of this alternative would not result in significant impacts to recreational or visual resources.

4.9.5.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, neither the Perry-Foley nor Cross City airports would be used to support HH-60 aircrew swaps. Recreational and visual resources, as described in Section 3.9, would remain unchanged.

4.10 TERRESTRIAL BIOLOGICAL RESOURCES

This section analyzes the potential for impacts to terrestrial biological resources resulting from implementation of the proposed action or alternatives. Since there are no construction or ground disturbing activities associated with the proposed action or alternatives, the analysis addresses those terrestrial biological resources that might be affected by projected changes in airspace use.

4.10.1 Water Training Areas

4.10.1.1 PROPOSED WATER TRAINING AREA (WTA1)

WTA1 lies approximately 4 miles offshore. Potential impacts to terrestrial biological resources include the accumulation of expended training-related debris (i.e., flares, lightsticks, and sea dye packs) in the coastal marshes. Although the accumulation of debris along the shorelines and in coastal wetlands would not significantly impact terrestrial biological resources, the debris would impact the aesthetics of the area, especially at the St. Marks National Wildlife Refuge (NWR) to the north and west of WTA1 (refer to Section 4.9, Recreation). While there is the potential for adverse aesthetic impacts, there would be no significant impacts to terrestrial biological resources.

4.10.1.2 ALTERNATIVE WATER TRAINING AREA (WTA2)

Potential impacts to terrestrial biological resources would be similar to those discussed for the proposed action. As such, no significant impacts to terrestrial biological resources are anticipated.

4.10.1.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue training operations by HH-60 and HC-130 aircrews. Therefore, terrestrial biological resources, as described in Section 3.11, would remain unchanged.

4.10.2 Fort Stewart Helicopter AR Tracks

4.10.2.1 PROPOSED FORT STEWART HELICOPTER AR TRACK (FS-AR1)

The potential sources of impacts to wildlife from aircraft overflights are the visual effect of the approaching aircraft and the associated noise. Visual impacts are not expected to be significant because approximately 95 percent of the operations would take place at altitudes greater than 1,000 feet above ground level (AGL), which is higher than the altitude accounting for most reactions to visual stimuli by wildlife (Lamp 1989; Bowles 1995). Noise levels associated with the proposed action would not change significantly from ambient levels (see Section 4.2, Noise). In addition, due to the relative slow speed of HH-60 and HC-130 aircraft, the rate of increase in sound level (i.e., onset rate) is low. Therefore, the startle effect on wildlife (especially birds) is greatly reduced, as is the BASH risk. There would be no significant impacts to wildlife from noise associated with aircraft overflights.

The only potential impact to terrestrial biological resources underlying the proposed Fort Stewart helicopter air refueling (AR) track would be from an accidental fuel spill during normal refueling operations. The Fuel Jettison Simulation (FJSIM) model was used to estimate water surface impacts as a result of an accidental fuel spill of 34 gallons due to the severing of the fuel hose by the rotor of the

HH-60 (refer to Section 4.4, Safety). The FJSIM model estimates that fuel would be spread out over an area of approximately 1,350,000 square feet and the amount reaching the ground would average approximately 0.0002 ounce per square foot. JP-8 is a complex mixture of volatile alkanes and aromatics and when released onto the ground or surface water, quickly evaporates. Since this type of accidental spill is extremely unlikely and since only very small quantities of fuel would be released into the environment, impacts to terrestrial biological resources would not be significant.

Bird-aircraft strikes along FS-AR1 would be negligible due to three reasons. First, the lands underlying FS-AR1 do not contain major riparian or other habitats that support large concentrations of birds. Second, the type of aircraft and their slow speed (HH-60s and HC-130s) reduces the chances of a bird-aircraft strike hazard (BASH) incident since they both exhibit a low rate of increase in sound level or onset rate. Due to the low onset rate of both aircraft, the startle affect on birds is greatly reduced as is the BASH potential. Third, Moody Air Force Base (AFB) would continue to employ bird-aircraft strike avoidance procedures (e.g., Bird Avoidance Model [BAM]) that have proved successful in the past. Combined, these three factors indicate that bird-aircraft strikes would not likely increase along FS-AR1.

Approximately half of FS-AR1 is above the U.S. Fish and Wildlife Service (USFWS) designated 40-mile foraging zone for two nests of the endangered wood stork (refer to Figure 3.10-1). Although this species has historically migrated into South and Central America (Rodgers et al. 1996), the existing colonies in Florida and the southeast are considered essentially non-migratory (Kaufman 1996). Wood stork flocks do fly at altitudes that may cause BASH issues within FS-AR1. However, this type of flight pattern is more associated with nest-site activity and the nearest wood stork nest is 25 miles away. There would be no significant impacts to threatened and endangered species with implementation of the proposed action.

4.10.2.2 ALTERNATIVE FORT STEWART HELICOPTER AR TRACK (FS-AR2)

The potential sources of impacts to wildlife from aircraft overflights are the visual effect of the approaching aircraft and the associated noise. Visual impacts are not expected to be significant because approximately 95 percent of the operations along FS-AR2 would take place at altitudes greater than 1,000 feet AGL, which is higher than the altitude accounting for most reactions to visual stimuli by wildlife (Lamp 1989; Bowles 1995). Noise levels associated with the FS-AR2 would not change significantly and the associated potential impacts would be similar to those previously discussed for FS-AR1. There would be no significant impacts to wildlife from noise associated with aircraft overflights.

The only potential impact to terrestrial biological resources underlying the FS-AR2 would be from an accidental fuel spill during normal refueling operations. The FJSIM model was used to estimate water surface impacts as a result of an accidental fuel spill of 34 gallons due to the severing of the fuel hose by the rotor of the HH-60 (refer to Section 4.4, Safety). The FJSIM model estimates that fuel would be spread out over an area of approximately 1,350,000 square feet and the amount reaching the ground would average approximately 0.0002 ounce per square foot. JP-8 is a complex mixture of volatile alkanes and aromatics and when released onto the ground or surface water, quickly evaporates. Since this type of accidental spill is extremely unlikely and since only very small quantities of fuel would be released into the environment, impacts to terrestrial biological resources would not be significant.

BASH potential along FS-AR2 would be similar as that previously described for FS-AR1 and bird-aircraft strikes would be rare.

FS-AR2 almost entirely overlays the USFWS designated 40-mile foraging zone for two nests of the endangered wood stork (refer to Figure 3.10-1). Historically, this species has migrated into South and Central America (Rodgers et al. 1996). However, the existing colonies in Florida and the southeast are considered essentially non-migratory (Kaufman 1996). Wood stork flocks do fly at altitudes that may cause BASH issues within the refueling track. However, this type of flight pattern is more associated with nest-site activity and the nearest wood stork nest is 35 miles away. There would be no significant impacts to threatened and endangered species with implementation of the proposed action.

4.10.2.3 No-Action Alternative

Under the No-Action Alternative, the establishment of a Fort Stewart helicopter AR track would not occur and baseline conditions, as described in Section 3.10, would remain unchanged.

4.10.3 Water Training Area Helicopter AR Tracks

4.10.3.1 Proposed Water Training Area Helicopter AR Track (WTA-AR1)

The potential sources of impacts to wildlife from aircraft overflights are the visual effect of the approaching aircraft and the associated subsonic noise. Visual impacts are not expected to be significant because approximately 95 percent of the operations along WTA-AR1 would take place at altitudes greater than 1,000 feet AGL, which is higher than the altitude accounting for most reactions to visual stimuli by wildlife (Lamp 1989; Bowles 1995). Noise levels associated with the WTA-AR1 would not change significantly from ambient conditions (see Section 4.2, Noise). There would be no significant impacts to wildlife from noise associated with aircraft overflights.

The only potential impact to terrestrial biological resources underlying the WTA-AR1 would be from an accidental fuel spill during normal refueling operations. In this area water quality could be affected within designated Outstanding Florida Waters (OFW) basins if an accidental fuel spill were to occur. The FJSIM model was used to estimate water surface impacts as a result of an accidental fuel spill of 34 gallons due to the severing of the fuel hose by the rotor of the HH-60 (refer to Section 4.4, Safety). The FJSIM model estimates that fuel would be spread out over an area of approximately 1,350,000 square feet and the amount reaching the ground would average approximately 0.0002 ounce per square foot. JP-8 is a complex mixture of volatile alkanes and aromatics and when released onto the ground or surface water, quickly evaporates. Since this type of accidental spill is extremely unlikely and since only very small quantities of fuel would be released into the environment, impacts to terrestrial biological resources would not be significant.

The northern portion of WTA-AR1 overlies the Hixtown Swamp Complex, a major wetland habitat that is known to support large concentrations of birds (refer to Figure 3.10-3). The potential for BASH incidents would not be significant due to two reasons. Since Moody AFB standard BASH avoidance procedures would be implemented to avoid seasonally heavy concentrations of birds and the wetland area of concern underlies only 10 percent of the northern end of the track, there would be an insignificant increase in the potential for bird-aircraft strikes.

WTA-AR1 is above a 40-mile foraging zone for the wood stork although the closest nest is over 20 miles to the west. In addition, the closest bald eagle nest is 3 miles from the southern border of the track. No other threatened or endangered species are known to occur below the proposed track. Therefore, impacts to threatened and endangered species would not be significant.

4.10.3.2 ALTERNATIVE WATER TRAINING AREA HELICOPTER AR TRACK (WTA-AR2)

The impacts from aircraft overflights and aerial refueling operations in WTA-AR2 on terrestrial biological resources are expected to be similar to those discussed for the proposed action. The potential for bird-aircraft strikes may be less than that for WTA-AR1 since WTA-AR2 does not overlie the Hixtown Swamp Complex or any other major riparian or wetland habitat that has known congregations of birds. Like WTA-AR1, the alternative WTA AR track overlies wood stork foraging zones. Noise levels would be the same as for the proposed track and would not exceed 40 dB (DNL). With establishment of WTA-AR2, there would be no significant impacts to terrestrial biological resources.

4.10.3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the establishment of a WTA helicopter AR track would not occur and baseline conditions, as described in Section 3.10, would remain unchanged.

4.10.4 Avon Park Helicopter AR Tracks

4.10.4.1 PROPOSED AVON PARK HELICOPTER AR TRACK (AP-AR1)

Although AP-AR1 is located entirely over water, a number of sensitive terrestrial biological resources occur onshore adjacent to the northeastern and southeastern edges of the track. Cedar Keys NWR is 2 miles to the north of the track and contains numerous coastal wetland communities that are major concentration areas for waterfowl and wading birds. Chassahowitzka NWR lies 2 miles due east of AP-AR1 and also contains extensive coastal marshes with concentrations of birds. The southern end of the Big Bend Sea Grasses Aquatic Preserve lies beneath the northern portion of AP-AR1. A number of bald eagle nest sites are located along the coast, the closest nest being approximately 4 miles away. Although these sensitive resources are in proximity to AP-AR1, no significant impacts are expected to any terrestrial biological resources due to the altitude (2,000 feet AGL) and lateral distance from these sensitive resources at which refueling operations would be conducted and the low number of sortie-operations per year (28) along the refueling track.

4.10.4.2 ALTERNATIVE AVON PARK HELICOPTER AR TRACK (AP-AR2)

The alternative Avon Park AR track lies further offshore than AP-AR1 and consequently is farther from the sensitive terrestrial biological resources (e.g., NWRs, bald eagle nest sites) mentioned previously for AP-AR1. There would be no impacts to terrestrial biological resources upon implementation of the alternative Avon Park helicopter AR track.

4.10.4.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the establishment of an Avon Park helicopter AR track would not occur and baseline conditions, as described in Section 3.10, would remain unchanged.

4.10.5 Crew Swap Facilities

4.10.5.1 PROPOSED CREW SWAP FACILITY (PERRY-FOLEY AIRPORT)

No ground-disturbing activities would be associated with the proposed action. Therefore, vegetation, wetlands, and wildlife habitat would not be affected. Perry-Foley Airport would be used to land HH-60s for a brief time, switch pilots, and then leave, returning to the WTA. Noise levels associated with the proposed action would not be changed significantly from ambient conditions (see Section 4.7, Noise). Therefore, the change in the noise environment associated with the proposed action would not cause abandonment of habitat by wildlife or other significant impacts.

4.10.5.2 ALTERNATIVE CREW SWAP FACILITY (CROSS CITY AIRPORT)

No ground-disturbing activities would be associated with the alternative crew swap facility. Therefore, vegetation, wetlands, and wildlife habitat would not be affected. The Cross City Airport would be used to land HH-60s for a brief time, switch pilots, and then leave, returning to the WTA. Noise levels associated with the proposed action would be less than 40 dB (DNL). Therefore, the change in the noise environment associated with the proposed action would not cause abandonment of habitat by wildlife or other significant impacts.

4.10.5.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the establishment of a crew swap facility would not occur and baseline conditions, as described in Section 3.10, would remain unchanged.

4.11 MARINE BIOLOGICAL RESOURCES

This section analyzes the potential for impacts to marine biological resources from implementation of the proposed action or alternatives. This section comprises three major subsections: 1) marine flora; 2) invertebrates, fish, and sea turtles; and 3) marine mammals. Potential impacts from the proposed action and alternatives are addressed within each of these major subsections as appropriate. The major marine biological resource issues addressed within these subsections include: 1) the potential for marine marker ingestion by marine species of concern, 2) potential acoustic impacts on marine mammals from aircraft overflights and search and rescue training operations, and 3) potential fuel spills along the proposed and alternative Avon Park air refueling (AR) tracks and associated impacts on species or habitats of concern.

4.11.1 Marine Flora

4.11.1.1 WATER TRAINING AREAS

The use of marine location markers (i.e., flares, lightsticks, and sea dye packs) during search and rescue training operations in the water training area (WTA) would result in the addition of these items or their by-products into the marine environment. A total of 11,006 lightsticks, 2,545 flares, and 1,190 sea dye packs would be dropped annually within the WTA.

The MK6 flare is designed to completely incinerate its wooden housing and internal contents. Small amounts of uncombusted wood may float and wash ashore but would not have any impacts on marine flora in the WTA. The smaller MK25 flare is composed of an aluminum housing containing the flare materials. Upon combustion of the internal flare materials, the aluminum housing would sink. Seagrass beds and other marine flora are not extensive in the WTA, and it is unlikely that the aluminum housing would directly impact seagrass beds in the area. However, if an aluminum housing were to settle on a seagrass bed, impacts to marine flora would not be significant since the components of the housing are not toxic.

Due to their plastic composition, lightsticks and expended sea dye packs would not directly impact marine flora in the WTA. The contents of either would be dispersed and diluted quickly in the waters of the Gulf as a result of natural mixing due to wind, wave, and current action.

Due to the lack of extensive seagrass beds and other marine flora in the WTA, the dispersed nature of proposed training operations within the WTA, and the rapid dispersion and dilution of the by-products of any of the marine location markers, impacts to marine flora would not be significant.

No-Action Alternative

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue training operations by HH-60 and HC-130 aircrews. Therefore, existing marine resources, as described in Section 3.11, would remain unchanged.

4.11.1.2 FORT STEWART HELICOPTER AR TRACKS

The proposed and alternative Fort Stewart helicopter AR tracks are located entirely over land and no marine biological resources occur beneath these tracks.

4.11.1.3 WATER TRAINING AREA HELICOPTER AR TRACKS

The proposed and alternative WTA helicopter AR tracks are located entirely over land and no marine biological resources occur beneath these tracks.

4.11.1.4 AVON PARK HELICOPTER AR TRACKS

The only potential impact to marine flora underlying the Avon Park helicopter AR tracks would be from an accidental fuel spill during normal refueling operations. An accidental fuel spill of this nature is highly unlikely. The Fuel Jettison Simulation (FJSIM) model was used to estimate water surface impacts as a result of an accidental fuel spill of 34 gallons due to the severing of the fuel hose by the rotor of the HH-60 (refer to Section 4.4, Safety). The FJSIM model estimates that fuel would be spread out over an area of approximately 1,350,000 square feet and the amount reaching the water's surface would average approximately 0.0002 ounce per square foot. JP-8 is a complex mixture of volatile alkanes and aromatics and when released onto surface water, quickly evaporates. In the unlikely event of a fuel spill, approximately 13 gallons could reach the surface and would be spread out over a broad area (roughly 31 acres; refer to Section 4.4, Safety). Due to the small quantities of fuel released into the environment, the evaporative nature of the fuel, and the dispersal action of wind and waves, impacts to marine flora would not be significant.

No-Action Alternative

Under the No-Action Alternative, a helicopter AR track would not be established in the Gulf of Mexico for air refueling training operations by HH-60 and HC-130 aircrews. Therefore, marine biological resources, as described in Section 3.11, would remain unchanged.

4.11.1.5 CREW SWAP FACILITIES

The proposed and alternative aircrew swap facilities are located on land and no marine biological resources are associated with these locations.

4.11.2 Invertebrates, Fish, and Sea Turtles

4.11.2.1 WATER TRAINING AREAS

Invertebrates. As discussed previously (Section 4.11.1), the use of marine location markers (i.e., flares, lightsticks, and sea dye packs) during search and rescue training operations in the WTA would result in the addition of these items or their by-products into the marine environment. Due to the dispersed nature of training operations within the WTA and the rapid dispersion and dilution of the by-products of any of the marine location markers, impacts to marine invertebrates would not be significant.

Fish. As discussed previously (Section 4.11.1), the use of marine location markers (i.e., flares, lightsticks, and sea dye packs) during search and rescue training operations in the WTA would result in the addition of these items or their by-products into the marine environment. Due to the dispersed nature of training operations within the WTA and the rapid dispersion and dilution of the by-products of any of the marine location markers, impacts to marine fish would not be significant.

Sea Turtles. The ingestion of man-made debris constitutes a potential threat to sea turtles that occur in the study region (Balazs 1985; Carr 1987). Plastic can lodge in an animal's digestive tract causing reduced nutrient absorption, intestinal damage, releases of toxic chemicals, or blockages, which cause starvation (Balazs 1985). Researchers have reported high levels of debris ingestion in all species of stranded sea turtles along the Gulf coast. In studies along the Texas Gulf coast, ingestion rates were highest in loggerhead (51 and 26 percent) and green sea turtle (47 and 32 percent); leatherback, hawksbill, and Kemp's ridley had lower ingestion rates (24, 14, and 4 percent, respectively) (Plotkin and Amos 1988, 1990; Stanley et al. 1988; NRC 1990; Plotkin 1993).

Kemp's ridley and loggerhead would likely be the most abundant sea turtles in the general area, and the presence of green sea turtles would not be unexpected given the proximity of seagrass beds in the nearshore areas adjacent to the WTA. However, Kemp's ridleys are most common in the nearshore region, being more frequently observed inside the bays and in estuarine habitats than in offshore areas like the WTA.

While some green turtles may be encountered in the Apalachee Bay area, the coastal zone south of Cedar Key is a more important foraging area for this species. Leatherback sea turtles are pelagic and feed at the surface or in the water column on jellyfish. However, being an offshore pelagic species, leatherback sea turtles would be rare in nearshore waters of the WTA.

Loggerheads are expected to be the most common sea turtle at the depths occurring in the WTA. Further, it has been documented that loggerheads have a high rate of debris ingestion with plastics being the dominant debris type consumed. Should a marine marker-sea turtle interaction occur, the affected species would most likely be the loggerhead.

A total of 11,006 lightsticks, 2,545 flares, and 1,190 sea dye packs would be dropped annually within the WTA. Of the three types of marine markers, flares would be the least likely to be ingested by sea turtles because of their basic construction (refer to Section 4.3, Waste Management). Most instances of sea turtles ingesting foreign objects involve soft-plastic derivatives such as plastic bags, plastic sheeting, balloons, and monofilament fishing line that might be confused with jellyfish or other prey (NRC 1990). The MK6 flare is designed to completely incinerate its wooden housing and internal contents. Small amounts of uncombusted wood may float and wash ashore. The smaller MK25 flare is composed of an aluminum housing containing the flare materials. Upon combustion of the internal flare materials, the aluminum housing would sink. The expended remains of either flare would not be an attractant to a feeding or swimming sea turtle. In addition, the size of the expended aluminum casing of the MK25 would preclude any possibility of ingestion by a bottom foraging sea turtle.

The likelihood that either marker would be consumed is low, however, because the expected densities of sea turtles, lightsticks, and expended dye packs in the project area would be low. The dispersal of buoyant lightsticks would be wind-driven and therefore variable. On average, net dispersal would be expected to be from west to east during winter months and from east to west during summer. Lightsticks, being highly buoyant, could be transported out of the study area by prevailing currents, while others could find their way into coastal seagrass beds, creating more of an aesthetic problem as opposed to a biological hazard. While lightsticks could drift into these coastal habitats, their density would be low following the dispersal occurring in the unknown time interval between the "point source" release and their stranding on the coast. In addition, the size, shape, and composition of a lightstick make it unlikely that a sea turtle would be able to ingest a lightstick. Sea turtles are known to investigate or "mouth" potential food items and if a lightstick is encountered a turtle may attempt to consume it.

However, there have been no records of sea turtles having ingested lightsticks (Plotkin and Amos 1988, 1990; Stanley et al. 1988; NRC 1990; Plotkin 1993).

Because of its similarity to the types of plastics most often consumed by sea turtles, expended sea dye packs would be the more likely of the two marine markers to be consumed if encountered. Over the longer term, neutrally buoyant expended sea dye packs would be more of a concern. If dye packs submerge, they would be less likely to be purged from the marine system. Some could be transported out of the study area by prevailing currents, while others could find their way into coastal seagrass beds. If expended dye packs are not transported out of Apalachee Bay in substantial numbers, the cumulative effect of adding 1,190 sea dye packets per year to the Gulf would increase the probability of a sea turtle encounter. There exists a remote, yet real, possibility that sea turtles in the project area could encounter and consume expended sea dye packs released into the WTA during training operations. The encounter may be detrimental or even fatal. Use of sea dye packs and lightsticks may thus result in the incidental take of threatened and endangered sea turtles. Incidental take is defined as take that results from, but is not the purpose of, carrying out an otherwise lawful activity. To minimize chances of such take, formal Endangered Species Act consultation with the National Marine Fisheries Service was completed and an incidental take permit was obtained that addresses use of the proposed WTA. The terms and conditions, and consultation-derived reasonable and prudent measures within the incidental take statement will be implemented. These include the development of a program aimed at helping to understand the effects of marine debris ingestion by sea turtles and implementation of a program to monitor the effects of debris. Specific details on the take authorization and terms and conditions are included within the Biological Opinion issued by NMFS (included in Appendix C). Therefore, impacts to marine biological resources would not be significant.

No-Action Alternative

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue training operations by HH-60 and HC-130 aircrews. Therefore, marine biological resources, as described in Section 3.11, would remain unchanged.

4.11.2.2 FORT STEWART HELICOPTER AR TRACKS

The proposed and alternative Fort Stewart helicopter AR tracks are located entirely over land and no marine biological resources occur beneath these tracks.

4.11.2.3 WATER TRAINING AREA HELICOPTER AR TRACKS

The proposed and alternative WTA helicopter AR tracks are located entirely over land and no marine biological resources occur beneath these tracks.

4.11.2.4 AVON PARK HELICOPTER AR TRACKS

Invertebrates. The only potential impact to marine invertebrates underlying the Avon Park helicopter AR tracks would be from an accidental fuel spill during normal refueling operations. The effect of a fuel spill on marine invertebrates underlying the Avon Park AR tracks would probably be minimal based upon the relatively small area affected, weathering and dispersal of the spill, and the overwhelming numerical dominance and reproductive resiliency of invertebrate species. This includes all species of invertebrates including commercially important species like blue crab, stone crab, shrimp, and oysters. Even in the areas directly covered by fuel, effects would be limited to the surficial layers of the water column, thereby insulating the benthic environment from direct exposure. In addition, since JP-8 evaporates quickly from surface waters (see Section 4.11.1.4), it would be present for only limited time periods. Therefore, impacts to marine invertebrate species would not be significant upon implementation of either the proposed or alternative Avon Park helicopter AR track.

Fish. The only potential impact to marine fish underlying the Avon Park helicopter AR tracks would be from an accidental fuel spill during normal refueling operations. The effect of a fuel spill on marine fish underlying the Avon Park AR tracks would probably be minimal based upon the relatively small area affected, weathering and dispersal of the spill, and the overwhelming numerical dominance and reproductive resiliency of fish. This includes all species of finfish including commercially important species like gag grouper. Even in the areas directly covered by fuel, effects would be limited to the water's surface thereby insulating the water column environment from direct exposure. In addition, since JP-8 evaporates quickly from surface waters (see Section 4.11.1.4), it would be present for only limited time periods. The likelihood that the endangered Gulf sturgeon would be affected by a fuel spill is low because 1) Gulf sturgeon are predominantly found in river and estuarine systems and are rarely found as far from shore as the Avon Park helicopter AR tracks (U.S. Fish and Wildlife Service [USFWS] and Gulf States Marine Fisheries Commission [GSMFC] 1995), and 2) Gulf sturgeon are primarily benthic inhabitants, and as with marine invertebrates would not be affected by a fuel spill on the surface. Therefore, impacts to marine fish species would not be significant with implementation of either the proposed or alternative Avon Park helicopter AR track.

Sea Turtles. Sea turtles and marine mammals are the marine fauna most likely to encounter a fuel spill (refer to Section 4.11.3.4 for a discussion of fuel spill effects on marine mammals). As discussed in Section 4.4, Safety, an accidental fuel spill is highly unlikely. The degree to which sea turtles are affected by hydrocarbons depends on the specific composition of the hydrocarbon, the amount of weathering that occurs before exposure, and the duration of exposure. Prolonged exposure can adversely affect marine turtle skin tissues, sight, respiration, blood chemistry, and salt gland function (Lutcavage et al. 1996). While turtles are known to ingest oil (Gramentz 1988), this often occurs during feeding when tar balls or other heavy hydrocarbon aggregations are confused with food; a scenario unlikely for the AR tracks. However, turtles may also ingest hydrocarbons when surfacing to breathe. Based upon the unlikelihood of an accidental fuel spill and the small area affected by a fuel spill if one occurred (refer to Section 4.4, Safety), the extremely small quantities of fuel reaching the water's surface, weathering and dispersal of the spill, and relative rarity of sea turtles found beneath the Avon Park helicopter AR tracks, there would be no significant impacts to sea turtles resulting from implementation of the proposed or alternative Avon Park helicopter AR tracks.

No-Action Alternative

Under the No-Action Alternative, a helicopter AR track would not be established in the Gulf of Mexico for air refueling training operations by HH-60 and HC-130 aircrews. Therefore, marine biological resources, as described in Section 3.11, would remain unchanged.

4.11.2.5 CREW SWAP FACILITIES

The proposed and alternative aircrew swap facilities are located on land and no marine biological resources are associated with these locations.

4.11.3 Marine Mammals

In this environmental assessment (EA), mathematical modeling and information from the acoustic and marine mammal literature (specific references are provided in the following discussions as appropriate) were used to estimate the impacts of proposed search and rescue training operations on the two species of marine mammals (bottlenose dolphin and West Indian manatee) common near the proposed and alternative WTA and helicopter AR tracks. The activities analyzed are the potential acoustic impacts of HC-130 and HH-60 aircraft operations, potential impacts of exposure to fuel spills arising from aerial refueling operations over the sea, potential impacts of exposure to lightstick and flare illumination devices, and exposure to the components of sea dye markers dispensed in plastic bags.

The National Marine Fisheries Service has concurred with the findings of this EA that the proposed action would not affect the listed West Indian manatee (refer to the Biological Opinion included in Appendix C). The analysis of potential effects is described in the following sections.

The sound sources considered in this EA are HC-130 fixed-wing aircraft and HH-60 helicopters. A notable portion of the concern about noise impacts involves marine mammals, principally bottlenose dolphins and manatees, at or below the surface of the water. Thus, transmission of airborne sound into the ocean is an important consideration. For further discussion of the basic characteristics of air-to-water transmission of sound for subsonic sources and how it is modeled, please refer to Appendix A. A detailed description of air-water sound transmission is also given in Richardson et al. (1995). A general summary of the characteristics of air-to-water sound transmission and metrics used to describe underwater noise is provided below.

Air-to-Water Sound Transmission

The audibility or apparent loudness of a noise source is determined by the radiated acoustic power (source level), the propagation efficiency, the ambient noise, and the hearing sensitivity of the subject species at relevant frequencies.

Sound from an elevated source in air is refracted upon transmission into water because of the difference in sound speeds in the two media (a ratio of about 0.23). Because of this difference, the direct sound path is totally reflected for grazing angles less than 77 degrees (i.e., if the sound reaches the surface at an angle more than 13 degrees from vertical). Because of the large difference in the acoustic properties of water and air, the pressure field is actually doubled at the surface of the water, resulting in a 6-decibel (dB) increase in pressure level at the surface.

For a passing airborne source, received levels at and below the surface diminish with increasing source altitude, but the duration of exposure increases. The maximum received levels at and below the surface also diminish with increasing source altitude. Total noise energy exposure is inversely proportional to the product of source altitude and speed because of the link between altitude and duration of exposure. With increasing horizontal distance from the airborne source, underwater sound diminishes more rapidly than does the airborne sound.

Sound transmission in shallow water is highly variable and site-specific because it is strongly influenced by the acoustic properties of the bottom and surface as well as by variations in sound speed within the water column. As in deep water, variations in temperature and salinity with depth cause sound rays to be refracted downward or upward. However, shallow depth does not allow most types of sound channeling effects evident for deep water. Refraction of sound in shallow water can result in either reduced or enhanced sound transmission. With upward refraction, bottom reflections and the resulting bottom losses are reduced; with downward refraction, the opposite occurs. Thus, sound transmission conditions in continental shelf areas can vary widely. In this EA airborne sound transmission was also considered during acoustic modeling because sound from aircraft travels through air before entering water, and is attenuated along the airborne portion of the propagation path.

Underwater ambient noise, if it is sufficiently strong, may prevent a marine mammal from detecting a man-made sound through a process known as masking. Masking can occur as a result of either natural sounds (e.g., during periods of strong winds or near surf zones) or manmade sounds (e.g., shipping noise). Predicted impacts of the aircraft sounds modeled in this EA are based on the assumption that ambient noise is low enough such that hearing sensitivity (rather than masking by ambient noise) will always be the factor limiting detectability of aircraft sound. This is a conservative assumption since it is unlikely that ambient noise would always be low.

Sound level often depends on the frequency and bandwidth under consideration. The relevant bandwidth will vary with the circumstances. Sound level data from studies of human community noise often are weighted (e.g., A-weighted) to place most emphasis on frequencies to which humans are most sensitive. A-weighted and other human-related sound level data (Richardson et al. 1995) are often inappropriate for other species, such as the West Indian manatee and especially the bottlenose dolphin—the marine mammals considered in this EA. Instead, this EA is based on sound levels and auditory sensitivity at each frequency in relation to the hearing sensitivity of these marine mammals at that frequency.

Sound spectra depict the distribution of sound power as a function of frequency. Frequency is the rate of particle vibrations measured in cycles per second or hertz (Hz). Low- and high-frequency sounds are perceived by humans as low-pitched (as in a bass voice) and high-pitched (as in a soprano voice). Spectra depict the relative or absolute levels of the sound components at various frequencies. The sound spectra presented in this EA are "proportional bandwidth spectra", showing levels in bands 1/3-octave wide. A 1/3-octave band is a range of frequencies whose upper limit in hertz is $2^{1/3}$ (or 1.26) times the lower limit; bandwidth is proportional to center frequency. Three adjacent 1/3-octave bands span one octave, which is a band whose upper frequency is two times its lower frequency.

Animals generally respond to sound as pressure, and sound pressure levels underwater are usually expressed in units of micropascals (μPa) or in dBs reference to 1 μPa (dB re μPa). A decibel is a logarithmic measure of sound strength calculated as $20 \log_{10} (P/P_{ref})$, where P is sound pressure and P_{ref} is a reference pressure (e.g., 1 μPa).

The hearing ability of any mammal, marine or otherwise, is a complex function of a variety of biotic and abiotic factors. For instance, the absolute threshold is the level of sound that is barely audible in the absence of significant ambient noise (although, even for a single animal, the minimum detectable sound level varies over time). Also, threshold varies with sound frequency. The graph relating threshold to frequency is the audiogram (as shown in Figure 4.11-1). The best frequency is the one with the lowest threshold, that is, the best sensitivity. The best frequency varies among marine mammal species, with some species being more sensitive than others at their respective best frequencies (see next section).

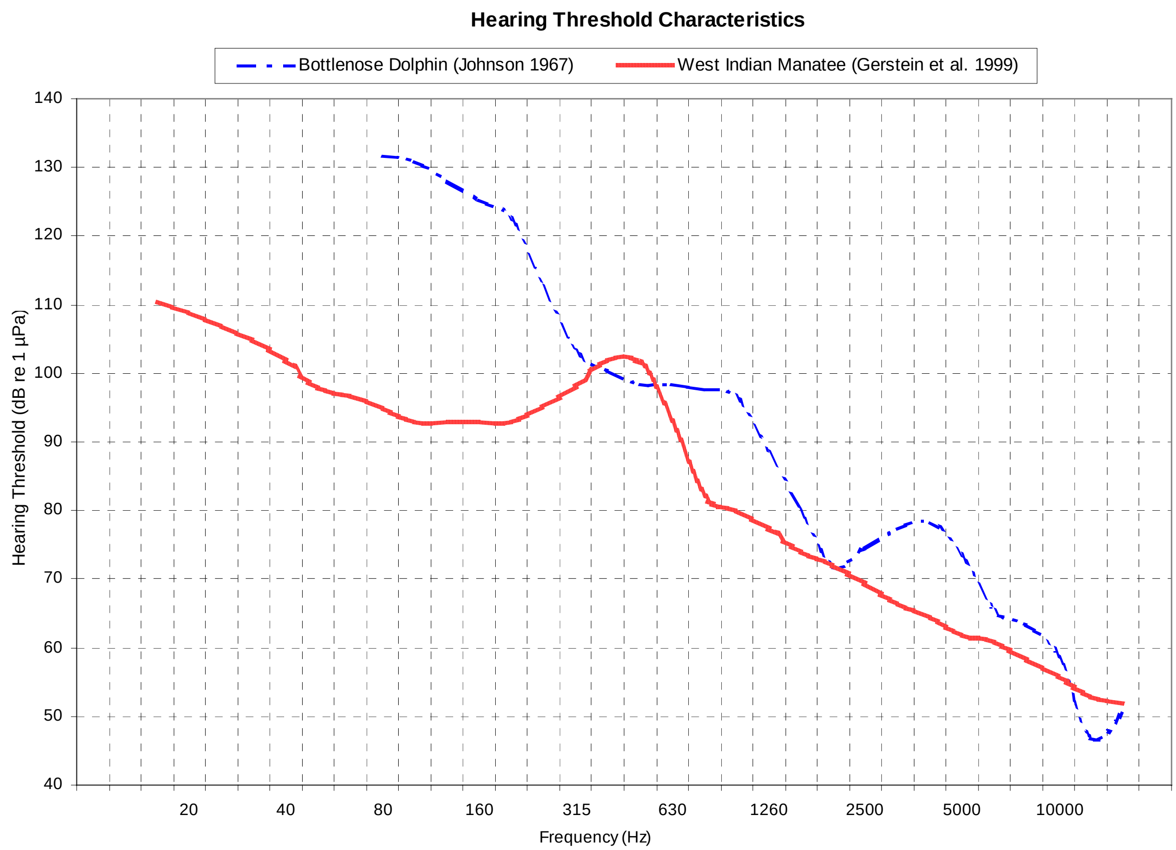

FIGURE 4.11-1 Underwater hearing thresholds (audiograms) of the bottlenose dolphin and West Indian manatee. From Johnson (1967) and Gerstein et al. (1999), respectively.

Hearing Abilities of Bottlenose Dolphins and West Indian Manatees

Both bottlenose dolphins and West Indian manatees hear well underwater. Dolphins are most sensitive to sounds at frequencies above 10 kilohertz (kHz). At low and moderate frequencies (below 16 kHz), the manatee appears to hear as well or better than the bottlenose dolphin and some other marine mammals (Gerstein et al. 1999).

Hearing extends at least as low as 40 to 75 Hz in the bottlenose dolphin (Johnson 1967). However, its sensitivity at these low frequencies is relatively poor (see Figure 4.11-1). Although this odontocete (toothed whale) usually seems rather insensitive to low-frequency sounds, it may be more sensitive to some combination of low-frequency particle motion and pressure fluctuations when in the near field of the acoustic source (Turl 1993). At higher frequencies, the bottlenose dolphin's hearing sensitivity improves markedly.

The anatomy of the manatee hearing apparatus has been studied (e.g., Fischer 1988, Ketten et al. 1992). The latter authors found evidence of a "low-frequency" ear with a narrow frequency range, poor sensitivity, and poor localization ability. However, the data of Gerstein et al. (1999) suggest that manatees may hear better than suggested by this anatomical evidence.

The West Indian manatee's hearing sensitivity has been determined by behavioral testing (Gerstein et al. 1999). It heard sounds from 15 Hz to 46 kHz, with best sensitivity at 6 to 20 kHz. Sensitivity was good at the best frequency: 48 to 50 dB re 1 µPa. Below 3 kHz, the manatee was reportedly more sensitive than most other marine mammals studied up to that date, and hearing extended down into the infrasonic range (15 Hz). Sensitivity at 10 to 32 kHz was also unexpectedly good, given that manatee calls are below 10 to 12 kHz (Richardson et al. 1995). Auditory evoked potential[2] data suggest that the manatee seems most sensitive around 1 to 1.5 kHz, notably less sensitive at 4 kHz, and even less so at 8 kHz. However, there may be some sensitivity up to 35 kHz (Bullock et al. 1982). An audiogram for this species is presented in Gerstein et al. (1999; see Figure 4.11-1). At sound frequencies below 1 kHz the manatee's hearing sensitivity declines, although less rapidly than for the bottlenose dolphin.

Behavioral Responses of Bottlenose Dolphins and West Indian Manatees to Aircraft

As compared with continued and undisturbed occupancy of a preferred area, displacement from a preferred area due to noise-related or visual disturbance can be considered potentially negative. However, it may be preferable for an animal to be displaced rather than to remain in an area where there is risk of physical injury or chronic behavioral or physiological effects (Richardson et al. 1995). In this sense, displacement, initiated by the animal itself, can prevent potentially adverse effects.

Although there are published observations of marine mammal reactions to aircraft, or lack of reactions (for a recent review see Richardson et al. 1995), few have dealt with the West Indian manatee. In most cases, airborne or waterborne noise from aircraft was the apparent stimulus. However, vision was probably involved in some cases. Variable responses to aircraft are partly a result of differences in aircraft type, altitude, and flight pattern (e.g., straight-line overflight, circling, or hovering) (Richardson et al. 1995). These factors can affect the spectral properties, temporal properties, and level of noise received by animals.

Most species of toothed whales do not appear to react to aircraft overflights, except when the aircraft fly at low altitude (below 500 feet) (Richardson et al. 1995). Beaked whales, pygmy and dwarf sperm whales, and Dall's porpoise appear to react more notably to low-level aircraft overflights than do dolphins or sperm whales. Whales that do react will dive hastily, turn, or swim away from the flight path (see below). Feeding or socializing cetaceans (whales and dolphins) are less likely to react than those engaged in other activities.

Bottlenose dolphins observed during aerial surveys from Twin Otter turboprop aircraft operating at 750 feet MSL and 110 knots revealed that this species did not react as strongly to the presence of the aircraft as did some other odontocete species. The bottlenose dolphins changed their behavior in response to overflights by this aircraft during only a relatively small proportion of the encounters (Würsig et al. 1998). They were most likely to change their behavior (usually by diving) when they were milling or

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2 Neural recordings of responses to sounds are made using electrodes implanted in the animal's brain or attached to the outside of the skull.

resting. During earlier surveys with a similar aircraft and methodology, bottlenose dolphins reacted like other small cetaceans (Mullin et al. 1991); bottlenose dolphins did not appear to react aversively to the aircraft except when its shadow passed directly over them. In this case, the dolphins would make a startled dive. These reactions are likely to be of short duration.

Manatees can also show behavioral reactions to low-flying or noisy aircraft. The "roar" of a low-flying jet fighter (type and altitude unknown) caused a resting male manatee at Crystal River to "flinch violently and dive from the surface to the bottom" (Hartman 1979). Rathbun (1988) reported that West Indian manatees were disturbed to a greater degree by a Bell 47G survey helicopter than by a Cessna 172 fixed-wing aircraft. (Both of these survey aircraft are smaller than the HH-60 and much smaller than the HC-130.) In these cases, the manatees moved from shallow to deeper waters. Rathbun's (1988) study suggests that manatee behavior may be altered in response to a helicopter flying below 330 feet if the manatees are exposed to "rotor popping" sounds. While not stated in these reports, it is likely that these behavioral reactions to overflights were transitory and there were no long-lasting behavioral or physiological effects.

Very few data on reactions of marine mammals to helicopters hovering at low altitude are available in the literature. However, based on the limited observational data, the high noise level at the surface below the helicopter, and the extended duration of exposure (relative to aircraft such as jets), behavioral reactions are expected to be stronger than to helicopters or fixed-wing aircraft engaged in overflights at higher altitude.

Acoustic Thresholds

Most of the activities conducted by the Air Force in the proposed WTA or the Avon Park helicopter AR tracks would be relatively transient from the perspective of a specific marine mammal. For most Air Force activities (except hovering helicopters), the potential source of disturbance at a given location lasts for no more than a few seconds. Also, the frequencies of occurrence and distributions of the proposed search and rescue training operations are such that any given animal would be exposed to strong noise transients only infrequently.

A few of the search and rescue training operations may result in more prolonged exposure to sounds produced by Air Force activities. For purposes of this EA, prolonged exposure is taken to be "more than a few seconds". (Frequent exposure to transient sounds, if it occurred, would fall into a similar category.) For bottlenose dolphins and manatees, prolonged activities are considered to have a potentially significant impact if the activities may exclude animals from important areas such as feeding, breeding, or nursing areas for a period of days or longer. Temporary displacement (i.e., for a period of less than one to two days) would be considered potentially significant if (1) there were risk of injury to calves and/or a risk of separating calves from their mothers, or (2) manatees were forced into colder water during times when exposure to such low temperatures threatens their survival. However, as discussed below, there is no such risk.

In this EA, strong and/or prolonged disturbance is considered to be at least potentially significant, as is Temporary Threshold Shift (TTS) in their hearing. TTS is the mildest form of hearing impairment. For sound exposures at or somewhat above the TTS threshold, hearing sensitivity recovers rapidly after exposure to the noise ends. However, momentary mild disturbance is considered to be less than significant. More specifically,

- For dolphins and manatees, exposure to prolonged activities is considered to have potentially significant impacts on individuals and potentially significant impacts on populations if the activities exclude the mammals from important areas for a period of days or longer. Temporary displacement for less than one or two days is considered to be less than significant provided there is no potential for injury, calf separation, or TTS, and provided that these incidents are infrequent for any one marine mammal.

- Exposure to brief transient sounds such as those from aircraft overflights often causes alert or startle reactions without any extended interruption of prior activities. Brief alert or startle responses are considered less than significant unless they are accompanied by other indicators of more severe disturbance.

- Cases in which the received level of transient sound is high enough to cause TTS are considered to have adverse impacts on the individuals involved (following NMFS 1995) and may be potentially significant to their populations, depending on the severity of the TTS and the status of the animals involved. However, the analysis described below indicates that the proposed activities would not cause TTS.

Table 4.11-1 shows, for dolphins and manatees, the received levels of transient and prolonged sounds at which potentially significant disturbance reactions may begin to occur. These criteria are based on the general principles outlined above. Following convention, underwater levels are quoted in decibels with respect to 1 µPa.

Table 4.11-1. Assumed Sound Pressure Criteria (dB re 1 µPa) for Disturbance and Temporary Threshold Shift (TTS) in Bottlenose Dolphin and West Indian Manatee

Criteria	*Bottlenose Dolphin*	*Manatee*
Disturbance from Prolonged Sounds in Water (dB re 1 µPa)[1]	140 [2]	120 [4]
TTS from Transient Sounds in Water (dB re 1 µPa SEL)	190 [3]	- [5]

[1]For purposes of this EA, prolonged exposure is taken to be "more than a few seconds."
[2]Based on a review of published and reported behavioral responses to anthropogenic sounds in this and related species, many of which are described in Richardson et al. (1995).
[3]Based on published threshold values for TTS in one toothed whale species (Ridgway et al. 1997) and speculative inference from in-air human TTS values (Kryter 1985, Richardson et al. 1995), plus criteria in NMFS (1995).
[4]Based on the assumption that manatees may be more sensitive to prolonged low-frequency sounds than are bottlenose dolphins, and would be no more sensitive than baleen whales (see text).
[5]Data are not available.

The levels of underwater sound obtained using the sound prediction model adopted for this EA (based on Urick 1972, Malme and Smith 1988) are maximum received root mean square (rms) sound levels (refer to Appendix A for more details). Transient sounds are often described in terms of their equivalent Sound Exposure Level (SEL). SEL refers to a cumulative exposure to sound equivalent in energy to that received during one second of exposure at the stated level. For the slow aircraft of interest in the EA, the SEL values are typically 3 to 10 dB higher than the maximum rms value because the effective sound duration is longer than 1 second. For the hovering helicopter, the sound is essentially continuous. While the measurements in air provide the effective time duration of the overflight, the underwater sound duration does not directly follow the same time history because of the multipath contributions of the direct-refracted path and the laterally transmitted path. The sound prediction model is a frequency domain model and is not capable of estimating the time-spread due to multipath.

Because of the two factors discussed above, the maximum rms sound level reached at a given receiving point is considered the most relevant output of the model. This output can then be applied independent of the temporal nature of the source.

It is assumed that dolphins exposed to prolonged sounds at received levels of 140 dB re 1 µPa or above may show avoidance. There is no general consensus on an appropriate response criterion for this situation. However, based on the literature reviewed in Richardson et al. (1995), it is apparent that most small toothed whales exposed to prolonged or repeated underwater sounds are unlikely to be displaced unless the overall received level is at least 140 dB re 1 µPa. Ridgway et al. (1997) found that captive bottlenose dolphins exposed to 1-second pulses of sound did not show strong behavioral reactions unless the received level was at least 178 to 186 dB re 1 µPa, depending on frequency and individual animal.

It is assumed that manatees exposed to prolonged sounds at received levels of 120 dB re 1 µPa or above may show avoidance. There is no specific information regarding received levels of prolonged underwater sounds that elicit behavioral responses by manatees. Given the manatee's apparently superior low-frequency hearing abilities, and the predominance of low frequency energy in the spectra of both the HH-60 and HC-130 aircraft, manatees might show avoidance when exposed to received levels lower than those eliciting behavioral reactions in the bottlenose dolphin. However, it is unlikely that manatees would be any more sensitive than baleen whales, for which a 120 dB re 1 µPa disturbance criterion is often assumed. The 120 dB threshold is considered a conservative (i.e., probably low) estimate of the level of prolonged underwater sound that could elicit behavioral disturbance in manatees.

4.11.3.1 Water Training Areas

The following subsections address the potential for impacts of anthropogenic sounds, lightsticks, flares and sea dye markers on marine mammals within the proposed and alternative WTAs resulting from HH-60 and HC-130 search and rescue training operations.

Impacts of the Overflight of an HC-130 at 1,000 Feet MSL

The predicted underwater sound levels resulting from the overflight of an HC-130 aircraft transiting the ocean at 1,000 feet above mean sea level (MSL) (note that the terminology "MSL" is used in this EA to indicate altitude above the water's surface) and low speed would be relatively low. Directly under the flight path at a depth of 1 foot, the maximum level in any 1/3-octave band (the one centered at 80 Hz; refer to Appendix A) would be about 110 dB re 1 µPa. The maximum overall level would be about 112-115 dB (Figure 4.11-2). The highest levels would be at low frequencies (<200 Hz). At almost all frequencies the sound levels would decline at increasing lateral distances from the aircraft's track. Received sound levels would also diminish with increasing depth in the water. In addition, at any location, underwater sounds originating from the aircraft would decline rapidly after the aircraft has passed. By comparing the estimated sound levels of an overflight at 1,000 feet MSL with those at 250 feet MSL (see next section), the decrease in received sound level with increasing aircraft altitude is apparent.

Given the hearing abilities of the bottlenose dolphin and manatee (see previous subsection), it is likely that both species would hear the sounds from a direct overflight at 1,000 feet MSL by an HC-130 aircraft. Both species would hear the sound components above a few hundred hertz, and the manatee would hear the lower frequency components as well (see Figure 4.11-2). However, the overall as well as the 1/3-octave received levels of these sounds would be less than the disturbance criteria listed in Table 4.11-1, and would not likely result in a behavioral disturbance even upon prolonged exposure. In this case, the sound would be transient, not prolonged. TTS would not occur. Dolphins might dive if the shadow of the aircraft crossed their position, but this occurrence would be rare and this transitory response would have no lasting consequences. Therefore, the impacts, if any, of an HC-130 aircraft overflight at 1,000 feet MSL would not be significant at individual or population levels for bottlenose dolphins or manatees.

Impacts of the Overflight of an HC-130 at 250 Feet MSL

The predicted underwater sound levels resulting from the overflight of an HC-130 aircraft transiting the ocean at 250 feet MSL and low speed would be relatively low. Directly under the flight path at a depth of 1 foot, the maximum level in any 1/3-octave band (the one centered at 80 Hz; refer to Appendix A) would be about 121 dB re 1 µPa. The maximum overall level would be about 126-127 dB (Figure 4.11-3). The highest levels would be at low frequencies (<200 Hz). At almost all frequencies the sound levels would decline at increasing lateral distances from the aircraft's track, and the decline with increasing lateral distance would be more rapid than for overflights at higher altitudes (see Figure 4.11-2). The track width at which 1/3-octave sound levels would exceed 120 dB re 1 µPa extends out to 200 feet for some of the lower frequencies. Received sound levels would also diminish with increasing depth in the water. In addition, at any location, underwater sounds originating from the aircraft would decline rapidly after the aircraft has passed.

Given the hearing abilities of the bottlenose dolphin and manatee, it is likely that both species would hear sounds from a direct overflight at 250 feet MSL by an HC-130 aircraft. Both species would hear the sound components above a few hundred hertz, and the manatee would hear the lower frequency components as well (see Figure 4.11-3). Because the overall as well as the 1/3-octave received levels of these sounds could exceed the disturbance criteria for manatees listed in Table 4.11-1, this overflight could result in a behavioral disturbance for this species. Because the manatees exposed to sound levels high enough to exceed the disturbance criterion would likely move away from the area rapidly, the

Figure

4.11-2 Predicted underwater sound levels (1-foot depth) during an overflight by an HC-130 aircraft at 1,000 feet MSL and low speed (140 knots) presented as a set of 1/3-octave spectra for various ranges. The audiograms of the bottlenose and manatee are also shown.

Figure

4.11-3 Predicted underwater sound levels (1-foot depth) during an overflight by an HC-130 aircraft at 250 feet MSL and low speed (140 knots) presented as a set of 1/3-octave spectra for various ranges. The audiograms of the bottlenose dolphin and manatee are also shown.

disturbance would be transitory. The aircraft's sound would be transient, not prolonged, and TTS would not occur. Dolphins might dive if the shadow of the aircraft crossed their position, but this occurrence would be rare and this transitory response would have no lasting consequences. Therefore, the impacts, if any, of an HC-130 aircraft overflight at 250 feet MSL would not be significant at individual or population levels for bottlenose dolphins or manatees. Because the impacts of an overflight at 250 feet MSL are not significant, they would not be significant for overflights at greater altitude.

Impacts of the Overflight of an HH-60 at 1,000 Feet MSL

Similar to the HC-130 overflights at 1,000 feet MSL, the predicted underwater sound levels at 1-foot depth resulting from the overflight of an HH-60 helicopter transiting the ocean at 1,000 feet MSL and 120 knots would be relatively low—less than 100 dB re 1 µPa in any 1/3-octave band above 40 Hz directly under the helicopter's track (Figure 4.11-4). Only at very low frequencies (≤20 Hz) would the predicted 1/3-octave sound level reach as high as 110 dB re 1 µPa directly under the helicopter's track. The overall level would not exceed 114 dB re 1 µPa. The sound levels generally decline at increasing lateral distances from the helicopter's track. Received sound levels would also diminish with increasing depth in the water. In addition, at any location, underwater sounds originating from the helicopter would decline rapidly after the helicopter has passed. By comparing the estimated sound levels of an overflight at 1,000 feet MSL with those at 100 feet MSL (described below), the decrease in received sound level with increasing aircraft altitude is apparent.

Given the hearing abilities of the bottlenose dolphin and manatee, it is likely that both species would hear sounds from an HH-60 overflight at 1,000 feet MSL. However, these sounds would not be injurious (e.g., much less than that required to produce TTS) and, based on the criteria in Table 4.11-1, would not likely result in behavioral disturbance. As noted previously, dolphins will dive in response to the shadow of an aircraft crossing their position, but as for the HC-130 overflight at 1,000 feet MSL, this occurrence would be very rare and the response would likely be transitory. Therefore, the impacts, if any, of an HH-60 helicopter overflight at 1,000 feet MSL would not be significant at individual or population levels for bottlenose dolphins or manatees.

Impacts of the Overflight of an HH-60 Helicopter at 100 Feet MSL

The predicted underwater sound levels at 1-foot depth resulting from the overflight of an HH-60 helicopter transiting the ocean at 100 feet MSL would be higher than those at 1,000 feet MSL. One-third octave levels would be about 112-118 dB re 1 µPa directly under the helicopter's track for most of the lower frequencies (Figure 4.11-5). At very low frequencies (<20 Hz) the predicted 1/3-octave sound level could reach as high as 129 dB re 1 µPa directly under the helicopter's track. The overall level would be as high as 132 dB re 1 µPa directly below the helicopter. As expected, at almost all frequencies the sound levels decline at increasing lateral distances from the aircraft's track. The track width at which 1/3-octave sound levels would exceed 120 dB re 1 µPa extends out to 250 feet for some of the lower frequencies.

Figure

4.11-4 Predicted underwater sound characteristics (1-foot depth) of the overflight of an HH-60 helicopter at 1,000 feet MSL, and at a speed of 120 knots presented as a set of spectra vs. range curves. The audiograms of the bottlenose dolphin and manatee are also shown.

Figure

4.11-5 Predicted underwater sound characteristics (1-foot depth) of the overflight of an HH-60 helicopter at 100 feet MSL, and at a speed of 70 knots presented as a set of spectra vs. range curves. The audiograms of the bottlenose dolphin and manatee are also shown.

Given the hearing abilities of the bottlenose dolphin and manatee, both species would hear sounds from the low-altitude HH-60 overflight. These sounds would not be injurious (e.g., much less than that required to produce TTS). Based on the criteria in Table 4.11-1, they may cause behavioral disturbance to manatees at a maximum distance of 250 feet laterally from the helicopter track. Because the manatees exposed to sound levels high enough to exceed the disturbance criterion would likely move away from the area rapidly, the disturbance would be transitory. As noted previously, dolphins will dive in response to the shadow of an aircraft crossing their position, but as for the other operations this occurrence would be very rare and the response would likely be transitory. Thus, the impacts, if any, of an HH-60 overflight at 100 feet MSL would not be significant at individual or population levels for bottlenose dolphins or manatees. Because impacts of an overflight at 100 feet MSL are not significant, impacts of overflights at higher altitude would not be significant.

Impacts of an HH-60 Helicopter Hovering at 10 Feet MSL

The predicted underwater sound levels resulting from the stationary hover of an HH-60 helicopter at 10 feet MSL would be higher than during transit flights at 100 feet or greater. The overall predicted underwater sound levels would be about 146-147 dB re 1 μPa directly under the helicopter (Figure 4.11-6). One-third octave levels would be about 130-136 dB re 1 μPa below the helicopter across a range of frequencies. At very low frequencies (<20 Hz) the predicted 1/3-octave sound level could reach as high as 143 dB re 1 μPa directly under the helicopter. As expected, at almost all frequencies the sound levels decline at increasing lateral distances from the helicopter's position. The distance at which 1/3-octave sound levels would exceed 120 dB re 1 μPa extends out to 100 feet for some of the lower frequencies.

Given the hearing abilities of the bottlenose dolphin and manatee, there is no doubt that both species would hear sounds from the hovering HH-60. However, even at the relatively high predicted sound levels, these sounds would be non-injurious (e.g., less than that required to produce TTS). Based on the criteria in Table 4.11-1, a hovering HH-60 is likely to cause behavioral disturbance to manatees at a maximum distance of 100 feet and for dolphins immediately under the helicopter. Because both dolphins and manatees exposed to sound levels high enough to exceed the disturbance criteria would likely move away from the area rapidly, the disturbance would be transitory. Therefore, the impacts, if any, of an HH-60 helicopter hovering at 10 feet MSL would not be significant at individual or population levels for bottlenose dolphins or manatees.

Impacts of Exposure to Lightsticks

Lightsticks are small, plastic chemiluminescent devices that would be used as portable light sources during operations after dark in the WTA. A total of 11,006 lightsticks would be dropped annually within the WTA. As described in Section 3.3 (Waste Management), Navy, Air Force, and Coast Guard groups operating within the Gulf use lightsticks during some of their training and rescue operations. Commercial fishermen also use lightsticks to mark their longlines, but these operations occur on the shelf edge or south of the study area, and are conducted in areas where water depths are greater than 50 fathoms (300 feet). Given the distance of these fishing operations from the WTA, it is very unlikely that

Figure

4.11-6 Predicted underwater sound characteristics (1-foot depth) of a hovering HH-60 helicopter at 10 feet MSL presented as a set of spectra vs. range curves.

lightsticks deployed in these offshore areas would drift into the WTA and be encountered by dolphins or manatees there.

Lightsticks contain two solutions which, when mixed together by breaking two small glass ampoules within the plastic casing, produce a light with little or no heat by-product. The constituents of these solutions do not meet the criteria for a listed hazardous waste, although hydrogen peroxide, one of the constituents, is an irritant to mammalian skin and mucous membranes at high concentrations. It is unlikely that contact with the spent lightsticks would result in exposure to the chemical contents as the housing is a tough, pliable plastic. If the casing were broken, either through degradation over time or physical destruction (such as a bottlenose dolphin or manatee chewing through the casing during play or feeding), the enclosed small quantity of chemicals would disperse rapidly. The compounds within the spent lightsticks are relatively inert, and those (such as hydrogen peroxide) within unspent lightsticks are not present in sufficient quantities to cause more than short-term, localized irritation to mucous membranes of the mouth or eyes.

While there might be some risk of injury to marine mammals if they ingested the sharp plastic or glass shards of a broken lightstick, this would be an unlikely event due to the large area over which lightsticks are released. There are no records of dolphin or manatee deaths resulting from ingestion of lightsticks and ingestion of foreign objects by cetaceans in the wild does not appear to be a common occurrence (Tarpley and Marwitz 1993).

Beck and Barros (1991) examined 439 manatee carcasses salvaged from 1978 to 1986. Only 63 (14.4 percent) had debris in their gastrointestinal tracts and they speculated that 4 (0.9 percent) might have died as a result of debris ingestion. Fishing line was by far the most common type of man-made debris in the gastrointestinal tracts, with plastic bags and a wide variety of other items also recovered. Vessel collisions remain the greatest identifiable cause of manatee mortality in Florida (Hartman 1979, Beck and Barros 1991).

The major type of bottlenose dolphin mortality in the Gulf of Mexico appears to be natural, rather than a result of human activities (Miller 1992, NMFS 1999).

Impacts of Exposure to Flares and Sea Dye Markers

Approximately 2,545 flares would be used annually in the proposed WTA during search and rescue training activities. No non-military uses of flares are anticipated in the area, although commercial and recreational vessel operators might use flares for detection during an emergency. Navy, Air Force, and Coast Guard groups may occasionally use flares during training and rescue operations in the Gulf. Toxicity is not a concern with flares because the primary material in flares, magnesium, is not highly toxic (Air Force 1997b). There have been no documented reports of wildlife consuming flare materials, and it is unlikely that bottlenose dolphins or manatees would ingest these materials. The probability of injury from falling dud flares and debris would be extremely remote. Although impulse cartridges and squibs used in some flares contain chromium and lead, a screening health risk assessment concluded that they do not present a significant health risk in the environment (Air Force 1997b) in the quantities that would be used in the WTA.

Bottlenose dolphins or manatees could ingest flare debris with food. This scenario is unlikely, and any effects of such ingestion are likely to be short-term and unlikely to cause serious internal damage to digestive organs. Contact with flare debris is unlikely to cause injury to skin or eyes because contact would not be prolonged and the materials contained in spent flares is biologically inert. Flare debris would be encountered in very small quantities and, aside from a small amount of wood debris (i.e., from the MK6), would sink in oceanic waters (particularly the aluminum housing of the MK25). The impacts of flares on bottlenose dolphins and manatees are considered not significant.

During search and rescue training operations in the proposed WTA, the rescue squadrons would deploy plastic bags of brightly-colored fluorescein dye to provide visual reference during marine operations. The sea dye is contained in a plastic bag, approximately the length and width of a piece of letter-format paper, that would be dropped from an aircraft at an altitude greater than 50 feet. Upon impact the bags burst and the dye is dispensed into the water. At dilute concentrations the dye itself is relatively inert. A bowhead whale (*Balaena mysticetus*) calf has been observed orienting to and playing for an extended period (22 minutes) within an area colored by fluorescein dye (Würsig et al. 1985) so for this animal the dilute dye did not appear to be particularly noxious.

The plastic bags associated with dye markers may sink to the bottom or remain on the surface of the water and drift toward shore, causing a potential ingestion hazard for dolphins and manatees. In a study of manatee carcasses recovered along the Florida coast, Beck and Barros (1991) reported that only 0.9 percent (4 animals) might have died as a result of debris ingestion. Only a small proportion of the debris found in the gastrointestinal tracts was plastic fragments or plastic bags. Ingestion of foreign objects, including plastic bags, by cetaceans in the Gulf of Mexico does not appear to be a common occurrence based on analysis of the stomach contents of stranded animals (Tarpley and Marwitz 1993).

It is possible that the plastic bags used to dispense sea dye might pose a potential ingestion hazard for bottlenose dolphins and manatees. However, the evidence to date does not suggest that the risk to these marine mammals from exposure to these bags is high. These sea dye bags probably represent a small fraction of the total man-made plastic debris to which these two species have been and will be exposed. The impacts of sea dye bags on bottlenose dolphins and manatees would not be significant.

No-Action Alternative

Under the No-Action Alternative, a WTA would not be established in the Gulf of Mexico for search and rescue training operations by HH-60 and HC-130 aircrews. Therefore, existing marine resources, as described in Section 3.11, would not be affected.

4.11.3.2 FORT STEWART HELICOPTER AR TRACKS

The proposed FS-AR1 and alternative FS-AR2 are located entirely over land and no marine biological resources occur beneath these tracks.

4.11.3.3 WATER TRAINING AREA HELICOPTER AR TRACKS

The proposed WTA-AR1 and alternative WTA-AR2 are located entirely over land and no marine biological resources occur beneath these tracks.

4.11.3.4 AVON PARK HELICOPTER AR TRACKS

The following subsection addresses the potential for impacts from man-made sounds and fuel spills on marine mammals beneath the proposed and alternative Avon Park helicopter AR tracks resulting from HH-60 and HC-130 refueling operations.

Impacts of the Overflight of an HC-130 Aircraft and an HH-60 Helicopter at 1,000 Feet MSL During Refueling

The predicted underwater sound levels at 1-foot depth resulting from the simultaneous overflight of an HC-130 aircraft and an HH-60 helicopter refueling at 1,000 feet MSL would be relatively low. Directly under the flight path the maximum level in any 1/3-octave band (the one centered at 80 Hz) would be about 110 dB re 1 µPa. The maximum overall level would be about 115 dB (Figure 4.11-7). The highest levels would be at low frequencies (<200 Hz). At almost all frequencies the sound levels would decline at increasing lateral distances from the aircrafts' track. Received sound levels would also diminish with increasing depth in the water. In addition, at any location, underwater sounds originating from the pair of aircraft would decline rapidly after the aircraft have passed.

Given the hearing abilities of the bottlenose dolphin and manatee, it is likely that both species would hear sounds from the HC-130 and HH-60 refueling overflights. However, these sounds would not be injurious (e.g., much less than required to produce TTS) and, based on the criteria in Table 4.11-1, would not likely result in a behavioral disturbance. As noted previously, dolphins will dive in response to the shadow of an aircraft crossing their position, but as for the other operations this occurrence would be very rare and the response would likely be transitory. Thus, the impacts, if any, of an HC-130 and HH-60 refueling overflight at 1,000 feet MSL would not be significant at individual or population levels for bottlenose dolphins or manatees. Because the impacts of a refueling flight at 1,000 feet MSL are not significant, they would not be significant for overflights at greater altitudes (e.g., at 2,000 feet MSL).

Impacts of Exposure to Fuel Spills from Aerial Refueling Operations

Only about 18 aerial refueling operations per year are anticipated on the Avon Park AR track. Although highly unlikely, it is possible that marine mammals might be exposed to jet fuel lost from a ruptured fuel line during aerial refueling operations in the helicopter AR tracks. Fuel spills resulting from HH-60 helicopter aerial refueling operations could occur when the fuel hose is cut; however, the Air Force has conducted in-flight refueling of helicopters for many years, and no documented fuel spills have occurred (Air Force Safety Center 1999) (refer to Section 4.4, Safety). Although the refueling aircraft are equipped with automated emergency shutoff valves, there is still a possibility that some fuel might be lost through accidental rupture of a fuel line during in-flight operations.

If a fuel spill occurred, it would be small, and it is extremely unlikely that any bottlenose dolphin or West Indian manatee would be exposed to the volatile fractions as most of this fuel evaporates before it reaches the sea surface. As this fuel disperses and falls towards the sea surface, a significant fraction is lost to evaporation before it reaches the water. Available literature provided no quantifiable estimates of this evaporation and dispersion, so the Fuel Jettison Simulation (FJSIM) model (Version 1.0, 1996) was used to approximate a release of jet fuel from a cut fuel hose. In the unlikely event of a hose rupture,

Figure

4.11-7 Predicted underwater sound characteristics (1-foot depth) of the overflight of an HC-130 aircraft and an HH-60 helicopter during refueling operations at 1,000 feet MSL presented as a set of spectra vs. range curves. The audiograms of the bottlenose dolphin and manatee are also shown.

approximately 13 gallons of fuel could reach the surface and would be spread out over an area of approximately 31 acres (for a description of modeling assumptions and results, refer to Section 4.4, Safety).

Potential Impacts of a Refueling Spill on Bottlenose Dolphins

Although scientific literature on the topic is relatively limited, it appears that cetaceans are not greatly susceptible to the effects of aviation fuel. Oiling of their external surface with heavier petroleum hydrocarbons does not appear to have any adverse thermo-regulatory effects (Geraci 1990). Dolphins do not rely on external pelage for insulation. However, weak or highly stressed individual dolphins or manatees may be more vulnerable to the effects of fuel. Population-level effects are not expected, as no significant long-term and lethal effects from external exposure, ingestion, or bioaccumulation of small amounts of oil have been demonstrated (Geraci 1990).

Even in the cases of vastly larger petroleum spills, including the much-studied Santa Barbara (California) and Exxon Valdez (Alaska) spills, there is no firm evidence that implicates the oil spills in causing the death in Alaska of cetaceans (Geraci 1990; Loughlin 1994), although some killer whales in Prince William Sound may have either left the area or died following the spill. The unusually high counts of dead marine mammals recorded after these spills likely represented increased survey effort (Geraci 1990).

Avoidance and Behavioral Effects. Studies on both captive and wild cetaceans indicate that they can detect oil spills. Captive bottlenose dolphins could detect (visually or through skin contact) and avoid very thin oil films (including colorless mineral oil) in test enclosures (St. Aubin et al. 1985; Geraci 1990).

Wild bottlenose dolphins exposed to the Mega Borg oil spill in 1990 (Gulf of Mexico) appeared to detect, but did not consistently avoid, contact with most oil types (Smultea and Würsig 1995). This is consistent with observations of other cetaceans behaving normally in the presence of spilled oil (Harvey and Dahlheim 1994; Matkin et al. 1994). It is possible that cetaceans continue to swim through oil because of an overriding behavioral motivation (e.g., feeding). There are some reports that indicate that dolphins attempt to minimize contact with surface oil by decreasing their respiration rate and increasing dive duration (Smultea and Würsig 1995).

Effects of Fuel Contacting External Surfaces. Bottlenose dolphins rely on a layer of blubber for insulation and contact with jet fuel would have little if any effect on their ability to thermoregulate. Effects of oiling on cetacean skin appear to be minor and of little significance to the animal’s health. Although Geraci (1990) applied gasoline-soaked pads to the skin of captive dolphins for up to 75 minutes there were no short or long term physiological reactions; in contrast to similar tests with human subjects, the thickened epidermis of the bottlenose dolphin safeguards the protective lipids within the epidermal matrix from being solubilized and removed. Even after contact with gasoline for up to 16 hours, there was no change in the lipid concentration in the underlying skin cells of Pacific white-sided dolphins (Geraci and St. Aubin 1985). It can be assumed that, if jet fuel contacted the eyes, effects would be similar to those observed in ringed seals (conjunctivitis, corneal abrasion, and swollen nictitating membranes), but that long-term exposure would be needed to cause permanent damage (St. Aubin 1990).

Thus contact with jet fuel is unlikely to cause injury to dolphin skin or eyes unless contact is prolonged. Prolonged exposure is not expected in the case of the relatively small quantities of jet fuel that might reach the surface following release during aerial refueling. Some cetaceans appear to be able to detect and avoid oil, but the fact that they do not usually do so suggests that the oil is not causing immediate irritation.

Effects of Direct and Indirect Fuel Ingestion. Bottlenose dolphins could ingest spilled fuel directly, or indirectly by eating contaminated prey. Such effects are likely to be short-term and are unlikely to cause serious internal damage. If fuel spills occurred along the helicopter AR tracks, they would be relatively small, and small amounts of ingested petroleum hydrocarbons are not highly toxic. Also, aviation fuels are volatile. The low molecular weight fractions to which mammals are more sensitive are the fractions that evaporate most rapidly both before and after the fuel falls to the surface of the water, and the highly-dispersed fuel that does reach the surface would not remain on the sea surface for long.

Bottlenose dolphins could ingest a small amount of spilled jet fuel with contaminated food or with water (although dolphins and manatees apparently drink only limited amounts of water). It could also be absorbed through the respiratory tract if the animals inhale volatile compounds from a surface fuel slick. Dolphins that consume heavy oil void it in vomit or feces, or metabolize it at rates that prevent significant bioaccumulation. When returned to clean water, such contaminated animals can excrete this internal oil (Engelhardt 1978, 1982). Only small traces of oil were found in the liver of a killer whale exposed to the large amount of heavy oil spilled from the Exxon Valdez (Bence and Burns 1995). The jet fuel that bottlenose dolphins might encounter after an aerial refueling spill along the helicopter AR tracks is much lighter and would dissipate in the environment so rapidly that it is highly unlikely that a dolphin would consume a quantity sufficient to cause morbidity.

If dolphins inhaled the volatile fraction of freshly spilled fuel, they could suffer from irritated mucous membranes in the eyes, nares (equivalent to the human nostrils), and lungs. With prolonged exposure, some hydrocarbon compounds could be absorbed through the respiratory membranes, possibly causing toxic effects (Geraci 1990). However, the volatile components are dispersed rapidly relative to heavier, less noxious, components of the fuel (see the fuel spill simulation results earlier). Further, because some evidence suggests that dolphins attempt to minimize contact with surface oil by decreasing their respiration rate and increasing dive duration (Smultea and Würsig 1995), this would limit respiratory exposure to any spilled jet fuel.

Thus a small fuel spill such as might occur as a result of a fuel hose rupture during aerial refueling would likely have no effects on the behavior or distribution of bottlenose dolphins. If these animals were displaced through avoidance of contact with the spilled fuel, the fuel would soon dissipate, allowing the dolphins to return. There is no evidence that contact with jet fuel would have adverse physiological effects unless consumed in improbable quantities and/or contacted for prolonged periods. Because this species is normally found in groups of less than 30 (Mullin et al. 1994), which move almost continually, any single fuel spills would have minimal effects, if any, on only a small number of dolphins. Given the small size and infrequent nature of accidental fuel spills during refueling, it is very unlikely that the same dolphin would be exposed to more than one of these spills. Therefore, effects of a fuel spill during refueling would be brief, localized, and are not considered significant either at the individual or population level.

Potential Impacts of a Refueling Spill on Manatees

Unlike bottlenose dolphins, manatees are slow-moving herbivores, which spend most of their time relatively close to shore. Manatees do not rely on external pelage for insulation, and often occupy canals and inland waterways where they are exposed to petroleum products from recreational and industrial sources with no apparent adverse effects. Most confirmed manatee mortality has come from either boat strikes, or to a lesser extent, entanglement in discarded monofilament fishing line (Beck and Barros 1991). There have been no studies demonstrating any relationship between manatee mortality in Florida and oil spills (St. Aubin and Lounsbury 1990).

Avoidance and Behavioral Effects. Given their olfactory anatomy, it is likely that manatees could smell spilled jet fuel. However, it is not clear that they could or would move away (especially from feeding areas) even if they did detect the fuel. They require warm waters for thermoregulation and, to maintain their energy balance, they must consume a significant proportion of their body mass each day in plants gathered in shallow waters. However, it is unlikely that an aerial fuel spill would occur in such a nearshore area frequented by manatees.

Effects of Fuel Contacting External Surfaces. It is likely that the thick, tough skin of manatees has similar (or better) resistance to hydrocarbon exposure as has been demonstrated experimentally for dolphins. Exposure to spilled jet fuel might irritate the manatees' eyes and mucous membranes (lungs). However, based on studies of other types of mammals and based on the small amount of fuel likely to be encountered, it is unlikely that any serious effects would occur (St. Aubin and Lounsbury 1990).

Effects of Direct and Indirect Fuel Ingestion. Manatees might ingest small amounts of spilled jet fuel as they feed at or near the surface. It is not specifically known what effects this might have on manatees, but based on studies of other mammals, serious effects are not expected. It is also unlikely that an aerial fuel spill would occur in a nearshore area frequented by manatees, or would contact the benthic-growing eelgrass beds usually preferred by feeding manatees (e.g., Hartman 1979). Researchers (Geraci and St. Aubin 1980) have speculated that ingested hydrocarbons (e.g., oil) might interfere with the manatees' unique gastric glands or harm intestinal flora vital to digestion, but this is unconfirmed. Most manatees are larger than bottlenose dolphins, so the presumed amount of jet fuel needed to cause morbidity or mortality (see assumptions above) would be even greater (and unlikely).

Thus a small fuel spill such as might occur as a result of a fuel hose rupture during aerial refueling would likely have no effects on the behavior or distribution of West Indian manatees. Even if these animals were displaced through avoidance of contact with the spilled fuel, the fuel would soon dissipate, allowing the manatees to return. There is no evidence that contact with jet fuel would have adverse physiological effects unless consumed in improbable quantities and/or contacted for improbably prolonged periods. There is speculation that consumption of heavier hydrocarbons could have impacts on the functioning of the manatees' digestive system, but this has not been tested and might not be relevant to the much lighter components of jet fuel. Because this species is normally found singly or in small groups (Hartman 1979, Rathbun 1988), any single fuel spills would have minimal effects, if any, on only a small number of manatees. Given the small size and infrequent nature of fuel spills during refueling, it is very unlikely that the same manatee would be exposed to more than one of these spills. Therefore, effects of a fuel spill during refueling would be brief, localized, and are not considered significant either at the individual or population level.

No-Action Alternative

Under the No-Action Alternative, neither the proposed nor alternative Avon Park helicopter AR track would be established. Therefore, existing marine resources, as described in Section 3.11, would be unaffected.

4.11.3.5 CREW SWAP FACILITIES

The proposed and alternative aircrew swap facilities are located on land and no marine biological resources are associated with these locations.

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5.0 CUMULATIVE EFFECTS

This section provides: 1) a definition of cumulative effects, 2) a description of past, present, and reasonably foreseeable actions relevant to cumulative effects, 3) an assessment of the nature of interaction of the proposed action with other actions, and 4) an evaluation of cumulative effects potentially resulting from these interactions.

5.1 DEFINITION OF CUMULATIVE EFFECTS

Council on Environmental Quality (CEQ) regulations stipulate that the cumulative effects analysis within an environmental assessment (EA) should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 Code of Federal Regulations [CFR] 1508.7). Recent CEQ guidance in *Considering Cumulative Effects* affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the proposed action (CEQ 1997). The scope must consider geographic and temporal overlaps among the proposed action and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than those more geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects.

To identify cumulative effects the analysis needs to address three fundamental questions:

1. Does a relationship exist such that affected resource areas of the proposed action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?

2. If one or more of the affected resource areas of the proposed action and another action could be expected to interact, would the proposed action affect or be affected by impacts of the other action?

3. If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

5.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA, the region of influence (ROI) delimits the geographic extent of the cumulative effects analysis. The ROI includes the horizontal boundaries of the airspace used for training, as well as the land and water areas overflown by aircraft using the proposed water training area (WTA) and helicopter air refueling (AR) tracks. Though implementation of the proposed action would have no impact upon Moody Air Force Base (AFB) or its local environs, the base is included in the cumulative effects analysis to assess combined airfield operations impacts of the proposed action with other reasonably foreseeable actions at the base. Actions not occurring within or adjacent to the ROI are not considered for cumulative effects analysis. The time frame for cumulative effects centers on the timing of the proposed action. For the proposed action, the time frame starts in January 2000 and would continue into the foreseeable future.

Another factor influencing the scope of cumulative effects analysis involves identifying other actions to consider. Beyond determining that the geographic scope and time frame for the actions interrelate to the proposed action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions included notices of intent for environmental impact statements (EISs) and EAs, management plans, land use plans, other National Environmental Policy Act (NEPA) studies, and economic and demographic projections.

5.3 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Numerous other activities exist in the ROI. The activities described here are by no means inclusive, but serve to highlight some major influences in the region and to provide perspective on the contribution to any impacts generated by the proposed action.

5.3.1 Past and Present Actions at Moody AFB Relevant to the Proposed Action

In 1998, the Air Force made the decision to implement the following force structure changes at Moody AFB: 1) drawdown 24 A/OA-10 aircraft and 563 personnel, and inactivate the 70th Fighter Squadron (70 FS); 2) beddown an Introduction to Fighter Fundamentals (IFF) pilot training program, the associated 57 T-38C aircraft and 408 personnel, and build and renovate facilities required to accommodate the IFF program; and 3) beddown six additional HH-60 helicopters and 168 personnel into the 41st Rescue Squadron (41 RQS). An EA was prepared to assess the force structure actions and a Finding of No Significant Impact (FONSI) was signed on September 23, 1998.

The findings of the EA included no significant impacts to affected airspace. In addition, while implementation of the action would result in long-term increases of mobile source emissions, these increases would not produce long-term air quality degradation. Noise levels in the immediate vicinity of the base would increase over baseline levels; expansion of noise contours would occur in predominantly unpopulated areas. Noise levels under the airspace units would not change significantly from current conditions. Aircraft overflights would be of short duration and would not significantly affect visual or recreational settings. Hazardous waste generation on base would increase due to the addition of 57 T-38C aircraft and HH-60 helicopters, but this increase would be controlled and managed through existing hazardous waste management policies and procedures. No hazardous wastes would be generated at the range or beneath associated airspace areas. Geological resources, water resources, biological resources, and cultural resources would not be significantly impacted. Construction activities would occur within developed areas on base.

Ground disturbance off base would be limited to Grand Bay Range, which is currently approved for munitions training. Wildlife occurring under the Military Training Routes (MTRs), Military Operation Areas (MOAs) and the Moody Low Altitude Tactical Navigation (LATN) area is already subject to noise from military aircraft and would not be adversely affected. Base personnel would increase by 14 people, and the existing housing in the region would accommodate these personnel and associated dependents. Sufficient infrastructure and service capacity, including roadway capacity, exists in the ROI to accommodate potential growth resulting from implementation of the force structure actions. Regional economic activity would increase slightly as a result of the proposed action.

5.3.2 Reasonably Foreseeable Actions at Moody AFB

The following proposals are currently under consideration by the Air Force. Separate NEPA review of each would be conducted before implementation of these proposed actions.

- *Beddown of the 820th Security Forces Group (820 SFG)* – In accordance with the fiscal year (FY) 1999 Force Structure Announcement, the 820 SFG would be relocated to Moody AFB. Over 600 personnel authorizations would be reassigned to the base. The mission of the 820 SFG is to provide trained, equipped, and deployable force protection forces to meet Air Force requirements in support of Combat Air Forces.

- *Drawdown of F-16 Aircraft* – The Air Force is planning force structure changes to streamline fighter squadron operations. Beginning in FY 2001, Moody AFB would lose 36 F-16 Block 40 primary aircraft inventory (PAI) aircraft and approximately 1,259 military manpower authorizations. This action would affect the airspace environment. The departing F-16 aircraft and personnel would be reassigned throughout the Air Force as required. In conjunction with the departure of the last F-16 aircraft, the 347th Wing will convert to a combat search and rescue wing.

- *Establishment of Joint Primary Aircraft Training (JPATS) Course* – This would result in changes in PAI, aircraft operations, and personnel. Moody AFB would receive 45 T-6A aircraft and approximately 400 new personnel. This proposed action would add about 100 average daily sorties at Moody AFB and T-6A aircrews would conduct sortie-operations within the Moody LATN area; Moody 1, Moody 3, and Live Oak MOAs; and along MTRs including visual route (VR)-1065 and VR-1066. Several new buildings would be constructed along with renovations to existing buildings as part of the proposed action at Moody AFB.

Other Reasonably Foreseeable Actions near Moody AFB

Levi Strauss & Company, the sixth largest employer in Lowndes County, recently announced the closure of its Valdosta facility, resulting in the loss of 900 local jobs. In addition, Dollar General Stores has announced plans to move its distribution center to Florida, which will result in the loss of 500 additional jobs (Georgia Department of Labor 1999). The loss of these jobs would likely be offset by steady industrial and commercial growth in Lowndes County. The other major employers in the county are Moody AFB, South Georgia Medical Center, Valdosta State University, Lowndes County School System, and Valdosta City School system. Lowe's Distribution Center is expanding operations and will employ more than 350 people and Sterling Pulp Chemicals recently completed a new facility which will employ 25 people.

5.3.3 Other Federal Actions

Federal agency actions relevant to the ROI include those of the Ballistic Missile Defense Organization (BMDO), Air Force, U.S. Navy (Navy), U.S. Army (Army), U.S. Coast Guard (Coast Guard), and Federal Aviation Administration (FAA).

5.3.3.1 BALLISTIC MISSILE DEFENSE ORGANIZATION

BMDO has used and will continue to use the Gulf of Mexico for testing and the Eglin Gulf Test Range (EGTR) to conduct Theater Missile Defense (TMD) testing of missile interceptor systems. While missile testing adds debris to the marine environment, the airspace is approximately 50 miles southwest of the proposed WTA. The contribution of TMD testing and training activities in the EGTR to cumulative effects is small compared to existing activities. This is due to the limited number of actual test events and the short duration of these events. In addition, the type of debris is very different than that which would be generated by the proposed action; TMD debris consists mainly of metallic objects that sink in the ocean environment.

5.3.3.2 AIR FORCE

The Air Force has used and will continue to use the Gulf of Mexico to conduct test and training operations. Specifically, the Air Force conducts operations at Tyndall AFB, near Panama City, Florida, and MacDill AFB, near Tampa, Florida. MacDill AFB has an instrument route (IR) located near Avon Park AFR.

EGTR, encompassing 130,000 square miles of airspace over the Gulf of Mexico, is scheduled and operated by Eglin AFB for testing and training operations. Eglin AFB actively plans to reduce impacts on threatened and endangered species populations within the EGTR through the collection of species population and distribution information (Eglin AFB 1997).

One upcoming Air Force project involves the deployment of F-22 fighter jet aircraft, which is currently in the test and validation stage. The F-22s may eventually replace the F-15s. The F-22s would be involved in training in the areas near Tyndall AFB. Cumulative impacts of the F-22s would be primarily due to differences between the noise characterizations of the F-22 and F-15. The time frame for this action is the next 5 to 10 years.

5.3.3.3 U.S. NAVY

The Navy has used and will continue to use the Gulf of Mexico as a training area. Naval Air Station (NAS) Pensacola conducts numerous activities in the Gulf, including training operations by air wings and squadrons, and flight demonstration and search and rescue operations. The types of materials used during search and rescue operations are similar to those proposed for use in the WTA. However, lightsticks are attached to personnel or equipment during Navy rescue training operations and free-floating lightsticks are not typically released. Therefore, the majority of materials used during Navy rescue training operations are recovered. Other major Navy installations with activities in the Gulf include NAS Whiting Field, near Milton, Florida, and the Naval Coastal Systems Center near Panama City, Florida.

5.3.3.4 U.S. ARMY

The U.S. Army has used and will continue to use the Gulf of Mexico, as well as training areas at other military bases in the vicinity of the Florida panhandle and the proposed WTA. The Army will continue to conduct training operations in the Eglin Training Area, near Fort Walton Beach, Florida. In addition, the U.S. Army has used and will continue to use Fort Stewart, near Hinesville, Georgia as a training area for a variety of activities.

In addition, the U.S. Army Corps of Engineers provides management support to activities in the Gulf region. The Corps jurisdiction extends seaward to include all ocean waters within a zone three nautical miles (NM) from the coastline (the "territorial seas"). Limited authorities extend across the outer continental shelf for artificial islands, installations and other devices (see 43 United States Code [USC] 333 (e)). Activities requiring Section 10 permits include structures (e.g., piers, wharves, breakwaters, bulkheads, jetties, weirs, transmission lines) and work such as dredging or disposal of dredged material, or excavation, filling, or other modifications to the navigable waters of the U.S.

5.3.3.5 U.S. COAST GUARD

The Coast Guard has used and will continue to use the Gulf of Mexico for training purposes as well as for day to day operations. The Coast Guard is involved in a variety of missions in the Gulf of Mexico including search and rescue, marine environmental protection, enforcement of laws and treaties, drug interdiction, marine safety, and national security. The types of materials used during Coast Guard search and rescue operations are similar to those proposed for use in the WTA. During training operations, the Coast Guard typically attaches lightsticks directly to personnel survival suits or to strings leading back to the surface ships. Therefore, the Coast Guard is generally able to recover all of the lightsticks deployed during a training exercise.

5.3.3.6 FEDERAL AVIATION ADMINISTRATION

The FAA has a major proposal to modernize and reengineer the National Airspace Architecture. The National Airspace Architecture describes changes in communications, navigation, surveillance, automation tools, avionics, and computers/networks. These changes will affect flight operations over Georgia, Florida and the Gulf of Mexico. The FAA is planning to redesign Air Route Traffic Control Centers (ARTCC) to accommodate air traffic in the Jacksonville, Miami, and Houston ARTCCs. None of these changes would affect the proposed WTAs or proposed helicopter AR tracks.

One of these proposed changes is a Free Flight operational concept. Free Flight centers on allowing pilots, whenever practical, to choose the optimum flight profile. This concept of operations is expected to decrease user costs, improve airspace flexibility, and remove flight restrictions. Implementation of the National Airspace Architecture is being synchronized with the International Civil Aviation Organization to ensure interoperability and global integration.

A few highlights include: 1) expanded surveillance coverage of airspace and airport surfaces, to provide increased air-to-air situation awareness for pilots, 2) more efficient sequencing of arriving and departing aircraft through improved air traffic control decision support tools, 3) accurate and timely weather data to controllers and pilots, 4) sharing of real-time information between users and providers, and 5) increased ability of users to fly more direct routes.

Over the next 10 years, the navigation system is expected to use satellites augmented by ground monitoring stations to provide navigation signal coverage throughout the National Airspace Architecture. Satellite-based navigation will support direct routes and help users meet their schedules with more predictability. Reliance on ground-based navigation aids is expected to decline as satellite navigation provides equivalent levels of service (FAA 1999a).

While this FAA initiative is still in the planning stages, the cumulative effects to Air Force operations and airspace management, particularly with respect to implementation of the proposed action analyzed in this EA, remain unknown at this time. No changes in airspace boundaries are planned.

Another FAA initiative related to airspace involves the redesign of the Gulf of Mexico airspace. This proposal includes the Air Force, Coast Guard, Navy, and other DoD agencies. These changes are not due to occur within the next 5 to 7 years and would not affect the proposed water training area or helicopter AR tracks.

5.3.4 Non-Federal Actions

There are no known state, county or municipality actions that are proposed or planned within the ROI that would directly interact with the proposed action. Madison County, Florida is in the process of preparing an Airport Master Plan for a new publicly owned, publicly used general aviation airport in Madison County. The airport is expected to be located at the coordinates 30º 26' N latitude, 83º 23' W longitude (Madison County Board of Commissioners 1999). The helicopter AR tracks would not be located directly above the proposed airport and would not interfere with the associated airspace. Ninety-five percent of all air refueling operations would occur at 2,000 feet AGL. In addition, all air refueling operations would be conducted at a distance of greater than 3.0 NM from the proposed facility. None of the proposed AR tracks would interfere with the safe and efficient operation of licensed private aviation facilities.

With respect to activities in the Gulf of Mexico, the northern Gulf of Mexico coastal zone is one of the major recreational regions of the U.S., particularly for marine fishing and beach activities. Its resources include coastal beaches, barrier islands, coral reefs, estuarine bay and sounds, river deltas, and tidal marshes. Many of these are held in trust for the public under federal, state, and local jurisdiction. Commercial facilities such as resorts and marinas are also primary areas for tourist activity. Outdoor recreational activity in the gulf is primarily located along the shoreline and is associated with accessible beach areas. Beaches are a major focal point for tourism as well as a primary source of recreational activity for residents.

The Gulf waters are estimated to support more than one third of the nation's marine recreational fishing, with over 4 million fisherman in 1985 who caught an estimated 42 million fish. Tourism-related dollars in the Gulf Coast states contribute an estimated $20 billion to the local economy each year. Commercial fishing in the Gulf of Mexico in 1991 produced over 1.7 billion pounds valued at over $641 million. Florida's west coast ranked fourth amount the Gulf states of Louisiana, Mississippi, Texas, Alabama and Florida in total commercial landings in 1988 with over 143 million pounds, valued at over $131.4 million (Air Force 1999c).

The infrastructure for oil and gas production in the Gulf of Mexico is highly developed. This infrastructure includes oil refineries, petrochemical and gas processing plants, supply bases for offshore services, platform construction yards, pipeline yards, and other industry-related installations. Oil and gas refineries, natural gas plants, and petrochemical plants contribute little to the eastern Gulf of Mexico economy. Florida oil production peaked in the 1975-1980 period with just under 50 million barrels produced in 1978. There are no active oil and gas producing wells within the proposed WTAs. There are however, a number of oil and gas leases within this area (Eglin 1999).

5.4 CUMULATIVE EFFECTS SUMMARY

The key issues and primary resource areas of interest in this EA are marine biological resources, short-term noise effects, and issues involving marine debris. No other resource areas were found to have any measured effect resulting from implementation of the proposed action. The incremental contribution of impacts of the proposed action, when considered in combination with other past, present, and reasonably foreseeable actions would be negligible.

In summary, none of the projected impacts of the proposed action and alternatives are significant in themselves. At this time, there are no known existing actions, or current future proposals, from which a significant cumulative impact in the ROI could result when combined with the effects of the proposed training in the Gulf of Mexico or the overland areas in Georgia and Florida.

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6.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The National Environmental Policy Act (NEPA) requires that environmental analysis include identification of "…any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." Irreversible and irretrievable resource commitments are related to the use of nonrenewable resource and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

For the proposed action, most resource commitments are neither irreversible nor irretrievable. Most impacts are short-term and temporary, or longer lasting, but negligible. Those limited resources that may involve a possible irreversible or irretrievable commitment under the proposed action are discussed below.

The proposed action would require the use of fuels for aircraft operations. This fuel would be used as long as the combat search and rescue (CSAR) programs continued. While the CSAR squadrons would perform wet refueling operations requiring fuel consumption, the increased efficiency achieved through implementation of the proposed action compared to current training scenarios would possibly result in a decrease in overall fuel consumption. Other materials that would be consumed include sea dye markers, flares, and lightsticks in the proposed water training area (WTA).

Since no construction or renovation would occur as part of the proposed action, no materials required for this type of activity would be used. There would be no irreversible or irretrievable commitments of construction materials such as concrete, sand, bricks, and steel, or materials used for renovation such as insulation, wiring, and paint.

There would be no wildlife habitat lost through implementation of the proposed action. No irreversible or irretrievable commitment of biological resources would occur.

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