# Draft Environmental Assessment for Hurricane Recovery and Installation Development

Tyndall Air Force Base, Florida

January 2020



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# DRAFT ENVIRONMENTAL ASSESSMENT FOR HURRICANE RECOVERY AND INSTALLATION DEVELOPMENT AT

## **TYNDALL AIR FORCE BASE, FLORIDA**



PREPARED FOR: Department of the Air Force

January 2020

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## **COVER SHEET**

Responsible Agency: 325th Fighter Wing (325 FW), Tyndall Air Force Base (AFB), Florida

Proposed Action: Hurricane Michael Recovery Program at Tyndall AFB, Bay County, Florida

**Points of Contact:** 325 CES/CEIEC, Attn: Draft Environmental Assessment for Hurricane Recovery and Installation Development at Tyndall Air Force Base, Florida. 540 Mississippi Ave Building 36270 Tyndall AFB, FL 32403

**Report Designation:** Environmental Assessment (EA)

**Abstract:** The 325 FW at Tyndall AFB is planning demolition, construction and renovation of numerous facilities throughout the installation that were severely damaged by Hurricane Michael in 2018. Under the Proposed Action, 28 individual projects spanning six planning areas throughout the installation would be constructed. Three additional projects have been identified which cover more than one planning area, and thus are described as Multi-Area projects. The purpose of implementing the installation development projects at Tyndall AFB is to recover mission capabilities at Tyndall AFB, impacted by Hurricane Michael. The need for the proposed actions is to rebuild Tyndall AFB to a fully operational base, thereby providing new facilities/infrastructure, as well as executing repair, demolition and functionality improvements necessary to support the 325 FW mission and tenant units.

There would be no new missions or personnel assigned to Tyndall AFB as a result of the Proposed Action. The Air Force proposes to implement the development over a five-year period beginning in 2020. Demolition of damaged buildings and construction of new structures within the Flightline Area, including hangars and headquarters facilities, would be the priority projects. Up to 1,164 acres of land would be developed, much of which is currently developed or previously developed.

The following resources were identified for study in this EA: Air Quality, Noise, Safety and Occupational Health, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Wastes, Socioeconomic Resources, and Environmental Justice.

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Letters or other written comments provided may be published in the Final Environmental Assessment. As required by law, substantive comments will be addressed in the Final Environmental Assessment and made available to the public. Any personal information provided will be kept confidential. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final Environmental Assessment. Names, personal home addresses and phone numbers will not be published in the Final Environmental Assessment.

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#### DRAFT

#### FINDING OF NO SIGNIFICANT IMPACT

#### for

## HURRICANE RECOVERY AND INSTALLATION DEVELOPMENT AT TYNDALL AIR FORCE BASE, FLORIDA ENVIRONMENTAL ASSESSMENT

Pursuant to the Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of the National Environmental Policy Act of 1969 (NEPA), Title 40 of the Code of Federal Regulations (CFR) Parts 1500-1508 and the Air Force Environmental Impact Analysis Process Regulations (32 CFR Part 989), the U.S. Air Force (Air Force) has prepared this Environmental Assessment (EA) to evaluate the potential impacts on the natural and human environment associated with the Hurricane Michael Recovery Program at Tyndall Air Force Base (AFB), Florida.

#### **Purpose and Need**

The purpose of implementing the installation development projects at Tyndall AFB is to recover mission capabilities at Tyndall AFB, impacted by Hurricane Michael. The impact of the hurricane caused extensive damage to the base's mission, facilities, infrastructure and natural resources areas. The proposed actions would include construction of new facilities and infrastructure, renovations, consolidation, and demolition as well as management of natural resources to restore mission capabilities. The need for the proposed actions is to rebuild Tyndall AFB to a fully operational base, thereby providing new facilities/infrastructure, as well as executing repair, demolition and functionality improvements necessary to support the 325 FW (325th Fighter Wing) mission and tenant units.

#### **Proposed Action**

Under the Proposed Action, 28 individual projects spanning six planning areas throughout the installation would be constructed. Three additional projects have been identified which cover more than one planning area, and thus are described as Multi-Area projects. Development in the 2000 Area would include construction of morale, welfare, and recreation facilities at the Marina and recreational facilities that include courts and athletic fields, pavilions and picnic areas, playground, outdoor swimming pool and driving range. Within the 8500 Area, a Subscale Drone facility complex with pilotless aircraft shops would be constructed. Support facilities in this area include an Electronic Counter Measure pod shop and storage, engine test cell, chute shop, and wash rack.

In the 9700 Area, a new Air Force Civil Engineer Center (AFCEC) Research, Development, Testing & Evaluation (RDT&E) Facility and a new Fire Station would be constructed. The RDT&E Facility would include numerous research labs including, but not limited to, cyber operations, firefighting research, ballistics laboratory, materials testing and robotics research. The Flightline Area, which sustained substantial damage during Hurricane Michael, will include demolition and reconstruction of numerous buildings, including a new Aircraft Maintenance Hangar and a Headquarters building for the 53rd Weapons Evaluation Group (53 WEG), an Operations Support Squadron Facility to support the 53 WEG, an Aerospace Operations and Physiology Facility, Gate Complexes, Vehicle Maintenance Facilities, Deployment Center/Flight Line Dining/Army and Air Force Exchange

Service facility, and Munition Storage Area facilities. The drainage system within the Flightline Area will also be upgraded to provide improved drainage and reduce operational conflicts during major rain events.

A new Vehicle Maintenance Shop, Base Engineer Covered Storage Facility, and a Technical Training Classroom are proposed for construction within the Silver Flag Area. The Support Area, which houses much of the administrative, barracks, and headquarters buildings, was also severely damaged during Hurricane Michael; consequently, most of the facilities require demolition and reconstruction. Projects in the Support Area include construction of the 325 FW Headquarters Building; a Civil Engineer Squadron, Base Contracting Squadron, and United States Army Corps of Engineers (USACE) Complex; a Logistics Readiness Squadron Complex; an Emergency Management and Emergency Operations Complex; a Mobility Storage Facility for Security Forces Squadron; new lodging and dormitory facilities; Child Development Center; Chapel; and Gate Complexes.

The Multi-Area projects include the airfield drainage mentioned above, demolition of 268 buildings throughout the installation, and utility replacements and upgrades to support the new facilities. Utility upgrades include water, wastewater, communication, power transmission facilities and security fences; these projects would occur within existing utility corridors and rights-of-way.

## Alternatives

Action Alternatives for projects in each of the planning areas were evaluated against a set of selection standards to determine which alternatives would be carried forward for detailed environmental impact analysis. Multiple Action Alternatives were evaluated against selection standard criteria for projects in the Flightline, Support, and 9700 Areas. Only the Action Alternatives that meet all selection standards were analyzed in detail for potential environmental impacts. Proposed projects in the 2000, 8500, and Silver Flag Areas, as well as the Multi-Area building demolitions, airfield drainage, and utility corridor projects are subjected to unique constraints due to the nature of the projects and the areas in which they would be implemented. Therefore, only a single Action Alternative was considered for each of these projects. Additionally, a No Action Alternative was analyzed for each of the project areas.

Demolitions would be expected to begin in Fiscal Year (FY) 2020; construction within the Flightline Area would be priority and expected to begin in the third quarter of FY 2021 and last for approximately four years. The new lodging facilities, dormitories, child development center and gate complexes would begin around the same time and would be expected to be completed within two years. The remainder of the projects would be expected to be initiated in the fall of 2023 and require approximately two years to complete. All projects would be scheduled to be completed by the end of 2025.

The No Action Alternative would not allow demolition of damaged facilities and construction of new facilities and infrastructure. Under this alternative, Tyndall AFB would not be able to meet its mission. Additionally, the damaged facilities would further deteriorate and possibly increase health and safety hazards.

#### **Environmental Consequences**

The Proposed Actions would have no effect on geology, airspace, cultural resources, or visual resources. The Air Force has determined that the Proposed Actions may affect and is likely to adversely affect the endangered plant telephus spurge (*Euphorbia telephioides*) due to construction of the Gate Complex in the Support Area; Section 7 Consultation, under the Endangered Species Act (ESA), is on-going to identify conservation measures to offset these impacts.

Negligible to minor impacts would occur on air quality; ambient noise levels; safety and occupational health; soils; vegetation/wildlife habitat; ground and surface water supplies and quality; wildlife populations; and hazardous and solid waste. Up to 128.7 acres of wetlands, 118,299 linear feet (LF) of other surface waters, and 126.9 acres of floodplains would be impacted. No major long-term impacts on demographics or social services and conditions would be expected, including demand for housing, education, law enforcement, fire protection, emergency medical services, and medical services. Disproportionate impacts on minority or low-income populations would not be expected.

#### Mitigation Measure and Permit Requirements

Conservation measures to offset impacts on telephus spurge populations will be identified through Section 7 ESA consultation. Compensatory wetland mitigation will be required to offset impacts on state and/or federally jurisdictional wetlands and other surface waters. The mitigation requirements will be identified through the state and Federal permitting process. In addition, a National Pollutant Discharge Elimination (NPDES) General Construction Permit will be required for all construction sites, including development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). A Consistency Determination will be required as outlined under the Florida Coastal Zone Management Plan and authorized by the Federal Coastal Zone Management Act. As of the writing of this Draft EA, Section 106 of the National Historic Preservation Act consultation with the Florida State Historic Preservation Office (SHPO) is ongoing. The Cultural Resources Survey Report completed for the Proposed Actions has been submitted to the SHPO and any mitigation measures identified during the consultation will be included in the Final EA.

#### Public Review and Stakeholder Coordination

Coordination letters were submitted to numerous public stakeholders, including the Florida Clearinghouse, Florida SHPO, U.S. Fish and Wildlife Service, and Native American Tribes claiming cultural affinity to the area. An early notification of impacts on wetlands and floodplains was published in the *Panama City News Herald* in October 2019. Copies of the notice and coordination letters are included in **Appendix B** of the EA. The Draft EA will be released for public review for 30 days. A Notice of Availability will be published in the *Panama City News Herald*.

#### Finding of No Significant Impact

Based on my review of the facts and analyses presented in the attached EA, I conclude that Alternative 1 (Proposed Action) would not have a significant impact on the natural or human environment either by itself or cumulatively. The requirements of NEPA and the CEQ's regulations have been fulfilled. An Environmental Impact Statement is not required and will not be prepared.

#### Finding of No Practicable Alternative

Executive Order (EO) 11990, *Protection of Wetlands*, (24 May 1977) directs agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland and the proposed construction incorporates all possible measures to limit harm associated with development in the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands. In accordance with EO 11990 and 32 CFR Part 989, a Finding of No Practicable Alternative (FONPA) must accompany the Finding of No Significant Impact (FONSI) stating why there are no practicable alternatives to development within or affecting wetland areas.

Similarly, EO 11988, *Floodplain Management* (May 24, 1977), requires Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. If it is found that there is no practicable alternative, the agency must minimize potential harm to the floodplain and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. Finally, new construction in a floodplain must apply accepted flood proofing and flood protection to include elevating structures above the base flood level rather than filling in land. In accordance with EO 11988, a FONPA must accompany the FONSI stating why there are no practicable alternatives to development within or affecting floodplains.

The Proposed Actions would result in impacts to both wetlands and floodplains. The following FONPA is therefore presented with the FONSI, pursuant to EO 11990 and EO 11988.

**Wetlands**: Wetland impacts would be reduced to the maximum extent possible through project design and implementation of environmental protection measures. Pursuant to Section 404(b)(1) of the Clean Water Act, wetland impacts must be avoided to the greatest extent practicable. During the design and permitting phase of the Proposed Actions, jurisdictional wetlands would need to be delineated in accordance to the USACE's 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*. Any necessary agency coordination and required permits would be acquired prior to commencing any ground-breaking activities associated with construction. Measures to minimize wetland impacts may include site plan reconfiguration, installation of buffer areas along the perimeter of wetlands, or erosion controls to prevent sedimentation in adjacent wetlands. Construction Site NPDES permit and its associated procedures as detailed in erosion and sediment control plans (ESCP); SWPPP; and Spill Prevention, Control, and Countermeasures Plans.

As noted in the attached EA, there are no practicable alternatives to the Proposed Actions that would avoid all impacts or further minimize impacts to wetlands because the objectives sought by these projects preclude the selection of any practicable alternatives due to mission requirements,

installation layout constraints, and the nature of proposed projects. In addition to the Preferred Alternatives, multiple project sites were evaluated throughout the base using the selection criteria identified in the EA. Approximately 128.7 acres of wetlands occur within the proposed project areas. Other surface waters identified in the proposed project areas consist of approximately 118,299 LF of drainage ditches and 0.8 acre of a stormwater management pond/open water. A formal Jurisdictional Determination of the wetlands and other surface waters will be determined during the state and Federal permitting process. Of the 128.7 acres of wetlands, an estimated 3.8 acres of wetlands occur within the 2000 Area, which is the site of the marina and associated facilities. Impacts to wetlands within this area are unavoidable because construction of such facilities is required to be near water bodies. The greatest wetland acreage (73.0 acres) occurs within the 9700 Area. The Air Force evaluated four other locations for these projects and determined that none would fully satisfy the selection criteria. The alternate sites either resulted in incompatible land use between the AFCEC testing facilities and nearby dormitory facilities, did not support Remotely Piloted Aircraft mission due to proximity to the Flightline, or would be situated completely within Environmental Restoration Program sites. The remaining impacts would occur in the 8500 (2.3 acres), Support (0.2 acres), and Multi-Areas (51.1 acres). Two additional alternative locations were considered for the Support Area projects and determined that neither would fully satisfy the selection criteria. The alternate sites either would not support mission needs or would not improve pedestrian and vehicular circulation or optimize development patterns within the Support Area. The remaining project alternatives are constrained either due to the location or the nature of the projects and therefore could not be located to other sites. Taking all the environmental, economic, and other pertinent factors into account, pursuant to EO 11990, the authority delegated by Secretary of the Air Force Order 791.1, and taking into consideration the submitted information, I find that there is no practicable alternative to this action and the proposed action includes all practical measures to minimize harm to the environment.

*Floodplains*: Similarly, there is no practicable alternative to implementing the Proposed Actions at Tyndall AFB outside of floodplains. Temporary construction activity and long-term impacts due to the construction of new structures associated with the Proposed Actions would occur within the 100-year floodplain. Construction related impacts to floodplains in general would be minimized through implementation of an approved ESCP, construction best management practices, and other appropriate environmental protection measures and through adherence to the NPDES permit and SWPPP. Long-term impacts to floodplains from the Proposed Actions would be minimized by implementing guidelines provided in EO 11988 for construction in a floodplain to the extent practicable, including site grading so that structures are elevated to at least one foot above the base flood level and providing compensatory storage within the floodplain.

Overall, approximately 126.9 acres of the proposed project areas are located within the 100-year floodplain. Approximately 67.5 acres of those floodplains occur within the Multi-Area projects, including replacement of a utility corridor that is located within floodplains. Approximately 34.3 acres of floodplains occur within the 9700 Area. Projects in the 2000 Area are located within 18.2 acres of floodplains adjacent to the proposed marina development. The remaining floodplains occur within the proposed 8500 (0.1 acre), Flightline (0.9 acre), and Support Area (5.9 acres) projects. Implementation of the Proposed Actions would not increase the frequency, duration, depth, or velocity of flood flows.

As noted in the attached EA, there are no practicable alternatives to the Proposed Actions that would avoid all impacts or further minimize impacts to floodplains because the objectives sought by these projects preclude the selection of any practicable alternatives due to mission requirements, installation layout constraints, and the nature of proposed project. In addition to the Preferred Alternatives, multiple project sites were evaluated throughout the base using the selection criteria identified in the EA. Two additional locations were evaluated for the Flightline Area projects and the Air Force determined that one would not meet mission needs and the other would result in explosives safety setback areas encroaching on public traffic route U.S. Highway 98. As described above, alternate sites for the 9700 Area facilities were also evaluated but eliminated for various reasons. The remaining projects that would impact floodplains are constrained to their proposed locations due to installation layout and the nature of the projects. Taking all the environmental, economic, and other pertinent factors into account, pursuant to EO 11988, the authority delegated by Secretary of the Air Force Order 791.1, and taking into consideration the submitted information, I find that there is no practicable alternative to this action and the proposed action includes all

DEE JAY KATZER, Colonel,

Date

U.S. Air Force Chief, Civil Engineer Division HQ Air Combat Command (ACC/A4C)

## LIST OF ACRONYMS AND ABBREVIATIONS

325 CES/		CO	Carbon Monoxide
CEIEC	325th Civil Engineer	$CO_2$	Carbon Dioxide
	Squadron/Environmental	$CO_2e$	Carbon Dioxide Equivalent
	Element, Compliance	CR	County Road
325 FW	325th Fighter Wing	CRM	Cultural Resources
53 WEG	53rd Weapons Evaluation		Management
	Group	CWA	Clean Water Act
	•	CZMA	Coastal Zone Management Act
AAFES	Army and Air Force Exchange Service	CZMP	Coastal Zone Management Plan
ACAM	Air Conformity Applicability	dB	Decibels
	Model	dBA	A-weighted decibel
ACS	American Community Survey	DNL	Average Day/Night Sound
AFB	Air Force Base		Level
AFCEC	Air Force Civil Engineer Center	DoD	Department of Defense
AFFF	Aqueous Film-Forming Foam	DoDI	Department of Defense
AFI	Air Force Instruction		Instruction
AFMAN	Air Force Manual		
AFOSH	Air Force Occupational Safety	EA	Environmental Assessment
	and Health	EIAP	Environmental Impact
AFPD	Air Force Policy Directive		Assessment Process
AICUZ	Air Installations Compatible	EIS	Environmental Impact
11002	Use Zone		Statement
Air Force	United States Air Force	EM	Emergency Management
ALT CP	Alternate Command Post	FO	Executive Order
ARAR	Applicable or Relevant and	EOC	Emergency Operations Center
	Appropriate Requirements	FOD	Explosive Ordnance Disposal
AST	Aboveground Storage Tank	FRP	Environmental Resource Permit
7101	Aboveground Storage Tank	FRP	Environmental Restoration
BFF	Base Flood Elevation		Program
BMP	Best Management Practice	FSΔ	Endangered Species Act
BDA	Basalina Rick Assessment	ESCP	Endangered Species Act
DKA	Daschile Risk Assessment	ESOD	Distance
<b>a</b>		ESQD	Distance
CAA	Clean Air Act		
CCCL	Coastal Construction Control	F.A.C.	Florida Administrative Code
	Line	F.S.	Florida Statutes
CE	Civil Engineer	FAA	Federal Aviation Administration
CEQ	Council on Environmental	FCMP	Florida Coastal Management
	Quality		Program
CERCLA	Comprehensive Environmental	FDACS	Florida Department of
	Response, Compensation, and		Agriculture and Consumer
	Liability Act		Services
CES	Civil Engineer Squadron	FDEP	Florida Department of
CFR	Code of Federal Regulations		<b>Environmental Protection</b>
$CH_4$	Methane	FDOT	Florida Department of

	Transportation		
FEMA	Federal Emergency	MBTA	Migratory Bird Treaty Act
	Management Agency	MDG	Medical Group
FFA	Federal Facility Agreement	MHE	Material Handling Equipment
FLDHR	Florida Division of Historic	MHW	Mean High Water
	Resources	MMRP	Military Munitions Response
FI MSE	Florida Master Site File		Program
FONDA	Finding of No Practicable	MSA	Munition Storage Area
TONIA	Alternative	MWR	Morale Welfare and
FONSI	Finding of No Significant		Recreation
POINSI	Impact		Recreation
FS	Eessibility Study	N-O	Nitrogen Ovide
	Formal Training Unit		National Ambiant Air Quality
	Formal Fraining Unit	NAAQS	Standarda
гwС	Conservation Commission		National Environmental Deliev
EX	Conservation Commission	NEPA	National Environmental Policy
Γĭ	Fiscal Year		
aua		NEW	Net Explosive Weight
GHG	Greenhouse Gas	NFA	No Further Action
GSRC	Gulf South Research	NHPA	National Historic Preservation
	Corporation		Act
		$NO_2$	Nitrogen Dioxide
НАР	Hazardous Air Pollutant	NOA	Notice of Availability
HAZWOPER	Hazardous Waste, Operations,	$NO_x$	Nitrogen Oxide
	and Emergency Response	NPDES	National Pollutant Discharge
HFC	Hydrofluorocarbons		Elimination System
HQ	Headquarters	NRHP	National Register of Historic
HQ ACC	Headquarters Air Combat		Places
	Command	NSS	Noise Sensitive Sites
HWAS	Hazardous Waste Accumulation	NWFWMD	Northwest Florida Water
	Site		Management District
HWMP	Hazardous Waste Management		
	Plan	$O_3$	Ozone
		OSHA	Occupational Health and Safety
IAP	Initial Accumulation Point		Administration
ICRMP	Integrated Cultural Resources	OSS	<b>Operations Support Squadron</b>
	Management Plan	OWS	Oil/Water Separator
IDP	Installation Development Plan		
INRMP	Integrated Natural Resources	Pb	Lead
	Management Plan	PCB	Polychlorinated Biphenyls
IRP	Installation Restoration Program	PFC	Perfluorocarbons
ISWMP	Integrated Solid Waste	PFOA	Perfluorooctanoic Acid
	Management Plan	PFOS	Perfluorooctane Sulfonate
ITN	Information Transfer Node	$\mathbf{PM}_{10}$	Particulate Matter less than 10
		1 1.10	microns in diameter
km	Kilometer	PM2 5	Particulate Matter less than 2.5
		1 1112.5	microns in diameter
LBP	Lead-based Paint	PMO	Program Management Office
LE	Linear Feet	POI	Petroleum Oil and Lubricante
I	Maximum Sound Level	nnh	Parts Per Rillion
	Logistics Readiness Squadron	PDE PPC	Personal Protective Fouinment
	Long-Term Operations	nnm	Parts Per Million
	Long-rorm Operations	ppm	

R&D	Research and Development	$\mu g/m^3$	Micrograms Per Cubic Meter		
RA	Remedial Action				
RCRA	Resource Conservation and				
	Recovery Act				
RDT&E	Research, Development, Testing				
	& Evaluation				
RED HORSE	Rapid Engineers Deployable				
	Heavy Operations Repair				
	Squadron Engineers				
RI	Remedial Investigation				
ROD	Record of Decision				
ROI	Region of Influence				
RPA	Remotely Piloted Aircraft				
SF	Square Feet				
$SF_6$	Sulfur Hexafluoride				
SFHA	Special Flood Hazard Area				
SFS	Security Forces Squadron				
SHPO	State Historic Preservation				
	Officer				
SIP	State Implementation Plan				
$SO_2$	Sulfur Dioxide				
SPCC	Spill Prevention, Control, and				
	Countermeasures				
SR	State Road				
SWPPP	Stormwater Pollution				
	Prevention Plan				
SY	Square Yards				
TBD	To Be Determined				
U.S.	United States				
U.S.C.	United States Code				
UFC	Unified Facilities Criteria				
USACE	United States Army Corps of				
	Engineers				
USEPA	United States Environmental				
	Protection Agency				
USFWS	United States Fish and Wildlife Service				
UST	Underground Storage Tank				
UXO	Unexploded Ordnances				
VAQ	Visiting Airmen's Ouarters				
VOC	Volatile Organic Compounds				
VOQ	Visiting Officers Quarters				
VQ	Visiting Quarters				
WEG	Weapons Evaluation Group				

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## **1.0 PURPOSE AND NEED**

## **1.1 INTRODUCTION**

The 325th Fighter Wing (325 FW) at Tyndall Air Force Base (AFB), in conjunction with Headquarters Air Combat Command (HQ ACC) and the Tyndall Program Management Office (PMO) established by the Air Force Installation and Missions Support Center (AFIMSC), has identified and programmed urgent reconstruction and development project needs at Tyndall AFB (i.e., Proposed Actions), which are expected to be implemented over the next five years (Calendar Year 2020– Calendar Year 2025). The mission recovery will consist of construction of new facilities and infrastructure, renovations, consolidation, and demolition as well as management of natural resources.

This Environmental Assessment (EA) was prepared to evaluate the potential environmental impacts of these proposed projects in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [U.S.C.] 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 Code of Federal Regulations [CFR] 1500-1508), the U.S. Air Force (Air Force) Environmental Impact Analysis Process (EIAP) Regulations at 32 CFR Part 989, and Air Force Instruction (AFI) 32-7061.

Tyndall AFB occupies approximately 29,276 acres in Bay County, Florida, approximately 13 miles southeast of Panama City (**Figure 1.1-1**). Over 30 organizations operate at Tyndall AFB including the 325 FW, the First Air Force, the 53rd Weapons Evaluation Group (53 WEG), and the Air Force Civil Engineer Center (AFCEC).

On October 10, 2018 Tyndall AFB sustained a direct hit from Hurricane Michael, a category five hurricane with wind speeds in excess of 156 miles per hour. This was the strongest sustained wind hurricane to hit the continental United States in over 25 years. Every facility on the installation sustained at least some damage with more than 50 percent of the facilities significantly damaged. Hurricane Michael caused extensive damage to Tyndall AFB facilities, infrastructure and environmental conditions (natural resources management areas) base-wide, which impacted mission capabilities and significantly altered baseline conditions.

With this EA, the intent of the 325 FW and HQ ACC is to streamline NEPA compliance and facilitate the rapid reconstruction of the installation by evaluating in one integrated document the potential impacts on the human environment of the projects proposed for execution at Tyndall AFB. These projects are presented in **Section 1.4**.



Path: S:Projects/G/GSRC/60610846 Tyndall AFB EA/900 Work/920 G/S/mxd/190827\_Figure 1-1-1\_Location Map.mxd , Date Saved: 8/27/2019 11:13:37 AM

As part of the recovery effort, emergency actions were enacted. The Air Force consulted with the CEQ to identify emergency alternative arrangements to comply with NEPA and restore training operations as quickly as possible. The alternative arrangements were approved and accepted in December of 2018. The only Air Force F-22A Formal Training Unit (FTU) was temporarily relocated from Tyndall AFB to Eglin AFB under a Special EA. The Air Force has proposed to permanently relocate the F-22A FTU at Langley AFB. The Proposed Actions addressed in this EA, which pertains to the reconstruction of Tyndall AFB due to damage incurred from Hurricane Michael, is unrelated to the F-22 activities, and the potential permanent F-22 relocation to another facility is independent of this Proposed Actions covered in this EA. Therefore, the proposed permanent F-22 relocation will be addressed under a separate NEPA document.

The information presented in this document will serve as the basis for deciding whether the Proposed Actions would result in a significant impact to the human environment, requiring the preparation of an Environmental Impact Statement (EIS), or whether no significant impacts would occur, in which case a Finding of No Significant Impact (FONSI) would be appropriate. If the execution of any of the Proposed Actions would involve "construction" in a wetland as defined in Executive Order (EO) 11990, *Protection of Wetlands*, or "action" in a floodplain under EO 11988, *Floodplain Management*, a Finding of No Practicable Alternative would be prepared in conjunction with the FONSI.

## **1.2 BACKGROUND**

Installation development and proposed reconstruction actions at Tyndall AFB should be accomplished in accordance with the Air Force Comprehensive Planning Program established in AFI 32-1015, Integrated Installation Planning. Comprehensive Planning establishes a systematic framework for informing decision-making on the physical development of Air Force installations and their environment. The objective of the Comprehensive Planning Process is to synthesize data and information to enable commanders to make effective development decisions affecting their installation and the surrounding community. As a part of the Comprehensive Planning Process, installations are divided into identifiable planning areas based on geographical features, land use patterns, building types, and/or transportation networks. Within these planning areas, the Base Community Planner identifies shortfalls in the existing capability, capacity, or relationship of installation resources with respect to their contribution to successful accomplishment of installation missions. A thorough analysis of the existing conditions, a study of the requirements, and the vision, goals, and objectives of the installation allow the development of conceptual alternatives. These alternatives are evaluated against measurable criteria/selection standards and evaluated during the EIAP. So, the planning activities required by the Comprehensive Planning Process must integrate EIAP to ensure planning decisions reflect environmental values, identify alternatives to be considered, and document the rationale for dismissed alternatives.

## **1.3 PURPOSE AND NEED**

The purpose of implementing the installation development projects at Tyndall AFB is to recover mission capabilities at Tyndall AFB, impacted by Hurricane Michael. The impact of the hurricane caused extensive damage to the base's mission, facilities, infrastructure and natural resources areas. The Proposed Actions would include construction of new facilities and infrastructure, renovations, consolidation, and demolition as well as management of natural resources to restore mission capabilities.

The need for the Proposed Actions is to rebuild Tyndall AFB to a fully operational base, thereby providing new facilities/infrastructure, as well as executing repair, demolition and functionality improvements necessary to support the 325 FW mission and tenant units. Installation development projects must be developed in a manner that:

- Supports the Air Force mission requirements and quality of life of units and Airmen hosted by the installation;
- Meets all applicable Department of Defense (DoD), Federal, state, and local laws and regulations, such as but not limited to the Endangered Species Act (ESA), National Historic Preservation Act (NHPA), Clean Water Act (CWA), Clean Air Act (CAA), Resource Conservation and Recovery Act, and Migratory Bird Treaty Act (MBTA). More detailed information regarding resource-specific laws and regulations is provided in the specific resource sections of this EA;
- Provides reliable utilities and an efficient transportation system to support Tyndall AFB and meets current Air Force requirements for functional space, consistent with Air Force Manual 32-1084, *Facility Requirements*;
- Reduces the consumption of fuel, energy, water, and other resources, maximizes the use of existing facilities, and reduces the footprint of unnecessary or redundant facilities and infrastructure;
- Supports and enhances the morale and welfare of personnel assigned to the installation, their families, and civilian staff, consistent with Department of Defense Instruction (DoDI) 1015.10, *Military Morale, Welfare, and Recreation Programs* (6 July 2009); and
- Meets applicable DoD antiterrorism/force protection criteria, consistent with Unified Facilities Criteria 4-010-01, *Department of Defense Minimum Antiterrorism Standards for Buildings* and the Air Force Installation Force Protection Guide.

# 1.4 PROJECTS IDENTIFIED FOR HURRICANE RECOVERY AND INSTALLATION DEVELOPMENT

Based on the established purpose and need for the Proposed Actions, Tyndall AFB has identified and programmed 28 individual projects spanning six planning areas throughout the installation. Three additional projects have been identified which cover more than one planning area, hereinafter referred to as "Multi-Area projects". **Tables 1.4-1** through **1.4-7** list all projects identified for this EA across each planning area, and these projects are also depicted graphically on **Figures 1.4-1** through **1.4-7**. Constraints associated with each project area are also shown on these figures. Of note, demolition requirements associated within each planning development area are identified in **Figure 1.4-7c** and are associated with the base-wide demolition list in **Appendix A**.

Project ID	Project Name	Description of Project	Anticipated Timeframe
2000-1a 2000-1b 2000-1c	Morale, Welfare and Recreation Facilities	Construct morale, welfare, and recreation (MWR) facilities at the Marina and at a new recreation area. Marina facilities include pavilions (4,250 square feet [SF]), boat slips, floating pier, recreation center (42,728 SF), restrooms (680 SF) and a bath house (372 SF). Approximately 98,005 SF of parking area and 1,778 feet of dry storage fencing would also be installed. Recreational facilities include courts and athletic fields, pavilions and picnic areas, support facilities (5,983 SF), playground, outdoor swimming pool and driving range. Includes 290,381 SF of parking area, 12,321 SF of sidewalk and two slabs totaling 6,337 SF in size. Collectively these facilities support service members and dependents and fulfill base requirement for MWR facilities.	Sept 2023- Sept 2025

#### TABLE 1.4-1 2000 AREA DEVELOPMENT

Source: Tyndall AFB, 2019b.



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#### TABLE 1.4-2 8500 AREA DEVELOPMENT

Project ID	Project Name	Description of Project	Anticipated Timeframe
8500-1	53 WEG Subscale Drone Facility	Construct a Subscale Drone facility complex with pilotless aircraft shops (50,870 SF), Electronic Counter Measure pod shops and storage (38,763), engine test cell (4,200 SF), chute shop (23,463 SF), and wash rack (2,588 SF). Approximately 15,950 SF of roadway would be demolished to accommodate facility construction, and replaced with approximately 31,429 SF of roadway. Similarly, approximately 8,284 SF of parking/pavement area would be demolished and replaced with 15,911 SF of new impervious area.	Sept 2023 – Sept 2025

Source: Tyndall AFB, 2019b.




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Project ID	Project Name	Description of Project	Anticipated Timeframe
9700-1	AFCEC RDT&E Facilities and Gate	Construct AFCEC Research, Development, Testing & Evaluation (RDT&E) Facilities, including: RDT&E Research Facility (135,120 SF); AFCEC Firefighting Research and Development (R&D) Facility (17,437 SF); Ballistics Lab (11,000 SF); Vehicle Maintenance Facility (12,540 SF); Heavy Equipment Storage (5,500 SF); Cyber Operations Building (22,000 SF); Civil Engineer (CE) Materials Testing Runway Support Building (2,750 SF); Robotics Range Control Support Building (27,500 SF); Energy and Utility Range Control Support Buildings (1,100 SF); Materials Testing Runway (75,000 SF); Robotics Storage Range (200,000 SF); Gate and Lane Houses (512 SF); Vehicle Inspection Port (1,763 SF) with Canopy (3,201 SF). Perimeter Fencing (11,000 linear feet [LF]), and five active and passive barriers would also be constructed, along with approximately 34,800 SF of access roadway.	Sept 2023 – Sept 2025
9700-2	Fire Station #4	Construct a 6,356 SF two bay, satellite firefighting vehicle station to meet response times to the Silver Flag Training Area and AFCEC RDT&E Facilities.	Sept 2023 – Sept 2025

#### TABLE 1.4-3 9700 AREA DEVELOPMENT

Source: Tyndall AFB, 2019b.



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#### TABLE 1.4-4 FLIGHTLINE AREA DEVELOPMENT

Project ID	Project Name	Description of Project	Anticipated Timeframe
F-01	53 WEG Hangar	Construct an Aircraft Maintenance Hangar and associated facilities for the 53 WEG. Proposed facility construction includes a QF-16 Aircraft Maintenance Shop (15,434 SF), Armament Research Testing facilities (1,610 SF), Maintenance Hangar (94,898 SF), Aircraft Corrosion Control facilities (9,200 SF), and a Fuel Systems Maintenance Dock (13,380 SF).	July 2021 – May 2022
F-02	53 WEG HQ Facility	Construct a consolidated facility with administrative and operations areas for the 53rd Test Support Squadron, 53 WEG, and 83rd Squadron Operations staff. The administrative areas include conferencing, meeting, and other special spaces. The squadron operations areas would provide mission planning, Sensitive Compartmented Information Facility workspace, briefing, storage, and vault space. Temporary Duty maintenance bays would also be provided. Overall, proposed facilities total 9,632 SF of Group Headquarters (HQ) facilities, 39,367 SF of Squadron Operations facilities, and 26,394 SF of Sensitive Compartmented Information Facility space.	Sept 2023 – Sept 2025
F-03	Tyndall AFB Gate Complexes (Flightline)	<u>Airey Gate (Flightline</u> ): Entry access, includes one Gate House (500 SF), two Lane Houses (900 SF), five lanes (three in and two out) and five active/passive barriers for the protection of restricted or controlled areas. Supporting facilities include a canopy and overwatch facility; 5,400 SF total. The perimeter fence will span the site of the gates' primary and supporting facilities and will be 11,000 LF. Approximately 62,212 SF of pavement area and 83,743 SF of roadway would be demolished to enable installation of approximately 144,436 SF of proposed access roadway area.	July 2021 – Sept 2021
F-04	OSS Facility	Construct a consolidated Operations Support Squadron (OSS) Facility to support the 53 WEG in three main functions: Base Operations (12,041 SF), Transient Alert (12,370 SF), and Radar Approach Control Center (9,784 SF).	Sept 2023 – Aug 2024
F-05	WEG Parking Apron	Approximately 13,691 square yards (SY) of pavement is required to support the Weapons Evaluation Group (WEG) aircraft and provide area for aircraft operations outside of the obstruction free area. Parking aprons provide aircraft parking, servicing, and loading capabilities. Apron lighting is also provided to support nighttime maintenance activities on the apron. The additional pavement allows access to the hangars and maintenance facilities as well as provides adequate space for taxi lanes with pull through parking. The extension of the parking apron is also required to move aircraft out of the live ordnance loading area and the taxiway obstruction free areas to reduce the need for waivers and the associated hazards with operating in those areas.	July 2021 – May 2022
F-06	Aerospace & Operational Physiology Facility	Construct an Aerospace Operations and Physiology as well as an Aircrew Flight and Equipment Shop, collectively totaling approximately 11,658 SF. The facility provides highly specialized training areas including an altitude chamber, pump and oxygen room, recovery room, and reduced oxygen breathing device room. Assembly and administrative areas are also required.	Sept 2023 – April 2025
F-07	Special Purpose Vehicle Maintenance	Construct two Vehicle Maintenance Facilities to support refueling vehicles, fire trucks and material handling equipment (MHE). The facilities include a Refueler Maintenance facility (8,231 SF) and a Vehicle Maintenance Fire and MHE facility (11,994 SF). For	July 2021 – July 2023

Project ID	Project Name	Description of Project	Anticipated Timeframe
		efficiency and safety, the Refueler Maintenance facility will be located in the refueler parking area and service the R-11s and C- 300 refueling vehicles. The Fire and MHE Maintenance Facility, located on the flight line, will service approximately 60 pieces of MHE and 14 fire trucks.	
F-08	Operations Group/ Maintenance Group HQ	Construct a combined Operations, Maintenance, and Reserve Group HQ, totaling approximately 31,027 SF, for the 325th Operations Group, Maintenance Group, and Mission Support Group.	July 2021 – Jan 2022
F-09	Deployment Center/Flight Line Dining/AAFES	Construct a Deployment Center/Flight Line Dining/Army and Air Force Exchange Service (AAFES) facility to provide space for receiving and processing personnel and baggage, kitchen, dining, and sales services. Proposed facility construction includes a Deployment Processing Center (37,362 SF), Secure Cargo Yard (123,850 SF), Flight Kitchen/Dining Facility (5,995 SF), AAFES Shoppette (1,076 SF), and an AAFES Barbershop (323 SF).	Sept 2023 – Sept 2025
F-10	Flightline – MSA Facilities, 7000 Area	Construct new facilities and renovate existing Munition Storage Area (MSA) facilities. Proposed facility construction includes: Above Ground Magazines (20,000 SF); Conventional Munitions Shop (19,085 SF); Ancillary Explosive Facilities (16,980 SF); Administration Facilities (7,580 SF); and Air Supply Equipment Shop/Storage Facility Pad (5,400 SF). The facilities will include administration, maintenance bays and a concrete pad. Improvements include resurfacing and striping the entire parking area to accommodate up to 76 cars and construction of a new egress road to correct a life-safety deficiency. Otherwise, several facilities that were damaged may be reused after renovations: Missile Maintenance (Building 7028, 11,975 SF), Countermeasures (Building 7024, 1,980 SF), Administrative (Building 7032, 2,534 SF and Building 7052, 5,046 SF). Repairs may include re-roofing, door and window replacements, mechanical and electrical replacements and interior fit-outs.	July 2021 – Apr 2023

Source: Tyndall AFB, 2019b.











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Project ID	Project Name	Description of Project	Anticipated Timeframe
SF-01	Silver Flag Facilities	Construct multiple facilities at the Silver Flag training site, including a Vehicle Maintenance Shop (11,920 SF), Base Engineer Covered Storage Facility (10,000 SF), and a Technical Training Classroom (10,072 SF). The vehicle maintenance shop provides capabilities for heavy vehicle maintenance with six maintenance bays.	Sept 2023 – Sept 2025

#### TABLE 1.4-5 SILVER FLAG AREA DEVELOPMENT

Source: Tyndall AFB, 2019b.



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#### TABLE 1.4-6 SUPPORT AREA DEVELOPMENT

Project ID	Project Name	Description of Project	Anticipated Timeframe
SA-01	Civil Engineer Contracting USACE Complex	Construct a Civil Engineer Squadron (CES), Base Contracting Squadron, and United States Army Corps of Engineers (USACE) Complex. This project will provide administrative space for CE, Contracting, and USACE functions. Proposed facility construction includes: a Base Engineer Maintenance Shop (28,460 SF); Base Engineer Maintenance Shop 6000 Area (24,078 SF); Forestry Guard Station (6,925 SF); Base Engineer Storage Shed (37,208 SF); Base Engineer Storage Shed 6000 Area (2,063 SF); Base Engineer Administration (17,577 SF); Group HQ (7,960 SF); Administration Office, Non-Air Force (1,135 SF); Base Engineer Covered Storage Facility (20,819 SF); Base CE Storage (13,451 SF); Base CE Storage 6000 Area (10,332 SF); Helicopter Pad (2,500 SF); Explosive Ordnance Disposal (EOD) Facility (16,994 SF); and a Base Engineer Pavement & Grounds Facility (5,957 SF).	Sept 2023 – Sept 2025
		As shown on <b>Figure 1.4-6</b> , the footprint of project SA-01 adjoins the footprints of projects SA-02 and SA-03. Within this combined area, approximately 219,575 SF of existing pavement would be demolished and replaced with new/realigned parking and pavement areas totaling approximately 200,946 SF.	
SA-02	Logistics Readiness Squadron Complex	Construct a Logistics Readiness Squadron (LRS) Complex to include: Vehicle Operations Administration (5,653 SF); Supply Administration (8,657 SF); Supply Administration HQ (8,451 SF); Traffic Management Office (2,393 SF); Hazardous Storage (6,095 SF); Supply Warehouse (90,375 SF); Air Freight Terminal (12,500 SF); Vehicle Yard (122,709 SF); Supply Open Storage (27,828 SF); Air Freight Processing (90,000 SF); Supply & Equipment Shed (14,930 SF); and a Vehicle Maintenance Shop (28,800 SF). As shown on <b>Figure 1.4-6</b> , the footprint of project SA-02 adjoins the footprints of projects SA-01 and SA-03. Within this combined area, approximately 219,575 SF of existing pavement would be demolished and replaced with new/realigned parking and pavement areas totaling approximately 200 946 SF	Sept 2023 – Sept 2025
SA-03	Emergency Management, EOC, ALT CP	Construct an emergency management (EM) facility (11,897 SF), emergency operations center (EOC) (6,878 SF), and alternate command post (ALT CP) facility (2,269 SF) to support EM actions for base operations. As shown on <b>Figure 1.4-6</b> , the footprint of project SA-03 adjoins the footprints of projects SA-01 and SA-02. Within this combined area, approximately 219,575 SF of existing pavement would be demolished and replaced with new/realigned parking and pavement areas totaling approximately 200,946 SF.	Sept 2023 – Sept 2025
SA-04	SFS Mobility Storage Facility	Construct a Mobility Storage Facility (3,000 SF) for Security Forces Squadron (SFS) to store their deployment and excess equipment.	Sept 2023 – Sept 2025
SA-05	New Lodging Facilities	Construct new Visiting Quarters (VQ) Lodging facility (169,486 SF) to provide 360 guestrooms, housekeeping spaces, and other amenities. The project will replace and consolidate the current aging and degraded visiting quarter facilities into a	July 2021 – July 2023

Project ID	Project Name	Description of Project	Anticipated Timeframe
		new facility that meets current standards for visitors' quarters.	
		As shown on <b>Figure 1.4-6</b> , the footprint of project SA-05 adjoins the footprints of projects SA-09 and SA-10. Within this combined area, approximately 354,012 SF of existing pavement/parking areas and approximately 130,525 SF of roadways would be demolished and replaced with new/realigned pavement/parking areas totaling approximately 686,496 SF, as well as new/realigned roadways totaling 177,299 SF.	
SA-06	Dorm Complex	Construct two five-story permanent party dormitories (266,856 SF) and one one-story technical training dormitory (13,450 SF). Properly sized and configured dormitories are required to support unaccompanied permanent party E1-E4s and the training of students. A total of approximately 167,681 SF of parking area and miscellaneous pavement is proposed to be demolished, along with approximately 19,325 SF of roadway, to be replaced with approximately 106,531 SF of new impervious area.	July 2021 – July 2023
SA-07	Child Development Center	Construct large Child Development Center (41,126 SF) to support dependent children, age six week to five years, of active duty service members assigned to Tyndall AFB with full-day, part-day, and hourly child care services. A total of approximately 105,097 SF of parking area and miscellaneous pavement is proposed to be demolished, along with approximately 74,224 SF of roadway, to be replaced with approximately 78,050 SF of new parking area and 33,085 SF of new roadway.	July 2021 – July 2023
SA-08	325 FW Headquarters Building	Construct an HQ facility (26,487 SF) to accommodate the 325 FW staff. The facility would house increased growth and consolidate functions into one facility. The facility would contain Wing Operations, and Operations Support functions and would include an Intelligence Community Directive /Intelligence Community Standard compliant section. The HQ facility would also contain a separate Command Post (7,494 SF) and a Crisis Action Team. Construct a second HQs administrative facility (3,061 SF) to support sensitive military programs. A total of approximately 255,141 SF of parking area and miscellaneous pavement is proposed to be demolished, along with approximately 128,094 SF of roadway, to be replaced with approximately 83,538 SF of new parking area and 15,405 SF of new roadway.	Oct 2023 – Sept 2025
SA-09	Chapel	Construct a chapel complex consisting of a Base Chapel (17,128 SF) and a religious education facility (4,873 SF). The chapel requires administrative and worship spaces. As shown on <b>Figure 1.4-6</b> , the footprint of project SA-09 adjoins the footprints of projects SA-05 and SA-10. Within this combined area, approximately 354,012 SF of existing pavement/parking areas and approximately 130,525 SF of roadways would be demolished and replaced with new/realigned pavement/parking areas totaling approximately 686,496 SF, as well as new/realigned roadways totaling 177,299 SF.	Sept 2023 – Sept 2025

Project ID	Project Name	Description of Project	Anticipated Timeframe
SA-10	Community Commons Facility	Construct two Community Commons facilities. The first includes a Recreation Center (8,415 SF), Bowling Center (19,624 SF), Base Restaurant (12,500 SF), and Arts and Crafts Center (9,875 SF). The second facility includes a Base Library (16,436 SF), Post Office (6,325 SF), Fast Food Service Facility and Coffee Bar (1,313 SF), and Bay County Tax Collector office (1,000 SF). As shown on <b>Figure 1.4-6</b> , the footprint of project SA-10 adjoins the footprints of projects SA-05 and SA-09. Within this combined area, approximately 354,012 SF of existing pavement/parking areas and approximately 130,525 SF of roadways would be demolished and replaced with new/realigned pavement/parking areas totaling approximately 686,496 SF, as well as new/realigned roadways totaling	Sept 2023 – Sept 2025
SA-11	Tyndall AFB Gate Complexes (Support)	<ul> <li>177,299 SF.</li> <li>Tyndall Gate (Support Area): Entry and large vehicle inspection station. Includes one Gate House (500 SF), two Lane Houses (900 SF), five lanes (three in and two out) and one Vehicle Inspection Port (3,740 SF). The vehicle inspection port is a one-bay building for authorizing and inspecting larger/heavy duty vehicles entering at the Tyndall Gate. Includes five active/passive barriers for the protection of restricted or controlled areas or any area where threat of terrorism is imminent. Supporting facilities include a canopy (4,500 SF) and overwatch facility (900 SF). The perimeter fence will span the site of the gates' primary and supporting facilities and will be 11,000 LF.</li> <li>Commercial Gate (Support Area): Entry and large vehicle inspection station. Includes one Gate House (500 SF), two Lane Houses (900 SF), six lanes (three in and three out) and one Vehicle Inspection Port (3,740 SF). The vehicle inspection port is a two-bay building for authorizing and inspecting larger/heavy duty vehicles entering at the Commercial Gate. Includes six active/passive for the protection of restricted or controlled areas or any area where threat of terrorism is imminent. Supporting facilities include a canopy (4,500 SF) and overwatch facility (900 SF). The perimeter fence will span the site of the gates' primary and supporting facilities and will be 11,000 LF.</li> </ul>	July 2021- Nov 2021

Source: Tyndall AFB, 2019b.









Project ID	Project Name	Description of Project	Anticipated Timeframe
M-01	Airfield Drainage	Construct drainage ditches (72,649 LF) for proper stormwater management. Standing water from inadequate drainage can severely damage airfield pavements as well as attract unwanted wildlife. This project would demolish existing pipes, inlets, retention, and all other stormwater components found inadequate or unused in the comprehensive drainage system on the airfield.	July 2021 – July 2023
M-02	Site Development and Utilities	Construct additional utilities that are required to align with the placement of the new facilities. The existing utilities are in the path of new building locations and do not meet the current standards. Utilities have reached the end of their useful life and the continued expansion of the system over the past 75 years has led to ineffective splicing, thus they need to be replaced with modern components to support further growth. Proposed utilities construction includes Electrical (120,851 LF), Water (48,510 LF), Waste Water (15,620 LF), Storm Water (22,605 LF), Communications (80,622 LF), Roads (141,357 SY), Gas Pipeline (Gas Main) (22,530 SF), and Security Fence (22,424 LF).	May 2021 – July 2022
M-03	Building Demolitions	Demolish 264 buildings/structures on Tyndall AFB, totaling 1,921,2124 SF, that have either sustained damage beyond what is economically recoverable, and/or are being replaced/consolidated by individual proposed actions. Refer to <b>Appendix A</b> for a listing of buildings to be demolished.	Start 2020

#### **TABLE 1.4-7 MULTI-AREA DEVELOPMENT**

Source: Tyndall AFB, 2019b

January 2020

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# 1.5 ENVIRONMENTAL ANALYSIS APPROACH

To effectively manage the complexity and volume of installation development projects needed on Tyndall AFB the Air Force plans to use this EA as a baseline environmental analysis for future projects that are similar in scope to those analyzed in this EA. Any additional projects or future activities proposed on areas associated with the installation must be evaluated on their own merit under the Air Force EIAP guidelines to determine their environmental impacts and appropriate level of NEPA analysis required.

# 1.6 INTERAGENCY/INTERGOVERNMENTAL COORDINATION AND CONSULTATIONS

#### **1.6.1** Interagency Coordination and Consultations

Scoping is an early and open process for developing the breadth of issues to be addressed in the EA and for identifying significant concerns related to a proposed action. Per the requirements of Intergovernmental Cooperation Act of 1968 (42 U.S.C. 4231(a)) and EO 12372, *Intergovernmental Review of Federal Programs*, Federal, state, and local agencies with jurisdiction that could be affected by the Proposed Actions were notified during the development of this EA.

Appendix B contains the list of agencies consulted during this analysis and copies of correspondence.

#### **1.6.2** Government to Government Consultations

EO 13175, *Consultation and Coordination with Indian Tribal Governments* directs Federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. Consistent with that EO, DoDI 4710.02, Interactions with Federally-Recognized Tribes, and AFI 90-2002, Air Force Interaction with Federally-recognized Tribes, federally-recognized tribes that are historically affiliated with the Tyndall AFB geographic region will be invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation processes is distinct from NEPA consultation or the interagency coordination processes, and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Tyndall AFB point-of-contact for Native American tribes is the 325 FW Commander, who serves as the Installation Tribal Liaison Officer.

On 31 October 2019 the Air Force solicited early comment from the six Native American tribal governments whose interests might be directly and substantially affected by the Proposed Actions. Letters informing the tribes of the intent to prepare the attached EA and requesting input from the tribes were sent to the Poarch Band of Creek Indians, Seminole Nation of Oklahoma, Miccosukee Tribe of Indians of Florida, Muscogee (Creek) Nation, Seminole Tribe of Florida, and Thlopthlocco Tribal Town.

Correspondence and Additional information regarding the Native American tribal governments that were consulted with regarding these actions are listed in **Appendix B**.

#### **1.6.3** Other Agency Consultations

Per the requirements of Section 106 of the NHPA and implementing regulations (36 CFR Part 800), Section 7 of the ESA and implementing regulations, and the MBTA, findings of effect and request for concurrence were transmitted to the Florida Division of Historic Resources (FLDHR) State Historic Preservation Officer (SHPO) and the U.S. Fish and Wildlife Service (USFWS) on 15 October 2019. Other state and local agencies were consulted through the Florida Department of Environmental Protection (FDEP) Office of Intergovernmental Programs State Clearinghouse Process.

Concurrence indicating a preliminary finding of no potential to cause effects/no historic properties affected/adverse effect is pending from the State SHPO. Concurrence indicating a primary finding of no effect/may affect, not likely to adversely affect/likely to adversely affect from the USFWS is similarly pending.

Correspondence regarding the findings and concurrence and resolution of any adverse effect is included in **Appendix B**.

# 1.7 PUBLIC AND AGENCY REVIEW OF THE ENVIRONMENTAL ASSESSMENT

Because the proposed action areas coincide with wetlands and/or floodplains, it is subject to the requirements and objectives of EO 11990 and EO 11988. The Air Force published early notice (i.e., at least 30 days prior to the release of the Draft EA) that the Proposed Actions would occur in a floodplain/wetland in the *Panama City News Herald* in October 2019. The comment period for public and agency input on these projects lasted for 30 days. The notice identified state and Federal regulatory agencies with special expertise that had been contacted and solicited public comment on the Proposed Actions and any practicable alternatives.

A Notice of Availability (NOA) of the Draft EA was published in the *Panama City News Herald*, announcing the availability of the EA for review in January 2020. The NOA invited the public to review and comment on the Draft EA. The NOA and public and agency comments will be provided in **Appendix B** of the Final EA.

Copies of the Draft EA were also made available for review at the following location:

Bay County Public Library 898 W 11th St. Panama City, FL 32401

#### **1.8 DECISION TO BE MADE**

The Air Force will make one of the following three decisions regarding the Proposed Actions:

- Select the No Action Alternative and do not implement the Proposed Actions.
- Prepare a FONSI and implement the Proposed Actions, if based on the analysis in this EA, the Proposed Actions would not have a significant environmental impact.

• Initiate preparation of an EIS, if based on the analysis in this EA, the Proposed Actions would have a significant environmental impact.

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# 2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

# 2.1 PROPOSED ACTION

Under the Proposed Action, 28 individual projects spanning six planning areas throughout the installation, as well as the three additional Multi-Area projects would rebuild Tyndall AFB to a fully operational base, providing new facilities/infrastructure, repair, demolition and functionality improvements to support the 325 FW mission and tenant units. This document assesses all individual projects within a planning area collectively as a discrete proposed action, and evaluates alternatives at a planning area level.

# 2.2 SELECTION STANDARDS

Under NEPA and 32 CFR Part 989, this EA is required to analyze the potential environmental impacts of the Proposed Actions, No Action Alternative, and reasonable alternatives. Reasonable alternatives are those that meet the underlying purpose of, and need for, the Proposed Actions; are feasible from a technical and economic standpoint; and meet reasonable selection standards (screening criteria) that are suitable to a particular action. Selection standards may include requirements or constraints associated with operational, technical, environmental, budgetary, and time factors. Alternatives that are determined to not be reasonable can be eliminated from detailed analysis in this EA. Additionally, EO 11988 and EO 11990 require consideration of practicable alternatives to avoid adverse effects on floodplains and wetlands, respectively. Practicable alternatives are those that are capable of being done within existing constraints and include consideration of pertinent factors including the environment, community welfare, cost, and available technology. Evaluation of multiple options in the planning process allows viable alternatives to be carried forward.

Planners review functional and spatial relationship concepts, current facility locations, environmental conditions, and the existing on-base environment. This analysis supports the NEPA process by considering several alternatives and evaluating their viability.

Alternatives to the Proposed Actions were each evaluated based on three universal selection standards, which were applied to all alternatives, described below.

**Standard 1:** *Planning Constraints* – Planning constraints are man-made or natural elements that can create significant limitations to the operation or construction of buildings, roadways, utility systems, airfields, training ranges, and other facilities. These constraints, when considered collectively with the installation's capacity opportunities, inform the identification of potential areas for development, as well as those areas that can be redeveloped to support growth. This standard addresses compatibility with installation operational aspects, natural and built resources, and land use compatibility, and largely dictate the location/placement of a proposed facility.

 Operational – Operational constraints are generally related to flying and maintaining aircraft; storing fuel, munitions, and other potentially hazardous cargo; and operating training ranges or fulfilling similar operational requirements that can limit future development activity. At Tyndall AFB, operational constraints include, but are not limited to, airfield clearance and safety zones,

noise contours, explosive safety quantity distance (ESQD) zones, and antiterrorism force protection.

- *Natural* Natural constraints include environmental and cultural resources at Tyndall AFB. These provide positive aesthetic, social, cultural, and recreational attributes that substantially contribute to the overall quality of life on base.
- *Built* Built constraints are related to the condition, functionality, or effectiveness of infrastructure systems, facilities, and other man-made improvements.
- Land Use Compatibility Land use compatibility constraints are associated with land use designations (e.g., airfield, administrative, recreation, etc.) on the installation and ensuring that planning considerations account for compatibility between proposed and existing uses (e.g., recreational use may not be compatible with the airfield).

**Standard 2:** *Installation Capacity Opportunities* – This refers to the capabilities of the installation's existing facilities/infrastructure to meet existing and future mission needs. This standard largely drives the scope of the facility/infrastructure development and/or improvement and requires support of the following aspects:

• Mission operations, mission support, built infrastructure, and quality of life.

**Standard 3:** *Sustainability Development Indicators* – This refers to the ability to operate into the future without a decline in the mission (i.e., mission sustainment), but also minimizing impacts on the natural and man-made systems that support it (i.e., environmental sustainability). Sustainability is a holistic approach to asset management that seeks to minimize the negative impacts of the Air Force's mission and operations on the environment. This standard also generally drives the scope of the facility/infrastructure development and/or improvement and supports sustainability of the installation through consideration of the following:

• Energy, water, waste water, air quality, facilities space optimization, encroachment, airfields, natural/cultural resources.

# 2.3 PROPOSED ACTIONS AND ALTERNATIVES

The NEPA and the CEQ regulations mandate the consideration of reasonable alternatives to the Proposed Actions. Reasonable alternatives are those that also could be utilized to meet the purpose of and need for each proposed action.

The NEPA process is intended to support flexible, informed decision-making. The analysis provided by this EA and feedback from the public and other agencies will inform decisions made about whether, when and how to execute the Proposed Actions. Among the alternatives evaluated for each project is a No Action Alternative.

The scope, location, and objectives of the Proposed Actions are described here, grouped by planning area. This section also presents reasonable and practicable alternatives for projects where multiple viable courses of action exist. Those alternatives are assessed relative to the universal selection standards and
project-specific selection standards. Selection standards identified for this EA are aligned with the planning principles described in **Section 1.2**, and are reflective of the Air Force requirement to consider natural and operational constraints, installation capacity and resiliency, sustainability and mission sustainment matters in its decision-making process per **Section 2.2** above. Further, the selection standards acknowledge and align with directives from the Secretary of the Air Force as issued in the January 2019 Air Force Infrastructure Investment Strategy (Air Force, 2019i).

Alternatives that fully met all three universal selection standards were considered reasonable and retained for consideration in this EA. Alternatives that did not meet one or more of the standards, or only partially met the standards, were eliminated and not carried forward for detailed analysis in the EA. **Table 2.3-1** presents a summary of the project-specific and universal selection standards applicable to each installation development project (and alternative) included in this EA.

ID	Standard Description	Supports Universal Standards
SS- 01	<ul> <li>Supports DoD Infrastructure Investment Strategy Objectives to:</li> <li>Reduce total facility square footage of obsolete or unused facilities by five percent in 20 years through divestment, demolition, conversion and consolidation.</li> <li>Cost-effectively modernize infrastructure by driving down life-cycle costs of recapitalization and improve infrastructure readiness.</li> <li>Harden infrastructure, reduce vulnerabilities, and respond/recover from disruptions to operations and supporting infrastructure.</li> <li>Prioritize repair of mission-critical infrastructure to achieve a facility mission capable rate of 90 percent or higher.</li> </ul>	Standard 1 (Built Constraints); Standard 2 (Mission Operations and Built Infrastructure); Standard 3 (Facilities Space Optimization)
SS-02	<ul> <li>Complies with mission needs by:</li> <li>Promoting operational efficiency and mission adjacency.</li> <li>Complying with all facility sizing and siting requirements based on mission needs.</li> <li>Prioritizing consolidation and relocation efforts to create development opportunities and improve operational efficiencies.</li> </ul>	Standard 2 (Mission Operations and Support, and Built Infrastructure)
SS-03	Supports MWR programs in accordance with AFI 34-101.	Standard 2 (Mission Support and Quality of Life)
SS-04	Avoids or minimizes interaction with operational and natural resource constraints (wetlands, floodplains, cultural resources, known contamination sites, clear zones, accident potential zones, explosives safety setbacks); or unavoidable interactions can be adequately mitigated.	Standard 1 (Operational and Natural Constraints)

# TABLE 2.3-1 PROJECT-SPECIFIC SELECTION STANDARDS SUMMARY

# 2.3.1 Flightline Area Alternatives

Besides the Flightline Area proposed action alternative shown on **Figure 1.4-4**, the Air Force investigated the following alternative courses of action to many of the individual Flightline Area projects defined in **Section 1.4** of this EA (AECOM, 2019). Adjacent planning constraints (i.e., natural resources, institutional controls boundaries) were considered where present. Each alternative is assessed in further

detail in the following sections, including an assessment of whether or not it conforms to applicable universal and project-specific selection standards, summarized on **Table 2.3-2**.

## Alternatives Considered:

- Proposed Action Alternative (Figures 1.4-4a and 1.4.4c): The proposed action alternative is considered the Air Force Preferred Alternative for Flightline Area reconstruction, including restoration of damaged MSA facilities (detailed in Section 1.4). The proposed action alternative would require airfield criteria waivers for penetrations to imaginary surfaces designed to provide adequate vertical clearance for arriving and departing aircraft. It also promotes operational adjacency and allows live ordnance loading adjacent to the Flightline.
- Alternative A (Figure 2.3-1): Alternative A focuses on the re-utilization of existing buildings, pavements and utilities wherever possible (MSA facility reconstruction for this alternative is the same as the proposed action alternative) Requires airfield criteria waivers for penetrations to imaginary surfaces designed to provide adequate vertical clearance for arriving and departing aircraft. Limits live ordnance loading of aircraft to the Live Ordnance Loading Area north of the Flightline ramp and runways. Some facility configurations do not promote operational adjacency. For clarity and for presentation purposes, pertinent Flightline Area constraints are shown separately on Figure 2.3-1a.
- Alternative B (Figure 2.3-2): Alternative B is similar to Alternative A but installs a larger degree of new structures and infrastructure (MSA facility reconstruction for this alternative is the same as the proposed action alternative). Allows live ordnance loading adjacent to the Flightline. Sets buildings back further toward U.S. Highway 98 which alleviates the need for airfield criteria waivers, but as a consequence reduced support facility area between the Flightline and U.S. Highway 98. For clarity and for presentation purposes, pertinent Flightline Area constraints are shown separately on Figure 2.3-2a.
- *No Action Alternative*: The No Action Alternative, Flightline operational capabilities and structural/infrastructural requirements would not be restored.

# Selection Standards Evaluation:

The results of the selection standards evaluation of the Proposed Action and alternatives is summarized on **Table 2.3-2** below. As shown, As shown, Alternative A does not satisfy SS-01 or SS-02. Alternative B satisfies SS-01 but only partially satisfies SS-02 and SS-04 and would result in operational inefficiencies as well as reduced safety due to proximity of explosives and munitions safety setbacks to public traffic route U.S. Highway 98. Therefore, Alternatives A and B were not retained for further evaluation.

	Evaluation			
ID	Proposed Action Alternative (Figures 1.4-4a and 4c)	Alternative A (Figure 2.3-1)	Alternative B (Figure 2.3-2)	
SS-01	<u>Yes</u> : Consolidates building areas/functions, promotes new, efficient buildings, and minimizes additional pavement areas.	<u>No</u> : Maximizes use of existing buildings, pavements, utilities, which does not increase resiliency, efficiency, or drive down life-cycle costs.	<u>Yes:</u> Consolidates building areas/functions, promotes new, efficient buildings, and minimizes additional pavement areas.	
SS-02	<u>Yes:</u> Allows ordnance loading on Flightline. Facility consolidation promotes adjacency which lowers mission response times and increases operational efficiency.	<u>No:</u> Operationally inefficient since facilities are spread out and maintenance access time is increased. Does not allow loading of ordnance on Flightline.	Yes/Partially: Although some facility consolidation occurs which maximizes efficiency and adjacency, limits support space between Flightline and U.S. Highway 98, limiting development opportunities in these areas.	
SS-03		Not applicable		
SS-04	<u>Yes:</u> Vertical penetrations to airspace occur but can be mitigated using airfield criteria waiver process. Environmental Restoration Program (ERP) sites coincide with project areas but interaction can be mitigated using design measures and obeying institutional controls/best practices during construction.	<u>Yes:</u> Vertical penetrations to airspace surfaces occur but can be mitigated using airfield criteria waiver process. ERP sites coincide with project areas, but interaction can be mitigated using design measures and obeying institutional controls/best practices during construction.	<u>Yes/Partially</u> : Airfield criteria waivers for vertical airspace penetrations are not needed due to greater structure distances from airfield. ERP site involvement can be mitigated as with other alternatives. However, places explosives/munitions safety setbacks closer to public traffic route U.S. Highway 98 than other alternatives.	

## TABLE 2.3-2 SELECTION STANDARDS EVALUATION: FLIGHTLINE AREA ALTERNATIVES

Selection Standards Legend:

SS-01: Supports DoD Infrastructure Investment Strategy objectives

SS-02: Complies with mission needs

SS-03: Supports MWR programs

SS-04: Avoids/minimizes operational and environmental constraints

Color Legend:

Green – Alternative meets selection standard. (or "mostly meets")

Yellow – Alternative partially meets selection standard. (or "meets some but not most")

 $\mathbf{Red}$  – Alternative does not meet selection standard. (or "does not meet most")

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## 2.3.2 SUPPORT AREA ALTERNATIVES

Besides the Support Area proposed action alternative shown on **Figure 1.4-6**, the Air Force investigated the following alternative courses of action to many of the individual Support Area projects defined in **Section 1.4** of this EA (AECOM, 2019). Adjacent planning constraints (i.e., natural resources, institutional controls boundaries) were considered where present. Each alternative is assessed in further detail in the following sections, including an assessment of whether or not it conforms to applicable universal and project-specific selection standards, summarized on **Table 2.3-3**.

## Alternatives Considered:

- **Proposed Action Alternative (Figure 1.4-6)**: The proposed action alternative is considered the Air Force Preferred Alternative for Support Area reconstruction (detailed in **Section 1.4**). The proposed action alternative maximizes consolidation of existing functions, optimizes land use development patterns, and integrates a variety of transportation improvements to streamline vehicular and pedestrian circulation.
- *Alternative A (Figure 2.3-3):* Focuses on utilizing existing transportation network, infrastructure and facilities to maximum extent practicable. Duplicates pre-storm development patterns. Pertinent Support Area constraints are also shown on Figure 2.3-3.
- *Alternative B (Figure 2.3-4):* Similar to Alternative A but prioritizes demolition and replacement of existing facilities. Consolidates existing functions into new multi-story buildings. Pertinent Support Area constraints are also shown on **Figure 2.3-4**.
- *No Action Alternative*: The No Action Alternative, Support Area facilities and functions would remain unsupported and degraded from post-hurricane conditions.

## Selection Standards Evaluation:

The results of the selection standards evaluation of the Proposed Action and alternatives is summarized on **Table 2.3-3** below. As shown, Alternative A does not satisfy SS-01 and only partially satisfies SS-02. Alternative B satisfies SS-01, SS-03, SS-04, and SS-05, but only partially satisfies SS-02 and would not improve pedestrian and vehicular circulation or optimize development patterns within the Support Area. Therefore, Alternatives A and B were not retained for further evaluation.

	Evaluation			
ID	Proposed Action Alternative (Figure 1.4-6)	Alternative A (Figure 2.3-3)	Alternative B (Figure 2.3-4)	
SS-01	<u>Yes:</u> Consolidates existing functions into new multi- story facilities with lower life cycle costs, increased resiliency and greater optimization of available facility space.	<u>No:</u> Reuses existing infrastructure and does not fully consolidate facilities in a way that reduces facility and infrastructure footprints. Maintenance and life-cycle costs are not reduced due to a lack of consolidation.	<u>Yes:</u> Consolidates existing functions into new multi- story facilities with lower life cycle costs, increased resiliency and greater optimization of available facility space.	
SS-02	<u>Yes:</u> Consolidates all 325 LRS and 325 CES facilities into the Support Area, which frees up developable space in the Flightline Area and reduces travel time between 325 LRS facilities. Simplifies roadway alignments and pedestrian walkways in order to improve pedestrian/vehicular circulation and optimize development patterns in the area.	<u>No:</u> Does not fully relocate 325 LRS and 325 CES functions from Flightline Area which does not fully support adjacency and efficiency objectives, increases travel times, and foregoes some Flightline development opportunities. Does not improve pedestrian/vehicular circulation or optimize development patterns in the area.	<u>Yes/Partially:</u> Consolidates all 325 LRS and 325 CES facilities into the Support Area, which frees up developable space in the Flightline Area and reduces travel time between 325 LRS facilities. Does not improve pedestrian/vehicular circulation or optimize development patterns in the planning area.	
SS-03	Yes: Provides full consolidation and enhancement of MWR facilities.	<u>Yes/Partially:</u> Restores facilities that are contributive to installation MWR needs but does not fully consolidate these facilities or improve quality of life beyond "status quo" conditions.	Yes: Provides full consolidation and enhancement of MWR facilities.	
SS-04	Yes: Avoids all applicable major natural and operational constraints located within Support Area.	Yes: Some projects are sited within or adjacent to 100- year floodplain, but opportunities exist to avoid or minimize encroachment.	Yes: Some projects are sited within or adjacent to 100- year floodplain, but opportunities exist to avoid or minimize encroachment.	

## **TABLE 2.3-3 SELECTION STANDARDS EVALUATION: SUPPORT AREA ALTERNATIVES**

Selection Standards Legend:

SS-01: Supports DoD Infrastructure Investment Strategy objectives

**SS-02:** Complies with mission needs

SS-03: Supports MWR programs SS-04: Avoids/minimizes operational and environmental constraints

Color Legend:

Green – Alternative meets selection standard. (or "mostly meets")

Yellow - Alternative partially meets selection standard. (or "meets some but not most")

Red – Alternative does not meet selection standard. (or "does not meet most")











## 2.3.3 9700 AREA ALTERNATIVES

Besides the 9700 Area proposed action alternative shown on **Figure 1.4-3**, the Air Force investigated the following alternative courses of action to 9700 Area projects defined in **Sections 1.4** of this EA. The candidate locations are shown on **Figure 2.3-5**. Adjacent planning constraints (i.e., natural resources, institutional controls boundaries) were considered where present. Each alternative is assessed in further detail in the following sections, including an assessment of whether or not it conforms to applicable universal and project-specific selection standards summarized on **Table 2.3-4**.

## Alternatives Considered:

- Proposed Action Alternative (Figure 1.4-3): The proposed action alternative is the Air Force Preferred Alternative for the reconstruction of the 9700 Area, maximizing operational synergies with Rapid Engineers Deployable Heavy Operations Repair Squadron Engineers (RED HORSE) and R&D functions, asset consolidation, perimeter and airspace security.
- Alternative A (Figure 2.3-6): Places AFCEC laboratory complex near RED HORSE mission, 1.5 miles along Farmdale Road from U.S. Highway 98. Provides visual screening being set back far from base roadways. Provides convenient access to training runway and Sky X demolition range. Located within restricted airspace to facilitate Remotely Piloted Aircraft (RPA) mission. Pertinent 9700 Area constraints are also shown on Figure 2.3-6.
- Alternative B (Figure 2.3-7): Locates new, consolidated laboratory facilities adjacent to existing AFCEC laboratories and administrative functions in Buildings 1117 and 1120. Limits available range area for robotics and RPA testing. Does not promote adjacency to RED HORSE mission and requires travel to Sky X range. Located near Flightline which is not conducive to RPA mission. Pertinent 9700 Area constraints are also shown on Figure 2.3-7.
- Alternative C (Figure 2.3-8): Repurposes and expands existing laboratory and administration facilities in Buildings 1117 and 1120. Does not provide consolidated laboratory campus or room or additional mission capacity or expansion. Does not promote adjacency to RED HORSE mission and requires travel to Sky X range. Located within restricted airspace to facilitate RPA mission. Pertinent 9700 Area constraints are also shown on Figure 2.3-8.
- *Alternative D (Figure 2.3-9):* Reconstructs existing complex in original location and re-utilizes existing infrastructure and facilities. Located within restricted airspace to facilitate RPA mission. Pertinent 9700 Area constraints are also shown on **Figure 2.3-9**.
- *No Action Alternative*: The No Action Alternative, AFCEC mission capabilities and structural/infrastructural requirements would not be restored.

# Selection Standards Evaluation:

The results of the selection standards evaluation of the Proposed Action and alternatives is summarized on **Table 2.3-4**. As shown, As shown, Alternative A only partially satisfies SS-01, SS-02, and SS-03. Alternative A would not maximize facility consolidation, would result in AFCEC R&D testing and requirements group remaining geographically separated, and would site facilities within or adjacent to explosives safety setback areas. Alternative B satisfies SS-01 but does not satisfy SS-02 and only partially

satisfies SS-04. Alternative B would site AFCEC facilities within an incompatible land use zone and would not support the RPA missions. Alternative C does not satisfy SS-02 and only partially satisfies SS\_01 and SS-04. Alternative C would not maximize consolidation or removal of obsolete facilities and would site AFCEC facilities within an incompatible land use zone. Alternative D satisfies SS-04 but does not satisfy SS-01 or SS-02. Therefore, Alternatives A, B, C, and D were not retained for further evaluation.

1 A	IABLE 2.5-4 SELECTION STANDARDS EVALUATION: 9700 AREA ALTERNATIVES         Evaluation					
ID	Proposed Action Alternative (Figure 1.4-3)	Alternative A (Figure 2.3-6)	Alternative B (Figure 2.3-7)	Alternative C (Figure 2.3-8)	Alternative D (Figure 2.3-9)	
SS-01	Yes: Consolidates all AFCEC assets into one campus.	Yes/ Partially: Facilities are spread across a large geographic area and although the alternative makes space in Building 1117 to consolidate some AFCEC functions, overall facility consolidation is not maximized.	<u>Yes:</u> Consolidates all AFCEC assets into one campus.	Yes/Partially: Provides mixed consolidation opportunities for most of existing AFCEC facility requirements by expanding existing building areas. Does not maximize consolidation or removal of obsolete facilities.	<u>No:</u> Reconstructs facilities in basically the same location/configurati on as previous facilities, which are prone to flooding. Location directly adjacent to coastline and within storm zone does not promote resiliency of new facilities.	
SS-02	Yes: Takes full opportunity of synergies with RED HORSE, consolidates all R&D testing and requirements group functions, and promotes adjacency to Sky X range. Provides secured perimeter and entry control point.	<u>Yes/Partially:</u> Although siting near the RED HORSE mission could increase adjacency and efficiency, the AFCEC R&D testing group and requirements group remain geographically separated. Provides entry control point.	No: Operational efficiency and mission adjacency opportunities are missed in that the facilities are separated from the RED HORSE mission and use of the Sky X range requires travel across the installation.	<u>No:</u> Operational efficiency and mission adjacency opportunities are missed in that the facilities are separated from the <b>RED HORSE</b> mission, and use of the Sky X range requires travel across the installation.	<u>No:</u> Overall response times are the greatest of all alternatives considered, due to remote location and distance of over ten miles from Support Area.	
SS-03			Not applicable.			
SS-04	<u>Yes:</u> Some project areas intersect known wetlands and floodplains, but could potentially be avoided/mitigat ed with project design measures.	Yes/Partially: Although location in restricted airspace is supportive of the RPA mission, facilities are sited within or adjacent to explosives safety setbacks. Some project areas intersect known wetlands and floodplains, but could potentially be avoided/mitigated	Yes/Partially: Some project areas intersect known wetlands and floodplains, but could potentially be avoided/mitigate d with project design measures. However, AFCEC testing facilities are an incompatible land use with nearby dormitory facilities. Does	Yes/Partially: Some project areas intersect known wetlands and floodplains, but could potentially be avoided/mitigated with project design measures. However, AFCEC testing facilities are an incompatible land use with nearby dormitory facilities, Does	Yes/Partially: Although location is restricted airspace is supportive of RPA mission, facilities are unavoidably sited completely within wetlands and floodplains. Facilities are sited completely within ERP sites but interaction can be mitigated using design measures and obeying	

# TABLE 2.3-4 SELECTION STANDARDS EVALUATION: 9700 AREA ALTERNATIVES

with project design measures.	not support RPA mission due to	not support RPA mission due to	institutional controls/best
Ũ	proximity to	proximity to	practices during

#### Selection Standards Legend:

SS-01: Supports DoD Infrastructure Investment Strategy objectives

**SS-02:** Complies with mission needs

SS-03: Supports MWR programs

SS-04: Avoids/minimizes operational and environmental constraints

Color Legend:

Green – Alternative meets selection standard. (or "mostly meets")

Yellow – Alternative partially meets selection standard. (or "meets some but not most")

**Red** – Alternative does not meet selection standard. (or "does not meet most")





Work/910 CAD/25-SKETCHES/Exhibits/FIG 2.3-6.dwg EA\900 AFB S:\Projects\G\GSRC\60610846 Tyndall



13:48 10/18/2019 EA\900 Work\910 CAD\25-SKETCHES\Exhibits\FIG 2.3-7.dwg AFB S:\Projects\G\GSRC\60610846 Tyndall





10/18/2019 EA\900 Work\910 CAD\25-SKETCHES\Exhibits\FIG 2.3-9.dwg AFB S:\Projects\G\GSRC\60610846 Tyndall

# 2.3.4 Alternatives Considered for Remaining Projects

## 2000 Area Project Alternatives:

Besides the proposed action alternative shown on **Figures 1.4-1a** and **1c**, the Air Force considered the merits of the No Action Alternative to restoring recreational facilities in the 2000 Area. With the No Action Alternative, airmen and their families as well as visitors to Tyndall AFB, would lose access to marina amenities and sports and recreational amenities that were available in pre-hurricane conditions. Per AFI 34-101, *Morale, Welfare and Recreation Programs and Use Eligibility*, outdoor recreation capabilities support mission readiness through programs and facilities delivering Airmen and family resilience and readiness. Outdoor recreation also enhances team building and unit cohesion and trust among Airmen (Air Force, 2019). Therefore, the Air Force has identified the proposed action alternative shown on **Figures 1.4-1a** and **1c** as the Preferred Alternative for 2000 Area projects in alignment with selection standard SS-03 (**Table 2.3-1**).

## 8500 Area Project Alternatives:

Besides the proposed action alternative shown on **Figures 1.4-2** and **2a**, the Air Force considered the merits of the No Action Alternative to reconstructing Subscale Drone and related facilities in the 8500 Area. With the No Action Alternative, the 53 WEG Subscale Drone mission would not be fully supported as it was prior to the hurricane. The facilities in the Subscale Drone complex need to be collocated for operational efficiency and mission support, located near the drone runway, and located within and adjacent to compatible land uses. Available locations and configurations that would fully support the mission are limited to the proposed action alternative. Therefore, the Air Force has identified the proposed action alternative shown on **Figure 1.4-2** as the Preferred Alternative for 8500 Area projects in alignment with selection standards SS-01, SS-02, and SS-04 (**Table 2.3-1**).

# Silver Flag Area Project Alternatives:

Besides the proposed action alternative shown on **Figures 1.4-5**, the Air Force considered the merits of the No Action Alternative to restoring training and support facilities in the Silver Flag Area. With the No Action Alternative, hurricane-damaged or destroyed buildings that support the training and other activities at Silver Flag would not be replaced. This would continue to impede the RED HORSE training activities located at the site. Facility siting and planning efforts to restore and maximize site functionality are constrained by the location and configuration of the Silver Flag area. The proposed action alternative would restore and maximize site functionality and fully meet mission needs within existing constraints. Therefore, the Air Force has identified the proposed action alternative shown on **Figure 1.4-5** as the Preferred Alternative for Silver Flag Area projects in alignment with selection standards SS-01, SS-02, and SS-04 (**Table 2.3-1**).

# Multi-Area Building Demolition Alternatives:

Besides the proposed action alternative shown on **Figure 1.4-7a**, the Air Force considered the merits of the No Action Alternative to demolishing the over 200 buildings identified in **Appendix A** of this EA.

With the No Action Alternative, the buildings listed in **Appendix A** would remain in place, which the Air Force determined would substantially impede mission rebuild capabilities and would compromise the health and safety of airmen and installation personnel. Therefore, the Air Force has identified the proposed action alternative shown on **Figure 1.4-7a** and detailed in **Appendix A** as the Preferred Alternative for demolition activities in alignment with selection standards SS-01 and SS-02 (**Table 2.3-1**).

# Multi-Area Airfield Drainage Alternatives:

Besides the proposed action alternative shown on **Figure 1.4-7b**, the Air Force considered the merits of the No Action Alternative to performing drainage improvements to the infield portions of the airfield. With the No Action Alternative, no stormwater ditches would be installed and no demolition of outdated, damaged, underutilized or derelict stormwater management structures would occur. Standing water would continue to persist on the airfield after rainfall events from inadequate drainage, which would continue to severely damage airfield pavements as well as attract unwanted wildlife. Therefore, the Air Force has identified the proposed action alternative shown on **Figure 1.4-7b** as the Preferred Alternative for demolition activities in alignment with selection standard SS-02 (**Table 2.3-1**).

# Multi-Area Utility Corridor Project Alternatives:

Besides the proposed action alternative shown on **Figure 1.4-7b**, the Air Force considered the merits of the No Action Alternative to building the Multi-Area utility corridor to upgrade utilities and provide connections to newly constructed or relocated facilities. With the No Action Alternative, outdated and in some cases insufficient utility lines and connections would remain in place. No new utility corridors or rights-of-way would be provided and newly constructed or relocated facilities would not have utility connections. The configuration of the proposed utility corridor is necessary to provide utility service and connections to proposed new construction and the siting was designed to minimize or avoid environmentally sensitive areas. Therefore, the Air Force has identified the proposed action alternative shown on **Figure 1.4-7b** as the Preferred Alternative for the utility corridor project in alignment with selection standards SS-01, SS-02, and SS-03 (**Table 2.3-1**).

# 2.3.5 Alternatives Eliminated from Detailed Consideration

Per 32 CFR 989.8(c), the Air Force may expressly eliminate alternatives from detailed analysis. Reasonable selection standards were applied to determine whether or not action alternatives considered, including the proposed action alternative and No Action Alternative, were suitable for detailed evaluation in this EA. Only alternatives which fully satisfied applicable selection standards, as summarized on **Tables 2.3-1** through **2.3-4**, as well as the No Action Alternative, were retained for detailed environmental analysis in the remainder of this EA. Alternatives which did not meet or only partially met established selection standards were eliminated from further analysis.

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# 3.0 AFFECTED ENVIRONMENT

# 3.1 SCOPE OF THE ANALYSIS

The scope of this EA includes an analysis of effects resulting from the implementation of the Proposed Actions and No Action Alternative. Alternatives not fully achieving established selection standards, as discussed in **Section 2.3** of this EA, were not retained for detailed analysis. The EA environmental analysis process identifies and discloses potential effects on the natural and human environments in and surrounding Tyndall AFB. Impacts are identified and disclosed within established Regions of Influence (ROI) which are resource specific. For instance, the ROI for land use is entirely within the installation boundary, while the ROI for air quality is the entire airshed.

# 3.1.1 **RESOURCES ANALYZED**

Based on the components of the Proposed Actions, the Air Force determined that there would be temporary and short-term effects due to construction or demolition projects at Tyndall AFB, as well as long-term effects associated with the construction activities. As a result of this review, resource categories are evaluated: air quality; noise; safety and occupational health; land use; soils; water resources; biological resources; cultural resources; hazardous materials and waste; and socioeconomics.

## 3.1.2 **Resources Eliminated from Detailed Analysis**

The Proposed Actions was determined to have no effect on several resources; therefore, these resources were eliminated from detailed analysis in this EA, in accordance with CEQ regulations. The resources that were eliminated from detailed analysis and the rationale for their elimination are presented in the subsections that follow.

# 3.1.2.1 Visual Resources

The Air Force anticipates no negative effects on or conflicts with visual resources as a result of the Proposed Actions at Tyndall AFB. The justification is that construction and/or improvement projects would 1) take place on the installation and be consistent with the existing visual landscapes; 2) primarily occur in the developed portion of the installation; 3) be built of materials similar to other structures on the installation; and 4) be landscaped consistent with the existing habitat. For these reasons, implementation of the Proposed Actions or No -Action Alterative would not have an adverse impact on the visual environment at Tyndall AFB or the lands surrounding the installation.

# 3.1.2.2 Airspace

The Proposed Actions do not include any beddown of additional units or increase in the number of aircraft or sorties operating out of Tyndall AFB. Therefore, the Proposed Actions would have no effect on the classification or parameters of any Special Use Airspace or any other existing airspace that overlies Tyndall AFB. The Proposed Actions would also have no potential to result in airspace restrictions or congestion, or otherwise impact military or non-military use of any airspace. For these reasons, the Proposed Actions would have no effect on airspace.

# 3.1.2.3 Geology

The Proposed Actions would not involve any activity that would adversely affect subsurface geological formations. Construction of the new structures and demolition of the existing buildings would be conducted using standard methods that would have no appreciable impact on geology such as site clearing, grading, and compacting. Excavation is expected to be conducted only to depths necessary for the facility foundation and utility connections. For these reasons, the Proposed Actions would have no appreciable effect on geology.

# **3.2 AIR QUALITY AND CLIMATE CHANGE**

Air quality impacts can range from localized effects to the dispersal and transport of air pollutants across large geographic areas. For the purposes of the air quality impact assessment, potential air emissions associated with the Proposed Actions are quantified and disclosed, compared against any applicable thresholds, and discussed in the context of the airshed and air quality control framework applicable to Bay County. For this EA, the applicable ROI is the airshed within which Bay County resides. However, the nature and magnitude of the Proposed Actions are expected to create only localized impacts to the area surrounding Tyndall AFB within this airshed.

# 3.2.1 NATIONAL AMBIENT AIR QUALITY STANDARDS

Pursuant to the CAA and its amendments, the U.S. Environmental Protection Agency (USEPA) identifies air pollutants that cause or contribute to the endangerment of human health and or environmental welfare and establishes air quality "criteria" that guide the establishment of air quality standards to regulate these pollutants (42 U.S.C. Sections 7408 - 7409). To date, the USEPA has established such criteria for six air pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter less than 2.5 micrometers in diameter (PM<sub>2.5</sub>), particulate matter less than ten micrometers in diameter (PM<sub>10</sub>), and sulfur dioxide (SO<sub>2</sub>), and has subsequently promulgated National Ambient Air Quality Standards (NAAQS) meant to safeguard public health (i.e., primary NAAQS) and environmental welfare (i.e., secondary NAAQS). Current NAAQS are presented in **Table 3.2-1**.

Areas where monitored outdoor air concentrations are within an applicable NAAQS are considered in attainment of that NAAQS. If sufficient ambient air monitoring data are not available to make a determination, the area is instead deemed attainment/unclassifiable. Areas where monitored outdoor air concentrations exceed the NAAQS are designated by the USEPA as nonattainment areas. Nonattainment designations for some pollutants (e.g., O<sub>3</sub>) can be further classified based on the severity of the NAAQS exceedances. Lastly, areas that have historically exceeded the NAAQS, but have since instituted controls and programs that have successfully remedied these exceedances are known as maintenance areas. Currently, Bay County is considered attainment of all NAAQS (Air Force, 2019a).

State agencies having nonattainment or maintenance areas within their jurisdiction are charged with developing air quality control plans, called State Implementation Plans (SIP), that include strategies and measures to bring the area back into compliance with the NAAQS by a USEPA-prescribed deadline. SIPs are also devised to maintain compliance with a NAAQS once attainment is achieved.

Pollutant	Averaging Time	Level	Form
00	8-hour	9 ppm	Not to be avagaded more than once per year
0	1-hour	35 ppm	Not to be exceeded more than once per year
Pb	Rolling 3-month average	0.15 μg/m <sup>3</sup>	Not to be exceeded
NO <sub>2</sub>	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, 3-year average
	Annual	53 ppb	Annual mean
<b>O</b> <sub>3</sub>	8-hour	0.070 ppm	Annual fourth-highest daily maximum 8-hr concentration, 3-year average
	PM <sub>2.5</sub> Annual (primary)	$12 \ \mu g/m^3$	Annual mean, 3-year average
DM	PM <sub>2.5</sub> Annual (secondary)	15 μg/m <sup>3</sup>	Annual mean, 3-year average
PM	<sup>PM</sup> <sub>2.5</sub> 24-hour	$35 \ \mu g/m^3$	98th percentile, 3-year average
	PM <sub>10</sub> 24-hour	$150 \ \mu g/m^3$	Not to be exceeded more than once per year, 3-year average
SO <sub>2</sub>	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, 3-year average
	3-hour	0.5 ppm	Not to be exceeded more than once per year

## TABLE 3.2-1 NATIONAL AMBIENT AIR QUALITY STANDARDS

Notes:  $ppb = parts per billion; ppm = parts per million; <math>\mu g/m^3 = micrograms per cubic meter of air.$ Source: USEPA, 2019a.

To gauge compliance with the NAAQS and pursuant to USEPA requirements, the FDEP Division of Air Resource Management has established and maintains a permanent network of ambient air monitors across the state, including areas within and surrounding Bay County. One monitoring station is located within 8 miles of Tyndall AFB. This station collects data for O<sub>3</sub>. Additional ambient air quality monitors are located 67 miles (O<sub>3</sub> and PM<sub>10</sub>), 80 miles (O<sub>3</sub> and PM<sub>2.5</sub>), 87 miles (O<sub>3</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>2</sub>), 117 miles (Pb), and 177 miles (O<sub>3</sub>, nitrogen oxides [NO<sub>x</sub>], PM<sub>2.5</sub>, and SO<sub>2</sub>) from Tyndall AFB. **Table 3.2-2** summarizes O<sub>3</sub> data collected over the period of 2016 to 2018 at the nearest station.

The monitoring data demonstrate that concentrations of  $O_3$ , in the area surrounding Tyndall AFB are well below applicable NAAQS. No violations of the NAAQS are registered for the pollutant measured.

	NAAQS	USEPA Monitor ID# (Distance and Direction from Tyndall AFB)			
Pollutant	Primary/Secondary	Averaging Time	Level	12-005-0006 (8 miles northwest)	
<b>O</b> <sub>3</sub>	Primary and Secondary	8 hours	0.070 ppb	0.060	

## TABLE 3.2-2 AIR MONITORING DATA SUMMARY

Source: USEPA, 2019b.

# 3.2.2 EXISTING AIR QUALITY CONDITIONS

## 3.2.2.1 Clean Air Act Conformity

The General Conformity Rule of the Federal CAA mandates that the Federal government not engage, support or provide financial assistance for licensing or permitting, or approve any activity not conforming to an approved SIP. This rule applies to all Federal actions except highway and transit actions which are instead regulated by the Transportation Conformity Rule. The rule takes into account air pollutant emissions associated with actions that are Federally funded, licensed, permitted, or approved, and ensures that such emissions do not cause or contribute to air quality degradation, thus preventing the achievement of state and Federal air quality goals.

Air Force Policy Directive (AFPD) 32-70, *Environmental Considerations in Air Force Programs and Activities*, mandates that the Air Force comply with all Federal, state and local environmental laws and standards. In accordance with AFPD 32-70, AFI 32-7040, *Air Quality Compliance and Resource Management*, explains responsibilities and specifics on how to assess, attain and sustain compliance with the CAA and other Federal, state and local air quality regulations. This AFI provides further and more specific instruction on the requirements of the Air Force's EIAP for air quality promulgated at 32 CFR 989.30, which mandates that EIAP documents such as this EA address General Conformity.

Because Bay County and the surrounding area meets all NAAQS, the region is considered in attainment for all pollutants (Air Force, 2019c). Therefore, the State of Florida is not required to develop an emissions inventory or attainment demonstration SIP for the region, and the General Conformity Rule does not apply to the Proposed Actions.

## 3.2.2.2 Hazardous Air Pollutants

In addition to the criteria pollutants discussed above, non-criteria toxic pollutants, called hazardous air pollutants (HAPs), are also regulated under the CAA. The USEPA has identified a total 187 HAPs that are known or suspected to cause health effects in small doses. HAPs are emitted by a wide range of manmade and naturally occurring sources including combustion mobile and stationary sources. However, unlike the NAAQS for criteria pollutants, Federal ambient air quality standards do not exist for noncriteria pollutants.

## 3.2.2.3 Stationary and Mobile Source Emissions

No new major stationary sources are associated with the Proposed Actions at Tyndall AFB. New major stationary sources are subject to Prevention of Significant Deterioration and/or New Source Review programs to ensure that these sources are constructed without significant deterioration of the air in the area. The USEPA oversees programs for stationary source operating permits (Title V) and for new or modified major stationary source construction and operation. Mobile sources are regulated under the CAA Title II through enforcing emissions standards on sources manufactured.

Tyndall AFB has a Federally Enforceable State Operation Permit, under Florida Statutes (F.S.) Chapter 403. Installation sources regulated by the permit include paint booths, fuel fill stands, jet engine testing, fuel tanks external combustion equipment (including boilers), and stationary emergency reciprocating

internal combustion engines (emergency generators). The permit requires Tyndall AFB's permitted sources to emit less than 90 tons per year each for CO, SO<sub>2</sub>, and NO<sub>x</sub>; 80 tons per year of Volatile Organic Compounds (VOC); and 8 and 21 tons per year for individual and total HAPs respectively to avoid being a major source with respect to Title V (FDEP, 2015). **Table 3.2-3** summarizes Tyndall AFB's calendar year 2018 stationary source permitted emissions report (FDEP, 2018).

Pollutant	Tons Per Year	Permit Limit	In Compliance?	
CO	8.05	90	Yes	
NO <sub>x</sub>	19.57	90	Yes	
PM <sub>2.5</sub>	1.09			
$PM_{10}$	1.09			
$SO_2$	1.29	90	Yes	
VOC	4.50	80	Yes	
HAPs	0.52	21	Yes	

## TABLE 3.2-3 AIR QUALITY PERMIT EMISSIONS REPORT – TYNDALL AFB 2018

Source: FDEP, 2018.

# 3.2.2.4 Greenhouse Gas Emissions

Greenhouse gases (GHGs) are compounds that contribute to the greenhouse effect. The greenhouse effect is a natural phenomenon where gases trap heat within the lowest portion of the earth's atmosphere, causing heating at the surface of the earth. The primary long-lived GHGs directly emitted by human activities are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>).

The heating effect from these gases is considered the probable cause of the global warming observed over the last 50 years (USEPA, 2009a). Global warming and climate change can affect many aspects of the environment. The USEPA has recognized potential risks to public health or welfare and signed an endangerment finding regarding GHGs under Section 202(a) of the CAA (USEPA, 2009b), which finds that the current and projected concentrations of the six key well-mixed GHGs – CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub> – in the atmosphere threaten the public health and welfare of current and future generations. Emissions of GHGs estimated for the Proposed Actions are discussed in **Section 4.1.1.6** of this EA.

# 3.3 NOISE

Sound is defined as a particular auditory impact produced by a given source, for example the sound of rain on a rooftop. Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory impact. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. Noise can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the source, distance between the source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g., residential areas, schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists. These are generally referred to as noise sensitive receptors.

Sound levels vary with time. For example, the sound increases as an aircraft approaches, then falls and blends into the ambient, or background, as the aircraft recedes into the distance. Because of this variation, it is often convenient to describe a particular noise "event" by its highest or maximum sound level ( $L_{max}$ ). It should be noted that  $L_{max}$  describes only one dimension of an event; it provides no information on the cumulative noise exposure generated by a sound source. In fact, two events with identical  $L_{max}$  levels may produce very different total noise exposures. One may be of very short duration, while the other may last much longer.

Human response to noise varies, as do the metrics used to quantify it. Generally, sound can be calculated with instruments that record instantaneous sound levels in decibels (dB). An A-weighted decibel (dBA) is the unit used to characterize sound levels that can be sensed by the human ear. "A- weighted" denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event. The threshold of audibility is generally within the range of 10 to 25 dBA for normal hearing. The threshold of pain occurs at the upper boundary of audibility, which is normally in the region of 135 dBA (USEPA, 1981a). **Table 3.3-1** compares common sounds and shows how they rank in terms of auditory impacts. As shown, a whisper is normally 30 dBA and considered to be very quiet while an air conditioning unit 20 feet away is considered an intrusive noise at 60 dBA. Noise levels can become annoying at 80 dBA and very annoying at 90 dBA. To the human ear, each 10-dBA increase seems twice as loud (USEPA, 1981b).

Noise Level (dBA)	Common Sounds	Effect
10	Just audible	Negligible
30	Soft whisper (15 feet)	Very quiet
50	Light auto traffic (100 feet)	Quiet
60	Air conditioning unit (20 feet)	Intrusive
70	Noisy restaurant or freeway traffic	Telephone use difficult
80	Alarm clock (2 feet)	Annoying
90	Heavy truck (50 feet) or city traffic	Very annoying Hearing damage (8 hours)
100	Garbage truck	Very annoying
110	Pile drivers	Strained vocal effort
120	Jet takeoff (200 feet) or auto horn (3 feet)	Maximum vocal effort
140	Carrier deck jet operation	Painfully loud

## TABLE 3.3-1 SOUND LEVELS AND HUMAN RESPONSE

Source: USEPA, 1981a.

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration (OSHA) established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed to is 115 dBA, and exposure to this level must not exceed 15 minutes within an 8-hour period. These standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.
The average day/night sound level (DNL) metric is a measure of the total community noise environment. DNL is the average A-weighted sound level over a 24-hour period, with a 10-dBA adjustment added to the nighttime levels (between 2200 and 0700 hours). This adjustment is an effort to account for increased human sensitivity to nighttime noise events. DNL was endorsed by the USEPA for use by Federal agencies and was adopted by the U.S. Department of Housing and Urban Development. DNL is an accepted unit for quantifying annoyance to humans from general environmental noise, including aviation and construction noise. Land use compatibility and incompatibility are determined by comparing the predicted DNL at a site with the recommended land uses. Noise levels occurring at night generally produce a greater annoyance than those of the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than those occurring during the day, at least in terms of its potential for causing community annoyance.

Due to the DNL descriptor's close correlation with the degree of community annoyance from aircraft noise, most Federal agencies have formally adopted DNL for measuring and evaluating aircraft noise for land use planning and noise impact assessment. Federal committees such as the Federal Interagency Committee on Urban Noise and the Federal Interagency Committee on Noise, which include the USEPA, the Federal Aviation Administration (FAA), DoD, Department of Housing and Urban Development, and the Veterans Administration, found DNL to be the best metric for land use planning. They also found no new cumulative sound descriptors or metrics of sufficient scientific standing to substitute for DNL.

DNL accounts for the noise levels in terms of sound exposure level of all individual aircraft events, the number of times those events occur, and the period day/night in which they occur. Values of DNL can be measured with standard monitoring equipment or predicted with computer models such as NOISEMAP.

AFI 32-7063, *Air Installations Compatible Use Zone (AICUZ) Program*, requires plotting DNL contours of 65, 70, 75, 80, and 85 dB for use in analyzing land use compatibility for both the current mission and the projected mission in the 5- to 10-year range. Air Force Handbook 32-7084, *AICUZ Program Manager's Guide*, requires the use of NOISEMAP to produce these noise contours and to analyze noise levels at noise-sensitive areas, except at major commercial airports where the NEPA noise requirement is met by using the FAA methodology and noise model.

The ambient noise environment at Tyndall AFB is affected by U.S. DoD aircraft operations, including Air Force, Army, Navy, and Marine Corp aircraft and military vehicles. A noise analysis was completed at Tyndall AFB in 2016 in support of the AICUZ Study (Air Force, 2016b). These noise contours included noise data from all aircraft operations associated with Tyndall AFB, and projected the 2016 noise condition and represents the existing condition at Tyndall AFB. According to the 2016 AICUZ, approximately 166 acres of off-airport land is contained within the DNL 65 dB or higher noise contours. According to the AICUZ, a population of approximately 212 persons is contained within these contours (Air Force, 2016b).

Other than residential land uses on the mainland north and west of Tyndall AFB, the AICUZ did not identify any additional Noise Sensitive Sites (NSS) within the noise contour, which would include religious institutions, educational facilities and health care facilities. Most NSS on or near Tyndall AFB have been damaged by Hurricane Michael and in the process of or planned for demolition. However, a review of on base facilities indicates that on base NSS that are currently in use or will be rebuilt, include

Visiting Officers Quarters (VOQs) and Visiting Airmen's Quarters (VAQs), a chapel, transient cabins, base housing, and Tyndall Elementary School.

# 3.4 SAFETY AND OCCUPATIONAL HEALTH

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. The elements of an accident-prone environment include the presence of a hazard and an exposed population at risk of encountering the hazard. Numerous approaches are available to manage the operational environment to improve safety, including reducing the magnitude of a hazard or reducing the probability of encountering the hazard. The primary safety categories discussed in this analysis include Construction and Demolition Safety and Mission Safety.

Factors involving primary occupational safety and health issues are addressed in the OSHA and Air Force Occupational Safety and Health (AFOSH) Standards. All day-to-day operations and maintenance activities on Tyndall AFB are performed by trained, qualified personnel in accordance with applicable equipment technical directives, approved occupational safety and health standards, and sound maintenance practices. The handling, processing, storage, and disposal of hazardous byproducts resulting from construction, demolition, operations, and maintenance are accomplished in accordance with the Federal and state requirements applicable to each substance.

Both natural and man-made environmental hazards may be present on base at any time due to the varied activities that take place at Tyndall AFB. Naturally-occurring potential health and safety hazards include insects, snakes, climactic conditions, and flash floods. Potential man-made health and safety hazards can include construction, demolition, transportation, maintenance and repair activities, the creation of noisy environments, and certain military activities. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

This analysis addresses the safety implications from construction, demolition, and other activities associated with the Proposed Actions. The safety-related ROI for this EA corresponds to the footprints of the individual Proposed Actions where construction, demolition and operational activities would occur. Construction site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees, and implementation of operational practices that reduce risk of illness, injury, death, and property damage. The health and safety of on-site military and civilian workers, including construction contractors, are safeguarded by numerous DoD and Air Force regulations designed to comply with OSHA standards. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

# 3.4.1 CONSTRUCTION AND DEMOLITION SAFETY

All contractors performing construction and demolition activities on Air Force installations are responsible following Federal OSHA regulations, as well as AFOSH standards set forth in AFI 91-202, *The Air Force Mishap Prevention Program*, (Air Force, 2017d), and Air Force Manual (AFMAN) 91-

203, *Air Force Occupational Safety, Fire, and Health Standards*. (Air Force, 2018c). AFOSH standards follow OSHA regulations and are required to conduct work activities in a manner that does not increase risk to workers or the public. The regulations address the health and safety of people at work and cover potential exposure to a wide range of chemical, physical, and biological hazards, and ergonomic stressors. Examples of activities that can be hazardous include transportation, maintenance and repair activities, and the creation of extremely noisy environments. The regulations are designed to control these hazards by eliminating exposure to the hazards via administrative or engineering controls, substitution, use of personal protective equipment (PPE), and availability of Safety Data Sheets.

Occupational health and safety are the responsibility of each employer, as applicable. Employer responsibilities are to review potentially hazardous workplace conditions; monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous substances), physical (e.g., noise propagation, falls), and biological (e.g., infectious waste, wildlife, poisonous plants) agents, and ergonomic stressors; and recommend and evaluate controls (e.g., prevention, administrative, engineering, PPE) to ensure exposure to personnel is eliminated or adequately controlled.

Additional health and safety risks to construction personnel exist in the form of munitions stored at various facilities within the MSA in the Flightline District and the possibility of encountering unexploded ordnances (UXO) within UXO probability areas (known munitions test/training areas). Proposed project F-10 (Flightline – MSA Facilities, 7000) would require construction and building renovation within the MSA Area. Proposed project M-03 (Building Demolitions) would include building demolition within the MSA. The Sky X Explosives Test Range is located in the southern portion of the Silver Flag district, roughly two miles south-southeast of the proposed location of Project SF-01 and would not be affected by the Proposed Actions.

For activities during which there is the potential for construction workers to encounter contamination from ERP sites, it is recommended that a health and safety plan be prepared in accordance with OSHA requirements prior to commencement of construction activities. Workers performing soil-removal activities within ERP sites are required to have OSHA 40-hour Hazardous Waste, Operations, and Emergency Response (HAZWOPER) training. In addition to this training, supervisors are required to have an OSHA Site Supervisor certification. Should contamination be encountered, the handling, storage, transportation, and disposal activities would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and Tyndall AFB programs and procedures. HAZWOPER regulations that protect workers and the public at or near a hazardous waste cleanup site are discussed in 29 CFR 1910.120 and 29 CFR 1926. ERP sites at Tyndall AFB and their constraints and controls are further discussed in **Sections 3.10.5** and **4.9.1.5**.

# 3.4.2 MISSION SAFETY

Mission safety on Air Force installations is maintained through adherence to DoD and Air Force safety policies and plans. The Air Force safety program ensures the safety of personnel and the public on the installation by regulating mission activities. AFI 91-202 implements AFPD 91-2, *Safety Programs*, (Air Force, 2019e), and provides guidance for implementing the safety program for all activities that occur on Air Force installations.

Tyndall AFB is a secure military installation with access limited to military personnel, civilian employees, military dependents, and approved visitors. Operations and maintenance activities conducted on the installation are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by AFOSH requirements. Adherence to industrial-type safety procedures and directives ensures safe working conditions.

Safety constraints such as ESQD arcs and UXO probability areas partially determine the suitability of areas for various land uses and, therefore, minimize safety hazards associated with mission activities. Although exposure of susceptible populations to safety hazards outside the safety constraints is unlikely, these constraints do not guarantee an absolute absence of risk. ESQD arcs are buffers around facilities that contain high-explosive munitions or flammable elements. The size and shape of an ESQD arc depends on the facility and the net explosive weight (NEW) of the munitions being housed. Separations set by ESQD arcs establish the minimum distances necessary to prevent the exposure of Air Force personnel and the public to potential safety hazards. Air Force protects personnel from the risks associated with UXO by controlling access to areas of concern; managing programs to remove UXO; and maintaining records of expenditures, range clearance operations, EOD incidents, and areas of known or suspected UXO.

Tyndall AFB aggressively manages its development program to ensure that it meets explosive safety requirements (Air Force, 2015a). There are 19 explosive safety zones at Tyndall AFB. Development not related to munitions is restricted within the ESQD arcs surrounding the MSA, airfields, the Silver Flag training site, explosive testing sites, and the EOD range. The most restrictive ESQD arcs constrain approximately 50 acres of developed land on the southwest end of the main aircraft parking apron. The land within the arc supports aircraft operations and maintenance facilities for the 53 WEG and 325 Maintenance Group and does not include apron pavements. The remainder of mission-essential land adjacent to the apron is unencumbered by ESQD arcs.

The Tyndall AFB MSA provides storage for munitions used on aircraft and space for weapons evaluations. The installation has storage capacity for up to 842,000 pounds NEW in 20 facilities including 16 igloos, three segregated magazines, and one storage, rocket checkout, and assembly facility.

# 3.5 LAND USE

The term land use refers to either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. For the Air Force, the term "land use" refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Air Force land use planning commonly use 12 general land use classifications: Airfield, Aircraft Operations and Maintenance, Industrial, Administrative, Community (Commercial), Community (Service), Medical, Housing (Accompanied), Housing (Unaccompanied), Outdoor Recreation, Open Space, and Water. As a part of the Comprehensive Planning Process, installations are divided into identifiable Planning Districts based on geographical features, land use patterns, building types, and/or transportation networks. The ROI for land use is the entirety of Tyndall AFB, which encompasses approximately 29,276 acres.

## 3.5.1 EXISTING LAND USE

There are 13 distinct land use categories on Tyndall AFB. The land use categories include Administrative, Aircraft Operations and Maintenance, Airfield, Community (Commercial), Community (Service), Housing (Accompanied), Housing (Unaccompanied), Industrial, Medical/Dental, Open Space, Outdoor Recreation, Training, and Water. Existing land use complements the established planning districts with minimal adjacent incompatible land uses; however, there are notable operational inefficiencies resulting from similar and/or complementary functions being geographically separated, land use constraints and new and changing missions.

There are typical facilities that complement and are compatible with land use categories. Therefore, to supplement land use planning, Tyndall AFB further defines typical facilities/features and functions of land to encourage and plan for compatible development.

Hurricane Michael directly impacted land use and typical land use facilities by destroying or damaging facilities, thus altering the built environment from existing conditions prior to the storm. Every facility on the installation sustained at least some damage with more than 50 percent of the facilities being significantly damaged. Thus, support services, tenants and personnel are operating under temporary conditions conducting mission requirements in impermeant facilities with inadequate infrastructure and often co-located with dissimilar support organizations and geographically separated from complementary and compatibles facilities and support services. Significant inefficiencies in base functionality have been realized as a result of Hurricane Michael. While land use and the planning framework at Tyndall AFB cannot be physically damaged the realization and function of land was significantly impacted as a result of Hurricane Michael.

In response to the damage sustained at Tyndall AFB, the Air Force commissioned development of a new Master Plan in support of the re-build of Tyndall AFB. To provide a complete analysis of existing land use, this analysis provides pre- and post-storm conditions of land use as baseline conditions were significantly altered as a result of Hurricane Michael.

# 3.5.2 PLANNING DISTRICTS

Land use on Tyndall AFB is governed by a land use plan which provides direction for siting future improvement projects on the installation. The Tyndall AFB Installation Development Plan (IDP) (Air Force, 2015a) resulted from a comprehensive planning process that describes the installation's past, present and future physical state and serves as the guidance document for all future facility programming decisions. The Tyndall AFB IDP was created in accordance with AFI 32-7062, *Comprehensive Planning*, with principles from Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning*.

The four planning districts identified for Tyndall AFB are, Tyndall West, Support Area, Flightline Area, and Tyndall East. They are briefly described below (as they were prior to Hurricane Michael) and depicted on **Figure 3.5-1** (Air Force, 2015a). The Proposed Actions identified in **Section 1** refer to project areas, a further delineation of the planning districts, which organizes similar and compatible facilities/features and functions of land.

**Tyndall West District.** The Tyndall West District includes the advanced wastewater treatment plant, the closed Pelican Point Golf Course, privatized accompanied housing, and undeveloped land. U.S. Highway 98 divides 120 acres of accompanied housing to the north from the majority of the district between the highway and Saint Andrew Bay. The primary land use of the district is accompanied-housing. The 2000 Area Proposed Actions, as well as Site Development and Utilities and Building Demolitions associated with the Multi-Area Development Proposed Actions are located within this district.

**Support Area District.** The Support District is the community and mission support center of Tyndall AFB. The district includes the majority of installation administration space, the Base Exchange, commissary, dormitories, fitness center, dining facilities, lodging and medical facilities. The Support Area, 8500 Area Proposed Actions, as well as Site Development and Utilities and Building Demolitions associated with the Multi-Area Development Proposed Actions are located within this district.

**Flightline Area District.** The Flightline District includes the installation's runways, accompanying taxiways, aprons, Flightline facilities that support the Flightline, MSA, fuel supply areas, and drone runway. The primary facilities within this district include aircraft hangars, aircraft maintenance units, base operations, the Air Traffic Control tower, and administrative facilities directly related to flight operations or aircraft maintenance. This district is predominantly industrial and mission oriented. Aircraft operations and maintenance, administrative, and industrial land uses directly affect Tyndall AFB's mission; therefore, this district includes the most important real estate on Tyndall AFB (Air Force, 2015a). The Flightline District is the most important for mission effectiveness and the most visible of the four planning districts. The Flightline Area Development Proposed Actions, as well as Airfield Drainage, Site Development and Utilities and Building Demolitions associated with the Multi-Area Development Proposed Actions are located within this district.

**Tyndall East District.** The Tyndall East District is east of the Flightline District and is primarily undeveloped. The district houses some training functions, including the 53 WEG subscale launch facilities, the AFCEC Sky 10 blast range, and the RED HORSE Silver Flag Site. U.S. Highway 98 bisects the district, creating two distinct parcels. The 9700 Area and Silver Flag Area Proposed Actions, as well as Site Development and Utilities and Building Demolitions associated with the Multi-Area Development Proposed Actions are located within this district.

Implementation of the proposed installation development projects to recover mission capabilities at Tyndall AFB would be constructed in all four planning districts. The existing land use and development are consistent within each planning district; however, each district has documented issues and recommended future planning recommendations to improve overall functionality of the installation and increase efficiencies of support and mission related operations (Air Force, 2015a).



# 3.5.3 LAND USE CONSTRAINTS

DoD and Air Force have prescribed development principles and best practices for more efficient land use and resource conservation. These practices encourage infill development and other more efficient land development techniques to maximize resources before considering land acquisition or development on previously undeveloped land. Planning constraints establish the limitations associated with development at Tyndall AFB and affect the pattern, density, and placement of facilities and infrastructure and ultimately affect site planning decisions.

Land use constraints are elements of the natural or built environment that create limitations on the operation of the base's buildings, roadways, utility systems, airfields, training ranges and other infrastructure. Development constraints are categorized as operational, natural and environmental or built. These land use constraints are located throughout Tyndall AFB, spanning all four planning districts and are a consideration when planning for future development. Development constraints are briefly discussed below and throughout this EA.

**Operational.** Operational planning constraints are generally related to flight operations and maintenance of aircraft. These constraints include munitions, potentially hazardous cargo, training, ranges and similar operational requirements that can limit future development activity. Identified operational constraints at Tyndall AFB are associated with AICUZ, airfield clearances, antiterrorism, and ESQD arcs that could limit development potential. Operational constraints do not necessarily restrict mission expansion and growth potential at the installation because operational constraints are often also mission requirements.

**Natural and Environmental.** Environmental constraints include cultural and natural resources, ERP sites and hazardous/non-hazardous waste and material which can constrain development and restrict the location of mission activities. Potential natural planning constraints on Tyndall AFB include Bird Aircraft Strike Hazard, Installation Restoration Program (IRP), soils and geology, threatened and endangered species, topography and physiology, and wetlands and floodplains.

**Built.** Built constraints are related to the condition, functionality and effectiveness of infrastructure systems, facilities and other man-made improvements. Existing development at Tyndall AFB can create significant limitations to current and future missions. Identified built constraints at Tyndall AFB include historic structures, historical or archaeological sites, utility systems, airfield infrastructure, transportation infrastructure and facilities.

Prior to Hurricane Michael, developable areas and areas of potential redevelopment were identified within each planning district and were potentially available for new development or redevelopment (Air Force, 2015a). However, as a result of Hurricane Michael, land use constraints, most notably the built constraint, were significantly altered, thus shifting the existing future planning documents from a reactive framework to one of pro-active planning and affording the Air Force the opportunity to re-build Tyndall AFB in a manner that capitalizes on approved development principles and best practices for more efficient land use and resource conservation.

# 3.6 SOILS

Soils at Tyndall AFB are formed from sandy, marine sediments and are predominately sandy, acidic, poorly drained, have low shrink-swell potential, and are relatively close to the underlying water table. There are 18 different soil types found on the project areas on Tyndall AFB. The characteristics of the major soil series and other soil types found on the installation are provided in **Table 3.6-1**. **Tables 3.6-2a** through **3.6-2g** identify soil types and acreages of soils included in each of the EA project areas Note that Project M-03 (Building Demolition) is not shown due to nature of project and low potential to disturb soils.

Soil Series	Depth to Water Table	Location	Characteristics
Allanton sand	At or near the surface	Nearly level or slightly depressional areas along poorly defined drainageways	Poorly drained soil, available water capacity is low to medium in surface and other layers, permeability is rapid to moderately rapid
Bayvi loamy sand 0 to 6 inches		Tidal marshes on marine terraces	Extremely acidic, very deep, poorly or very poorly drained, have a very low available water capacity, slow runoff, rapid permeability (but internal drainage is impeded by the high water table), very high surface runoff, and are very prone to flooding (especially during high tides)
Beaches	At the surface or 0 to 72 inches	Beaches on marine terraces	High salinity levels, inundated by high tide or wave action daily, subject to movement by wind and water, poorly drained
Chipley sand	30 to 60 inches	Gently sloping areas between upland and lower lying flatwoods	Somewhat poorly drained, available water capacity is low, rapid permeability
Fripp-Corolla complex	Fripp-Corolla complex Greater than 72 inches G		Permeability is very rapid, available water capacity is low, these soils are subject to storm tide flooding
Hurricane 24 to 42 inches		Flats and rises of marine terrace	Strongly acidic, very deep, very poorly drained, have a low available water capacity, very rapid permeability and negligible surface runoff, are not prone to ponding or flooding, but are very susceptible to wind erosion
Kureb sand	Below 80 inches	Broad upland areas near the coast	Excessively drained, have a very low available water capacity, and rapid permeability
Leon sand	6 to 18 inches	Flatwoods on marine terraces	Very strongly acidic, very deep, poorly drained, have a very low available water capacity, rapid permeability on the surface, high surface runoff, are not prone to ponding or flooding, but are very susceptible to wind erosion

## TABLE 3.6-1 SOIL TYPES AND CHARACTERISTICS REPRESENTED ON TYNDALL AFB

Soil Series	Depth to Water Table	Location	Characteristics
Mandarin sand	18 to 42 inches	Flats and rises of marine terraces	Very strongly acidic, very deep, somewhat poorly drained, have a low available water capacity, rapid permeability on the surface, very low surface runoff, are not prone to ponding or flooding, but are very susceptible to wind erosion
Osier fine sand	0 to 6 inches	Depressions on marine terraces and flatwood areas	Extremely acidic, very deep, poorly drained, have a low available water capacity, rapid permeability (but internal drainage is impeded by the high water table), negligible surface runoff, are not prone to flooding, but are prone to ponding, and are very susceptible to wind erosion
Pamlico- Dorovan complex	0 to 10 inches	Depressions along drainage ways	Very poorly drained, have a very high available water capacity, have moderate permeability, are not prone to flooding but frequently pond
Pickney	0 to 6 inches	Depressions on marine terraces	Very strongly acidic, very deep, very poorly drained, have a moderate available water capacity, rapid permeability on the surface (but internal drainage is impeded by the high water table), negligible surface runoff, are frequently prone to ponding and occasionally prone to flooding, and are very susceptible to wind erosion
Pits	Unknown	Varies	These areas consist of soil that has been excavated for use in road construction and as fill material in preparing sites for buildings
Pottsburg	0 to 6 inches	Flats of marine terraces	Very strongly acidic, very deep, poorly drained, have a low available water capacity, rapid permeability on the surface, negligible surface runoff, are not prone to ponding or flooding, and are very susceptible to wind erosion
Resota fine sand	42 to 60 inches	Ridges and knolls of marine terraces	Strongly acidic, very deep, moderately well drained, have a very low available water capacity, very rapid permeability on the surface, negligible surface runoff, are not prone to ponding or flooding, and are very susceptible to wind erosion
Rutledge sand	0 to 6 inches	Depressions on marine terraces	Strongly acidic, very deep, very poorly drained, have a low available water capacity, rapid permeability on the surface (but internal drainage is impeded by the high water table), negligible surface runoff, are not prone to flooding but frequently pond, and are very susceptible to wind erosion
Arents	8 to 36 inches	Rises on marine terraces	Man-made mixture of various soil series (from earth moving operations such as dredging and filling), neutral, very deep, somewhat poorly drained, have a very low available water capacity, variable permeability, negligible surface runoff, and are not prone to either

Soil Series	Depth to Water Table	Location	Characteristics
			flooding or ponding
Urban	Unknown	Multiple areas	These areas consist of 75 percent or more of developed land uses such as streets, houses, commercial buildings, parking lots, shopping centers, industrial parks, or airports and related facilities

Source: Air Force, 2019d; U.S. Department of Agriculture (USDA), 1984; USDA NRCS, 2019.

#### TABLE 3.6-2A SOILS – 2000 AREA PROJECTS

Description	2000-1a	2000-1b	2000-1c	Total
Beaches	5.7	6.5	0.0	12.2
Kureb sand, 0 to 5 percent slopes	0.4	0.1	0.0	0.5
Leon sand, 0 to 2 percent slopes	0.0	0.0	22.6	22.6
Mandarin sand, 0 to 2 percent slopes	0.0	0.0	8.6	8.6
Pottsburg-Pottsburg, wet, sand, 0 to 2 percent slopes	0.0	2.0	0.0	2.0
Resota fine sand, 0 to 5 percent slopes	0.0	0.0	14.8	14.8
Water	0.0	4.3	0.0	4.3
Grand Total	6.1	12.9	46.0	65.0

Source: USDA NRCS, 2019.

## TABLE 3.6-2B SOILS – 8500 AREA PROJECTS

	8500 Area (acres)
Description	8500-1
Leon sand, 0 to 2 percent slopes	18.6
Mandarin sand, 0 to 2 percent slopes	13.2
Grand Total	31.8

Source: USDA NRCS, 2019.

## TABLE 3.6-2C SOILS – 9700 AREA PROJECTS

	9700 Area (acres)		
Description	9700-1	9700-2	Total
Leon sand, 0 to 2 percent slopes	56.7	0.0	56.7
Mandarin sand, 0 to 2 percent slopes	21.9	0.0	21.9
Pamlico-Dorovan complex	3.9	0.0	3.9
Pottsburg-Pottsburg, wet, sand, 0 to 2 percent slopes	97.4	0.5	97.9
Rutlege sand, 0 to 2 percent slopes	2.0	0.0	2.0
Grand Total	181.9	0.5	182.4

Source: USDA NRCS, 2019.

## TABLE 3.6-2D SOILS – FLIGHTLINE AREA PROJECTS

		Flightline Area (acres)									
Description	<b>F-01</b>	<b>F-02</b>	<b>F-03</b>	<b>F-04</b>	<b>F-05</b>	<b>F-06</b>	<b>F-07</b>	<b>F-08</b>	<b>F-09</b>	<b>F-10</b>	Total
Arents, 0 to 5 percent slopes	0.0	0.0	1.2	0.0	0.1	0.0	0.0	0.0	0.0	4.9	6.2
Urban land	5.4	1.4	11.9	1.3	1.7	2.6	1.6	3.1	2.7	0.0	31.7
Grand Total	5.4	1.4	13.1	1.3	1.8	2.6	1.6	3.1	2.7	4.9	37.9

Source: USDA NRCS, 2019.

## TABLE 3.6-2E SOILS – SILVER FLAG AREA PROJECTS

	Silver Flag Area (acres)
Description	SF-01
Leon sand, 0 to 2 percent slopes	2.2
Pottsburg-Pottsburg, wet, sand, 0 to 2 percent slopes	1.2
Grand Total	3.4

Source: USDA NRCS, 2019.

# TABLE 3.6-2F SOILS – SUPPORT AREA PROJECTS

	Support Area (acres)							
	SA-01,		SA-05,					
Description	SA-02, SA-03	SA-04	SA-09, SA-10	SA-06	SA-07	SA-08	SA-11	Total
Arents, 0 to 5 percent slopes	0.0	0.0	12.3	0.0	0.1	0.0	26.8	39.2
Hurricane sand, 0 to 2 percent slopes	0.0	4.1	5.0	0.0	0.0	2.7	14.7	26.5
Leon sand, 0 to 2 percent slopes	5.4	1.7	3.8	0.0	0.0	0.0	16.2	27.1
Mandarin sand, 0 to 2 percent slopes	38.8	0.0	14.1	30.8	3.3	0.0	9.4	96.4
Pamlico-Dorovan complex	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3
Pottsburg-Pottsburg, wet, sand, 0 to 2 percent slopes	0.0	0.0	3.8	0.0	0.3	0.0	0.0	4.1
Resota fine sand, 0 to 5 percent slopes	0.0	0.0	9.6	0.0	0.6	0.0	0.0	10.2
Urban land	3.5	0.0	0.0	0.9	0.0	3.3	0.8	8.5
Grand Total	47.7	5.8	48.6	31.7	4.3	6.0	69.2	213.3

Source: USDA NRCS, 2019.

## TABLE 3.6-2G SOILS – MULTI- AREA PROJECTS

	Multi-Area Projects (acres)			
Description	M-01	M-02	Total	
Allanton sand	0.0	0.4	0.4	
Arents, 0 to 5 percent slopes	186.0	17.4	203.4	
Bayvi loamy sand	0.0	2.9	2.9	
Beaches	0.0	1.9	1.9	
Chipley sand, 0 to 5 percent slopes	0.0	3.8	3.8	
Fripp-Corolla complex, 2 to 30 percent slopes	0.0	9.4	9.4	
Hurricane sand, 0 to 2 percent slopes	0.0	8.6	8.6	
Kureb sand, 0 to 5 percent slopes	0.0	0.4	0.4	
Leon sand, 0 to 2 percent slopes	0.0	83.6	83.6	
Mandarin sand, 0 to 2 percent slopes	0.0	94.9	94.9	
Osier fine sand	0.0	47.7	47.7	
Pamlico-Dorovan complex	0.3	3.5	3.8	
Pickney fine sand	0.0	1.1	1.1	
Pottsburg-Pottsburg, wet, sand, 0 to 2 percent slopes	0.7	69.1	69.8	
Resota fine sand, 0 to 5 percent slopes	0.0	19.2	19.2	
Rutlege sand, 0 to 2 percent slopes	0.7	58.0	58.7	
Urban land	0.0	19.8	19.8	
Grand Total	187.7	441.7	629.4	

Source: USDA NRCS, 2019

Note: Project M-03 (Building Demolition) not shown due to nature of project and low potential to disturb soils.

# 3.7 WATER RESOURCES

Water resources include those waters that are above and below the surface of the Earth. Water resources for this EA include surface water, groundwater, floodplains (drainage basins), including waters of the U.S. (including wetlands), and coastal zone management. Surface and groundwater resources are protected by Federal and state laws and regulations, including the (CWA [Sections 401, 402, and 303(d)], the Safe Drinking Water Act, Section 438 of the Energy Independence and Security Act, and the USEPA's National Pollutant Discharge Elimination System (NPDES) administered by the FDEP.

## 3.7.1 SURFACE WATER

Surface water is any body of water at land's surface and includes natural features such as wetlands, swamps, streams, rivers, ponds, lakes, marshes, bayous, and oceans. Man-made surface waters include impoundments, canals, drainage ditches, and storm water catchments (but are not necessarily considered waters of the U.S). Tyndall AFB, within Bay County, Florida, is located in the St. Andrew Bay watershed in the Northwest Florida Water Management District ([NWFWMD], 2017). The St. Andrew Bay Watershed covers approximately 740,000 acres of the central Florida panhandle. This watershed is unique in that it contains no major rivers (NWFWMD, 2017). The St. Andrew Bay estuary system covers approximately 59,568 acres and is comprised of five bay and lagoon segments; St. Andrew Bay, East Bay, West Bay, North Bay, and Grand Lagoon. St. Andrew Bay lies to the northwest of Tyndall AFB and northeast of East Bay. Additionally, St. Andrew Sound lies to the south of Tyndall AFB and covers approximately 4,707 acres. Compared to watershed systems that contain major rivers, the estuarine waters of the St. Andrew Bay Watershed are deeper, clearer, and are characterized by high and consistent salinity. There are several additional water features that are either connected to St. Andrew Sound or East Bay that are adjacent to Tyndall AFB and these include Wild Goose Lagoon, Blind Alligator Bayou, Strange Bayou, Fred Bayou, Pearl Bayou, Freshwater Bayou, Sheephead Bayou, and Smack Bayou. Tyndall AFB contains one natural lake, Felix Lake; although, it is located on the northern section of the base and not adjacent to any project area (Air Force, 2019d).

The following Federal regulations apply to Federal proposed actions that would impact surface waters:

*Section 401 of the Clean Water Act* - Section 401 of the CWA requires state certification of all Federal licenses and permits in which there is a "discharge of fill material into navigable waters." The certification process is used to determine whether an activity, as described in the Federal license or permit, would impact established site-specific water quality standards. A water quality certification from the issuing state, the FDEP in this case, is required prior to the issuance of the relevant Federal license or permit. The most common Federal license or permit requiring certification is the USACE CWA Section 404 Permit.

*Section 402 of the Clean Water Act* - The NPDES program was created by Section 402 of the CWA. This program authorizes the USEPA to issue permits for the point-source discharge of pollutants into waters of the U.S. The NPDES permitting program controls water pollution by regulating point sources that discharge pollutants into waters of the U.S.

Stormwater from construction sites that would result in a disturbance of one acre or more are regulated under the FDEP NPDES, Generic Permit for Stormwater Discharge from Large and Small Construction Activities.

*Section 404 of the Clean Water Act* - The USACE, through its permit program, regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to Section 404 of the CWA. In addition, the USEPA has regulatory oversight of the USACE permit program, allowing the agency under Section 404(c) to veto USACE–issued permits where there are unacceptable environmental impacts. As defined in 33 CFR Section 328.3:

(a) The term waters of the U.S. means

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters:

(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(ii) Which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the U.S. under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;

(6) The territorial seas; and

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section.

Wetlands are defined 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. Wetlands generally include

swamps, marshes, bogs, and similar areas" (33 CFR Section 328.3[b]) (USEPA, 2019c; USACE, 2010), wetlands are discussed in more detail in the following section.

*Section 303(d) of the CWA* - Section 303(d) of the CWA requires states to develop a list of waters that do not meet established water quality standards and to develop corrective action plans for those waters on the list. Surface waters that do not meet established water quality standards are designated as being "impaired". There are no stream reaches near any of the project area; however, two estuaries located adjacent to Tyndall AFB are listed on Florida's 303(d) list: St. Andrew Bay and East Bay. Both of these estuaries are listed for high levels of total nitrogen; St. Andrew Bay is also listed for fecal coliform and East Bay is listed for bacteria in shellfish.

Section 10 of the River and Harbors Act of 1899 - Section 10 of the River and Harbors Act of 1899 regulates structures or work in or affecting navigable waters. Navigable waters under this statute are defined as "those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (33 U.S.C. Section 403). The USACE implements a permit program to evaluate impacts on navigable waters and their navigable capacity under Section 10 (jointly with Section 404 of the CWA when a discharge of fill material is also involved). Regulated structures include such objects as buoys, piers, docks, bulkheads, and jetties, while work includes dredging or filling activities.

*EO 11990 – Protection of Wetlands -* EO 11990 directs Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the values of wetlands for federally funded projects. Federal Emergency Management Agency (FEMA) regulations for complying with EO 11990 are found at 44 CFR Section 9, Floodplain Management and Protection of Wetlands.

AFI 32-7064, Integrated Natural Resources Management - AFI 32-7064 directs that installations shall develop and maintain current inventories of wetlands in order to plan for long-term protection or mitigation.

# 3.7.2 GROUNDWATER

Groundwater is classically defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated (i.e., the pore spaces in the subsurface materials are completely filled with water). It is part of the hydrologic cycle, originating as precipitation that infiltrates or seeps into the subsurface and then moves toward surface water bodies, where it discharges to complete the hydrologic cycle.

Tyndall AFB is located within the Floridan aquifer. The Floridan aquifer covers an area of approximately 64,000,000 acres (100,000 square-miles) and covers all of Florida in addition to southern Alabama, southeastern Georgia, and southern South Carolina; and it is one of the most productive aquifers in the world (U.S. Geological Survey, 2019). The Floridan aquifer lies approximately 250 to 350 feet below the surface (USFWS, 2015); however, this is not the primary source of potable water on Tyndall AFB. The primary source of potable water is Deer Point Lake Reservoir (NWFWMD, 2017); it is 5,000-acres in size and is located seven miles north of Panama City.

## 3.7.3 WETLANDS

The 325th Civil Engineer Squadron/Environmental Element, Compliance (325 CES/CEIEC) has primary responsibility for wetland protection, including evaluation of potential wetland impacts by the Proposed Actions, at Tyndall AFB. The Tyndall AFB Integrated Natural Resources Management Plan (INRMP) (Air Force, 2019d) includes guidance on the management and protection of wetlands at the Tyndall AFB.

## 3.7.3.1 Affected Environment

Wetland and other surface water delineation surveys were performed in accordance with the guidelines found within the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (USACE, 2010) and methodologies prescribed in Chapter 62-340, Florida Administrative Code (F.A.C.), "Delineation of the Landward Extent of Wetlands and Surface Waters". Surveys were performed in October and November 2019 (GSRC, 2019) and revealed 128.7 acres of wetland habitat. Other surface waters identified in the proposed project areas consist of 118,299 LF of drainage ditches and 0.8 acre of a stormwater management pond/open water (**Figures 3.7-1a through 3.7-1h**). **Table 3.7-1** summarizes the acreage and type of all identified wetlands and other surface waters identified within the proposed project areas. Approximately 51 acres of wetlands identified in the project area of M-02 (Site Development and Utilities) were mapped using the USFWS's National Wetland Inventory (NWI) mapper (USFWS, 2019b) and have not yet been field verified but are included in **Table 3.7-1**. A formal Jurisdictional Determination of the wetlands and other surface waters will be determined during the state and Federal permitting process.

TABLE 3.7-1 WE1	TABLE 3.7-1 WETLAND AND OTHER SURFACE WATERS IDENTIFIED IN THE PROJECT AREAS									
<b>Project Category</b>	Project	Wetland	Туре	Acreage	Linear Feet					
	2000-1a	Wetland 5	Wet prairie	1.8	-					
2000 Area Projects ( <b>Figures 3.7-1a</b> and		Other Surface Waters	Ditches and Drainage Features	-	124					
	2000-1b	Wetland 6	Wet prairie	0.4	-					
		Wetland 7	Wet prairie	0.2	-					
3.71-b)	2000-1c	Other Surface Waters	Ditches and Drainage Features	-	1,615					
		Wetland 8	Marsh Vegetation	1.4	-					
			Total - 2000 Area	3.8	1,739					
8500 Area Projects ( <b>Figure 3.7-1c</b> )	8500-1	Wetland 4	Wet Prairie	2.3	-					
0700 Arros		Other Surface Waters	Ditches and Drainage Features	-	7,501					
Projects	9700-1	Wetland 1	Wetland 1ShrubWetland 2Shrub		-					
(Figure 3.7-1d)		Wetland 2			-					
		Wetland 3 Slash pine/shrub		45.7	-					
			Total - 9700 Area	70.7	7,501					
Flightline Area Projects ( <b>Figure 3.7-1e</b> )	F-03	Other Surface Waters	Ditches and Drainage Features	-	1,177					
Support Area	SA-01,	Other Surface	Ditches and Drainage	-	2,501					

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Project Category	Project	Wetland	Туре	Acreage	Linear Feet				
Projects (Figure 3.7-1f)	SA-02, SA-03	Waters	Features						
	SA-05, SA-09, SA-10	Other Surface Waters	Ditches and Drainage Features	-	59				
		Other Surface	Ditches and Drainage Features	-	1,806				
	SA-06	waters	Open Water	0.1	-				
		Wetland 9	Marsh Vegetation	0.2	-				
	SA-07	Other Surface Waters	Ditches and Drainage Features	-	59				
	SA-11	Other Surface Waters	Ditches and Drainage Features	-	132				
			Total - Support Area	0.3	4,557				
	M-01	Other Surface Waters	Ditches and Drainage Features	0.7	4,541				
		Wetland 12	Marsh Vegetation	0.1	-				
		Other Surface Waters	Ditches and Drainage Features	-	98,784				
		Wetland 10	Slash Pine/Shrub	0.3	-				
Multi-Area		Wetland 11	Shrub	0.2	-				
Projects		Wetland 13	Shrub	0.1	-				
(Figures 3.7-1g and 2.7.1b)	M-02		Estuarine and Marine Deepwater	2.7	-				
<b>3.</b> /-III)			Estuarine and Marine Wetland	18.1	-				
		NWI	Freshwater Emergent Wetland	1.5	-				
			Freshwater Forested/Shrub Wetland	25.9	-				
			Freshwater Pond	2.8	-				
Total - Multi-Area 52.4 103,3									
	Grand Total 129.5 118,299								

Source: GSRC, 2019; USFWS, 2019b. Note: NWI wetlands not yet field verified.

Most of the wetlands (54.6 percent) occur in the 9700 Area. This wetland community consists of hydric slash pine and shrub habitat and efforts to salvage damaged and some remaining timber in this area are currently underway.







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## 3.7.4 FLOODPLAINS

Floodplains are lands bordering rivers and streams that are typically dry but covered with water during floods. They occur in both inland and coastal areas. Risk of flooding is typically related to local topography, the frequency of precipitation events, size of the watershed above the floodplain, and in the case of coastal areas, storm surge intensity. The direct function of a floodplain is to absorb water and energy from storms. Indirect benefits are groundwater recharge from stormwater absorption, nutrient cycling, waste disposal, carbon sequestration, wildlife habitat, vegetative diversity, and aesthetic qualities.

FEMA categorizes floodplains into several categories based on their chance of flooding in any given year. The location and extents of floodplain areas with the proposed project areas are shown ins **Figures 3.7-2a through 3.7-2h** and summarized in **Table 3.7-2**.

Project Category	Project	Acreage			
		Zone A	Zone AE	Zone VE	Total
2000 Area Projects	2000-1a	0.0	2.8	0.0	2.8
(Figures 3.7-2a and 3.7-	2000-1b	0.0	6.5	4.9	11.4
<b>2b</b> )	2000-1c	4.0	0.0	0.0	4.0
	Total – 2000 Area	4.0	9.3	4.9	18.2
8500 Area Projects	8500.1	0.1	0.0	0.0	0.1
( <b>Figure 3.7-2c</b> )	0500-1	0.1	0.0	0.0	0.1
9700 Area Projects	0700 1	20.6	47	0.0	3/3
(Figure 3.7-2d)	9700-1	29.0	4.7	0.0	54.5
Flightline Area Projects	F-10	0.0	0.9	0.0	0.9
(Figure 3.7-2e)					
Support Area Projects	SA-01/SA-02/SA-03	0.1	0.0	0.0	0.1
(Figure 3.7-2f)	SA-11	5.8	0.0	0.0	5.8
	Total – Support Area	5.9	0.0	0.0	5.9
Multi-Area Projects	M-01	0.3	2.2	0.0	2.5
(Figures 3.7-2g and 3.7- 2h)	M-02	33.7	31.3	0.0	65.0
	Total – Multi Area	34.0	33.5	0.0	67.5
	Grand Total	73.4	48.4	4.9	126.9

## TABLE 3.7-2 FLOODPLAINS IDENTIFIED IN THE PROJECT AREAS

Source: FEMA, 2019.

Notes: Zone A and AE – one percent annual chance of flooding; 100-year floodplain; Zone VE – one percent chance of flooding with additional hazards due to storm-induced velocity wave action; 100-year floodplain with additional hazards

The following Federal regulations apply to Federal proposed actions that would impact floodplains:

*EO 11988, Floodplain Management* - EO 11988 requires Federal agencies to avoid direct or indirect support or development within or affecting the one percent annual chance Special Flood Hazard Area (SFHA) (i.e., the 100-year floodplain) whenever there is a practicable alternative for Critical Actions, within the 0.2 percent annual chance SFHA (i.e., the 500-year floodplain). EO 11988 further directs all Federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. FEMA's regulations for complying with EO 11988 are found in 44 CFR Part 9.









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## 3.7.5 COASTAL ZONE MANAGEMENT

The coastal zone includes those coastal lands or water uses governed by the FDEP, pursuant to the Federal Coastal Zone Management Act (CZMA) (16 U.S.C. 1451 et seq., as amended). The Florida Coastal Management Program (FCMP) implements these regulations within the state of Florida and encompasses the state's 67 counties and territorial seas. The outer boundary of Florida's coastal zone is the limit of state waters, which for the Atlantic Ocean coast of Florida is three nautical miles from shore and for the Gulf of Mexico coast of Florida is nine nautical miles from shore. The FCMP is administered by eight state agencies and five water management districts.

The CZMA was enacted to preserve, protect, develop, and, where possible, restore and enhance the resources of the Nation's coastal zone. Federal agency activities affecting a state's coastal zone must be consistent to the maximum extent practicable with the enforceable policies of the state's coastal management program. The CZMA allows coastal states to develop a Coastal Zone Management Plan (CZMP) whereby it designates permissible land and water use within the state's coastal zone. The FCMP was approved by National Oceanic and Atmospheric Administration in 1981 and is codified in Chapter 380, Part II, F.S.. FCMP consists of a network of 24 Florida statutes administered by eight state agencies and five water management districts. Coordination of the program is managed by FDEP.

FDEP is given the authority by Congress to review certain Federal activities that have reasonably foreseeable effects on any land use, water use, or natural resources in its coastal zone to make sure that the Federal actions are consistent with the enforceable policies of Florida's federally approved FCMP. This authority is referred to as "Federal consistency." Some examples of "coastal land or water uses" include such activities as public access, recreation, fishing, historic or cultural preservation, development, energy infrastructure and use, hazards management, marinas, floodplain management, scenic and aesthetic enjoyment, and resource creation or restoration.

A CZMA review of Federal agency activities is conducted and proceeds with a submittal of either a Consistency Determination or a Negative Determination. As detailed in 15 CFR 930, state agencies, such as the FCMP, have 60 days from receipt of this document in which to concur with or object to a Consistency Determination, or to request an extension in writing. The Federal agency may presume state agency concurrence if the state agency's response is not received within 60 days from receipt of the Federal agency's Consistency Determination and supporting information. Tyndall AFB is located within the Florida Coastal Zone and is therefore required to submit a Federal Consistency Determination for the Proposed Action.

# 3.8 BIOLOGICAL RESOURCES

## **3.8.1** VEGETATION AND WILDLIFE

## 3.8.1.1 Vegetation

Tyndall AFB occurs within the Subtropical Division, Coastal Plain Mixed Forest Province, Section 232 (Bailey, 1995). This ecoregion is characterized by enduring mild winters and hot humid summers.

Precipitation occurs evenly throughout the year, but peaks slightly in correlation with thunderstorms occurring through the spring and midsummer months. The proposed project areas are at elevations ranging between approximately two and 78 feet above mean sea level.

All of the Proposed Action project areas showed evidence of recent disturbance during October and November 2019 field reviews (GSRC, 2019). All land use/vegetative cover within the proposed project areas were classified using Florida Department of Transportation's (FDOT's) Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT, 1999) and were adapted from NWFWMD's 2015-2016 Land Use GIS database (NWFWMD, 2018) and Tyndall AFB's land use cover GIS data (Tyndall AFB, 2019a). Wetlands and other surface waters are further refined and identified in **Section 3.7.3**. **Tables 3.8-1a** through **3.8-1g** summarizes the acreage of each land use/vegetative cover type within the Proposed Action areas. Areas that were not classified using the FLUCFCS but were assessed via desktop analysis are developed areas that consist of paved surfaces and buildings.

		2000 Area (Acres)			
FLUCFCS Code	FLUCFCS Description	2000-1a	2000-1b	2000-1c	Total
<b>Developed Uplands</b>				-	
1210	Fixed Single Family Units	-	0.2	-	0.2
1841	Marinas (Basins)	-	3.3	-	3.3
Unclassified Deve	loped Area (Pavement and Structures)	-	1.4	6.0	7.4
	Subtotal Developed Uplands	-	4.9	6.0	10.9
Undeveloped Uplands					
3100	Herbaceous (Dry Prairie)	-	0.2	1.1	1.3
3220	Coastal Scrub	4.6	1.0	-	5.6
3300	Mixed Rangeland		-	0.4	0.4
4210	Xeric Oak	-	-	0.7	0.7
4360	Upland Scrub, Pine and Hardwoods	-	-	37.2	37.2
4410	Coniferous Plantations, Slash Pine	-	-	0.2	0.2
	Subtotal Undeveloped Uplands	4.6	1.2	39.6	45.4
Wetlands and Other S	urface Waters				
5120	Stormwater conveyance	-	6.8	-	6.8
6270	Slash Pine Swamp Forest	-	-	0.5	0.5
6421	Cordgrass	1.4	-	-	1.4
6520	Shorelines	0.1	-	-	0.1
S	ubtotal Wetlands and Other Surface Waters	1.5	6.8	0.5	8.8
	Grand Total	6.1	12.9	46.1	65.1

#### TABLE 3.8-1A LAND USE/VEGETATIVE COVER – 2000 AREA PROJECTS

Source: FDOT, 1999; NWFWMD, 2018; Tyndall AFB, 2019a.

		8500 Area (acres)
FLUCFCS Code	FLUCFCS Description	8500-1
<b>Developed Uplands</b>		
1430	Professional Services	8.5
Unclassified De	eveloped Area (Pavement and Structures)	1.4
	Subtotal Developed Uplands	9.9
Undeveloped Uplands		
3100	Herbaceous (Dry Prairie)	2.9
4410	Coniferous Plantations, Slash Pine	18.7
	Subtotal Undeveloped Uplands	21.6
Wetlands and Other Surfac	e Waters	
6110	Bay Swamps	0.1
6270	Slash Pine Swamp Forest	0.2
	0.3	
	Grand Total	31.8

Source: FDOT, 1999; NWFWMD, 2018; Tyndall AFB, 2019a.

#### TABLE 3.8-1C LAND USE/VEGETATIVE COVER – 9700 AREA PROJECTS

		9700 Area (acres)		
FLUCFCS Code	FLUCFCS Description	9700-1	9700-2	Total
Developed Uplands				
1754	0.8	-	0.8	
Unclassified Develope	ed Area (Pavement and Structures)	2.2	-	2.2
	Subtotal Developed Uplands	3.0	-	3.0
Undeveloped Uplands				
3100	Herbaceous (Dry Prairie)	2.6	-	2.6
4110	Pine Flatwoods	3.3	-	3.3
4120	Longleaf Pine - Xeric Oak	29.3	-	29.3
4410	Coniferous Plantations, Slash Pine	5.9	-	5.9
	Subtotal Undeveloped Uplands	41.1	-	41.1
Wetlands and Other Surfa	ce Waters			
6110	Bay Swamps	5.6	-	5.6
6140	Titi Swamps	19.3	-	19.3
6250	Hydric Pine Flatwoods	1.1	-	1.1
6270 Slash Pine Swamp Forest		111.9	0.5	112.4
Subt	otal Wetlands and Other Surface Waters	137.9	0.5	138.4
	Grand Total	182.0	0.5	182.5

Source: FDOT, 1999; NWFWMD, 2018; Tyndall AFB, 2019a.

## TABLE 3.8-1D LAND USE/VEGETATIVE COVER – FLIGHTLINE AREA PROJECTS

FLUCFCS	FLUCFCS		Flightline Area (acres)									
Code	Description	<b>F-01</b>	<b>F-02</b>	<b>F-03</b>	<b>F-04</b>	<b>F-05</b>	<b>F-06</b>	<b>F-07</b>	<b>F-08</b>	<b>F-09</b>	<b>F-10</b>	Total
Developed U	Developed Uplands											
8110	Airports	2.2	0.5	7.4	0.5	1.6	0.7	0.3	0.3	1.5	3.5	18.5
Unclassifie	d Developed											
Area (Pav	vement and											
Struc	ctures)	3.2	0.9	4.6	0.8	0.2	1.9	1.3	2.8	1.2	1.3	18.2
Subtotal Deve	eloped Uplands	5.4	1.4	12.0	1.3	1.8	2.6	1.6	3.1	2.7	4.8	36.7
Undeveloped	Uplands											
	Herbaceous											
3100	(Dry Prairie)	-	-	1.1	-	-	-	-	-	-	-	1.1
Subtote	al Undeveloped											
	Uplands	-	-	1.1	-	-	-	-	-	-	-	1.1
Wetlands and	d Other Surface	Waters	5									
	Stormwater											
5120	conveyance	-	-	0.1	-	-	-	-	-	-	0.1	0.2
Subtotal Wetle	ands and Other											
	Surface Waters	-	-	0.1	-	-	-	-	-	-	0.1	0.2
	Grand Total	5.4	1.4	13.2	1.3	1.8	2.6	1.6	3.1	2.7	4.9	38.0

Source: FDOT, 1999; NWFWMD, 2018; Tyndall AFB, 2019a.

#### TABLE 3.8-1E LAND USE/VEGETATIVE COVER – SILVER FLAG AREA PROJECTS

		Silver Flag Area (acres)
FLUCFS Code	FLUCFCS Description	SF-01
<b>Developed Uplands</b>		
1731	Air Force Installation	1.7
Unclassified Develope	1.4	
	Subtotal Developed Uplands	3.1
Undeveloped Upland	S	
3100	Herbaceous (Dry Prairie)	0.3
	Subtotal Undeveloped Uplands	0.3
	Grand Total	3.4

Source: FDOT, 1999; NWFWMD, 2018; Tyndall AFB, 2019a.

## TABLE 3.8-1F LAND USE/VEGETATIVE COVER – SUPPORT AREA PROJECTS

		Support Area (acres)							
		SA-01,		SA-05,					
FLUCFCS	FLUCFCS	SA-02,		SA-09,					
Code	Description	SA-03	SA-04	SA-10	SA-06	SA-07	SA-08	SA-11	Total
Developed U	plands								
	Rural land in								
	transition without								
	positive indicators of								
7410	intended activity	-	-	-	-	-	-	0.2	0.2
8341	Treatment Plants	-	-	-	-	-	-	5.8	5.8
Unclassifi	ed Developed Area								
(Paveme	ent and Structures)	12.0	1.9	22.9	8.5	1.4	3.6	6.6	56.9
Subto	tal Developed Uplands	12.0	1.9	22.9	8.5	1.4	3.6	12.6	62.9
Undeveloped	l Uplands								
	Herbaceous (Dry								
3100	Prairie)	34.3	3.9	25.4	23.0	2.9	2.4	18.2	110.1
4110	Pine Flatwoods	0.4	-	-	-	-	-	-	0.4
4140	Pine - Mesic Oak	-	-	-	-	-	-	13.0	13.0
	Temperate								
4250	Hardwoods	0.5	-	-	-	-	-	-	0.5
	Coniferous								
	Plantations, Slash								
4410	Pine	-	-	-	-	-	-	21.5	21.5
Subtotal	l Undeveloped Uplands	35.2	3.9	25.4	23.0	2.9	2.4	52.7	145.5
Wetlands an	d Other Surface Water	S							
5110	Natural Stream	-	-	-	-	-	-	1.6	1.6
	Stormwater								
5120	conveyance	0.4	-	0.3	0.1	-	-	0.1	0.9
6140	Titi Swamps	-	-	-	-	-	-	0.4	0.4
	Hydric Pine								
6250	Flatwoods	-	-	-	-	-	-	1.9	1.9
	Slash Pine Swamp								
6270	Forest	0.1	-	-	-	-	-	-	0.1
Subto	tal Wetlands and Other								
	Surface Waters	0.5	-	0.3	0.1	-	-	4.0	4.9
	Grand Total	47.7	5.8	48.6	31.6	4.3	6.0	69.3	213.3

Source: FDOT, 1999; NWFWMD, 2018; Tyndall AFB, 2019a.

## TABLE 3.8-1G LAND USE/VEGETATIVE COVER – MULTI- AREA PROJECTS

		Multi-Area Project		ojects			
FLUCFCS			(acres)				
Code	FLUCFCS Description	<b>M-01</b>	<b>M-02</b>	Total			
Developed Upla	nds						
1430	Professional Services	-	1.6	1.6			
1731	Air Force Installation	-	1.1	1.1			
1893	Skeet Ranges	-	1.4	1.4			
8110	Airports	162.7	4.6	167.3			
8143	Two-Lane Highways (State)	-	0.1	0.1			
8330	Water Supply Plants	0.1	-	0.1			
8341	Treatment Plants	-	1.4	1.4			
U	Inclassified Developed Area (Pavement and Structures)	15.1	58.2	73.3			
	Subtotal Developed Uplands	177.9	68.4	246.3			
Undeveloped U	Undeveloped Uplands						
3100	Herbaceous (Dry Prairie)	4.3	235.4	239.7			

			-Area Pr	ojects
FLUCFCS			(acres)	
Code	FLUCFCS Description	M-01	<b>M-02</b>	Total
3220	Coastal Scrub	-	4.9	4.9
4110	Pine Flatwoods	-	8.0	8.0
4120	Longleaf Pine - Xeric Oak	-	0.2	0.2
4140	Pine - Mesic Oak	-	1.7	1.7
4150	Mixed Pine	-	13.9	13.9
4210	Xeric Oak	-	0.1	0.1
4250	Temperate Hardwoods	-	5.4	5.4
4270	Live Oak	-	1.1	1.1
4360	Upland Scrub, Pine and Hardwoods	-	12.5	12.5
4410	Coniferous Plantations, Slash Pine	-	32.8	32.8
	Subtotal Undeveloped Uplands	4.3	316.0	320.3
Wetlands and C	Other Surface Waters			
5120	Stormwater conveyance	4.9	6.8	11.7
5240	Lakes less than 10 acres (4 hectares) which are dominant features.	-	1.6	1.6
	Reservoirs less than 10 acres (4 hectares) which are dominant			
5340	features	-	1.2	1.2
	Embayments not opening directly into the Gulf of Mexico or the			
5420	Atlantic Ocean	0.1	2.6	2.7
6110	Bay Swamps	-	0.2	0.2
6140	Titi Swamps	-	0.5	0.5
6250	Hydric Pine Flatwoods	0.1	5.3	5.4
6260	Hydric Pine Savanna	-	1.0	1.0
6270	Slash Pine Swamp Forest	-	16.7	16.7
6410	Freshwater Marshes	-	0.1	0.1
6411	Sawgrass	-	1.5	1.5
6417	Freshwater Marsh with shrubs, brushes, and vines	0.6	-	0.6
6420	Saltwater Marshes	-	2.9	2.9
6421	Cordgrass	-	17.5	17.5
	Subtotal Wetlands and Other Surface Waters	5.7	57.9	63.6
	187.9	442.3	630.2	

Source: FDOT, 1999; NWFWMD, 2018; Tyndall AFB, 2019a.

Within the 2000 Area project area, majority of the land use/vegetative cover consists of forested and herbaceous undeveloped uplands (70 percent). Approximately 17 percent of these areas consist of developed land use and 13 percent consists of wetlands/other surface waters. Dominant vegetative species present within the forested wetland areas include southern wax myrtle (*Morella cerifera*), bighead rush (*Juncus megacephalus*), large-leaf pennywort (*Hydrocotyle bonariensis*), erect-leaf witchgrass (*Panicum erectifolium*), bent spikerush (*Eleocharis geniculata*), starrush whitetop (*Dichromena colorata*), camphorweed (*Heterotheca subaxillaris*), bahiagrass (*Paspalum notatum*), carpetgrass (*Axonopus affinis*), and Carolina yelloweyed grass (*Xyris caroliniana*). Based on the field reviews, the majority of the forested upland areas are disturbed, clear-cut pine plantations predominantly consisting of bighead rush, common cattail (*Typha latifolia*), dwarf papyrus sedge (*Cyperus haspan*), Bentwan flatsedge (*Cyperus reflexus*), and coffeeweed (*Sesbania herbacea*).

Within the 8500 Area project area, approximately 68 percent of the land use/vegetative cover consists of mostly forested, undeveloped uplands followed by 31 percent developed land use and one percent forested wetlands. Based on the field reviews, the forested, upland areas consist mostly of clear-cut pine plantations predominantly consisting of bighead rush, gallberry (*Ilex glabra*), common persimmon

(*Diospyros virginiana*), shining sumac (*Rhus copallinum*), bloodroot (*Lachnanthes caroliniana*), broomsedge bluestem (*Andropogon virginicus*), savannah meadow beauty (*Rhexia alifanus*), justiceweed (*Eupatorium leucolepis*), slender goldentop (*Euthamia minor*), tapered rosette grass (*Dicanthelium acuminatum*), saw greenbrier (*Smilax bona-nox*), little bluestem (*Schizachyrium scoparium*), wand goldenrod (*Solidago stricta*), yellow nutsedge (*Cyperus esculentus*), mangrove flatsedge (*Cyperus ligularis*) and lowland rotala (*Rotala ramosior*).

The majority of the 9700 Area project area is comprised of forested wetlands (76 percent). Approximately 22 percent of the area is comprised of undeveloped uplands and two percent is developed land use. Based on the field reviews, the undeveloped uplands within this area have been previously disturbed and there was evidence of timber harvest activities within the forested uplands and wetlands. Dominant vegetative species within the pine plantation areas consist of slash pine, saw palmetto (*Serenoa repens*), southern wax myrtle, broomsedge bluestem, little bluestem, gallberry, bloodroot, justiceweed, bighead rush, coffeeweed, yaupon holly (*Ilex vomitoria*), bitter sneezeweed (*Helenium amarum*), dodder (*Cuscuta americana*), eastern prickly pear (*Opuntia humifosa*), needleleaf rosette grass (*Dicanthelium aciculare*), Garber's blazing star (*Liatris garberi*), sand post oak (*Quercus margaretta*), vanilla leaf (*Carphephorus odoratissimus*), orange milkwort (*Polygala lutea*), swamp titi (*Cyrilla racemiflora*), sweetbay magnolia (*Magnolia virginiana*), fetterbush (*Lyonia lucida*), Apalachicola St. John's-wort (*Hypericum chapmanii*), muscadine (*Vitis rotundifolia*), dwarf huckleberry (*Gaylussica dumosa*), laurel greenbrier (*Smilax laurifolia*), and narrowleaf yellowtops (*Flaverina linearis*).

The Flightline Area project area is mostly comprised of developed land use (96 percent). Approximately one percent of the area is comprised of drainage features and three percent is comprised of herbaceous, undeveloped uplands.

Majority of the Silver Flag Area project area is comprised of developed land use (91 percent) and the remaining nine percent of the area is herbaceous, undeveloped uplands.

The Support Area project area consists mostly of undeveloped uplands (68 percent) followed by 30 percent developed land use and two percent wetlands and other surface waters (forested and natural streams). Based on the field reviews, majority of this area has been previously developed or clear-cut. Portions of the area that remain vegetated primarily consist of seedlings and saplings of water oak (*Quercus nigra*), live oak (*Q. viginiana*), and sweetbay magnolia along with saw palmetto, fetterbush, muscadine, common persimmon, gallberry, saw greenbrier, slash pine, American sycamore (*Platanus occidentalis*), water oak, sabal palm (*Sabal palmetto*), Napier grass (*Pennisetum purpureum*), broomsedge bluestem, black-jack (*Bidens pilosa*), southern dewberry (*Rubus trivialis*), saw greenbrier, and large-leaf pennywort.

The Multi-Area project areas are comprised of 51 percent undeveloped uplands, 39 percent developed land use, and 10 percent wetlands/other surface waters. Based on the field reviews, these areas consist mostly of maintained road rights-of-way and landscaping.

## 3.8.1.2 Wildlife

The numerous biotic communities occurring on Tyndall AFB provide habitat and support for a high diversity of terrestrial and aquatic animal species. A common assemblage of mammal species inhabiting this region includes least shrew (*Cryptodus parva*), eastern red bat (*Lasiurus borealis*), pocket gopher (*Geomys pinetus*), eastern mole (*Scalopus aquaticus*), cotton mouse (*Peromyscus gossypinus*), eastern gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), salt marsh rabbit (*Sylvilagus aquaticus*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*) striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*), and North American opossum (*Didelphis virginiana*) (Air Force, 2019d).

Due to the subtropical climate and variety of wetland, shoreline, and woodland ecosystems, a wealth of bird species have the potential to reside within the habitat types located on Tyndall AFB. Regularly encountered avian species include pie-billed grebe (*Podilymbus podiceps*), anhinga (*Anhinga anhinga*), snowy egret (*Egretta thula*), great blue heron (*Ardea herodias*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), northern bobwhite (*Colinus virginianus*), American coot (*Fulica americana*), killdeer (*Charadrius vociferous*), willet (*Tringa semipalmata*), least sandpiper (*Calidris minutilla*), American woodcock (*Scolopax minor*), ring-billed gull (*Larus delawarensis*), mourning dove (*Zenaida macroura*), great horned owl (*Bubo virginianus*), belted kingfisher (*Megaceryle alcyon*), red-bellied woodpecker (*Melanerpes carolinus*), eastern phoebe (*Sayornis phoebe*), American crow (*Corvus brachyrhynchos*), tufted titmouse (*Baeolophus bicolor*), Carolina wren (*Thryothorus ludovicianus*), eastern bluebird (*Sialia sialis*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), yellow-rumped warbler (*Setophaga coronata*), song sparrow (*Melospiza melodia*), and northern cardinal (*Cardinal cardinalis*).

Typical herpetofauna for the region include eastern newt (*Notophthalmus viridescens*), southeastern slimy salamander (*Plethodon grobmani*), southern toad (*Anaxyrus terrestris*), green tree frog (*Hyla cinerea*), bull frog (*Lithobates catesbeiana*), southern leopard frog (*Lithobates sphenocephala*), American alligator (*Alligator mississippiensis*), common snapping turtle (*Chelydra serpentina*), common musk turtle (*Sternotherus odoratus*), box turtle (*Terrapene carolina*), red-eared slider (*Trachemys scripta*), Florida softshell (*Apalone ferox*), green anole (*Anolis carolinensis*), fence lizard (*Sceloporus undulates*), five-lined skink (*Plestiodon fasciatus*), six-lined racerunner (*Aspidoceles sexlineatus*), slender glass lizard (*Ophisaurus attenuatus*), banded water snake (*Nerodia fasciata*), garter snake (*Thamnophis sirtalis*), eastern hognose snake (*Heterodon platirhinos*), black racer (*Coluber constrictor*), rough green snake (*Opheodrys aestivus*), corn snake (*Pantherophis guttata*), gray rat snake (*Pantherophis obsoleta*), king snake (*Lampropeltis getula*), cottonmouth (*Agkistrodon piscivorous*), and eastern diamondback rattlesnake (*Crotalus adamanteus*).

Common freshwater fish species found on Tyndall AFB include sheepshead minnow (*Cyprinodon variegatus*), long-nosed killifish (*Fundulus similis*), largemouth bass (*Micropterus salmoides*), spotted sunfish (*Lepomis punctatus*), bluegill (*Lepomis macrochirus*), and channel catfish (*Ictalurus punctatus*).

## 3.8.1.3 Federally Listed Species

The ESA (16 U.S.C. 1532 et. seq.) of 1973, as amended, was enacted to provide a program for the preservation of endangered and threatened species and to provide protection for the ecosystems upon which these species depend for their survival. All Federal agencies are required to implement protection programs for designated species and to use their authorities to further the purposes of the act. Responsibility for the identification of a threatened or endangered species and development of any potential recovery plans lies with the Secretary of the Interior and the Secretary of Commerce. The Secretary of the Interior and the Secretary of Commerce (marine species) are responsible for the identification of threatened or endangered species and development of any potential recovery plan.

USFWS is the primary agency responsible for implementing the ESA, and is responsible for birds and other terrestrial and freshwater species. USFWS responsibilities under the ESA include (1) the identification of threatened and endangered species; (2) the identification of critical habitats for listed species; (3) implementation of research on, and recovery efforts for, these species; and (4) consultation with other Federal agencies concerning measures to avoid harm to listed species.

Information in this section was gleaned from the Biological Assessment prepared by the USFWS staff at Tyndall AFB (USFWS, 2019a) impacts on threatened or endangered species as a result of the Proposed Action (**Appendix C**). The Air Force and USFWS are currently undergoing Section 7 consultation regarding potential impacts to threatened or endangered species. **Table 3.8-2** provides information about the federally listed species known to occur on Tyndall AFB and the adjacent Gulf of Mexico.

Scientific Name	Common Name	Federal Status	Location
Reptiles			
Caretta	Atlantic loggerhead sea turtle	Т	Tyndall AFB, Gulf of Mexico
Chelonia mydas	Atlantic green sea turtle	Е	Tyndall AFB, Gulf of Mexico
Dermochelys coriacea	Leatherback sea turtle	Е	Tyndall AFB, Gulf of Mexico
Gopherus polyphemus	Gopher tortoise	С	Tyndall AFB
Lepidochelys kempi	Kemp's Ridley sea turtle	Е	Tyndall AFB, Gulf of Mexico
Birds			
Calidris canutus rufa	Red Knot	Т	Tyndall AFB
Charadrius melodus	Piping plover	Т	Tyndall AFB
Mammals			
Peromyscus polionatus allophrys	Choctawhatchee beach mouse	E	Tyndall AFB
Peromyscus polionatus peninsularis	St. Andrew beach mouse	E	Tyndall AFB
Plants			
Euphorbia telephioides	Telephus spurge	Т	Tyndall AFB
Pinguicula ionantha	Godfrey's butterwort	Т	Tyndall AFB

## TABLE 3.8-2 FEDERALLY LISTED SPECIES ASSOCIATED WITH TYNDALL AFB

Sources: USFWS, 2015; USFWS, 2019a.

Notes: E – Endangered; T – Threatened; C – Candidate

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## Sea Turtles

Four species of sea turtles occur in the nearshore waters of the Gulf of Mexico and are known to nest on Tyndall AFB's barrier islands. These species include the Atlantic loggerhead sea turtle, Atlantic green sea turtle, leatherback sea turtle, and Kemp's ridley sea turtle. The loggerhead is the most common of the four species to nest on Tyndall AFB's beaches with occasional nesting by leatherback, green, and Kemp's Ridley sea turtles. The peak nesting period is June and July, with an average of 50 nests per year. Green sea turtle and leatherback sea turtle nesting was first documented at Tyndall AFB in 1998 and 2001, respectively. A Kemp's ridley was first observed laying a nest on Tyndall AFB in 2016 (Air Force, 2019d).

# Atlantic loggerhead sea turtle (*Caretta caretta*)

The loggerhead sea turtle is federally and state listed as threatened in the Florida panhandle. This species was originally listed as threatened throughout its global range in 1978 but the listing status was revised in 2011 by creating nine distinct population segments of which four segments are federally threatened and the other five segments are federally endangered (USFWS, 2011). Nesting females typically come ashore to dig nests and deposit eggs between 1 May and 31 August with peak nesting activity occurring in June and July. Nests are dug between the mean high water (MHW) mark and the dune line with nests periodically created in the dunes. Within one nesting season, individual loggerheads are known to nest from one to seven times. On-shore threats to the loggerhead sea turtle include degradation or destruction of nesting habitat from coastal development, hatchling disorientation due to beachfront lighting, and nest depredation. The loggerhead is the most common nesting sea turtle on Tyndall AFB and is known to nest on Shell Island, Crooked Island West, Crooked Island East, and occasionally Buck Beach (Air Force, 2019d). Critical habitat has not been designated for loggerhead sea turtles along the Gulf Coast of Florida.

# Atlantic green sea turtle (*Chelonia mydas*)

Populations of the green sea turtle are federally and state listed as endangered in Florida and on the Pacific Coast of Mexico with all other populations listed as threatened in its eastern range of North America (USFWS, 1978). Green sea turtles usually nest between June and September and a nesting female can lay as many as nine nests in a season (National Marine Fisheries Service and USFWS, 1991). This species typically breeds at two-to four-year intervals and very rarely breeds every year. On-shore threats to this species are the same as threats for loggerhead sea turtles. Green sea turtle nesting events are fairly uncommon on Tyndall AFB's beaches with the exception of the 2019 nesting season during which 20 green sea turtle nests were documented. There has been no designation of critical habitat for green sea turtles along Florida's Gulf coast.

# Kemp's ridley sea turtle (Lepidochelys kempii)

The Kemp's ridley sea turtle is federally and state listed as endangered throughout its global range (USFWS, 1970). The range of the Kemp's ridley includes the Gulf of Mexico and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland. Nesting is essentially limited to the beaches of the western Gulf of Mexico, primarily in Tamaulipas and Veracruz, Mexico with a few

historical records in Campeche, Mexico. The major habitat for Kemp's ridleys is the nearshore and inshore waters of the northern Gulf of Mexico. Kemp's ridley sea turtles nest from April to July with mean clutch sizes of approximately 100 eggs. Females can breed annually and mean number of nests per season is 2.5. On-shore threats to this species are the same as threats for loggerhead sea turtles. The first confirmed Kemp's ridley nest on Tyndall AFB was detected on May 24, 2016 on Crooked Island West. Critical habitat has not been designated for Kemp's ridley sea turtles along the Gulf Coast of Florida.

## Leatherback sea turtle (*Dermochelys coriacea*)

The leatherback sea turtle is federally and state listed as endangered throughout its global range (USFWS, 1970). Only infrequent nesting activity has been documented for the leatherback in northwest Florida (Longieliere et al., 1997). The nesting and hatching season for the leatherback extends from May 1 through September 30, with nest incubation ranging from 60 to 75 days occurring on two to three-year intervals (Longieliere et al., 1997). Since 2001, there have been three documented cases of leatherback turtle nesting on Tyndall AFB. Critical habitat has not been designated for leatherback turtles along the Gulf coast of Florida.

## Tyndall AFB Sea Turtle Monitoring and Management

The primary objectives of the Tyndall AFB sea turtle monitoring program are to 1) collect data annually to determine the distribution and abundance of sea turtle nesting activity on 18 miles of Tyndall AFB's Gulf of Mexico beaches, and 2) provide nest location information for military mission avoidance purposes. Additional data gathered during nesting surveys includes incubation period, nest depredation, hatchling disorientation, and nest success (hatchling emergence). Surveys are conducted in accordance with data collection and reporting protocols defined in the Marine Turtle Permit. Sea turtle nesting surveys are conducted five times per week on Crooked Island West and East, and the Federal section of Shell Island (18 miles of beach in total) from 1 May to 31 August. The surveys are designed to 1) locate the crawls of nesting female turtles, 2) determine crawl status (i.e. nesting crawl vs. false crawl), 3) species identification, and 4) nest protection. Data collected for each crawl and/or nest includes global positioning system coordinates of crawl/nest, crawl length and width, presence of dunes in the vicinity, distance from MHW mark to dunes, and dune height. If a body pit is identified at the crawl site, eggs are located and wire screens are secured over nest site to deter predation. Post-hatching surveys are conducted 1 September to 31 October to determine nest success. Nests are assessed for evidence of hatching activity, predation, inundation, and storm damage and continue to be monitored until three days after hatchlings have emerged.

The primary objective of sea turtle management at Tyndall AFB is to support the military mission while meeting the legal requirements of the ESA. Tyndall AFB's 18 miles of undeveloped beaches provide a valuable land to sea transition zone for training purposes and also serve as high quality habitat for nesting sea turtles. The primary goals of sea turtle conservation and management at Tyndall AFB include 1) locating and protecting nests, 2) nest relocation when necessary, 3) predator removal, 4) resolution of beach lighting issues, 5) beach driving restrictions, and 6) restoration and protection of nesting habitat. In addition to using screening to protect nests, predator control in the form of trapping and removing predators from Tyndall AFB's beaches is conducted.

Lighting has only occasionally been problematic for sea turtles on Tyndall AFB's beaches resulting in hatchling disorientation. Artificial lighting problems are identified and addressed as quickly as possible. Currently, the only lighting issues on Tyndall AFB beaches are from urban glow originating from Panama City and Mexico Beach but incidences of hatchling disorientation resulting from urban glow have been minimal. Additionally, a wildlife friendly lighting plan is being developed for Tyndall AFB and will be incorporated in the rebuilding of the base infrastructure reducing the potential for sea turtle disorientation caused by artificial lighting.

# Gopher Tortoise (Gopherus polyphemus)

The gopher tortoise is state-listed as threatened by the Florida Fish and Wildlife Conservation Commission (FWC) and is considered a candidate species for Federal listing by USFWS due to habitat loss, degradation, and a declining number of individuals. The gopher tortoise requires well-drained, loose, sandy soils for burrowing, and low-growing herbs and grasses for food. Gopher tortoises are known to occur on Tyndall AFB and suitable habitat is available within the proposed project areas. However, no burrows or individuals were observed during the field reviews. Critical habitat has not been designated for the gopher tortoise in Florida.

# Piping Plover (Charadrius melodus)

The piping plover is federally and state listed as threatened. This shorebird breeds in three geographic regions in the U.S. and are therefore divided into three breeding populations which include the Atlantic Coast, Great Lakes and North Great Plains. All three populations winter along beaches and barrier islands from North Carolina to Florida, and along the Florida Gulf Coast to Texas, Mexico, and the Caribbean. Piping plover preferred wintering habitat used for foraging and roosting includes beaches, salt marshes, coastal lagoons, and sand, mud, and algal flats (USFWS, 2003). Piping plovers consistently winter along Tyndall AFB's shoreline during the non-breeding (wintering and migrating) season from July 15 through May 15. Concentration is highest in areas containing pools and low elevation beach sites that are washed over and exposed by tidal fluctuations. Tyndall AFB's over-wintering population normally reaches 18 percent of all birds utilizing Florida as an over-wintering location. Portions of the barrier islands on Tyndall AFB have been designated critical habitat for the piping plover. Primary threats to the piping plover on wintering grounds include degradation and destruction of habitat, human disturbance, and predators.

## Piping Plover Critical Habitat and Species Management

Critical habitat designation for wintering and breeding grounds for the piping plover was published in the Federal Register on 10 July 2001 (USFWS, 2001) (Unit FL–5: Shell/Crooked Islands in Bay County). Piping plover critical habitat is a term defined in the ESA that refers to specific geographic areas that contain the essential habitat features necessary for the conservation of threatened and/or endangered species. At the time of designation, the critical habitat areas do not necessarily have to be occupied by piping plovers. Critical habitat areas may require special protection or management considerations for current populations as well as potential population increases necessary to achieve species recovery.

The primary management for piping plovers on Tyndall AFB consists of maintaining suitable wintering habitat for foraging, sheltering, and roosting. Management activities conducted at Tyndall AFB that benefit non-breeding piping plovers include 1) predator removal, 2) beach driving restrictions, 3) construction and maintenance of boardwalks, and 4) Critical Wildlife Area and Critical Habitat designations. Specific coastal dune protection and restoration measures at Tyndall AFB that may benefit piping plovers include 1) construction of elevated boardwalks on Crooked Island East and NCO beach (access point for Crooked Island West and Shell Island) to eliminate pedestrian traffic in and around dunes and prevent erosion, and 2) protection of dunes (via sand fence installation) by vegetating with sea oats to encourage establishment. Tyndall AFB recreation regulations also requires pedestrians to access the beach via marked roads or boardwalks and to stay out of sand dunes at all times (Tyndall AFB, 2015).

## Red Knot (Calidris canutus rufa)

The red knot is federally and state threatened and migrates annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the southeastern U.S., northeastern Gulf of Mexico, northern Brazil, and the southern tip of South America (USFWS, 2014). Staging and stopover areas in the wintering regions are used for resting and foraging. They winter at intertidal marine habitats near coastal inlets, estuaries, and bays. Wintering grounds for the red knot include coastal sites from Massachusetts and California southward to southern South America. Knots and other shorebirds depend on quiet, intertidal beach locations as resting sites during high tides. Migrating and wintering knots use marine habitats including sandy beaches, salt marshes, lagoons, mudflats of estuaries and bays, and mangrove swamps that contain an abundance of invertebrate prey. The red knot is observed at Tyndall AFB during migration, in particular on Crooked Island West, Crooked Island East, and Shell Island. Primary threats to the piping plover on wintering grounds include degradation and destruction of habitat, human disturbance, and predators. The red knot occurs in small numbers at Tyndall AFB during migration. It has similar habitat requirements and is present during similar time periods as the piping plover.

The primary management for red knots at Tyndall AFB includes maintaining suitable wintering habitat for foraging, sheltering, and roosting. Management activities conducted at Tyndall AFB that benefit this species include 1) predator removal, 2) beach driving restrictions, 3) construction and maintenance of boardwalks, and 4) Critical Wildlife Area and critical habitat designations.

### Choctawhatchee Beach Mouse (*Peromyscus polionotus allophrys*)

The Choctawhatchee beach mouse is federally and state listed as endangered and populations are currently known to occur in Bay, Okaloosa, and Walton counties in the Florida Panhandle (USFWS, 1987; USFWS, 2006). They inhabit coastal dunes on Shell Island and Crooked Island West at Tyndall AFB and their distribution ranges from Choctawhatchee Bay to St. Andrew Bay, Florida. The Choctawhatchee beach mouse was detected on Shell Island as early as 1950. In 1998, Shell Island and Crooked Island West became connected at East Pass due to the accretion of sand that had expanded southward on the eastern end of the Federal portion of Shell Island. The connection of Shell Island and Crooked Island West provided the opportunity for Choctawhatchee beach mice inhabiting Shell Island to expand their range to Crooked Island West. Presence of the Choctawhatchee beach mouse on Crooked

Island West was confirmed during trapping events in 2000 and the presence of the Choctawhatchee beach mouse continues to be monitored on Crooked Island West and Shell Island to date (USFWS, 2010).

## St. Andrew Beach Mouse (Peromyscus polionotus peninsularis)

The St. Andrew beach mouse is federally and state listed as endangered. Prior to the 1980s, there were two populations of this subspecies, one known to occur on Crooked Island East at Tyndall AFB and the other occurring on St. Joseph Peninsula, Gulf County, Florida. However, a 1992-1993 trapping event on Crooked Island East produced zero captures of the St. Andrew beach mouse and the subspecies was therefore thought to be extirpated from Crooked Island East. Re-introduction of 43 individuals to Crooked Island East from the St. Joseph Peninsula State Park population occurred between November 1997 and December 1998 (USFWS, 2010) and the presence of the St. Andrew beach mouse continues to be monitored on Crooked Island East to date.

## Choctawhatchee and St. Andrew Beach Mouse Habitat, Threats, and Management

The Choctawhatchee beach mouse and St. Andrew beach mouse inhabit primary, secondary, and inland tertiary dunes within well-developed coastal dune ecosystems (USFWS, 2010). They are burrow-inhabiting animals but move around within their home range to forage, breed, and maintain other burrows that they have created (USFWS, 1987). Principal threats that have led to the decline of the Choctawhatchee beach mouse and the St. Andrew beach mouse include habitat degradation or loss due to land development, catastrophic storm events, and human recreational activity on dunes. Other potential threats include shoreline erosion, predators, and artificial beach lighting.

The primary goals of beach mouse conservation and management at Tyndall AFB consist of 1) dune restoration and protection, 2) predator removal, 3) resolution of beach lighting issues, and 4) beach driving restrictions, 5) designation of critical habitat. Additional coastal dune protection measures on Crooked Island West, Crooked Island East and Shell Island at Tyndall AFB include the construction and maintenance of boardwalks, sand fence installation, and beach driving restrictions. Specific coastal dune protection and restoration measures at Tyndall AFB include 1) construction of an elevated boardwalk on Crooked Island East and NCO beach to eliminate pedestrian traffic in and around dunes, and 2) protection of dunes (via sand fence installation) by vegetating with sea oats to encourage establishment. Predator control in the form of trapping and removing predators from Tyndall's beaches is conducted. Artificial light pollution is minimized on all Tyndall AFB beaches during the sea turtle nesting season (May 1 to August 30), which directly benefits the nocturnal Choctawhatchee and St. Andrew beach mice. Prior to the approval of the INRMP (Air Force, 2019d), critical habitat had been designated for the St. Andrew beach mouse on Crooked Island West and for the Choctawhatchee beach mouse on Crooked Island West and Shell Island to ensure protection of their coastal dune habitat.

## Godfrey's Butterwort (Pinguicula ionantha)

Godfrey's butterwort is listed as federally threatened and state endangered and is known to occur in Bay, Calhoun, Franklin, Gulf, Liberty, and Wakulla counties in the Florida Panhandle (USFWS, 1994). It is a carnivorous plant that inhabits herb bogs, flatwoods depressions, savannas, and ditches adjacent to the aforementioned habitats historically embedded within the longleaf pine matrix (Godfrey and Wooten,

1981; Wunderlin and Hansen, 2011). Godfrey's butterwort often occurs in areas that are seasonally inundated with shallow water. Ecosystem degradation is the primary threat to this species resulting from commercial forest production, inadequate prescribed fire management, fire exclusion, and urban development. Other threats include shading from the overstory pines and midstory shrubs, drainage of wetlands, and water quality degradation (USFWS, 1994).

Prescribed fire is the most important management tool for improving or maintaining suitable habitat for Godfrey's butterwort at Tyndall AFB. Commercial timber production coupled with fire exclusion had been the primary reasons for ecosystem degradation at Tyndall AFB since the 1960s. Re-introduction of prescribed fire began in 1996 when the Forestry Department began a prescribed fire program across the base. Seasonality of prescribed fire may be one of the most important factors related to Godfrey's butterwort habitat improvement due to its habitat preferences (wettest edges of the ecotone between herbaceous wetlands and upland pine flatwoods). Since 1996, Tyndall AFB natural resources staff has been working to accomplish more growing season burns as well as promote burning through wetlands. Mechanical removal of the shrub layer in wetlands began in 2018 to improve habitat for Godfrey's butterwort and other listed species that have been difficult to manage with prescribed fire.

# Telephus spurge (Euphorbia telephioides)

Telephus spurge is a perennial herbaceous plant species listed as federally threatened and state endangered and is currently restricted to coastal (within four miles of the coast) Bay, Franklin, and Gulf counties in the Florida Panhandle (USFWS, 2007). Populations of this species have been observed on a variety of sites including xeric scrub pine to mesic pine flatwoods, disturbed sandy roads, and less commonly in wetlands with seepage slope species. Telephus spurge can also be found in pine flatwoods or upland pine communities with a longleaf pine and/or slash pine overstory and herbaceous understory dominated by wiregrass, other grasses, and forbs that have historically been burned on a two- to threeyear fire return interval. It is generally found inhabiting sites with sandy, acidic soil with little to no litter and low organic and moisture content (Peterson and Campbell, 2007). This species is characterized as ephemeral in that it can appear suddenly and be abundant at newly disturbed sites but may not be there upon re-survey a few years later. Large tuberous roots allow this species to survive underground when subjected to suboptimal or poor habitat conditions. The primary threats to telephus spurge include habitat degradation and destruction caused by commercial timber production, inadequate prescribed fire management, fire exclusion, and urban development (USFWS, 2007).

Commercial timber production coupled with fire exclusion had been the primary reasons for ecosystem degradation at Tyndall AFB. Prescribed fire is the most important management tool for improving or maintaining habitat for telephus spurge at Tyndall AFB as this species is thought to respond with prolific emergence following fire (Kaeser, 2018). The Tyndall AFB natural resources staff has been working to promote more burning during the growing season as well as burning on an 18- to 30-month fire return interval, benefiting telephus spurge. Longleaf pine restoration efforts in slash pine plantations (pine flatwoods) and former sand pine plantations coupled with low intensity, frequent fire will improve potential habitat for telephus spurge on Tyndall AFB.

## 3.8.1.4 State Listed Species

While the USFWS has primary responsibility for Florida species that are federally endangered or threatened, the FWC maintains a list of Florida's imperiled state listed animal species. The Florida Department of Agriculture and Consumer Services (FDACS) maintains a list of regulated plant species. A list of state-protected plant and animal species with potential to occur at Tyndall AFB is provided in **Table 3.8-3**. This list does not include those species both state and federally listed as they are described above.

Scientific Name	Common Name	State Status
Plants		
Asclepias viridula	Southern milkweed	Е
Chrysopsis godfreyi	Godfrey's golden aster	Т
Cleistes bifaria	Small spreading pogonia	Т
Drosera filiformis	Dew thread sundew	Т
Drosera intermedia	Spoon-leafed sundew	Е
Eurybia spinulosa	Apalachicola aster	Е
Gentiana pennelliana	Wiregrass gentian	Е
Justicia crassifolia	Thick-leaved water willow	Т
Lilium catesbaei	Southern red lily	Т
Lupinus westianus	Gulf coast lupine	Е
Oxypolis greenmanii	Giant water dropwort	Т
Physostegia godfreyi	Apalachicola dragonhead	Т
Pinguicula lutea	Yellow-flowered butterwort	Т
Pinguicula planifolia	Chapman's butterwort	E
Pogonia ophioglossoides	Snakemouth orchid	E
Polygonella marcophylla	Large-leaved jointweed	Т
Ruellia noctiflora	White-flowered wild petunia	Т
Sarracenia psittacina	Parrot pitcher plant	Т
Sarracenia rosea	Purple pitcher plant	Т
Verbesina chapmanii	Chapman's crownbeard	E
Xyris isoetifolia	Quillwort yellow-eyed grass	Е
Xyris longisepala	Karst pond yellow-eyed grass	Е
Xyris scabrifolia	Harper's yellow-eyed grass	Т
Reptiles		
Pituophis melanoleucus mugitus	Florida pine snake	Т
Birds		
Charadrius nivosus	Snowy plover	Т
Egretta caerulea	Little blue heron	Т
Egretta rufescens	Reddish egret	Т
Egretta tricolor	Tricolored heron	Т
Falco sparverius paulus	Southeastern American kestrel	Т
Haematopus palliatus	American oystercatcher	Т
Platalea ajaja	Roseate spoonbill	Т
Rynchops niger	Black skimmer	Т
Sternula antillarum	Least Tern	Т
Mammals		
Ursus americanus floridanus	Florida black bear	NL*

#### TABLE 3.8-3. STATE-LISTED SPECIES WITH POTENTIAL TO OCCUR AT TYNDALL AFB

Sources: FDACS, 2010; FWC, 2018.

Notes: E – Endangered; T – Threatened; NL – Not Listed

\* The Florida black bear is no longer state-listed; however, this species is managed in Florida by the FWC's Florida Black Bear Conservation rule (68A-4.009, F.A.C.).

### **State-Listed Plant Species**

Several plants species state listed by the FDACS have the potential to occur at Tyndall AFB in various habitats. However, during the October and November 2019 field surveys, no state listed plant species were observed within the proposed project areas.

#### Florida pine snake (Pituophis melanoleucus mugitus)

The Florida pine snake is state listed as threatened and prefers sandhill, old fields, and pastures with sandy soils as well as sand pine scrub and scrubby flatwoods. It may use gopher tortoise burrows for shelter to escape hot or cold ambient temperatures within its range. Marginally suitable habitat for this species is available within the proposed project areas within the pine plantations and grassy upland areas. No pine snakes were observed during the field reviews.

#### **Snowy Plover** (*Charadrius nivosus*)

The snowy plover is state listed as threatened and is typically found on open, sandy beaches and on tidal mudflats and sandflats along both coasts. Piping plovers spend a large portion of their year "wintering" in Florida but do not breed there. Pairs of piping plovers arrive at breeding grounds from southern Canada to Nebraska starting in late March and early April. The main threat to piping plovers is habitat loss as development on beaches has reduced the amount of suitable wintering areas available. Other threats include predation from raccoons, skunks, and foxes (FWC, 2019a).

# Little blue heron (*Egretta caerulea*), reddish egret (*Egretta rufescens*), tricolored heron (*Egretta tricolor*), and roseate spoonbill (*Platalea ajaja*)

The little blue heron, reddish egret, tricolored heron and roseate spoonbill are all state-listed as threatened and occur statewide where they forage in a variety of coastal and inland wetlands including swamps, marshes and the edges of water bodies. Nesting occurs in a variety of forested or shrub wetlands. Suitable foraging and nesting habitat for these species is present within the proposed project areas in the herbaceous and shrub wetlands. No wading birds were observed during the field reviews.

# American oystercatcher (*Platalea ajaja*), black skimmer (*Rynchops niger*), and least tern (*Sternula antillarum*)

The American oystercatcher, black skimmer, and least tern are all state listed as threatened and inhabit beaches, sandbars, spoil islands, shell rakes, salt marsh, and oyster reefs. These shorebirds are found from the coasts of the northeastern U.S. down to Florida's Gulf Coast. Habitat loss due to coastal development is the main threat to these shorebirds. Shorebirds are known to occur on Tyndall AFB along the Gulf Coast shoreline.

## Southeastern American kestrel (Falco sparverius paulus)

The southeastern American kestrel is listed as threatened and is non-migratory. The species utilizes open habitats for foraging and nests in tree cavities. Habitats such as pine scrub, dry prairies, mixed pine and hardwood forests, and pine flatwoods are preferable for the southeastern American kestrel. While suitable habitat for this species is available in the forested uplands, no individuals or nests were observed during the field reviews.

## Florida Black Bear (Ursus americanus floridanus)

Although the Florida black bear has been removed from the state listing, it is still protected and managed by the FWC pursuant to the Florida Black Bear Conservation Rule 68A-4.009, F.A.C. The Florida black bear can be found statewide in a number of habitats including mixed hardwood pine communities, cabbage palm hammock and forested wetland systems. This species tends to den alone within tree cavities, river banks, logs or caves. They will also seek shelter on the ground in palmetto thickets, gallberry, fetterbush, and sweet pepperbush. Marginally suitable habitat for the black bear is available within the proposed project areas in the forested upland and wetland areas. Established by the FWC, a Bear Management Unit (BMU) is a geographic location bounded by county and/or state borders with one of the seven Florida black bear subpopulations within it. The goal of a BMU is to provide a defined area within which FWC can have a community-focused effort to effectively manage and conserve Florida black bears (FWC, 2019b). According to FWC, Tyndall AFB is located within the East Panhandle BMU where their occurrence is classified as "frequent". No black bears were observed at Tyndall AFB during the field reviews.

# **3.9 CULTURAL RESOURCES**

Cultural resources can include prehistoric or historic buildings, sites, districts, objects, or structures evaluated as significant (54 U.S.C. 300308). Also included in the definition are significant properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization (36 CFR 800 16[1][1]). This section describes the state of knowledge pertaining to cultural resources, including previously reported archaeological sites and historic resources, as well as previously conducted research in the area of potential effect of the Proposed Actions.

For this EA, Tyndall AFB conducted an archaeological survey to inventory and identify Historic Properties as defined by 36 CFR 800. The findings of this survey were used to inform the **Section 3.9.1** Affected Environment below.

### 3.9.1 AFFECTED ENVIRONMENT

The prehistory of the Florida Panhandle/northwestern Florida region extends deep into remote antiquity, is unquestionably complex, and as a result has many unresolved controversies. A comprehensive discussion of the prehistoric record and the divergent opinions of specialists are beyond the scope of this section. The major culture periods generally recognized for northwestern Florida include the Paleoindian Period, Archaic Period, Woodland Period, Mississippian Period (some scholars combine this with the Woodland Period), Protohistoric Period, and the Historic Period (**Table 3.9-1**). Each of the major periods

is further divided into multiple sub-periods and local phases based on the nature of the local archaeological record. Each of the local phases in **Table 3.9-1** will be briefly summarized below. A more comprehensive synthesis of the prehistory and history of Tyndall AFB is provided in the Air Force Integrated Cultural Resources Management Plan (ICRMP) Tyndall AFB (Air Force, 2016a). This document is hereby incorporated by reference.

As a Federal land manager, Tyndall AFB is obligated to implement regulations set forth in Section 110 of the NHPA of 1966, as amended, and with its implementing regulations (54 U.S.C. 306101). Tyndall AFB cultural resources are managed by Tyndall Environmental Management Flight with support from Eglin Installation Support Section of AFCEC and the Eglin Cultural Resources Management (CRM) team. Under Section 110 of the NHPA, Federal agencies are required to develop a historic preservation program and are encouraged to take efforts to locate and preserve cultural resources on properties under Federal management or control regardless of future use or disturbance. As such, Tyndall AFB developed an ICRMP (Air Force, 2016a) with updated support from Eglin CRM and maintains an inventory of all previously reported cultural resources on Tyndall AFB managed lands, as well as an account of all the land that has previously been surveyed on the installation. This documentation is useful for project planning, managing the protection and preservation of known cultural resources, and inventorying lands that have not been investigated for the presence of cultural resources. In the case of this particular project this documentation was useful in determining which proposed project areas have not previously been surveyed and whether any Proposed Actions overlapped previously reported cultural resources.

As reported in **Appendix D**, the Support Area has recently been surveyed for cultural resources for the purposes of this EA (Wood, 2019). Three additional areas were identified in consultation with the Eglin AFB CRM as having not been subject to adequate cultural resources inventory surveys, the Flightline Area, Munitions Area, and 8500 Area. These three areas, shown on **Figure 3.9-1**, were subject to further investigation to determine whether the Proposed Actions in those areas would have adverse effects to cultural resources. The investigation into these three areas is described below.

Culture Period	Subperiod	Phase/Culture(s)	Approximate Years Before Present
Historic	-	American	195 – present
		European	350 - 195
Protohistoric	-	Bear Point	550/450 - 350
Mississippian	-	Fort Walton - Pensacola	1050 - 550/450
Woodland	Late Woodland	Weeden Island -	1650 - 1050
		Wakulla	
	Middle Woodland	Santa Rosa-Swift Creek	1740 - 1650
	Early Woodland	Deptford	2500 - 1740
Archaic	Late Archaic	-	5000 - 2500
	Middle Archaic		7000 - 5000
	Early Archaic		9500 - 7000
Paleoindian	-	-	12,000 - 9500

Source: Air Force, 2016a.

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## 3.9.1.1 Previous Investigations

Search of the Florida Master Site File (FLMSF) and Tyndall AFB's cultural resources inventory has revealed that 29 cultural resources investigations have been conducted within 1.6 kilometers (km) (1.0 mile) of the selected project survey parcels. These investigations include cultural resources assessments, monitoring reports, historic building inventories and evaluations, and Phase I archaeological surveys similar to the one proposed in this document. **Table 3.9-2** summarizes the previous investigations conducted within 1.6 km (1.0 mile) of the proposed project alternative areas. Three previous investigations overlap portions of the survey areas to be investigated in the current project. These surveys include FLMSF Survey Numbers 138 (Knudsen et al., 1979), 1387 (Campbell and Thomas, 1985), and 22358 (Bartlett et al., 2015).

Survey Number	Title	Year	Authors
138	Partial Cultural Resource Inventory of Tyndall AFB, Florida	1979	Knudsen, Gary, D. and James W. Stoutmire
424	Cultural Resources Survey of the Proposed Drone Runway and Supporting Facilities, Tyndall AFB	1976	Nielsen, Jerry
1387	Cultural resources investigation at Tyndall AFB, Bay County, Florida.	1985	Campbell, Janice L. and Prentice M. Thomas Jr.
9493	Identification and Evaluation of Historic Properties Within the One Mile Area of Potential Effects of the Proposed 160-foot Beacon Beach (Tyndall AFB) Wireless Telecommunications Tower (American Tower Corporation #224680), Bay County, Florida	2003	Parker, Brian T.
11134	Assessment of Potential Effects Upon Historic Properties: Proposed 160-Foot Panama 11 Wireless Telecommunications Tower (Sprint Site Number 224680), Bay County, Florida	2005	Parker, Brian T.
14993	Phase I Archaeological Survey of an Alternate Drone Launch System Site at Tyndall AFB, Bay County, Florida	2007	RabbySmith, Steven
17904	Phase I Archaeological Survey of the Site DB039 Debris Dump Tract, Tyndall AFB, Bay County, Florida	2010	RabbySmith, Steven L., RPA
18397	Cultural Resources Survey of TY-2 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2010	Bourgeois, Carrie Williams, Christina M. Callisto, and Janice L. Campbell
20366	Limited Phase I Archaeological Investigation & Monitoring of Environmental Restoration Site LF005, Tyndall AFB, Bay County Florida	2013	Aubuchon, Benjamin, James R, Morehead, and Christina Zimmerman
20607	Cultural Resources Survey of Five Timber Tracks Contract FA4890-04-D-0009-DK13 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2012	Callisto, Christina M., Janice L. Campbell, and James H. Mathews
20958	Cultural Resources Survey of TY-100 & TY-101 (Task Order TY- 13-0002) Contract W9128F-12-2-0002-0006 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2014	Campbell, Janice L., Bret Kent, and James H. Mathews
22319	Cultural Resource Assessment Review Request Cultural Resource Reconnaissance Survey of SR30 (US98) from Tyndall AFB to the Gulf County Line. By Carl McMurray, February 1993.	1993	McMurray, Carl

# TABLE 3.9-2 PREVIOUS SURVEYS CONDUCTED WITHIN 1.6 KILOMETERS (1 MILE) OF THE PROJECT SURVEY AREAS

Survey Number	Title	Year	Authors
22358	Cultural Resource Assessment Survey for the State Road (SR) 30 (U.S.US 98) Alternative 7 Elevated Roadway at Tyndall AFB Entrance Bay County, Florida	2015	Bartlett, Laurel, Elizabeth, Chambless, Melissa Dye, and Jessica Fish
22458	Cultural Resources Survey of TY-112 (Task Order TY-14-0014) Contract W9128F-12-2-0002 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2015	Campbell, Janice L., Sarah Deihl, and Erica Meyer
22532	Cultural Resources Survey of TY-111 (Task Order TY-14-0013) Contract W9128F-12-2-0002 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2015	Campbell, Janice L., Ryan N. Clark, and James R, Morehead
22534	Cultural Resources Survey of TY-113 (Task Order TY-14-0015) Contract W9128F-12-2-0002 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2015	Campbell, Janice L., Ryan N. Clark, and James R, Morehead
23221	Phase I Archaeological Investigation of Survey Areas TY-0134, Tyndall AFB, Bay County, Florida	2016	Benjamin Stewart, BA, Kathleen Furgerson, MA, RPA, Mark Martinkovic, MA, RPA
23223	Phase I Archaeological Investigation of Survey Area TY-0122 Tyndall AFB, Bay County, Florida	2016	Benjamin Stewart, BA, Kathleen Furgerson, MA, RPA, Mark Martinkovic, MA, RPA
23224	Archaeological Monitoring at 8By1765 in Association with GCEC Directional Bore, DHR Project No. 2015-5362 (Letter Report)	2016	TG Earnest
23830	Phase I Archaeological Investigation of Survey Area TY-0124 Tyndall AFB, Bay County, Florida	2016	Benjamin Stewart, BA, Kathleen Furgerson, MA, RPA, Mark Martinkovic, MA, RPA
23831	Phase I Archaeological Investigation of Survey Area TY-0123 Tyndall AFB, Bay County, Florida	2016	Benjamin Stewart, BA, Kathleen Furgerson, MA, RPA, Mark Martinkovic, MA, RPA
23832	Phase I Archaeological Investigation of Survey Areas TY-0131, Tyndall AFB, Bay County, Florida	2016	Furgerson, Kathleen, Mark Martinkovic, MA, RPA, and Scott Seibel
24164	Archaeological Survey of TY-142 Tyndall AFB, Bay County, Florida Task Order TY-16-0021 Contract W9128F-12-2-002	2017	Campbell, Janice L., Ryan N. Clark, and Zackery Cruze
24165	Archaeological Survey Unit TY-0137, 194 Acres, Tyndall AFB, Bay County, Florida Task Order TY-15-0004 Contract W9128F- 12-2-002 Survey Unit TY-0137	2015	Bradley, Dawn M., Savannah L. Darr, and Stephen T. Mocas
24677	Archaeological Survey of TY-144 Tyndall AFB, Bay County, Florida Task Order TY-16-0022 Contract W9128F-12-2-0040	2017	Campbell, Janice L., Ryan N. Clark, and Zackery Cruze
24705	Archaeological Survey of TY-155 Tyndall AFB, Bay County, Florida Task Order TY-17-0007 Contract W9128F-12-2-0002	2017	Brannon, Shannon, Janice L. Campbell, and Ryan N. Clark
24725	Archaeological Surveys Conducted for the Upgrade for the Medical Facility Complex, Tyndall AFB, Bay County, Florida.	2017	Brown, Teresa L.
25042	Phase I Archaeological Investigation of Survey of TY-146 on Tyndall AFB, Bay County, Florida., Contract: W9128F-12-2-0002, Task Order: TY-17-0002	2017	Mikell, Gregory A.

Survey Number	Title	Year	Authors
25442	Phase I Archaeological Investigation of Survey of TY-158 and TY- 159 on Tyndall AFB, Bay County, Florida., Contract: W9128F-12- 2-0002, Task Order: TY-17-0014	2017	Mikell, Gregory A.

Source: FLMSF, 2019; Air Force, 2016a.

FLMSF Survey Number 138 was described in the report, *Partial Cultural Resource Inventory of Tyndall Air Force Base* (Knudsen et al., 1979). The investigation appears to have consisted of a base-wide inventory updating a summary of all of the cultural resources known to exist on the base at that time. It is unclear whether any fieldwork was conducted in support of the project. The project recorded 57 new resources and re- recorded either previously reported resources that included both archaeological sites and structures (Knudsen et al., 1979). None of the sites discussed are located in current project survey areas.

FLMSF Survey Number 1387 also appears to have been a base-wide investigation reporting 29 new resources and 70 previously known resources that included both archaeological sites and structures (Campbell and Thomas, 1985). The findings were described in the report titled, *Cultural resources investigation at Tyndall Air Force Base, Bay County, Florida* (Campbell and Thomas, 1985). None of the resources reported are located within the current survey areas.

FLMSF Survey Number 22358 is reported in *Cultural Resource Assessment Survey for the SR 30 (U.S. 98) Alternative 7 Elevated Roadway at Tyndall Air Force Base Entrance Bay County, Florida* (Bartlett et al., 2015). The investigation partially overlapped the northwestern portion of the Flightline Area in the current investigation. The investigation recorded two new resources and re-recorded 15 previously known resources that included both archaeological sites and structures (Bartlett et al., 2015). Ten of the structures were located in the Flightline Area and all were recommended ineligible for the National Register of Historic Places (NRHP). It is unclear what methods were employed during fieldwork during this investigation.

## 3.9.1.2 Previously Recorded Resources

The search of the FLMSF and Tyndall AFB cultural resources inventory also revealed the presence of 31 archaeological sites (**Table 3.9-3**) and 205 historic structures within 1.6 km (1.0 mile) of the project survey areas. The vast majority of the archaeological sites previously recorded were located on land (land-terrestrial) and were not underwater sites. Within this population of cultural resources within 1.6 km (1.0 mile) of project survey areas is evidence for a continuous human presence dating from the Formative Period (Deptford Phase) to present. Sites range from prehistoric artifact scatters, middens and campsites to shell middens to historic period artifact scatters, camps, building remains, and historic wells. None of the previously reported archaeological sites are located within or overlap the current project alternative areas.

# TABLE 3.9-3 PREVIOUS ARCHAEOLOGICAL SITES RECORDED WITHIN 1.6 KILOMETERS (1MILE) OF THE PROJECT SURVEY AREAS

Site Number	Site Name	Site Type	Cultural/Temporal Association	Survey Recommendation	SHPO Recommendation
BY00025	Mound	Prehistoric burial	Weeden Island, A.D.	Not Evaluated by	Not Evaluated by
	Near Pearl	mound(s)	450-1000	Recorder	SHPO

Site	Site Name	Site Type	Cultural/Temporal	Survey	SHPO
Number	Bayou		Association	Recommendation	Recommendation
	24904				
BY00132	East Bay Historic 1	Building remains, Homestead, Land- terrestrial, Historic refuse/dump, Artifact scatter-low density (< 2 per square meter)	Nineteenth century American, 1821- 1899,Twentieth century American, 1900-present, American, 1821- present, Boom Times, 1921-1929, Depression and New Deal, 1930-1940, Fort Walton, A.D. 1000- 1500, Post- Reconstruction, 1880- 1897, Spanish- American War, 1898-1916	Eligible for NRHP	Eligible for NRHP
BY00134	East Bay 4	Land-terrestrial, Artifact scatter-low density (< 2 per square meter)	Indeterminate, Prehistoric with pottery	Ineligible for NRHP	Insufficient Information
BY00190	Tyndall AFB Aboriginal 7	Redeposited site (to this location)	Indeterminate	Ineligible	Not Evaluated by SHPO
BY00692	NN	Habitation (prehistoric), Prehistoric midden(s), Artifact scatter-low density (< 2 per square meter)	Weeden Island, A.D. 450-1000	Not Evaluated by Recorder	Ineligible for NRHP
BY01692	TY-100-9- A	Land-terrestrial	Twentieth century American, 1900- present, World War II & Aftermath 1941- 1950	Insufficient Information	Insufficient Information
BY01350	Two Palms Homestead	Building remains, Subsurface features are present, Homestead, Land-terrestrial, Historic refuse/dump, Artifact scatter-low density (< 2 per square meter)	Twentieth century American, 1900- present	Ineligible for NRHP	Ineligible for NRHP
BY01386	TIM 3-A	Campsite (prehistoric), Subsurface features are present, Land- terrestrial, Prehistoric shell	Twentieth century American, 1900- present, Fort Walton, A.D. 1000- 1500, Weeden Island, A.D. 450-1000	Insufficient Information	Insufficient Information

Site Number	Site Name	Site Type	Cultural/Temporal	Survey Recommendation	SHPO Recommendation
Tumber		midden	Association	Recommendation	Accommentation
		Calanda fa calendaria			
BY01387	TIM 3-B	Subsurface features are present, Homestead, Land- terrestrial	Twentieth century American, 1900- present, Prehistoric	Insufficient Information	Insufficient Information
BY01388	TIM 4-B	Subsurface features are present, Land- terrestrial, Artifact scatter- low density (< 2 per square meter)	Twentieth century American, 1900- present, Weeden Island, A.D. 450-1000	Ineligible for NRHP	Ineligible for NRHP
BY01496	Wet Dune Midden	Specialized site for procurement of raw materials, Land- terrestrial, Prehistoric midden(s)	Ft. Walton, A.D. 1000-1500, Weeden Island II	Insufficient Information	Not Evaluated by SHPO
BY01763	TY-113 A; Tyndall AFB Jeep Range 7	Land-terrestrial	Nineteenth century American, 1821-1899, Twentieth century American, 1900- present, Weeden Island, A.D. 450-1000	Insufficient Information	Insufficient Information
BY01765	ТҮ-113-Е	Subsurface features are present, Homestead, Land- terrestrial, Historic well	Twentieth century American, 1900- present	Insufficient Information	Insufficient Information
BY01767	TY112-B, TY112-C	Land-terrestrial	Deptford, 700 B.C 300 B.C., Prehistoric lacking pottery, Prehistoric with pottery	Insufficient Information	Insufficient Information
BY01768	TY-113-I/J	Land-terrestrial	Fort Walton, A.D. 1000-1500	Insufficient Information	Insufficient Information
BY01780	TY-111-B	Land-terrestrial	Weeden Island, A.D. 450-1000	Ineligible for NRHP	Ineligible for NRHP
BY01781	TY-111-C	Land-terrestrial	Nineteenth century American, 1821-1899, Twentieth century American, 1900- present, Weeden Island, A.D. 450-1000	Ineligible for NRHP	Ineligible for NRHP
BY01782	TY-111- D/E	Land-terrestrial, Prehistoric shell midden	American, 1821- present, Weeden Island, A.D. 450-1000	Not Evaluated by Recorder	Ineligible for NRHP
BY01808	FS-7	Land-terrestrial, Turpentine camp	Twentieth century American, 1900- present, Prehistoric	Ineligible for NRHP	Ineligible for NRHP
BY01947	TY-124- HSS-01	Building remains, Land-terrestrial	Twentieth century American, 1900- present	Eligible for NRHP	Insufficient Information

Site	Site Name	Site Type	Cultural/Temporal	Survey	SHPO
Number			Association	Recommendation	Recommendation
BY01948	TY-124- HSS-02	Building remains, Land-terrestrial	American, 1900- present	Eligible for NRHP	Insufficient Information
BY01949	TY-124 Gunnery Range Remnant	Historic earthworks, Land- terrestrial	Twentieth century American, 1900- present	Eligible for NRHP	Insufficient Information
BY01958	TY 131-01	Campsite (prehistoric), Land- terrestrial	Archaic, 8500 B.C 1000 B.C., Prehistoric lacking pottery	Ineligible for NRHP	Ineligible for NRHP
BY02278	TY-141 N	Land-terrestrial	Twentieth century American, 1900- present	Insufficient Information	Insufficient Information
BY02299	ТҮ-144-Е	Land-terrestrial	Weeden Island, A.D. 450-1000	Ineligible for NRHP	Ineligible for NRHP
BY02300	TY-144-F	Land-terrestrial	Nineteenth century American, 1821-1899, Twentieth century American, 1900- present	Insufficient Information	Insufficient Information
BY02301	TY-144-G	Building remains, Land-terrestrial	Twentieth century American, 1900- present	Insufficient Information	Insufficient Information
BY02302	ТҮ-144-Н	Building remains, Land-terrestrial	Twentieth century American, 1900- present	Insufficient Information	Insufficient Information
BY02377	TY-155 C	Land-terrestrial	Twentieth century American, 1900- present	Ineligible for NRHP	Ineligible for NRHP
BY02378	TY-155 F	Campsite (prehistoric), Habitation (prehistoric),Land- terrestrial, Prehistoric shell midden, Historic well	Twentieth century American, 1900- present, Fort Walton, A.D. 1000- 1500, Mississippian, Weeden Island, A.D. 450-1000	Insufficient Information	Insufficient Information
BY02379	TY-155 R	Campsite (prehistoric), Land- terrestrial, Prehistoric shell midden	Fort Walton, A.D. 1000-1500, Mississippian, Santa Rosa-Swift Creek	Insufficient Information	Insufficient Information

Note: Land-terrestrial = located on land. Source: Knudsen et al., 1979; Campbell and Thomas, 1985; Bartlett et al., 2015.

## 3.9.1.3 Current Investigation

An intensive Phase I archaeological survey was conducted in support of this EA to assess effects to cultural resources in areas that had not previously been surveyed. The survey was conducted in accordance with the guidelines of the FLDHR, Cultural Resource Management Standards and Operational Manual (FLDHR, 2003). The intensive Phase I survey included pedestrian surface inspection supplemented with systematic shovel testing along transects. The initial research design and work plan for the investigation planned to survey the project areas at a high probability intensity level and included

survey transects spaced 25 meters apart with shovel tests excavated at 25-meter intervals along transects. Preliminary background research revealed that the USDA Natural Resources Conservation Service Web Soil Survey characterized the soils in the Flightline Area and Munitions Areas as consisting predominantly of Urban Land and Arents, both of which are highly disturbed soil types produced by human induced cutting, filling, and land leveling, which are not conducive to finding intact archaeological deposits. As a contingency plan for areas in which it was determined that modern construction and disturbance had destroyed the context of deposits to the depth reached by shovel testing (1.0 meter), the survey intensity was reduced to medium (50-meter transect/shovel test intervals) or low probability (100-meter transect/shovel test intervals). All exposed areas were carefully examined for artifacts. Additional judgmental subsurface excavations were placed in those areas considered to be likely site locations. All shovel tests were 50 centimeters (19.69 inches) in diameter and dug in arbitrary 10centimeter (3.94-inch) stratigraphic levels. All shovel tests were dug to a minimum of 1.0 meter (3.3 feet) below surface unless digging is inhibited by groundwater levels. All excavated soil were screened through 6.34-millimeter (0.25-inch) hardware cloth mounted in portable wooden frames. All shovel tests throughout the survey areas were negative for cultural material.

# 3.10 HAZARDOUS MATERIALS/WASTE AND SOLID WASTE

# **3.10.1 HAZARDOUS MATERIALS**

Hazardous materials have been declared hazardous through Federal listings including: Extremely Hazardous Substances listed in Appendix A of 40 CFR 355, *Emergency Planning and Notification*; those listed as hazardous if released, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 40 CFR 302.4, *Designation of Hazardous Substances*; and by definition of hazardous chemicals by the OSHA in 29 CFR 1910.1200, *Hazard Communication*. Hazardous materials are defined in AFI 32-7086, *Hazardous Materials Management*, to include all items covered under the Emergency Planning and Community Right-to Know Act or other applicable host nation, Federal, state, or local tracking or reporting requirements; all items covered by the OSHA under 29 CFR 1910.1200, or 29 CFR 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*; and Class I or Class II Ozone Depleting Substances. Hazardous materials used at the various buildings to be demolished or constructed include petroleum, oil, and lubricants (POL), paints, cleaning agents, and pesticides.

## **3.10.2 HAZARDOUS WASTE**

Hazardous waste is any solid, liquid, or contained gas waste that is dangerous or potentially harmful to human health or the environment. Hazardous wastes are classified under the Resource Conservation and Recovery Act (RCRA) in 40 CFR 261, *Identification and Listing of Hazardous Waste*, as either characteristic wastes or listed wastes. Characteristic hazardous wastes exhibit one or more of the following traits: ignitability, reactivity, corrosivity, or toxicity. Listed hazardous wastes are wastes specifically listed as being hazardous and are from either specific sources, non-specific sources, or discarded chemical products.

The Tyndall AFB Hazardous Waste Management Plan (HWMP) (Air Force, 2017b) provides guidance on the proper handling and disposal of hazardous waste, including spill contingency and response

requirements, at Tyndall AFB. Procedures and responsibilities for responding to a hazardous waste spill or other incidents are also addressed in the Tyndall AFB Spill Prevention, Control, and Countermeasure (SPCC) Plan (Air Force, 2016c). The 325 CES/CEIEC has primary responsibility for the management of hazardous waste at Tyndall AFB.

Tyndall AFB is classified as a Large Quantity Generator of hazardous waste. Hazardous wastes at the Tyndall AFB are controlled and managed from the point of generation to the point of ultimate disposal. Wastes are temporarily stored at designated Initial Accumulation Points (IAPs) at work locations. Once the storage limit is reached, the wastes are transferred to the 90-Day Hazardous Waste Accumulation Site (HWAS) (Building 6011). Within 90 days, the wastes are transported off-base and disposed of in accordance with applicable regulations.

# 3.10.3 TOXIC SUBSTANCES

A toxic substance is a substance that when ingested or absorbed is harmful or fatal to living organisms. As discussed previously, toxicity is an attribute of some hazardous waste. Through the Toxic Substances Control Act, the USEPA regulates toxic substances such as asbestos, lead-based paint (LBP), polychlorinated biphenyls (PCBs), and radon. Asbestos-containing materials (ACM) at Tyndall AFB are managed in accordance with the guidance provided in the 325 FW Asbestos Management and Operations Plan (Air Force, 2018a). LBP and PCBs are managed at the Installation in accordance with all applicable regulations. Tyndall AFB is located in an area that has low radon levels; indoor radon accumulation has been determined to not be a concern at the Installation. Surveys for ACM and LBP have been completed on 42 structures proposed for demolition and ACM was detected in 38 of these. The other four buildings were reported as non-detected for ACM. LBP was reported in eight structures and only two were reported as non-detected for LBP. The remaining structures have not been surveyed or there has only been a limited survey completed for ACM and LBP. Structures constructed after 1985 would be unlikely to contain ACM or LBP. As standard practice, all structures proposed to be demolished or modified at Tyndall AFB are treated as potentially containing ACM and LBP, unless surveys are completed and no ACM or LBP are found. No potential sources of PCBs are expected to exist in any of the structures to be demolished. Appendix A includes a summary of buildings proposed for demolition and the status of ACM and LBP surveys and presence within the structures.

Most, if not all, of the buildings likely were treated to prevent termite infestations. These treatments typically involve pesticides injected into the soil surrounding the buildings. Consequently, soil contamination is likely surrounding each of the buildings proposed for demolition.

## 3.10.4 SOLID WASTE

Solid wastes are those substances defined in 40 CFR 261.2. Pursuant to Subtitle D of RCRA and its amendments, Federal regulations and guidance address solid waste collection and storage and its subsequent burning, use as a fuel, or landfilling. AFI 32-7042, *Waste Management*, provides guidance for Air Force installations to develop solid waste management plans that ensure regulatory compliance (Air Force, 2019f). Non-hazardous solid waste generated at Tyndall AFB is managed in compliance with the Tyndall AFB Integrated Solid Waste Management Plan (ISWMP) (Air Force, 2017c). Non-hazardous solid waste is properly collected, handled, managed, transported, and disposed off-base by a contractor.
The 325 CES/CEIEC has primary responsibility for the management of non-hazardous solid waste at Tyndall AFB.

#### 3.10.5 Environmental Restoration Program

The IRP was developed by the DoD to identify, characterize, and remediate contamination from past hazardous waste disposal operations and hazardous materials spills at DoD facilities. Sites on DoD property suspected to be contaminated from past munitions use are investigated and cleaned up under the Military Munitions Response Program (MMRP). Together, the IRP and MMRP make up the DoD's current ERP. Depending on the circumstances, ERP sites are investigated and cleaned up in accordance with the CERCLA or RCRA, or an integrated approach based on both laws. The Air Force currently addresses MMRP sites under CERCLA. In 1997, the USEPA placed Tyndall AFB on the Superfund program's National Priorities List . USEPA, Air Force and FDEP signed an Interagency Agreement known as a Federal Facility Agreement (FFA) on September 20, 2013 to guide the cleanup of the base. These formal agreements are site cleanup plans that ensure coordination of work priorities and establish enforceable schedules for cleanup activities for the life of the project. A total of A total of 38 operable units are listed on the EPA website (USEPA, 2019d).

AFI 32-7020, *The Environmental Restoration Program*, provides guidance and procedures for executing the Air Force ERP within the U.S. The Tyndall AFB ERP includes sites from the IRP and the MMRP, both of which are funded through the Defense Environmental Restoration Account to fulfill the requirements of AFI 32-7020.

Investigation and cleanup activity areas at Tyndall AFB include spill sites, former fire training areas, former landfills, storage tank sites, areas where munitions were used, and SW management units. Sites are at varying stages of investigation, cleanup, and closeout. Outlined below are typical activities that are undertaken for each site at Tyndall AFB during investigation, cleanup and closeout (Tyndall AFB, 2019c).

**Remedial Investigation (RI):** The RI characterizes the site contamination from any spill, leak or disposal. The RI addresses three aspects of a site. First, it identifies the type of pollutant or pollutants at or near a site and migration potential to other areas. Second, it assesses the degree of impact present. Third, it characterizes the actual and potential risks to human health and the environment. Normally, a major part of the RI is the Baseline Risk Assessment (BRA). The BRA details the ways in which site contaminants may affect human and ecological health.

**Feasibility Study (FS):** The FS compares several different ways to cleanup each site. The potential remedies are developed and screened for effectiveness, implementability, and cost. The remaining alternatives are further evaluated in the "Detailed Analysis of Alternatives." The FS process involves identifying potential treatment technologies, screening technologies, assembling technologies into alternatives, screening alternatives, identifying action specific to Applicable or Relevant and Appropriate Requirements (ARARs) and performing a detailed analysis of alternatives. Assessment and comparison of technologies are based on the USEPA's nine evaluation criteria. Technologies shall be assessed:

a) to determine whether they can adequately protect human health and the environment;

- b) to determine whether they attain with ARARs under Federal and State environmental laws;
- c) for the long-term effectiveness & permanence they afford, along with the degree of certainty;
- d) to the degree to which employ recycling or treatment that reduces toxicity, mobility or volume;
- e) for short term effectiveness;
- f) for the ease or difficulty of implementing;
- g) for costs;
- h) for Federal and State's acceptance; and
- i) for community acceptance

**Remedial Action (RA):** The RA is usually broken into several phases: the actual construction of remedial systems and the execution or operations of the selected remedy to clean up the site .At more complex sites, the RA process is often further divided into several construction/operation segments to address different media (soil, groundwater, sediment, surface water, and air) contaminants. If the system operation will entail several years of operation this will be referred to as long-term operation (LTO).

**Remedy Selection Process, Proposed Plan/Record of Decision (ROD):** Based on the FS, an agreement with the USEPA, the FDEP and other regulators is sought in order to develop a cleanup strategy and select the best remedy using the nine selection criteria. A PP is prepared describing the preferred cleanup method or preferred remedy alternative. The PP also summarizes other alternatives for the site, including a no action alternative. The PP is then presented to the public for review and comment. The public can submit written and oral comments on all remedies during a 30-day comment period. During this comment period, the Air Force will answer questions from the public on the PP. The Air Force will also provide the opportunity for a public meeting to explain the remedy and solicit oral and written comments. After the PP public comment period ends, the Air Force prepares a ROD. This document explains the selected remedy for a particular site or sites. The ROD considers public comments on the PP and community concerns and addresses any public comments received during the PP public comment period. After the ROD is signed by the Air Force and regulatory agencies, a public notice is published in a local newspaper and the ROD is made available to the public for inspection.

IRP sites which overlap with the EA Proposed Actions are summarized on **Table 3.10-1** in terms of site type, site description and phase of investigation/remediation as described above. Refer to **Figures 1.4-1** through 1.4-7 for depictions of the Proposed Action project footprints in relation to the IRP sites. Potential impacts to these sites due to the Proposed Actions are further discussed in **Section 4.9.1**.

Project Category	Project	IRP Site ID	Site Name	Site Type	Phase/ Status	Site Description
		LF010	Capehart Marina Rubble Storage	Storage	ROD Approved	This 0.5-acre site has been used since about 1975 for the aboveground storage of concrete rubble. The Air Force and the USEPA, in consultation with the FDEP, determined that no remedial action is required. Given the approval of a No Action determination by the regulatory agencies, the Air Force prepared a No Action ROD for the site and has received ROD approval.
2000 Area Projects	2000-1b	TU202	Beacon Beach Marina	Underground Storage Tank	Memorandum of Decision/ SCRO	This 1.22-acre site is where 400 gallons of gasoline leaked from the underground fuel line in 1992. The Beacon Beach Marina is the base recreational boat launch and storage facility that includes a boat launch ramp and boat fueling system. The original site layout for the fuel dispenser utilized three USTs north of the dispenser. This system was later replaced with a 5,000-gallon aboveground storage tank (AST) with concrete secondary containment. An underground fuel line connected the AST to the dispenser. In 1992, a release of 400 gallons of gasoline was reported from the underground piping system. The AST and connecting fuel line were removed along with the AST containment area. In addition, the three USTs from the older fueling system were also removed. A new double-walled AST fuel tank system was subsequently constructed adjacent to the fuel dispenser. The Tyndall AFB IRP team, consisting of members from the FDEP, the Air Force, the USEPA, and various environmental consulting firms, have determined that the site has met No Further Action (NFA) conditions in accordance with Risk Management Option Level I per Chapter 62-780.680 F.A.C The AF submitted the Draft Memorandum of Decision for NFA/SRCR to FDEP on 22 January 2019. Once the SRCO has been issued, the existing groundwater monitoring wells will be abandoned according to Florida requirements.
	2000-1c	LF003	Beacon Beach Road Landfill	Landfill	Site Closure	This 5.3-acre site reportedly received household and mess hall wastes from 1943 to 1948 as a general refuse landfill. Source materials included glass bottles, plastic, wire, and partially-corroded remains of metal containers and equipment parts. The excavation and off-site disposal of buried waste, and associated soil was completed in August 2018. The base has obtained official site closure from the regulatory agencies.
8500 Area Projects	8500-1	SR169	Jeep Range	Small Arms Range	RI/FS	This 1,594-acre site consists of twelve individual training ranges constructed in the early 1940s for the Flexible Gunnery School stationed at Tyndall AFB. The Jeep Ranges were operational until December 1945 when the Flexible Gunnery School was closed. Munitions associated with the Site SR169 included .22, .30, and .50 caliber small arms rounds. The rounds were fired from stationary machine guns at passing targets.
	F-02	TU205	Building 239	Underground	RI/FS	This 8-acre site includes a number of former POL and oil/water separator

# TABLE 3.10-1 IRP SITES WITHIN OR ADJACENT TO EA PROPOSED ACTIONS

Project Category	Project	IRP Site ID	Site Name	Site Type	Phase/ Status	Site Description
				Storage Tank		(OWS) sites situated in close proximity to Building 239, as well as a chlorinated hydrocarbon plume that was identified in previous investigations. The facility historically has been used as a jet engine test facility. The site study area incorporates multiple industrial features, some of which have been in operation since the 1960s. The site was moved from the FDEP program to CERCLA in 2010.
		N/A	BLDG 451 Former PCP Transformer Storage	Transformer Storage	RI Scoping	This 1,482-square-foot cinder block shed with a concrete floor once stored out of service transformers containing PCB contaminated oil prior to being shipped off-site.
	F-03	N/A	BLDG 460 OWS	60 Oil/Water Separator RI Scoping This former 300-ga operations on the e 1994.		This former 300-gallon OWS had received oily waters from the maintenance operations on the equipment until the unit was taken out of service in March 1994.
		N/A	BLDG 462 WAA	Waste Accumulation Area	RI Scoping	This 7,121-square-foot building reportedly accumulated aerosol cans and universal defined waste items in a 15-gallon drum and a 1-gallon drum.
	F-04, F-06, F-09	OW217	Building 264/280	Oil/Water Separator	RI/FS	This 25-acre site combines the potential for groundwater impacts reported at Building 280 (Hangar 4) to be associated with the groundwater plume identified at former Building 264. Hangar 4 was constructed in 1955 and is currently used for small-scale aircraft maintenance and training support for Flightline maintenance crews. Former Building 264 was built in 1959 and was used for maintenance and repair of aerospace ground equipment until it was demolished in the early 2000s along with two exterior wash pads and associated OWSs.
	F-07, F-08, F-09	SS026	Vehicle Maintenance Area	Spill Site Area	RI/FS	This 54-acre study area incorporate multiple industrial and administrative facilities, some of which date back to the 1940s. Site SS026 is the Vehicle Maintenance Area which is comprised of four buildings (Buildings 560, 561, 571, and 559) that perform a variety of general repair, bodywork, painting, washing, and refueling functions. Site SS026 also contains a number of active and former OWS, underground storage tanks (UST), and AST which are and have been used for storage of petroleum products and waste fluids related to the activities performed in the Vehicle Maintenance Area.
	F-10	N/A	Munitions Storage Area	Munitions	Active	This active MSA, also known as the Ammo Area, is located northeast of the Flightline and is used for storage of munitions.
Support Area Projects	SA-05, SA-09, SA-10	N/A	BLDG 934 WAA	Waste Accumulation Area	RI Scoping	This 60-square-foot secondary containment metal bin and 1,000-gallon used oil collection tank are used to accumulate small quantities of waste solvents, paint wastes, and other miscellaneous hazardous wastes (used fuel/oil filters, spent antifreeze, parts wash fluid, oil/fuel absorbent material rags, asbestos

Project Category	Project	IRP Site ID	Site Name	Site Type	Phase/ Status	Site Description
						brake pads, used batteries, etc.) in the collection tank, a 55-gallon drum, a 15-gallon drum, and a 1-gallon drum.
		FT023	Former Active Fire Training Area	Fire/Crash Training Area	RI/FS	This 5.2-acre fire training area was used in 1981-1992. The site formerly consisted of a fire training pit, a 10,000-gallon AST, a pump-house, and an OWS and drain field. Fuel (JP-4) stored in an AST was pumped via underground piping to the fire training pit, dispensed onto a surplus or simulated aircraft, ignited, then extinguished for firefighting training purposes, including the application of new fire suppression technologies and chemicals. The site's groundwater has reached FDEP cleanup criteria. Additional sampling at this site is warranted due to Fire Training history.
	M-01	OT004	Southeast Runway Extension Burial Site	Debris Burial	Site Closure	This 18.4-acre site was reported to have been used intermittently from 1945 to 1965 for disposal of used containers, drums, batteries, and parts. The Air Force and the USEPA, in consultation with the FDEP, determined that no remedial action was required. Given the approval of a No Action determination by the regulatory agencies, the Air Force prepared a No Action ROD for the site, which has received regulatory approval. IRP site has been closed by regulatory agencies.
Multi		SS015	POL Area B	Spill Site Area	RI/FS	This 25-acre site was a POL tank farm (fourteen USTs and one AST) from 1941 through 1980. All tanks were removed between 1985 and 1987.
Area Projects		SS026	Vehicle Maintenance Area	Spill Site Area	RI/FS	See description under Flightline Area Projects (F-07).
		LF003	Beacon Beach Road Landfill	Landfill	Site Closure	See description under 2000 Area Projects (2001-c). IRP site has been closed by regulatory agencies.
	M-02	LF012	Highway 98 Burial Site	Debris Burial	Site Closure	This 5.49-acre site was used for burial of rubble and debris from the razing of Magnolia and Tyndall housing during the mid-1960's. The Air Force and the USEPA, in consultation with the FDEP, determined that no remedial action was required. Given the approval of a No Action determination by the regulatory agencies, the Air Force prepared a No Action ROD) for the site, which has received regulatory approval. IRP site has been closed by regulatory agencies.
		OW217	Building 264/280	Oil/Water Separator	RI/FS	See description under Flightline Area Projects (F-04/F-06/F-09).
		SA181	Tower Range	Storage Area	ROD	This 52.6-acre Small Arms Firing Range (skeet range) used for training Army Air Corps turret gunners in the 1940s. During subsequent years, portions of SA181 were also used for pistol, rifle, and miniaturization range training. A ROD is in development to detail remedial actions.
		SR169	Jeep Range	Small Arms	RI/FS	See description under 8500 Area Projects (8500-1).

Project Category	Project	IRP Site ID	Site Name	Site Type	Phase/ Status	Site Description
				Range		
		SR170 A	Tyndall Elementary School	Small Arms Range	RI/FS	The former shooting range is referred to as the Stationary Target Range (SR170A), which consisted of a triangular range road with 30-foot portable towers at the range, operated from 1941 to 1946. Tyndall AFB Gunnery School students rode in the back of trucks and fired either handheld or turret-mounted 12-gauge shotguns. The Gunnery School students shot at clay targets thrown at various angles from the towers. Lead pellets and clay target debris were distributed across the range during Gunnery School activities. Tyndall Elementary School was constructed on 25 acres of the former Stationary Target Range in 1951. Lead pellets and clay target fragments are known to have been released throughout the property. Lead pellets may pose an unacceptable level of risk if purposely or accidentally ingested by small children. Three removal actions occurred in 2009, 2015 and 2016.
		SS015	POL Area B	Spill Site Area	RI/FS	See description under Multi-Area Projects (M-01).
		SS026	Vehicle Maintenance Area	Spill Site Area	RI/FS	See description under Flightline Area Projects (F-07).
		TU205	Building 239	Underground Storage Tank	RI/FS	See description under Flightline Area Projects (F-02).
		OW040 /BLDG 188 WAA	Building 315	Oil Water/Separat or	RI Scoping	This 0.3-acre site consist of a former 10,200-gallon OWS associated with aircraft paining operations that was closed in place in 2001 after passing the tightness test. Based on the supplemental sampling results, the Air Force recommends No Action for this site. Building 315 was razed in 2018. The site is currently vacant.
		SS015	POL Area B	Spill Site Area	RI/FS	See description under Multi-Area Projects (M-01).
	M-03 (within/ adjacent to EA project areas)	N/A	BLDG 182 WAA	Waste Accumulation Area	RI Scoping	This former 65-square-foot spill containment building was reportedly accumulated residual sealant, rags with spent solvent, paint pens, silver laden dust and debris from aircraft maintenance, aerosol cans, oil/fuel absorbent material, and universal defined waste items in a 55-gallon drum, a 15-gallon drum, and a 1-gallon drum. While this WAA is within the foot print of IRP site SS015, Building 182 is being addressed under IRP Site TU204. IRP Site TU204 was transferred to the State Petroleum Program for further investigation on May 2016.
		N/A	BLDG 180 WAA	Waste Accumulation Area	RI Scoping	This 65-square-foot spill containment building is reportedly accumulated residual sealant, rags with spent solvent, paint pens, silver laden dust and debris from aircraft maintenance, aerosol cans, oil/fuel absorbent material, and universal defined waste items in a 55-gallon drum, a 15-gallon drum, and a 1-gallon drum.

Project Category	Project	IRP Site ID	Site Name	Site Type	Phase/ Status	Site Description
		TU204	Building 182 Former UST Site	Underground Storage Tank	Deferred to FDEP POL Program	This 0.29-acre site is where soil and groundwater contamination was discovered in the vicinity during the removal of a 2,000-gallon JP-4 UST in 1991.
		N/A	BLDG 258 WAA	Waste Accumulation Area	RI Scoping	This 240-square-foot hazardous waste storage building 257 (outside of building 258) reportedly accumulated part cleaning washer fluid, oil/fuel absorbent material, aerosol cans, paint pens, used oil/fuel filters, universal defined waste items, and residual sealant in a 55-gallon drums.
		SS026	Vehicle Maintenance Area	Spill Site Area	RI/FS	See description under Flightline Area Projects (F-07).
		N/A	BLDG 559 WAA	Waste Accumulation Area	RI Scoping	This 3,466-square-foot building and a former 40-square-foot area outside the building reportedly accumulated small quantities of waste solvents, paint wastes and other miscellaneous hazardous wastes (rags, asbestos brake pads, used batteries, etc.) in a 55-gallon drums.
		OW217	Building 264/280	Oil/Water Separator	RI/FS	See description under Flightline Area Projects.
		TU205	Building 239	Underground Storage Tank	RI/FS	See description under Flightline Area Projects (F-02).

Source: Tyndall AFB, 2019c

# 3.11 SOCIOECONOMICS

Socioeconomics analyses involve economic and social elements such as population levels, workforce and consumer activities. Factors that characterize the socioeconomic environment represent a composite of several interrelated and nonrelated attributes. Indicators of economic conditions for a geographic area can include demographics, median household income, unemployment rates, employment, and housing data. Data on employment identify employment by industry or trade and unemployment trends. Data on personal income in a region are used to compare the before and after effects of any jobs created or lost as a result of a Proposed Actions. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region. Changes in demographic and economic conditions are typically accompanied by changes in other community components, such as housing availability, education, and the provision of installation and public services, which are also discussed in this section.

The ROI for socioeconomics is defined as the geographical area within which the principal direct and secondary socioeconomic effects of actions associated with the Proposed Actions would likely occur and where most consequences for local jurisdictions would be expected. Tyndall AFB is located 12 miles east of Panama City in Bay County, Florida. The ROI for the analysis of socioeconomic impacts for the Proposed Actions is the census tracts including and surrounding Tyndall AFB, which are tracts 5, 6, 7, 9, 10, 26.07, 19, and 20. This ROI illustrates socioeconomic characteristics for the area nearest to Tyndall AFB and the geographic area where most impacts from the Proposed Actions would be expected to occur. Additionally, data for Panama City, Bay County and the state of Florida are provided for further information and areas of comparison. Information pertaining to the existing social and economic characteristics of the ROI was gathered from data published by the U.S. Census Bureau. Specifically, the most recent published data used were the 2013-2017 American Community Survey (ACS) Five-Year Estimates.

# **3.11.1 POPULATION**

Based on data from the U.S. Census Bureau, the estimated population of the ROI in 2017 was 15,723, which represents a 23.2 percent increase since 2000. The population of Bay County increased by 17.7 percent since 2000, while Panama City only increased by less than 1 percent. The state of Florida increased at a percentage similar to the ROI (21.2 percent) (U.S. Census Bureau, 2000a; U.S. Census Bureau, 2010a; U.S. Census Bureau, 2010b; U.S. Census Bureau, 2017a). The workforce population of Tyndall AFB in 2017 was 26,598, including military and civilian personnel and dependents as well as military retirees and their dependents. Total employment at Tyndall AFB consisted of 5,657 personnel, including 3,644 active duty military personnel, 1,304 appropriated fund civilians, and 709 non-appropriated fund contract civilians and private business employees (Air Force, 2017a).

# 3.11.2 ECONOMIC ACTIVITY (EMPLOYMENT AND EARNINGS)

The total number of employed people in the civilian labor force in the ROI in 2017 was 5,870. The industry employing the highest percentage of the civilian labor force in the ROI, Panama City, Bay

County, and the state of Florida was the educational services/health care and social assistance industry. Per capita income in 2017 the ROI was \$28,102. It is similar in the comparative regions. As of August 2019, the unemployment rate in Bay County (not seasonally adjusted), Panama City (not seasonally adjusted), and Florida (seasonally adjusted) was 3.5 percent, 3.6 percent, and 3.3 percent, respectively (U.S. Department of Labor, 2019).

The total economic impact of Tyndall AFB during Fiscal Year 2017 was approximately \$596 million. This includes payroll for military and civilian personnel of more than \$370 million, creation of 1,908 jobs with an estimated value of approximately \$75 million, and local expenditures of approximately \$150 million (Air Force, 2017a).

## 3.11.3 HOUSING

Three housing options are available for Tyndall AFB personnel, including privatized military family housing, unaccompanied housing, and community housing (Air Force, 2019a). The U.S. Census Bureau estimates that in 2017, there were 101,437 housing units in Bay County, of which 32,764 were unoccupied resulting in a 32.3 percent vacancy rate. Owner-occupied units in Bay County account for 62.4 percent of the housing units, while the remaining 37.6 percent were renter-occupied units. In Panama City, there were 18,053 housing units, of which 3,159 were unoccupied resulting in a 17.5 percent vacancy rate. The 2017 census estimate for the ROI is 10,114 housing units, of which approximately 427 were unoccupied, resulting in a 4.2 percent vacancy rate. Owner-occupied units account for 88.8 percent of the housing units in the ROI, while the remaining 11.2 percent are renter occupied (U.S. Census Bureau, 2017g; U.S. Census Bureau, 2017h; U.S. Census Bureau, 2017h; U.S. Census Bureau, 2017h;

## **3.11.4 EDUCATION**

Tyndall AFB is located in the Bay District. There are three schools within close proximity to Tyndall AFB. Tyndall Elementary School is a kindergarten through fifth grade school located on the installation approximately one mile from the Main Gate. Everitt Middle School (6th-8th grade) and Rutherford High School (9th-12th grade) are located in Panama City. School Liaison Officers are available at Tyndall AFB that work closely with school district staff to network, educate, and work in partnership with local schools and establish support programs. Bay District Schools is also a member of the Military Child Education Coalition whose mission is to ensure inclusive, quality educational opportunities for all military-connected children affected by mobility, transition, deployments and family separation (Bay District Schools, 2019).

## 3.11.5 INSTALLATION AND PUBLIC SERVICES

Law enforcement services (police) at Tyndall AFB are provided by the Tyndall Community Police, and fire protection and emergency services through the Tyndall AFB Fire and Emergency Services and the Ambulance Services Department. The 325th Medical Group (MDG) operates as an outpatient medical facility with family practice, pediatrics, dental, flight medicine and women's health clinics. Services provided at the clinics include radiology and a clinical laboratory. The group also offers a clinical pharmacy, nutritional medicine programs, and base support services such as public health, bioenvironmental engineering and aerospace physiology.

Public services in the ROI consist of law enforcement, fire protection, emergency medical services, and medical services. The Bay County Sheriff's Office provides law enforcement services for the County and has civil and patrol divisions. Other law enforcement agencies in the area include the Parker Police Department, Panama City Police Department, and Panama City Beach Police Department. Bay County Fire Services occupies 13 stations in unincorporated Bay County. Bay County Emergency Medical Services operates several Advanced Life Support Paramedic Mobile Intensive Care units from locations throughout Bay County and works closely with the Fire and Law Enforcement agencies who respond as First Responders.

The closest emergency room to Tyndall AFB and the ROI is at the Gulf Coast Regional Medical Center located approximately 12 miles from the installation in Panama City.

# 3.12 ENVIRONMENTAL JUSTICE

Analysis of environmental justice evaluates impacts on environmental justice populations (i.e., minority and low-income populations) and is directed by EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The Air Force Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process (EIAP) (Air Force, 2014a) also provides guidance on how to fulfill the requirement for environmental justice analysis. EO 12898 was created to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, tribal, and local programs and policies. EO 12898 requires each Federal agency to identify and address whether their proposed actions result in disproportionately high and adverse environmental and health impacts on low-income or minority populations. Additionally, EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, directs that Federal agencies identify and assess environmental health and safety risks resulting from Federal actions that may disproportionately affect children.

The ROI for environmental justice is the same as that described for socioeconomics effects (Section 3.11).

# 3.12.1 MINORITY AND LOW-INCOME POPULATIONS

Minority population levels within the ROI are lower than Bay County, Panama City, Florida, and those found throughout the U.S. Within the ROI, the population in 2017 reporting to be a race other than white was 16.1 percent of the total, which is substantially lower than the 27.6 percent for Panama City, 24.3 percent for Florida, and 27.0 percent for the U.S., but is similar to 18.2 percent for Bay County (U.S. Census Bureau, 2017a; U.S. Census Bureau, 2017j). The Hispanic or Latino population in the ROI (8.2 percent) is substantially lower than the population in the Florida (24.7 percent) and the U.S. (17.6 percent) but is statistically similar to that of Panama City (8.5 percent) and Bay County (6.0 percent). The percentage of individuals below the poverty level is not available for the ROI; however, in Panama City (21.6 percent), it is slightly higher than that of Bay County (15.4 percent), Florida (15.5 percent), and the

U.S. (14.6 percent). The frequency of families below the poverty level in Panama City is 16.5 percent, which is higher than that of Bay County (10.7 percent), Florida (11.1 percent), and the U.S. (10.5 percent). This trend is also reflected in the lower per capita income and median household income in Panama City relative to Bay County, Florida and the U.S. as a whole. The per capita income and median household income in the ROI similar to that of Bay County, Florida and the U.S. (U.S. Census Bureau, 2017e; U.S. Census Bureau, 2017k).

## 3.12.2 CHILDREN

In 2017, the number of children under the age of 18 living in the ROI was 3,474. The number of children present within the ROI is generally consistent with the distribution averages of Panama City, Bay County, Florida and the U.S. (U.S. Census Bureau, 2017l).

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# 4.0 ENVIRONMENTAL CONSEQUENCES

This EA provides a detailed analysis of the potential direct, indirect, and cumulative impacts that would result from implementation of the Proposed Actions or No Action Alternative. As discussed in **Sections 2.3** and **3.1**, of this EA and consistent with 32 CFR 989.8(c), alternatives not fully achieving established selection standards were not retained for detailed analysis. Direct impacts are those effects that are caused by the action and occur at the same time and place (40 CFR Section 1508.8[a]). Indirect impacts are those effects that are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable (40 CFR Section 1508.8[b]). Cumulative impacts are those that would result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions. As appropriate, impacts are further discussed as being temporary, short-term, or long-term. For purposes of this EA, temporary effects are defined as those that would last for the duration of the construction period; short-term impacts would last from the completion of construction to three years. Long-term impacts are defined as those impacts that would occur from three to 10 years after construction, while permanent impacts indicate an irretrievable loss or alteration.

In an EA, the magnitude of the impact is considered regardless of whether the impact is adverse or beneficial. Determination of the significance of the impact, as described in 40 CFR 1508.27, requires considerations of both context and intensity. Context considers the geographic extent of the potential impact (local, regional, or greater extent) while intensity considers the severity of the impact. The following terms are used to describe the magnitude of impacts in this EA:

- No Effect: The action would not cause a detectable change.
- Negligible: The impact would be at the lowest level of detection; the impact would not be significant.
- Minor: The impact would be slight but detectable; the impact would not be significant.
- Moderate: The impact would be readily apparent; the impact would not be significant.
- Major: The impact would be clearly adverse or beneficial; the impact has the potential to be significant. The significance of adverse and beneficial impacts is subject to interpretation and should be determined based on the final proposal. In cases of adverse impacts, the impact may be reduced to less than significant by mitigation, design features, and/or other measures that may be taken

# 4.1 AIR QUALITY AND CLIMATE CHANGE

This section identifies and discloses potential air quality impacts from criteria pollutant and GHG emissions associated with the Proposed Actions. The air quality impact analysis follows the EIAP Air Quality Guidelines (Solutio Environmental, 2017) for criteria pollutants, and GHG emissions. Impacts to air quality would be considered significant if the Proposed Actions were to:

• Cause pollutant concentrations to exceed one or more of the NAAQS for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.

The majority of air emissions associated with the Proposed Actions would be temporary in nature (limited to the duration of demolition and construction activities) and would be caused by construction equipment and vehicle operation, asphalt paving, and dust generated from demolition and disturbance on unpaved areas. LTO emissions related to the Proposed Actions would result from fuel combustion by newly-installed emergency generators and space heating equipment. These emissions are expected to be small and generally not represent an increase from the current conditions.

The Air Force's Air Conformity Applicability Model (ACAM) was used to analyze the potential air quality impacts associated with the Proposed Actions, as described above, in accordance with the AFI 32-7040, the EIAP, and the General Conformity Rule (40 CFR 93 Subpart B).

The Proposed Actions would not result in significant impacts to air quality. The following subsections describe the non-significant effects on air quality that would result from the Proposed Actions.

## 4.1.1 **PROPOSED ACTIONS**

## 4.1.1.1 Operational Activities

The Proposed Actions would not result in any new operational activities (i.e., new missions) or increased operational levels (i.e., additional personnel). Operational levels of and resulting emissions from existing permitted stationary emissions sources discussed in **Section 3.2.2.3** and depicted in **Table 3.2-3** are not expected to change considerably with the implementation of the Proposed Actions. New heating equipment and emergency generators installed in the new buildings would replace equipment of similar sizes and capacities in hurricane-damaged areas, and therefore, emissions from these sources would be unlikely to increase. However, the following analysis conservatively includes "steady state" (operational) emissions from these sources to demonstrate their potential impact on air quality.

## 4.1.1.2 Demolition and Construction Activities

Demolition and construction activities associated with the Proposed Actions would include demolishing existing buildings, structures, and utilities; site clearing and grading; trenching and excavation; paving; constructing new buildings and associated utilities; and application of architectural coatings. Construction period emissions depend on expected material quantities and equipment/vehicle utilization requirements for each project component.

Demolition and construction activities associated with the Proposed Actions would result in the following short-term air quality impacts:

- Fugitive dust would be generated by demolition and construction operations.
- Emissions of criteria pollutants (VOC and NO<sub>x</sub> [as precursors of O<sub>3</sub>], CO, PM<sub>10</sub>, and PM<sub>2.5</sub> [including its precursor SO<sub>2</sub>], and GHG emissions) would result from demolition and construction activities such as:
  - Use of diesel-powered and gas-powered demolition and construction equipment,
  - Evaporation of architectural coatings and paving asphalt, and

- Construction workers' commutes and haul truck trips.

## 4.1.1.3 Emissions Results

As mentioned, the operational and construction emissions resulting from the Proposed Actions were calculated using ACAM. These emissions are "netted" on an annual basis. The impact analysis must consider the greatest annual emissions associated with the Proposed Actions. Since emissions from the Proposed Actions can vary from year-to-year depending on activity, the greatest annual net change in emissions for each pollutant forms the basis of the analysis. The individual pollutant worst-case emission value may occur in a different project year. The total annual emissions during the construction phase of the Proposed Actions are presented in **Tables 4.1-1a** through **4.1-1g** for each year until the action reaches "steady state" (i.e., once the action is fully implemented and operational with no further net change in emissions).

 TABLE 4.1-1A 2020 CONSTRUCTION PHASE EMISSIONS

	Proposed Actions	Air Quality Indicator					
Pollutant	Emissions (ton/year)	Threshold (ton/year)	Exceedance (Yes or No)				
Not in a Re	Not in a Regulatory Area						
VOC	0.896	100	No				
NO <sub>x</sub>	6.901	100	No				
CO	4.108	100	No				
SO <sub>x</sub>	0.017	100	No				
$PM_{10}$	76.277	100	No				
PM <sub>2.5</sub>	0.279	100	No				
Pb	0.000	25	No				
NH <sub>3</sub>	0.018	100	No				
CO <sub>2</sub> e	1,820.3						

Notes: CO<sub>2</sub>e = Carbon Dioxide Equivalent Source: ACAM, run on 14 October 2019.

#### TABLE 4.1-1B 2021 CONSTRUCTION PHASE EMISSIONS

	Bronogod Actions	Air Quality Indicator						
Pollutant	Emissions (ton/year)	Threshold (ton/year)	Exceedance (Yes or No)					
Not in a Re	Not in a Regulatory Area							
VOC	1.814	100	No					
NO <sub>x</sub>	10.163	100	No					
CO	8.483	100	No					
SO <sub>x</sub>	0.032	100	No					
PM10	62.225	100	No					
PM <sub>2.5</sub>	0.432	100	No					
Pb	0.000	25	No					
NH <sub>3</sub>	0.027	100	No					
CO <sub>2</sub> e	2.931.5							

Source: ACAM, run on 14 October 2019.

	Dronogod Actions	Air Quality Indicator			
Pollutant	Emissions (ton/year)	Threshold (ton/year)	Exceedance (Yes or No)		
Not in a Re	gulatory Area				
VOC	4.064	100	No		
NO <sub>x</sub>	10.159	100	No		
CO	9.629	100	No		
SO <sub>x</sub>	0.058	100	No		
PM <sub>10</sub>	55.974	100	No		
PM <sub>2.5</sub>	0.461	100	No		
Pb	0.000	25	No		
NH <sub>3</sub>	0.020	100	No		
CO <sub>2</sub> e	3,380.4				

## TABLE 4.1-1C 2022 CONSTRUCTION PHASE EMISSIONS

Source: ACAM, run on 14 October 2019.

#### TABLE 4.1-1D 2023 CONSTRUCTION PHASE EMISSIONS

	Proposed Actions	Air Quality Indicator			
Pollutant	Emissions (ton/year)	Threshold (ton/year)	Exceedance (Yes or No)		
Not in a Re	gulatory Area				
VOC	10.117	100	No		
NO <sub>x</sub>	12.323	100	No		
CO	8.233	100	No		
SO <sub>x</sub>	7.506	100	No		
$PM_{10}$	45.288	100	No		
PM <sub>2.5</sub>	0.624	100	No		
Pb	0.000	25	No		
NH <sub>3</sub>	0.025	100	No		
CO <sub>2</sub> e	5,605.6				

Source: ACAM, run on 14 October 2019.

#### **TABLE 4.1-1E 2024 CONSTRUCTION PHASE EMISSIONS**

	Dronogod Actions	Air Quality Indicator						
Pollutant	Emissions (ton/year)	Threshold (ton/year)	Exceedance (Yes or No)					
Not in a Re	Not in a Regulatory Area							
VOC	2.068	100	No					
NO <sub>x</sub>	15.977	100	No					
CO	13.052	100	No					
SOx	14.950	100	No					
PM10	1.269	100	No					
PM <sub>2.5</sub>	0.811	100	No					
Pb	0.000	25	No					
NH <sub>3</sub>	0.017	100	No					
CO <sub>2</sub> e	7.602.5							

Source: ACAM, run on 14 October 2019.

	Proposed Actions	Air Quality Indicator			
Pollutant	Emissions (ton/year)	Threshold (ton/year)	Exceedance (Yes or No)		
Not in a Re	gulatory Area				
VOC	18.690	100	No		
NO <sub>x</sub>	15.699	100	No		
CO	11.900	100	No		
SO <sub>x</sub>	14.998	100	No		
PM <sub>10</sub>	1.387	100	No		
PM <sub>2.5</sub>	0.932	100	No		
Pb	0.000	25	No		
NH <sub>3</sub>	0.010	100	No		
CO <sub>2</sub> e	9,375.7				

#### TABLE 4.1-1F 2025 CONSTRUCTION PHASE EMISSIONS

Source: ACAM, run on 14 October 2019.

	Proposed Actions	Air Quality Indicator			
Pollutant	Emissions (ton/year)	Threshold (ton/year)	Exceedance (Yes or No)		
Not in a Re	gulatory Area				
VOC	0.803	100	No		
NO <sub>x</sub>	14.635	100	No		
CO	8.287	100	No		
SO <sub>x</sub>	15.083	100	No		
$PM_{10}$	1.573	100	No		
PM <sub>2.5</sub>	1.122	100	No		
Pb	0.000	25	No		
NH <sub>3</sub>	0.000	100	No		
CO <sub>2</sub> e	12,750.4				

#### TABLE 4.1-1G 2026 EMISSIONS (STEADY STATE)

Source: ACAM, run on 14 October 2019.

## 4.1.1.4 Clean Air Act General Conformity Rule Applicability

The General Conformity Rule does not apply to the Proposed Actions because Tyndall AFB is located within an area designated in attainment with of all criteria pollutants.

#### 4.1.1.5 Attainment Criteria Pollutant Emissions

Unlike nonattainment or maintenance criteria pollutants, General Conformity *de minimis* levels have not been established for attainment criteria pollutant emissions. However, as outlined in the EIAP Guide, the General Conformity *de minimis* thresholds are used as NEPA significance indicators for air quality in attainment areas. General Conformity *de minimis* threshold values are the maximum net change an action can acceptably emit in nonattainment and maintenance areas. These threshold values would also be a conservative indicator that an action's emissions within an attainment area would also be acceptable. In other words, if the threshold is acceptable in nonattainment areas, it will also be acceptable in attainment areas. For the Proposed Actions, all attainment criteria pollutants are below the significance indicators presented in **Tables 4.1-1a** through **4.1-1g**. Therefore, the potential air quality impact from all criteria pollutants is insignificant.

## 4.1.1.6 Greenhouse Gas Emissions and Climate Change

The estimated increase of GHG emissions associated with construction activities would produce about 9,376 metric tons of carbon dioxide equivalent ( $CO_2e$ ) in the peak year of construction (2025). For the steady-state (or operational phase) of the Proposed Actions, the newly installed heating equipment and generators is expected to yield no net increase (i.e., 0 ton per year  $CO_2e$ ) in GHGs. However, for a conservative analysis, assuming that the new equipment did not replace existing equipment, the annual net increase would be approximately 12,750 tons of  $CO_2e$  per year.

The change in climate conditions caused by GHGs resulting from the burning of fossil fuels from activities associated with the Proposed Actions is a global effect. Therefore, the disclosure of localized incremental emissions has no weight to impact climate change. Consequently, given the minimal increase predicted for temporary construction and steady state activities, the Proposed Actions would result in an insignificant impact on overall global or U.S. cumulative GHG emissions and global climate change.

Tyndall AFB climate is warm during the summer with high temperatures in the 80s to 90s and moderate during winter when low temperatures tend to be in the 40s to 50s. The annual average precipitation at Tyndall AFB is approximately 61 in with heaviest rainfall occurring during the summer and autumn months (Florida Climate Center, 2019). Proposed new building construction and demolition of damaged structures are not anticipated to be directly affected by global climate change and resulting warmer temperatures and possible sea level rise. Project M-01 (Airfield Drainage) would remove inadequate airfield drainage infrastructure and replace it with appropriately-sized drainage ditches, which would allow the airfield to drain properly and therefore to better respond to future storm events that could result from such potential changes.

## 4.1.1.7 Mitigation Measures

No mitigation measures would be required.

#### 4.1.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, construction activities and emissions associated with the Proposed Actions would not occur. The hurricane-damaged buildings and their associated utilities would remain in their current locations, and existing building heating equipment and emergency generators would not be demolished and replaced. No construction or demolition activities would occur, and therefore no significant impacts to air quality would occur.

## 4.2 NOISE

## 4.2.1 PROPOSED ACTIONS

#### 4.2.1.1 Operational Activities

Based on the information regarding the individual projects, implementation of the Proposed Actions would not result in any aircraft noise related impacts on sensitive noise receptors in the vicinity of Tyndall AFB. Therefore, a quantitative analysis of aircraft operational noise is not included in this EA.

## 4.2.1.2 Demolition and Construction Activities

Construction and demolition activities associated with the Proposed Actions are expected to result in a short-term, negligible to minor, adverse impact on the noise environment at Tyndall AFB. Construction activities would include, but are not limited to: land clearing, grading, and excavation; pavement construction, demolition, and removal; and building construction, demolition, and removal. These activities would involve the use of vehicles, heavy construction equipment, and machinery and would be conducted during the daytime hours of 0700 to 1700. Construction activities would temporarily increase noise levels in the immediate vicinity of the Proposed Action areas; however, because distance rapidly attenuates noise levels, the areas would experience only a minor increase in ambient noise conditions during construction hours. The VAQ is centrally located near large areas of demolition and construction. The VAQ may experience some annoyance due to construction noise; however, this noise will be temporary in nature both in the daily operation of the sites and the length of the project. Of the other NSS, the chapel is closest to a project site at just over 1,100 feet from the nearest construction site; Tyndall Elementary School is approximately 2,300 feet from the nearest project site, the VOQ is approximately 2,500 feet, and the nearest long-term base housing is almost 3,800 feet from the nearest project site. Table 4.2-1 presents measured noise levels of common construction equipment at 50 feet. The table also provides the attenuation of these sound levels at 500, 1,000 and 1,500 feet. Therefore, implementation of the Proposed Actions would not be expected to result in a significant impact on the noise environment.

Construction Equipment	L <sub>max</sub> at 50 feet	L <sub>max</sub> at 500 feet	L <sub>max</sub> at 1,000 feet	L <sub>max</sub> at 1,500 feet
Cement and Mortar Mixers Composite	80	60	54.0	50.5
Concrete/Industrial Saws Composite	90	70	63.9794	60.45757
Cranes Composite	88	68	61.9794	58.45757
Excavators Composite	81	61	54.9794	51.45757
Forklifts Composite	85	65	58.9794	55.45757
Generator Sets Composite	81	61	54.9794	51.45757
Graders Composite	85	65	58.9794	55.45757
Other Construction Equipment Composite	85	65	58.9794	55.45757
Other General Industrial Equipment Composite	85	65	58.9794	55.45757
Pavers Composite	77	57	50.9794	47.45757
Paving Equipment Composite	77	57	50.9794	47.45757
Rollers Composite	80	60	53.9794	50.45757
Rubber Tired Dozers Composite	82	62	55.9794	52.45757
Scrapers Composite	85	65	58.9794	55.45757
Tractors/Loaders/Backhoes Composite	85	65	58.9794	55.45757
Welders Composite	73	53	46.9794	43.45757

**TABLE 4.2-1 CONSTRUCTION EQUIPMENT NOISE LEVELS** 

Source: USDOT, 2006.

#### 4.2.1.3 Mitigation Measures

No mitigation measures would be required.

#### 4.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Actions and the associated construction activities would not occur, and existing conditions discussed in **Section 3.3** would continue. Implementation of the No Action Alternative would not result in any new or additional impacts on the noise environment.

# 4.3 SAFETY AND OCCUPATIONAL HEALTH

An increased risk for bodily injury, illness, death, or property damage from the Proposed Actions would be considered an adverse impact on safety. Impacts associated with health and safety would be considered significant if the Proposed Actions were to:

- Substantially increase risks associated with the safety of construction personnel, contractors, Air Force personnel or the local community.
- Hinder the ability to respond to an emergency.
- Introduce a new health or safety risk for which the Air Force is not prepared or does not have adequate management and response plans in place.

## 4.3.1 PROPOSED ACTIONS

#### 4.3.1.1 Construction Safety

No adverse impact on safety would be anticipated under the Proposed Actions. Short-term, minor impacts on contractor health and safety could occur from implementation of the Proposed Actions. The short-term risk associated with work performed by demolition and construction contractors would slightly increase at Tyndall AFB during the normal workday, as construction and demolition activity levels would increase. During construction and demolition, all actions would be performed in accordance with AFOSH directives and OSHA regulations. Occupational health and safety hazards associated with construction of the proposed new facilities and demolition of the existing structures under the Proposed Actions would include loud noise, heavy machinery, debris, electricity, and hazardous materials used or encountered during work. To minimize occupational health and safety risks, workers would wear and use appropriate PPE and follow applicable OSHA standards and procedures. Work areas would be clearly marked with appropriate signage and secured against unauthorized entry. The Proposed Actions would not pose new or unacceptable safety risks to installation personnel or activities at the installation but would enable Tyndall AFB to meet current and future mission objectives at the installation and conduct or meet mission requirements in a safe operating environment. No long-term impacts on safety would be expected.

ACM, LBP, and PCB-containing materials could be encountered during demolition activities for Project M-03 These materials require appropriate characterization, removal, handling, and disposal during demolition activities by qualified personnel; however, adherence to all Federal, state, local regulations, and Tyndall AFB management plans (e.g. Asbestos, Hazardous Waste, and Solid Waste Management Plans) would result in negligible impacts on safety during implementation of the Proposed Actions. Long-term, beneficial impacts on safety would be expected from the removal of ACM, LBP, and PCB-contaminated materials, which would reduce exposure to personnel. All proposed construction and

demolition activities would be conducted in accordance with Federal, state, and local regulations to minimize safety hazards associated with hazardous materials, wastes, and substances.

Changes to daily base activities and vehicular operations, including the addition of construction personnel on base, additional vehicles entering and exiting the base for construction operations, and the addition of heavy machinery/construction equipment to the base would result in a short-term increase in the potential for more accidents to occur. Furthermore, construction and demolition activities may require pedestrian and traffic detours. Standard construction traffic control measures and effective communication to installation personnel regarding changes to traffic would be used to protect workers and Tyndall AFB employees and visitors. Construction workers could encounter soil or groundwater contamination as a result of an ERP site or previously unknown soil or groundwater contamination. Workers and demolition and construction activities would be required to adhere to access restrictions and institutional controls to minimize exposure and risk. A health and safety plan would be developed and implemented by the selected contractors to further minimize potential impacts to health and safety of contractor employees.

Demolition and construction activities within the MSA (Project F-10) could expose workers to risk from stored munitions and ordnances. The risk of impacts to worker health and safety would be minimized by coordinating siting and construction plans with the installation safety office and ensuring explosives site plans have been approved before beginning construction as required in AFMAN 91-201, *Explosives Safety Standards*. (Air Force, 2017e).

# 4.3.1.2 Explosives and Munitions Safety

Short-term, minor impacts could occur during construction and demolition activities that would take place within existing ESQD arcs. Building demolition in the MSA associated with Project M-03, and building repair, renovation, and construction activities associated with Project F-10 would occur within an ESQD arc. Contractors working on these projects could be exposed to an increased risk of potential explosions. To avoid potential impacts on construction workers and the installation mission, these projects should be coordinated with the installation Safety Office to ensure that no handling or transportation of explosive materials would occur within ESQD arcs while workers are within these areas. This precaution would minimize explosive safety risks to workers. Prior to any trenching or other ground-disturbing work, the project areas should be surveyed for potential UXO. All of the project areas that are within established ESQD arcs would be mission-necessary and consistent with current land uses.

Project F-10 (Flightline – MSA Facilities, 7000 Area) would include construction of new munitions storage facilities. This would require reconfiguring roadways in the area and establishing new QSQD arcs. The reconfigured MSA would be required to meet explosives setback standards for munitions facilities and other facilities and land uses involving the presence of explosives at military installations. AFMAN 91-201 and DoD 605509-M, DoD Ammunition and Explosives Safety Standards: General Explosives Safety Information and Requirements (U.S. DoD, 2012a) jointly establish requirements for such facilities. As stated above, this proposed project would be mission-necessary and consistent with current land uses.

## 4.3.1.3 Mission Safety

Several proposed projects would improve mission safety at Tyndall AFB. Project M-03 (Building Demolitions) would remove damaged and unstable structures that could pose a risk to human health and safety and would remove potential sources of contamination and risk from hazardous materials (e.g. ACM, LBP, and PCB-containing materials) within the structures. Project F-10 (Flightline – MSA Facilities, 7000 Area) includes repairs and renovations to certain structures that would improve their stability and safety. Project 9700-2 (Fire Station #4) would construct a satellite firefighting vehicle station to meet response times to the Silver Flag Training Area and AFCEC RDT&E Facilities. Projects 9700-1 (AFCEC RDT&E Facilities and Gate), F-03 (Tyndall AFB Gate Complexes [Flightline]), and SA-11 (Tyndall AFB Gate Complexes [Support]) would improve mission safety through enhancing installation access control by constructing perimeter fencing and vehicle inspection ports. Project SA-03 (Emergency Management, EOC, ALT CP) would construct an EM facility, EOC, and ALT CP facility to support EM actions for base operations. Together, these Proposed Actions would have a beneficial impact on mission safety. Because there would be measures in place to protect worker safety during construction and none of the Proposed Actions would hinder the ability to respond to an emergency or introduce a new health or safety risk to Tyndall AFB, no significant impacts to safety or occupational health would occur.

## 4.3.1.4 Mitigation Measures

No mitigation measures would be required.

## 4.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, construction and demolition activities would not occur and, thus, there would be no changes to safety and occupational conditions at Tyndall AFB. Continued mission operations within or adjacent to damaged facilities could induce a long-term adverse effect on airmen and employees at Tyndall AFB.

# 4.4 LAND USE

An action could have a significant effect on land use if it were to preclude the viability of a land use or the continued use or occupation of the area, be incompatible with adjacent land use to the extent that public health and safety is threatened, conflict with planning criteria established to ensure the safety and protection of human life and property, or result in noncompliance with laws, regulations, or orders applicable to land use.

Other relevant factors considered when evaluating potential impacts on land use include the existing and future land use designations both on and adjacent to the project site, the proximity of adjacent land use parcels to the project site, the duration of the proposed activity, and its permanence.

Tyndall AFB has identified and programmed individual projects spanning all four planning districts (**Section 3.5.2**), specifically the following six project areas; 2000 Area, 8500 Area, 9700 Area, Flightline Area, Sliver Flag Area, Support Area, and the projects that span Multi-Areas.

## 4.4.1 **PROPOSED ACTIONS**

Construction and operation of the Proposed Actions would not result in any significant impact on land use. Each of the individual Proposed Actions is consistent with current and future land uses as determined by Tyndall AFB and documented in installation planning documents and supports the installation's long-range facility development plan (Air Force, 2015a). The existing land use and future land use compatibility of each Proposed Action are provided in **Table 4.4-1**.

Project Category	Planning District(s)	Project	Existing Land Use	Future Land Use	Compatibility
	Tem de ll	2000-1a, 2000- 1b	Outdoor recreation	Outdoor recreation	Compatible
2000 Area Projects	Vest Planning District	2000-1c	Open Space	Outdoor Recreation, Community Service	Compatible - outdoor recreation permitted and community services permitted with restrictions.
8500 Area Projects	Support Area Planning District	8500-1	Industrial, Open Space	Industrial, Open Space	Compatible – industrial permitted with restrictions and although proposed activities not permitted within open space, meets the long-range planning goals of operational synergies & asset consolidation.
9700 Area Projects	Tyndall East Planning District	9700-1, 9700-2	Open Space	Industrial, Open Space	Compatible - industrial permitted and although proposed activities are not permitted within open space, meets the long-range planning goals of operational synergies, asset consolidation & perimeter and airspace security (Section 2.3.3)
Flightline Area Projects	Flightline Planning District	F-01 – F-09	Aircraft Operations and Maintenance	Aircraft Operations and Maintenance	Compatible
Trojects	District	F-10	Industrial	Industrial	Compatible
Silver Flag Area Projects	Tyndall East Planning District	SF-01	Training	Industrial	Compatible
Support Area Projects	Support Area Planning District	SA-03, SA-05, SA- 06, SA-07, SA- 08, SA-09, SA- 10	Industrial, Admin Community servia Unaccompanied-H Medical, Open sp Commercial, Trai	istrative, ces, nousing, ace, Community ning, and	Compatible

TABLE 4 4-1 PROJECT LAND	USE AND	LAND USE COMP.	ATIRILITY SUMMARY
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Project Category	Planning District(s)	Project	Existing Land Use	Future Land Use	Compatibility
		SA-01, SA-02, SA- 11, SA-04	Outdoor Recreation	on	Compatible- permitted with restrictions
Multi-Area Projects	Flightline Planning District	M-01	Aircraft Operations and Maintenance	Aircraft Operations and Maintenance	Compatible
Multi Aroo	All	M-02	Various	Various	Compatible
Projects	Planning Districts	M-03	Various	Various	Compatible

Following Hurricane Michael, the Air Force established multiple task forces to assist the 325 FW in recovering the installation. One of the task forces was created to focus on installation facilities and infrastructure and ultimately the establishment of a PMO to continue to support Tyndall AFB redevelopment and reconstruction. The mission of the PMO is "To repair, reshape, and rebuild Tyndall AFB to support both near-term resumption of mission operations and long-term redevelopment of Tyndall as the model Air Force 'Installation of the Future'." As a result, Air Force planners developed a Master Plan in accordance with Air Force guidance to guide the future planning and development of Tyndall AFB.

The future planning efforts implement future development planning strategies outlined in UFC 2-100-01. They support the DoD-wide installation planning philosophy to develop a sustainable platform to support the effective execution of assigned missions as efficiently as possible, thus adopting the future planning recommendations as established in the IDP (Air Force, 2015a). Therefore, construction and implementation of the Proposed Actions are consistent and compatible with future land uses as determined by Tyndall AFB.

Construction and implementation of the Proposed Actions would be in all four planning districts on Tyndall AFB. Future development on Tyndall AFB should be consistent with the Tyndall AFB Master Plan/Area Development Plan, IDP and the planning goals established in the future land use plan. The future land use plan for Tyndall AFB considers land use compatibility, facility consolidation, mission sustainability, quality of life, safety and security, and past Tyndall AFB planning studies. A major emphasis of the installation's long-range facility development plan is to consolidate land uses and collocate similar functions. Therefore, long-term beneficial impacts from implementation of the Proposed Actions would occur.

# 4.4.1.1 Mitigation Measures

No mitigation measures would be required.

# 4.4.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Actions would not occur and the temporary conditions and uses of land and facilities would continue. Implementation of the No Action Alternative would cause significant adverse effects on land use on Tyndall AFB. The installation mission support services, tenants and personnel would continue to operate in temporary locations, facilities and under incumbered conditions that do not adequately meet long-term mission requirements or Air Force standards. Pre-

storm existing land use conditions would not be realized; therefore, continuation of conducting installation operations in temporary conditions will result in short-term adverse impacts to land use. Implementation of the No Action Alternative does not follow the future planning recommendations as established by Tyndall AFB; therefore, long-term adverse impacts on land use would occur. In addition, retaining damaged buildings, facilities and infrastructure on Tyndall AFB would result in long-term adverse impacts on land use as re-development would not occur.

# 4.5 SOILS

# 4.5.1 **PROPOSED ACTIONS**

Site preparation and construction activities would directly disturb approximately 1164 acres of native and non-native soils, over half of which (approximately 629 acres) would result from the Flightline drainage improvement and utility upgrade projects. Erosion from the construction sites could result in additional indirect effects; consequently, any soil disturbance that would expose the soils to wind, rain, and stormwater runoff must be stabilized by some means. Tyndall AFB would be required to obtain a Stormwater Construction Permit from the FDEP prior to construction. The construction contractor would be required to develop a Stormwater Pollution Prevention Plan (SWPPP) specific to each site. that would detail erosion prevention and control measures to be implemented during site preparation and construction activities. No prime or unique farmland soils would be disturbed or removed from the project area.

**Table 4.5-1** presents the soil types and amounts that would be disturbed under the Proposed Actions (refer back to **Section 3.6** for a breakdown of these soils types per individual Proposed Action). As can be seen from this table, the Arents, Pottsburg, Leon, and Mandarin soil types compose the majority of land to be disturbed. Arents soils are a man-made mixture of various soil series, resulting from earth moving operations such as dredging and filling and are not prone to either flooding or ponding. The other three most commonly disturbed soil types typically occur on flat areas above marine terraces and are considered to be poorly drained but not prone to flooding. There would be minor impacts on soils upon implementation of the Proposed Actions.

Soil Type	Acres Impacted	% of Total
Allanton sand	0.4	<1%
Arents, 0 to 5 percent slopes	248.8	21%
Bayvi loamy sand	2.9	<1%
Beaches	14.1	1%
Chipley sand, 0 to 5 percent slopes	3.8	<1%
Fripp-Corolla complex, 2 to 30 percent slopes	9.4	<1%
Hurricane sand, 0 to 2 percent slopes	35.1	3%
Kureb sand, 0 to 5 percent slopes	0.9	<1%
Leon sand, 0 to 2 percent slopes	210.8	18%
Mandarin sand, 0 to 2 percent slopes	235.0	20%
Osier fine sand	47.7	4%
Pamlico-Dorovan complex	9.0	<1%
Pickney fine sand	1.1	<1%
Pits	0.0	0%
Pottsburg-Pottsburg, wet, sand, 0 to 2 percent slopes	175.0	15%
Resota fine sand, 0 to 5 percent slopes	44.2	4%
Rutlege sand, 0 to 2 percent slopes	60.7	5%
Urban land	60.0	5%
Water	4.3	<1%

## **TABLE 4.5-1 SOIL TYPES AND AMOUNTS**

Sources: USDA NRCS, 2019

## 4.5.1.1 Mitigation Measures

No mitigation measures would be required.

#### 4.5.2 NO ACTION ALTERNATIVE

No construction or ground disturbing activities would occur under this alternative. Therefore, the No Action Alternative would have no direct or indirect impacts, either beneficial or adverse, on soils.

## 4.6 WATER RESOURCES

## 4.6.1 PROPOSED ACTIONS

#### 4.6.1.1 Surface Water

The Proposed Actions may potentially have temporary, negligible impacts on surface waters as a result of increases in erosion and sedimentation during periods of construction or demolition. Disturbed soils and hazardous substances (i.e. POLs) could directly impact water quality during a major rain event. However, through the use of best management practices (BMPs), as outlined in the SWPPP, these effects would be minimal.

## 4.6.1.2 Groundwater

Proposed construction and demolition activities would not involve withdrawals from, or discharges to surface water bodies or groundwater. Groundwater within the surficial aquifer may be encountered during certain types of construction activities such as excavation within the footprint of new facilities. Any dewatering necessary during such construction activities would be conducted using standard methods

and would have no effect on groundwater quality or flow. Hazardous materials used and hazardous waste generated during construction would be managed in accordance with all applicable environmental compliance regulations and Tyndall AFB environmental management plans. Therefore, negligible to minor impacts on groundwater would be expected.

# 4.6.1.3 Wetlands

Appropriate BMPs and engineering controls should be implemented during construction to limit the extent of damage to wetland and other surface water habitat in all project areas. Although final designs and laydown footprints are not developed as yet, it is estimated that approximately 128.7 acres of wetlands and 118,299 LF (i.e., drainage features) and 0.8 acre (stormwater pond/open water) of other surface waters are located within the proposed project areas. Majority of these wetlands and other surface waters are highly disturbed and altered due to hurricane damage and timber harvest/salvage operations (GSRC, 2019). As mentioned in **Section 3.7.3**, a formal Jurisdictional Determination of the wetlands and other surface waters will be determined during the state and Federal permitting process. During design and permitting, efforts will be made to minimize impacts to wetlands and other surface waters to the greatest extent practicable.

The wetlands located within the proposed project areas that were field surveyed were further assessed using the Uniform Mitigation Assessment Method (UMAM), Chapter 62-345, F.A.C. The assessment was performed for all wetland acreage included in each Proposed Action project footprint, because the notional construction within those footprints shown in **Section 1.4** of this EA may be subject to change during final design. The UMAM methodology provides a standardized procedure used by all regulatory agencies in Florida for assessing the functions provided by wetlands and other surface waters, the amount that those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset that loss. The wetland function indicators measured by UMAM include:

- Location and Landscape Support,
- Water Environment, and
- Community Structure.

**Table 4.6-1** shows the preliminary results of the UMAM assessment score (delta) for each wetland, the acreage, and the functional loss associated with the acreage. The wetlands located within the project area of M-02 that have not yet been field verified (51.0 acres) will be assessed when surveyed. Other surface waters, though potentially jurisdictional, were not included in this assessment. As described above, this assessment assumes all wetlands located within the Proposed Action areas that have been surveyed would be impacted, as the notional construction within each project footprint may change during final design. However, as previously mentioned, minimization measures to reduce these impacts during the design and permitting phase will be implemented. Therefore, the approximate functional loss of wetland values as a result of 77.7 acres of potential wetland impacts is 29.2 units. UMAM scores are approximate and will be further refined during the permitting process. and formal jurisdiction approval.

Project Category	Wetland ID	Туре	Score (Delta)	Acres	Functional Loss (Units)
	5	Wet Prairie	0.43	1.8	0.77
2000	6	Wet Prairie	0.43	0.4	0.17
Area Projects	7	Wet Prairie	0.43	0.2	0.09
110jeets	8	Marsh Vegetation	0.40	1.4	0.56
		Subtotal – 20	000 Area	3.8	1.59
8500 Area Projects	4	Wet Prairie	0.43	2.3	0.99
9700	1	Shrub	0.50	24.7	12.35
Area	2	Shrub	0.50	0.3	0.15
Projects	3	Slash Pine/Shrub	0.30	45.7	13.71
Subtotal – 9700 Area		73.0	27.2		
Support Area Projects	9	Marsh Vegetation	0.50	0.2	0.10
	10	Slash Pine/Shrub	0.30	0.3	0.09
Multi-	11	Shrub	0.50	0.2	0.10
Projects	12	Marsh Vegetation	0.50	0.1	0.05
110,000	13	Shrub	0.50	0.1	0.05
Subtotal – Multi-Area 0.			0.09	0.39	
		Gra	nd Total	77.7	29.18

# TABLE 4.6-1 UNIFORM MITIGATION ASSESSMENT METHODOLOGY (UMAM) ANALYSIS OF WETLAND IMPACTS RESULTING FROM THE PROPOSED ACTIONS

Sources: GSRC, 2019; AECOM, 2019. Note: UMAM analysis is preliminary and will be refined during permitting process.

## 4.6.1.4 Floodplains

As shown in **Table 3.7-2**, a total of approximately 126.9 acres of the Proposed Action areas are located within the 100-year floodplain. During the design phase, the construction footprint for each of the Proposed Actions will implement design measures to avoid/minimize impacts to floodplains to the greatest extent practicable. Unavoidable impacts to floodplains resulting from the implementation of the Proposed Actions will be mitigated.

The Proposed Actions may increase the risk or impact of floods on human safety or adversely impact the beneficial values that floodplains serve. The Proposed Actions may increase the duration, frequency, velocity, or volume of flood events due to the reduction of floodplain capacity. All potential effects, if any, would remain on Tyndall AFB property. Mitigation actions to address these impacts are discussed in **Sections 4.6.1.3** and **5.0**.

## 4.6.1.5 Coastal Zone Management

Based on the geography of Florida and the legal basis for the state program, the entire state of Florida is included within the coastal zone. Geographically, Florida has low land elevation, a generally high water table, and an extensive coastline with many rivers emptying into coastal waters. Few places in Florida are more than 70 miles from either the Atlantic Ocean or the Gulf of Mexico. The result is an interrelationship between the land and coastal waters, which makes it difficult to establish a boundary that

would exclude inland areas. Because of this relationship, the state boundaries include the entire area encompassed by the state's 67 counties and its territorial seas. All of Tyndall AFB is within Florida's coastal zone, as defined by the FCMP. While Federal lands such as Tyndall are statutorily excluded from Florida's coastal zone, Federal approval of the FCMP elicits Section 307 of the CZMA and mandates that activities on Federal lands that have the potential to affect coastal resources or uses on non-Federal lands comply to the maximum extent practicable with the enforceable policies of the FCMP. Florida's CZMP includes the 24 enforceable policies (statutory authorities) incorporated into the federally approved FCMP. **Table 4.6-2** provides a summary of the 24 enforceable policies and the Proposed Action's consistency with each policy.

As appropriate, the Air Force (i.e., Tyndall's Natural Resources Office) would submit either an analysis of the CZMA Consistency Determination or prepare a CZMA Negative Determination under 15 CFR 930, and request a Concurrence of these determinations from the Florida State Clearinghouse for the construction actions. The determination and request for Concurrence would state that this activity would not have an effect on the Florida coastal zone concerning water resources. Tyndall AFB management policies provide for the sustainable water management and the conservation of surface water and groundwater for full beneficial use.

Florida Statute	Legal Scope	Consistency Evaluation
Chapter 161 Beach and Shore Preservation	Authorizes the Bureau of Beaches and Coastal Systems within FDEP jurisdiction to regulate construction on or seaward of the state's beaches.	The Proposed Actions would not adversely affect beach and shore management, specifically as it pertains to the Coastal Construction Permit Program, the Coastal Construction Control Line (CCCL) Program, and the Coastal Zone Protection Program. The Proposed Actions would occur within Tyndall AFB and would not occur seaward of the CCCL.
Chapter 163, Part II Growth Policy; County and Municipal Planning; Land Development Regulation	Requires local governments to prepare, adopt, and implement comprehensive plans that encourage the most appropriate use of land and natural resources in a manner consistent with the public interest.	The Proposed Actions would occur within Tyndall AFB and therefore would not affect municipal or county government comprehensive plans.
Chapter 186 State and Regional Planning	Details state level planning requirements. Requires the development of special statewide plans governing water use, land development, and transportation.	As part of the NEPA process, the Proposed Actions has been coordinated with Federal, state and local governments and agencies, including the FDEP State Clearinghouse, for compatibility with state and regional planning.
Chapter 252 Emergency Management	Provides for planning and implementation of the state's response to, efforts to recover from, and the mitigation of natural and man-made disasters.	The Proposed Actions would not have an effect on the ability of the state to respond to or recover from natural or manmade disasters.
Chapter 253 State Lands	Addresses the state's administration of public lands and property of this state and provides direction regarding the acquisition, disposal, and management of all state lands.	The Proposed Actions would occur entirely within Tyndall AFB. No state lands would be disturbed during the construction, renovations, infrastructure construction, or demolitions and therefore, would not be affected.

#### TABLE 4.6-2 FLORIDA COASTAL MANAGEMENT PROGRAM CONSISTENCY REVIEW

Florida Statute	Legal Scope	Consistency Evaluation
State Parks and Preserves	management of state parks and preserves.	state parks, recreational areas or preserves. Secondary or indirect impacts to environmental or social resources related to these facilities are not anticipated. Opportunity for recreation on state lands would not be affected.
Chapter 259 Land Acquisition for Conservation or Recreation	Authorizes acquisition of environmentally endangered lands and outdoor recreation lands.	The Proposed Actions would occur within Tyndall AFB and would not have an effect on the acquisition of environmentally endangered and outdoor recreation lands.
Chapter 260 Recreational Trails System	Authorizes acquisition of land to create a recreational trails system and to facilitate management of the system.	The Proposed Actions would occur within Tyndall AFB and would not have an impact on the acquisition of land to create a recreational trails system.
Chapter 267 Historical Resources	Addresses management and preservation of the state's archaeological and historical resources.	The Proposed Actions is not expected to adversely affect historical or cultural resources of the State of Florida. Section 106 of the NHPA consultation with the Florida SHPO is ongoing. The Cultural Resources Survey Report completed for the Proposed Action Proposed Actions has been submitted to the SHPO and any mitigation measures identified during the consultation will be included in the Final EA.
Chapter 288 Commercial Development and Capital Improvements	Provides the framework for promoting and developing the general business, trade, and tourism components of the state economy.	The Proposed Actions would occur on an active military installation with limited access to the public and limited or no implications for or effect on general business, trade, and tourism components of the state economy.
Chapter 334 Transportation Administration	Addresses the state's policy concerning transportation administration.	The Proposed Actions would not have an impact on the state's transportation administration policies.
Chapter 339 Transportation Finance and Planning	Addresses the finance and planning needs of the state's transportation system.	The Proposed Actions would not have an effect on the finance and planning needs of the state's transportation system.
Chapter 373 Water Resources	Addresses the state's policy concerning water resources.	The Proposed Actions could have negligible to minor impacts on surface water and groundwater. Temporary, indirect, negligible adverse impacts from soil disturbance could create non-point source water pollution; however, BMPs would be utilized to reduce the chance of impacts on surface water resources. The Proposed Actions could impact up to 126.9 acres of floodplains and could decrease the beneficial values that floodplains provide; however, all effects occur on Tyndall AFB and would result in negligible to minor impacts on floodplains. Design measures would be implemented to avoid/minimize impacts to floodplains. Mitigation would be provided for unavoidable floodplain impacts.
		The Proposed Actions could impact up to 128.7 acres of wetlands and up to 118,299 LF of other surface waters. Design measures would be implemented to avoid/minimize impacts to wetlands and other

Florida Statute	Legal Scope	Consistency Evaluation
		surface waters. The Air Force, USACE and FDEP/NWFWMD will identify the appropriate mitigation efforts to offset these impacts. Overall, there would be no significant impacts on water resources as a result of the Proposed Action.
Chapter 375 Outdoor Recreation and Conservation Lands	Develops comprehensive multipurpose outdoor recreation plans to document recreational supply and demand, describe current recreational opportunities, estimate need for additional recreational opportunities, and propose means to meet the identified needs.	The Proposed Actions would not impact the state's development or evaluation of multipurpose outdoor recreation plans.
Chapter 376 Pollutant Discharge Prevention and Removal	Regulates transfer, storage, and transportation of pollutants, and cleanup of pollutant discharges.	During construction, the contractor would be required to prepare project-specific SPCC documenting measures to prevent accidental release to the environment and, should they occur, the corrective action to minimize environmental impacts. Project-specific BMPs would be implemented for the operation of the Proposed Actions in accordance with existing or modified stormwater discharge permit conditions. The Proposed Actions would not alter the types of hazardous and other regulated materials used at Tyndall AFB (e.g., cleaning solvents, lubricants). No involvement and impact associated with hazardous materials or wastes is anticipated. The Proposed Actions would not involve the transfer of pollutants between vessels; between onshore facilities and vessels; between offshore facilities and vessels; or between terminal facilities within jurisdiction of the state and state waters.
Chapter 377 Energy Resources	Addresses regulation, planning, and development of energy resources of the state.	Implementation of the Proposed Action would not cause unsupportable demands on available natural resources or energy supplies, and construction and operation of the Proposed Action would not require consumable natural
Chapter 379 Fish and Wildlife Conservation	Addresses management and protection of fish and wildlife in the state.	The Proposed Actions would have permanent, adverse effects on vegetation potentially utilized by wildlife. Undeveloped uplands and wetlands/other surface waters potentially providing habitat to wildlife species may be impacted by the Proposed Actions; however, based on the October and November 2019 field reviews, a large portion of these habitats have been previously disturbed by timber harvest/salvage operations. Disturbances to wildlife within these habitats could include mortality due to construction activities; degradation and loss of habitat causing loss of burrow or nests, cover, or forage habitat; and noise disturbance from construction activities disrupting

Florida Statute	Legal Scope	Consistency Evaluation
		wildlife activity and behavior. However, the small number of individuals expected to be lost would not appreciably reduce the overall population of wildlife species found known to occur within the area surrounding Tyndall AFB.
		Some individual telephus spurge specimens (federally threatened) are likely to be lost as a result of the Proposed Actions; however, the Air Force and USFWS will identify the proper conservation measures to offset these impacts through Section 7 consultation. Lighting systems used during the Proposed Actions would be designed to avoid or reduce illumination effects on sea turtles and coordination with Tyndall Natural Resources Section would be required prior to any ground disturbing activities. If any gopher tortoise burrows cannot be avoided by 25 feet, the tortoises would be relocated in accordance with Tyndall AFB's <i>Threatened and Endangered Species Component Plan</i> (Air Force, 2018b) and FWC's current guidelines. If gopher tortoises are in close proximity to the construction site, silt fencing or some other type of barrier would be erected to keep tortoises from moving into the construction area after surveys have been completed.
Chapter 380 Land and Water Management	Establishes land and water management policies to guide and coordinate local decisions relating to growth and development.	The Proposed Actions would be developed consistent with local land and water management plans. The Proposed Action is subject to local permit, stormwater, and environmental requirements and review. The Proposed Actions will require coordination with and authorization from the USACE and the NWFWMD/FDEP.
Chapter 381 Public Health, General Provisions	Establishes public policy concerning the state's public health system.	The Proposed Actions does not involve the construction of an onsite sewage treatment and disposal system. Construction activities associated with the Proposed Actions are governed by regulations established by the AFOSH Program and the OSHA. No appreciable change in the type, quantity, or disposal of solid wastes is expected. The Proposed Actions would not impact public policy or management in regard to sanitation, communicable diseases, or public health.
Chapter 388 Mosquito Control	Addresses mosquito control efforts in the state.	The Proposed Actions would not affect local mosquito control efforts or contribute to increased propagation of mosquitos.
Chapter 403 Environmental Control	Establishes public policy concerning environmental control in the state.	The construction and operations of the Proposed Actions would include project-specific BMPs and pollution prevention measures. The Proposed Action is not expected to exceed applicable state water quality standards or have substantial and longer-term water quality impacts. Air pollutant emissions associated with construction of the Proposed Actions would not exceed Air Force
		significance thresholds or cause exceedances of air

Florida Statute	Legal Scope	Consistency Evaluation
		quality standards. Long-term air emissions increases resulting from the Proposed action are expected to be negligible.
		Construction wastes and operational wastes would be collected, transported, recycled, and disposed of in compliance with applicable state and local regulations. The Air Force would obtain and comply with all applicable permits as required by law.
Chapter 553 Building Construction Standards	Provides a mechanism for the uniform adoption, updating, amendment, interpretation, and enforcement of a single, unified state building code, to be called the Florida Building Code. Obtain a permit from the appropriate enforcing agency.	The Proposed Actions would not affect the Building Construction Standards of the State of Florida. The Air Force would obtain and comply with all applicable permits as required by law.
Chapter 582 Soil and Water Conservation	Provides for the control and prevention of soil erosion.	A SWPPP would be developed and followed, and BMPs addressing erosion and sediment controls would be implemented to minimize impact to soils and water quality. The Proposed Actions would be consistent with the current characteristic features of the area and landscape and would not result in any changes to land use. The Proposed Actions would not affect soils or farmland within a Soil and Water Conservation District and would not convert prime farmland.
Chapter 597 Aquaculture	Establishes public policy concerning the cultivation of aquatic organisms.	The Proposed Actions has no activities related to the cultivation of marine species in the Study Area. The Proposed Actions activities would not affect aquaculture.

Source: Florida Statutes, as identified in table.

## 4.6.1.6 Mitigation Measures

For construction activity related to the Proposed Actions, a NPDES stormwater permit implementing appropriate pollution prevention techniques will be obtained from the FDEP. Any wastewater collection/transmission systems will require authorization from the FDEP pursuant to Chapter 62-604, F.A.C. and public drinking water system modifications will be authorized by FDEP pursuant to Chapter 62-555.900, F.A.C. In addition, pursuant to Section 373 Part IV, F.S., any construction and operation of surface water management systems will require an ERP from the FDEP or NWFWMD to ensure that activities or situations are not harmful to the water resources or inconsistent with the public interest. A CWA Section 404 permit and a Section 401 water quality certification would be required prior to any dredge and/or fill actions within federally jurisdictional wetlands.

Mitigation will be required to offset impacts on state and/or federally jurisdictional wetlands. Wetland impacts resulting from construction of the Proposed Actions will be mitigated to satisfy all mitigation requirements of 33 U.S.C. 1344 and Part IV, Chapter 373 F.S. During the process of obtaining these permits, USACE, Air Force, and FDEP will identify the necessary mitigation required to offset impacts to jurisdictional wetlands and other surface waters. The preference would be to avoid wetland impacts, but since that is likely not possible, the Air Force will consider on-site and in-kind, off-site and in-kind, and

obtaining credits from approved mitigation banks. Currently, there is one wetland mitigation bank (Horseshoe Creek Mitigation Bank) that services this area and is pending state and Federal permits to eventually have freshwater herbaceous, freshwater forested, and saltmarsh wetland credits available. Therefore, implementation of the Proposed Actions would not result in significant impacts on wetlands.

Drainage system improvements associated with the Proposed Actions would be designed to properly convey and store stormwater flows, and would not impede floodwater flows during major storm events. The Proposed Actions' design would comply with local floodplain management policies and regulations, which promote designs to minimize flood impacts. Adverse effects could be further minimized by elevating all facilities above the base flood elevation (BFE), applying construction period erosion and sedimentation controls, and using pervious surfaces for stormwater retention and treatment where possible.

Implementation of a SWPPP and the BMPs identified in the SWPPP will reduce or eliminate the potential for eroded soils and contaminants from entering surface water bodies and groundwater. Consultation with the Florida State Clearinghouse will facilitate identification of mitigation measures, if needed, under the CZMA.

Approximately 126.9 acres of floodplains would be impacted by the Proposed Actions. As part of the alternatives analysis conducted for the Proposed Actions, siting and construction were evaluated based on three project-specific selection standards. Selection standard SS-04 includes minimizing impacts on natural systems, including floodplains. Therefore, pursuant to EO 11998, the Air Force has concluded that there is no practicable alternative to siting and constructing the individual projects included in the Proposed Actions. Accordingly, the following mitigations are required to: 1) protect structures sited in the floodplain, and 2) minimize impacts to flood elevation, function and capacity within floodplain areas.

First, design elements will be incorporated into the individual projects that would encroach on floodplains to minimize and mitigate potential floodplain impacts to the greatest extent practicable. In general, building footprints would be reduced as much as possible to minimize encroachments into the floodplain. Other design elements could include constructing buildings on land elevated above the BFE through placement of fill; establishing basement elevations and first floor elevations consistent with potential flood levels; and elevating utilities and equipment that might be hazardous to life if submerged.

Additionally, to minimize impacts to flood elevation, function and capacity within the 100- and 500-year floodplain due to cut and fill activities, compensatory storage will be provided by excavating material within or adjacent to the same floodplain to be used as fill, in a manner that does not disturb or impact wetlands, endangered vegetation, or potential cultural sites.

## 4.6.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, no construction or demolition activities would occur; therefore, there would be no direct impacts on surface waters, groundwater, wetlands, floodplains or the coastal zone. Timber salvage efforts would likely continue, and depending upon if skidder trails are constructed in the wetland areas, could impact wetlands through the removal of herbaceous and shrub level plants, the

potential introduction of non-native species, and/or the alteration of natural waterflow patterns. However, no significant impacts are anticipated.

# 4.7 BIOLOGICAL RESOURCES

## 4.7.1 PROPOSED ACTIONS

The Proposed Actions would have permanent, adverse effects on vegetative cover potentially utilized by wildlife. Tables 3.8-1a through 3.8-1g summarizes the land use/vegetative cover occurring within the proposed project areas. Undeveloped uplands and wetlands/other surface waters potentially providing habitat to wildlife species may be impacted by the Proposed Actions; however, based on the October and November 2019 field reviews (GSRC, 2019), a large portion of these habitats have been previously disturbed by timber harvest/salvage operations. During the design phase of each of the Proposed Actions, efforts will be made to reduce the construction footprints to the greatest extent possible to minimize impacts to wildlife habitat. There is a potential for wildlife mortality of individuals found in the proposed project areas during construction activities. These mortalities are most likely to involve small, slowmoving animal species that take cover in leaf litter or upper soil layers, such as various rodent, amphibian, and reptile species. The direct degradation and loss of habitat would also potentially impact burrows and nests, as well as cover, forage, and other important wildlife resources. The loss of these resources would result in the displacement of individuals that would then be forced to compete with other wildlife for the remaining resources. Disturbances due to noise generated by construction equipment may disrupt wildlife activity temporarily, particularly avian courtship and breeding behaviors. However, the small number of individuals expected to be lost would not appreciably reduce the overall population of wildlife species known to occur within the area surrounding Tyndall AFB. It would be expected that species utilizing this habitat would move to adjacent similar habitat. Therefore, the displacement of wildlife would minimally reduce the population size within the proposed project areas, and would have a negligible effect on the overall population viability.

Based upon information identified in the Biological Assessment for the Proposed Actions (USFWS, 2019a), the Air Force has determined that the Proposed Actions may affect and is likely to adversely affect the telephus spurge. The Air Force has determined that other construction, demolition, or renovation activities would have no effect on any other federally and/or state listed species. Surveys were conducted for all species and the telephus spurge was the only species recorded at any of the project sites. Design of new facilities, particularly those nearer to the beaches, will include measures to avoid lighting disturbance on sea turtles. Section 7 consultation with USFWS is currently ongoing.

# 4.7.1.1 Mitigation Measures

No mitigation measures would be required for general wildlife populations. Any new lighting systems will be designed to avoid or reduce illumination effects on sea turtles. Avoidance of the telephus spurge populations at the gate site would be achieved, if practicable, or salvage/relocation of the affected populations would occur, based upon completion of the Section 7 consultation.

Within 30 days of ground disturbance, Tyndall AFB Natural Resources would complete a gopher tortoise survey at and in the vicinity of the construction sites. If any found burrows cannot be avoided by 25 feet,

the tortoises and any commensal species would be relocated in accordance with Tyndall AFB's *Threatened and Endangered Species Component Plan* (Air Force, 2018b) and FWC's current guidelines. If gopher tortoises are in close proximity to the construction site, silt fencing or some other type of barrier would be erected to keep tortoises from moving into the construction area after surveys have been completed.

## 4.7.2 NO ACTION ALTERNATIVE

No construction or ground disturbing activities would occur under this alternative. Therefore, the No Action Alternative would have no direct or indirect impacts either beneficial or adverse on biological resources, including federally and/or state listed species.

# 4.8 CULTURAL RESOURCES

## 4.8.1 **PROPOSED ACTIONS**

Section 106 consultation for the demolition of the structures has been coordinated through the Florida SHPO and six Native American Tribes who have expressed an interest in Tyndall AFB. As a result of this consultation, concurrence has been received that no adverse effect on historic properties would occur under the Proposed Actions. Areas that were not previously surveyed and that are proposed for construction have been surveyed for cultural resources and no significant sites or materials were found in any of the project areas. No previously recorded cultural resources are located within the areas proposed for restoration in this alternative. The Cultural Resources Survey Report (**Appendix D**) has been submitted to the Florida SHPO for consultation under Section 106 of the NHPA. Cultural resources would not be adversely affected upon implementation of the Proposed Actions.

## 4.8.1.1 Mitigation Measures

No mitigation measures would be required.

## 4.8.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, Tyndall AFB mission capabilities and structural/infrastructural requirements would not be restored. No cultural resources would be adversely affected by the No Action Alternative.

# 4.9 HAZARDOUS MATERIALS/WASTE AND SOLID WASTE

## 4.9.1 PROPOSED ACTIONS

## 4.9.1.1 Hazardous Materials

Construction of the proposed new facilities would involve use of typical construction-related hazardous materials such as POL, paints, and solvents. Handling and storage of hazardous materials during construction activities, including measures to prevent releases, would be required to be conducted in accordance with all applicable environmental compliance regulations and Tyndall AFB environmental
management plans. Hazardous materials or petroleum products (fuel and lubricants) would be required to be stored either double walled tanks or placed within secondary containment in order to prevent any impacts to soil or groundwater in the event of a spill. Management of other hazardous materials in compliance with Tyndall AFB HWMP (Air Force, 2017b) requirements and disposal of hazardous wastes as directed by the HWMP would minimize impacts from handling and disposal of hazardous substances. By following the procedures identified, impacts from hazardous and toxic substances due to the Proposed Actions would be minor.

No increases or substantial changes in current quantities and types of hazardous materials or wastes would be expected upon completion of the projects, as these activities are essentially replacing structures and functions that were operational prior to Hurricane Michael.

# 4.9.1.2 Hazardous Waste

Handling, storage, and disposal of hazardous waste generated during construction activities, including measures to prevent releases, would be required to be conducted in accordance with all applicable environmental compliance regulations and Tyndall AFB environmental management plans. The proposed facilities would be expected to use and manage the same type and similar amounts of hazardous materials/waste as their current facilities. Generated hazardous waste would be stored in one or more designated IAPs at Tyndall AFB in compliance with the waste containerization requirements specified in the Tyndall AFB HWMP (Air Force, 2017b). Certain wastes, such as spent air filters, may be removed from the facilities during maintenance events and taken directly to the 90-day HWAS instead of being stored in an onsite IAP. Therefore, the Proposed Actions would result in no negligible effects regarding hazardous wastes.

# 4.9.1.3 Toxic Substances

Demolition of existing buildings as part of Project M-03 could potentially expose ACM and LBP. Surveys for ACM and LBP have been completed on 42 structures proposed for demolition. ACM was detected in 38 of these. The other four buildings were reported as non-detected for ACM. LBP was reported in eight structures and only two were reported as non-detected for LBP. The remaining structures have not been surveyed or there has only been a limited survey completed for ACM and LBP. Structures constructed after 1985 (accounting for approximately half of the buildings proposed for demolition) would be unlikely to contain ACM or LBP. As standard practice, all structures proposed to be demolished or modified at Tyndall AFB are treated as potentially containing ACM and LBP, unless surveys are completed, and no ACM or LBP are found. Tyndall AFB would conduct ACM and LBP surveys prior to demolition of previously un-surveyed structures. If ACM or LBP is encountered during demolition, BMPs in compliance with Federal and state regulations and Tyndall AFB's environmental management plans for handling and disposing of ACM and LBP would be followed, thus minimizing any impacts from the release of these contaminants to the environment. Thus, no or negligible effects relative to toxic substances would occur.

# 4.9.1.4 Solid Waste

Construction of the proposed structures and demolition of the damaged structures would generate nonhazardous, construction-related solid waste such as scrap metal and rubble. Projects 8500-1, F-03, SA-01, SA-02, SA-03, SA-05, SA-06, SA-07, SA-08, SA-09, and SA-10 would include demolition of a total of 1,614,863 SF of asphalt pavement parking areas and roadways. Project M-03 would demolish approximately 1,921,214 SF of buildings. **Table 4.9-1** summarizes the quantities and types of demolition debris expected to be generated from the Proposed Action. Such solid waste would be disposed at an off-base landfill or recycled/reused as appropriate. Solid waste generated during construction and demolition activities would be managed in accordance with the Tyndall AFB ISWMP (Air Force, 2017c). Therefore, minor to moderate effects relative to solid wastes at Tyndall AFB would occur due to the Proposed Action.

	Project ID (Cubic Yards)								
Debris Type	8500-1	F-03	SA-01, SA-02, SA-03	SA-05, SA-09, SA-10	SA-06	SA-07	SA-08	M-03	Total
Concrete	0	0	0	0	0	0	0	541,325	541,325
Wood Products	0	0	0	0	0	0	0	244,712	244,712
Drywall and Plasters	0	0	0	0	0	0	0	86,369	86,369
Steel	0	0	0	0	0	0	0	28,524	28,524
Brick & Clay Tile	0	0	0	0	0	0	0	80,465	80,465
Asphalt Shingles	0	0	0	0	0	0	0	85,946	85,946
Asphalt Concrete	377	2,270	3,416	7,397	2,909	2,789	5,961	0	25,120
Total	377	2,270	3,416	7,397	2,909	2,789	5,961	1,067,341	1,092,461

 TABLE 4.9-1 ESTIMATED DEMOLITION DEBRIS FROM PROPOSED ACTIONS

Sources: FEMA, 2010; USEPA, 2016b.

# 4.9.1.5 Environmental Restoration Program

As stated in **Section 3.10.5**, a variety of IRP sites are collocated with the Proposed Actions and planned construction activities have potential to cause short-term adverse impacts to ongoing remediation activities at these sites. Refer to **Table 4.9-2** for an appraisal of likely potential impacts to each site based on the site status, as well as the planned activities associated with each of the Proposed Actions.

# TABLE 4.9-2 POTENTIAL IMPACTS TO IRP SITES

Project Category	Project	IRP Site ID	Site Name	Site Type	Impact Assessment		
2000.15		LF010	Capehart Marina Rubble Storage	Storage	None, NFA ROD approved by regulators		
2000 Area Projects	2000-10	TU202	Beacon Beach Marina	Underground Storage Tank	None, pending issuance of SRCO		
	2000-1c	LF003	Beacon Beach Road Landfill	Landfill	None, IRP site has been closed by regulatory agencies		
8500 Area Projects	8500-1	SR169	Jeep Range	Small Arms Range	During 2013 investigations, samples were collected from various media at the sites (including soil, sediment, surface water, and groundwater) and analyzed for munitions constituents associated with small arms debris present at the site. Additionally, as part of the RI conducted from July 2015 through July 2016, samples were collected from various media at the sites. Soils, sediment, surface water, and groundwater were evaluated for metals and small arms propellants. As shown on <b>Figure 1.4-2 and 1.4-2a</b> , planned construction for this Proposed Actions may partially occur on unpaved areas requiring earthworks and ground disturbance. Therefore, there is <b>potential for short-term, minor-to-moderate adverse impacts</b> related to Proposed Action construction activities.		
	F-02		Building 239	Underground Storage Tank	Only a small portion of the Proposed Action footprint overlaps this IRP site as shown on <b>Figure 1,4-4b</b> . Proposed construction would occur entirely on already paved area which minimizes the potential for disturbance of any contaminated soils or other environmental media associated with this IRP site. Therefore, there <b>is low overall</b> <b>potential for short-term minor adverse impacts</b> related to Proposed Action construction activities.		
		N/A	BLDG 451 Former PCP Transformer Storage	Transformer Storage	The Proposed Action footprint overlaps these IRP solid waste management units as shown on <b>Figure 1,4-4b</b> . Proposed construction		
		N/A	BLDG 460 OWS	Oil/Water Separator	would occur entirely on already paved area which minimizes the		
	F-03	N/A	BLDG 462 WAA	Waste Accumulation Area	potential for disturbance of any contaminated soils or other environmental media associated with this IRP site. Therefore, there is <b>low potential for short-term minor adverse impacts</b> related to Proposed Action construction activities.		
F-04, F-06, F-09		OW217 Building 264/280		Oil/Water Separator	Site assessments were completed on the UST and OWS at Building 264 in 1997, 1998, 2000 and 2008. Petroleum contaminated soil was encountered during the 1996 removal of a 3,000-gallon diesel UST previously located at the east corner of Building 280. The UST was		

Project Category	Project	IRP Site ID	Site Name	Site Type	Impact Assessment			
					removed from the site and properly disposed. A Closure Assessment Form dated December 30, 1996 was submitted to notify the FDEP of the removal of the UST, the occurrence of petroleum contaminated soil, the removal of soil, and subsequent sampling. Site assessments for Building 280 were completed in 1996 and 2000. As shown on <b>Figure 1.4-4b</b> , planned construction for these Proposed Actions may partially occur on unpaved areas requiring earthworks and ground disturbance, although most construction would occur on paved area. Therefore, there is <b>low-to-moderate potential for short- term, minor adverse impacts</b> related to Proposed Action construction activities.			
	F-07, F-08, F-09	SS026	Vehicle Maintenance Area	Spill Site Area	The Proposed Action footprint overlaps these IRP sites as shown on <b>Figure 1,4-4b</b> . Proposed construction would occur almost entirely on already paved area which minimizes the potential for disturbance of any contaminated soils or other environmental media associated with this IRP site. Therefore, there is <b>low potential for short-term minor adverse impacts</b> related to Proposed Action construction activities.			
	F-10	N/A	Munitions Storage Area	Munitions	. SS520 has been closed by regulatory agencies. Only OW579, which is forecast for closure through state regulatory agencies, remains open in the MSA. Accordingly, pending further studies, it is possible that ground disturbance associated with Proposed Action construction activities could present a <b>low-to-moderate potential for short-term</b> , <b>adverse impacts.</b>			
Support Area Projects	SA-05, SA-09, SA-10	N/A	BLDG 934 WAA	Waste Accumulation Area	As shown on <b>Figure 1.4-6a</b> , the overall footprint of this IRP solid waste management unit is small and planned construction activities associated with the Proposed Actions that overlap this footprint would occur entirely on already paved area which minimizes the potential for disturbance of contaminated environmental media. Therefore, there is <b>low potential for short-term minor adverse</b> <b>impacts</b> related to Proposed Action construction activities.			
Multi Area Projects	M-01	FT023	Former Active Fire Training Area	Fire/Crash Training Area	An ongoing RI began in 2011 to address data gaps. Fire-fighting activities, which began at Site FT023 in 1980, may have involved the use of firefighting agents known as Aqueous Film- Forming Foams (AFFFs), which came into use as early as 1970. AFFFs are comprised of fluorocarbon surfactants and petroleum- based foam stabilizers may have contributed to the release of			

Project Category	Project	IRP Site ID	Site Name	Site Type	Impact Assessment
					"emerging" contaminants known as perfluorinated compounds, specifically perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), into the environment.
					As shown on <b>Figure 1.4-7a</b> , the northernmost extent of the planned airfield drainage improvement areas intersect this IRP site, and planned construction activities would require earthworks and ground disturbance to compete. Accordingly, there is <b>moderate-to-high</b> <b>potential for short-term adverse impacts</b> related to Proposed Action construction activities.
		OT004	Southeast Runway Extension Burial Site	Debris Burial	None, IRP site has been closed by regulatory agencies
		SS015	POL Area B	Spill Site Area	In March 2009, approximately 1,700 tons of contaminated soils and 1.8 tons of abandoned pipelines were removed from SS015. However, an unknown quantity of contaminated soils and abandoned pipelines are still present at the site (the supplemental RI will confirm this amount), and groundwater impacts from benzene, toluene, ethylbenzene, and xylenes contamination are still present as well. In 2015 additional investigative sampling was conducted to gather updated contaminant levels and identify potential data gaps. As shown on <b>Figure 1.4-7a</b> , the planned airfield drainage improvement areas intersect this IRP site, and planned construction activities would require earthworks and ground disturbance to compete. Accordingly there is <b>moderate-to-high potential for short-term adverse impacts</b> related to Proposed Action construction activities.
		SS026	Vehicle Maintenance Area	Spill Site Area	Soil impacts that have been identified at SS026 to date are primarily associated with aromatic and total petroleum hydrocarbon constituents, and notably lacking in VOCs. Based on historical groundwater sampling results, VOCs represent the most prevalent contaminants of potential concern in groundwater at SS026, occurring in varying locations and concentrations in the shallow, intermediate, and deep Surficial Aquifer. Of the VOC compounds reported, trichloroethylene and benzene are the constituents present in the highest concentrations and/or most widely distributed areas. As shown on <b>Figure 1.4-7a</b> , the planned airfield drainage

Project Category	Project	IRP Site ID	Site Name	Site Type	Impact Assessment
					improvement areas intersect this IRP site, and planned construction activities would require earthworks and ground disturbance to compete. Accordingly there is <b>moderate-to-high potential for</b> <b>short-term adverse impacts</b> related to Proposed Action construction activities.
		LF003	Beacon Beach Road Landfill	Landfill	None, IRP site has been closed by regulatory agencies
		LF012	Highway 98 Burial Site	Debris Burial	None, IRP site has been closed by regulatory agencies
		OW217	Building 264/280	Oil/Water Separator	See synopsis for Projects F-04, F-06, and F-09.
		SA181	Tower Range	Storage Area	A ROD is in development to detail remedial actions. As shown on <b>Figure 1.4-7b</b> , the planned utility improvement areas intersect this IRP site, and planned construction activities would require earthworks and ground disturbance to compete. Accordingly, pending further studies, there is <b>moderate-to-high potential for short-term adverse impacts</b> related to Proposed Action construction activities.
		SR169	Jeep Range	Small Arms Range	See synopsis for Project 8500-1.
	M-02	SR170 A	Tyndall Elementary School	Small Arms Range	In May 2009, Tyndall's ERP Management Office collected soil samples around the school grounds as part of the MMRP. Results of these samples showed lead and aromatic hydrocarbon levels in certain areas at the school property were above acceptable residential screening levels. In July 2009, the Air Force removed approximately two feet of soil from the playground to the rear and adjacent areas the sides of the school and replaced the excavated soil with clean soil and new playground equipment. Another soil removal occurred in front of the school between October and November 2015 in support of a Bay County Schools project to provide driveway improvements, paved parking lots, and landscaping. A third removal action occurred in 2016. A Remedial Investigation is currently underway. As shown on <b>Figure 1.4-7b</b> , the planned utility improvement areas intersect this IRP site, and planned construction activities would require earthworks and ground disturbance to compete. Accordingly, there is <b>moderate-to-high potential for short-term adverse</b> <b>impacts</b> related to Proposed Action construction activities
		<u>SS015</u>	POL Area B	Spill Site Area	See synopsis for Project M-01.
		SS026	Vehicle Maintenance	Spill Site Area	See synopsis for Projects F-07, F-08, and F-09.

Project Category	Project	IRP Site ID	Site Name	Site Type	Impact Assessment
			Area		
		TU205	Building 239	Underground Storage Tank	See synopsis for Project F-02.
		OW040 /BLDG 188 WAA	Building 315	Oil Water/Separator	
		SS015	POL Area B	Spill Site Area	
	M-03 (within/ adjacent to EA	N/A	BLDG 182 WAA	Waste Accumulation Area	
		n/ N/A	BLDG 180 WAA	Waste Accumulation Area	This Proposed Action involves demolition and removal of buildings
		TU204	Building 182 Former UST Site	Underground Storage Tank	in a manner that would potentially disturb contaminated
	project areas)	N/A	BLDG 258 WAA	Waste Accumulation Area	sites associated with this project are <b>low-to-negligible</b> .
		SS026	Vehicle Maintenance Area	Spill Site Area	
		N/A	BLDG 559 WAA	Waste Accumulation Area	
		OW217	Building 264/280	Oil/Water Separator	
		TU205	Building 239	Underground Storage Tank	

Source: Tyndall AFB, 2019c

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As summarized on **Table 4.9-2**, implementation of the Proposed Actions could affect or be affected by IRP sites. An ERP Waiver to Construct memorandum would be required for development over any applicable ERP sites. In order to receive a waiver, the following criteria must be adequately addressed: 1) construction must not adversely impact cleanup options or schedules; 2) construction must not adversely impact migration of contaminants from the site; and 3) site contaminants must be adequately characterized and delineated (Air Force, 2014e). If soil contamination is present at any development sites, a permit for soil remediation may be required from the FDEP.

Worker safety during construction would be required to be in compliance with OSHA safety requirements pertaining to worker exposure, and with all applicable worker safety regulations. The construction contractor would be responsible to fulfill its obligation under 29 CFR 1910.120, *Occupational Safety and Health Administration Standards, Hazardous Waste Operations and Emergency Response*, to address the health and safety of its employees during construction and demolition activities under the Proposed Actions, with respect to worker exposure to hazardous waste and proper management of soil and groundwater encountered during construction, including testing, handling, and disposal procedures. Management of soil and groundwater encountered during construction with the 325 CES/CEIEC, and in accordance with Tyndall AFB protocols and all applicable environmental regulations.

# 4.9.1.6 Mitigation Measures

No mitigation measures would be required. As stated above, ERP waivers would be required to construct on ERP sites and all stipulations of those waivers must be adhered to. Additionally, contractors are expected to comply with all Federal and state regulations regarding removal, handling, and disposal of ACM, LBP, and other hazardous waste.

# 4.9.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, no hazardous, toxic or solid waste would be produced since demolition and construction activities would not occur. IRP sites would continue to be remediated.

# 4.10 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND THE PROTECTION OF CHILDREN

Socioeconomic and environmental justice impacts are assessed in terms of direct impacts on the local economy and related impacts on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. A proposed action could have a significant impact with respect to the socioeconomic conditions if it were to result in at least one of the following:

- Substantial change in the local or regional economy, employment, or business volume.
- Substantial change in the local or regional population and in housing, education, installation services, or public services from the increased or decreased demands of the population change.

#### 4.10.1 PROPOSED ACTIONS

## 4.10.1.1 Socioeconomic Resources

Short-term, minor, beneficial impacts on the local economy would occur from the proposed construction, demolition, and renovation projects at Tyndall AFB. These activities would stimulate the local economy through the employment of construction workers and the purchase of construction-related materials and other goods and services, as well as secondary purchases of goods and services. Due to the short-term nature of construction, the economic benefits would be temporary.

The proposed construction and associated expenditures could generate additional jobs, most likely in the construction industry, but also in other industries, such as retail, that would generate additional indirect and induced income in Bay County and Panama City.

In 2017, Panama City had a civilian labor force of 15,674 people of which 851 (5.4 percent) were employed in the construction industry (U.S. Census Bureau, 2017d). It is expected that the local labor force would be sufficient to meet the demand for new jobs in the construction and other industries without a migration of workers into the area. Therefore, no impacts on population would occur as a result of the Proposed Actions because it is expected that all construction workers would be from the local or regional area.

In the event that construction workers contracted for the Proposed Actions are obtained outside of the local or regional area, the temporary increase in the workforce during the construction phase will result in a temporary increase in local housing and lodging needs for construction workers contracted at Tyndall AFB. As discussed in **Section 3.11.3**, the most recently published U.S. Census estimates (2017) show that Bay County and Panama City have housing vacancy rates of 32.3 percent and 17.5 percent, respectively. Additional, temporary lodging (hotels) and permanent housing (single-family homes, duplexes, apartments, and mobile home facilities) are currently under construction or scheduled to begin construction (see **Table 4.11-1**). Given current housing vacancy rates and the ongoing development of new housing units and temporary lodging, it is unlikely that temporary or permanent relocation of construction workers to Bay County during the construction of the Proposed Actions would exceed or cause significant impacts to the local housing supply. During construction, Tyndall AFB would evaluate the need for temporary modular housing on-installation, to further defray the impact of short-term temporary needs for construction worker housing on local housing supplies.

There would be no anticipated change to the number of personnel employed or stationed at Tyndall AFB as a result of the Proposed Actions; therefore, no significant short- or long-term impacts on demographics or social services and conditions would be expected, including demand for housing, education, law enforcement, fire protection, emergency medical services, and medical services.

# 4.10.1.2 Environmental Justice

Implementation of the selected projects would occur entirely on Tyndall AFB. Possible adverse effects from construction activities could include increased traffic and noise levels and decreased air quality and infrastructure capacity, but these effects would be short-term, intermittent, and minor, and would likely impact on-installation residents more than off-installation populations. The ROI has a lower percentage of

residents of a racial minority than the state of Florida (16.1 percent versus 24.3 percent). Based on the reported trends, the per capita income and median household income are similar to that of Bay County, Florida, and the U.S. The Proposed Actions might have short-term, negligible to minor, adverse effects on minority and low-income populations from construction noise and traffic, decreased air quality, and infrastructure capacity; however, as stated above these would occur primarily on the base. Therefore, disproportionate impacts on minority or low-income populations would not be expected. Significant impacts would not occur.

# 4.10.1.3 Protection of Children

Children's health and safety risks associated with implementation of the Proposed Actions would be dependent upon changes in the location, nature, tempo, or schedule of activities. Impacts would focus on compatibility of child-oriented land uses and facilities with a new operational condition, and related changes in risk exposure. Currently, no change in operational tempo or shift in operational schedule is planned as part of the Proposed Actions. Activity on base would not differ substantially from that currently supported. **Sections 4.1** and **4.2** of this document show that no significant long-term change in noise or air quality is expected to result from the implementation of the Proposed Actions.

Long-term beneficial impacts will also result from the implementation of the Proposed Actions, specifically the rebuild of child development facilities. For instance, portions of Tyndall Elementary School currently cannot be utilized due to hurricane-sustained damages; the rebuild of the school and similar facilities will restore and enhance the safety of area on base used by children.

# 4.10.1.4 Mitigation Measures

No mitigation would be required.

# 4.10.2 NO ACTION ALTERNATIVE

The No Action Alternative would not result in any additional socioeconomic or environmental justice impacts. The proposed construction, demolition, and renovation projects would not occur, and there would be no associated expenditures that would provide short-term construction employment or generate additional indirect and induced income beyond the scope of normal conditions and influences within the ROI, Panama City, or Bay County.

# 4.11 CUMULATIVE IMPACTS

Cumulative impacts to environmental resources result from incremental effects of proposed actions when combined with other past, present, and reasonably foreseeable future projects in the ROI. The ROI for cumulative impacts is generally limited to Tyndall AFB and the adjacent portions of Bay County, Panama City, and other municipalities. In this analysis the ROI is defined as a six-mile buffer around the Tyndall AFB property line because 1) there are no long-term operational changes anticipated due to the Proposed Actions and 2) physical impacts related to the Proposed Actions are largely confined to Tyndall AFB. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. In accordance with NEPA, a discussion of cumulative impacts resulting from projects that are proposed (or anticipated over

the foreseeable future) is required. This section focuses on the effects of the proposed hurricane recovery and installation development projects in concert with any reasonably foreseeable actions that are separate from the project but are expected to occur concurrently and in the same geographic extent.

The assessment of cumulative effects begins with defining the scope of other project actions and the potential interrelationship with the proposed action (CEQ, 1997). The scope of the analysis must consider other projects that coincide with the location and timetable of implementation of the Proposed Actions. Cumulative effects can arise from single or multiple actions and through additive or interactive processes acting individually or in combination with each other. Actions that are not part of the proposal, but that could be considered as actions connected in time or space (40 CFR 1508.25) (CEQ, 1997) could include projects that affect areas on or near the Proposed Actions. This EA analysis addresses three questions to identify cumulative effects:

**1**. Does a relationship exist such that elements of the Proposed Action might interact with elements of past, present, or reasonably foreseeable actions?

2. If one or more of the elements of the project and another action could be expected to interact, would the project affect or be affected by impacts of the other action?

3. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

For the scenarios under consideration to have a cumulatively significant impact on an environmental resource, two conditions must be met. First, the combined impacts of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the impacts of the Proposed Actions must be significant. Second, the Proposed Actions must make a substantial contribution to that significant cumulative impact. Proposed actions of limited scope do not typically require as comprehensive an assessment of cumulative impacts as proposed actions that have significant environmental impacts over a large area (CEQ, 2005).

Planning efforts in the ROI include the actions described within this EA, as well as those other projects that are ongoing or planned over the short-term and medium-term timeframes. The current IDP for Tyndall AFB identifies a series of planned short-range (1-5 years), medium-range (6-10 years) and long-range (11+ years) development projects slated for military construction programming and subsequent implementation on Tyndall AFB. Notably, the IDP identifies a total of 10 short-range projects and 18 medium-range projects (Air Force, 2015a). The cumulative impacts analysis assumes that the short-range and medium-range projects identified in the IDP continue to be priorities at Tyndall AFB in addition to the hurricane recovery projects included in the Proposed Actions. Short-range projects with an assigned project number in 2015 were considered to occur in the past relative to the Proposed Actions. Short-range projects number to be determined (TBD) and medium-range projects with assigned project number to occur in the present. And medium-range projects with projects number TBD were considered to occur in the future.

On 25 November 2019 the DoD published in the Federal Register a Notice of Intent to Prepare an EIS for F-35A Wing Beddown and MQ-9 Wing Beddown (Federal Register, 2019). If these new missions were to

be based at Tyndall AFB, environmental impacts from the construction of needed facilities and ongoing operation of those facilities and of the aircraft would result in additional cumulative environmental effects. These potential future effects are considered in the following analysis.

A detailed records search was performed to identify specific projects recently completed, currently underway, or planned within the next several years within the ROI by state, county, and local agencies and planning departments. Searches included online databases and websites for the City of Panama City Beach, Bay County/Panama City Public Works, Bay County Planning and Zoning Department, and FDOT (Bay County, 2019a; Bay County, 2019b; Bay County, 2019c; Panama City, 2019; FDOT, 2019).

**Table 4.11-1** shows past, present, and reasonably foreseeable actions on Tyndall AFB and off-installation within the ROI that could interact with implementation of the Proposed Actions. The table briefly describes each identified action, presents the proponent or jurisdiction of each action and the timeframe (e.g., past, present, future), and indicates which resources potentially interact with the Proposed Actions. For this cumulative impacts analysis Cumulative Impacts Analysis, additional emphasis is placed on the short-range projects on **Table 4.11-1** as these projects are potentially more "foreseeable" than those on the medium-range planning horizon or more conceptual in nature.

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<b>TABLE 4.11-1 REGIONAL</b>	<b>PROJECTS CONSIDERED FOR</b>	R CUMULATIVE IMPACTS ANALYSIS

<b>Proponent/Location</b>	Action	Description	Timeframe	<b>Resource Interaction</b>
Tyndall AFB/Flightline	Add Capabilities to MSA	As indicated by title.	Past	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Tyndall East	Construct Independent Duty Medical Technician Clinic at Silver Flag Site	As indicated by title.	Present	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Renovate Clinic	As indicated by title.	Present	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Replace 400 Area to 6000 Area Fuel Line	As indicated by title.	Past	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Construct Live Ordnance Loading Area	As indicated by title.	Past	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Consolidate Chapel	As indicated by title.	Past	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Replace/Expand Building 400 for New LRS PN	As indicated by title.	Present	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Construct Contractor- Owned, Contractor Operated Service Station	As indicated by title.	Past	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Construct Veterinary Clinic	As indicated by title.	Present	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/All Districts	Upgrade Exterior Lighting to LED	As indicated by title.	Past	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Construct Fire Station	As indicated by title.	Present	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Construct Passenger Terminal/Mobility Processing Center	As indicated by title.	Present	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Construct Phase 1 VQ	As indicated by title.	Present	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Construct Hot Pit Refueling Apron	As indicated by title.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials

<b>Proponent/Location</b>	Action	Description	Timeframe	<b>Resource Interaction</b>
				and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Extend Water to Subscale Areas	As indicated by title.	Present	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Construct 6000 and 7000 Areas Information Transfer Nodes (ITNs)	As indicated by title.	Future	Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Tyndall West	Construct ITN at Fire Station in Privatized Housing	As indicated by title.	Future	Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Relocate Radar Approach Control	As indicated by title.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Construct AFCEC Network Operations and Security Center	As indicated by title.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Construct Combat Ramp	As indicated by title.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Construct LRS Warehouse	As indicated by title.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Construct Vehicle and Cargo Inspection Station	As indicated by title.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Flightline	Install 9MW On-Site Generator	As indicated by title.	Future	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Construct Phase II VQ	As indicated by title.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Tyndall East	Install Water Main, Silver Flag Site	As indicated by title.	Present	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Support District	Construct Indoor Firing Range	As indicated by title.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Tyndall AFB/Tyndall West	Expand Fam Camp	As indicated by title.	Present	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice

<b>Proponent/Location</b>	Action	Description	Timeframe	<b>Resource Interaction</b>
Tyndall AFB/Tyndall West	Acquire Seclusion Bay/Long Point Cove Land	As indicated by title.	Future	Land Use
Tyndall AFB/Location Unknown	EIS Pending: F–35A Wing Beddown and MQ–9 Wing Beddown	Establish new base missions for beddown of F-35A wing (74 aircraft) and beddown of MQ-9 wing (24 remotely piloted aircraft). Includes construction of needed facilities, mission HQ buildings, and operation of aircraft.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Allanton PF Facility Building	35,100-square-foot building with parking and stormwater improvements	Past, Present	Air Quality, Noise, Land Use, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	MDC Electric	3,000-square-foot office/warehouse. 0.35 acre.	Past	Air Quality, Noise, Land Use, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Farmdale	64 lot residential subdivision. 56.2 acres.	Past	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Proposed: Mill Point Subdivision	24 lot residential subdivision. 4.5 acres.	Future	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Tractor Supply Company	19,097-square-foot retail store. 4.4 acres.	Present	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Canopy Place Subdivision	23-lot residential subdivision. 19.8 acres.	Past, Present	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Cedar Grove Commerce Park Lot 4	9,724-square-foot warehouse building. 1.1 acres.	Present	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Redemption Way Retreat	2,400-square-foot church retreat facility. 30.5 acres.	Past, Present	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and

<b>Proponent/Location</b>	Action	Description	Timeframe	Resource Interaction
				Environmental Justice
Bay County Planning and Zoning	Proposed: Subway at Thomas Drive	1,822 square-foot restaurant. 1 acre.	Future	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Tidewater Creek Marina	Two private marinas/docks. 2.2 acres.	Present, Future	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Proposed: Palace Sands Condo	25 story condominium. 9.2 acres.	Future	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Half Hitch Tackle Expansion	7,000-square-foot retail expansion. 2.4 acres.	Past, Present	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Tidewater Creek - Phase 2	12-unit single-family residential development. 2.2 acres.	Past	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Proposed: Residential at Thomas Drive	12-lot residential duplex subdivision. 1.1 acres.	Future	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Cedar Grove Commerce Park Lot 3	15,000-square-foot office and warehouse facility. 1.6 acres.	Present	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Aleczander Preserve	12-lot residential subdivision. 6 acres.	Past, Present	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Proposed: Coastal Palms Subdivision Phase 1	66-lot residential subdivision. 40.4 acres.	Future	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Proposed: Dat Cajun Place	7,000-square-foot restaurant. 3 acres.	Future	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Highway 231 FSER	<ul><li>11,796-square-foot medical facility.</li><li>2.3 acres.</li></ul>	Present	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice

<b>Proponent/Location</b>	Action	Description	Timeframe	<b>Resource Interaction</b>
Bay County Planning and Zoning	7209 Laird Street Office/Warehouse	23,840-square-foot office and warehouse. 2.7 acres.	Present	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Magnolia Ridge	134-lot residential subdivision. 44 acres.	Past, Present	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Tudor's Biscuit World & Retail	2,800-square-foot restaurant, 3,500- square-foot retail center. 1.3 acres	Past, Present	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	104 Thomas Drive Warehouse	4,200-square-foot warehouse building. 0.9 acres.	Past, Present	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Dever Office Building	5,660-square-foot office building. 0.4 acres.	Past, Present	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Planning and Zoning	Panama City Beach Sports Park	13-field multi-use sports park facility. 210 acres.	Past	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Public Works	Bay County Courthouse Post Hurricane Repairs	Exterior and interior post-hurricane repairs for Bay County Courthouse.	Present	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Public Works	Hurricane Repairs, State Attorney - Public Defender's Office	Exterior and interior post-hurricane repairs for State Attorney's office building.	Present	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Public Works	Library Hurricane Repairs	Exterior and interior post-hurricane repairs to Bay County Public Library.	Present	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Public Works	Hurricane Repairs, Construction Bay County Junior Deputies	Exterior and interior post-hurricane repairs for Bay County Junior Deputies office.	Present	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Public Works	Hurricane Repairs, Bay Co Health Department	Exterior and interior post-hurricane repairs for Florida State Department of Health, Bay County.	Present	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Public Works	Frankford Avenue Sidewalk	Resurface Frankford Avenue and add curb and gutter with a six-foot sidewalk along both sides of	Present, Future	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and

<b>Proponent/Location</b>	Action	Description	Timeframe	Resource Interaction
		Frankford Avenue, from 23rd Street to SR 390. The project will consist of earthwork operations, replacement of existing cross drain, paving, and stabilization of all disturbed areas.		Environmental Justice
Bay County Public Works	County Road (CR) 2297 Bridge Replacement	Replace bridge over Laird Bayou.	Present, Future	Air Quality, Noise, Land Use, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Public Works	Hurricane Repairs, Sheriff's Office	Exterior and interior post-hurricane repairs for Bay County Sheriff's Office.	Present	Air Quality, Noise, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
Bay County Public Works	Water Treatment Plant Roadway Paving & Improvements	Roadway improvements at the Bay County Water Treatment Plant. The project will consist of earthwork operations, asphalt paving, compacted gravel, concrete paving, asphalt milling and resurfacing, and stabilization of all disturbed areas.	Present, Future	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
FDOT	U.S. 98 at the intersection of Airey Avenue and Tyndall Drive	New intersection configuration to separate Tyndall AFB traffic from through traffic, and an overpass to improve on-base traffic flow. Interchange - Add Lanes	Present, Future	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
FDOT	U.S. 98 (Tyndall Parkway) Resurfacing	Milling and resurfacing SR 30A (U.S. 98 / Tyndall Parkway) from CR 2327 (Transmitter Road) in Bay County. Also included is guardrail, additional sidewalk, driveways, signing, pavement markings and minor drainage improvements.	Present, Future	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
FDOT	Proposed: SR 22 Wewa Highway from U.S. 98B to Star Avenue	Widen the roadway to a four-lane urban section, with curb and gutter, and a raised landscaped median. Bike lanes and sidewalks are also provided in each direction to accommodate the pedestrian users along the corridor. The four-lane	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice

<b>Proponent/Location</b>	Action	Description	Timeframe	Resource Interaction
		section will include exclusive left- turn lanes located at major intersections and driveway connections, consistent with access class 5 and a single-lane left-turn flyover from southbound Tyndall Parkway to eastbound Wewa Highway.		
FDOT	SR 390 from east of CR 2312 to Jenks Avenue	Multi-lane reconstruction project primarily consists of widening SR 390 (St. Andrews Boulevard) from CR 2312 (Baldwin Road) to Jenks Avenue. The typical section will consist of six 12-foot travel lanes separated by a 22-foot median with curb and gutter, four-foot bicycle lanes and curb and gutter on the outside. Six-foot sidewalk will be constructed along both sides of the roadway adjacent to the curb and gutter.	Present, Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
FDOT	SR 390 from 23rd Street to east of Baldwin Road	Widening SR 390 (St. Andrews Boulevard) from two to six lanes, constructing drainage improvements, adding dedicated bicycle lanes, sidewalks, and Americans with Disabilities Act accessibility improvements.	Present, Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
FDOT	SR 368A Collegiate Drive from west of Moody Avenue to 23rd Street	Widen Collegiate Drive from west of Moody Avenue to 23rd Street for the addition of bike lanes. Existing travel lanes, auxiliary lanes, and paved shoulders will be resurfaced.	Present, Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
FDOT	23rd Street Flyover Project	Intersection improvement project on SR 30 (U.S. 98) at SR 368 (23rd Street) in Panama City. Add Lanes and Reconstruct.	Present, Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
FDOT	U.S. 231 from SR 368 23rd Street to south of	Widen 5.5 miles of U.S. 231 from four to six lanes with bike lanes,	Present, Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials

<b>Proponent/Location</b>	Action	Description	Timeframe	<b>Resource Interaction</b>
	Pipe Line Road	sidewalks, and drainage improvements. Approximately 1.6 miles of Segment 7, from U.S. 98 (15th Street) to north of SR 368 (23rd Street), includes adding flyover ramps on U.S. 98 at the intersection of U.S. 231 and on SR 77 (Martin Luther King, Jr. Boulevard) over U.S. 231. Martin Luther King, Jr. Boulevard will be widened from four to six lanes from East 23rd Street to 15th Street. It will bridge over U.S. 231 and the Bay Line Railroad.		and Waste, Socioeconomics and Environmental Justice
FDOT	Front Beach Road from East Lakeshore Drive to Portside Drive	Construct sidewalks along both sides of SR/CR 30 (Front Beach Road) from East Lakeshore Drive to Portside Drive.	Present, Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
FDOT	SR 390 from Jenks Avenue to SR 77	Multi-lane reconstruction project on SR 390 from Jenks Avenue to Indiana Avenue in Bay County. Improvements include widening 1.5 miles of the existing roadway from two to six-lanes while adding medians, buffered bicycle lanes and sidewalks, water quality and treatment facilities, and a closed drainage system. The widening of SR 390 east of SR 77 will facilitate the transition to the existing two- lane roadway. A new pedestrian overpass will be built above the six- lane roadway at Mowat Middle School.	Present, Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice
FDOT	Proposed: Gulf Coast Parkway	Proposed Gulf Coast Parkway will provide a connection between U.S. 98 in Gulf County with U.S. 231 (north of Panama City) and U.S. 98 in Bay County, Four-lane divided.	Future	Air Quality, Noise, Soils, Water Resources, Biological Resources, Cultural Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice

<b>Proponent/Location</b>	Action	Description	Timeframe	Resource Interaction
		controlled-access, arterial highway.		
Panama City Beach Public Works	Front Beach Road Segment 2	Jackson Boulevard to South Thomas Drive Public transit system. Pedestrian and bicycle improvements.	Present, Future	Air Quality, Noise, Soils, Water Resources, Hazardous Materials and Waste, Socioeconomics and Environmental Justice

Sources: Air Force, 2015a; Federal Register, 2019; Bay County, 2019a; Bay County, 2019b; Bay County, 2019c; FDOT, 2019; Panama City, 2019.

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The following sections evaluate the cumulative effects from the past, present, and reasonably foreseeable future actions presented in **Table 4.11-1** above. **Table 4.11-2** below provides a summary of the cumulative effects. No significant adverse cumulative impacts are expected to result from the Proposed Actions when considered with other reasonably foreseeable actions within the ROI.

<b>Resource Area</b>	Proposed Actions	Past, Present, and Foreseeable Actions	Cumulative Effects
Air Quality	٩		
Noise	۵		۵
Safety and Health	٥	۵	
Land Use	0	٥	0
Soils	۵	٥	۵
Water Resources	۵	٥	۵
Biological Resources	0		0
Cultural Resources	۵		
Hazardous Materials and	_		_
Waste			
Socioeconomics and		_	
Environmental Justice	0		O

#### TABLE 4.11-2 SUMMARY OF CUMULATIVE IMPACTS

Notes:  $\circ$  – Not affected or beneficial impacts, **a** - Affected but not significant, short to medium term, impacts that range from low to high intensity • – Significant impacts, that are high in intensity or are long term.

## 4.11.1 AIR QUALITY

#### 4.11.1.1 Proposed Actions

The Proposed Actions' air quality impacts would be largely constrained to the facilities construction period occurring between years 2020-2025. The multi-year time frame anticipated for construction activities would correspond with other regional construction and development projects occurring in the ROI. Construction of each of the Proposed Actions would have some degree of adverse effect on air quality; accordingly, impacts of overlapping projects are anticipated. However, operational and construction-related annual emissions associated with the Proposed Actions are well beneath the applicable CAA *de minimis* thresholds for all pollutants. Construction-related emissions of other pollutants and GHGs are similarly within Air Force significance thresholds. Operational emissions are expected to be comparable to existing emission rates. However, the conservative analysis that considers operational emissions as additional to existing emissions demonstrates that under a worst-case scenario such emissions levels, significant cumulative impacts to air quality resulting from the Proposed Actions are not anticipated.

# 4.11.1.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur, no temporary construction emissions would occur, and there would be no associated contribution to cumulative impacts to air quality.

### 4.11.2 NOISE

## 4.11.2.1 Proposed Actions

Construction-related noise would be temporary, while none of the projects considered would have an impact on operations-related noise activities. Cumulative noise levels are not expected to substantially change the noise contours currently experienced within the region of Tyndall AFB. Future projects, such as the proposed beddown of F-35A and MQ-9 wings, could change noise contours at Tyndall AFB. However, impacts to noise from the Proposed Actions would not add or contribute to possible future impacts from those other projects. Therefore, the Proposed Actions, when combined with other past, present, and reasonably foreseeable projects would not contribute to adverse cumulative impacts on the noise environment.

#### 4.11.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur and there would be no associated contribution to cumulative impacts to noise.

## 4.11.3 SAFETY AND OCCUPATIONAL HEALTH

## 4.11.3.1 Proposed Action

Short-term, negligible, adverse cumulative impacts on health and safety (e.g., slips, falls, heat exposure, exposure to mechanical, electrical, vision, chemical hazards) could occur from construction, demolition, maintenance, and repair activities associated with the Proposed Actions and other planned actions occurring at the installation. Construction workers could also encounter soil or groundwater contamination as a result of an IRP site or previously unknown soil or groundwater contamination. However, implementation of appropriate safety methods and following OSHA and AFOSH safety standards during these activities would minimize the potential for such impacts. With these protocols in place, health and safety risks from all planned projects, and when considered cumulatively, would be reduced to acceptable levels. The removal of ACM, LBP, and PCB-contaminated materials, and other planned actions that improve safety would result in a long-term, beneficial impact on safety and occupational health for personnel and residents at Tyndall AFB, which would offset some health and safety risks associated with past and present actions on the installation. Therefore, no significant cumulative impacts to safety and occupational health are anticipated.

#### 4.11.3.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur and there would be no associated contribution to cumulative impacts relative to health and safety.

# 4.11.4 LAND USE

# 4.11.4.1 Proposed Actions

No impacts to land use are anticipated from the Proposed Actions. Implementation of the proposed installation development projects will accomplish future development expectations for long-range

planning and land use as described in the Tyndall AFB IDP and Master Plan. The Proposed Actions are consistent with the Tyndall AFB IDP and the planning goals established in the future land use plan. The future land use plan for Tyndall AFB considers land use compatibility, facility consolidation, mission sustainability, quality of life, safety and security. A major emphasis of the installation's long-range facility development plan is to consolidate land uses and collocate similar functions. Therefore, the Proposed Actions, when combined with other past, present, and reasonably foreseeable projects, would not contribute to adverse cumulative impacts on land use.

# 4.11.4.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur and there would be no associated contribution to cumulative impacts on land use.

# 4.11.5 SOILS

# 4.11.5.1 Proposed Actions

Demolition and construction activities would directly disturb approximately 1,164 acres of native and non-native soils, over half of which (approximately 629 acres) would result from the Flightline drainage improvement and utility upgrade projects. None of the soils affected are considered as prime or unique farmland soils and all are locally or regionally common. Other construction activities in the region proposed by the county, city or state governments, as well as commercial and private developers would also remove soils from biological productivity. Tyndall AFB would be required to obtain a Stormwater Construction Permit from the FDEP prior to construction. The construction contractor would be required to develop a SWPPP specific to each site. that would detail erosion prevention and control measures to be implemented during site preparation and construction activities Therefore, the Proposed Actions, when combined with other past, present, and reasonably foreseeable projects would result in a minor contribution to adverse cumulative impacts on the regional soils.

# 4.11.5.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur and there would be no associated contribution to cumulative impacts on soils.

# 4.11.6 WATER RESOURCES

# 4.11.6.1 Proposed Actions

Construction activities would impact up to 128.7 acres of wetlands and 118,299 LF (i.e., drainage features) and 0.8 acre (stormwater pond/open water) of other surface waters. During design and permitting, efforts will be made to minimize impacts to wetlands and other surface waters to the greatest extent practicable. Mitigation measures would be implemented to minimize impacts to wetlands and other surface waters, in compliance with EO 11990 and Section 404 of the CWA. There would be a permanent loss of floodplain functions due to the construction activities. Given the amount of restoration-related construction ongoing in Bay County, other impacts to floodplains are likely as well, although these impacts will be minimized through state and local building ordinances regarding floodplains. The

construction activities will essentially replace those facilities that were damaged by Hurricane Michael, so it is expected that the Proposed Actions would result in a Negative Determination regarding CZMA issues and no increase in long-term impacts. No long-term impacts on surface waters and groundwater were identified. Therefore, the Proposed Actions, when combined with other past, present, and reasonably foreseeable projects would result in minor contributions to adverse cumulative impacts on water resources, primarily wetlands and floodplain functions.

# 4.11.6.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur and there would be no associated contribution to cumulative impacts relative to water resources.

## 4.11.7 BIOLOGICAL RESOURCES

## 4.11.7.1 Proposed Action

Construction activities would impact potential wildlife habitat; however, most of these areas have been previously disturbed by development or timber harvesting/salvage operations. Wildlife occupying these habitats would be affected, but the effects are considered minor and would not adversely affect the population viability. Some individual telephus spurge specimens will be lost; however, the Air Force and USFWS will identify the proper conservation measures to offset these impacts through Section 7 consultation. Therefore, the Proposed Actions, when combined with other past, present, and reasonably foreseeable projects would result in minor contributions to adverse cumulative impacts on biological resources.

#### 4.11.7.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur and there would be no associated contribution to cumulative impacts relative to biological resources.

#### 4.11.8 CULTURAL RESOURCES

#### 4.11.8.1 Proposed Actions

Demolition and construction activities would not impact any significant historic properties. Therefore, the Proposed Actions, when combined with other past, present, and reasonably foreseeable projects would not contribute to adverse cumulative impacts on cultural resources.

#### 4.11.8.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur and there would be no associated contribution to cumulative impacts relative to cultural resources.

#### 4.11.9 HAZARDOUS MATERIALS AND WASTE

#### 4.11.9.1 Proposed Actions

Demolition and construction activities would increase the use and storage of hazardous materials (e.g., solvents, paints, adhesives, etc.) at Tyndall AFB for the short-term. Some short-term increases would be realized in terms of the quantity of fuel used during construction activities for these actions. Demolition would increase the amount of hazardous wastes generated, but these activities would last for less than five years and all wastes would be disposed of properly. No increases or substantial changes in current quantities and types of hazardous materials or wastes would be expected upon completion of the projects, as these activities are essentially replacing structures and functions that were operational prior to Hurricane Michael. No change in aircraft operations or use of motor vehicles at the installation would be expected, and therefore, throughput of petroleum substances and hazardous waste streams would not increase. Operations-related hazardous waste generation (e.g., used oil, used filters, oily rags, etc.) would continue to be managed in accordance with the installation's HWMP and all applicable Federal, state, and local regulations. Given the amount of restoration-related construction ongoing in Bay County, other hazardous waste and construction debris will be generated for the foreseeable future. It is expected that these wastes will also be properly disposed.

A variety of IRP sites are collocated with the Proposed Actions and planned construction activities have potential to cause short-term adverse impacts to ongoing remediation activities at these sites. As summarized on **Table 4.9-2**, implementation of the Proposed Actions could affect or be affected by IRP sites. ERP waivers would be required to construct on ERP sites and all stipulations of those waivers must be adhered to. If soil contamination is present at any development sites, a permit for soil remediation may be required from the FDEP. Additionally, contractors are expected to comply with all Federal and state regulations regarding removal, handling, and disposal of ACM, LBP, and other hazardous waste. Worker safety during construction would be required to be in compliance with OSHA safety requirements pertaining to worker exposure, and with all applicable worker safety regulations.

Therefore, the Proposed Actions, when combined with other past, present, and reasonably foreseeable projects would result in minor contributions to adverse cumulative impacts on hazardous materials/waste and solid waste.

#### 4.11.9.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur and there would be no associated contribution to cumulative impacts relative to hazardous wastes.

#### 4.11.10 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

#### 4.11.10.1 Proposed Actions

Cumulatively, the Proposed Actions and other actions that would occur over the next five years would have short-term, minor to moderate, beneficial effects in the ROI, Panama City and Bay County through the increased demand for construction workers and the procurement of goods and services. Constructionrelated expenditures would not be expected to generate long-term cumulative socioeconomic benefits. In

the event that construction workers contracted for the Proposed Actions are obtained outside of the local or regional area, the temporary increase in the workforce during the construction phase will result in a temporary increase in local housing and lodging needs. Because the Proposed Actions would not result in a long-term increase in the installation or regional population, they would not contribute to cumulative demographic impacts in the region.

Because the Proposed Actions would not result in disproportionately high and adverse impacts on environmental justice populations, they would not contribute to cumulative environmental justice impacts in the region.

# 4.11.10.2 No Action Alternative

Under the No Action Alternative, the Proposed Actions would not occur and there would be no associated contribution to cumulative socioeconomic or environmental justice impacts.

# 5.0 MITIGATION MEASURES AND REQUIRED PERMITS

# Wetlands

Compensatory wetland mitigation will be required to offset impacts to state and/or federally jurisdictional wetlands. The mitigation requirements will be identified through the state and Federal permitting process. Tyndall AFB is located within the St. Andrew Bay watershed. Currently, there is one wetland mitigation bank (Horseshoe Creek Mitigation Bank) that services this watershed and is pending state and Federal permits to eventually have freshwater herbaceous, freshwater forested, and saltmarsh wetland credits available. Representatives of the bank anticipate credits will be released for purchase in March 2020 pending state and Federal approvals.

A CWA Section 404 permit and a Section 401 water quality certification would be required prior to any dredge and/or fill actions within federally jurisdictional wetlands. An Environmental Resource Permit (ERP) would be required from the FDEP/NWFWMD for any impacts to state jurisdictional wetlands. Florida's ERP program regulates activities in uplands that generate stormwater runoff or otherwise alter surface water flows. Per these regulations, activities that increase the imperviousness of a given area require an ERP from the FDEP or Water Management District (i.e., NWFWMD), unless they qualify to be exempted; affected areas less than 4,000 SF are exempt from permitting. Based on preliminary design, the total amount of impervious area that would be created from construction of the proposed facilities would far exceed that threshold and require an ERP.

An NPDES stormwater construction permit is required from the FDEP for any proposed project in Florida that would disturb one acre or more of land. As part of this permit, the proponent of the project is required to prepare and implement a SWPPP, which outlines the BMPs and engineering controls to be used to prevent and minimize erosion, sedimentation, and pollution during construction.

# Floodplains

Drainage system improvements associated with the Proposed Actions would be designed to properly convey and store stormwater flows, and would not impede floodwater flows during major storm events. The Proposed Actions' design would comply with local floodplain management policies and regulations, which promote designs to minimize flood impacts. Adverse effects could be further minimized by elevating all facilities above the BFE, applying construction period erosion and sedimentation controls, and using pervious surfaces for stormwater retention and treatment where possible.

To minimize impacts to and within floodplains, design elements will be incorporated into the individual projects that would encroach on floodplains. In general, building footprints would be reduced as much as possible to minimize encroachments into the floodplain. Other design elements could include constructing buildings on land elevated above the BFE through placement of fill; establishing basement elevations and first floor elevations consistent with potential flood levels; and elevating utilities and equipment that might be hazardous to life if submerged. To minimize loss of floodplain storage and function, compensatory storage will be provided by excavating material within or adjacent to the same floodplain

to be used as fill, in a manner that does not disturb or impact wetlands, endangered vegetation, or potential cultural sites.

#### **Biological Resources**

Within 30 days of ground disturbance, Tyndall Natural Resources would complete a gopher tortoise (*Gopherus polyphemus*) survey at and in the vicinity of the construction sites. If any found burrows cannot be avoided by 25 feet, the tortoises and any commensal species would be relocated in accordance with Tyndall AFB's *Threatened and Endangered Species Component Plan* (Air Force, 2018b) and FWC's current guidelines. If gopher tortoises are in close proximity to the construction site, silt fencing or some other type of barrier would be erected to keep tortoises from moving into the construction area after surveys have been completed. Any new lighting systems will be designed to avoid or reduce illumination effects on sea turtles. The Air Force and USFWS will determine the appropriate conservation measures to offset impacts on telephus spurge populations through Section 7 consultation.

#### Cultural Resources

In the event that unknown cultural resources are inadvertently discovered during construction or demolition, all work would stop immediately, the proper authorities would be promptly notified, and measures to protect and evaluate the inadvertent find would be implemented in accordance with the Tyndall AFB ICRMP (Air Force, 2016a).

#### Hazardous Materials

Prior to demolition of the all buildings, Tyndall AFB would conduct ACM and LBP surveys of each structure. Any encountered ACM or LBP would be remediated and disposed of in accordance with Tyndall AFB's environmental management plans and in compliance with all applicable regulations.

Worker safety during construction would be required to be in compliance with OSHA safety requirements pertaining to worker exposure, and with all applicable worker safety regulations. The construction contractor would be responsible to fulfill its obligation under 29 CFR 1910.120 to address the health and safety of its employees during construction and demolition activities under the Proposed Actions, with respect to worker exposure to hazardous waste and proper management of soil and groundwater encountered during construction would be required to be conducted in coordination with the 325 CES/CEIEC, and in accordance with Tyndall AFB protocols and all applicable environmental regulations. If any potential munitions and explosives of concern is encountered during construction contractor would be required to immediately stop work and notify the 325 CES/CEIEC.

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- 29 U.S. Code §651 et seq. Occupational Safety and Health Act, as amended
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APPENDIX A List of Buildings to be Demolished

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Bldg	Name	Asbestos Status	Lead Based Paint Status	Bldg Square Footage
24	ACFT Shelter	Unknown	Unknown	6,300
26	ACFT Shelter (Garage Door Closures Only)	Unknown	Unknown	6,300
124	CES WAREHOUSE	Unknown	Unknown	2,400
126	EGRESS SHOP	Unknown	Unknown	5,745
	LIFT STATION FOR WEST SECTION OF			
127	FLIGHTLINE FROM B290	Unknown	Unknown	328
150	GENERATOR BLDG	Unknown	Unknown	420
156	HANGAR 3	Detected	Unknown	43,787
162	44 FS OPS (RESERVES)	Unknown	Detected	1,000
164	95 FS OPS	Detected	Unknown	14,322
165	PAVILION NORTH OF B164	Unknown	Unknown	400
179	PAVILION HANGAR 2 (B180)	Unknown	Unknown	500
180	HANGAR 2	Detected	Detected	41,554
181	SHP A/M ORGL	Unknown	Unknown	2,010
182	HANGAR 1	Detected	Unknown	41,329
183	PAVILLION AT HANGAR 1, B182	Unknown	Unknown	440
187	PAVILION LOCATED BEHIND BLDG 188	Unknown	Unknown	550
100	A D.M.A.MENTE C.V.C.	None		10 212
188	ARMAMENI SIS	Detected	Unknown	10,212
220	WEC SODN ODS	Unknown	Unknown	1,778
223	AVIATION OPEDATIONS DUILDING	Detected	Unknown	10,020
224	WEG HO/82 EWS	Unknown	Detected	11,314
220	DAVILION DEHIND DI DC 224	Unknown	Unknown	41,000
220	FIDE SUDDESSION DUMPHOUSE	Unknown	Unknown	1,000
233	TINE SUPPRESSION FOR HOUSE	Unknown	Unknown	1,440
239	WEAPONS TRAILER MAINTENANCE	Unknown	Unknown	4,124
240	COLD STORAGE	Detected	Unknown	9 230
256	DRONE SUBSCALE MX	Detected	Unknown	26.871
259	PAVILION WEST OF B258	Unknown	Unknown	510
257	MXS STORAGE	Unknown	Unknown	1 040
262	AGE FLIFL PLIMP	Unknown	Unknown	550
265	BASE SUPPY	Unknown	Unknown	135.247
266	BASE SUPPLY	Detected	Unknown	135.247
270	GATE HOUSE	Unknown	Unknown	85
272	STORAGE	Unknown	Unknown	408
273	FIRE SUPPRESSION PUMPHOUSE	Unknown	Unknown	3.300
274	DRONE MAINTENANCE	Unknown	Unknown	6.532
	HANGAR 4 (F-22 PAINT	Chikhowh	Chikhowh	
280	BOOTHS/WEAPONS LOAD TRNG)	Detected	Detected	66,771
295	F-22 LO/CRF	Unknown	Unknown	30,525
311	WEG CLASSIFIED STORAGE FAC	Unknown	Unknown	6,052
318	LIFT STA #24	Unknown	Unknown	144
323	HUSH HOUSE #2	Unknown	Unknown	1,080
325	HUSH HOUSE #1 PAD	Unknown	Unknown	1,864

Bldg	Name	Asbestos Status	Lead Based Paint Status	Bldg Square Footage
	VERTICAL ACFT EXTERNAL TANK			
333	STORAGE	Unknown	Unknown	11,700
433	PATIO (2 FS)	Unknown	Unknown	480
474	WEST ZONE	Unknown	Unknown	4,374
503	ACMI OPERATIONS	Unknown	Unknown	9,508
504	FIRE SUPPRESSION PUMPHOUSE	Unknown	Unknown	1,462
505	COMM ADMIN	Unknown	Unknown	2,975
509	VACANT	Unknown	Unknown	280
522	RAPTOR REPAIR	Unknown	Unknown	37,082
526	LOX CART MAINTENANCE	Unknown	Unknown	960
530	44 FG ADMIN/WING IA-IP	Detected	Unknown	11,129
		None		
532	AAFES FAST FOOD	Detected	Unknown	3,120
542	325 MXG/44 MXS	Unknown	Unknown	21,400
546	FLT SIM PHYSI	Detected	Unknown	23,917
549	FTD CLASSROOMS	Unknown	Unknown	38,486
559	VEHICLE MAINT	Unknown	Unknown	3,466
561	NO DESCRIPTION	Unknown	Unknown	4,059
630	AIREY GATE HOUSE	Unknown	Unknown	200
	OVERHEAD PROTECTION FOR AIREY			
631	GATE HOUSE	Unknown	Unknown	3,685
645	PATIO (CONS)	Unknown	Unknown	776
651	PAVILION BEHIND BLDG 649	Unknown	Unknown	400
703	CHAPEL 1	Detected	Unknown	4,238
705	STORAGE AFRC	Unknown	Detected	400
	FAMILY SUPPORT CENTER/AIRMANS			
745	ATTIC	Detected	Unknown	6,936
747	FAMILY SUPPORT/AMN'S ATTIC	Detected	Unknown	10,778
821	PATIO (COMM)	Unknown	Unknown	340
856	AFCEC ADMIN	Detected	Unknown	7,287
909	DISASTER PREP	Unknown	Unknown	10,636
912	AAFES VENDOR	Detected	Unknown	1,615
914	BOWLING CENTER	Detected	Unknown	15,600
916	BASE LIBRARY	Detected	Unknown	11,574
				Not
928	CAR WASH AAFES	Unknown	Unknown	Applicable
934	SKILLS DEVELOP/CROSS FIT	Unknown	Unknown	14,551
960	BURGER KING	Unknown	Unknown	3,520
	EOD TEMPORARY LOCATION DURING		None	
1013	B729 RENOVATIONS	Detected	Detected	6,936
1014	RESTROOMS	Unknown	Unknown	129
1015	HONOR GUARD/CANADIAN AF	Detected	Unknown	8,942
	LINEN EXCHANGE/CIVIL AIR		None	
1016	PATROL/AFCEC STORAGE	Detected	Detected	6,936
1017	SCORE BOOTH FALCON FIELD	Unknown	Unknown	432

Bldg	Name	Asbestos	Lead Based	Bldg Square
1036	MS DORM	Detected	Unknown	31,559
1045	PAVILION NORTH OF B1046	Unknown	Unknown	440
1046	MED GP DORM	Detected	Unknown	31.818
1060	DORM VAO	Unknown	Unknown	41.611
1126	SCORE BOOTH FEDERAL FIELD	Unknown	Unknown	648
1132	STORAGE FOR BALLFIELDS	Unknown	Unknown	1,530
1149	DORM	Detected	Unknown	38,562
1150	DORM	Unknown	Unknown	13,700
1151	DORM DAYROOM QUADS	Unknown	Unknown	2,615
1152	DORM	Unknown	Unknown	12,109
1153	DORM DAYROOM	Unknown	Unknown	3,315
1154	DORM	Unknown	Unknown	12,109
1155	DORM DAYROOM	Unknown	Unknown	2,615
1156	TECH TRAINING STUDENT HOUSING	Unknown	Unknown	13,700
1255	GATR SITE	Unknown	Unknown	3,554
1262	STORAGE NATURAL RESOURCES	Unknown	Unknown	3,053
1263	LATRINE AT SKEET RANGE	Unknown	Unknown	400
1286	OLD STORAGE FACILITY	Unknown	Unknown	231
1287	ADC	Unknown	Unknown	1,550
1305	RELIGION EDUCATION CENTER	Detected	Unknown	7,597
	BILLETING			
1307	MAINTENANCE/STORAGE/LAUNDRY	Unknown	Detected	8,244
1309	VET CLINIC/HOME DAYCARE MGT	Detected	Unknown	7,081
1314	TLF	Unknown	Unknown	5,280
1315	TLF	Unknown	Unknown	3,531
1316	TLF	Unknown	Unknown	3,531
1317	VOQ	Unknown	Unknown	4,010
1318	TLF	Unknown	Unknown	2,640
1332	SAND DOLLAR INN BILLETING OFFICE	Detected	Unknown	6,815
1352	STORAGE	Unknown	Unknown	6,171
1360	VOQ	Unknown	Unknown	20,674
1361	VOQ	Unknown	Unknown	20,698
1380	VOQ	Detected	Unknown	17,738
1381	VOQ	Detected	Unknown	18,229
1406	AFOSI BLDG (NOTE* Comm Hub)	Detected	Unknown	8,901
		None		
1410	CHILD CARE CTR	Detected	Unknown	23,062
1454	O'CLUB	Unknown	Unknown	21,806
1476	COMM AND CTR STORAGE	Unknown	Unknown	5,228
1506	THRIFT SHOP STORE	Unknown	Unknown	12,548
1540	POOL	Unknown	Unknown	5,220
1541	POLL WATER TRMT	Unknown	Unknown	419
1550	CAC RUN OPERATIONS/NCO CLUB (BAR)	Detected	Unknown	36,467
1580	VAQ DORM	Detected	Detected	6,296
1582	VAQ DORM	Detected	Unknown	6,422

Bldg	Name	Asbestos Status	Lead Based Paint Status	Bldg Square Footage
				Not
1618	ROTC OBSTACLE COURSE	Unknown	Unknown	Applicable
1652	TYNDALL BEACH REC BLDG	Unknown	Unknown	2,446
1680	DORM	Detected	Unknown	29,329
1708	PEST MGMT STORAGE	Unknown	Unknown	2,080
1723	CE SUPPORT BLDG	Unknown	Unknown	1,102
1769	STORAGE SERE	Unknown	Unknown	800
1812	PODS STORAGE/SHOP	Unknown	Unknown	16,405
1818	SPECIAL PROJECTS	Unknown	Unknown	3,750
1820	PAVILION @ 1800 AREA	Unknown	Unknown	270
2399	GIRL SCOUT HUT	Unknown	Unknown	1,267
2580	VISITOR CENTER/PASS & ID	Unknown	Unknown	2,432
2600	COMMERCIAL GATE INSPECTION FACILITY	Unknown	Unknown	640
	COMMERCIALGATE INSPECTION AREA			
2610	BLDG	Unknown	Unknown	670
2893	FIRE STATION QUARTERS	None Detected	Unknown	3,540
2894	FIRE STATION VEHICLE BLDG	Unknown	Unknown	969
2899	MWR/NAF STORAGE	Unknown	Unknown	4,020
3001	SECURITY FORCE TRAINING	Unknown	Unknown	2,910
3002	STORAGE	Unknown	Unknown	936
3015	GOLF CART BARN	Unknown	Unknown	6,433
3017	GOLF STORAGE	Unknown	Unknown	2,269
3018	GOLF CLUBHSE	Unknown	Unknown	4,020
3027	GOLF COUSRE STORAGE	Unknown	Unknown	999
3029	GOLF COURSE CLUB HOUSE	Detected	Unknown	9,952
3034	GOLF STORAGE	Unknown	Unknown	255
3133	TLF SUPPORT	Unknown	Unknown	2,824
3134	WOOD MANOR III	Unknown	Unknown	2,682
3135	TLF	Unknown	Unknown	2,682
3136	TLF	Unknown	Unknown	2,682
3137	TLF	Unknown	Unknown	3,137
3138	TLF	Unknown	Unknown	2,682
3139	TLF	Unknown	Unknown	2,682
3140	TLF	Unknown	Unknown	3,137
3141	TLF	Unknown	Unknown	2,682
3142	TLF	Unknown	Unknown	3,137
3143	TLF	Unknown	Unknown	2,682
3144	TLF	Unknown	Unknown	2,682
3146	TLF	Unknown	Unknown	2,682
3148	TLF	Unknown	Unknown	2,450
3149	TLF	Unknown	Unknown	3,137
3150	TLF	Unknown	Unknown	2,682
3152	TLF	Unknown	Unknown	2,682

Draft Environmental Assessment for Hurricane Recovery and Installation Development at Tyndall Air Force Base, Florida

Dida	Nama	Asbestos	Lead Based	Bldg Square
Diug	INAILIE	Status	Paint Status	Footage
3153	TLF	Unknown	Unknown	2,682
3154	TLF	Unknown	Unknown	2,450
3155	TLF	Unknown	Unknown	3,137
3156	TLF	Unknown	Unknown	2,682
3158	TLF	Unknown	Unknown	2,682
3159	TLF	Unknown	Unknown	2,682
3160	TLF	Unknown	Unknown	3,137
3161	TLF	Unknown	Unknown	2,450
3162	TLF	Unknown	Unknown	2,682
3163	TLF	Unknown	Unknown	2,682
3164	TLF	Unknown	Unknown	2,682
3216	YOUTH CENTER STORAGE	Unknown	Unknown	800
3285	PAVILIONS FELIX LAKE REC AREA	Unknown	Unknown	300
3350	FELIX LAKE BX SHOPPETTE	Unknown	Unknown	5,591
				Not
3351	FELIX LAKE GAS STATION TANKS	Unknown	Unknown	Applicable
4025	SABRE GATE	Unknown	Unknown	200
4027	HUNTING/FISHING CHECK STATION	Unknown	Unknown	382
4572	LATRINE HERITAGE PARK	Unknown	Unknown	683
4580	PAVILIONS HERITAGE PARK	Unknown	Unknown	4,033
5007	STORAGE	Unknown	Unknown	128
	SWING SPACE STORAGE (OLD SHOAL			
5008	POINT SHOPPETTE)	Unknown	Detected	3,104
				Not
5009	PICNIC AREA AT B5008	Unknown	Unknown	Applicable
5013	BONITA BAY MWR	Unknown	Unknown	4,888
5018	STORAGGE MWR	Unknown	Unknown	120
5024	STORAGE BONITA BAY MWR	Unknown	Unknown	240
				Not
5030	MARINA DOCK/PIERS/BOAT RAMPS	Unknown	Unknown	Applicable
5033	ATRS STORAGE	Unknown	Unknown	241
6002	LATRINE 6000 AREA REC SITE	Unknown	Unknown	393
6004	STORAGE	Unknown	Unknown	1,040
6005	STORAGE	Unknown	Unknown	2,500
6006	EXERCISE COMMAND CENTER	Unknown	Unknown	528
6008	CE STORAGE	Unknown	Unknown	3,200
6010	CE STORAGE	Unknown	Unknown	3,200
6014	BE STORAGE	Unknown	Unknown	3,200
6015	PAVILION WEST OF 6006	Unknown	Unknown	600
6016	BCE REFUSE CONTRACTOR	Unknown	Unknown	1,505
6021	SHOP	Unknown	Unknown	4,130
6022	POWERPRO MX SHOP	Unknown	Unknown	1,330
6023	STORAGE	Unknown	Unknown	1,330
6027	CES WORKSHOP	Detected	Unknown	9,748
6028	SHOP	Unknown	Unknown	1,020

Bldg	Name	Asbestos Status	Lead Based Paint Status	Bldg Square Footage
6030	GROUND MX SHOP	Unknown	Unknown	4,000
6032	WEIGHT SCALES	Unknown	Unknown	61
6033	POWER PRO STOR	Unknown	Unknown	4,000
6034	POWERPRO STORAGE	Unknown	Unknown	1,125
6060	SABER CONTRACTOR STORAGE	Unknown	Unknown	6,360
6063	STORAGE	Unknown	Unknown	192
6067	CE UTILITIES	Unknown	Unknown	1,500
7027	STORAGE	Unknown	Unknown	5,000
7029	MUNITIONS STORAGE	Unknown	Unknown	5,000
7030	STORAGE	Unknown	Unknown	5,000
7031	STORAGE MUNITIONS	Unknown	Unknown	5,000
7033	MUNITION ADMIN	Unknown	Unknown	3,220
7040	SHP MSL AS	Unknown	Unknown	3,200
7062	NO NAME	Unknown	Unknown	6,501
8522	SUBSCALE DRONE MX BLDG	Unknown	Unknown	1,695
8523	SUB SCALE WELL HOUSE	Unknown	Unknown	54
8531	SUBSCALE DRONE OFFICE	Unknown	Unknown	390
9306	DRONE STORAGE	Unknown	Unknown	7,000
9349	DRONE CTL TOWER - NORTH	Unknown	Unknown	75
9350	DRONE CTL TOWER - WEST	Unknown	Unknown	75
9400	SATELLITE FIRE STATION-SILVER FLAG	Unknown	Unknown	4,320
				Not
9420	SILVER FLAG SHOOTING RANGE	Unknown	Unknown	Applicable
9421	SILVER FLAG STORAGE	Unknown	Unknown	240
9432	HEALTH STORAGE	Unknown	Unknown	6,000
9443	RESEARCH FIRE EQUIPMENT STORAGE	Unknown	Unknown	6,495
9496	MULTI PURPOSE REC BLDG	Unknown	Unknown	733
9497	MISC REC BLDG	Unknown	Unknown	3,288
9525	METAL STORAGE BLDG @ SKY TEN	Unknown	Unknown	2,011
9545	DRONE MAINT/RECOVERY BLDG	Unknown	Unknown	1,200
9704	PAINT SHOP STORAGE	Unknown	Unknown	409
9705	WELL #13	Unknown	Unknown	210
9706	AFRL ADMIN	Detected	Unknown	9,523
9708	FIRE TECH ADMIN	Unknown	Unknown	3,400
9709	BOAT STORAGE	Unknown	Unknown	4,120
9710	VEHICLE BODY SHOP	Unknown	Unknown	2,479
9716	PARACHUTE TRAINING TOWER	Unknown	Unknown	122
9718	FIRE RESEARCH LAB	Unknown	Unknown	3,200
9719	GRAPHICS SHOP/STORAGE	Unknown	Unknown	2,400
9720	FABRICATION SHOP	Unknown	Unknown	13,166
9721	STORAGE	Unknown	Unknown	96
9722	PAVILION FOR 9700 AREA	Unknown	Unknown	1,400
9725	ROBOTICS PROTOTYPE	Unknown	Unknown	25,650
9727	RANGE CONTROL FACILITY	Unknown	Unknown	1,700
9729	AFRL BALLISTICS FACILITY	Unknown	Unknown	3,322

Bldg	Name	Asbestos Status	Lead Based Paint Status	Bldg Square Footage
9730	VEH MX SHOP	Unknown	Unknown	25,114
9732	AFRL EXERCISE FAC	Unknown	Unknown	1,200
9733	CE SHOPS AFRL	Unknown	Unknown	5,632
9735	AFCEC/DHS EXLOSIVE LAB	Unknown	Unknown	9,000
9737	PAVEMENTS LAB STORAGE SHED	Unknown	Unknown	1,000
9738	ROBOTICS LAB	Unknown	Unknown	29,797
9739	VEHICLE PARKING SHED	Unknown	Unknown	2,200
9742	STRUCT/MATL LAB	Unknown	Unknown	14,461
9766	STORAGE SHED	Unknown	Unknown	2,400
9768	GAS MASK REPAIR SHOP	Unknown	Unknown	1,507
	GOV FUEL PUMP OVERHEAD			
20499	PROTECTION	Unknown	Unknown	5,700
29408	DHS EXP PREP (DOG HOUSE)	Unknown	Unknown	240
				Not
42260	SEPTIC LAGOON	Unknown	Unknown	applicable
				Not
42275	WASTEWATER TREATMENT LAGOON	Unknown	Unknown	applicable
N of				Not
1735	SEPTIC LAGOON	Unknown	Unknown	applicable

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APPENDIX B Agency Coordination and Public Involvement

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### **DEPARTMENT OF THE AIR FORCE** 325TH FIGHTER WING (ACC) TYNDALL AIR FORCE BASE FLORIDA

Ms. Donna L. Barber Chief, Installation Management Flight 325th Civil Engineer Squadron 540 Mississippi Ave Tyndall AFB FL 32403

Mr. Chris Stahl, Coordinator Office of Intergovernmental Programs Department of Environmental Protection 3900 Commonwealth Blvd, Mail Station 47 Tallahassee FL 32399

Dear Mr. Stahl

The United States Air Force (Air Force), is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with the recovery efforts at Tyndall Air Force Base (AFB), Florida. The EA is being prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations implementing NEPA, and the Air Force NEPA regulations.

Under the Proposed Action, the 325th Fighter Wing at Tyndall AFB, proposes to repair several facilities, demolish 264 buildings, construct 26 individual facilities, construct multiple facilities in three separate complex areas, conduct drainage improvements, and new or upgraded utilities spanning six planning areas throughout Tyndall AFB; Flightline Area, Support Area, 9700 Area-Crooked Island (AF Civil Engineering Center Research, Development, Testing & Evaluation), Subscale Drone Area, Silver Flag Area, and Munitions Area. These projects are being proposed as a result of the devastation caused by Hurricane Michael, October 10, 2018.

The EA for recovery assesses the potential environmental impacts associated with this Proposed Action, and examines the cumulative effects when combined with past, present, and any future proposals. As part of the Air Force's Environmental Impact Analysis Process, we request your input in identifying general or specific issues or areas of concern you feel should be addressed in the environmental analysis.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to Mr. Jose J. Cintron at

jose.cintron.1@us.af.mil, (850) 283-4341, or via mail at Jose J. Cintron, 325 CES/CEIE, 540 Mississippi Ave, Tyndall AFB FL 32403-501 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

DONNA L. BARBER, GS-13, DAF

Attachment: 1. Figure 1 – Proposed Action Area Areas



### **DEPARTMENT OF THE AIR FORCE** 325TH FIGHTER WING (ACC) TYNDALL AIR FORCE BASE FLORIDA

Ms. Donna L. Barber Chief, Installation Management Flight 325th Civil Engineer Squadron 540 Mississippi Ave Tyndall AFB FL 32403

Dr. Timothy A. Parsons State Historic Preservation Officer Division of Historical Resources 500 South Bronough Street Tallahassee FL 32399

Dear Dr. Parsons

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DONNA L. BARBER, GS-13, DAF

Attachment: 1. Figure 1 – Proposed Action Area Areas



### **DEPARTMENT OF THE AIR FORCE** 325TH FIGHTER WING (ACC) TYNDALL AIR FORCE BASE FLORIDA

Ms. Donna L. Barber Chief, Installation Management Flight 325th Civil Engineer Squadron 540 Mississippi Ave Tyndall AFB FL 32403

Dr. Sean M. Blomquist U.S. Fish and Wildlife Service 1601 Balboa Avenue Panama City FL 32405

Dear Mr. Blomquist

The United States Air Force (Air Force), is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with the recovery efforts at Tyndall Air Force Base (AFB), Florida. The EA is being prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations implementing NEPA, and the Air Force NEPA regulations.

Under the Proposed Action, the 325th Fighter Wing at Tyndall AFB, proposes to repair several facilities, demolish 264 buildings, construct 26 individual facilities, construct multiple facilities in three separate complex areas, conduct drainage improvements, and new or upgraded utilities spanning six planning areas throughout Tyndall AFB; Flightline Area, Support Area, 9700 Area-Crooked Island (AF Civil Engineering Center Research, Development, Testing & Evaluation), Subscale Drone Area, Silver Flag Area, and Munitions Area. These projects are being proposed as a result of the devastation caused by Hurricane Michael, October 10, 2018.

The EA for recovery assesses the potential environmental impacts associated with this Proposed Action, and examines the cumulative effects when combined with past, present, and any future proposals. As part of the Air Force's Environmental Impact Analysis Process, we request your input in identifying general or specific issues or areas of concern you feel should be addressed in the environmental analysis.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to Mr. Jose J. Cintron at

jose.cintron.1@us.af.mil, (850) 283-4341, or via mail at Jose J. Cintron, 325 CES/CEIE, 540 Mississippi Ave, Tyndall AFB FL 32403-501 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

DONNA L. BARBER, GS-13, DAF

Attachment: 1. Figure 1 – Proposed Action Area Areas



### DEPARTMENT OF THE AIR FORCE 325TH FIGHTER WING (ACC) TYNDALL AIR FORCE BASE FLORIDA

UCT 3 1 2019

Colonel Brian S. Laidlaw Commander 325th Fighter Wing 501 Airey Avenue, Suite 1 Tyndall AFB FL 32403-5549

Mr. James Floyd Principal Chief The Muscogee (Creek) Nation P.O Box 580 Okmulgee OK 74447

Dear Principal Chief Floyd

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the recovery efforts at Tyndall Air Force Base (AFB), Florida. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the Air Force is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

Under the Proposed Action, the 325th Fighter Wing at Tyndall AFB proposes to repair several facilities, demolish 264 buildings, construct 26 individual facilities, construct multiple facilities in three separate complex areas, conduct drainage improvements, and construct or upgrade utilities spanning six planning areas throughout Tyndall AFB: Flightline Area, Support Area, 9700 Area-Crooked Island (AF Civil Engineer Center Research, Development, Testing & Evaluation), Subscale Drone Area, Silver Flag Area, and Munitions Area. These projects are being proposed as a result of the devastation caused by Hurricane Michael, October 10, 2018.

In accordance with the NHPA, the Air Force would like to initiate government-togovernment consultation regarding the Hurricane Michael Recovery Projects. The Air Force requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this undertaking might adversely affect any historic properties of religious and cultural significance to the Muscogee (Creek) Nation.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to Mr. Jose J. Cintron at: jose.cintron.1@us.af.mil, (850) 283-4341, or via mail at Jose J. Cintron, 325 CES/CEIE, 540

Mississippi Ave, Tyndall AFB FL 32403 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF Commander

Attachment: Figure 1 – Proposed Action Areas

cc:

Ms. Corain Lowe-Zepeda Tribal Historic Preservation Officer The Muscogee (Creek) Nation Office of the Administration PO Box 580 Okmulgee OK 74447



## DEPARTMENT OF THE AIR FORCE 325TH FIGHTER WING (ACC) TYNDALL AIR FORCE BASE FLORIDA

UCT 3 1 2019

Colonel Brian S. Laidlaw Commander 325th Fighter Wing 501 Airey Avenue, Suite 1 Tyndall AFB FL 32403-5549

Mr. Ryan Morrow Town King Thlopthlocco Tribal Town P.O. Box 188 Okemah OK 74859-0188

Dear Town King Morrow

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the recovery efforts at Tyndall Air Force Base (AFB), Florida. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the Air Force is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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In accordance with the NHPA, the Air Force would like to initiate government-togovernment consultation regarding the Hurricane Michael Recovery Projects. The Air Force requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this undertaking might adversely affect any historic properties of religious and cultural significance to the Thlopthlocco Tribal Town.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to Mr. Jose J. Cintron at: jose.cintron.1@us.af.mil, (850) 283-4341, or via mail at Jose J. Cintron, 325 CES/CEIE, 540

Mississippi Ave, Tyndall AFB FL 32403 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF Commander

Attachment: Figure 1 – Proposed Action Areas

cc: Mr. Emman Spain Tribal Historic Preservation Officer Thlopthlocco Tribal Town P.O. Box 188 Okemah OK 74859-0188



### DEPARTMENT OF THE AIR FORCE 325TH FIGHTER WING (ACC) TYNDALL AIR FORCE BASE FLORIDA

OCT 3 1 2019

Colonel Brian S. Laidlaw Commander 325th Fighter Wing 501 Airey Avenue, Suite 1 Tyndall AFB FL 32403-5549

Mr. Billy Cypress Chairman Miccosukee Tribe of Indians of Florida Tamiami Station P.O. Box 440021 Miami FL 33144

Dear Chairman Cypress

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the recovery efforts at Tyndall Air Force Base (AFB), Florida. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the Air Force is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

Under the Proposed Action, the 325th Fighter Wing at Tyndall AFB proposes to repair several facilities, demolish 264 buildings, construct 26 individual facilities, construct multiple facilities in three separate complex areas, conduct drainage improvements, and construct or upgrade utilities spanning six planning areas throughout Tyndall AFB: Flightline Area, Support Area, 9700 Area-Crooked Island (AF Civil Engineer Center Research, Development, Testing & Evaluation), Subscale Drone Area, Silver Flag Area, and Munitions Area. These projects are being proposed as a result of the devastation caused by Hurricane Michael, October 10, 2018.

In accordance with the NHPA, the Air Force would like to initiate government-togovernment consultation regarding the Hurricane Michael Recovery Projects. The Air Force requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this undertaking might adversely affect any historic properties of religious and cultural significance to the Miccosukee Tribe of Indians of Florida.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to Mr. Jose J. Cintron at: jose.cintron.l@us.af.mil, (850) 283-4341, or via mail at Jose J. Cintron, 325 CES/CEIE, 540 Mississippi Ave, Tyndall AFB FL 32403 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF Commander

Attachment: Figure 1 – Proposed Action Areas

cc:

Mr. Fred Dayhoff Section 106 and NAGPRA Coordinator Miccosukee Tribe of Indians of Florida HC 61 SR Box 68 Old Loop Road Ochopee FL 34141


#### DEPARTMENT OF THE AIR FORCE 325TH FIGHTER WING (ACC) TYNDALL AIR FORCE BASE FLORIDA

OCT 3 1 2019

Colonel Brian S. Laidlaw Commander 325th Fighter Wing 501 Airey Avenue, Suite 1 Tyndall AFB FL 32403-5549

Mr. Marcellus Osceola Jr. Chairman Seminole Tribe of Florida 6300 Stirling Road Hollywood FL 33024

Dear Chairman Osceola

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the recovery efforts at Tyndall Air Force Base (AFB), Florida. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the Air Force is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

Under the Proposed Action, the 325th Fighter Wing at Tyndall AFB proposes to repair several facilities, demolish 264 buildings, construct 26 individual facilities, construct multiple facilities in three separate complex areas, conduct drainage improvements, and construct or upgrade utilities spanning six planning areas throughout Tyndall AFB: Flightline Area, Support Area, 9700 Area-Crooked Island (AF Civil Engineer Center Research, Development, Testing & Evaluation), Subscale Drone Area, Silver Flag Area, and Munitions Area. These projects are being proposed as a result of the devastation caused by Hurricane Michael, October 10, 2018.

In accordance with the NHPA, the Air Force would like to initiate government-togovernment consultation regarding the Hurricane Michael Recovery Projects. The Air Force requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this undertaking might adversely affect any historic properties of religious and cultural significance to the Seminole Tribe of Florida.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to Mr. Jose J. Cintron at: jose.cintron.1@us.af.mil, (850) 283-4341, or via mail at Jose J. Cintron, 325 CES/CEIE, 540

Mississippi Ave, Tyndall AFB FL 32403 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF Commander

Attachment: Figure 1 – Proposed Action Areas

cc:

Dr. Paul N. Backhouse Tribal Historic Preservation Officer Ah-Ta-Thi-Ki Museum 30290 Josie Billie Highway, PMB 1004 Clewiston FL 33440



#### DEPARTMENT OF THE AIR FORCE 325TH FIGHTER WING (ACC) TYNDALL AIR FORCE BASE FLORIDA

OCT 3 1 2019

Colonel Brian S. Laidlaw Commander 325th Fighter Wing 501 Airey Avenue, Suite 1 Tyndall AFB FL 32403-5549

Mr. Gregory Chilcoat Principal Chief Seminole Nation of Oklahoma P.O. Box 1498 Wewoka OK 74884

Dear Principal Chief Chilcoat

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the recovery efforts at Tyndall Air Force Base (AFB), Florida. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the Air Force is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

Under the Proposed Action, the 325th Fighter Wing at Tyndall AFB proposes to repair several facilities, demolish 264 buildings, construct 26 individual facilities, construct multiple facilities in three separate complex areas, conduct drainage improvements, and construct or upgrade utilities spanning six planning areas throughout Tyndall AFB: Flightline Area, Support Area, 9700 Area-Crooked Island (AF Civil Engineer Center Research, Development, Testing & Evaluation), Subscale Drone Area, Silver Flag Area, and Munitions Area. These projects are being proposed as a result of the devastation caused by Hurricane Michael, October 10, 2018.

In accordance with the NHPA, the Air Force would like to initiate government-togovernment consultation regarding the Hurricane Michael Recovery Projects. The Air Force requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this undertaking might adversely affect any historic properties of religious and cultural significance to the Seminole Nation of Oklahoma.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to Mr. Jose J. Cintron at: jose.cintron.1@us.af.mil, (850) 283-4341, or via mail at Jose J. Cintron, 325 CES/CEIE, 540

Mississippi Ave, Tyndall AFB FL 32403 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF Commander

Attachment: Figure 1 – Proposed Action Areas

ce:

Mr. Theodore Isham Tribal Historic Preservation Officer Seminole Nation of Oklahoma 12555 NS 3540 Road Seminole OK 74868



#### DEPARTMENT OF THE AIR FORCE 325TH FIGHTER WING (ACC) TYNDALL AIR FORCE BASE FLORIDA

OCT 3 1 2019

Colonel Brian S. Laidlaw Commander 325th Fighter Wing 501 Airey Avenue, Suite 1 Tyndall AFB FL 32403-5549

Ms. Stephanie A. Bryan Tribal Chair Poarch Band of Creek Indians 5811 Jack Springs Road Building 500 Atmore AL 36502

Dear Chairwoman Bryan

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the recovery efforts at Tyndall Air Force Base (AFB), Florida. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the Air Force is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

Under the Proposed Action, the 325th Fighter Wing at Tyndall AFB proposes to repair several facilities, demolish 264 buildings, construct 26 individual facilities, construct multiple facilities in three separate complex areas, conduct drainage improvements, and construct or upgrade utilities spanning six planning areas throughout Tyndall AFB: Flightline Area, Support Area, 9700 Area-Crooked Island (AF Civil Engineer Center Research, Development, Testing & Evaluation), Subscale Drone Area, Silver Flag Area, and Munitions Area. These projects are being proposed as a result of the devastation caused by Hurricane Michael, October 10, 2018.

In accordance with the NHPA, the Air Force would like to initiate government-togovernment consultation regarding the Hurricane Michael Recovery Projects. The Air Force requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this undertaking might adversely affect any historic properties of religious and cultural significance to the Poarch Band of Creek Indians.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft EA, please forward written issues or concerns to Mr. Jose J. Cintron at: jose.cintron.1@us.af.mil, (850) 283-4341, or via mail at Jose J. Cintron, 325 CES/CEIE, 540

Mississippi Ave, Tyndall AFB FL 32403 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF Commander

Attachment: Figure 1 – Proposed Action Areas

cc:

Ms. Carolyn White Regulatory Affairs Division Director and Acting Tribal Historic Preservation Officer Poarch Band of Creek Indians 5811 Jack Springs Road Atmore AL 36502

#### Draft Environmental Assessment for Hurricane Recovery and Installation Development at Tyndall Air Force Base, Florida

APPENDIX C Biological Assessment

## Biological Evaluation to Determine Impacts to Federally-Listed Species from Tyndall Air Force Base's Hurricane Reconstruction Program

# 1. Introduction

This document is being submitted to fulfill requirements under Section 7 of the Endangered Species Act (ESA). Briefly, this report addresses potential impacts to all federally-listed threatened and endangered (T&E) species associated with the recovery of Tyndall Air Force Base (AFB) from the damage incurred by a major hurricane in October 2018. This Biological Evaluation (BE), conducted by the 325<sup>th</sup> Civil Engineer Environmental Element, Natural Resources (325 CES/CEIEN), is meant to initiate the consultation process with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the ESA. The objectives of this BE are to:

- 1. Describe the affected environment and its likelihood to support any T&E species.
- 2. Name federally listed T&E species occurring or potentially occurring on Tyndall AFB and describe their range, habitat and their occurrence in the action area.
- 3. Describe the effects of the proposed action on each listed species or critical habitat.
- 4. Describe conservation measures that have the potential to impact, either beneficially or adversely, those documented species.
- 5. Determine and quantify what effects the proposed activities will likely have on federally listed species.

# 2. Location

Tyndall AFB is located in the southeast corner of Bay County in the Florida panhandle and covers approximately 30,000 acres (12,140 hectares [ha]), approximately 13 miles (20 kilometers [km]) east of Panama City, Florida. The base is a combination of developed and natural areas located on a peninsula that is bisected by U.S. Highway 98. The base is approximately 18 miles (29 km) long and 3 miles (4.8 km) wide, and is surrounded by East Bay, St. Andrew Bay, and the Gulf of Mexico (GOM) to the north, west, and south. Crooked Island West (CIW) and East (CIE), which form St. Andrew Sound, are barrier spits on the Gulf. Tyndall AFB is composed of approximately 23,350 acres (9,449 ha) of unimproved land, 1,080 acres (437 ha) of semi-improved land, and 4,840 acres (1,958.7 ha) of improved land.

# 3. Proposed Action

On 10 October 2018, Tyndall Air Force Base (AFB) took a direct hit from Hurricane Michael, with maximum sustained wind speeds of 160 mph. Installation infrastructure was severely damaged and utility networks, communications, and roadways were disrupted/impacted. Over 200 facilities were considered damaged beyond repair from an economical standpoint. Base infrastructure that sustained storm damage included facilities on the flightline, support side, and 9700 Areas. The demolition and reconstruction activities associated with the proposed action will be initiated in FY20 and are proposed to be completed within 5 years from the initiation of construction.

Under the Proposed Action, Tyndall AFB, proposes to repair several facilities, demolish 264 buildings (Figure 1), construct 26 individual facilities, construct multiple facilities in three separate complex areas, conduct drainage improvements, and new or upgraded utilities spanning

six planning areas throughout Tyndall AFB; Flightline Area, Support Area, 9700 Area-Crooked Island (AF Civil Engineer Center Research, Development, Testing & Evaluation), Subscale Drone Area, Silver Flag Area, and Munitions Area (Figure 2). The reconstruction program will meet current mission requirements and improve mission efficiencies by realigning mission sets that would provide capacity for future growth.



Figure 1. Tyndall AFB environmental assessment building demolitions



Figure 2. Tyndall AFB environmental assessment project areas

The proposed actions will affect previously undeveloped land. The proposed action will include but is not limited to construction of new facilities, street lighting, exterior building lighting, parking areas, street modifications, sidewalks, storm water management and treatment, landscaping, utility corridors, and associated water, wastewater, electrical, and gas lines. The primary objectives of the reconstruction program are to develop Tyndall AFB in a resilient and sustainable manner that will focus on efficient land use through building consolidation, creation of walkable campuses, and addressing flood and storm surge risks.

#### 4. Species Descriptions

Table 1 provides information about the federally listed threatened and endangered species known to occur on Tyndall AFB (TAFB) and the Gulf of Mexico (GOM).

Scientific Name	Common Name	Federal	Location
		Status	
Reptiles			
Caretta caretta	Atlantic loggerhead sea turtle	Т	TAFB,GOM
Chelonia mydas	Atlantic green sea turtle	E	TAFB,GOM
Dermochelys coriacea	Leatherback sea turtle	E	TAFB,GOM
Lepidochelys kempi	Kemp's Ridley sea turtle	E	TAFB,GOM
Birds			
Charadrius melodus	Piping plover	Т	TAFB
Calidris canutus rufa	Red Knot	Т	TAFB
Mammals			
Peromyscus polionatus	Choctawhatchee beach mouse	E	TAFB
allophrys			
Peromyscus polionatus	St. Andrews beach mouse	E	TAFB
peninsularis			
Plants			
Euphorbia telephioides	Telephus spurge	Т	TAFB
Pinguicula ionantha	Godfrey's butterwort	Т	TAFB

 Table 1. Federally Listed T&E Species Associated with Tyndall AFB

E – Endangered; T – Threatened; T(S/A) – threatened due to similarity of appearance

## Sea Turtles

Four species of sea turtles occur in the nearshore GOM waters off Tyndall AFB and are known to nest on Tyndall's GOM barrier islands. These species include the Atlantic loggerhead sea turtle, Atlantic green sea turtle, leatherback sea turtle, and Kemp's ridley sea turtle. The loggerhead is the most common of the four species to nest on Tyndall's beaches with occasional nesting by leatherback, green, and Kemp's Ridley sea turtles. The peak nesting period is June and July, with an average of 50 nests per year (INRMP 2015). Green sea turtle and leatherback sea turtle nesting was first documented on Tyndall in 1998 and 2001, respectively. A Kemp's Ridley was first observed laying a nest on Tyndall in 2016 during which Natural Resources staff recorded video footage to confirm identity of this rare event.

## Atlantic loggerhead sea turtle (Caretta caretta)

The loggerhead sea turtle is federally and state listed as threatened in the Florida panhandle. This species was originally listed as threatened throughout its global range in 1978 but the listing status was revised in 2011 by creating 9 distinct population segments of which 4 segments are federally threatened and the other 5 segments are federally endangered (USFWS Federal Register July 27, 2011). Nesting females typically come ashore to dig nests and deposit eggs between 1 May and 31 August with peak nesting activity occurring in June and July. Nests are dug between the mean high water (MHW) mark and the dune line with nests periodically created in the dunes. Within one nesting season, individual loggerheads are known to nest from 1 to 7 times. On-shore threats to the loggerhead sea turtle include degradation or destruction of nesting habitat from coastal development, hatchling disorientation due to beachfront lighting, and nest depredation. The loggerhead is the most common nesting sea turtle on Tyndall and is known to nest on Shell Island, CIE, CIW, and occasionally Buck Beach (INRMP 2015). Critical habitat has not been designated for loggerhead sea turtles along the Gulf Coast of Florida.

#### Atlantic green sea turtle (Chelonia mydas)

Populations of the green sea turtle are listed as federally endangered in Florida and on the Pacific Coast of Mexico with all other populations listed as threatened in its eastern range of North America (USFWS Federal Register July 28, 1978). Green sea turtles usually nest between June and September and a nesting female can lay as many as 9 nests in a season (NMFS and USFWS Recovery Plan 1991). This species typically breeds at 2 to 4 year intervals and very rarely breeds every year. On-shore threats to this species are the same as threats for loggerhead sea turtles. Green sea turtle nesting events are fairly uncommon on Tyndall's beaches with the exception of the 2019 nesting season during which 20 green sea turtle nests were documented. There has been no designation of critical habitat for green sea turtles along Florida's Gulf coast.

#### Kemp's ridley sea turtle (Lepidochelys kempii)

The Kemp's ridley sea turtle is listed as federally endangered under the ESA throughout its global range (USFWS Federal Register December 2, 1970). The range of the Kemp's ridley includes the Gulf coasts of Mexico and the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland. Nesting is essentially limited to the beaches of the western Gulf of Mexico, primarily in Tamaulipas and Veracruz, Mexico with a few historical records in Campeche, Mexico. The major habitat for Kemp's ridleys is the nearshore and inshore waters of the northern Gulf of Mexico. Kemp's ridley sea turtles nest from April to July with mean clutch sizes of approximately 100 eggs. Females can breed annually and mean number of nests per season is 2.5. On-shore threats to this species are the same as threats for loggerhead sea turtles. The first confirmed Kemp's ridley nest on Tyndall was detected on May 24, 2016 on CIW. Critical habitat has not been designated for Kemp's ridley sea turtles along the Gulf Coast of Florida.

#### Leatherback sea turtle (Dermochelys coriacea)

The leatherback sea turtle is listed as federally endangered under the ESA throughout its global range (USFWS Federal Register June 2, 1970). Only infrequent nesting activity has been documented for the leatherback in northwest Florida (Longieliere et al. 1997). The nesting and hatching season for the leatherback extends from May 1 through September 30, with nest incubation ranging from 60 to 75 days occurring on 2-3 year intervals (Longieliere et al. 1997). Since 2001, there have been 3 documented cases of leatherback turtle nesting on Tyndall AFB. Critical habitat has not been designated for leatherback turtles along the Gulf coast of Florida.

## Tyndall AFB Sea Turtle Monitoring and Management

The primary objectives of the Tyndall AFB sea turtle monitoring program are to 1) collect data annually to determine the distribution and abundance of sea turtle nesting activity on 18 miles of Tyndall's GOM beaches, and 2) provide nest location information for military mission avoidance purposes. Additional data gathered during nesting surveys includes incubation period, nest depredation, hatchling disorientation, and nest success (hatchling emergence). Surveys are

conducted in accordance with data collection and reporting protocols defined in the Marine Turtle Permit. Sea turtle nesting surveys are conducted five times per week on CIE, CIW, and the federal section of Shell Island (18 miles of beach in total) from 1 May to 31 August. The surveys are designed to 1) locate the crawls of nesting female turtles, 2) determine crawl status (i.e. nesting crawl vs. false crawl), 3) species identification, and 4) nest protection. Data collected for each crawl and/or nest includes GPS coordinates of crawl/nest, crawl length and width, presence of dunes in the vicinity, distance from MHW mark to dunes, and dune height. If a body pit is identified at the crawl site, eggs are located and wire screens are secured over nest site to deter predation. Post-hatching surveys are conducted 1 September to 31 October to determine nest success. Nests are assessed for evidence of hatching activity, predation, inundation, and storm damage and continue to be monitored until 3 days after hatchlings have emerged.

The primary objective of sea turtle management at Tyndall AFB is to support the military mission while meeting the legal requirements of the ESA. Tyndall's 18 miles of undeveloped beaches provide a valuable land to sea transition zone for training purposes and also serve as high quality habitat for nesting sea turtles. The primary goals of sea turtle conservation and management at Tyndall AFB include 1) locating and protecting nests, 2) nest relocation when necessary, 3) predator removal, 4) resolution of beach lighting issues, 5) beach driving restrictions, and 6) restoration and protection of nesting habitat. In addition to using screening to protect nests, predator control in the form of trapping and removing predators from Tyndall's beaches is conducted.

Lighting has only occasionally been problematic for sea turtles on Tyndall's beaches resulting in hatchling disorientation. Artificial lighting problems are identified and addressed as quickly as possible. Currently, the only lighting issues on Tyndall beaches are from urban glow originating from Panama City and Mexico Beach but incidences of hatchling disorientation resulting from urban glow have been minimal. Additionally, a wildlife friendly lighting plan is being developed for Tyndall AFB and will be incorporated in the rebuilding of the base infrastructure reducing the potential for sea turtle disorientation caused by artificial lighting.

#### Piping Plover (Charadrius melodus)

In 1986, the Atlantic Coast piping plover was listed as threatened (U.S. Fish and Wildlife Service 1988), the Great Lakes piping plover listed as endangered, and the Northern Great Plains piping plover listed as threatened under the ESA. The piping plover breeds in 3 geographic regions in the United States and are therefore divided into 3 breeding populations which include the Atlantic Coast, Great Lakes and North Great Plains. All three populations winter along beaches and barrier islands from North Carolina to Florida, and along the Florida Gulf Coast to Texas, Mexico, and the Caribbean (USFWS Great Lakes Piping Plover Recovery Plan 2003). Piping plover preferred wintering habitat used for foraging and roosting includes beaches, salt marshes, coastal lagoons, and sand, mud, and algal flats (USFWS Great Lakes Piping Plover Recovery Plan 2003). Piping plovers consistently winter along Tyndall's shoreline during the non-breeding (wintering and migrating) season from July 15 through May 15. Concentration is highest in areas containing pools and low elevation beach sites that are washed over and exposed by tidal fluctuations. Tyndall's over-wintering population normally reaches 18 percent of all birds utilizing Florida as an over-wintering location. Portions of the barrier islands on Tyndall AFB

have been designated Critical Wildlife Habitat for the piping plover. Primary threats to the piping plover on wintering grounds include degradation and destruction of habitat, human disturbance, and predators.

#### **Piping Plover Critical Habitat and Species Management**

Critical habitat designation for wintering and breeding grounds for the piping plover was published in the Federal Register on 10 July 2001 (USFWS 2001) (Unit FL–5: Shell/Crooked Islands 1789 ha (4419 ac) in Bay County). Piping plover critical habitat is a term defined in the Endangered Species Act, 1973 that refers to specific geographic areas that contain the essential habitat features necessary for the conservation of threatened and/or endangered species. At the time of designation, the critical habitat areas do not necessarily have to be occupied by piping plovers. Critical habitat areas may require special protection or management considerations for current populations as well as potential population increases necessary to achieve species recovery.

The primary management for piping plovers on Tyndall AFB consist of maintaining suitable wintering habitat for foraging, sheltering, and roosting. Management activities conducted at Tyndall that benefit non-breeding piping plovers include 1) predator removal, 2) beach driving restrictions, 3) construction and maintenance of boardwalks, and 4) Critical Wildlife Area and Critical Habitat designations. Specific coastal dune protection and restoration measures at Tyndall AFB that may benefit piping plovers include 1) construction of elevated boardwalks on CIE and NCO beach to eliminate pedestrian traffic in and around dunes and prevent erosion, and 2) protection of dunes (via sand fence installation) newly vegetated with sea oats to encourage establishment of vegetated dunes. Tyndall recreation regulations also requires pedestrians to access the beach via marked roads or boardwalks and to stay out of sand dunes at all times (2015-2016 Hunting, Fishing and General Recreation Regulations).

## Red Knot (Calidris canutus rufa)

The U.S. Fish and Wildlife Service listed the rufa red knot as federally threatened under the ESA in December 2014. The red knot migrates annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the southeastern United States, northeastern GOM, northern Brazil, the southern tip of South America (USFWS 2014). Staging and stopover areas in the wintering regions are used for resting and foraging. They winter at intertidal marine habitats near coastal inlets, estuaries, and bays. Wintering grounds for the red knot include coastal sites from Massachusetts and California southward to southern South America. Knots and other shorebirds depend on quiet, intertidal beach locations as resting sites during high tides. Migrating and wintering knots use marine habitats including sandy beaches, salt marshes, lagoons, mudflats of estuaries and bays, and mangrove swamps that contain an abundance of invertebrate prey. The red knot is observed at Tyndall AFB during migration, on CIE, CIW, and Shell Island. Primary threats to the piping plover on wintering grounds include degradation and destruction of habitat, human disturbance, and predators. The red knot occurs in small numbers at Tyndall AFB during migration. It has similar habitat requirements and is present during similar time periods as the piping plover.

The primary management for red knots at Tyndall AFB include maintaining suitable wintering habitat for foraging, sheltering, and roosting. Management activities conducted at Tyndall that

benefit this species include 1) predator removal, 2) beach driving restrictions, 3) construction and maintenance of boardwalks, and 4) Critical Wildlife Area and Critical Habitat designations. Details about predator removal, beach driving restrictions, boardwalk construction maintenance, and Critical Wildlife Area and Critical Habitat designations can be found in the piping plover management section above.

#### Choctawhatchee Beach Mouse (Peromyscus polionotus allophrys)

The Choctawhatchee beach mouse was federally listed as endangered under the ESA in June 1985 and populations are currently known to occur in Bay, Okaloosa, and Walton Counties in the Florida panhandle (USFWS 1987, USFWS 2006). They inhabit coastal dunes on Shell Island and CIW at Tyndall AFB and their distribution ranges from Choctawhatchee Bay to St. Andrew Bay, Florida. The Choctawhatchee beach mouse was detected on Shell Island as early at 1950. In 1998, Shell Island and CIW became connected at East Pass due to the accretion of sand that had expanded southward on the eastern end of the federal portion of Shell Island (USFWS 2010). The connection of Shell Island and CIW provided the opportunity for Choctawhatchee beach mice inhabiting Shell Island to expand their range to CIW. Presence of the Choctawhatchee beach mouse on CIW was confirmed by trapping events in 2000 and the presence of the Choctawhatchee beach mouse to be monitored on CIW and Shell Island to date.

#### St. Andrews Beach Mouse (Peromyscus polionotus peninsularis)

The St. Andrew beach mouse was federally listed as endangered in November 1998 under the ESA (USFWS 2010). Prior to the 1980's there were two populations of this subspecies, one known to occur on CIE at Tyndall AFB and the other occurring on St. Joseph Peninsula, Gulf County, Florida. However, a1992-1993 trapping event on CIE produced zero captures of the St. Andrew beach mouse and the subspecies was therefore thought to be extirpated from CIE. Re-introduction of 43 individuals to CIE from the St. Joseph Peninsula State Park population occurred between November 1997 and December 1998 (USFWS 2010) and the presence of the St. Andrew beach mouse continues to be monitored on CIE to date.

## Choctawhatchee and St. Andrews Beach Mouse Habitat, Threats, and Management

The Choctawhatchee beach mouse and St. Andrew beach mouse inhabit primary, secondary, and inland tertiary dunes within well-developed coastal dune ecosystems (USFWS 2010). They are burrow-inhabiting animals but move around within their home range to forage, breed, and maintain other burrows that they have created (USFWS 1987). Principal threats that have led to the decline of the Choctawhatchee beach mouse and the St. Andrew beach mouse include habitat degradation or loss due to land development, catastrophic storm events, and human recreational activity on dunes. Other potential threats include shoreline erosion, predators, and artificial beach lighting.

The primary goals of beach mouse conservation and management at Tyndall AFB consist of 1) dune restoration and protection, 2) predator removal, 3) resolution of beach lighting issues, and 4) beach driving restrictions, 5) designation of critical habitat. Additional coastal dune protection measures on CIE, CIW, and Shell Island at Tyndall AFB include the construction and maintenance of boardwalks, sand fence installation, and beach driving restrictions. Specific coastal dune protection and restoration measures at Tyndall AFB include 1) construction of an elevated boardwalk on CIE and NCO beach (access point for CIW and Shell Island) to eliminate

pedestrian traffic in and around dunes, and 2) protection of dunes (via sand fence installation) newly vegetated with sea oats to encourage establishment of vegetated dunes. Predator control in the form of trapping and removing predators from Tyndall's beaches is conducted. Artificial light pollution is minimized on all Tyndall GOM beaches during the sea turtle nesting season (May 1 to August 30) which directly benefits the nocturnal Choctawhatchee and St. Andrew beach mice. Prior to the approval of the INRMP, critical habitat had been designated for the St. Andrew beach mouse on CIE and Choctawhatchee beach mouse on CIW and Shell Island to ensure protection of their coastal dune habitat.

#### Godfrey's Butterwort (Pinguicula ionantha)

Godfrey's butterwort is listed as federally threatened and state endangered and is known to occur in Bay, Calhoun, Franklin, Gulf, Liberty, and Wakulla counties in the Florida panhandle (USFWS 1994). It is a carnivorous plant that inhabits herb bogs, flatwoods depressions, savannas, and ditches adjacent to the aforementioned habitats historically embedded within the longleaf pine matrix (Godfrey and Wooten 1981, Wunderlin and Hansen 2011). Godfrey's butterwort often occurs in areas that are seasonally inundated with shallow water. Ecosystem degradation is the primary threat to this species resulting from commercial forest production, inadequate prescribed fire management, fire exclusion, and urban development. Other threats include shading from the overstory pines and midstory shrubs, drainage of wetlands, and water quality degradation (USFWS 1994).

Prescribed fire is the most important management tool for improving or maintaining critical habitat for Godfrey's butterwort at Tyndall AFB. Commercial timber production coupled with fire exclusion had been the primary reasons for ecosystem degradation at Tyndall AFB since the 1960's. Re-introduction of prescribed fire began in 1996 when the Forestry Department began a prescribed fire program across the base. Seasonality of prescribed fire may be one of the most important factors related to Godfrey's butterwort habitat improvement due to its habitat preferences (wettest edges of the ecotone between herbaceous wetlands and upland pine flatwoods). Since 1996, Tyndall NRS has been working to accomplish more growing season burns as well as promote burning through wetlands. Mechanical removal of the shrub layer in wetlands began in 2018 to improve critical habitat for Godfrey's butterwort and other T&E species that have been difficult to manage with prescribed fire.

## **Telephus spurge** (*Euphorbia telephioides*)

Telephus spurge is a perennial herbaceous plant species listed as federally threatened and state endangered and is currently restricted to coastal (within 4 miles of the coast) Bay, Franklin, and Gulf counties in the Florida panhandle (USFWS 2007). Populations of this species have been observed on a variety of sites including xeric scrub pine to mesic pine flatwoods, disturbed sandy roads, and less commonly in wetlands with seepage slope species. Telephus spurge can also be found in pine flatwoods or upland pine communities with a longleaf pine and/or slash pine overstory and herbaceous understory dominated by wiregrass, other grasses, and forbs that have historically been burned on a 2 to 3 year fire return interval. It is generally found inhabiting sites with sandy, acidic soil with little to no litter and low organic and moisture content (Peterson and Campbell 2007). This species is characterized as ephemeral in that it can appear suddenly and be abundant at newly disturbed sites but may not be there upon re-survey a few years later (USFWS 2007). Large tuberous roots allow this species to survive underground when subjected to suboptimal or poor habitat conditions. The primary threats to telephus spurge include habitat degradation and destruction caused by commercial timber production, inadequate prescribed fire management, fire exclusion, and urban development.

Commercial timber production coupled with fire exclusion had been the primary reasons for ecosystem degradation at Tyndall AFB. Prescribed fire is the most important management tool for improving or maintaining critical habitat for telephus spurge at Tyndall AFB as this species is thought to respond with prolific emergence following fire (M. Kaeser, Personal Observation). The Tyndall NRS has been working to promote more burning during the growing season as well as burning on an 18-30 month fire return interval, benefiting telephus spurge and its critical habitat. Longleaf pine restoration efforts in slash pine plantations (pine flatwoods) and former sand pine plantations coupled with low intensity, frequent fire will improve potential habitat for telephus spurge on Tyndall

# 5. Effects of Proposed Actions on Federally Listed Species

## **Flightline Area**

The *Flightline area* (Figure 3) construction occurs entirely within the previously existing flightline footprint. The area was filled and leveled and no natural communities occur in the footprint of the construction. This area does not support any T&E species or habitat and will have NO EFFECT on T&E species or their habitats. The *Airfield Drainage* proposed action area is contained within the current footprint of the flightline. NO EFFECT on T&E species and suitable habitat was not found.



Figure 3. Tyndall AFB environmental assessment airfield drainage areas

#### **Munitions Area**

The proposed action within the *Munitions area* is within an already developed area, does not contain any natural habitats, and will therefore have NO EFFECT on T&E species.

#### **Support Area**

With the exception of the *Gate Complexes* and *Site Development and Infrastructure* proposed actions, the proposed projects in the *Support Area* are within previously developed/altered areas that contain no natural habitat and will have NO EFFECT on T&E species.

The proposed *Gate Complex* sites were closely examined for presence of T&E species. The Airey and Tyndall Gate areas did not contain any natural habitat or presence of T&E therefore will have NO EFFECT. Habitat that might support T&E species was present in portions of the Cleveland site area but no T&E species were observed and therefore will have NO EFFECT on T&E species. The survey of the alternative site did result in the discovery of a population of Telephus Spurge (federally threatened) and thus MAY AFFECT, LIKELY TO ADVERSELY AFFECT the listed species.



Figure 4. Locations of federally threatened Euphorbia telephioides

*Utilities* proposed action area (Figure 5) contains about 6 acres of natural dune habitat on the mainland but due to the proposed action and lack of connectivity with current barrier island beach mouse habitat, we conclude that the action will have NO EFFECT on T&E species and does not contain suitable habitat for T&E species.



Figure 5. Tyndall AFB environmental assessment project utilities

## Sabre Area

Proposed actions within *Sabre Area* will have NO EFFECT on T&E species and does not contain suitable habitat for T&E species.

## Subscale Area

Proposed actions within *Subscale area* will have NO EFFECT on T&E species and does not contain suitable habitat for T&E species.

## Silver Flag Area

The only T&E species that could potentially occur in the *Red Horse Rebuild* proposed action area is the federally threatened plant, Godfrey's butterwort. However, no plants were observed in the project area during recent surveys therefore will have NO EFFECT.

Potential habitat for both of Tyndall AFB's federally listed plant species is present in the 9700 area proposed action area but the absence of fire in the wetland habitats has allowed surrounding vegetation to overgrow subsequently making it difficult to detect threatened wetland species that

may currently exist there. No T&E species were observed during the surveys and therefore will have NO EFFECT on T&E species.

The following table (Table 2) provides a summary of the impact determinations for each of the Tyndall AFB T&E species, based on the evaluation.

Tuble 2. Summary of Impult Determinations for Tyndan Tall Species				
SPECIES COMMON NAME	NO	MAY AFFECT, NOT	MAY AFFECT, LIKELY	
	EFFECT	LIKELY TO	TO ADVERSELY	
		ADVERSELY AFFECT	AFFECT	
Atlantic loggerhead sea turtle	X*			
Atlantic green sea turtle	X*			
Leatherback sea turtle	X*			
Kemp's ridley sea turtle	X*			
Choctawhatchee beach mouse	Х			
St. Andrews beach mouse	Х			
Piping plover	Х			
Red knot	Х			
Telephus spurge			Х	
Godfrey's butterwort	Х			

 Table 2. Summary of Impact Determinations for Tyndall T&E Species

\*if allowances are made to avoid impact from lighting disturbance

## 6. Conclusion

The U.S. Fish and Wildlife Service will be given the opportunity to evaluate all proposed actions and potential effects to T&E species relating to the Hurricane Reconstruction Program at Tyndall AFB. The U.S. Fish and Wildlife Service will be notified immediately if any of the actions considered in this biological evaluation are modified or if additional information on federally listed species becomes available, as re-initiation of consultation may be required. If impact to listed species occurs beyond what has been considered in this assessment, all operations will cease and the Service will be notified. Any modifications or conditions resulting from consultation with the Service will be implemented prior to commencement of activities.

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**APPENDIX D Cultural Resources Survey Reports** 

# FINAL REPORT

# HURRICANE MICHAEL RECOVERY PHASE I ARCHAEOLOGICAL SURVEY AT TYNDALL AIR FORCE BASE, BAY COUNTY, FLORIDA

Prepared for: Air Force Civil Engineer Center



and

U.S. Army Corps of Engineers, Mobile District



US Army Corps of Engineers® Mobile District

Prepared by: Bretton Somers, Ph.D., RPA and Ryan A. Hale, M.S., RPA



December 2019

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Contract Number: W91278-16-D-0004 Delivery Order W9127819F0265

too

Bretton M. Somers, PhD, RPA Principal Investigator

December 2019

## ABSTRACT

Gulf South Research Corporation (GSRC) personnel have completed a Phase I archaeological investigation of 342 acres (ac) at Tyndall Air Force Base (AFB) in Bay County, Florida under U.S. Army Corps of Engineers, Mobile District (CESAM) contract W91278-16-D-0004, Delivery Order W9127819F0265. The investigation was developed for Air Force Civil Engineer Center (AFCEC) and is being conducted in support of Hurricane Michael Recovery efforts at Tyndall AFB under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and with its implementing regulations (16 United States Code [U.S.C.] 470f). Other applicable Federal cultural resources laws include the Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001-3013) and the Archaeological Resources Protection Act (ARPA) of 1979 (Public Law 96-95; 16 U.S.C. 470 *aa-mm*), as amended.

Hurricane recovery efforts include the removal of debris, demolition of damaged structures and buildings, and the construction of new infrastructure. This investigation has been conducted to evaluate areas selected for new construction. Three land areas selected for new construction totaling 342 acres have been identified to be surveyed in this investigation and include the Flightline Area (242 acres), the Munitions Area (82 acres), and the 8500 Area (18 acres).

The investigation consisted of an intensive Phase I archaeological survey including background research and a field survey with pedestrian surface inspection, supplemented with shovel testing along transects to identify and document all archaeological resources within the assigned project areas. Fieldwork was conducted over 12 days from October 8 until October 25, 2019.

Survey of these areas was initially conducted at a high probability intensity level with shovel test pits (STPs) excavated at 25 meter (m) intervals along transects. This intensity level was adjusted to moderate probability (50-m intervals) for the Flightline Area and moderate and low (100-m intervals) probability for the Munitions Area when it was observed that deposits in the those areas were highly disturbed. The 8500 Area was surveyed entirely at high probability intensity. Each of the three areas is highly developed with numerous structures, paved areas, water runoff control features, and utilities. A total of 148 STPs were excavated during this investigation with an additional 126 not excavated due to impediments of the built environment. Only two STPs were positive and both were in the Flightline Area. Both positive STPs were delineated and determined to be isolated objects (IOs).

IO 1 consists of a single Leon Weeden Island (ca. 1,600-1,100 B.P.) type projectile point; it was recovered from TR 4 STP 5 at approximately 60-70 centimeters below ground surface (cmbgs). Additional STPs excavated to delineate the find were all negative. Deposits in the STP do not suggest the find is part of an intact cultural deposit.

IO 2 consists of one unidentified (UID) small mammal bone and two cervical vertebra from a small mammal. The remains are not charred nor do they exhibit any cut marks or other evidence related to human activity or anything to suggest they are cultural artifacts. The faunal materials were recovered from a depth of approximately 60-70 cmbgs. The deposits in the STP do not suggest the faunal remains are part of an intact cultural deposit.

Neither IO qualifies as an archaeological site nor do they possess integrity or criteria to be considered for NRHP eligibility. No NRHP eligible archaeological resources have been recorded within the Flightline Area, Munitions Area, and 8500 Area during this investigation. As a result, no adverse effects will occur to archaeological resources as a result of the proposed Hurricane Michael recovery actions in the three project areas. No further work is recommended.

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# INTRODUCTION

This technical report describes the investigation conducted for Air Force Civil Engineer Center (AFCEC) by Gulf South Research Corporation (GSRC) that included an archaeological survey of up to 200 acres (ac) (59.08 hectares [ha]) at Tyndall Air Force Base (AFB) in Bay County, Florida (Figure 1). The investigation was conducted under U.S. Army Corps of Engineers, Mobile District (CESAM) contract W91278-16-D-0004, Delivery Order W9127819F0265. The investigation consisted of an intensive Phase I archaeological survey including background research and a field survey with pedestrian surface inspection supplemented with shovel testing along transects to identify and document all archaeological resources within the assigned project areas.

This project is being conducted in support of Hurricane Michael Recovery efforts at Tyndall AFB under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and with its implementing regulations (16 United States Code [U.S.C.] 470f). Other applicable Federal cultural resources laws include the Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001-3013) and the Archaeological Resources Protection Act (ARPA) of 1979 (Public Law 96-95; 16 U.S.C. 470 *aa-mm)*, as amended.

All work was conducted in accordance with Air Force Instruction (AFI) 32-7065 Cultural Resources Management, the Standard Operating Procedures identified in the *U.S. Air Force Integrated Cultural Resources Management Plan for Tyndall Air Force Base* (ICRMP) (Tyndall AFB 2016), Florida Division of Historical Resources (DHR) Guidelines for Use by Historic Preservation Professionals, and the Secretary of Interior's Guidelines for Local Surveys: A Basis for Preservation Planning (National Register Bulletin Number 24). This investigation was conducted by professional archaeologists meeting the qualifications specified in the Secretary of the Interior's Professional Qualification Standards (*Federal Register*, Vol. 48, No. 190, Thursday, September 29, 1983, pp. 44738-44739). Dr. Bretton Somers is the project principal investigator and is a Registered Professional Archaeologist. All research was conducted in accordance with the professional and ethical standards of the Register of Professional Archaeologists.

#### **Project Background**

On 10 October 2018, Tyndall AFB received a direct impact from Category 4, Hurricane Michael. The hurricane caused extensive damage to infrastructure (facilities, roads, fences etc.), natural resources (wetlands, forestry areas), and mission capability (aircraft departed, personnel losses, and economic impacts). Following the storm, Tyndall AFB initiated recovery efforts to evaluate the damage and actions needed to ensure the base was safe for personnel to return. Hurricane recovery efforts include the removal of debris, demolition of damaged structures and buildings, and the construction of new infrastructure. Additionally, new facilities will need to be constructed to replace those that have been lost. Three land areas selected for new construction have been identified to be surveyed in this investigation and include the Flightline Area, The Munitions Area, and the 8500 Area (Figure 2). The Flightline Area measures 242 acres (ac) and consists of a relatively level, built up area beside the Tyndall AFB airfield. The area includes numerous structures, paved areas, water diversion structures, and utilities mostly designed to service air field needs. A large portion of the 242-acre Flightline Area was not shovel tested due to the existing built environment; shovel testing was confined to non-built areas.





Figure 2. Portion of the Long Point, FL 7.5-minute topographic quadrangle showing the cultural survey areas.

October 2019

The Munitions Area measures 82 ac and similarly consists of a relatively level, built up area with numerous ammunition storage bunkers and facilities for servicing the storage, removal, and safety of keeping munitions in the area. Shovel testing in the Munitions Area was also limited to non-built areas.

The 8500 Area measures 18 ac and is less developed than the other two survey areas. The northern half of the of the parcel is level where several buildings, paved areas, and a loop road currently exist and the southern half of the parcel slope downward toward St. Andrew's Sound to the south. Shovel testing in the 8500 Area was also limited in the vicinity of built areas.

### **Reporting Conventions**

Cultural resources specialists typically express measurements using the metric system when reporting on indigenous archaeological sites and English measurements when discussing non-indigenous properties. In this report, measurements derived from United States Geological Survey (USGS) maps or other sources in which English measurements are used, are given only in English dimensions. Thus, distances are given in miles (mi) and survey areas are given in ac. Scientific measurements of survey coverage, excavations, distances to the nearest water sources, and indigenous resources will be expressed in metric units. Metric-English conversions are provided for clarity where appropriate or as originally presented.

## ENVIRONMENTAL SETTING

### Legal Description

Tyndall AFB is located in Bay County, Florida, approximately 6.0 mi south of Panama City. The facility is situated along 18 mi of a northwest trending peninsula that is landlocked on its southeastern side. The peninsula is bordered by East Bay to the north, St. Andrews Bay to the northwest, west and southwest, and St. Andrews Sound to the southeast. The peninsula is attached by a small isthmus to Shell Island to the south and southwest that shields it from the Gulf of Mexico. Township and Range are situated on a slightly irregular polygonal system due to Tyndall AFB's peninsular location and the irregular coastlines that coincide with this setting. Table 1 summarizes the Township, Range, and Sections within which the project-related areas are located.

Survey Area	Township	Fownship Range	
	55	13W	6 and 7
Flightline Area	58	14W	1
Munitions Area	5S	13W	4 and 9
8500 Area	58	13W	21

Table 1. Public Land Survey System Subdivisions of the Project Areas.

#### Climate

The climate of Bay County is heavily influenced by the Gulf of Mexico and considered moderate, with high humidity and warm temperatures present most of the year. Summers are long, warm, and humid and winters are mild to cool. Average annual rainfall for the area is 152.4 centimeters (cm) (60 inches [in]) (Duffee et al. 1984). Thunderstorms are frequent during summer months occurring 1 to 3 days a week. Occasionally, the passage of tropical disturbances and hurricanes occur capable of producing heavy rains and winds in excess of 200 miles per hour occur during the late summer months at an average rate of about one storm every 8 years.

## Geomorphology

Tyndall AFB lies within the Gulf Coast Lowlands, a subdivision of the northern or proximal geomorphic zone, as described by White (1970). The development of the Gulf Coast Lowlands occurred over the past 5 million years as shifts in groundwater related to glaciation events led to the development of karst landforms (Rupert and Arthur 1990). This karst development, in association with processes of erosion and sedimentation by high-standing Pleistocene seas, has produced a series of eight marine terraces in Bay County. Tyndall AFB is located on the two southernmost and lowest in elevation, the Pamlico Terrace at 8 to 25 feet above mean sea level (amsl) and the Silver Bluff Terrace 0 to 10 feet amsl (Duffee et al. 1984).

#### Soils

A number of factors influence soil formation, including parent material, climate, effect of biological organisms, surface relief, and time (Duffee et al. 1984). Additionally, impacts such as those from tropical storms and mechanical disturbances can mix and redeposit soils. As illustrated in Figures 3 through 5 and Table 2, seven soil types are plotted across the three project areas including: Arents 0 to 5 percent slopes; Urban land; Pickney fine sand; Leon sand 0 to 2 percent slopes; Rutlege sand, 0 to 2 percent slopes; Osier











fine sand, and Mandarin, 0 to 2 percent slopes (Soil Survey Staff 2019, Duffee et al. 1984). A description of each soil type follows.

Project Survey Area	Map Symbol	Soil Type	Acres (sum)
Flightline	43	Urban land	178.81
Flightline	40	Arents 0 to 5 percent slopes	63.52
Munitions	50	Pickney fine sand	7.54
Munitions	13	Leon sand 0 to 2 percent slopes	1.88
Munitions	40	Arents 0 to 5 percent slopes	67.79
Munitions	29	Rutlege sand 0 to 2 percent slopes	1.04
Munitions	31	Osier fine sand	2.11
Munitions	99	Water	1.14
8500	13	Leon sand 0 to 2 percent slopes	13.09
8500	50	Pickney fine sand	1.36
8500	27	Mandarin 0 to 2 percent slopes	3.46

Table 2. Soil Units within Project Survey Areas.

*Arents 0 to 5 percent slopes*. This soil unit consists of land created by human induced earthmoving activities including dredging, cutting, filling, and levelling. Slopes are generally manufactured and smooth. A variety of soil color is possible depending on mixture of parent material and is mostly sandy in texture within Bay County (Soil Survey Staff 2019, Duffee et al. 1984).

*Urban land*. This soil unit is primarily those areas consisting of high densities of residential, commercial, and industrial developments. The surface of these areas is typically graded, and the original soils may have been altered by cutting, filling, shaping, and grading, or may have been overlain by concrete or other surface coverings (Soil Survey Staff 2019, Duffee et al. 1984).

*Pickney fine sand.* This soil unit is a very deep and very poorly drained sandy soil situated on nearly level flats and slightly depressional areas in the coastal lowlands. Slopes are primarily flat to less than 1 percent. The surface layer is black sand to a depth of approximately 76.2 cm (30 in). A subsurface layer of dark gray fine sand extends to a depth of 116.8 cm (46 in). The substratum extends to a depth of 203.2 cm (80 in) and is composed of gray or light gray fine sand (Soil Survey Staff 2019, Duffee et al. 1984).

*Leon sand 0 to 2 percent slopes*. This soil unit is a very deep and poorly drained sandy soil of the coastal lowlands. Slopes are generally less than 2 percent and are situated in areas of nearly level flatwoods. The surface consists of dark gray sand to about 7.62 cm (3 in). A gray sand subsurface extends to a depth of 38.1 cm (15 in) and is underlain by subsoil that extends to 203.2 cm (80 in). The subsoil consists of three distinct parts that include a dark reddish brown and dark brown sand upper part, a light brownish gray and very pale brown sand middle part, and a very dark brown sand lower part (Soil Survey Staff 2019, Duffee et al. 1984).

*Rutlege sand 0 to 2 percent slopes*. This soil unit occurs along drainageways on nearly level to slightly depressional surfaces. The surface layer is typically black sand to a depth of 33.0 cm (13 in) followed by very dark gray sand to 55.9 cm (22 in). Subsoil consists of gray sand to 139.7 cm (55 in) and light gray sand mottled with yellow and brown to 203.2 cm (80 in) (Soil Survey Staff 2019, Duffee et al. 1984).

*Osier fine sand*. This soil unit is a somewhat poorly drained soil in nearly level or in slightly depressional areas and flatwoods. The surface layer is typically black fine sand to a depth of 20.3 cm (8 in) followed

by a subsurface of dark gray fine sand to 86.1 cm (34 in). Subsoil is a dark gray fine sand to 109.2 cm (43 in), dark gray fine sand to 152.4 cm (60 in) and then brown and gray fine sand to 203.5 cm (80 in) (Soil Survey Staff 2019, Duffee et al. 1984).

*Mandarin 0 to 2 percent slopes.* This soil unit is a somewhat poorly drained soil in nearly level or very gently sloping environments on ridges and knolls in the flatwoods. Typically the surface layer is gray sand to a depth of about 17.8 cm (7 in). A subsurface layer is composed of white sand to a depth of 63.5 cm (25 in). Subsoil is dark brown sand to 91.4 cm (36 in) and then brown and dark brown sand to 142.2 cm (56 in). A substratum consisting of light brownish gray sand occurs to 203.5 cm (80 in) (Soil Survey Staff 2019, Duffee et al. 1984).

## Flora and Fauna

The Florida panhandle lies entirely within the Coastal Plain physiographic province. This region is further subdivided into the Northern Highlands and the Gulf Coast Lowlands, the latter of which encompasses the southern portion of Bay County and the Tyndall AFB project area (Rupert 1993). The predominant natural communities on the facility are estuarine tidal marsh, scrub habitat, mesic flatwoods, scrubby flatwoods, wet flatwoods, beach dunes, and baygall.

Tidal marsh habitat occurs in the coastal zone and includes areas where the natural community is predominantly herbaceous. These areas are typically protected from large waves by a topographic barrier such as a shoreline slope or barrier island. This habitat may have distinct vegetation zones dominated by a single species of grass or rush. Seaward edges are typically dominated by saltmarsh cordgrass (*Spartina alterniflora*) while higher and less frequently flooded areas are dominated by needle rush (*Juncus roemerianus*). Other species present may include Carolina sea lavender (*Limonium carolinianum*), wand loosestrife (*Lythrum lineare*), and perennial saltmarsh aster (*Symphyotrichum tenuifolium*). Freshwater influx from the uplands may influence the landward edges of the marsh, which may contain species such as needle rush, and sawgrass (*Cladium jamaicense*), as well as several species of *Spartina* cordgrass (Florida Natural Areas Inventory [FNAI 2010]).

Scrub habitat is a unique plant community characterized by the dominance of evergreen woody shrubs and herbaceous perennials with extremely limited or no tree canopy. It develops on dry, xeric, sandy ridges and dunes typically behind beaches. Common plants found in scrub habitat include sand pine *(Pinus clausa)*, Florida rosemary *(Ceratiola ericoides)*, saw palmetto *(Serenoa repens)*, threeawns *(Aristida spp.)*, hairsedges *(Bulbostylis spp.)*, and sandyfield beachsedge *(Rhynchospora megalocarpa)* (FNAI 2010).

Mesic flatwoods habitat is characterized by an open canopy of pines, principally longleaf pine (*Pinus palustris*) and a dense ground layer of low shrubs, grasses, and forbs. Common plants of the mesic flatwoods include slash pine (*Pinus elliottii*), saw palmetto, galberry (*Ilex glabra*), coastalplain staggerbush (*Lyonia fruticosa*), wiregrass (*Aristida stricta*), dropseeds (*Sporobolus curtissii*), panigrasses (*Dichanthelium* spp.), and broomsedges (*Andropogon* spp.) (FNAI 2010).

Scrubby flatwoods habitat includes an open canopy of widely spaced pine trees with a low, shrubby understory of scrub oak (*Quercus* spp.) and saw palmetto. The primary canopy species is longleaf and slash pine. One of four species of scrub oak and typical plants found in the mesic flatwoods including saw palmetto are also present. Wiregrass, broomsedge bluestem (*Andropogon virginicus*), and little bluestem (*Schizachyrium scoparium*) are some of the grasses found within the scrubby flatwoods (FNAI 2010).

Wet flatwoods are pine forests with little or no midstory, but with a dense groundcover of herbs, grasses, and low shrubs. Dominant pines include longleaf pine, slash pine, and pond pine (*Pinus serotina*). The groundcover may include sweetbay (Magnolia virginiana), swamp bay (Persea palustris), titi (Cyrilla recemiflora), and wax myrtle (Myrica cerifera). Herbs include wiregrass, blue maidencane (Amphicarpum muhlenbergianum), toothache grass (Ctenium aromaticum), beaksedges (Rhynchospora chamanni, R. latifolia, and R. compressa), and pitcher plants (Sarracenia spp.) (FNAI 2010).

Beach dune communities contain predominantly herbaceous cover of typically coastal specific plants. Sea oats (Uniola paniculata) typically builds this community, whose stems trap windblown sand grains from the beach. Other grasses tolerant of sand burial may include bitter panicgrass (Panicum amarum) and saltmeadow cordgrass (Spartina patens). Camphorweed (Heterotheca subaxillaris) may grow with sea oats along with creeping species such as beach morning glory (Ipomoea imperati) and railroad vine (Ipomoea pestcaprae ssp. brasiliensis), as well as salt-tolerant grasses such as seashore paspalum (Paspalum vaginatum) and seashore dropseed (Sporobolus virginicus) (FNAI 2010).

Baygall is an evergreen forested wetland of bay species located in a pronounced surface depression. Bay species found in baygalls include loblolly bay (Gordonia lasianthus), sweetbay, and swamp bay (Persea palustris). Examples of understory vegetation include fetterbush (Lyonia lucida), large gallberry (Ilex coriacea), dahoon (Ilex cassine), black titi (Cliftonia monophylla), and wax myrtle. Other trees may be found in the canopy along with the bays. These may include loblolly pine, sweetgum (Liquidambar styraciflua), and swamp tupelo (Nyssa sylvatica var. biflora) (FNAI 2010).

The variety of habitats found within the project area support a great number of mammals, birds, reptiles, and amphibians. Mammalian species common to the area include common raccoon (*Procyon lotor*), coyote (*Canis latrans*), swamp rabbit (*Sylvilagus aquaticus*), and river otter (*Lontra canadensis*). Other species likely to occur in the project area include white-tailed deer (*Odocoileus virginianus*), Virginia opossum (*Didelphis virginiana*), and common muskrat (*Ondatra zibethicus*).

Florida is home to 142 native species of amphibians and reptiles (Krysko et al. 2011). Common species within the area of Tyndall AFB and the central Florida panhandle include American alligator *(Alligator mississippiensis)*, green anole *(Anolis carolinensis)*, bluestripe ribbon snake *(Thamnophis sirtalis sauritus)*, southern black racer *(Coluber constrictor priapus)*, and Florida cottonmouth *(Agkistrodon piscivorus conanti)* (Krysko et al. 2011). The area is also within the range of the Eastern indigo snake *(Drymarchon corais couperi)* that is Federally listed as a threatened species due to habitat loss (Krysko et al. 2011).

During a study conducted between 1961 and 1963, Cooley (1978) identified 180 species of bony fishes in and around Pensacola's estuary system. Several of the more common species encountered during these surveys included southern codling (*Urophycis floridana*), gafftopsail catfish (*Bagre marinus*), sand weakfish (*Cynoscion arenarius*), gulf menhaden (*Brevoortia patronus*), and flathead mullet (*Mugil cephalus*).

According to the bird checklist for Tyndall AFB (Department of Defense [DoD] Partners in Flight [PIF] 2013), 253 resident, migratory, and wintering avian species have been recorded on the Tyndall AFB facility. Common resident species that utilize the various habitats found on the facility for breeding and nesting purposes include northern cardinal (*Cardinalis cardinalis*), common yellowthroat (*Geothlypis trichas*), fish crow (*Corvus ossifragus*), European starling (*Sturnus vulgaris*), sanderling (*Calidris alba*), laughing gull (*Leucophaeus atricilla*), mourning dove (*Zenaida macroura*), and great blue heron (*Ardea herodias*). Migrant species include those birds that utilize the variety of habitats on Tyndall AFB as stopover sites during their annual southbound (spring) or northbound (fall) migrations. Included among these are lesser yellowlegs (*Tringa flavipes*), semipalmated sandpiper (*Calidris pusilla*), pectoral

sandpiper (*Calidris melanotos*), red-eyed vireo (*Vireo olivaceus*), blue grosbeak (*Passerina caerulea*), indigo bunting (*Passerina cyanea*), and Baltimore oriole (*Icterus galbula*). Numerous species also travel from more northerly latitudes to winter on the facility including common loon (*Icterus galbula*), dunlin (*Calidris alpina*), piping plover (*Charadrius melodus*), semipalmated plover (*Charadrius semipalmatus*), horned grebe (*Podiceps auritus*), American robin (*Turdus migratorius*), yellow-rumped warbler (*Dendroica coronata*), savannah sparrow (*Passerculus sandwichensis*), swamp sparrow (*Melospiza georgiana*), American goldfinch (*Spinus tristis*), and numerous species of waterfowl (DoD PIF 2013).

### CULTURAL SETTING

#### **Prehistoric Context**

The prehistory of the Florida Panhandle/Northwestern Florida region extends deep into remote antiquity, is unquestionably complex, and as a result has many unresolved controversies. A comprehensive discussion of the prehistoric record and the divergent opinions of specialists are beyond the scope of this investigation. The following discussion is intended to be general in nature with a focus on major trends in the regional culture history<sup>1</sup>.

The exact timing of the first human migration into North America is still a subject of considerable debate. The general consensus among archaeologists, based on datable archaeological evidence from contexts with credible integrity, suggests that humans were in North America by the end of the Late Pleistocene epoch—sometime around 11,200 years Before Present (B.P.) to 10,900 B.P. (Anderson et al. 1996; Grayson 1993; Milanich 1994; Taylor et al. 1996; Beck and Jones 2007). By this time, human populations were established in the Americas as far south as Chile. Most scholars agree that the thenextant Bering Land Bridge was the primary access point for the earliest Americans, and it is possible that additional populations crossed via coastal routes.

The landscape encountered by the initial inhabitants of the Bay County area has changed dramatically from an upland river valley to a coastal bay. Florida supported interior forests, grasslands, and a coastal plain that was 100 miles wider than today (Weisman 2003:216). With lower sea level, the current location of Tyndall AFB would have been 60 to 70 miles from the Late Pleistocene coastline. Since that period, global climatic change has led to a rise in sea levels, inundating earlier coastlines and rivers. Climate change from a cooler, drier climate to one more mesic and warm with maritime influences has altered the available resources for people inhabiting the area. Throughout the geographic flux of the last 12,000 years, humans have maintained a presence in the region, and while the material remains of some of the earliest inhabitants of the region have been inundated by rising seawater along the continental shelf, the current project area locality was available for human occupation and use throughout this time.

Scholars recognize six major cultural periods for northwestern Florida. These cultural periods are distinguished by what has been interpreted as substantive changes in life ways as represented by the material remains of the inhabitants of the region over time. The timing of these periods is debated and somewhat arbitrary, as major changes in life ways and the material culture from which they are interpreted likely occurred over time, with various permutations over the landscape and not simultaneously on an absolute date. Nevertheless, changes in material culture form the chronological and interpretive backbone of prehistory and will be conformed to here.

The major culture periods generally recognized for northwestern Florida include the Paleoindian Period, Archaic Period, Woodland Period, Mississippian Period (some scholars combine this with the Woodland Period), Protohistoric Period, and the Historic Period (Table 3). Each of the major periods is further divided into multiple sub-periods and local phases based on the nature of the local archaeological record. Each of the local phases in Table 3 will be briefly summarized below. A more comprehensive synthesis of the prehistory and history of Tyndall AFB is provided in the *U.S. Air Force Integrated Cultural Resources Management Plan Tyndall Air Force Base* (Tyndall AFB 2016).

<sup>&</sup>lt;sup>1</sup> Prehistoric dates and Table 3 dates are provided in years Before Present (B.P.), with protohistoric and historic dates in conventional *Anno Domini*.

Culture Period	Subperiod	Phase/Culture(s)	Approximate Years B.P.
Historia		American	195 - present
HISTORIC		European	350 - 195
Protohistoric		Bear Point	550/450 - 350
Mississippian		Fort Walton - Pensacola	1050 - 550/450
	Late Woodland	Weeden Island - Wakulla	1650 - 1050
Woodland	Middle Woodland	Santa Rosa-Swift Creek	1740 - 1650
	Early Woodland	Deptford	2500 - 1740
	Late Archaic		5000 - 2500
Archaic	Middle Archaic		7000 - 5000
	Early Archaic		9500 - 7000
Paleoindian			12,000 - 9500

Table 3. Cultural Chronology of Northwestern Florida.	Table 3.	ltural Chronology o	of Northwestern	Florida.*
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\* Adapted from Milanich (1994).

#### The Paleoindian and Archaic Periods

Little is known of the earliest human inhabitants of the Florida Panhandle/northwestern Florida area. Rising sea levels since the end of the Pleistocene have inundated many coastal sites and destroyed others that were once exposed to human occupation (Faught 2004). Small groups of mobile hunter-gatherers are also difficult to detect archaeologically. Much of our understanding from this period is derived from rare lithic assemblages in securely dated contexts. The majority of Paleoindian sites discovered in Florida are in areas of karstic geologic formations to the east. Scholars have hypothesized that during the arid conditions that prevailed during the Late Pleistocene to Early Holocene, these karstic formations trapped water, forming watering holes where game animals would gather (Dunbar and Waller 1983; Dunbar et al. 1989). Such locations would provide opportunistic ambush locations for Paleoindians to kill prev and as a result, numerous archaeological sites of Paleoindian age have been located in these settings (Dunbar and Waller 1983; Dunbar et al. 1989). Paleoindian groups in Florida exploited large game animals and are recognized by large, distinctive projectile points. The lanceolate points, when combined with the spearthrower, allowed the Paleoindians to hunt large mammals such as mammoth, mastodon, sloth, dire wolf, as well as bison, deer, and a variety of smaller game. The most characteristic Paleoindian tool identified in Florida is the Suwannee-type projectile point, although Clovis points have also been found. Numerous Suwannee points have been recovered in association with springs and rivers, where they were presumably used to ambush prey (Dunbar and Waller 1983; Dunbar et al. 1989; Milanich 1994; Milanich and Fairbanks 1980:39).

Additional diagnostic tools from the Paleoindian Period include unifacial scrapers, endscrapers, discoidal scrapers, and oblong scrapers, as well as adzes, spokeshaves, flaked knives, retouched flakes, blade tools, and oval stone weights presumably used for bolas (Milanich 1994:51; Milanich and Fairbanks 1980:39). Underwater excavations, such as those at Warm Mineral Springs, have given us a rare window into Paleoindian perishable tools of bone and shell. These include antler projectile points, socketed bone handles, an oak log mortar, and even a boomerang similar to those used by Australian Aborigines (Milanich 1994:53; Milanich and Fairbanks 1980:42).

As the climate gradually warmed around 9500 B.P., precipitation increased, sea levels rose, and plant and animal populations changed dramatically. The changing climate ultimately resulted in denser inland vegetation, which expanded the habitat of some species but reduced that of others. The populations of

megafauna were particularly vulnerable to changes in the climate and potentially under increased pressure from human predation, eventually became extinct (Milanich and Fairbanks 1980:45).

The Paleoindian Period is followed by the Archaic Period, which is marked by climate change and a shift from the hunting of large game animals to a more varied hunting and gathering lifestyle. Projectile points became progressively smaller, reflecting increased reliance on smaller and more furtive game. It also marks the beginnings of horticultural subsistence practices. The warmer and wetter conditions mentioned above also favored some plant species, such as the wild ancestors of corn, beans, squash, sunflower, and goosefoot. Human populations in the Americas began an intense economic relationship with these plant species, and in the process domesticated many of them whether through intentional selective breeding or by inadvertently scattering their seeds while harvesting and transporting them (Smith 2006).

Artifacts from Archaic Period sites typically include a wide variety of chipped stone projectile points, ranging from large points with concave stems in the Early Archaic (Arredondo), to notched varieties in the Late Archaic (Putnam, Layfayette and Clay). A higher population density than in previous periods is attested to by the fact that stemmed Middle Archaic points are the most frequently found type in Florida (Milanich and Fairbanks 1980:51-57). Some larger sites are known to be located near lithic quarries, though isolated quarry locations also exist. Lithic technology was an integral part of the Archaic economy, though less is known of perishable commodities and tools. Surviving bone tools include fish hooks, antler handles, awls and punches (Milanich and Fairbanks 1980:54).

A variety of ground stone implements can be found at sites dating to the Late Archaic Period (5000 to 2500 B.P.) along with evidence for semi-sedentary villages with formative agricultural practices. It is likely that social groups would aggregate seasonally into large communities at select times of the year, and disperse into smaller groups at other times. Larger settlements are known to cover more than 6 ac and produce hundreds of stone tools when surface collected (Milanich and Fairbanks 1980:50). Archaic peoples in Florida also constructed highly visible ring-shaped shell middens, some of which are 6 meters (m) in height and devoid of habitation debris. These seem to be deliberate monuments constructed during feasting events associated with aggregations of the population (Wallis 2007:216).

The anaerobic environment of some underwater sites in Florida have resulted in the excellent preservation of cultural materials and offer archaeologists unique insights into Archaic ways of life. For example, low water levels at Newnans Lake in the year 2000 revealed more than 100 well-preserved wooden Archaic Period canoes (Wheeler et al. 2003). The canoes were generally fire-hollowed logs with a narrow beam and shallow depth. The canoes would not have been very stable in open water, but would be a rapid form of transportation in experienced hands. The discovery at Newnans Lake confirms that canoe technology was an important part of the Archaic adaptation to aquatic environments, and was already in place by 4500 to 5000 B.P. (Wheeler et. al. 2003:546).

At Tyndall AFB, a possible Late Archaic cemetery was discovered at site 8BY165, which also contains Deptford Phase and Weeden Island Phase components. The cemetery included the burial of three to four individuals. Although no artifacts were found in association with the burials radiocarbon dates of cal 353-358 BC (2143 BP 1 $\sigma$  error 29) were obtained for the Woodland Period component of the site situated in the deposit above the cemetery suggesting an earlier Archaic Period date for the cemetery. The presence of the cemetery suggests Archaic Period people returned to the location periodically (Tyndall AFB 2016).

Radiocarbon dates were also obtained from an additional Late Archaic site (8BY09) at Tyndall AFB. Radiocarbon dates from 8BY09 suggest the site was occupied from 2,510 and 3,500 BP (840-470 B.C.)(Tyndall AFB 2016).

Paleoindian and Archaic Period sites are relatively rare in northwest Florida. The National Register of Historic Places (NRHP) listed Thomas Creek Archaeological District (8SR338<sup>2</sup>) in Santa Rosa County and the Page-Ladson site (8JE591) between Jefferson and Taylor counties as among the few regional sites with evidence of Paleoindian and Archaic Period occupations. The continuing rise of sea levels has inundated many coastal sites, including shell middens that have only been recently identified by divers (Milanich and Fairbanks 1980:50). The rising sea level associated with Holocene warming have affected the cultural record of Florida dramatically, and many surviving sites are now miles offshore, while others have been severely damaged or destroyed by erosion (Weisman 2003:216-217).

#### The Formative Period: Woodland and Mississippian Cultures

### Deptford Phase (2500 to 1740 B.P.)

The early Woodland Period in northwest Florida is defined by increasing sedentism, population growth, the appearance of burial mounds, and a marked increase in plant domestication. Pottery and ceramic production technology had already been introduced by Late Archaic times and continued to develop and flourish in the Woodland Period (Milanich and Fairbanks 1980:60). From this point forward, most scholars primarily differentiate chronological phases by changes in pottery types. The Deptford Phase is recognized by sand-tempered pottery stamped with carved wooden paddles, and is further differentiated by distinct methods that include Simple-Stamped, Check-Stamped, and Linear Check-Stamped types. Malleated pottery (roughened with a paddle wrapped in cord) and smooth-walled types are also present and recognized methods of this early phase (Milanich and Fairbanks 1980:65). Deptford Phase ceramics have non-spiculate, non-micaceous grit and sand paste (Cordell 1993).

More than 500 Deptford Phase sites have been documented in north Florida, and there is potential for many more to be discovered. Four Deptford Phase sites are listed on the NRHP in northwest Florida and include the Fort Walton Mound (80K6), the Waddells Mill Pond site (8JA65), the Yent Mound (8FR5), and the Pierce site (8FR14). Each of these sites also contains later occupational components. One archaeological district containing Deptford Phase sites, the Thomas Creek Archaeological District (8SR338), is also listed on the NRHP. Additional Deptford phase sites important to the regional prehistory include the Trestle Bridge, Hawkshaw (8ES1287), Pirate's Bay, Tucker, Carrabelle (8FR2), and Oakland Mound (8JE53) sites.

Deptford Phase sites are frequently located in live oak-magnolia hammocks adjacent to salt marshes (Milanich and Fairbanks 1980:68). At the time, these locations would have provided a wide range of edible plants and animals, and archaeological evidence indicates that Deptford Phase populations exploited nearly all of the available resources. Additional habitats, each supporting a variety of economically important species, were located nearby and were easily accessible by canoe or overland travel (Milanich and Fairbanks 1980:69). Data from Hawkshaw (8ES1287), Moccasin Mound (8SR85), and the Tucker site indicate that Deptford Phase populations exploited such estuarine resources as oyster, rangia, marsh clam, and several species of bony fish, as well as terrestrial animals such as deer, small mammals, and reptiles (Bense 1985:161-2; Claassen 1985:128; Milanich 1973:57). At Hawkshaw (8ES1287), there is also evidence of extensive gathering in the form of hickory nuts and acorns (Bense 1985:162). However, there is currently no evidence for the cultivation of domesticated plants from any Deptford Phase sites in northwest Florida, despite the evidence for increasing sedentism and increasing population. This may be a consequence of limited data from a small range of sites or the limited number of paleoethnobotanical studies conducted at Deptford Phase sites to date.

<sup>&</sup>lt;sup>2</sup> Florida Master Site File site numbers are provided where available. Some named sites have not been assigned formal site numbers, whereas some site numbers have no associated names.

Deptford Phase sites typically consist of three types: shell middens, inland middens, and burial mounds. Of the three site types, shell middens are the most common, the most visible, and the most well-known/documented. Local examples include the Hawkshaw site (8ES1287) in Pensacola, and the Pirate's Bay site on Choctawhatchee Bay. Deptford shell middens are often circular, ranging from 6 m to 9 m in diameter, and represent the accumulation of refuse from individual households. At sites with longer occupations, the middens can overlap, and sometimes form a larger communal midden. Fully excavated examples of Deptford Phase houses are oval shaped, can be as large as 6.7 m to almost 10 m in length, and tend to be arranged in a linear pattern parallel to the marsh. It has been estimated that each house was inhabited by five to six individuals and that Deptford Phase villages had five to 10 houses at any given time (Milanich and Fairbanks 1980:72-73).

Inland sites tend to be smaller than coastal sites, and can be more difficult to detect archaeologically. Compared to coastal locations, inland sites are relatively small and ephemeral, containing only artifact scatters with very limited assemblages and occasionally shallow middens. Inland sites are typically located around lakes and along rivers in the Tallahassee Hills (Tesar 1980:77) and in the pine forests of the Apalachicola National Forest (Forney 1985:101). Deptford Phase sites are also found on river channels, springheads on tributaries of streams, or adjacent to lakes and marshes in such places as the Upper Apalachicola River (White 1981), the Lower Apalachicola River Valley (Henefield and White 1986), the Choctawhatchee Bay area (Thomas and Campbell 1985:73) and in the Escambia River Valley (Bense 1985:163). Milanich (1973:56) suggests that this distribution indicates primary settlement along the coast, but sporadic or seasonal use of inland sites. Some researchers (White 1986:203; Tesar 1980:78), however, argue for a more intensive interior occupation. Given the lower visibility of interior sites compared to coastal sites, this issue remains unresolved.

Deptford Phase populations also constructed burial mounds, which occur late in the Deptford sequence and are quite rare, but can occur in a variety of ecological settings (Sears 1962). Deptford Phase examples of burial mound sites include Crystal River, Yent (8FR5), and Pierce (8FR14). The famous Yent Mound and Pierce Mound A are located on the coast (Sears 1962:6), but the Oakland Mound (8JE53) is found in inland Jefferson County (Tesar 1980:75). Although the exact dates of both Yent and Pierce are controversial (possibly dating to the post-Deptford Santa Rosa and Swift Creek phases), the Oakland Mound (8JE53) is securely dated to the Deptford Phase (Morrell 1960). Regardless of its exact chronological sequence, the Yent Mound represents the first clear evidence of the elaborate mortuary ceremonialism that characterizes the mortuary rituals of later periods.

Based on evidence from Yent, Sears (1962) identified a complex of ceremonial items he called the "Yent Complex." Although Deptford Phase sites are found across northern Florida, Yent Complex artifacts are confined to northwest Florida, along the Gulf Coast and including the current project area. The elaborate ceremonialism attested to by the Yent Complex may have been a result of contact both with more complex Woodland societies of the north (e.g., Adena, Hopewell, Cartersvile, and Copena) and with Gulf coastal plains peoples such as Tchefuncte (Milanich and Fairbanks 1980: 84). Supporting this hypothesis is the fact that many exotic items originating in these areas were found in early excavations.

Yent Complex mounds are round or oblong, and range from 18 m to 30 m in diameter (Sears 1962:5-6). Although many of the burials found in the mounds date from subsequent phases (Santa Rosa-Swift Creek through late Fort Walton), these structures eventually contained hundreds of burials indicating sustained use. Burial types within the mounds were diverse and include flexed, bundle, and single skull burials, as well as the occasional extended burial at Crystal River. The variation in burial types is further evidence that the mounds were used continuously for long spans of time (Sears 1962:4-5).

Funerary offerings associated with the Yent Complex are numerous and diverse, and include ceramic forms not normally found in Deptford Phase village sites. Mortuary vessels include a wide range of

unique and elaborate forms. At least some of these forms are thought to have been used to prepare ceremonial or medicinal teas, such as the infamous "black drink" (*Ilex vomitoria*) made from yaupon holly, which was used in historic periods to induce vomiting during religious ceremonies (Milanich 1994). Many of the ceramic vessels were ceremonially "killed" by punching a hole through the bottom, presumably so that the spirit of the vessel could accompany the dead to the afterlife or to prevent reuse (Milanich and Fairbanks 1980:86-87).

Other, more exotic items found in association with burials include copper panpipes, copper plates, and copper ear spools. One pair of copper earspools from Crystal River was silver plated and inset with pearls (Milanich 1994; Milanich and Fairbanks 1980:86). Cut carnivore teeth, plummets made from copper or stone, soapstone pipes, and an array of shell, bone, and copper ornaments are also known from burial contexts (Sears 1962:6-8; Weisman 2003:212). The chronological timing of the introduction of many of these exotic objects is uncertain due to the fact that the mounds were investigated before modern archaeological methods and techniques were employed. However, Deptford Phase sites may include insipient forms of an increasingly elaborate ceremonialism associated with mortuary practices on the Gulf Coast throughout later periods (Milanich and Fairbanks 1980:88).

# Santa Rosa-Swift Creek Phase (1740 to 1650 B.P.)

The Santa Rosa-Swift Creek Phase is a local cultural manifestation characterized by overlapping evidence of the Santa Rosa and Swift Creek cultural phases. The Santa Rosa-Swift Creek Phase represents the Middle Woodland Subperiod in northwest Florida. It is recognized by innovative pottery technology, mound burials, and a ceremonial complex which appears to have been heavily influenced by cultures to the north (Milanich and Fairbanks 1980:117). As mentioned above, artifacts of the Yent Complex may actually belong to the Santa Rosa-Swift Creek Phase and postdate Deptford. However, there is a considerable continuity between the Early and Middle Woodland Periods, and Santa Rosa or Swift Creek Phase components are found at all the Deptford Phase sites listed on the National Register.

Santa Rosa and Swift Creek are conceptualized as both the pottery styles and the heterogeneous groups that made, used, and distributed them. Complicating the issue is that these pottery types overlap in both time and space. In northwestern Florida, Santa Rosa pottery designs are influenced by cultures in the Lower Mississippi Valley (e.g., Marksville) and in Mobile Bay. By contrast, Swift Creek appears to have originated in Georgia and is found exclusively east of the Apalachicola Valley, except in mortuary contexts where Swift Creek ceramics occasionally occur as exotic grave goods. Wallis (2007:212) suggests that Swift Creek is best thought of as composed "of cultural groups that were distinct in many ways [yet] participated in a vast mélange of complicated stamped pottery production, exchange, and use". Santa Rosa and Swift Creek pottery series co-exist west of the Apalachicola Valley (as far as Mobile Bay) where they are referred to as Santa Rosa-Swift Creek.

Accordingly, both Santa Rosa and Swift Creek pottery series exhibit considerable internal diversity. The Santa Rosa pottery series includes Alligator Bayou Incised, Basin Bayou Incised, Santa Rosa Stamped, Santa Rosa Punctated, and fine paste, thin-walled plain ware. Likewise, Swift Creek pottery types include Swift Creek Complicated Stamped, St. Andrews Complicated Stamped, New River Complicated Stamped, West Florida Cordmarked, and Crooked River Complicated Stamped. Basal sherds with tetrapods and scalloped and/or crenellated-edged rims are also diagnostic of Swift Creek pottery (Milanich and Fairbanks 1980:90, 120-123).

Swift Creek lithic tools are generally made from imported chert and occasional exotic items, such as fossils and micaceous schist (White 1986:209). Locally available raw materials were used as well, but the nonlocal lithic materials were acquired through trade relationships within the Hopewell interaction sphere centered in the Mississippi valley to the west. Projectile point types include Swift Creek, Savannah

River, Bakers Creek; all of which are stemmed. Some examples are resharpened, and may have been hafted as knives rather than projectile points (Milanich and Fairbanks 1980:119-120).

Santa Rosa and Swift Creek sites in northwest Florida are not particularly well understood at present. Fewer sites are known from this phase than from other periods and few excavations have been conducted at Santa Rosa or Swift Creek sites. Many of the excavations were small-scale or took place decades ago, before current methods and techniques became available or common. Finally, the majority of previous investigations have been carried out at coastal sites, skewing our sample and resulting knowledge towards coastal occupations (Tesar 1980:596). Santa Rosa-Swift Creek sites listed in the NRHP include the Porter's Bar (8FR1), Hartsfield (8LE120A), Yon Mound and Village (8LI2), and Bird Hammock (8WA30) sites. Other important sites include Green Point (8FR11), 8BY73, Refuge Tower (8WA14), Snow Beach (8WA52), and Third Gulf Breeze (8SR8) sites. At Tyndall AFB Swift Creek pottery has been documented at the Hare Hammock site (8BY1347) a ring-midden village (Tyndall AFB 2016).

Known site types include inland villages, scattered inland campsites, coastal villages in strand hammocks, and coastal shell middens. Coastal sites are best known through shell middens, which have been discovered directly on the beach (e.g., Third Gulf Breeze [8SR8]), in estuaries (e.g., 8BY73 and Depot Creek [8GU56]), or slightly inland in coastal hammocks (e.g., Bird Hammock [8WA30]). Coastal shell middens can be horseshoe or circular shaped, rectangular, or linear. Circular, horseshoe-shaped, or rectangular shell middens have cleared internal areas and tend to be much larger (e.g., Bird Hammock [8WA30], Snow Beach [8WA52], and 8BY73). While the size and depth of the circular, semicircular, or rectangular middens is thought to indicate permanent villages, the linear middens are smaller and may indicate temporary special-use camps (Milanich and Fairbanks 1980:118).

Inland sites have received less attention, likely as a function of survey coverage in interior areas (Tesar 1980:596). Where good coverage exists (e.g., the Apalachicola River Valley), most sites are located near the river (e.g., 8JA205, 8JA227). A fewer number of sites are located on high bluffs (e.g., Beaver Dam Creek [8LI208]) or at the edge of swamps (e.g., the Roy Whitfield site [8GU52]) (White 1986:204; Henefield and White 1986:123). Likewise, Swift Creek sites in the Tallahassee Hills are most often near lakes and swamps (e.g., 8LE471, 8LE484) (Tesar 1980:595).

Most of our information about the subsistence economy of Santa Rosa and Swift Creek populations is derived from coastal sites such as Third Gulf Breeze (8SR8), Snow Beach 8WA52), Refuge Tower (8WA14) and 8BY73. Inhabitants of these sites exploited estuarine resources, including oyster, scallops, and fish (Phelps 1969:15; Bense and Watson 1979:109). Terrestrial animals such as deer, small mammals, reptiles, and birds were also hunted. Available faunal data suggest that exploitation of coastal resources primarily occurred during summer months (Phelps 1969:15). Very little modern paleobotanical work has been done for this phase. Bense and Watson (1979:109) indicate reliance on hickory nuts and acorns from 8BY73, but other evidence for the use of wild or domesticated plant foods is lacking. Phelps (1969) reports a squash seed, but it remains the only evidence of horticulture reported to date, despite evidence of growing populations and residential stability.

Burial mounds are commonly found adjacent to the larger coastal shell middens (e.g., the Porter's Bar site [8FR1]) and to larger inland village sites (Milanich and Fairbanks 1980:118). The inland mounds have not been investigated extensively at this time. Mayport Mound (8DU96) seems to have grown gradually over a period of five centuries as successive interments and associated grave offerings were deposited and covered by earth (Wallis 2007:218-219). Early excavations of less than half of this mound by Sahlins and others revealed over 50 individuals, along with an assortment of mica, tobacco pipes, projectile points, celts, shell beads, and various copper and hematite artifacts (Wallis 2007: 218-219). Pottery caches with shell cups are known at some sites and are thought to indicate the continuity of medicinal tea use. Overall, evidence suggests that Santa Rosa and Swift Creek ceremonial traditions were transitional and

shows continuity between the previous Deptford Phase and later Weeden Island traditions, as also observed in the continuity of site use (Milanich and Fairbanks 1980:124, Wallis 2007:226).

### Weeden Island-Wakulla Phase (1650 to 1050 B.P)

The Weeden-Island-Wakulla Phase represents the Late Woodland Subperiod in Northwestern Florida. This period sees the dramatic fluorescence of the elaborate ceremonialism originating in the Deptford Phase, and its subsequent replacement with a new form of ceremonialism influenced by the complex polities of the Mississippi Valley and its surrounding cultural sphere. The Weeden Island Phase is the most well-known of the Woodland Period archaeological cultures, with more than 1,000 sites documented to date. Five NRHP-eligible Weeden Island Phase sites (Porter's Bar [8FR1], Pierce, Yon Mound and Village [8LI2], Fort Walton Mound [8OK6], Bird Hammock [8WA30]), and the Thomas Creek Archaeological District [8SR388]) all have earlier habitation components indicative of cultural continuity with earlier phases. Other important Weeden Island sites include Aspalaga (8GD1), Torreya (8LI8), Sycamore (8GD13), Refuge Tower (8WA14), and Tucker.

The term "Weeden Island" was originally defined by Gordon Willey (1949) to include both Middle and Late Woodland subperiods on the Gulf Coast. Because of this, his use of the term included what we would now term Swift Creek and Santa Rosa. Subsequent scholars have also divided Weeden Island into two (White 1986), three (Thomas and Campbell 1985), or five (Percy and Brose 1974) distinct chronological phases.

Despite chronological discrepancies among scholars, the Weeden Island-Wakulla Phase is recognized by a wide range of pottery types. These include Carrabelle Incised, Carrabelle Punctated, Keith Incised, Weeden Island Incised, Weeden Island Punctated, Weeden Island Plain, Wakulla Check Stamped, complicated stamped, and corncob marked (Milanich and Fairbanks 1980:137, 141). Early in the sequence, ceramic types tend to be incised or punctated, while stamped varieties become more predominant later in the sequence. Effigy vessels are also documented earlier in the sequence for the Weeden Island-Wakulla Phase. It was originally believed that the effigy vessels and some well-made decorated vessels were the product of ceramic specialists; however, subsequent investigations at the McKeithen site (8CO17) in north Florida do not support the idea of specialist production (Cordell 1984).

Lithic assemblages include small triangular projectile point with a flat or concave bases, scrapers, choppers, knives, and hammerstones (Milanich 1974:22). A microlithic tool assemblage has also been documented at Weeden Island Palm Court (8BY43) in Bay County (Tesar 1965; Morse and Tesar 1974).

Weeden Island sites resemble those of the preceding period, and consist of coastal shell middens, inland middens, and burial mounds. Again, coastal shell middens are the most well-known and documented sites. The sites can be located directly on the coast (such as the Tucker site) or near estuaries and coastal swamps (Mound Field site [8WA8]). The coastal sites may be accompanied by one or more burial mounds (Milanich and Fairbanks 1980:132).

Inland Weeden Island-Wakulla sites have been located along ravines, on riverbanks, around lakes, along creeks, and on ridge tops near springs (White 1986:209; Tesar 1980:603; Percy and Brose 1974:18; Percy and Jones 1976:113). They take the form of small, sporadically used campsites or larger villages (Milanich and Fairbanks 1980:125). The latter have been interpreted as small, seasonal villages (Milanich 1974) or year-round settlements that moved every few years (Percy and Brose 1974:20). Smaller campsites are often within proximity to the larger villages, suggesting sporadic special-use locations rather than settlements (Milanich and Fairbanks 1980:125).

Examples of Weeden-Island-Wakulla village sites take a variety of forms. At the Torreya site (8LI8), several houses were arranged in a semicircle shape around a springhead (Milanich and Fairbanks

1980:126, Percy and Brose 1974:18). Likewise, the site of Aspalaga (8GD1) manifests as a circular midden some 900 m in diameter with a denser midden and three mounds in the center. However, the dating of the latter two features is uncertain, and they may postdate the Weeden-Island-Wakulla phase (Milanich and Fairbanks 1980:126). At Sycamore (8GD13) a single oval house approximately 9 m long by 6 m wide was discovered (Milanich 1974:28).

It has been argued that early Weeden Island occupation was centered on the coast but shifted inland during late Weeden Island times because of agriculture. However, it is possible that this perceived pattern is a result of increased survey coverage in recent years within inland settings (New World Research 1984). Available data suggest that Late Weeden Island subsistence was based on a broad spectrum of aquatic and terrestrial fauna and flora. Although maize agriculture is documented, it seems to have been used as a supplement rather than a staple at this time. Even inland middens can have significant accumulations of freshwater shell (White 1986:208). For example, subsistence at the Sycamore site (8GD13) in the upper Apalachicola Valley has yielded evidence of deer, numerous other mammals, shellfish, fish, nuts, acorns, fruits, and maize (Milanich 1974:33). A broad range of subsistence resources has also been recovered from Mack Bayou (8WL101), with a preponderance of estuarine and shallow coastal water species dominating the assemblage. Terrestrial species were limited to those likely to be taken at the forest edge. A large quantity of fish bones from the sheepshead fish (*Archosargus probatocephalus*), known for its unusual dentition, were also recovered (Mikell 2012).

Weeden Island-Wakulla is known for spectacular earthen mounds which are fairly numerous along the coast and along the Apalachicola River. Mounds are usually found near or within habitation sites and can measure up to 42 m in extent and up to 1.5 m high. The Aspalaga site (8GD1) includes a crescent-shaped village, a midden, and three or four mounds grouped in a triangle or square (Milanich 1974:1). The size and complexity of this site has led Milanich to argue that this site was a regional center of some kind (Milanich and Fairbanks 1980:137, Milanich et al. 1984:191-192). Examples of excavated mounds suggest that significant status differences were forming between social groups. Some groups (thought to be distinct lineages) had higher proportions of status goods, such as slate gorgets, shell ornaments, and clay pipes (Milanich and Fairbanks 1980:134).

Mounds were used continuously and exhibit elaborate ceremonialism in their construction. At the McKeithan site, burials were defleshed in one location, stored in a charnel house, and eventually buried at even intervals around the mound. They were accompanied by ceramic effigy vessels, numerous ornaments, and a variety of stone and shell ornaments including plummets, pendants, beads, and shell drinking cups. A chiefly personage or ritual specialist inhabiting one of the mounds was apparently buried in his house, which was then burnt and buried (Milanich and Fairbanks 1980:135-141).

Although some researchers explain Weeden Island-Wakulla by invoking a hypothetical invasion by Mississippian peoples, it is now generally thought that Weeden Island represents a local development influenced by events to the west and north (Weinstein and Dumas 2008:215). As mentioned above, there is clear cultural continuity between the Weeden Island-Wakulla Phase and preceding periods. In addition, the elaborate mound burial practices in early Weeden Island are lacking in the more dispersed settlement patterns of late Weeden Island occupations. Although some population movement may have occurred, it seems likely that interaction between local groups and the more complex societies of the Mississippi Valley led to the "Mississippianization" of late Weeden Island groups. This process continues into the next phase and is manifest through growing social and political complexity and increasing status differences (Mikell 1992:54; Milanich and Fairbanks 1980:143).

## Fort Walton-Pensacola Phase (1050 to 550/450 B.P.)

The Fort Walton-Pensacola Phase represents the Mississippian Period in northwest Florida and is defined by distinctive ceramics, large agricultural villages, and temple mounds (Marrinan and White 2007:292).

This period sees a greater integration of this region into the larger Mississippian interaction sphere, with the concomitant growth of large agricultural communities, monumental architecture, and social inequality. It also marks the end of pre-contact indigenous cultural development in Florida. There seems little doubt that the Fort Walton-Pensacola Phase populations are ancestral to the Apalachee, Chatot, and Pensacola people encountered by Narváez and by de Soto in the sixteenth century. Direct evidence of Spanish colonial contact has been identified at Pensacola culture sites (Milanich and Fairbanks 1980:194).

As originally defined, Fort Walton type ceramics are found east of the Apalachicola River, and Pensacola-type ceramics are found west of the river. However, there is considerable overlap in the distribution of these ceramic types. Both Pensacola and Fort Walton have a complex ceramic sequence, with a wide variety of types and variants, some found only in mortuary contexts. Distinctively Pensacola ceramic types include but are not limited to Pensacola Incised, D'Olive Incised, and D'Olive Engraved. The use of shell temper predominates in the west, while sand or grit temper is most common in the east. The majority of Pensacola ceramics found in residential contexts are simple plain wares, as was the case in Weeden Island (Milanich and Fairbanks 1980:203). The distribution of Pensacola and Fort Walton ceramics may correspond to distinct ethnic groups later in the protohistoric and historic periods, although this issue is uncertain and needs further exploration (Milanich and Fairbanks 1980:194, Marrinan and White 2007:292).

Weinstein and Dumas (2008) see the introduction of shell temper as signaling an intrusion of people into the northern Gulf Coast from the Moundville polity to the north. They cite high frequencies of late Woodland ceramic forms at important Pensacola sites (e.g., Bottle Creek [1BA2]) and a lack of transitional forms from Weeden Island types (Weinstein and Dumas 2008:204-205). In contrast, lithic types show continuity with Weeden Island types, except for the addition of small, triangular projectile points similar to those found at Mississippian sites throughout the Southeast (Milanich and Fairbanks 1980:196). Regardless, ceramic data suggest that Fort Walton and Pensacola Phase populations had similar ways of life, shared many cultural similarities, and were closely intertwined by innumerable social and economic relationships.

Important Pensacola Phase sites include the Bottle Creek Indian Mounds (1BA2), Butcherpen Mound (8SR29), Dauphin Island Mound, the Hickory Ridge Cemetery Archaeological District (8ES1280), the Naval Live Oaks Cemetery (8SR36), and the Fort Walton Mound (8OK6). Although Fort Walton is the site from which the "Fort Walton Culture" derives its name, the site itself has since been reassigned to the Pensacola culture.

Pensacola sites are found throughout northwest Florida and are located either directly on the coastal strand or inland. As is the case in the preceding periods, coastal sites are better investigated and more thoroughly documented. These range from small, linear shell middens representing temporary camps to very large (up to 200 m) and substantial shell middens indicative of villages. Larger villages had multiple temple mounds and obviously served as places central to the surrounding population (Milanich and Fairbanks 1980:195).

One of the largest of these central places is Bottle Creek (1BA2), located in the delta of Mobile Bay. This site includes at least 18 platform mounds, the largest measuring an astonishing 14 m high. Although the Pensacola culture was named for sites around the Pensacola and Choctawhatchee bays, there is a high frequency of Pensacola-related sites around both Mobile and Perdido bays. This has led Weinstein and Dumas (2008:204) to hypothesize that Bottle Creek was the center of the Pensacola culture.

Mound building during the Fort Walton-Pensacola Phase takes on a different character than in earlier periods, showing clear Mississipian influences. The use of mounds as collective burials becomes less common, with non-elites typically buried in cemeteries such as Hickory Ridge (8ES1280). The dead

were accompanied to the afterlife by a variety of grave offerings, including shell (e.g., *Whelk columellae*), projectile points, greenstone celts, mica, and hematite.

In contrast to earlier periods, mounds constructed during this phase seem to have functioned both as platforms for chiefly residences and as chiefly tombs. On the death of a chief, his residence was burned and the entire mound was capped by a fresh layer of soil. In this way, mounds became larger over time. Chiefly personages were buried with symbols of their office, including copper and shell ornaments and fine ceramics. Repoussé copper breast plates have also been found, with cloth remnants suggesting they were attached to garments (Milanich and Fairbanks 1980:198). Although it is possible that the chiefs of smaller villages were subordinate to and derived authority from chiefs of larger settlements, the exact political relations between Pensacola culture sites is likely to remain obscure until more systematic work is done.

In terms of subsistence practices, both Pensacola and Fort Walton show considerable continuity with Weeden Island, with the exception of a growing reliance on plant cultivation (Mikell 1992:54; Milanich 1994). Inland Pensacola and Fort Walton sites tend to be located in areas with fertile, easily worked soil. This pattern is interpreted as reflecting the growing importance of maize cultivation. Large quantities of corn kernels have been recovered from sites in this time range. Presumably, inland sites were inhabited by horticulturalists who supplemented their traditional wild foods with maize, beans, and curcurbits (Milanich 1994; Milanich and Fairbanks 1980:197). Evidence of maize cultivation is also present at coastal sites, despite acidic forest soils. However, locally abundant estuarine resources probably formed the backbone of the subsistence system at coastal sites as they had in earlier times (Mikell 1992:54-55). European trade goods such as glass, silver and gold objects, and iron tools were first introduced by the end of the Fort Walton-Pensacola Phase (Milanich and Fairbanks 1980:196). Despite thousands of years of indigenous cultural development resulting in sophisticated and populous polities, European contact would prove to be devastating to indigenous populations. The tribal leaders recognized and often resisted Spanish colonial intrusion, but were gravely afflicted by diseases such as smallpox.

## The Protohistoric Period

As discussed above, clear evidence of European contact is already attested to in the archaeological record in the later components of many Fort Walton-Pensacola culture sites. Although the first *recorded* European expedition to Florida was conducted by Ponce de Leon in 1513, the native inhabitants had already been in contact with the Spanish. Slavers, intent on capturing labor for use on plantations in the Caribbean, had been making forays into northwest Florida for years by the time that formal exploration began. The frequency of these interactions is indicated by the fact that one of the Native Americans encountered by de Leon already spoke Spanish on his arrival (Milanich and Fairbanks 1980:213). It is easy to imagine that many of these early and undocumented interactions with slavers were hostile in character, and may explain the ferocious native resistance encountered by early Spanish explorers. Cabeza de Vaca reports that the inhabitants of Pensacola Bay received the Spanish as friends, but then attacked them in the night without warning. Likewise, Hernando de Soto's interactions with the Apalachee and the Mabilians (from which the city of Mobile gets its name) were fairly disastrous, at least from the Spanish perspective (Weisman 2003:214).

Regardless of native efforts at resistance, these early encounters were destined to spread new European diseases to the region. The foremost of these was smallpox, which is believed to have killed well over half of the population of the New World. Smallpox is often fatal in children and the elderly. As such, it causes a demographic collapse while simultaneously eliminating the repositories of traditional cultural knowledge. Neither indigenous peoples nor contemporary Spaniards had a contagion theory of disease, and refugees from one settlement became carriers to the next. Investigations of burial mounds along the de Soto route show high rates of native mortality after his expedition, probably because of disease

(Weisman 2003:214). In northwest Florida, archaeological correlates to these events include a declining site density reflecting smaller populations, the decline of mound building and chiefly burials, and a decline in local craftsmanship coupled with an increasing proportion of European imports (Milanich and Fairbanks 1980:227).

The historical identity of the protohistoric peoples of coastal northwestern Florida is controversial. Inhabitants of the area east of the Apalachicola River Valley were recorded as "Apalachee" by the Narváez and de Soto expeditions, but west of the river cultural identities become more difficult and more controversial to reconstruct. Some identify the Pensacola archaeological culture with the "Mabilians" encountered by de Soto. However, as Marrinan and White (2007:312) point out, significant cultural changes could have occurred in this area both before the Spanish Entrada and because of it. As is described below, a series of population movements is associated with this period. In fact, the historic Pensacola tribe from which the area was named was formed from Muskogean speaking Apalachee who moved west into the modern Pensacola area in the early eighteenth century. Given the confused accounts of early recorded expeditions, complex population movements, possibly fluid ethnic divisions, and uncertainty about the degree to which ceramic styles represent cultural or ethnic identity, caution must be used in assigning the late Protohistoric populations to known historical groups.

In the earlier Protohistoric Period, material culture shows substantial continuity with earlier periods. In terms of ceramics, late Fort Walton-Pensacola (Bottle Creek subphase) gives way to the Bear Point subphase (550 to 300 B.P.) in northwest Florida. This phase is characterized by shell-tempered ceramics including Pensacola Incised, Pensacola Plain, Bell Plain, Mississippi Plain, D'Olive Incised, Moundville Incised, and Moundville Engraved (Mikell 1992:56). Ethnohistoric information for the time range in this area is very sparse. However, we have already seen that the preceding Fort Walton and Pensacola cultures were closely intertwined through social and economic ties. During the final stages of the Fort Walton-Pensacola Phase, these close cultural relationships had intensified. The proportion of Pensacola type ceramics increases during this phase, suggesting a "rapid increase in the inclusion of both ceremonial and secular Pensacola ceramics into a mature Fort Walton ceramic tradition" (Mikell 1992:61). By the time of European contact, the Pensacola culture was tightly integrated to groups both east and west, with western ties to the Bottle Creek area and by extension the Mississipian region perhaps predominating. It is perhaps significant that the historic Pensacola Apalachee eventually migrated to the Pensacola region rather than elsewhere, as they would have had local support.

By the Mission Period (1633-1635), the archaeological correlate of the Apalachee is called the Leon-Jefferson complex. Jefferson Ware is characterized by complex stamped ceramics, with the most common form being a bowl with a flaring rim. Given Catholic missionary presence, villages had no ceremonial mounds and burials shifted from mounds to flat cemeteries (Milanich and Fairbanks 1980:227). Houses were round, constructed of wattle and daub, and thatched with palmetto leaves. Overall, the material culture is less well made and shows less variety compared to earlier periods. Indigenous metalworking ceases, and lithic tools decrease in frequency as they are replaced by European imports. However, gunflints were manufactured locally, and broken glass was sometimes knapped into tools - as is done worldwide in colonial contexts (Milanich and Fairbanks 1980:229). The Apalachee were horticulturalists, relying on a mixture of agricultural and wild food resources. Crops included maize, beans, and curcurbits. As had been the case in previous periods, a tremendous diversity of wild resources were utilized (Milanich and Fairbanks 1980:228). They had chiefs who resided at larger settlements, and could assemble large armies of warriors from dispersed settlements (Weisman 2003 214). Like Mesoamerican populations as far south as the Yucatan, the Apalachee are described as playing the "great ball game" (Milanich and Fairbanks 1980:229-230).

Already depopulated by disease, Apalachee fortunes declined further at the beginning of Queen Ann's War of 1702. As part of a campaign against Spanish holdings, the English and allied native groups

destroyed many Apalachee missions and villages, taking over two thousand captives north to the Carolinas. Two years later Creek raids from Georgia destroyed more villages and took more captives, many which were assimilated into Creek society or sold to North Carolina slavers (Milanich and Fairbanks 1980:252). As many as 800 of the survivors fled west in 1704, becoming the historic Pensacola tribe. Other survivors no doubt persisted as well. Studies of Colonial Period St. Augustine have revealed that native women were readily accepted into Spanish households. This practice created a large and ever-growing Creole society, with these women acting as primary agents of cultural assimilation and adaptation (Weisman 2003:214). Although the distinctive Apalachee way of life comes to an end, some of their descendants survived locally by becoming incorporated into other populations or dispersing.

As discussed above, the Creek had already decimated the Apalachee, Timucua, and other northern Florida societies. Under pressure from slavers and unruly frontiersmen in Georgia, small bands of Creek migrated south into the deserted territory. In some cases they brought along culturally assimilated local captives, and sometimes settled among occasional surviving locals. These local survivals would have constituted a minority. While abandoned towns were sometimes reoccupied, the material culture shows no local precedents, instead clearly deriving from the early Creek complex to the north (Milanich and Fairbanks 1980:253).

The Creek, already quite diverse culturally, combine with local survivors and other refugees to develop a unique local cultural identity. They become known as the Seminole, the only native group to never sign a peace treaty with the United States (Milanich and Fairbanks 1980:254). As time progressed, the Seminole incorporated various other refugees, and persist despite the odds into the present. Seminole history is quite complex and is divided into five states beginning in 1716, though a complete treatment of Seminole history is beyond the scope of this summary.

Although never very populous, the early Seminole ranged widely and were experts at trading wild resources for European goods (Weisman 2003:215). Ceramic types associated with the historic Seminole include Ocmulgee Fields Incised, Walnut Roughened, and Chatahoochee Brushed. Unlike earlier local types these are malleated or scraped with a corncob, and some vessels have red paint. This difference makes it easy to distinguish early Seminole sites from those of earlier periods. Small, triangular projectile points are still in use, but most skirmishes and hunting seems to have been conducted with British flintlock muskets. Seminole burials are sometimes found placed in earlier burial mounds, often accompanied by blue or green glass beads (Milanich and Fairbanks 1980:254, 259). Settlement patterns show a changing cultural adaptation to local conditions. Early Creek settlements were generally inhabited year-round and feature a "squareground" flanked by summer and winter ritual buildings, sometimes still built on mounds. Mounds seem not to have been constructed by the early Seminole, although the squareground is retained. In addition, the settlement pattern becomes much more diffuse. This may have been in response to a growing reliance on feral cattle that had escaped from Spanish ranches (Milanich and Fairbanks 1980:255-256).

At the conclusion of the Seminole Wars of the early 1800s, the Seminole were reduced to 300 to 400 individuals. Most Seminole were forcibly resettled in the west while a few retreated into the depths of the Everglades - where they persisted. Very few sites from the later stages of Seminole history have been investigated (except by looters) and much more systematic work is needed on this period (Milanich and Fairbanks 1980:259). Today the Seminole number in the thousands, a testimony to their resilience and ability to adapt to difficult and rapidly changing conditions.

## The Historic Period

European colonization of the northwestern Florida began in August of 1559, with the arrival of Spanish explorer Tristan de Luna in Pensacola Bay, who was charged with establishing a colony on the bay by the Viceroy of Mexico. Mexican scholar Carlos de Siguenza y Gongora would describe the bay nearly 100 years later as "the finest jewel possessed by His Majesty…not only here in America but in all his kingdom." Unfortunately for Luna, a powerful hurricane struck only weeks after his landing and destroyed nearly all of his ships. The surviving three ships were sent to Veracruz, Mexico, to plead for reinforcements to help the survivors, and nearly a year later ships returned and transported most of the survivors to Havana. By August of 1561, any remaining soldiers had abandoned the outpost and had returned to Mexico (Webster 2009).

The Spanish did not try to establish another settlement at Pensacola Bay until 1698, but were eventually forced to abandon the settlement in 1719 after Jean-Baptiste Le Moyne Bienville led the French to capture the settlement. Other Spanish settlements in the Tyndall AFB area consisted of forts San Marcos de Apalachee on the Wakulla River ca. 1680 to 1758 and Crevecouer, originally built by the French in present day Port St. Joe and taken over by the Spanish in 1719 when it was abandoned. For the most part, the Spanish colonial holdings in northwestern Florida were neglected and in a state of decline when the British eventually took it over. Mission wares and one Spanish period site has been found on the barrier island Tyndall AFB shares with St. Andrews State Park (Tyndall AFB 2016).

The British took control of Florida from Spain in 1763 as part of the Treaty signed to end the Seven Years' War, in which the Spanish supported the French against Britain. For their part, the British began a campaign of improving the infrastructure at Pensacola and the various forts stretched along the coast of Florida, including at Port St. Joe and St. Marks. The British sought to exploit the colony for economic gain and additionally set up trading posts to trade with the local Native Americans. However, despite the establishment of trade relationships and land agreements with the local Choctaw, Chickasaw, and Creek, British development of the region including clearcutting forests and over hunting eventually contributed to the Native Americans not having the ability to sustain their traditional way of life and either assimilated into the colony or left. Along with trading posts, associated settlements became established such as the settlement of Wells along St. Andrews Bay. The British also began extracting forest resources including timber and naval stores. The British interest in the area also included issuing land grants for the development of homesteads and industry with several issued along the East River, Deer Point, and East Bay.

British control of Florida ended during the American Revolution when the Spanish, allied with the Americans, seized the territory from the British in 1781. The Spanish continued to allow many of the industries established by the British. Many of the colonists retained allegiance with Britain, given the economic development that had occurred under their rule. Though the alliance with the newly formed United States was what had instigated Spain's retaking of Florida, American expansionism eventually threatened the ownership of the colony. In the Treaty of San Lorenzo, the border between American territory and the Spanish colony was set at the 31<sup>st</sup> parallel, which reduced the size of the Spanish colonial claim. The establishment of this border further initiated turmoil in that the native tribes including Choctaw, Chickasaw, and Creek who occupied lands straddling the border were caught between allegiances, encroaching American settlement, and American civilization programs which caused intertribal warfare to break out.

At the time of the War of 1812, Spain, threatened by American expansionism and with limited resources to defend their colony, encouraged the British to assist them and allowed them to reoccupy Pensacola and use west Florida as a staging ground to wage war on the Americans. In 1814, Andrew Jackson with a column of Choctaw, marched through the area near Tyndall AFB on their way to attack and take control

of Pensacola. After the war, the Spanish retained the colony, but further insurgencies against the Americans by the Creek rumored to be supplied by the Spanish resulted in Andrew Jackson returning to retake Pensacola to put an end to hostilities. At this point, the Spanish were unable to maintain control of the colony and ceded Florida to the Americans in 1819. A couple of homesteads dating to the period of revolving colony rulers have been found on Tyndall AFB, but the identity of the occupants have not been determined.

Florida was established as a state in 1821. Development of the area increased after statehood, but was mostly reserved for Federal use and preservation of the forests. American settlers throughout the southeast during this period were in conflict with the local Native American population as they moved into the territory once occupied by the tribes and wanted them removed. The area around Tyndall AFB served as refuge for some displaced Native American population, but they were removed after 1839. Following removal of the natives, settlement of the area through the 1840s and 1850s increased. During this period, the first pioneer to settle on the peninsula that includes Tyndall AFB, was José Massalena a former Spanish citizen and African-American freedman settled at Davis Point.

The development of St. Andrews Bay was slow due in part to seasonal occupation of the area. Salt production served as the primary mode of trade. Sawmills also began to appear along several bayous as timber and logging operations increased in the area. Cotton, cattle, and seasonal fishing also helped to support the local economy during this time. There is very little evidence from the archaeological record during this period as settlement of the peninsula may have been restricted due to the lack of homesteading tracts. Furthermore, the peninsula was used and occupied by Creek Indians, a situation in which Euro-American settlers would have been dissuaded from venturing into. The indication that Tyndall AFB footprint was avoided by white homesteaders is further supported by the fact that the first known settler of the East Peninsula was an African-American freedman—a person, who like the Native Americans, would have had limited choices in where he could live without social persecution or judgement.

During the Civil War, Florida seceded from the United States and joined the Confederate States of America. The area around St. Andrews Bay was used mostly for slat manufacturing to supply the Confederate nation. In 1863, Union ships shelled the town of St. Andrews and burned numerous structures. The Confederate surrender in 1865 left West Florida in a state of anarchy brought to the area by roaming bands of criminals, deserters, and former soldiers. Following the war, numerous former slaves settled on the peninsula in the vicinity of José Massalena's homestead.

After 1878, the Federal government released several of its forest preservation tracts for homesteading resulting in increased development of the area including the east end of the peninsula. Many homesteaders carried on the established industry of harvesting forest products such as timber and turpentine manufacture. Local settlers began to run commercial fishing boats, and inns and hotels were constructed in towns on the peninsula. In 1908 the Atlanta & St. Andrews Bay Railway, or the Bay line, was constructed, connecting St. Andrews to the rest of the state. In 1913 the state established Panama City as the seat of Bay County. Growth and development would continue during this time and archaeological sites identified at Tyndall were built or occupied during this period.

Infrastructure and industry growth in this area during the 1930s helped to stave off the worst of the Great Depression. The International Paper mill was constructed in 1930 and helped to revitalize the timber industry that had been suffering since the end of World War I. This created a need for larger ships to access Panama City and the local industries, which led to the construction of a deeper pass cut between the Gulf of Mexico and St. Andrews Bay. Highway 98 was also built during this time allowing for a permanent connection between the various towns on the peninsula and St. Andrews Bay.

Looking to expand War Department facilities along the Gulf Coast, the U.S. Army condemned 28,517.65 acres on the peninsula to establish an airfield in 1940. A number of complications were encountered during the construction of the base. Buildings were being planned for areas that were too swampy, which led to issues for the workers that included dog-flies, mosquitos, skunks, and snakes. After a years' worth of construction, only 5 percent of the 168 buildings were ready for occupancy, and the grading of the airfield was yet to be completed. Nevertheless, the base officially opened with the bombing of Pearl Harbor on December 7, 1941. At first, the airfield consisted of three runways, taxi strips, parking apron, and a technical area with a hangar, warehouse, sub-depot, ordnance facilities, and a cantonment area with 71 barracks, schools, offices and utility buildings.

Base expansion was quick and by the end of 1942 enrollment had doubled. By the end of 1943, there were approximately 10,000 personnel on base (USAF HRA 1941), including members of the 785<sup>th</sup> Women's Auxiliary Army Corp (WAAC; later WAC) Post Headquarters Company. This growth forced the base to construct additional facilities to accommodate the training and support needs of personnel. However, the end of World War II brought a swift end to the gunnery training school as well as leaving the future of the base in uncertainty. By March 1946, only 985 people remained stationed at Tyndall Field (Underwood 1991:57).

In the spring of 1946, the Air Tactical School (ATS) moved to Tyndall offering a well-defined mission during a time when the U.S. military was making drastic changes to its organization. The following year the Air Force became a separate service branch under the Department of Defense and Tyndall Field became Tyndall Air Force Base. With a new identity to go along with a new and growing threat, Tyndall AFB was critical in providing innovative and specialized training programs throughout the Cold War.

As Tyndall AFB was settling into their role in the Cold War, the U.S. jumped into the Korean War. This created a new role for Tyndall AFB. Under ATC, the Aircraft Controllers course became the USAF Aircraft Controller School. By 1951, the school was divided into two principal training divisions, general aircraft controller and tactical aircraft controller, plus a new division—ground observer corps training—for Air Force officers. For general aircraft controller training, officers learned to guide friendly aircraft to intercept enemy aircraft from the ground until the friendly aircraft's own radar could take over for the intercept. Tactical aircraft controller training included more advanced course work and officers learned to work with forward ground units.

During the Korean War, Tyndall also participated in ATC's Mutual Defense Assistance Program (MDAP) along with Randolph, Ellington, and Goodfellow AFBs. MDAP mission was to train airmen from counties friendly toward the U.S. at the time. Foreign countries participating in MDAP included France, Belgium, Netherlands, Norway, Denmark, Italy, Portugal, Yugoslavia, Greece, the United Kingdom, Iran, Turkey, the Philippines, Thailand, and the Republic of China (Sligh 2003:80).

When the Korean War concluded in 1953, Tyndall AFB stayed steadfast in the training of all-weather pilots, interceptor weapons instructors, and aircraft controllers. Furthermore, pilots in training were in need of targets to hone their skills. The 3510th Tow Target Squadron, initially located at Randolph AFB, was assigned to Tyndall AFB in 1954. Members of the squadron would tow targets behind B-29s over the Gulf of Mexico, providing USAF Advanced Flying School and the USAF IWS students an opportunity to safely practice with live ordnance (Underwood 1991:77).

By the late 1950s, technological advances in military weaponry were evident at Tyndall AFB, both in the form of new fighter aircraft and in the targets used for practice. Where targets were once towed behind aircraft, training over the Gulf of Mexico became categorically different after July 3, 1958, when the 4756th Drone Squadron became operationally ready and launched its first Q-2A (Firebee) drone. Although the first drone launched was lost in a thunderstorm, it proved nevertheless that they could be

launched from airborne B-26s and controlled from the ground (Underwood 1991:84). The Firebee drone was a significant improvement in interceptor training, providing pilots with realistic targets. Its use also allowed the IWS to more thoroughly meet its mission to evaluate interceptor training programs and maintain the marksmanship and combat readiness of interceptor pilots (Underwood 1991:84–87).

Tyndall's connections to larger air defense radar networks began in the late 1950s, and expanded throughout the 1960s. As early as 1957, an Aircraft Control and Warning (AC&W) radar site was located at Tyndall AFB (present-day Facility 1277 was originally constructed as an AC&W Operations building). The AC&W system was the Air Force's first air defense network of the Cold War. Construction on the AC&W system's 85 radar stations and 11 command and control centers began in 1949 (Weitze 2003:272). Completion of the AC&W site at Tyndall was relatively late, and occurred as the Semi-Automatic Ground Environment (SAGE) system, the second generation of air defense radar infrastructure, was beginning to come on line. The SAGE system's technology "established the need for using continuous-wave radars in conjunction with digital computers capable of handling very fast data transmission and analysis" (Weitze 2003:285).

In 1962, the U.S. experienced one of its most trying periods of the Cold War with the Cuban Missile Crisis. During the tense few days between October 22 and November 5, Tyndall AFB played an important role in the military strategy to stand firm against the Soviet Union, while at the same time, avoiding war if at all possible. Tyndall AFB went on alert on October 22 and IWS became the "combination dispatch desk, combat alert center, and living quarters for all of Tyndall's alert aircrews," thus becoming one of the key defense bases in the southeast. Two alert flights (A and B) were formed and a strict alert schedule maintained. Air crews conducted identification intercepts throughout the period, but the unknown aircraft all turned out to be either "errant airliners or USAF aircraft returning from other missions" (4757th Air Defense Squadron [IWS] 1962).

The Vietnam War brought about a number of changes to Tyndall AFB in the 1960s and early 1970s. A consequence for any base during times of war was the loss of military personnel to combat duty. At Tyndall, the reduced manpower meant that a contractor—Ryan Aeronautical Corporation— was contracted in 1967 to operate the drones. Also in that same year, the 3250th Flying Training Squadron was transferred from Randolph AFB to Tyndall AFB to start a pilot instructor training program in response to increased combat in Vietnam (Durst and Wang 1996:68; Underwood 1991:98). U.S. military bases across the nation are obvious sites for patriotic display, however, during the nation's bicentennial; Tyndall AFB was recognized as a "Bicentennial Air Force Installation." With this special designation, Tyndall AFB flew an official bicentennial flag and received a certificate from the American Revolution Bicentennial Administration.

In the decades that followed, Tyndall AFB went through multiple reorganizations that brought in military personnel as well as a civilian workforce. Tyndall AFB has been steadfast in its ability to change as a mission dictates and be a leader in innovative technological advances. This will likely continue as Tyndall AFB pushes forward in its quest to become the Air Force Base of the Future following the devastation that hurricane Michael brought to its doorstep in October of 2018.

## **Previous Investigations**

Preliminary search of the Florida Site Master File (FLMSF) has revealed that 29 cultural resources investigations have been conducted within 1.6 kilometers (km) (1 mi) of the selected project survey parcels (Figure 6). These investigations include cultural resources assessments, monitoring reports, historic building inventories and evaluations, and Phase I archaeological surveys similar to the one proposed in this document. Table 4 summarizes the previous investigations conducted and Figure 6 depicts the location of the investigations in relation to the current project survey parcels. Three previous



Figure 6. Portion of the Long Point, FL 7.5-minute topographic quadrangle showing the previously conducted archaeological investigations within a one-mile buffer of the cultural survey areas.

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## Table 4. Previous Surveys Conducted within 1.6 Kilometers (1 Mile) of the Project Survey Areas.

Survey Number	Title	Year	Authors
138	Partial Cultural Resource Inventory of Tyndall AFB, Florida	1979	Knudsen, Gary, D. and James W. Stoutmire
424	Cultural Resources Survey of the Proposed Drone Runway and Supporting Facilities, Tyndall AFB	1976	Nielsen, Jerry
1387	Cultural resources investigation at Tyndall AFB, Bay County, Florida.	1985	Campbell, Janice L. and Prentice M. Thomas Jr.
9493	Identification and Evaluation of Historic Properties Within the One Mile Area of Potential Effects of the Proposed 160-foot Beacon Beach (Tyndall AFB) Wireless Telecommunications Tower (American Tower Corporation #224680), Bay County, Florida	2003	Parker, Brian T.
11134	Assessment of Potential Effects Upon Historic Properties: Proposed 160-Foot Panama 11 Wireless Telecommunications Tower (Sprint Site Number 224680), Bay County, Florida	2005	Parker, Brian T.
14993	Phase I Archaeological Survey of an Alternate Drone Launch System Site at Tyndall AFB, Bay County, Florida	2007	Rabby Smith, Steven
17904	Phase I Archaeological Survey of the Site DB039 Debris Dump Tract, Tyndall AFB, Bay County, Florida	2010	Rabby Smith, Steven L., RPA
18397	Cultural Resources Survey of TY-2 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2010	Bourgeois, Carrie Williams, Christina M. Callisto, and Janice L. Campbell
20366	Limited Phase I Archaeological Investigation & Monitoring of Environmental Restoration Site LF005, Tyndall AFB, Bay County Florida	2013	Aubuchon, Benjamin, James R, Morehead, and Christina Zimmerman
20607	Cultural Resources Survey of Five Timber Tracks Contract FA4890-04-D-0009-DK13 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2012	Callisto, Christina M., Janice L. Campbell, and James H. Mathews
20958	Cultural Resources Survey of TY-100 & TY-101 (Task Order TY-13-0002) Contract W9128F-12-2-0002-0006 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2014	Campbell, Janice L., Bret Kent, and James H. Mathews
22319	Cultural Resource Assessment Review Request Cultural Resource Reconnaissance Survey of SR30 (US98) from Tyndall AFB to the Gulf County Line. By Carl McMurray, February 1993.	1993	McMurray, Carl
22358	Cultural Resource Assessment Survey for the SR 30 (US 98) Alternative 7 Elevated Roadway at Tyndall AFB Entrance Bay County, Florida	2015	Bartlett, Laurel, Elizabeth, Chambless, Melissa Dye, and Jessica Fish
22458	Cultural Resources Survey of TY-112 (Task Order TY-14-0014) Contract W9128F-12-2-0002 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2015	Campbell, Janice L., Sarah Deihl, and Erica Meyer
22532	Cultural Resources Survey of TY-111 (Task Order TY-14-0013) Contract W9128F-12-2-0002 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2015	Campbell, Janice L., Ryan N. Clark, and James R, Morehead
22534	Cultural Resources Survey of TY-113 (Task Order TY-14-0015) Contract W9128F-12-2-0002 Cultural Resources Management Support, Tyndall AFB, Bay County, Florida	2015	Campbell, Janice L., Ryan N. Clark, and James R, Morehead
23221	Phase I Archaeological Investigation of Survey Areas TY-0134, Tyndall AFB, Bay County, Florida	2016	Benjamin Stewart, BA, Kathleen Furgerson, MA, RPA, Mark Martinkovic, MA, RPA
23223	Phase I Archaeological Investigation of Survey Area TY-0122 Tyndall AFB, Bay County, Florida	2016	Benjamin Stewart, BA, Kathleen Furgerson, MA, RPA, Mark Martinkovic, MA, RPA
23224	Archaeological Monitoring at 8By1765 in Association with GCEC Directional Bore, DHR Project No. 2015-5362 (Letter Report)	2016	TG Earnest
23830	Phase I Archaeological Investigation of Survey Area TY-0124 Tyndall AFB, Bay County, Florida	2016	Benjamin Stewart, BA, Kathleen Furgerson, MA, RPA, Mark Martinkovic, MA, RPA
23831	Phase I Archaeological Investigation of Survey Area TY-0123 Tyndall AFB, Bay County, Florida	2016	Benjamin Stewart, BA, Kathleen Furgerson, MA, RPA, Mark Martinkovic, MA, RPA
23832	Phase I Archaeological Investigation of Survey Areas TY-0131, Tyndall AFB, Bay County, Florida	2016	Furgerson, Kathleen, Mark Martinkovic, MA, RPA, and Scott Seibel
24164	Archaeological Survey of TY-142 Tyndall AFB, Bay County, Florida Task Order TY-16-0021 Contract W9128F-12-2-002	2017	Campbell, Janice L., Ryan N. Clark, and Zackery Cruze

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Survey Number	Title	Year	Authors
24165	Archaeological Survey Unit TY-0137, 194 Acres, Tyndall AFB, Bay County, Florida Task Order TY-15-0004 Contract W9128F-12-2-002 Survey Unit TY-0137	2015	Bradley, Dawn M., Savannah L. Darr, and Stephen T. Mocas
24677	Archaeological Survey of TY-144 Tyndall AFB, Bay County, Florida Task Order TY-16-0022 Contract W9128F-12-2-0040	2017	Campbell, Janice L., Ryan N. Clark, and Zackery Cruze
24705	Archaeological Survey of TY-155 Tyndall AFB, Bay County, Florida Task Order TY-17-0007 Contract W9128F-12-2-0002	2017	Brannon, Shannon, Janice L. Campbell, and Ryan N. Clark
24725	Archaeological Surveys Conducted for the Upgrade for the Medical Facility Complex, Tyndall AFB, Bay County, Florida.	2017	Brown, Teresa L.
25042	Phase I Archaeological Investigation of Survey of TY-146 on Tyndall AFB, Bay County, Florida., Contract: W9128F-12-2-0002, Task Order: TY-17-0002	2017	Mikell, Gregory A.
25442	Phase I Archaeological Investigation of Survey of TY-158 and TY-159 on Tyndall AFB, Bay County, Florida., Contract: W9128F-12-2-0002, Task Order: TY-17-0014	2017	Mikell, Gregory A.
NA	Phase I Archaeological Survey – Survey Areas TY-162, TY-163, and TY-164, Tyndall Air Force Base, Bay County, Florida	2019	Bradley, Dawn M.

\*Reports on file at the Florida Master Site File.

investigations overlap portions of the survey areas to be investigated in the current project. These surveys include FLMSF Survey Numbers 138 (Knudsen et al. 1979), 1387 (Campbell and Thomas 1985), and 22358 (Bartlett et al. 2015).

FLMSF Survey Number 138 was described in the report *Partial Cultural Resource Inventory of Tyndall Air Force Base.* The investigation appears to have consisted of a base-wide inventory updating a summary of all of the cultural resources known to exist on the base at that time. The project recorded 57 new resources and re-recorded eight previously reported resources that included both archaeological sites and structures (Knudsen et al. 1979). None of the sites discussed are located in current project survey areas.

FLMSF Survey Number 1387 also appears to have been a base-wide investigation reporting 29 new resources and 70 previously known resources that included both archaeological sites and structures (Campbell and Thomas 1985). The findings were described in the report titled *Cultural resources investigation at Tyndall Air Force Base, Bay County, Florida* (Campbell and Thomas 1985). None of the resources reported are located within the current survey areas.

FLMSF Survey Number 22358 is reported in *Cultural Resource Assessment Survey for the SR 30 (US 98) Alternative 7 Elevated Roadway at Tyndall Air Force Base Entrance Bay County, Florida* (Bartlett et al. 2015). The investigation partially overlapped the northwestern portion of the Flightline Area in the current investigation the investigation recorded two new resources and re-recorded 15 previously known resources that included both archaeological sites and structures (Bartlett et al. 2015). Ten of the structures were located in the Flightline Area and all were recommended ineligible for the NRHP.

## Previously Reported Cultural Resources

The preliminary search of the FLMSF also revealed the presence of 31 archaeological sites (Table 5) and 205 historic structures within 1.6 km (1 mi) of the project survey areas (Figure 7). Within this population of cultural resources within 1.6 km (1 mi) of project survey areas is evidence for a continuous human presence dating from the Formative Period (Deptford Phase) to present. Sites range from prehistoric artifact scatters, middens and campsites to shell middens to historic period artifact scatters, camps, building remains, and historic wells. None of the previously reported archaeological sites are located within or overlap the current project areas. One site, the Two Palms Homestead (BY1350) is immediately to the east of the 8500 Area. The site is the remains of a twentieth century homestead with an artifact scatter and building remains and has been determined ineligible for the NRHP. Although the site has been recorded outside of the current project area there is potential for more of the site to extend into the current project given the extensive waste accumulation and resultant scatter common in industrial and post-industrial American culture.

Although historic structures are not the focus of this investigation, their presence is revealing of the historic military activity that has occurred at the installation. The Flightline Area contains 49 structures that have been evaluated dating from 1942 to the 1980s. One structure within the Flightline project area, Hangar 3 (ca. 1943) is recommended eligible for the NRHP according to the most recent ICRMP (Tyndall AFB 2016). The Munitions Area contains 15 buildings (ca.1959 to present) that have been evaluated for historic significance and all have been recommended ineligible for the NRHP. The 8500 Area also contains 15 buildings (ca.1961) to present that have been evaluated for historic significance and all have been recommended ineligible for the destruction caused by Hurricane Michael, numerous buildings sustained severe damage, if they were not outright destroyed. Many buildings have been condemned due to the destruction and what remains of them are being demolished. At the time of writing it is not certain which buildings within the project areas are being demolished, although given that

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Table 5. Previously Reported Archaeological Sites within 1.6 Kilometers (1 Mile) of the Project Survey Areas.							
Site Number	Site Name	Site Type	Cultural/Temporal Association	Survey Recommendation	SHPO Recommendation		
BY00025	Mound Near Pearl Bayou	Prehistoric burial mound(s)	Weeden Island, A.D. 450-1000	Not Evaluated by Recorder	Not Evaluated by SHPO		
BY00132	East Bay Historic 1	Building remains, Homestead, Land-terrestrial, Historic refuse/dump, Artifact scatter-low density (< 2 per sq meter)	Nineteenth century American, 1821-1899,Twentieth century American, 1900-present, American, 1821-present, Boom Times, 1921-1929, Depression and New Deal, 1930-1940, Ft. Walton, A.D. 1000-1500, Post-Reconstruction, 1880-1897, Spanish-American War, 1898-1916	Eligible for NRHP	Eligible for NRHP		
BY00134	East Bay 4	Land-terrestrial, Artifact scatter-low density (< 2 per sq meter)	Indeterminate, Prehistoric with pottery	Ineligible for NRHP	Insufficient Information		
BY00190	TAFB Aboriginal 7	Redeposited site (to this location)	Indeterminate	Ineligible	Not Evaluated by SHPO		
BY00692	NN	Habitation (prehistoric), Prehistoric midden(s), Artifact scatter-low density (< 2 per sq meter)	Weeden Island, A.D. 450-1000	Not Evaluated by Recorder	Ineligible for NRHP		
BY01692	ТҮ-100-9-А	Land-terrestrial	Twentieth century American, 1900-present, World War II & Aftermath 1941-1950	Insufficient Information	Insufficient Information		
BY01350	Two Palms Homestead	Building remains, Subsurface features are present, Homestead, Land- terrestrial, Historic refuse/dump, Artifact scatter-low density (< 2 per sq meter)	Twentieth century American, 1900-present	Ineligible for NRHP	Ineligible for NRHP		
BY01386	TIM 3-A	Campsite (prehistoric), Subsurface features are present, Land- terrestrial, Prehistoric shell midden	Twentieth century American, 1900-present, Ft. Walton, A.D. 1000- 1500, Weeden Island, A.D. 450-1000	Insufficient Information	Insufficient Information		
BY01387	TIM 3-B	Subsurface features are present, Homestead, Land-terrestrial	Twentieth century American, 1900-present, Prehistoric	Insufficient Information	Insufficient Information		
BY01388	TIM 4-B	Subsurface features are present, Land-terrestrial, Artifact scatter-low density (< 2 per sq meter)	Twentieth century American, 1900-present, Weeden Island, A.D. 450-1000	Ineligible for NRHP	Ineligible for NRHP		
BY01496	Wet Dune Midden	Specialized site for procurement of raw materials, Land-terrestrial, Prehistoric midden(s)	Ft. Walton, A.D. 1000-1500, Weeden Island II	Insufficient Information	Not Evaluated by SHPO		
BY01763	TY-113 A; Tyndall AFB Jeep Range 7	Land-terrestrial	Nineteenth century American, 1821-1899, Twentieth century American, 1900-present, Weeden Island, A.D. 450-1000	Insufficient Information	Insufficient Information		
BY01765	ТҮ-113-Е	Subsurface features are present, Homestead, Land-terrestrial, Historic well	Twentieth century American, 1900-present	Insufficient Information	Insufficient Information		
BY01767	ТҮ112-В, ТҮ112-С	Land-terrestrial	Deptford, 700 B.C300 B.C., Prehistoric lacking pottery, Prehistoric with pottery	Insufficient Information	Insufficient Information		
BY01768	ТҮ-113-І/Ј	Land-terrestrial	Ft. Walton, A.D. 1000-1500	Insufficient Information	Insufficient Information		
BY01780	ТҮ-111-В	Land-terrestrial	Weeden Island, A.D. 450-1000	Ineligible for NRHP	Ineligible for NRHP		
BY01781	ТҮ-111-С	Land-terrestrial	Nineteenth century American, 1821-1899, Twentieth century American, 1900-present, Weeden Island, A.D. 450-1000	Ineligible for NRHP	Ineligible for NRHP		
BY01782	ТҮ-111-D/Е	Land-terrestrial, Prehistoric shell midden	American, 1821-present, Weeden Island, A.D. 450-1000	Not Evaluated by Recorder	Ineligible for NRHP		
BY01808	FS-7	Land-terrestrial, Turpentine camp	Twentieth century American, 1900-present, Prehistoric	Ineligible for NRHP	Ineligible for NRHP		
BY01947	TY-124-HSS-01	Building remains, Land-terrestrial	Twentieth century American, 1900-present	Eligible for NRHP	Insufficient Information		
BY01948	TY-124-HSS-02	Building remains, Land-terrestrial	Twentieth century American, 1900-present	Eligible for NRHP	Insufficient Information		

Table 5, contint	rable 5, continueu							
Site Number	Site Name	Site Type	Cultural/Temporal Association	Survey Recommendation	SHPO Recommendation			
BY01949	TY-124 Gunnery Range Remnant	Historic earthworks, Land-terrestrial	Twentieth century American, 1900-present	Eligible for NRHP	Insufficient Information			
BY01958	TY 131-01	Campsite (prehistoric), Land-terrestrial	Archaic, 8500 B.C1000 B.C., Prehistoric lacking pottery	Ineligible for NRHP	Ineligible for NRHP			
BY02278	TY-141 N	Land-terrestrial	Twentieth century American, 1900-present	Insufficient Information	Insufficient Information			
BY02299	ТҮ-144-Е	Land-terrestrial	Weeden Island, A.D. 450-1000	Ineligible for NRHP	Ineligible for NRHP			
BY02300	TY-144-F	Land-terrestrial	Nineteenth century American, 1821-1899, Twentieth century American, 1900-present	Insufficient Information	Insufficient Information			
BY02301	TY-144-G	Building remains, Land-terrestrial	Twentieth century American, 1900-present	Insufficient Information	Insufficient Information			
BY02302	ТҮ-144-Н	Building remains, Land-terrestrial	Twentieth century American, 1900-present	Insufficient Information	Insufficient Information			
BY02377	TY-155 C	Land-terrestrial	Twentieth century American, 1900-present	Ineligible for NRHP	Ineligible for NRHP			
BY02378	TY-155 F	Campsite (prehistoric), Habitation (prehistoric),Land- terrestrial,Prehistoric shell midden, Historic well	Twentieth century American, 1900-present, Ft. Walton, A.D. 1000- 1500, Mississippian, Weeden Island, A.D. 450-1000	Insufficient Information	Insufficient Information			
BY02379	TY-155 R	Campsite (prehistoric), Land-terrestrial, Prehistoric shell midden	Ft. Walton, A.D. 1000-1500, Mississippian, Santa Rosa-Swift Creek	Insufficient Information	Insufficient Information			

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Figure 7. Portion of the Long Point, FL 7.5-minute topographic quadrangle showing the previously recorded archaeological sites within a one-mile buffer of the cultural survey areas.

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none of the structures are individually eligible, the hurricane destruction and subsequent demolition will not impact the integrity of other resources.

## Expectations

Given the evidence revealed in the preliminary analysis of the cultural setting for the project area, the probability of encountering surface and subsurface cultural deposits is high. In addition, the area is rich with cultural resources, with 31 archaeological sites, 205 historic buildings within 1.6 km (1 mi) of the survey parcels. Thus, it can be expected that more cultural remains will be encountered. The majority of previously reported sites are from the Late Historic Period, as this area has undergone considerable development and land use during this time particularly in relation to the establishment of the military base. As such, it can be expected that the majority of cultural remains encountered in this investigation will also be from the Late Historic Period. Evidence suggests the area has been occupied as early as the Formative Period, with an increase in complexity and presumably population from the Weeden Island through Mississippian Phases.

The three project areas to be surveyed in this investigation have undergone considerable development since the 1940s. Development has consisted of land leveling, building construction, road, pavement, and water control structure construction, and installation of utilities. The majority of the soils in the Flightline Area and Munitions Area are classified as Urban and Arents; both soil types are defined as being created from modern human induced earthmoving activities including dredging, cutting, filling, and levelling. As such, soils in those areas are expected to be highly disturbed with low probability of containing intact cultural deposits.

## PROJECT WORK PLAN

### **Research Design**

This research serves to assist the U.S. Air Force in partially fulfilling its obligation as a Federal property manager under Section 106 of the NRHP to take into account the effects of undertakings on cultural resources. By surveying the proposed project areas the U.S. Air Force will determine whether the proposed actions will have adverse effects on cultural resources. Additionally, prior to conducting fieldwork a research design was developed to relate this investigation to current relevant research topics considered important to archaeological research in the area.

As an Intensive Phase I archaeological investigation, the primary goal of this research was to determine the presence or absence of cultural resources within the proposed project areas. The research topics to be addressed by this study include whether or not cultural deposits are intact and deeply buried, and the nature of these cultural deposits. Based on these observations GSRC archaeologists will attempt to provide NRHP eligibility recommendations or provide recommendations as to the level of further work required to evaluate NRHP eligibility.

Based on preliminary background research it appears the areas have had a human presence dating from the Formative Period (Deptford Phase) to present, though the majority of sites are from the Late Historic Period. In addition to presence/absence some research topics to be explored when sites are found will include:

- Can a cultural/temporal association be ascertained?
- What cultural activities were associated with these sites and are they representative of long-term occupation or temporary seasonal activity?
- Are these sites associated with particular events or individuals?
- Are these sites representative of currently known cultural and temporal human presence on the peninsula and vicinity or suggest previously unknown human activity for the area?
- How do these sites relate to other sites of similar cultural/temporal association within the vicinity and regional settlement patterns?

### **Project Planning/Background Research**

The archival review portion of this investigation included a study of previously reported archaeological and historic site records and previous investigations on file with the Tyndall/Eglin Cultural Resources Program and the Florida DHR, as well as a search on the National Parks Service (NPS) online National Register Information System (NRIS). All previously reported archaeological and historic resources and studies within 1.6 km (1.0 mi) of the project corridor were investigated.

Additionally, a literature search of current prevailing theories and research topics of the archaeological and historical fields, as well as the formation and characteristics of the physical landscape of the project area, was conducted. Additional archival records were consulted, and included; relevant historic maps of areas investigated, aerial photographs, and soil maps. Analysis of these data assisted in establishing a contextual framework for the types and density of cultural resources in the project area, as well as understanding how this investigation relates to the body of archaeological and historic research for the project vicinity.

## Fieldwork

Fieldwork was conducted in accordance with the guidelines of the Florida DHR, Cultural Resource Management Standards and Operational Manual (adopted 2002). This investigation included an intensive Phase I archaeological survey with pedestrian surface inspection supplemented with systematic shovel tests (STPs) excavated along transects. The intensity level for the areas to be surveyed was initially conducted with standards for high probability areas and included survey transects spaced 25 m (82 ft.) apart with shovel tests excavated at 25 m (82 ft.) intervals along transects. Given that the background investigation revealed that the soils in the Flightline and Munitions Areas are mostly Urban and Arents (soils produced predominantly from human induced earthmoving activities including dredging, cutting, filling, and levelling) it was anticipated that the deposits encountered in the field would exhibit a certain amount of disturbance. In consultation with the Eglin AFB Cultural Resource management team, it was agreed that if the deposits encountered in the project areas exhibited such disturbance to a depth of 1 m (3.3 ft.), then the shovel testing intensity would be downgraded to a moderate intensity level with shovel tests excavated at 50 m (164 ft.) intervals. If shovel testing at the moderate intensity level continued to exhibit disturbed deposits through a depth of 1 m (3.3 ft.), then the intensity level of would be further downgraded to low probability with shovel tests excavated at 100 m (328 ft.) intervals. All exposed areas were carefully examined for artifacts. Additional judgmental subsurface tests were placed in those areas considered to be likely site locations.

All shovel tests were 50 cm (19.69 in) in diameter and dug in arbitrary 10 cm (3.94 in) stratigraphic levels. All tests will were dug to a minimum of 1 m (3.3 ft.) below surface unless digging was inhibited by groundwater levels. All excavated soil was screened through 6.34 millimeter (mm) (0.25 in) hardware cloth mounted in portable wooden frames.

Field notes were taken as each shovel test was excavated. All recovered artifacts were placed in 4 mil polyethylene resealable zipper storage bags. All bags were labeled with the project name, site name and number (if applicable), provenience information, artifact type and count, date, excavator's name (or initials), and a field specimen (FS) number. Global positioning system (GPS) points were taken of the locations of all positive shovel tests and at the beginning and end of each transect. Shovel test locations were flagged with biodegradable flagging tape.

Positive shovel tests were investigated further to determine the nature of the find. In accordance with the guidelines of the Florida DHR, *Cultural Resource Management Standards and Operational Manual* (adopted 2002), single artifacts discovered in non-disturbed contexts were bracketed with at least an additional four shovel tests excavated in cardinal directions spaced 10 m (32.81 ft.) from the original find. Florida DHR defines archaeological occurrences as "the presence of one or two non-diagnostic artifacts, not known to be distant from their original context, which fit within a hypothetical cylinder of 30 m (98.43 ft.) diameter, regardless of depth below surface." If the results of bracketing yield more archaeological evidence or if the original find included more than a single artifact, additional delineation shovel tests spaced equidistant between transect shovel tests in cardinal directions will be excavated until two in a row are negative or the delineation reaches the boundary of the project survey area.

Archaeological sites were recorded with all the information necessary to complete site forms and, if possible, provide recommendations for the level of further work required to evaluate NRHP eligibility. This information is to include location, area, field maps, GPS locations of positive shovel tests and observed surface artifacts and features, observed disturbances, kinds of artifacts, features and ecofacts observed, and photographs. Diagnostic artifacts recovered from the surface and all artifacts recovered from shovel tests were collected and placed in new 4 mil polyethylene resealable zipper storage bags marked with provenience information in indelible ink on the exterior and cataloged in a field specimen inventory.

## Analysis and Documentation

Laboratory analysis was initiated in the field by a detailed recording of provenience information and assigning field specimen identification numbers to artifacts. Post-field processing in the laboratory began with cross-checking field specimens with the inventory lists from the field. All artifacts and other cultural materials recovered were washed (if appropriate), stabilized, and cataloged. These materials were analyzed using categories and techniques standard to Florida archaeological practice and in accordance with the guidelines of the Florida DHR, Cultural Resource Management Standards and Operational Manual (adopted 2002). Prehistoric ceramics will be classified into recognized typological categories. Counts and weights, as well as position on the vessel (e.g., rim, base, body), will be determined for all sherds. Chipped stone materials were separated into waste flakes (debitage), tools, and manufacturing failures/production rejects. Stone tools will be categorized into standard typologies. The analysis of the waste flakes will follow standard protocols and categories dependent on the quantity of material recovered. Faunal remains were identified to the lowest possible taxonomic category. Freshwater shellfish will be identified to genus and species, if possible, and counts, weights, and minimum number of individuals (MNI) will be determined, if possible. Historic artifacts were identified and cataloged into standard typological or functional categories. Metal or other oxidizing materials were evaluated for their research or data recovery potential and, if warranted, stabilized appropriately. Indeterminate ferrous fragments were discarded after analysis.

All appropriate Florida Master Site File forms were generated to document the project, newly recorded resources, and site update forms for previously recorded resources within the survey area, provided something warrants an update such as the boundary, condition, etc. These forms were submitted to the DHR following review by the Tyndall/Eglin AFB Cultural Resources Manager and included as appendices in the draft and final reports. All geographic information system data was submitted in Spatial Data Standards for Facilities, Infrastructure, and Environment compliant format.

### Curation

All recovered material, field notes, forms, and other project records were prepared for curation following both Federal standards (Curation of Federally-Owned and Administered Archaeological Collections; CFR Title 36, Part 79) and State of Florida DHR/AR 1A-32 curation guidelines. Artifacts and associated records shall be cataloged, packaged and labeled by the Contractor in accordance with Eglin Air Force Base Collections Requirements 2018. GSRC shall deliver the artifacts and associated records to the EAFB Curation Facility so they are ready for curation without further processing by Eglin curation staff. The Contractor shall input all cultural resource data generated by each survey into a database in accordance with EAFB Collection Requirements 2018. Artifacts were placed in new 4 mil polyethylene resalable zipper storage bags with acid-free labels that include full provenience and catalog information. Artifacts were packaged in acid-free storage boxes clearly labeled with project, dates, and provenience. All field logs and notes, analysis sheets, photographic record forms, and other documents produced during execution of this project were printed on acid-free paper and included in the curation delivery. Each box will include an inventory of contents on acid-free paper and an electronic inventory. All materials will be delivered to a curation facility to be decided in consultation with the Tyndall/Eglin AFB Cultural Resources Manager.

## RESULTS

The archaeological survey of Tyndall Airforce Base was conducted during the period of October 8 through 25, 2019 over three land areas within the base, including the Flightline Area, the Munitions Area, and the 8500 Area. All three areas include numerous structures, paved areas, water diversion structures, and utilities mostly designed to service base needs. Given the built environment in all three areas, shovel testing was confined to non-built areas. All areas were subjected to pedestrian surface inspections.

## **Flightline Area**

The Flightline Area is located to the north east of Highway 98 and measures 242 acres (ac) and consists of a relatively level, built up area, situated alongside the Tyndall AFB airfield (Figure 8). Soils in this area are comprised of Urban Land (178.81 ac) and Arents, 0 to 5 percent slopes (63.52 ac). Both of these soil types are described as being heavily altered by human activities that include, grading, dredging, cutting, filling, and levelling. The Flightline Area consists of a high density of residential, commercial, and industrial developments (Photograph 1). A typical STP profile recorded from the Flightline Area at STP 124 consists of four stratigraphic soil layers to a depth of 100 cmbgs (Figure 9). Stratum I is comprised of a dark grayish brown (10YR 4/2) sand that extends from 0-20 cmbgs. Stratum II extends from 20-30 cmbgs is a gray (10YR 6/1) sand. Stratum III is situated at a depth of 30-50 cmbgs is a grayish brown (10YR 5/2) sand. Stratum IV consists of a gray (10YR 5/1) sand.



Photograph 1. Tyndall Airforce Base built environment in the Flightline Area from Alabama Avenue facing east.

A total of 63 STPs were excavated within the Flightline Area with two positive for cultural materials. An additional 94 STPs were not excavated due to the presence of an obstructing element of the built environment at the location of the STP placement and where offsetting was not possible. Shovel testing in the northwestern portion of the Flightline Area was conducted at the intensity level for high probability areas at 25 m intervals. The middle portion of the Flightline Area, contains more structures, paved areas and utilities, forcing the placement of STPs to be confined to areas where the ground surface



Figure 8. Map showing the transect shovel test pits excavated during the Flightline Area survey.

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opportunistically could be excavated and was free of impediments. In the southeastern portion of Flightline Area, the high frequency of modern disturbance identified in the STPs became increasingly apparent. Deposits included modern trash (plastic, cellophane, glass, metal, etc.) observed in several shovel tests, as deep as a meter below surface. Soil strata were frequently disorganized in that there was little to no consistency between stratigraphic sequences from one shovel test to another even if they were located on the same landform. These observations lead to the in-the-field adjustment to reduce the intensity of the survey to moderate probability with STP intervals reduced to 50 m.

Two Isolated Occurrences (IOs) were identified in two positive STPs within the Flightline Area (Figure 10). Both IOs were identified in the western portion of the study area where STP intervals were conducted at 25 m intervals. IO 1 was recorded on transect 4 STP 5. This STP is situated just outside of the main perimeter fence line in a manicured lawn approximately 55 m (180 ft.) to the north east of Highway 98 (Photographs 2 and 3). A single Leon Weeden Island (ca. 1,600-1,100 B.P.) type projectile point was recovered from TR 4 STP 5 at approximately 60 to 70 cmbgs. The material type is a tan chert (Photograph 4). This Late Woodland, corner notched projectile point is primarily found in northern Florida and into southern Georgia and southeastern Alabama (www.projectilepoints.net/Points/Leon.html accessed October 29, 2019). The soil profile exhibited in this test pit was comprised of five stratigraphic layers (Figure 11). The first stratum was comprised of a gravish brown (10YR 5/2) sand that extended from the surface to a depth of 25 cmbgs. Situated beneath this stratum was a light gray (10YR 7/1) sand extending from 25-35 cmbgs. Following this stratum is a dark grayish brown (10YR 4/2) sand that continues from 35-55 cmbgs. Positioned below this stratum is a vellow (10YR 7/6) sand that goes from 55-65 cmbgs. The bottom stratum extends from 65-100 cmbgs and is comprised of a very pale brown (10YR 8/2) sand. In an effort to further determine the nature of this find, an additional four delineation shovel tests (D6, D7, D8, D9, D10, D11) were excavated at 10 m intervals in cardinal directions from the positive test and all were negative for cultural material (Table 6). Comparison of the soil strata recorded in the positive shovel test and the delineation shovel tests reveals the soils in the area appear to have been disturbed. No common stratigraphic sequence exists from one STP to the next. Soil colors and textures differ among STPs and in one STP the excavation was terminated due to concrete at 30 cmbgs and another was terminated at 65 cmbgs due to the presence of impassable rocks and concrete, suggesting previous construction had extended deep into deposits. This disturbance is unsurprising given the location of IO 1 is between the Highway 98 right of way and the fence line of the built up Flightline Area. Given that this was an isolated find and the resulting delineation test pits produced no further cultural materials, no further work is recommended at this location.





Photograph 2. Overview of Isolated Occurrence #1 and #2 from Transect 4 STP5 facing west with perimeter fence on the right and Highway 98 to the left.



Photograph 3. Overview of Isolated Occurrence #1 and #2 from Transect 4 STP 6 facing south with Highway 98 in background.



Photograph 4. Leon type projectile point, tan chert.



Shovel Test	~	Depth		~ ~ ~ ~	
Number	Stratum	(cmbgs)	Munsell	Soil Texture	Notes
	Ŧ	0.00	10YR 5/2 grayish	<b>C</b> 1	
	l	0-30	brown	very fine sand	
	11	30-45	10YR 7/1	very fine sand	
D 1		45.50	10YR 3/6 dark	very compact	
D-1		45-50	yellowish brown	concretion	
	Ι	0-20	10YR 6/1 gray	very fine sand	
			10YR 4/2 dark		
	II	20-30	grayish brown	very fine sand	
		20.00	10YR 6/6	<b>C</b> 1	
DO		30-60	brownish yellow	very fine sand	
D-2	IV	60-100	10YR 8/1 white	very fine sand	
	т	0.20	10YR 4/2  dark		
		0-20	grayish brown	sand	_
	11	20-50	10  Y K  8/1  White	sand	_
	111	50.80	10 Y R 3/3 dark	cond	
	111	30-80	$\frac{10 \text{VP} 6/3 \text{ pale}}{10 \text{VP} 6/3 \text{ pale}}$	sanu	
D-3	IV	80-100	brown	sand	
D-5	1 V	00-100	10 YR $4/2$ dark	Sand	
	T	0-30	gravish brown	fine sand	
		0.50	10 YR 5/2 gravish	inte Sund	-
	II	30-50	brown	fine sand	
			10 YR 3/2 very		
			dark grayish		
	III	50-60	brown	sand	
			10 YR 3/6 dark		
	IV	60-75	yellowish brown	sand	
			10 YR 5/6		
D-4	V	75-100	yellowish brown	sand	
			10YR 4/2 dark		Terminated at 30 cmbgs for
D-5	Ι	0-30	grayish brown	sand	PVC pipe
D-6					No Dig due to buried utility
			10YR 4/2 dark		
	I	0-30	gravish brown	sand	
	II	30-50	10YR 2/1 black	sand	
	III	50-70	10YR 6/1 gray	sand	
			10YR 3/3 dark		
D-7	IV	70-100	brown	sand	
			10YR 4/2 dark		Terminated at 30 cmbgs
D-8	Ι	0-30	grayish brown	sand	concrete
			10YR 4/2 dark		
	I	0-40	grayish brown	fine sand	
	II	40-75	10YR 8/1 white	fine sand	
D-9	III	75-85	10YR 2/1 black	sand	

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Table 6, continued								
Shovel Test Number	Stratum	Depth (cmbgs)	Munsell	Soil Texture	Notes			
			10YR 2/2 very					
	IV	85-100	dark brown	sand				
			10YR 4/2 dark					
	I	0-45	grayish brown	sand	Terminated at 65 cmbgs due			
D-10	II	45-65	10YR 6/1 gray	sand	to rocks and concrete			
			10YR 4/2 dark					
	Ι	0-20	grayish brown	very fine sand				
			2.5YR 5/1 reddish	clay (very				
	II	20-25	gray	compact)				
	III	25-40	10YR 5/1 gray	very fine sand				
	IV	40-55	2.5Y 7/1light gray	very fine sand				
	V	55-80	10YR 6/1 gray	very fine sand				
D-11	VI	80-100	10YR 2/1 black	sand (compact)				

The second isolated occurrence, IO 2, was identified on transect 4 at STP 7. This STP is situated just outside of the main perimeter fence line in a manicured lawn approximately 55 m (180 ft.) to the north east of Highway 98. Artifacts recovered from this STP include one unidentified (UID) small mammal faunal remains (Photograph 5) and two cervical vertebra small mammal faunal remains (Photograph 6). The remains are not charred nor do they exhibit any cut marks or other evidence related to human activity. The faunal materials were recovered from a depth of approximately 60 to 70 cmbgs. This STP exhibited four stratigraphic levels (Figure 12). Stratum I extends from the surface to a depth of 50 cmbgs was a grayish brown (10YR 5/2) sand. Situated beneath this stratum and extending from 50-70 cmbgs was a very pale brown (10YR 8/2) sand. This was followed by a dark yellowish brown (10YR 3/6) sand from 70-80 cmbgs. The bottom stratum was comprised of a yellow (10YR 7/6) sand from 80 to 100 cmbgs. In an effort to further determine the nature of this find, an additional five STPs (D1, D2, D3, D4, and D5) were excavated at 10 m intervals in cardinal directions from the positive test (Table 6). No other cultural materials were identified during the delineation of this isolated positive STP. Similar to the delineation shovel tests around IO 1, the deposits recorded in the delineation STPS around IO 2 appear disturbed with no common stratigraphic sequence and evidence for deep disturbance. Given that this was an isolated find and the resulting delineation test pits produced no further cultural material, no further work is recommended at this location.



Photograph 5. Unidentified small mammal faunal.



Photograph 6. Two cervical vertebra from unidentified small mammal.



## **Munitions** Area

The Munitions Area is located in the northeast section of Tyndall AFB approximately 1.18 km (.74 mi) east-northeast from the runway within the Flightline Area (Figure 13). The Munitions Area is measures 82 ac and is comprised of similar soils identified in the Flightline Area with 67.79 ac classified as Arents. In addition to the presence of the Arents soil unit, examination of topographic maps and aerial imagery (see Figures 2 and 14) of the area shows a rectilinear parcel of land surrounded by swamp suggesting this area is likely reclaimed swampland consisting of modern fill. The Munitions Area also consists of a relatively level, built up area with numerous ammunition storage bunkers and facilities for servicing the storage, removal, and safety of keeping munitions in the area (Photograph 7). The areas located outside of the perimeter fencing were shovel tested at 25 m intervals whereas the areas inside the fence were tested at 50 m intervals in the north west area, and then at 100 m intervals throughout the rest of the area. The increase between survey intervals was adjusted in the field due to increased evidence of modern disturbance identified within excavated STPs suggesting a moderate to low probability for encountering intact deposits. Furthermore, the water table was observed to be relatively shallow (80 cmbs) in this area, likely due to the area being encircled by swamp.



Photograph 7. Munitions building inside perimeter fencing with earthen bunkers in background right view from unnamed road facing north.

A total of 44 shovel tests were excavated within the Munitions Area with a total of 17 not excavated due to impediments. None of the shovel tests contained cultural materials. A typical shovel test profile was recorded from STP 47 and was excavated to a depth of 80 cmbgs where the water table was reached (Figure 14). The first stratum is comprised of a gray (10YR 5/1) sandy loam from 0-20 cmbgs. The second stratum is a very dark grayish brown (10YR 3/2) sandy loam that extends from 20-40 cmbgs. The final stratum consists of a very dark brown (10YR 3/2) sandy loam. The test was terminated at a depth of 80 cmbgs due to water filling the bottom of the test pit. Vegetation in the area mainly consisted of manicured grass with the surrounding landscape contain pine trees, palmetto, and scrub brush (Photograph 8). No cultural materials were recovered within the Munitions Area. No further work is recommended for this area.



Figure 13. Map showing the transect shovel test pits excavated during the Munitions Area survey.

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Photograph 8. Munitions Area showing drainage ditch, buried utilities, and surrounding vegetation from unnamed road facing west.

### 8500 Area

The 8500 Area is located approximately 5.87 km (3.65 mi) to the east of the Louisiana Avenue gate along Highway 98 (Figure 15). The 8500 Area measures 18 ac and is slightly less developed than the other two areas. The northern portion of the survey area is located within perimeter fencing and is level and contains several buildings, paved areas, an earthen bunker, and a paved road (Photograph 9). The southern portion of the area is located outside of the perimeter fence and gently slopes down to St. Andrew's Sound to the south (Photograph 10). This area appears to be seasonally inundated and during this survey was observed to have standing water in the southernmost portion of the study area. Inside the perimeter fence, shovel testing was limited in the vicinity of built areas. Outside of the perimeter fence, shovel testing was conducted at 25 m intervals.

A typical shovel test profile from the 8500 Area was recorded from STP 57 and displayed four stratigraphic layers (Figure 16). The first stratum was comprised of a gray (10YR 6/1) sand that extended from the surface to a depth of 30 cmbgs. The second stratum consists of a very dark grayish brown (10YR 3/2) sand and extends from 30-40 cmbgs. Situated beneath this is a light yellowish brown (10YR 6/4) sand that extends from 40-70 cmbgs. Stratum IV was observed to be a very pale brown (10YR 8/2) sand.

A total of 41 STPs were excavated in the 8500 Area with a total of 15 STPs not excavated due to the existing built environment (Photograph 11). There were no cultural materials recorded within the 8500 Area. No further work is required for this area.



Figure 15. Map showing the transect shovel test pits excavated during the 8500 Area survey.

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Photograph 9. 8500 Area showing buildings, bunker, and paved road facing north.



Photograph 10. 8500 Area southern portion outside of perimeter fence facing south with St. Andrew's Sound in the background.





Photograph 11. Buildings located within the 8500 Area facing east.

## SUMMARY AND RECOMMENDATIONS

GSRC conducted an intensive Phase I archaeological survey combining intensive pedestrian survey with systematic shovel testing along transects across the Flightline Area, The Munitions Area, and the 8500 Area totaling 342 acres at Tyndall AFB. Survey of these areas was initially conducted at a high probability intensity level with STPs excavated at 25 meter intervals along transects. This intensity level was adjusted to moderate probability (50-m intervals) for the Flightline Area and moderate and low (100-m intervals) probability for the Munitions Area when it was observed that deposits in the those areas were highly disturbed. The 8500 Area was surveyed entirely at high probability intensity. Each of the three areas is highly developed with numerous structures, paved areas, water runoff control features, and utilities. A total of 148 STPs were excavated during this investigation with an additional 126 not excavated due to impediments of the built environment. Only two STPs were positive and both were in the Flightline Area. Both positive STPs were delineated and determined to be IOs.

IO 1 consists of a single Leon Weeden Island (ca. 1,600-1,100 B.P.) type projectile point was recovered from TR 4 STP 5 at approximately 60 to 70 cmbgs. Additional STPs excavated to delineate the find were all negative. Deposits in the STP do not suggest the find is part of an intact cultural deposit.

IO 2 consists of one unidentified (UID) small mammal bone and two cervical vertebra from a small mammal. The remains are not charred nor do they exhibit any cut marks or other evidence related to human activity or anything to suggest they are cultural artifacts. The faunal materials were recovered from a depth of approximately 60 to 70 cmbgs. The deposits in the STP do not suggest the faunal remains are part of an intact cultural deposit.

Neither IO qualifies as an archaeological site nor do they possess integrity or criteria to be considered for NRHP eligibility. No NRHP eligible archaeological resources have been recorded within the Flightline Area, Munitions Area, and 8500 Area during this investigation. As a result, no adverse effects will occur to archaeological resources as a result of the proposed Hurricane Michael recovery actions in the three project areas. No further work is recommended.

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# **MANAGEMENT SUMMARY**

Phase I Archaeological Survey – Survey Areas TY-162, TY-163, and TY-164, Tyndall Air Force Base, Bay County, Florida

Contract No. 8F-30176-00 Task Order TY-19-0002 Wood Project No. 928050059



November 2019

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#### Phase I Archaeological Survey – Survey Areas TY-162, TY-163 and TY-164, Tyndall Air Force Base, Bay County, Florida

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#### INTRODUCTION

In May and October 2019, Wood Environment & Infrastructure Solutions, Inc. (Wood) completed a Phase I archaeological survey of approximately 854.99 acres (ac) (346 hectares [ha]) for Survey Areas TY-162, TY-163, and TY-164 (Task Order TY-19-0002) at Tyndall Air Force Base (AFB) in Bay County, Florida (**Figures 1 and 2**). The purpose of the archaeological survey was to determine if archaeological sites eligible for the National Register Historic Places (NRHP) are located within the survey areas. The survey was conducted to meet the requirements of Section 110 of the National Historic Preservation Act (NHPA) of 1966 (Public Law 89-665: 16 U.S.C. 470 et seq.), as amended, and was completed in accordance with the Secretary of the Interior's *Standards and Guidelines for Historic Preservation Projects* (Federal Register, Vol. 48, No. 190, September 1983, P. 44716-44742, et seq.), the Florida Division of Historical Resources (FDHR) Cultural Resource Management (CRM) Standards and Operations Manual *Module Three Guidelines for Use by Historic Preservation Professionals* (FDHR 2015).

The results of the survey are summarized below in **Table 1**. Approximately 30.7 acres in TY-162 and 53.6 acres in TY-164 were unable to be surveyed due to a dense amount of tree fall associated with damage from Hurricane Michael, a Category 5 storm which hit the base in October 2018. Four new archaeological sites (8BY2716, 8BY2717, 8BY2718 and 8BY2719) and one archaeological occurrence (IF 1) were identified during the survey. Sites 8BY2716 and 8BY2718 are both low density prehistoric artifact scatters, while site 8BY2719 consisted of several concrete pillars found on the surface. A low density of Herty cup fragments were found in association with these pillars, but no other materials were found on the surface or during shovel testing in the area, and the function of this site has not been determined. The prehistoric archaeological occurrence (IF 1) consisted of one lithic flake recovered in a single shovel test. Analysis of the artifacts recovered during the survey and full assessment of sites identified is in progress. Therefore, all recommendations in this management summary are preliminary and subject to change.

Survey Area	Size (acres)	Uncleared acres*	Survey Shovel Tests	Recording Shovel Tests	Results
TY-162	129.4	30.7	52	15	one new prehistoric site ( <b>8BY2718</b> ); one historic site ( <b>8BY2719</b> ); one prehistoric archaeological occurrence ( <b>IF-1</b> )
TY-163	350.93	n/a	204	38	two new prehistoric sites ( <b>8BY2716</b> and <b>8BY2717</b> )
TY-164	314.69	53.6	260	0	no sites or archaeological occurrences identified

Table 1. Summary of Newly Identified Sites within Survey Areas.

\*Denotes areas that could not be accessed due to dense amounts of tree fall

Additionally, four previously recorded sites extend into the TY-162 (8BY2280, 8BY2380 and 8BY2381) and TY-164 (8BY1496) survey boundaries. These sites are potentially eligible for the NRHP (see **Figures 1 and 2**).



Figure 1. Location of Survey Area TY-162 shown on USGS 1977 Navarre, Florida topographic quadrangle.



Figure 2. Location of Survey Areas TY-163 and TY-164 shown on USGS 1977 Navarre, Florida topographic quadrangle.



#### FIELD METHODOLOGY

Prior to accessing Tyndall AFB to conduct any survey, a TAFB 103 permit was completed for each survey area. None of the survey areas were marked as having the potential to contain unexploded ordinances (UXO).

All survey areas were assessed for their "Probability Zone" as defined in the FDHR Historic Preservation guidelines (FDHR 2015) in order to guide the level of effort necessary for survey in each area. Probability assessment of each survey area was completed via review of available topographic maps and aerial photos, review of previously recorded sites in or adjacent to the defined survey area, and consultation with the Tyndall Cultural Resource Management (CRM) staff. In-field examination of each survey area also impacted a survey area's probability zone designation. Intervals of shovel test excavations varied based on this probability determination, with shovel tests excavated at a 25-m interval in high probability zones, a 50-m interval in moderate probability zones, and a 100-m interval in low probability zones in accordance with FDHR guidelines (2015).

All shovel tests were at least 50-cm in diameter. On average, shovel tests were excavated to a depth of 100 cm below surface, unless water table was reached or a physical barrier such as concrete was encountered. Shovel tests related to the general survey of an area were labeled as "Survey Shovel Tests" or "SSTs." Soil from the shovel tests was screened through a 0.25-in (6.35-mm) hardware cloth. Measurements were recorded using the metric system, and shovel test forms and soil profile information were recorded for each test pit. Soils were described using the Munsell color chart and appropriate terminology. Photographs were taken of representative soil profiles throughout the survey area, as well as to document the general conditions within each area. Mapping for the project was completed using handheld 1-meter accuracy real-time Global Navigation satellite system (GNSS) receivers using US Global Positioning System (GPS) and Russian GNSS satellites. Signals from the satellites are processed and transferred to Apple iPad via internal Bluetooth radio broadcasters. Apple iPad applications are securely managed by users to record location, photo, and attribute information.

When cultural materials were identified, the area containing artifacts was assigned a temporary field site (FS) number and the location of the artifacts recorded using a GPS device. Site boundaries were delineated by pedestrian survey, the excavation of shovel tests at a reduced 10 m (32.8 ft) interval, or a combination of both. Shovel tests completed in association with delineation of a site or archaeological occurrence were labeled as "Recording Shovel Tests" or "RSTs." In accordance with FDHR guidelines, when only a single artifact was recovered or when one or two artifacts "non-diagnostic artifacts, not known to be distant from their original context, ...fit within a hypothetical cylinder of 30 cm diameter, regardless of depth below surface," the artifact location was recorded as an archaeological occurrence rather than an archaeological site (FDHR 2015:19). Florida State Site Forms will be completed for all sites identified during the survey.



#### SURVEY AREA DESCRIPTION AND RESULTS

#### Survey Area TY-162

Survey Area TY-162 consisted of seven non-contiguous sections (A-G) totaling 129.40 ac (52.4 ha) located along Beacon Beach Road near its intersection with DeJarnette Drive (**Figures 3-5**; see **Figure 1**). Land use within this survey area was a mix of Tyndall AFB infrastructure development and open fields/wooded areas. Approximately 30.7 ac (12.4 ha) of TY-162E, south of the old rifle range, could not be surveyed due to a dense amount of tree fall (see **Figure 4**). However, examination of topographic maps, aerial photos, and visual assessment along accessible portions of this area suggest it is wet, with water observed on the surface in some portions; such wet areas tend to have lower potential to yield significant archaeological deposits. In addition to the uncleared areas, two of the survey sections on the north side of Beacon Beach Road were associated with large antenna structures marked as having radiation hazard (**Figure 6**; see **Figure 3**). Though it was uncertain whether these structures were functional, the Tyndall Communication Squadron was consulted before entering the area; it was advised that these areas be avoided, and the ground not disturbed (personal communication, July 3, 2019).

The remainder of the survey area is covered by Tyndall infrastructure development, such as the (now demolished) rifle range building, a skeet and trap range, the Force Development Center, and other such structures (**Figure 7**). Other noted disturbances included paved and graveled roads, sidewalks, a running track, parking lots, drainage ditches and ponds, and buried utilities. However, isolated areas of undeveloped land in between these structures were noted.

Background researched revealed a portion of three previously defined sites (8BY2280, 8BY2380 and 8BY2381) were located within the current TY-162 survey boundary (see **Figures 3 to 5**). Two of the sites are World War II era military sites: 8BY2380 was identified as the Turret Tower Range No. 2 and site 8BY2381 as the Skeet Range (Campbell et al. 2017). These two sites have been previously recommended as potentially eligible for the NRHP. Site 8BY2280 is a prehistoric artifact scatter site that has been recommended as potentially eligible for the NRHP (Clark et al. 2017). In consultation with Tyndall AFB CRM staff, it was determined that no additional investigations at the Phase I level were necessary within the portion of these sites that overlap with the TY-162 survey boundary. Shovel tests were excavated along the boundary of the TY-162 survey area with these previously recorded sites, with one shovel test falling just inside the boundary of site 8BY2280. No artifacts were recovered in any of these shovel tests, suggesting that these sites do not extend further into the current boundary.

Three additional previously recorded sites (8BY155, 8BY2275, and 8BY2280) were identified as adjacent to the TY-162 boundary (see **Figures 3 to 5**). None of these sites were found to extend within the current survey boundary.



Figure 3. Survey Area TY-162 Section A-D results map.



Figure 4. Survey Area TY-162 Section E results map.



### Figure 5. Survey Area TY-162 Section F and G results map.



Figure 6. Antenna with radiation hazard sign, facing southeast.



Figure 7. General view of conditions encountered in TY-162, facing east.



Overall, the observed conditions, landform, and previously recorded sites identified in the vicinity suggested that the TY-162 survey area had a high to moderate probability to yield archaeological materials and, as such, the shovel test excavation interval ranged from 25- to 50-m. A total of 52 SSTs (14.56 m<sup>3</sup>) and 15 RSTs (4.2 m<sup>3</sup>) were excavated within this survey area, with two new archaeological sites (8BY2718 and 8BY2719) and one archaeological occurrence (IF 1) identified (see **Figures 3 to 5**).

Site 8BY2718, located in an open field on the south side of Beacon Beach Road, consisted of one prehistoric pottery fragment and three pieces of lithic debitage recovered in two shovel tests (**Figure 8**; **see Figure 3**). While artifact analysis is ongoing, the overall low amount of artifacts recovered from the site suggests it is unlikely to yield additional important information concerning prehistoric occupations at Tyndall AFB and, as such, it is preliminarily recommended as not eligible for the NRHP.

Site 8BY2719 is located in a wooded area behind the former rifle range and consisted of six concrete piers and one square concrete slab noted on the surface (**Figure 9**; **see Figure 4**). Each pier consisted of an approximately 1.7-x-1.7-m square base supporting a smaller (0.6-x-0.6-m) pillar for a total height of approximately 1.2 m (**Figure 10**). Flat metallic elements, which may have functioned as fasteners, were noted on top of the smaller pillars. While a low density of Herty cup fragments were noted on the surface near one of the piers (SF 1), shovel tests excavated within and around this area yielded no additional cultural materials. Given that this site is bounded by areas of dense tree fall to the south and west, it could not be confirmed whether additional pier structures are present in those directions. The function of these piers is undetermined. Additional research into the history of Tyndall development, such as into World War II training activities, is necessary in an attempt to determine site function before an NRHP-eligibility determination for this site can be made.

The archaeological occurrence (IF 1) consisted of one lithic flake recovered in a single shovel test in the portion of TY-162 on the north side of Beacon Beach Road (see **Figure 5**). IF 1, on its own, lacks sufficient context for further interpretations and is unlikely to yield additional significant information on prehistoric activities on Tyndall or in the Florida Panhandle. Therefore, IF 1 is recommended as not eligible for the NRHP.



Figure 8. Site 8BY2718 results map.



Figure 9. Site 8BY2719 results map.



Figure 10. Site 8BY2719 example of piers on the surface, facing north.

### Survey Area TY-163

Survey Area TY-163 is a 350.93 ac (142 ha) area located within the portion of the main base on the south side of U.S. Highway 98 (**Figures 11 and 12**; see **Figure 2**). This survey area has been heavily developed and consisted mainly of numerous structures, roads, sidewalks, artificial drainages, ponds, recreational features such as a running track and baseball fields, and buried utilities (**Figure 13**). However, there were many areas of open fields and lawns not obviously disturbed interspersed between these developments (**Figure 14**).

Background research revealed that, while no previously recorded sites are located within the TY-163 survey boundary, two sites are located adjacently to the south. These sites are 8BY2378, a multi-component prehistoric site containing shell midden deposits spanning across Heritage Park, and site 8BY2377, a twentieth century historic refuse site (Campbell et al. 2017). While 8BY2378 was recommended as potentially eligible for the NRHP, site 8BY2377 was determined to be ineligible.

Given the landform, observed conditions, and previously recorded sites in the vicinity, TY-163 was determined to have an overall moderate potential to yield archaeological deposits. As such, shovel tests were generally excavated at no more than a 50-m interval. However, given the disturbance from Tyndall related construction and maintenance, as well as areas of debris related to Hurricane Michael cleanup efforts, some shovel test were judgmentally placed rather than adhering to a strict interval to ensure coverage of the survey area.







Figure 12. Survey Area TY-163 results map, eastern portion.





Figure 13. General conditions in Survey Area TY-163 showing disturbance, facing east.



Figure 14. General conditions in Survey Area TY-163, facing west.

A total of 204 SSTs (57.12 m<sup>3</sup>) and 38 RSTs (10.64 m<sup>3</sup>) were excavated within TY-163, with two new archaeological sites (8BY2716 and 8BY2717) identified (see **Figures 11 and 12**). Site 8BY2716 is a low density prehistoric artifact scatter located on the north side of Mississippi Road between the Base Exchange and the Skills and Development Center building (**Figure 15**). This site was first identified as prehistoric pottery fragments recovered during archaeological monitoring of hurricane disaster relief activities; this monitoring occurred prior to the current survey. Tyndall AFB CRM staff alerted Wood to the general location of these materials and requested that the artifacts recovered during the monitoring be incorporated into Wood's Phase I survey report. Wood has not yet received this material, so it is still unknown how many artifacts were recovered during the monitoring. Shovel testing in the area, as part of the current investigation, yielded three pottery fragments and three pieces of lithic debitage in two shovel tests. While artifact analysis is ongoing, the overall paucity of material recovered from the site suggests it is unlikely to yield additional important information concerning prehistoric occupations at Tyndall AFB and, as such, it is preliminarily recommended as not eligible for the NRHP.

Site 8BY2717 is a prehistoric shell midden site located on the north side of Georgia Avenue and near the main entrance gate (Figure 16; see Figure 12). This midden, which yielded only two prehistoric pottery fragments, extended from the surface up to 25 cm below surface and consisted of a high density of shell (dominantly whelk and conk varieties) in a dark, organic matrix. Isolated areas of the midden, particularly in the northwestern portion, were disturbed by modern construction such as drainages and fenceposts; shell was exposed on the surface in association with these disturbances (Figure 17; see Figure 16). However, condition of the shells identified during shovel testing (mostly whole or large fragments) and the observed soil profiles in the shovel tests suggest that a majority of this midden is intact. Artifact analysis is still ongoing, so that cultural affiliation of the midden is yet undetermined. The midden's location, mainly its lack of proximity to a prominent water source, is of interest, as a majority of shell middens identified on Tyndall AFB tend to be located on landforms adjacent to larger bodies of water such as St. Andrew Bay. Excavation of larger (e.g. 1-x-1-m) units may provide additional artifacts, botanical samples, and subsequent features which would shed light on site use and strategy for its placement further inland. Therefore, although this midden is relatively small is size and yielded only a few artifacts, site 8BY2717 is recommended as potentially eligible for the NRHP. Further work is needed to evaluate the site's NRHP eligibility status.



Figure 15. Site 8BY2716 results map. Location of SF 1 is approximate.



Figure 16. Site 8BY2717 results map.



Figure 17. Site 8BY2717, area of midden exposed due to subsurface disturbance, facing north.

### Survey Area TY-164

Survey Area TY-164 is a 314.69 ac (127.3 ha) area located within the portion of the main base on the south side of U.S. Highway 98 and adjacently east of Survey Area TY-163 (Figure 18 to 20; see Figure 2). The northeastern portion of this survey area has been heavily developed and consisted of structures such as dorm buildings and the Human Resources Office, as well as roads, sidewalks, and artificial drainages. Other disturbances encountered include an area of dense wood chips on the surface and piles of structure debris attributed to Hurricane Michael clean-up efforts (Figure 21). However, like adjacent survey area TY-163, open grassy areas that were not obviously disturbed were present. In contrast, the southern and western portion TY-164 was relatively undeveloped and consisted of a coastal spit and dune landform extending along the St. Andrew Bay and St. Andrew Sound, and a low terrace landform covered in a secondary pine forest (see Figures 18 to 20). Vegetation on the coast dune landform varied from low grasses, short shrubs and sparse trees on and along the dunes to denser grasses and reeds in and around lower, wet pockets on the landform (Figure 22). Approximately 53.5 ac (21.7 ha) of the wooded area could not be surveyed due to a dense amount of tree fall. While field observations and examination of the topographic guadrangles and aerial photographs indicate that a majority of this wooded area is likely wet, one prehistoric shell midden site (8BY1496) has been previously identified on a low rise within that wooded section and within the TY-164 boundary (see Figure 20) and determined as potentially eligible for the NRHP (Rabbysmith 2010). The identification of this previously recorded site suggests potential for additional rises yielding prehistoric cultural materials to be present within this inaccessible portion of TY-164.







Figure 19. Survey Area TY-164 results map, central portion.









Figure 21. General conditions in Survey Area TY-163, facing west.



Figure 22. General conditions on dune/spit landform in Survey Area TY-164, facing west.

A small portion of the southern edge of the survey area corresponded with a raised two track access road leading to Tyndall Beach and surrounded by a low marshy, inundated area along a small lagoon feature (see **Figure 17**).

Given the variation in the encountered landforms, observed conditions and previously recorded sites in the vicinity, TY-164 ranged from having a moderate to high potential to yield archaeological deposits. As such, the interval of shovel test excavation varied from 25- to- 50-m. However, given disturbance from historic and modern Tyndall development, as well as areas of debris related to Hurricane Michael cleanup efforts, some shovel test were judgmentally placed rather than adhering to a strict interval to ensure coverage of the survey area.

A total of 260 SSTs (72.8 m<sup>3</sup>) were excavated within this survey area (see **Figures 18 to 20**). No new archaeological sites or archaeological occurrences were recorded during survey of TY-164. However, approximately 53.6 ac of TY-164 was unable to be surveyed due to a dense amount of tree fall. While a majority of this area is likely wet, one previously recorded prehistoric shell midden site (8BY1496) is located on a low rise within this area, suggesting the potential for additional rises yielding prehistoric cultural materials to be present; therefore, completion of the survey in this area is recommended once the area can be safely accessed.

### SUMMARY

Wood archaeologists completed Phase I archaeological survey of Survey Areas TY-162, TY-163 and TY-164 (Task Order TY-19-0002) at Tyndall AFB, Bay County, Florida. A total of 516 SSTs were excavated for this task order, with an additional 53 RSTs excavated during site delineations. Background research revealed portions of four previously recorded sites extend into the TY-162 (8BY2280, 8BY2380 and 8BY2381) and TY-164 (8BY1496) survey boundaries; all four sites have been previously determined as potentially eligible (**Table 2**). Shovel tests were excavated along the boundary of the three previously recorded sites in TY-162 yielded no artifacts and none of these sites were found to extend further into the current survey boundary. Site BY1496 was located in a dense are of downed trees so that survey was unable to be completed in this area.

Table 2. Sites Located within the TY-19-0002 Survey Areas and Preliminary				
Recommendations.				

Site #	Survey Area	Preliminary Recommendation*
8BY1496	TY-164	Previously determined as potentially eligible
8BY2280	TY-162	Previously determined as potentially eligible
8BY2380	TY-162	Previously determined as potentially eligible
8BY2381	TY-162	Previously determined as potentially eligible
8BY2716	TY-163	Not eligible
8BY2717	TY-163	Potentially eligible; further work
8BY2718	TY-162	Not eligible
8BY2719	TY-162	Additional research required for recommendation
IF-1	TY-162	Not eligible

\*Preliminary recommendations may change based on completion of full site analysis



The survey resulted in the identification of three new prehistoric archaeological sites (8BY2716, 8BY2717, and 8BY2718), one new historic archaeological site (8BY2719), and one prehistoric archaeological occurrence (IF-1) [see **Table 2**]. Analysis of the artifacts recovered during the Phase I survey is in progress. Therefore, all NRHP recommendations for the newly identified sites in this management summary are preliminary recommendations and are subject to change.

Sites 8BY2716 (located in TY-162) and 8BY2718 (located in TY-163) are both low density artifact scatters preliminarily recommended as not eligible for the NRHP. Site 8BY2716, located in Survey Area TY-163, yielded prehistoric materials in association with a shell midden feature and is recommended as potentially eligible for the NRHP. Further work is needed to determine its NRHP eligibility. Site 8BY2719, located in TY-162, consisted of six concrete and metal pier features found on the surface with a low density of Herty cup fragments also found on the surface. Function of these piers could not be determined and additional research into Tyndall development to attempt to determine function is necessary before an NRHP-eligibility recommendation for this site can be made. The archaeological occurrence (IF 1), located in TY-162, consisted of a single lithic flake recovered in one shovel test; this occurrence is unlikely to yield important information concerning prehistoric occupations at Tyndall or in the Florida panhandle and, as such, it is recommended as not eligible for the NRHP.

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