

# Volume I: Final Environmental Impact Statement for the Proposed Modernization and Expansion of Townsend Bombing Range, Georgia

March 2013



UNITED STATES MARINE CORPS

Marine Corps Air Station Beaufort  
Beaufort, South Carolina



**Volume I: Final  
Environmental Impact Statement  
for the  
Proposed Modernization and Expansion of  
Townsend Bombing Range, Georgia**

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**United States Marine Corps  
Marine Corps Air Station Beaufort  
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**Final  
ENVIRONMENTAL IMPACT STATEMENT  
March 2013**

**Lead Agency:** Department of the Navy

**Title of Proposed Action:** Proposed Modernization and Expansion of Townsend Bombing Range, Georgia

**Affected Jurisdiction:** McIntosh and Long Counties, Georgia

**Designation:** Environmental Impact Statement

**Abstract**

This Final Environmental Impact Statement (FEIS) has been prepared to evaluate the potential environmental impacts of acquiring additional property and constructing the necessary infrastructure to allow the use of precision-guided munitions (PGMs) at Townsend Bombing Range (TBR), Georgia. Through the use of PGMs at TBR, the United States Marine Corps (USMC) can more efficiently meet current training requirements for pilots of Marine Aircraft Group 31 (MAG-31) by significantly increasing air-to-ground training capabilities at Marine Corps Air Station (MCAS) Beaufort, South Carolina.

This FEIS has been prepared in accordance with Section (102)(2)(c) of the National Environmental Policy Act (NEPA) of 1969 and regulations implemented by the Council on Environmental Quality (40 Code of Federal Regulations [CFR] Parts 1500-1508), United States Department of the Navy NEPA regulations (32 CFR Part 775), and USMC NEPA directives (Marine Corps Order P5090.2A, Chapter 12, Change 2).

NEPA requires federal agencies to examine the potential impacts of their proposed actions on the human environment, which includes the natural and physical environment, and the relationship of people with that environment. An EIS is a detailed public document that complies with the requirements of NEPA by assessing the potential impacts that a major federal action may have on the human environment.

Potential impacts from four action alternatives and the No Action Alternative have been analyzed in this FEIS. Potential impacts have been analyzed for land use; socioeconomics; recreation; wetlands; water resources; airspace; noise; biological resources; cultural resources; air quality; transportation; topography, geology, and soils; utilities and infrastructure; and, hazardous materials and waste.

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# Executive Summary

This Final Environmental Impact Statement (FEIS) evaluates the potential environmental impacts associated with the proposed modernization and expansion of Townsend Bombing Range (TBR) in McIntosh County, Georgia, that would provide a modern and realistic training environment for the F/A-18 pilots of Marine Aircraft Group 31 (MAG-31), stationed at Marine Corps Air Station (MCAS) Beaufort, South Carolina, by accommodating the use of inert (with spotting charges) precision-guided munitions (PGMs) and the larger safety zones their use requires. To implement the Proposed Action, the United States Marine Corps (USMC) would acquire lands in the vicinity of TBR on which to create new target areas to allow for a greater variety of training activities, modify existing airspace, construct the required infrastructure, and improve training capabilities. This FEIS is prepared in accordance with Section (102)(2)(c) of the National Environmental Policy Act (NEPA) of 1969 and regulations implemented by the Council on Environmental Quality (CEQ; 40 Code of Federal Regulations [CFR] Parts 1500-1508), United States Department of the Navy NEPA regulations (32 CFR Part 775), and USMC NEPA directives (Marine Corps Order [MCO] P5090.2A, Chapter 12, Change 2).

## ES.1 Overview of Marine Corps Mission and Training

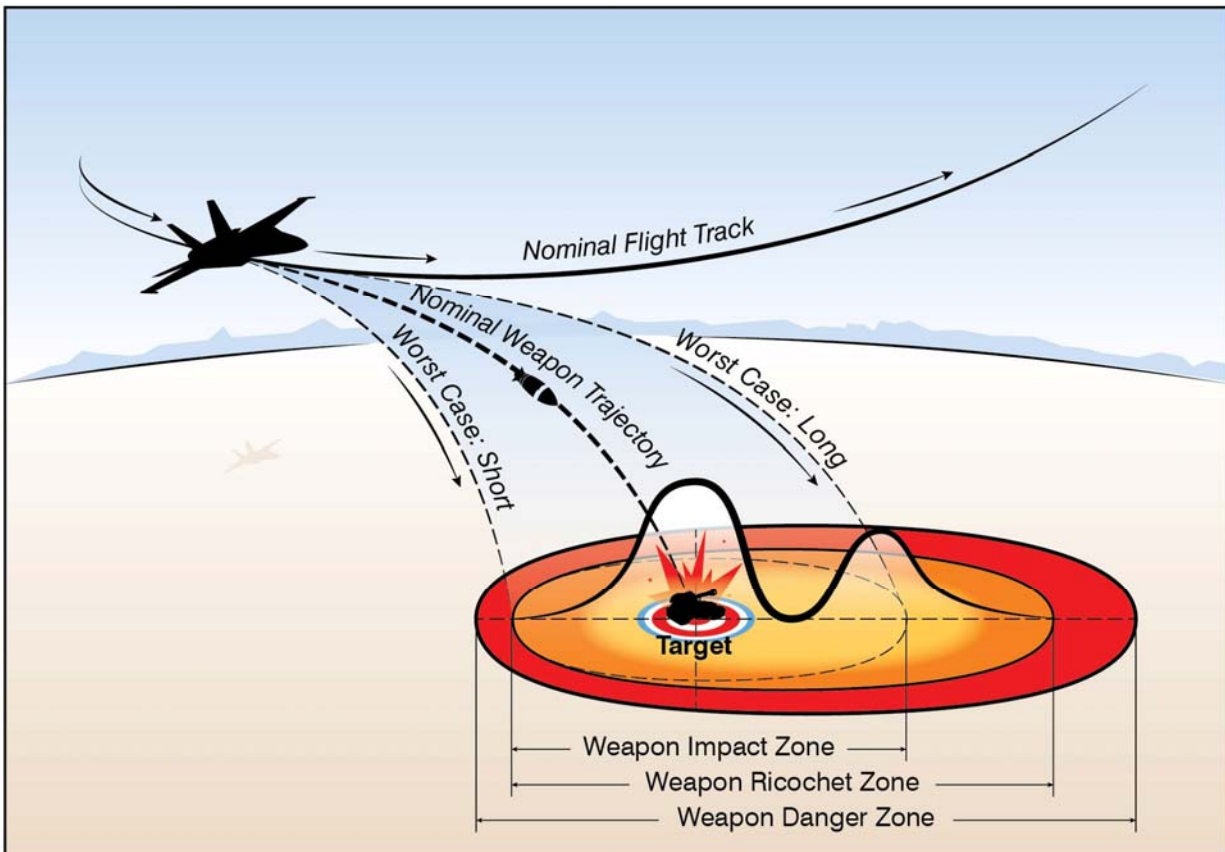
The United States effectively responds to international disruptions and conflicts because its armed forces conduct realistic training exercises that allow them to acquire and maintain critical combat skills at the level necessary to meet real-world events. The USMC is the Nation's force in readiness and must be prepared to deploy to meet a range of global contingencies as an air-ground task force. Before deploying, USMC aviation units must be proficient in various skills, and they must train as they expect to fight in order to fulfill their national security and military missions. USMC aviators must train and be proficient in multiple mission areas, which include the delivery of PGMs and use of air-to-ground weapons against a variety of target types to prepare for various combat scenarios. The USMC meets aviation training requirements, in part, by conducting air-to-ground training exercises and ensuring Marine aviators have access to ranges and airspace to develop and maintain skills for wartime missions and conduct training with various weapons systems.

## ES.2 Precision-Guided Munitions

PGMs are guided, advanced weapons that are designed to precisely hit a specific target. They are made with a laser or global positioning system (GPS) guidance systems with operable fins that correct the munitions' trajectory. Because of its ability to correct itself in-flight to the target, PGMs are often referred to as "smart bombs." PGMs are released from higher altitudes and at greater distance from the target than unguided weapons. Unguided munitions are free-falling when released from the aircraft and they descend towards the target with no ability to change their trajectory. Therefore, unguided weapons are often referred to as "dumb bombs." Unguided or General Purpose (GP) munitions are released at lower altitudes and at a closer distance to the target. Dumb bombs lack the potential to stray far from their initial trajectory, or line of release. By comparison a PGM's guidance system ensures a high level of accuracy; however, if the guidance system malfunctions, the higher altitudes and greater distance from which these weapons are employed give them the potential to stray further from the intended target than their unguided GP counterparts.

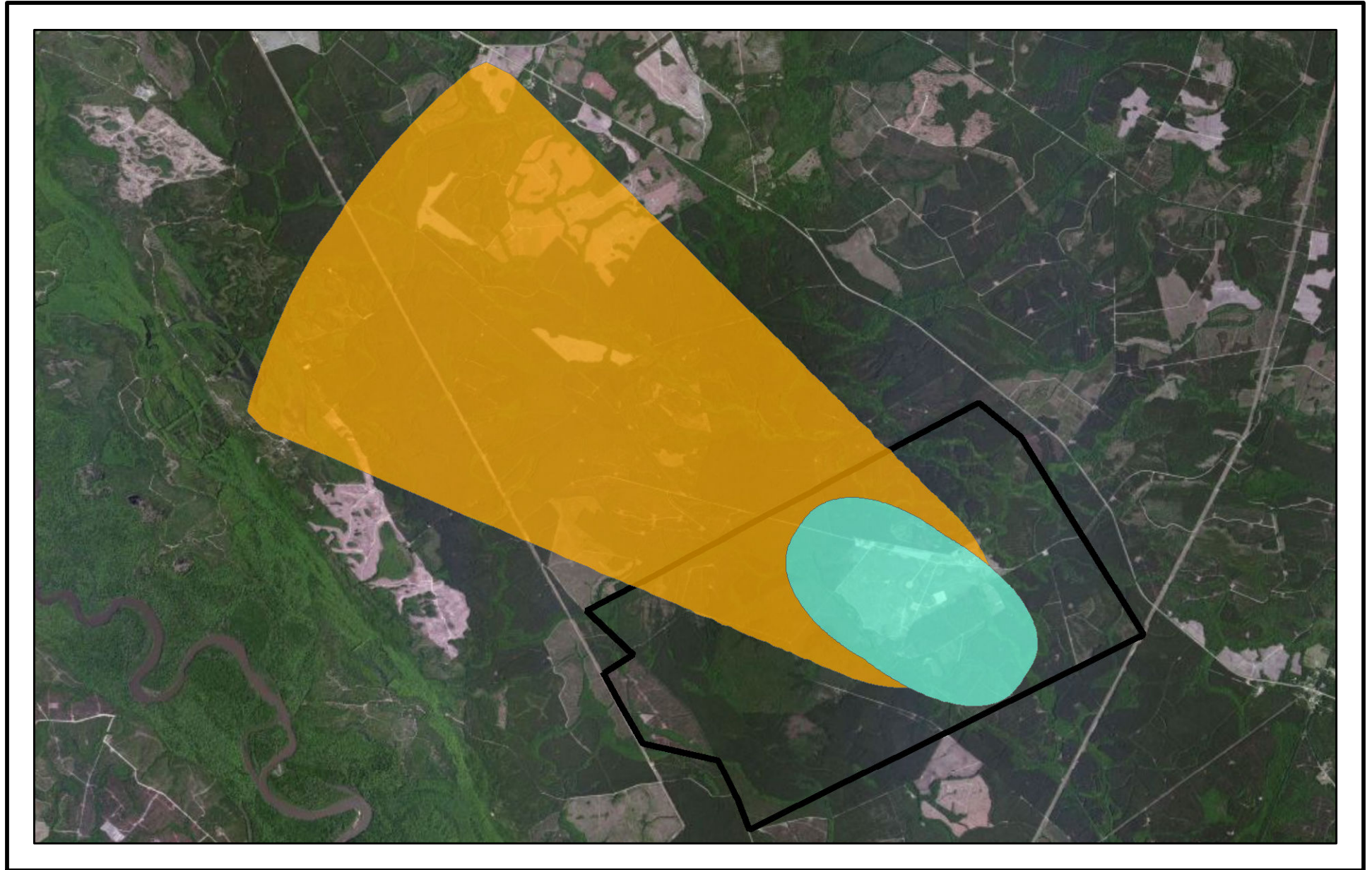
### ES.3 Weapon Danger Zones

A Weapon Danger Zone (WDZ) footprint represents a specific area drawn about a target based on weapon containment. Containment is defined as all weapon impacts, including ricochets, occurring within the WDZ. As outlined above, although PGMs have lower failure rates and are more accurate than non-guided GP weapons, the WDZ requirements are much larger because the WDZ must contain the area within which the weapon could impact the ground if the guidance system failed. By definition, as illustrated in Figure ES-1, a WDZ is a three-dimensional zone that encompasses the ground and airspace for lateral and vertical containment of projectiles, fragments, debris, and components resulting from the firing, launching, and/or detonation of air-to-ground ordnance. WDZs are sometimes informally known as “safety zones.” WDZs are developed for a specific air-to-ground munitions-delivery training event. The modeling software, WDZ Tool, considers the weapons dynamics (accuracy and fail rates), release parameters (airspeed, altitude, dive angle, and run-in heading), target material, and soil types to develop the WDZs. WDZ Tool is the United States Department of Defense’s (DOD’s) standard modeling program for determining WDZs. Due to the potential for a PGM to stray further from the intended target their WDZs are larger than their unguided GP counterparts. Figure ES-2 illustrates the size difference between PGM and GP WDZs when all the training parameters are the same, except the munition.



SOURCE: Ecology and Environment, Inc. 2012

Figure ES-1: Weapon Danger Zone



Existing Range

GP WDZ

PGM WDZ

GP = General Purpose Munition  
PGM = Precision-Guided Munition  
WDZ = Weapon Danger Zone



**Figure ES-2**  
**WDZ Comparison**  
Townsend Bombing Range  
McIntosh and Long Counties, Georgia

Sources: Bing Maps 2009,  
McFadden 2012



## **ES.4 Purpose of and Need for the Proposed Action**

MCAS Beaufort, South Carolina, is home to MAG-31, which has six operational F/A-18 Hornet Squadrons. The F/A-18 is a fighter and attack jet aircraft that carries out air-to-air and air-to-ground missions from land bases and aircraft carriers. MAG-31 conducts anti-air-warfare and offensive air support operations in support of Fleet Marine Forces from advanced bases, expeditionary airfields, or aircraft carriers and conducts other air operations as directed.

Through the preparation of a Universal Need Statement (UNS; May 1, 2003), MAG-31 identified its requirement for an air-to-ground training range that allows aircrews to utilize PGMs in a realistic training environment. Following the preparation of the UNS, the USMC began the process to certify the requirement to establish an air-to-ground training range to support MAG-31's aviation training needs and develop the approach to accommodate this requirement. In 2009, the Marine Requirements Oversight Council (MROC) concurred with the concept to expand TBR. Thus, the MROC approved the requirement to establish an East Coast range capable of supporting PGM training and determined that modernization of TBR was critical to ensuring the effective training of East Coast-based USMC aviation units.

The MROC's concurrence with MAG-31's need for an air-to-ground range that can accommodate realistic PGM training allowed the USMC and the United States Department of the Navy to request the DOD's approval to study the land acquisition alternatives that could support the creation of a modernized air-to-ground training range. The Office of the Secretary of Defense approved the request in December 2009. Based on these developments, the USMC initiated the preparation of the EIS to examine the potential impacts of the proposed land acquisition and airspace modification alternatives that could meet the training requirement.

To fulfill MAG-31's aviation training requirement to train with PGMs in a realistic training environment and achieve readiness proficiency for air-to-ground operations for MAG-31 F/A-18 pilots, the USMC proposes to modernize and expand TBR. This modernization and expansion of TBR would provide an enhanced, air-to-ground training range for MAG-31 F/A-18s that would safely accommodate the use of inert PGMs as well as the suite of inert weapons that are currently used at TBR and thus achieve greater readiness proficiency for air-to-ground operations. Inert weapons contain no explosives, but may contain a small smoke charge (spotting charge) to assist in scoring the event and providing feedback to the pilot.

It is critical that TBR, as the primary air-to-ground range for MAG-31, has the capability to accommodate MAG-31's operational requirements, including training in the employment of PGMs, and the adaptability to accommodate evolving training needs and areas of emphasis. TBR is one of four air-to-ground ranges within the USMC's inventory on the East Coast and one of seven USMC ranges in the United States that support air combat/air-to-ground operations. TBR is centrally located between the Gulf Coast and the Eastern Seaboard and because of its strategic location is an ideal venue in support of military training requirements.

Munitions that are currently utilized for training at TBR are non-guided, inert weapons. Under TBR's present configuration, it is unable to meet all the requirements of the current F/A-18 air-to-ground training syllabus, including the delivery of PGMs; furthermore, no range within the local flying area is capable of supporting MAG-31's required level of PGM training.

MAG-31 aviators must rely on training ranges in the southwestern United States to meet individual aircrew PGM training and readiness requirements. This reliance on the southwest ranges renders the USMC aviation training suboptimal and inefficient. When traveling to the southwest ranges to train, MAG-31 aviators must focus on their core skill requirements for PGM training. However, the southwest ranges are best suited for advanced-level and higher skills training. These core-skill PGM training requirements could be more efficiently accomplished at a range on the East Coast.

## **ES.5 Proposed Action and Alternatives**

### **ES.5.1 Proposed Action**

The Proposed Action that is evaluated in this FEIS is to modernize and expand TBR to accommodate MAG-31's requirement to train with inert PGMs and the larger safety zones their use requires. To accomplish this, the USMC proposes to acquire lands in the vicinity of TBR on which to create new target areas to accommodate the larger WDZs and meet the minimum threshold training requirement.

The Proposed Action includes the following interrelated components:

- Acquisition of land;
- Acquisition of a timber easement;
- Modification of existing airspace;
- Construction of infrastructure to support PGM training; and
- Improvement of training capabilities.

#### **ES.5.1.1 Acquisition of Land**

The USMC proposes to acquire land adjacent to TBR to accommodate the WDZs for guided bomb unit (GBU)-31, GBU-32, and GBU-38 (joint direct attack munitions [JDAMs]), and WDZs and Laser Safety Danger Zones (LSDZs) for GBU-10, GBU-12, and GBU-16 (laser-guided bombs [LGBs]). PGMs require larger WDZs and USMC range safety policies require danger zones to be contained within the range boundary and/or lands under exclusive military use and control. The WDZs and LSDZs are designed to contain all projectiles, hazardous fragments, laser hazards, and ricochets. To safely deliver PGMs at TBR, the land area must be increased to ensure the containment of the danger zones, while simultaneously allowing for the employment of realistic tactics, techniques, and procedures. The protection of the public from the hazards associated with the proposed training is of utmost importance and was a key component in the design of each of the proposed alternatives. Numerous precautions are mandated by the USMC, the U.S. Air Force, and local range safety regulations to protect the public, military, and civilian personnel.

To develop land acquisition areas, the USMC analyzed the lands surrounding TBR and used modeling software to determine WDZs/LSDZs. These land acquisition areas (up to approximately 34,861 acres), in combination or as stand-alone options, became the action alternatives for this FEIS. Each action alternative meets the minimum threshold training requirements for PGM delivery training as outlined in the June 1, 2010, joint letter from II Marine Expeditionary Force (MEF) and Marine Corps Installations East (MCIEAST) to the Marine Corps Combat Development Command (USMC 2010a). The land acquisition alternative must provide for a minimum of two 15-degree cones for final attack heading (one of which allows for tactical run-ins), with release of weapons at airspeeds from 360 to 540 knots (414 to 621 miles per hour) and at 24,000 feet mean sea level (MSL). Additionally, to meet the threshold training requirement, a range must allow for delivery of GBU-31, GBU-32, and GBU-38 (JDAMs); and GBU-10, GBU-12, and GBU-16 (LGBs).

Utilizing the delivery parameters stated above, WDZ Tool generated a Composite Weapon Danger Zone (CWDZ) to identify the land area necessary to meet the desired improvements in training capabilities and to ensure continued public safety for air-to-ground weapon delivery. The CWDZ was overlain on aerial imagery of the existing TBR and surrounding lands. Taking into account existing natural and manmade terrain features (roads, streams, power lines, etc.) and property ownership

boundaries, the acquisition areas were developed. The proposed acquisition areas would go up to, but would not include, these landscape features. The Proposed Action does not include the acquisition of the power lines or the current utility rights-of-way (ROWs). No utility transmission lines or associated ROWs would be affected by the Proposed Action.

The PGMs discussed in this EIS use laser or GPS guidance systems. A comprehensive safety program exists for the use of lasers. This program requires the individual targets and/or target areas to be certified for laser use, personnel to be trained in the proper use of lasers, and established procedures to be followed. Range officials will continue to ensure all prescribed precautions are enforced to protect the public from military operations.

The CWDZ was modified to minimize the amount of land necessary to fully contain the CWDZ while meeting the threshold training requirement. Through this process, the USMC developed four possible land acquisition areas. Acquisition Area 2, which was presented during scoping, is not being carried forward in this EIS for further analysis. Also, during preparation of this EIS, Area 1 as it was presented at scoping was divided into two sections and renamed Areas 1A and 1B. Therefore, the three possible land acquisition areas for the Proposed Action are:

- Acquisition Area 1A (approximately 6,231 acres);
- Acquisition Area 1B (approximately 4,956 acres); and
- Acquisition Area 3 (approximately 23,674 acres).

If this acquisition is approved, further steps such as erecting signage, fencing, and gates would be taken to ensure the public is excluded from those areas where hazards exist. Prior to the commencement of training and throughout the conduct of training, range personnel would ensure the range is clear of non-participating personnel. Personnel conducting training and range control personnel would actively manage all training activities to ensure all hazards remain within the boundaries of the proposed range.

### **ES.5.1.2 Acquisition of a Timber Easement**

In addition to the proposed land acquisition, the USMC proposes to purchase a timber easement from McIntosh County, Georgia, on approximately 3,007 acres of land within the current TBR boundary. McIntosh County retained the timber easement to the portion of the existing TBR property that was purchased from Union Camp Corporation in 1991-1992. McIntosh County manages its timberlands for commercial production, which requires infrequent prescribed burns. The USMC, on the other hand, requires the land to be managed to support military mission requirements. Air-to-ground training with inert ordnance can result in wildfires due to sparks as munitions hit the ground and ricochet, as well as from the spotting charge. The USMC manages timberlands in support of ordnance use by frequently employing prescribed burns. Prescribed burns help to eliminate underbrush, pine straw, dead leaves, and similar, which can fuel a wildfire. This is a critical land management tool on a range where a small spark could ignite this fuel causing a serious, uncontrolled wildfire. To ensure the safety of TBR personnel and the public, under the Proposed Action it is necessary for the USMC to own all the timberland and to manage it in support of mission requirements.

### **ES.5.1.3 Modification of Existing Airspace**

The USMC proposes to modify Restricted Area R-3007A by extending the current restricted area laterally to the proposed acquisition area boundary. The purpose of this additional airspace is to exclude non-participating aircraft from intruding into hazardous operations, as required by the Federal Aviation Administration (FAA) regulations. The current restricted area consists of airspace that extends from the surface to 25,000 feet MSL and airspace that extends from 100 feet above ground level (AGL) to 25,000 feet MSL. The proposed modification would eliminate the current gap from 100 feet AGL down to the

surface of the ground over the areas proposed for acquisition. This extension, which would apply only to the existing restricted airspace over lands proposed for acquisition by the United States Department of the Navy (DON), would unite the airspace with acquired land to enable the delivery of inert ordnance in order to comply with FAA regulations. It is not an indication that fixed-wing flight operations would be conducted at altitudes below 100 feet. No lateral modification of the R-3007 complex is proposed as part of the Proposed Action.

No loss or delay of emergency services would occur as the USMC and the Georgia Air National Guard (GA ANG) would continue to work with these services to suspend training activities and allow access through the restricted airspace when necessary.

#### **ES.5.1.4 Construction of Infrastructure to Support PGM Training**

Depending on the action alternative selected, the USMC would propose to construct up to eight new target areas. The target area acreage represent between 4% and 8% of the total land proposed for acquisition under the action alternatives. In general, the acreage outside the target areas would remain as forestland to support the air-to-ground training. Additional construction activities would include a new observation tower and support facilities, as well as additional utilities, roads, and fencing. Construction activities are expected to disturb up to 2,000 acres.

Target areas, ranging in size from 200 acres to 400 acres, would be constructed in locations that were determined to accommodate the larger WDZs that are required for realistic PGM training. Each target area would include an array of targets and would be surrounded by a 50-foot firebreak. The firebreak would not be constructed to handle everyday vehicle use, but could be used by emergency vehicles. Each target area may have a boundary fence 8 feet in height. Existing roads would be used to the greatest extent possible, but all target areas would require some degree of road construction or improvement. Each target area would include the construction of static or fixed targets, referred to as hard targets, designed to represent a specific real-world threat. Along with the hard targets, each target area would include relocatable, simulated, non-working tactical targets. Each target area would accommodate a Weapon Impact Scoring System (WISS), which is used to score air-to-ground ranges and provide feedback to the pilots on the level of accuracy for training purposes.

#### **ES.5.1.5 Improvement of Training Capabilities**

Currently, MAG-31 pilots can accomplish less than half of their air-to-ground training requirements at TBR. The expansion of TBR and the creation of new target areas would enhance current training capabilities by accommodating full-scale inert (non-explosive) weapons, enabling the use of PGMs, and increasing weapons delivery parameters by providing multiple run-in headings (i.e., aircraft direction during ordnance delivery). As a result, air-to-ground training capabilities could increase from 47% to 85% of the individual aircrew air-to-ground ordnance delivery training syllabus for the F/A-18.

### **ES.5.2 Public Scoping**

During the two 30-day public scoping periods (August 6 through September 7, 2010, and October 10 through November 8, 2010), the USMC used several methods to notify the public of opportunities for involvement and methods to comment during scoping. These methods included publishing a Notice of Intent, mailing scoping letters, issuing press releases and newspaper advertisements, and creating a public Web site for the EIS. In addition, two open-house public scoping meetings were held to provide the public the opportunity to review and learn about the USMC's proposal and to express their thoughts regarding the project and alternatives. A total of 110 comments were received through letters, emails, written comment sheets, and through the public Web site.

The majority of comments were received from local residents/citizens (approximately 80%) and local governments (approximately 8%). The main issues of concern raised in comments included impacts to:

- Socioeconomics (loss of tax revenue, and impacts to privately owned real property, property values, and property taxes);
- Recreation (decrease in area available for hunting, fishing, and other recreational activities);
- Biological resources (impacts to protected wildlife species and habitat loss);
- Water resources (impacts to wetlands and the Altamaha River corridor);
- Noise (perceived increase in air traffic and training missions, impacts to public safety as a result of noise);
- Alternatives preference; and
- Transportation (concern over road closures, particularly State Highway [Hwy.] 57).

A Scoping Summary Report was developed after the close of the second 30-day public comment period, and it describes the scoping process and summarizes the comments received. This report is available as Appendix A to this FEIS.

### **ES.5.3 Public Comment Period**

The 45-day Draft Environmental Impact Statement (DEIS) review period (July 13 to August 27, 2012) was extended through September 27, 2012. During this DEIS review, the USMC used several methods to notify the public of opportunities for involvement and methods to comment during the public comment period. These methods included publishing a Notice of Availability, mailing notification letters, issuing press releases and newspaper advertisements, advertising on the public Web site for the EIS, and advertising on a local public-access television station (Darien TV). In addition, two open-house public meetings were held to provide project information and findings of the DEIS, answer questions from community members, and solicit public input on important issues and concerns. A total of 100 comments were received through letters, emails, written comment sheets, and through the public Web site.

The majority of comments (72 comments; 72% of total received) came from local residents/citizens. A total of 20 comments in support of the Proposed Action were received. Based on comments heard and received in writing, the most pressing concerns include:

- Socioeconomics;
- Safety;
- Training concerns;
- Cultural resources;
- Noise;
- Natural resources; and
- Road closures/access.

A Public Comment Summary Report was developed after the close of the DEIS review period, and it describes the DEIS review process and summarizes the comments received. This report is available as Appendix B to this FEIS.

## **ES.5.4 Action Alternatives**

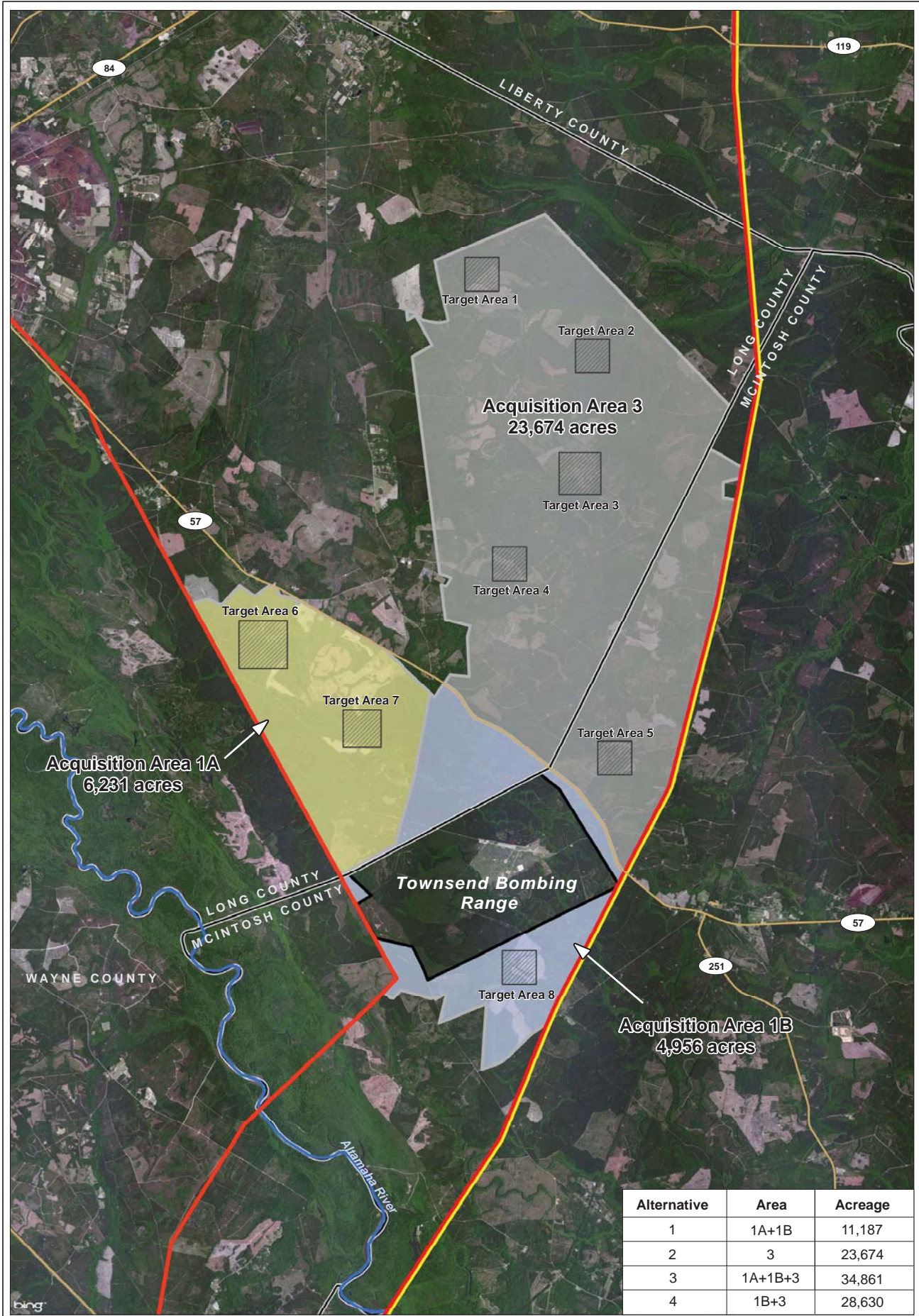
Alternatives for implementing the Proposed Action must be considered in accordance with NEPA, CEQ regulations for implementing NEPA, and MCO P5090.2A. However, only those action alternatives that reasonably meet the purpose of and need for the Proposed Action require detailed analysis.

This FEIS examines four action alternatives and the No Action Alternative. All four action alternatives would involve the acquisition and management of land and a timber easement, the modification of existing airspace, and the infrastructure to support PGM training, and would result in the improvement of training capabilities. The land acquired under each action alternative (Figure ES-3) would involve different strategic combinations of three possible land acquisition areas (referred to in this FEIS as “Acquisition Area 1A,” “Acquisition Area 1B,” and “Acquisition Area 3”), as follows:

- Alternative 1: Area 1A and Area 1B
- Alternative 2: Area 3
- Alternative 3: Area 1A, Area 1B, and Area 3
- Alternative 4: Area 1B and Area 3

Similarly under all four action alternatives, the USMC proposes to modify the existing airspace based on the amount of land acquired. Any combination of the land proposed to be acquired would be under the current Restricted Area R-3007. Alternative 1 would involve the relocation of the existing range compound facilities and observation tower to the northern corner of Area 1B. The existing facilities would not be relocated under Alternatives 2, 3, and 4; however, a new observation tower would need to be constructed in the southwestern corner of Area 3. All the action alternatives would involve the installation of target scoring equipment, facility and/or tower construction, and roadway construction/improvement.

Table ES-1 summarizes each of the action alternatives. The No Action Alternative is not a viable alternative since it does not meet the purpose and need; however, it serves as the baseline for comparison of impacts evaluated in this FEIS.



Alternative	Area	Acreage
1	1A+1B	11,187
2	3	23,674
3	1A+1B+3	34,861
4	1B+3	28,630

- Acquisition Area 1A
- Acquisition Area 1B
- Acquisition Area 3
- Existing Range
- Target Area
- Counties
- Major Roads
- Power Line
- Shared Power Line and Natural Gas Pipeline Right-of-Way
- Allamaha River



0 1 2 Miles

**Figure ES-3**  
**Land Acquisition Alternatives**  
 Townsend Bombing Range  
 McIntosh and Long Counties, Georgia

Sources: Bing Maps 2009, Based on Lusk 2009, McFadden 2011

**Table ES-1  
Summary of Action Alternatives**

Acquisition of Land and Timber Easement	Modification of Existing Airspace	Construction of Infrastructure to Support PGM Training	Improvement of Training Capabilities
<b>Alternative 1</b>			
<p>Acquisition Areas 1A and 1B (11,187 acres). Acquisition of 3,007-acre timber easement held by McIntosh County.</p>	<p>Restricted Area R-3007A would be modified by extending the current restricted area laterally to the proposed acquisition area boundary. The proposed modification would eliminate the current gap from 100 feet above ground level (AGL) down to the surface of the ground over those areas that are proposed for acquisition. This extension, which would apply only to the existing restricted airspace over lands proposed for acquisition by the U.S. Department of the Navy, would unite the airspace with acquired land to enable the delivery of inert ordnance in order to comply with Federal Aviation Administration regulations. It is not an indication that fixed-wing flight operations would be conducted at altitudes below 100 feet.</p>	<p><b>Target Area 6</b> <u>Airfield Site with Simulated Petroleum, Oil, and Lubricants (POL) Site/Fuel Farm</u></p> <ul style="list-style-type: none"> <li>• Two simulated runways</li> <li>• Tactical targets – simulated fuel storage tanks, mock airplanes, empty tanks, and vehicles</li> <li>• Scoring on the Weapon Impact Scoring System (WISS)</li> <li>• Approved for laser use</li> <li>• Approved for high-angle strafe</li> </ul> <p><b>Target Area 7</b> <u>Urban Target Area (UTA)</u></p> <ul style="list-style-type: none"> <li>• Simulates large urban city</li> <li>• Consists of various buildings and roadways</li> <li>• WISS scoring</li> <li>• Approved for laser use</li> <li>• Approved for high-angle strafe</li> </ul> <p><b>Target Area 8</b> <u>Fuel farm/POL Site</u></p> <ul style="list-style-type: none"> <li>• Tactical targets – empty fuel storage tanks and refueling vehicles</li> <li>• WISS scoring</li> <li>• Approved for laser use</li> <li>• Approved for high-angle strafe</li> </ul>	<p>Air-to-ground training capabilities could increase from 47% to 72%.</p>
<b>Alternative 2</b>			
<p>Acquisition Area 3 (23,674 acres). Acquisition of 3,007-acre timber easement held by McIntosh County.</p>	<p>Same as under Alternative 1.</p>	<p><b>Target Area 1</b> <u>UTA</u></p> <ul style="list-style-type: none"> <li>• Hard targets - simulate village/small urban area</li> <li>• Tactical targets – Surface-to-air missile (SAM) site (600-foot diameter)</li> <li>• WISS scoring</li> <li>• Approved for laser use</li> <li>• Approved for high angle strafe</li> </ul> <p><b>Target Area 2</b> <u>Terrorist Training Camp</u></p> <ul style="list-style-type: none"> <li>• Tactical Targets - Anti-Aircraft Artillery (AAA) and Radar Site</li> </ul>	<p>Air-to-ground training capabilities could increase from 47% to 85%.</p>



**Table ES-1  
Summary of Action Alternatives**

Acquisition of Land and Timber Easement	Modification of Existing Airspace	Construction of Infrastructure to Support PGM Training	Improvement of Training Capabilities
		<ul style="list-style-type: none"> <li>• WISS scoring</li> <li>• Approved for laser use</li> <li>• Approved for high-angle strafe</li> </ul> <p><b>Target Area 3</b> <i>Conventional Bull's-Eye</i></p> <ul style="list-style-type: none"> <li>• 500-foot radius cleared circle</li> <li>• Various tactical targets</li> <li>• WISS scoring</li> <li>• Approved for laser use</li> <li>• Approved for high-angle strafe</li> </ul> <p><b>Target Area 4</b> <i>Convoy Site</i></p> <ul style="list-style-type: none"> <li>• Simulates military convoy</li> <li>• Tactical targets – various-sized vehicles</li> <li>• WISS scoring</li> <li>• Approved for laser use</li> <li>• Approved for high-angle strafe</li> </ul> <p><b>Target Area 5</b> <i>Train Depot</i></p> <ul style="list-style-type: none"> <li>• Simulates moving targets on track</li> <li>• Remote operated global positioning system (GPS)-guided</li> <li>• Two additional tactical targets</li> <li>• WISS scoring</li> <li>• Approved for laser use</li> <li>• Approved for high-angle strafe</li> </ul>	
<b>Alternative 3</b>			
Acquisition Areas 1A, 1B, and 3 (34,861 acres). Acquisition of 3,007-acre timber easement held by McIntosh County.	Same as under Alternative 1.	Target Areas 1, 2, 3, 4, 5, 6, 7, and 8 ( <i>see Alternatives 1 and 2 for descriptions</i> )	Same as under Alternative 2.
<b>Alternative 4</b>			
Acquisition Areas 1B and 3 (28,630 acres). Acquisition of 3,007-acre timber easement held by McIntosh County.	Same as under Alternative 1.	Target Areas 1, 2, 3, 4, 5, and 8 ( <i>see Alternatives 1 and 2 for descriptions</i> )	Same as under Alternative 2.

## **ES.6 Preferred and Environmentally Preferred Alternatives**

Based on the analysis presented in this FEIS, the USMC has selected Alternative 4 as the Preferred Alternative. Alternative 4 represents the most favorable balance of operational utility and acceptable environmental impacts. Both operational and environmental criteria were compared in order to identify Alternative 4 as the Preferred Alternative.

### **ES.6.1 Operational Comparison Criteria**

In order to distinguish among the four action alternatives, the USMC applied the following operational comparison criteria to evaluate the relative operational desirability of each of the four action alternatives:

- Increased capacity of an expanded range to accommodate training missions prescribed in the air-to-ground portion of the F/A-18 training and readiness manual;
- Flexibility to accommodate various training skill levels and the ability to accommodate multiple training events simultaneously; and
- Availability of targets during range maintenance periods.

### **ES.6.2 Environmental Comparison Criteria**

In addition to the operational desirability, the USMC considered the environmental effect of each action alternative. Based on the comments received during the public scoping period and the outcome of the individual resource analyses, the USMC applied the following environmental comparison criteria in order to distinguish among the four action alternatives:

- Minimize the total acreage that would be acquired; and
- Avoid the acquisition of non-commercial forestland.

### **ES.6.3 Identification of the Preferred Alternative**

To arrive at the Preferred Alternative for this FEIS, the USMC selected: a) an operationally preferred alternative, and b) an environmentally preferred alternative based on the outcomes of the above comparisons. The operationally preferred alternative represents the action alternative that best meets the purpose of and need for the Proposed Action from an operational perspective and has the highest level of operational utility (i.e., it maximizes the training enhancement and value to the USMC). The environmentally preferred alternative, on the other hand, represents the action alternative that meets the purpose of and need for the Proposed Action while minimizing the impacts on the human environment, which includes the natural and physical environment, and the relationship of people with that environment. The USMC then weighed the merits of the operationally preferred alternative against the merits of the environmentally preferred alternative to establish the most suitable way-forward to meet the purpose of and need for the Proposed Action. This way-forward, or Preferred Alternative, represents the optimal balance between the operational utility and the impacts to the environment.

From an operational perspective, Alternative 3 is the best action alternative followed in decreasing order of operational utility by Alternative 4, Alternative 2, and Alternative 1. Alternative 3 is, therefore, the operationally preferred alternative. On the other hand, from an environmental perspective, Alternative 2 would have the least environmental impact and is the environmentally preferred alternative. The best balance between operational utility and acceptable environmental impacts is represented by Alternative 4; therefore, the USMC has selected Alternative 4 as the Preferred Alternative.

## **ES.7 Environmental Consequences of the Proposed Action**

This FEIS analyzes potential impacts on land use; socioeconomics; recreation; wetlands; water resources; airspace; noise; biological resources; cultural resources; air quality; transportation; topography, geology, and soils; utilities and infrastructure; and hazardous materials and waste. Cumulative effects of the Proposed Action in conjunction with other past, present, or reasonably foreseeable future actions also are analyzed. The environmental consequences for each of the four action alternatives, as well as the No Action Alternative, are discussed below and are summarized in Table ES-2.

**Table ES-2  
Comparison of Environmental Consequences**

Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative
<p><b>Land Use</b></p>	<p><b>Ownership and Relocation</b> Minimal to negligible impacts to land use as a result of changes in land ownership, including a hunt club lease, hunting lodge, residential housing unit, and a commercial paintball facility/operation located within Acquisition Area 1A.</p> <p><b>Plans and Policies</b> Consistent with McIntosh County Partial Comprehensive Plan Update, Long County Comprehensive Plan, and the Georgia Coastal Comprehensive Plan.</p> <p><b>Prime Farmland</b> Minimal impacts to approximately 10 acres of prime farmland located in Acquisition Area 1B.</p> <p><b>Marketable Forest Resources</b> Forest management would change from the primary objective of wood production based on short-rotation pine plantations to broader objectives using an ecosystem approach to management. Planned clearing for target areas would require approximately 204 acres and may require additional clearing during the configuration of the Weapon Impact Scoring System (WISS).</p> <p>Pine products would shift from the pulpwood, chip-n-saw, and some sawtimber that result from short (30-year) rotations, to greater proportions of high-quality sawtimber that would result from growing trees for up to 80 years.</p>	<p><b>Ownership and Relocation</b> Minimal to negligible impacts to land use as a result of changes in land ownership, including one privately owned property located within Acquisition Area 3.</p> <p><b>Plans and Policies</b> Same as Alternative 1.</p> <p><b>Prime Farmland</b> No impacts to prime farmland.</p> <p><b>Marketable Forest Resources</b> Same as Alternative 1, but planned clearing for target areas would require approximately 194 acres and may require additional clearing during the configuration of the WISS.</p>	<p><b>Ownership and Relocation</b> Same as Alternatives 1 and 2.</p> <p><b>Plans and Policies</b> Same as Alternative 1.</p> <p><b>Prime Farmland</b> Same as Alternative 1.</p> <p><b>Marketable Forest Resources</b> Same as Alternative 1, but planned clearing for target areas would require approximately 398 acres and may require additional clearing during the configuration of the WISS.</p>	<p><b>Ownership and Relocation</b> Same as Alternative 2.</p> <p><b>Plans and Policies</b> Same as Alternative 1.</p> <p><b>Prime Farmland</b> Same as Alternative 1.</p> <p><b>Marketable Forest Resources</b> Same as Alternative 1, but planned clearing for target areas would require approximately 257 acres and may require additional clearing during the configuration of the WISS.</p>	<p>Existing conditions would remain unchanged and no impacts to land use or forestlands would occur.</p>

**Table ES-2  
Comparison of Environmental Consequences**

Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative
<b>Socioeconomics</b>	<p><b>Population and Housing</b> Displacement of two households and one business in Long County (total of approximately 6 persons). No Environmental Justice or Protection of Children impacts.</p> <p><b>Economy, Employment, and Income Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• Tax revenue loss of \$12,708/year in McIntosh County and \$53,572/year in Long County</li> </ul> <p><b>Less than Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• 132 temporary jobs during construction</li> <li>• 14 permanent jobs during operations</li> </ul> <p><b>Forest Resources Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• Timber sales tax revenue loss over time of \$45,502 in McIntosh County and \$197,728 in Long County</li> </ul> <p><b>Public Services</b> No significant impacts; may increase Impact Aid in Long County.</p>	<p><b>Population and Housing</b> No impacts, including no environmental justice or protection of children impacts.</p> <p><b>Economy, Employment, and Income Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• Tax revenue loss of \$22,761/year in McIntosh County and \$118,435/year in Long County</li> </ul> <p><b>Less than Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• 87 temporary jobs during construction</li> <li>• 19 permanent jobs during operations</li> </ul> <p><b>Forest Resources Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• Timber sales tax revenue loss over time of \$106,486 in McIntosh County and \$410,988 in Long County</li> </ul> <p><b>Public Services</b> Same as Alternative 1.</p>	<p><b>Population and Housing</b> Same as Alternative 1.</p> <p><b>Economy, Employment, and Income Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• Tax revenue loss of \$35,469/year in McIntosh County and \$172,007/year in Long County</li> </ul> <p><b>Less than Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• 140 temporary jobs during construction</li> <li>• 29 permanent jobs during operations</li> </ul> <p><b>Forest Resources Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• Timber sales tax revenue loss over time of \$151,987 in McIntosh County and \$608,716 in Long County</li> </ul> <p><b>Public Services</b> Same as Alternative 1.</p>	<p><b>Population and Housing</b> Same as Alternative 2.</p> <p><b>Economy, Employment, and Income Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• Tax revenue loss of \$35,469/year in McIntosh County and \$131,318/year in Long County</li> </ul> <p><b>Less than Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• 105 temporary jobs during construction</li> <li>• 23 permanent jobs during operations</li> </ul> <p><b>Forest Resources Significant Impacts</b></p> <ul style="list-style-type: none"> <li>• Timber sales tax revenue loss over time of \$151,987 in McIntosh County and \$458,076 in Long County</li> </ul> <p><b>Public Services</b> Same as Alternative 1.</p>	<p>Existing conditions would remain unchanged and no impacts to socioeconomics would occur.</p>
<b>Recreation</b>	<p>Minimal adverse impacts due to lack of access to limited quasi-public hunting and fishing areas within the acquisition areas. Beneficial impacts as a result of opportunities for increased public access to previously inaccessible privately administered recreation lands through the TBR hunting program.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Potential fragmentation or loss of existing recreation areas/sites located on commercial forestry lands. Recreational activity under the No Action Alternative also would create the potential for incompatible land use associated with a future change in land ownership and use.</p>
<b>Wetlands</b>	<p>Minor direct (dredging, filling, clearing, or conversion) and indirect (habitat fragmentation, changes in wetland type or hydrology, reduction or loss of supporting adjacent habitats, and changes in land use) impacts to wetland environments due to construction activities for Target Areas 6-8, and the 50-foot firebreak:</p> <ul style="list-style-type: none"> <li>• 12.0 acres of direct impacts</li> <li>• 178.5 acres of indirect impacts</li> </ul>	<p>Minor direct (dredging, filling, clearing, or conversion) and indirect (habitat fragmentation, changes in wetland type or hydrology, reduction or loss of supporting adjacent habitats, and changes in land use) impacts to wetland environments due to construction activities for Target Areas 1-5, and the 50-foot firebreak:</p> <ul style="list-style-type: none"> <li>• 20.7 acres of direct impacts</li> <li>• 340.9 acres of indirect impacts</li> </ul>	<p>Minor direct (dredging, filling, clearing, or conversion) and indirect (habitat fragmentation, changes in wetland type or hydrology, reduction or loss of supporting adjacent habitats, and changes in land use) impacts to wetland environments due to construction activities for Target Areas 1-8, and the 50-foot firebreak:</p> <ul style="list-style-type: none"> <li>• 33.3 acres of direct impacts</li> <li>• 519.4 acres of indirect impacts</li> </ul>	<p>Minor direct (dredging, filling, clearing, or conversion) and indirect (habitat fragmentation, changes in wetland type or hydrology, reduction or loss of supporting adjacent habitats, and changes in land use) impacts to wetland environments due to construction activities for Target Areas 1-5 and 8, and the 50-foot firebreak:</p> <ul style="list-style-type: none"> <li>• 21.2 acres of direct impacts</li> <li>• 365.6 acres of indirect impacts</li> </ul>	<p>Existing conditions would remain unchanged and no impacts to wetlands would occur.</p>

**Table ES-2  
Comparison of Environmental Consequences**

Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative
<p><b>Water Resources</b></p>	<p><b>Surface Waters</b> Minimal direct (permanent conversion, relocation, or diversion of surface waters) and indirect (conversion impacts to vegetation adjacent to the stream) impacts to surface waters due to construction activities for Target Areas 6- 8, and the 50-foot firebreak:  <ul style="list-style-type: none"> <li>• 0.5 mile of direct impacts</li> <li>• 0.19 mile of indirect impacts</li> </ul> <p><b>Floodplains</b> Minimal indirect impacts to floodplains due to construction activities in target areas including vegetation clearing and the placement of small target structures:  <ul style="list-style-type: none"> <li>• 10.0 acres of indirect impacts</li> </ul> <p><b>Groundwater</b> Installation of a new supply well at the relocated range compound and existing well would be taken out of service. Proposed groundwater usage would be the slightly greater than current usage due to additional personnel and facilities.</p> </p></p>	<p><b>Surface Waters</b> Minimal direct (permanent conversion, relocation, or diversion of surface waters) and indirect (conversion impacts to vegetation adjacent to the stream) impacts to surface waters due to construction activities for Target Areas 1-5, and the 50-foot firebreak:  <ul style="list-style-type: none"> <li>• 0.11 mile of direct impacts</li> <li>• 0.14 mile of direct impacts</li> </ul> <p><b>Floodplains</b> No impacts</p> <p><b>Groundwater</b> Installation of a new supply well at the new range tower and support facilities in Area 3; existing well would remain in use at the existing range compound. Proposed groundwater usage would be slightly greater than current usage due to additional personnel and facilities.</p> </p>	<p><b>Surface Waters</b> Same as Alternatives 1 and 2:  <ul style="list-style-type: none"> <li>• 0.61 mile of direct impacts</li> <li>• 0.33 mile of indirect impacts</li> </ul> <p><b>Floodplains</b> Same as Alternative 1.</p> <p><b>Groundwater</b> Same as Alternative 2.</p> </p>	<p><b>Surface Waters</b> Same as Alternatives 1 and 2  <ul style="list-style-type: none"> <li>• 0.51 mile of direct impacts</li> <li>• 0.17 mile of indirect impacts</li> </ul> <p><b>Floodplains</b> Same as Alternative 1</p> <p><b>Groundwater</b> Same as Alternative 2.</p> </p>	<p>Existing conditions would remain unchanged and no impacts to surface waters, floodplains, and groundwater would occur.</p>

**Table ES-2  
Comparison of Environmental Consequences**

Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative
<p><b>Airspace</b></p>	<p>Restricted Area R 3007A would be modified by extending the current restricted area laterally to the proposed acquisition area boundary. The proposed modification would eliminate the current gap from 100 feet above ground level (AGL) down to the surface of the ground over the areas proposed for acquisition. This extension, which would apply only to the existing restricted airspace over lands proposed for acquisition by the DON, would unite the airspace with acquired land to enable the delivery of inert ordnance in order to comply with FAA regulations. It is not an indication that fixed-wing flight operations would be conducted at altitudes below 100 feet. No lateral modification of the R-3007 complex would occur, and modification of R-3007 would not impact any private and/or commercial flight tracks.</p> <p>No loss or delay of emergency services would occur as the United States Marine Corps (USMC) and Georgia Air National Guard would continue to work with these services to suspend training activities and allow access through the restricted airspace when necessary.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Existing conditions would remain unchanged and no impacts to airspace would occur.</p>
<p><b>Noise</b></p>	<p><b>Flight Operations</b> Same number of strafing sorties (94) conducted annually as current conditions. Same maximum noise level (55 A-weighted decibels [dBA]) from strafing operations as current conditions.</p> <p><b>Altitude Distributions</b> Operations conducted below 3,000 feet AGL would decrease from 19.7% to 16.3%. Operations conducted above 10,000 feet AGL would increase from 41.7% to 56.9%.</p> <p><b>Ordnance</b></p> <ul style="list-style-type: none"> <li>• Noise from gunnery strafing does not disperse out much farther than the target area boundaries and would remain within the range boundary.</li> <li>• The lowest modeled noise contour (57 C-weighted decibels [dBC]) of the air gunnery noise would remain well within the range boundaries.</li> </ul>	<p><b>Flight Operations</b> Same as Alternative 1.</p> <p><b>Altitude Distributions</b> Operations conducted below 3,000 feet AGL would decrease from 19.7% to 15.7%. Operations conducted above 10,000 feet AGL would increase from 41.7% to 56.9%.</p> <p><b>Ordnance</b> Same as Alternative 1.</p>	<p><b>Flight Operations</b> Same as Alternative 1.</p> <p><b>Altitude Distributions</b> Same as Alternative 2.</p> <p><b>Ordnance</b> Same as Alternative 1.</p>	<p><b>Flight Operations</b> Same as Alternative 1.</p> <p><b>Altitude Distributions</b> Same as Alternative 2.</p> <p><b>Ordnance</b> Same as Alternative 1.</p>	<p>Existing conditions would remain unchanged and no changes to existing noise levels would occur.</p>

**Table ES-2  
Comparison of Environmental Consequences**

Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative
<p><b>Biological Resources</b></p>	<p><b>Vegetation</b> Minor direct (vegetation clearing) and indirect (habitat fragmentation) impacts as a result of construction activities in Target Areas 6-8 and the 50-foot firebreak:  <ul style="list-style-type: none"> <li>• 827 acres of impacts</li> </ul> <b>Wildlife</b> Minor short-term (temporary displacement during construction activities) and long-term (permanent loss or alteration of habitat due to vegetation clearing in target areas) adverse impacts to wildlife. Long-term beneficial effects as a result of, implementation of an ecosystem management plan for vegetation and timber resources within the acquisition areas. Benefits include improved food resources, enhanced habitat connectivity, conversion to natural pine ecosystems, and improvements of the quality of shrub and herbaceous stratum for nesting activities.</p> <p><b>Threatened and Endangered Species and Migratory Birds</b> Per Section 7 under the Endangered Species Act (ESA) consultation with the U.S. Fish and Wildlife Service (USFWS):  <ul style="list-style-type: none"> <li>• May affect, not likely to adversely affect the eastern indigo snake, gopher tortoise, and wood stork.</li> <li>• No affect to frosted flatwoods salamander, striped newt, Kirtland's warbler, Backman's warbler, bald eagle, and hairy rattleweed.</li> </ul>                     For migratory birds, potential direct (mortality) and indirect (construction noise, increased human activity, and the removal of existing vegetation and habitat) impacts during construction activities in the target areas. Long-term beneficial effects as a result of, implementation of an ecosystem management plan for vegetation and timber resources within the acquisition areas. Benefits include improved food resources, enhanced habitat connectivity, conversion to natural pine ecosystems, and improvements of the quality of shrub and herbaceous stratum for nesting activities.</p>	<p><b>Vegetation</b> Minor direct (vegetation clearing) and indirect (habitat fragmentation) impacts as a result of construction activities in Target Areas 1-5 and the 50-foot firebreak:  <ul style="list-style-type: none"> <li>• 1,062.1 acres of impacts</li> </ul> <b>Wildlife</b> Same as Alternative 1.</p> <p><b>Threatened and Endangered Species and Migratory Birds</b> Same as Alternative 1.</p>	<p><b>Vegetation</b> Minor direct (vegetation clearing) and indirect (habitat fragmentation) impacts as a result of construction activities in Target Areas 1-8 and the 50-foot firebreak:  <ul style="list-style-type: none"> <li>• 1,889.1 acres of impacts</li> </ul> <b>Wildlife</b> Same as Alternative 1.</p> <p><b>Threatened and Endangered Species and Migratory Birds</b> Same as Alternative 1.</p>	<p><b>Vegetation</b> Minor direct (vegetation clearing) and indirect (habitat fragmentation) impacts as a result of construction activities in Target Areas 1-5 and 8, and the 50-foot firebreak:  <ul style="list-style-type: none"> <li>• 1,256.5 acres of impacts</li> </ul> <b>Wildlife</b> Same as Alternative 1.</p> <p><b>Threatened and Endangered Species and Migratory Birds</b> Same as Alternative 1.</p>	<p>Existing conditions would remain unchanged and no impacts (including beneficial effects) to biological resources would occur.</p>



**Table ES-2  
Comparison of Environmental Consequences**

Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative
<p><b>Cultural Resources</b></p>	<p>No impacts to archaeological resources located outside of the target areas. However, implementation of Alternative 1 would have the potential to result in permanent, indirect, negative impacts on built resources that are buildings because these buildings would be vacated following acquisition, would deteriorate over time, and the USMC would not maintain or monitor their condition. Additionally, implementation of Alternative 1 has the potential to result in direct, negative, permanent impacts on cultural resources located within target areas, including archaeological resources and built resources (structures and buildings). The USMC would conduct any necessary additional investigations to determine the NRHP eligibility of any cultural resources in target areas in accordance with the PA executed with the Georgia State Historic Preservation Officer (SHPO). The USMC shall consult with the GA SHPO and interested Native American tribes to avoid or minimize adverse effects to historic properties. If effects to historic properties cannot be avoided or minimized, the USMC shall resolve adverse effects per 36 CFR 800.6. The USMC would manage remaining portions of acquired areas (outside target areas) in accordance with the updated Integrated Cultural Resources Management Plan (ICRMP).                      Survey results:</p> <ul style="list-style-type: none"> <li>• 16 total cultural resources (12 inside target areas, 4 outside target areas)</li> <li>• 5 potential historic properties (3 inside target areas, 2 outside target areas)</li> </ul>	<p>Same as Alternative 1.</p> <p>Survey results:</p> <ul style="list-style-type: none"> <li>• 18 total cultural resources (10 inside target areas, 8 outside target areas)</li> <li>• 8 potential historic properties (3 inside target areas, 5 outside target areas)</li> </ul>	<p>Same as Alternative 1.</p> <p>Survey results:</p> <ul style="list-style-type: none"> <li>• 34 total cultural resources (22 inside target areas, 12 outside target areas)</li> <li>• 13 potential historic properties (5 inside target areas, 8 outside target areas)</li> </ul>	<p>Same as Alternative 1.</p> <p>Survey results:</p> <ul style="list-style-type: none"> <li>• 32 total cultural resources (20 inside target areas, 12 outside target areas)</li> <li>• 12 potential historic properties (5 inside target areas, 7 outside target areas)</li> </ul>	<p>The current potential for impacts on cultural resources and historic properties from management of the proposed acquisition areas for silviculture would continue. Also, all of the cultural resources identified within the acquisition areas to date would not be afforded protection consistent with federal statutes and regulations and USMC guidance for cultural resources and historic properties.</p>
<p><b>Air Quality</b></p>	<p><b>Construction</b>                      Short-term minor impact on local air quality due to construction-related emissions from land clearing, earthmoving, and development activities. No impact on visibility in the two Class I Wilderness Areas located near TBR (Wolf Island Wilderness Area and Okefenokee Wilderness Area).</p> <p><b>Operations</b>                      Long-term moderate adverse effects on air quality due to combustion emissions from prescribed burning activities. Minor long-term impacts also would occur due to combustion emissions from additional on and off-road vehicle use, equipment use, and fugitive particulate emissions on the newly acquired lands. However, the attainment status of the region would not be threatened or lead to a violation of any federal, state, or local air regulation.</p>	<p><b>Construction</b>                      Similar to, but lower than, those under Alternative 1 due to less land clearing within the proposed target areas.</p> <p><b>Operations</b>                      Similar to, but greater than, those under Alternative 1 due to a much larger land acquisition area and more combustion emissions from prescribed fires.</p>	<p><b>Construction</b>                      Similar to, but greater than, those under Alternatives 1, 2, and 4 due to more land clearing within the proposed target areas.</p> <p><b>Operations</b>                      Similar to, but greater than, those under Alternatives 1, 2, and 4 due to a much larger land acquisition area and more combustion emissions from prescribed fires.</p>	<p><b>Construction</b>                      Similar to, but slightly greater than, those under Alternatives 1 and 2 due to more land clearing within the proposed target areas.</p> <p><b>Operations</b>                      Similar to, but slightly greater than, those under Alternatives 1 and 2 due to a larger land acquisition area and more combustion emissions from prescribed fires.</p>	<p>Existing conditions would remain unchanged and no impacts to air quality would occur.</p>

**Table ES-2  
Comparison of Environmental Consequences**

Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative
<b>Transportation</b>	<p>No acquisition of state and/or locally owned roads and/or rights-of-way.</p> <p>Short-term transportation impacts during construction activities may occur due to additional construction equipment and vehicles utilizing State Highway (Hwy.) 57.</p> <p>No portion of State Hwy. 57 would be closed under this action alternative. The current practice of temporarily closing Blue's Reach Road (also known as [a.k.a.] Old Barrington Road and Old Cox Road) during certain training activities would continue under any of the action alternatives. Range officials may close the portion of Blue's Reach Road (a.k.a. Old Barrington Road and Old Cox Road) that enters the new range boundary when access to the range would conflict with training operations. The road would otherwise remain open.</p>	<p>No portion of State Hwy. 57 would be closed under this action alternative. The current practice of temporarily closing Blue's Reach Road (a.k.a. Old Barrington Road and Old Cox Road) during certain training activities would continue to occur under Alternative 2. Range officials may close the portion of Blue's Reach Road (a.k.a. Old Barrington Road and Old Cox Road) that enters the existing range boundary when access to the range would conflict with training operations. The road would otherwise remain open.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Existing conditions would remain unchanged and no new impacts to transportation would occur. Impacts to Blue's Reach Road (a.k.a. Old Barrington Road and Old Cox Road) would continue to occur due to the current practice of temporarily closing the section of the road that enters the existing range boundary during certain training activities when access to the range would conflict with training operations.</p>
<b>Topography, Geology, and Soils</b>	<p><b>Topography</b> Minor impacts to topography would occur due to the construction of roads, target structures, and firebreaks which may require grading</p> <p><b>Geology</b> No direct impacts on geologic resources and because no active surface mines are present in the proposed acquisition areas, there would be loss of production of any mineral resource.</p> <p><b>Soils</b> Moderate short-term direct impacts during target structure, roadway construction, and facility relocation. Minor short-term indirect impacts would consist of transport of sediment from disturbed areas to adjacent areas. Moderate long-term direct impacts from munitions delivery, road use, road and target maintenance and explosives ordnance disposal (EOD) clearance (soil disturbance that would increase the potential for soil erosion).  <ul style="list-style-type: none"> <li>• 206.65 acres of direct impacts including 17.36 acres of direct impacts to areas designated as prime farmland and farmland of statewide importance</li> </ul> </p>	<p><b>Topography</b> Same as Alternative 1.</p> <p><b>Geology</b> No impacts (same as Alternative 1).</p> <p><b>Soils</b> Similar to Alternative 1, however, Alternative 2 would involve the construction of a new observation tower rather than relocation of the existing facilities.  <ul style="list-style-type: none"> <li>• 173.75 acres of direct impacts including 8.07 acres of direct impacts to areas designated as prime farmland and farmland of statewide importance</li> </ul> </p>	<p><b>Topography</b> Same as Alternative 1.</p> <p><b>Geology</b> No impacts (same as Alternative 1).</p> <p><b>Soils</b> Similar to Alternative 1, however, Alternative 3 would involve the construction of a new observation tower rather than relocation of the existing facilities.  <ul style="list-style-type: none"> <li>• 380.4 acres of direct impacts including 25.43 acres of direct impacts to areas designated as prime farmland and farmland of statewide importance</li> </ul> </p>	<p><b>Topography</b> Same as Alternative 1.</p> <p><b>Geology</b> No impacts (same as Alternative 1).</p> <p><b>Soils</b> Similar to Alternative 1, however, Alternative 4 would involve the construction of a new observation tower rather than relocation of the existing facilities.  <ul style="list-style-type: none"> <li>• 235.16 acres of direct impacts including 18.5 acres of direct impacts to areas designated as prime farmland and farmland of statewide importance</li> </ul> </p>	<p>Existing conditions would remain unchanged and no impacts to topography, geology, and soils would occur.</p>

**Table ES-2  
Comparison of Environmental Consequences**

Environmental Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative
<p><b>Utilities and Infrastructure</b></p>	<p><b>Utilities</b> Minimal impacts to potable water, wastewater, stormwater, solid waste, electricity/natural gas, and telecommunications associated with increases in personnel, new infrastructure, and the relocation of existing facilities.</p> <p>The Proposed Action does not include the acquisition of the power lines or the current utility rights-of-way (ROWs). No utility transmission lines or associated ROWs would be affected by the Proposed Action. Relocation of lines would not be required and access to rights-of-way and easements would not be hindered. Therefore, service reliability would not be affected by the Proposed Action.</p> <p><b>Range Infrastructure</b> Upgrades to existing instrumentation, such as the WISS towers, the Improved Remote Strafe Scoring System (IRSSS), and the Moving Improved Remote Strafe Scoring System (MIRSSS). Equipment upgrades would also include the establishment of one Tactical Area Safety Surveillance System (TASSS) node on an existing flank tower, and 15 Range Safety Lighting System (RSLs) units covering the existing range perimeter.</p> <p>Site preparation and construction of Infrastructure/instrumentation for Target Areas 6-8 would include approximately 10 WISS towers; 10 equipment shelters; 12 RSLs units; 10 solar power subsystems or equivalent commercial power systems; and four associated TASSS nodes. Existing range facilities would be relocated to Area 1B.</p>	<p><b>Utilities</b> Similar to Alternative 1.</p> <p><b>Range Infrastructure</b> Site preparation and construction of range infrastructure/instrumentation for Target Areas 1-5, including approximately 12 WISS towers; 12 equipment shelters; 20 RSLs units; 12 solar power subsystems or equivalent commercial power systems; two MIRSS tracks; and six associated TASSS nodes. Also includes the construction of a new tower in Area 3.</p>	<p><b>Utilities</b> Similar to Alternative 1.</p> <p><b>Range Infrastructure</b> Site preparation and construction of range infrastructure/instrumentation for Target Areas 1-8, including approximately 22 WISS towers; 22 equipment shelters; 32 RSLs units; 22 solar power subsystems or equivalent commercial power systems; two MIRSS tracks; and ten associated TASSS nodes. Also includes the construction of a new tower in Area 3.</p>	<p><b>Utilities</b> Similar to Alternative 1.</p> <p><b>Range Infrastructure</b> Site preparation and construction of range infrastructure/instrumentation for Target Areas 1-5 and 8, including 16 WISS towers; 16 equipment shelters; 24 RSLs units; 16 solar power subsystems or equivalent commercial power systems; two MIRSS tracks; and eight associated TASSS nodes. Also includes the construction of a new tower in Area 3.</p>	<p>Existing conditions would remain unchanged and no impacts to utilities and infrastructure would occur.</p>
<p><b>Hazardous Materials and Waste</b></p>	<p>No change to permits, hazardous waste generator status, or management would be required. It is not anticipated that the identified orphan sites would be within the acquisition areas or have significant contamination issues associated with them; however, a final determination would be made through completion of an Environmental Condition of Property (ECP) report once the Record of Decision (ROD) for the EIS is signed.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Existing conditions would remain unchanged and no impacts from hazardous materials and wastes would occur.</p>

## ES.8 Cumulative Impacts

Potential cumulative impacts under each action alternative are summarized in Table ES-3.

<b>Table ES-3 Summary of Cumulative Effects</b>	
<b>Environmental Resource</b>	<b>Cumulative Effects</b>
<b>Land Use</b>	<p><b>Land Use</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal development/changes in land use near TBR. Heavier development within Coastal Georgia Region is outside of McIntosh and Long Counties. Potential land use conflicts with proposed cell tower construction adjacent to Area 3.</li> </ul> <p><b>Forestland</b></p> <ul style="list-style-type: none"> <li>• Not significant; majority of land acquired by the USMC would be managed for timber, but on a longer rotation. Positive cumulative effects as a result of ecosystem management when added to other regional land conservation efforts.</li> </ul>
<b>Socioeconomics</b>	<p><b>Population and Housing</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal increases in personnel offset by available housing and future development of housing.</li> </ul> <p><b>Employment and Income</b></p> <ul style="list-style-type: none"> <li>• Not significant; beneficial cumulative effects from construction activities when added to past, present and reasonably foreseeable future development actions.</li> </ul> <p><b>Taxes and Revenue</b></p> <ul style="list-style-type: none"> <li>• Significant; loss of taxable acreage under the Proposed Action added to lost taxable acreage due to conservation efforts and other federal actions results in significant cumulative effects. Reduced tax revenues may affect the ability of McIntosh and Long Counties to provide some services.</li> </ul> <p><b>Schools and Education</b></p> <ul style="list-style-type: none"> <li>• Not significant; potential increase in federally connected children could affect schools and Impact Aid, and total assessed value of taxable property would be reduced, which would decrease county revenues from which the school budgets are partly funded and may increase Impact Aid to the Long County School Board.</li> </ul> <p><b>Community Services</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal increase in personnel at TBR would not put a heavy burden on existing community services.</li> </ul> <p><b>Environmental Justice and Protection of Children</b></p> <ul style="list-style-type: none"> <li>• No cumulative effects</li> </ul>
<b>Recreation</b>	<ul style="list-style-type: none"> <li>• Not significant; certain hunting/fishing lease agreements would be terminated due to land ownership changes. However, limited access would be provided by the TBR public hunting program.</li> </ul>
<b>Wetlands</b>	<ul style="list-style-type: none"> <li>• Not significant; minimal loss of wetlands in target areas added to loss of wetlands from other past, present, and reasonably foreseeable development.</li> </ul>
<b>Water Resources</b>	<p><b>Surface Waters</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal direct and indirect impacts to surface waters (channelization of natural rivers, streams and creeks; filling of benthic environments; creation of ditches, drains, and other water control structures to regulate hydrologic regimes; discharge of waste, sediments, or other pollutants into surface waters; and clearing of riparian vegetation) in target areas added to impacts to waterbodies from other past, present, and reasonably foreseeable development.</li> </ul>

<b>Table ES-3 Summary of Cumulative Effects</b>	
<b>Environmental Resource</b>	<b>Cumulative Effects</b>
	<p><b>Floodplains</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal direct and indirect impacts to floodplains (i.e., filling in wetlands and other flood storage areas, modification of natural drainage patterns) in target areas added to impacts to floodplains from other past, present, and reasonably foreseeable development.</li> </ul> <p><b>Groundwater</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimally increased usage of Floridan aquifer added to other past, present, and reasonably foreseeable development that would require access to potable water.</li> </ul>
<b>Airspace</b>	<ul style="list-style-type: none"> <li>• Not significant; impacts from increases in operations from both existing and potentially new users in the future and impacts on civilian and commercial air traffic in the region are expected to be avoided through existing scheduling and management procedures.</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>• No cumulative effects.</li> </ul>
<b>Biological Resources</b>	<p><b>Vegetation</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal loss of vegetation in target areas added to vegetation removed from past, present, and reasonably foreseeable development.</li> </ul> <p><b>Wildlife</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal loss of habitat in target areas added to habitat removed from past, present, and reasonably foreseeable development.</li> </ul> <p><b>Threatened and Endangered Species</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal loss of habitat in target areas added to habitat removed from past, present, and reasonably foreseeable development.</li> </ul>
<b>Cultural Resources</b>	<ul style="list-style-type: none"> <li>• Not significant; potential additional impacts to cultural resources in the acquisition areas from training activities (particularly in target areas), but more cultural resources will be afforded federal protection under USMC land ownership.</li> </ul>
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>• Not significant; the small amount of emissions from project vehicles and equipment would not cause exceedences of air quality standards that would affect the attainment status of the area.</li> </ul>
<b>Transportation</b>	<ul style="list-style-type: none"> <li>• No cumulative effects.</li> </ul>
<b>Topography, Geology, and Soils</b>	<ul style="list-style-type: none"> <li>• No cumulative effects.</li> </ul>
<b>Utilities and Infrastructure</b>	<p><b>Utilities</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal increased load on potable water, wastewater, and electricity/power when added to development associated with past, present, and reasonably foreseeable future actions. Potential cumulative effects from telecommunications infrastructure (i.e., new cell towers) on TBR operations.</li> </ul> <p><b>Range Infrastructure</b></p> <ul style="list-style-type: none"> <li>• Not significant; minimal cumulative effects to other resources (soil erosion and compaction, and vegetation removal) as a result of previous development at TBR.</li> </ul>
<b>Hazardous Materials and Waste</b>	<ul style="list-style-type: none"> <li>• No cumulative effects.</li> </ul>

# Volume I

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# Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	microgram(s) per liter
µg/m <sup>3</sup>	micrograms per cubic meter
3 <sup>rd</sup> ID	Third Infantry Division
a.k.a.	also known as
AAA	anti-aircraft artillery
AADT	annual average daily traffic
ACHP	Advisory Council on Historic Preservation
AFB	Air Force Base
AFI	Air Force Instruction
AGL	above ground level
AI	Air Interdiction
AICUZ	Air Installations Compatible Use Zones
AIRFA	American Indian Religious Freedom Act of 1978, as amended
AMEC	AMEC Earth and Environmental, Inc.
ANG	Air National Guard
APE	area of potential effects
AR	Aerial Reconnaissance
ARPA	Archaeological Resources Protection Act of 1979, as amended
ARTCC	Air Route Traffic Control Center; <i>also referred to as</i> ATC (Air Traffic Control)
ASO	Air Station Order
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
BCT	Brigade Combat Team
BMP	best management practice
BRAC	Base Realignment and Closure
BRRC	Blue Ridge Research and Consulting, LLC
C&D	construction and demolition

CAA	Clean Air Act
CAC	Coastal Airspace Complex
CAC SEA	Final Supplemental Environmental Assessment for Proposed Coastal Airspace Complex
CAS	Close Air Support
CCD	Coastal Consistency Determination
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensations, and Liability Act
CESQG	conditionally exempt small quantity generators
CFA	Controlled Firing Area
CFR	Code of Federal Regulations
CGP	Construction General Permit
CGRDC	Coastal Georgia Regional Development Center
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2e</sub>	carbon dioxide equivalent
CPLO	Community Plans and Liaison Officer
CRTC	Combat Readiness Training Center
CWA	Clean Water Act
CWDZ	Composite Weapon Danger Zone
CZMA	Coastal Zone Management Act
dB	decibel(s)
dBA	A-weighted decibel(s)
dBc	C-weighted decibels
dBpk	peak pressure in decibels
DDT	dichloro-diphenyltrichloroethane
DEIS	Draft Environmental Impact Statement
DNL	day-night average sound level
DOD	(United States) Department of Defense
DON	(United States) Department of the Navy
DRMO	Defense Reutilization and Marketing Office
e.g.	for example
EACO	Eastern Area Counsels Office
ECP	Environmental Condition of Property

EDR	Environmental Data Resources
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
EO	Executive Order
EOD	explosive ordnance disposal
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act of 1973
ESPCP	Erosion, Sedimentation, and Pollution Control Plan
FAA	Federal Aviation Administration
FAC(A)	forward air controller (airborne)
FCC	Federal Communications Commission
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FLAG	Federal Land Managers' Air Quality Related Values Work Group
FMV	fair market value
FOTW	federally owned treatment works
FPPA	Farmland Protection Policy Act
FR	<i>Federal Register</i>
FTE	full-time equivalent
FY	fiscal year
GA ANG	Georgia Air National Guard
GA DCA	Georgia Department of Community Affairs
GA DNR	Georgia Department of Natural Resources
GA EPD	Georgia Environmental Protection Division
GBU	guided bomb unit
GDOT	Georgia Department of Transportation
GFC	Georgia Forestry Commission
GHG	greenhouse gas
GIS	geographic information system
GLCP	Georgia Land Conservation Program
Goodwood	Goodwood Georgia, LLC
GP	General Purpose
GPS	global positioning system

GPSC	Georgia Public Service Commission
HHS	(United States Department of) Health and Human Services
HMX	cyclotetramethylene tetranitramine
HQMC	Headquarters Marine Corps
HUD	(United States Department of) Housing and Urban Development
Hwy.	Highway
Hz	Hertz
I	Interstate
i.e.	that is
IAQCR	Interstate Air Quality Control Region
IBA	Important Bird Area
ICRMP	Integrated Cultural Resources Management Plan
ID	identification
IFR	Instrument Flight Rules
INRMP	Integrated Natural Resources Management Plan
IR	infrared
IRSSS	Improved Remote Strafe Scoring System
JDAM	joint direct attack munitions
JSF	Joint Strike Fighter
LAT	Low Altitude Training
LFE	Large Force Exercise
LGB	laser-guided bomb
LGTR	laser-guided training round
LLC	Limited Liability Company
$L_{max}$	Maximum Sound Level
LOS	level of service
LQG	large-quantity generator
LSDZ	Laser Safety Danger Zone
LUST	leaking underground storage tank
MAG	Marine Aircraft Group
MARFORCOM	Marine Forces Command
MAILS	multiple aircraft instantaneous line source (dispersion model)
MBTA	Migratory Bird Treaty Act of 1918
MC	munitions constituents

**EIS for Proposed Modernization and Expansion of TBR**  
***Acronyms and Abbreviations, continued***

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MCAS	Marine Corps Air Station
MCIEAST	Marine Corps Installations East
MCO	Marine Corps Order
MDL	method detection limit
MEF	Marine Expeditionary Force
mgd	million gallons per day
MIRSSS	Moving Improved Remote Strafe Scoring System
MMR	Military Munitions Rule
MOA	Military Operations Area; <i>also</i> Memorandum of Agreement
Molpus	Molpus Woodlands Group, LLC
MOU	Memorandum of Understanding
MR_NMAP	MOA Range NoiseMap
MROC	Marine Requirements Oversight Council
MSL	mean sea level
MTR	Military Training Route
n.d.	no date
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAS	Naval Air Station; <i>also</i> National Airspace System
NAVFAC SE	Naval Facilities Engineering Command Southeast
NAVMC	Navy Marine Corps (designation for Department of the Navy and United States Marine Corps forms)
NCOIC	Non-Commissioned Officer in Charge
NEPA	National Environmental Policy Act of 1969, as amended
NFPA	National Fire Protection Association
NHD	National Hydrography Dataset
NHL	National Historic Landmark
NHPA	National Historic Preservation Act of 1966, as amended
NM	nautical mile(s)
NO <sub>2</sub>	nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
Noise Control Act	Noise Pollution and Abatement Act of 1972



NO <sub>x</sub>	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NREAO	Natural Resources and Environmental Affairs Officer
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O.C.G.A.	Official Code of Georgia Annotated
OCRM	(Office of) Ocean and Coastal Resource Management
OIC	Officer in Charge
OPAREA	Operating Area
OPNAVINST	Office of the Secretary of the Navy Instruction
PAO	Public Affairs Officer
PEM	Palustrine Emergent Wetland
PFO	Palustrine Forested Wetland
PFPS	Portable Flight Planning Software
PGMs	precision-guided munitions
PILT	payment in lieu of taxes
PJD	Preliminary Jurisdictional Determination
PL	Public Law
PM <sub>10</sub>	particulate matter less than or equal to 10 microns in diameter
PM <sub>2.5</sub>	particulate matter less than 2.5 microns in diameter
POL	petroleum, oil, and lubricants
ppm	parts per million
PSS	Palustrine Scrub-Shrub Wetland
PTR	Primary Training Range
QDR	Quadrennial Defense Review
R-	Restricted Area
RAICUZ	Range Air Installations Compatible Use Zones
Rayonier	Rayonier, Inc.
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-trinitro-triazine
REIT	real estate investment trust
REVA	Range Environmental Vulnerability Assessment

RIMS	regional input-output modeling system
ROD	Record of Decision
ROE	right-of-entry
ROI	Region of Influence
ROVER	Remote Optical Video Enhanced Receiver
ROW	right-of-way
RSLs	Range Safety Lighting System
RTOC	Rayonier Timberlands Operating Company
SAIA	Sikes Act Improvement Act
SAM	surface-to-air
SCORP	(Georgia) Statewide Comprehensive Outdoor Recreation Plan
SECNAVINST	Secretary of the Navy Instruction
SEL	Sound Exposure Level
SHPO	State Historic Preservation Officer
Sikes Act	the Sikes Act and the Sikes Act Improvement Amendment (SAIA) of 1997
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SPR Plan	(Oil and Hazardous Substances) Spill Prevention and Response Plan
SQG	small-quantity generator
SR	State Road
SSURGO	(USDA NRCS) Soil Survey Geographic (database)
SUA	Special Use Airspace
TASSS	Tactical Area Safety Surveillance System
TBR	Townsend Bombing Range
TCP	traditional cultural property
TECOM	Training and Education Command
TIMO	Timber Investment Management Organization
TNT	trinitrotoluene
TRACON	Terminal Radar Approach Control
TSD	treatment, storage, and disposal
U.S.C.	United States Code
UAS	Unmanned Aircraft Systems
UFC	Unified Facilities Criteria
UNS	Universal Need Statement

USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
USPS	United States Postal Service
UST	underground storage tank
UTA	Urban Target Area
VDL	Video Data Link
VFR	Visual Flight Rules
VOC	volatile organic compounds
VR	Visual Route
W-Area	Warning Area
WASP	Weapons and Stores Planning (software)
WDZ	Weapon Danger Zone
WISS	Weapons Impact Scoring System
WMA	wildlife management area