# APPENDIX A Navy Activity Descriptions



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## Final

# **Environmental Impact Statement/Overseas Environmental Impact Statement Atlantic Fleet Training and Testing**

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#### A. NAVY ACTIVITY DESCRIPTIONS

The Navy has been conducting military readiness activities throughout the northwestern Atlantic Ocean, Gulf of Mexico, and inshore waters for decades. The tempo and types of training and testing activities have fluctuated within the Atlantic Fleet Training and Testing (AFTT) Study Area (Study Area) due to changing requirements, the introduction of new technologies, the dynamic nature of international events, advances in warfighting doctrine and procedures, and force structure changes. Such developments have influenced the frequency, duration, intensity, and location of required training and testing.

# A.1 DESCRIPTION OF SONAR, MUNITIONS, TARGETS, AND OTHER SYSTEMS EMPLOYED IN ATLANTIC FLEET TRAINING AND TESTING EVENTS

The Navy uses a variety of sensors, platforms, weapons, and other devices, including ones used to ensure the safety of Sailors and Marines, to meet its mission. Training and testing with these systems may have the potential to introduce acoustic (sound) energy and expended materials into the environment. The environmental impact of these activities was analyzed in Chapter 3 (Affected Environment and Environmental Consequences) of this Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS). This appendix presents and organizes sonar systems, munitions, targets, and other systems in a manner intended to facilitate understanding of both the activities that use them and the analysis of their environmental effects, described in Chapter 3 (Affected Environment and Environmental Consequences) of this EIS/OEIS.

#### A.1.1 SONAR SYSTEMS AND OTHER ACOUSTIC SOURCES

**Sonar.** Sonar, originally an acronym for "Sound Navigation And Ranging," is a technique that uses underwater sound to navigate, communicate, or detect underwater objects (the term sonar is also used for the equipment used to generate and receive sound). There are two basic types of sonar: active and passive.

Active sonar emits sound waves that travel through the water, reflect off objects, and return to a receiver. Sonar is used to determine the distance to an underwater object by calculating the speed of sound in water and the time for the sound wave to travel to the object and back. For example, active sonar systems are used to track targets or to aid in vessel navigation by identifying known ocean floor features. Some whales, dolphins, and bats use echolocation, a similar technique, to identify their surroundings and to locate prey.

Passive sonar uses listening equipment, such as underwater microphones (hydrophones) and receiving sensors on ships, submarines, aircraft, or autonomous vehicles, to pick up underwater sounds. The advantage of passive sonar is that it places no sound in the water and, thus, does not reveal the location of the listening vessel. Passive sonar can indicate the presence, character, and direction of noise producing objects such as ships and submarines; however, passive sonar is increasingly ineffective as modern submarines become quieter. Passive sonar has no potential acoustic impact on the environment and, therefore, is not discussed further or analyzed within this EIS/OEIS.

All sounds, including sonar, are categorized by frequency. For this EIS/OEIS, active sonar is categorized into four frequency ranges: low-frequency, mid-frequency, high-frequency, and very high-frequency.

- Low-frequency active sonar emits sounds at frequencies less than 1 kilohertz (kHz). Low-frequency active sonar is useful for detecting objects at great distances because low-frequency sounds do not dissipate as rapidly as higher-frequency sounds.
- Mid-frequency active sonar emits sounds at frequencies from 1 to 10 kHz. Mid-frequency active sonar is the Navy's primary tool for detecting and identifying submarines. Active sonar in this frequency range provides a valuable combination of range and target accuracy.
- High-frequency active sonar emits sounds at frequencies greater than 10 kHz, up to 100 kHz.
   High-frequency sounds dissipate rapidly and have a small effective range; however, high-frequency sounds provide higher resolution of objects and are useful at detecting and identifying smaller objects such as sea mines.
- Very high-frequency sources are those that operate above 100 kHz but below 200 kHz. Very high-frequency sounds provide even higher resolution of objects and are sometimes used for underwater communication.

Modern sonar technology includes a variety of sonar sensor and processing systems. In concept, the simplest active sonar emits sound waves, or "pings," sent out in multiple directions, and the sound waves then reflect off of the target object in multiple directions (Figure A.1-1).

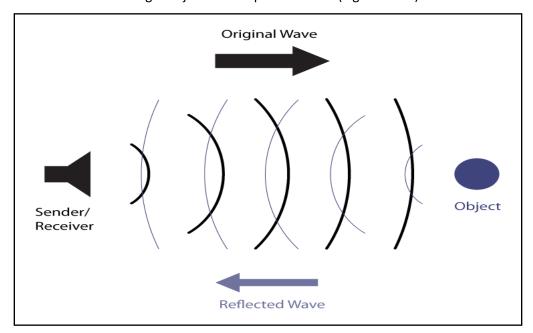


Figure A.1-1: Principle of an Active Sonar

<sup>&</sup>lt;sup>1</sup> Surveillance Towed Array Sensor System (SURTASS) Low-Frequency Active sonar, which may be used in the Study Area, is not among the sources analyzed in this document. The potential environmental impacts from use of SURTASS Low-Frequency Active sonar are analyzed in separate analyses under the National Environmental Policy Act.

The sonar source calculates the time it takes for reflected sound waves to return; this calculation determines the distance to the target object. More sophisticated active sonars emit a ping and then rapidly scan or listen to the sound waves in a specific area. This provides both distance to the target and directional information. Even more advanced sonars use multiple receivers to listen to echoes from several directions simultaneously and provide efficient detection of both direction and distance. It should be noted that active sonar is rarely used continuously throughout the listed activities. In addition, when sonar is in use, the sonar "pings" occur at intervals, referred to as a duty cycle, and the signals themselves are very short in duration. For example, a sonar that emits a 1-second ping every 10 seconds has a 10 percent duty cycle.

The Navy utilizes sonar systems and other acoustic sensors in support of a variety of mission requirements. Primary uses include detection of and defense against submarines (anti-submarine warfare) and mines (mine warfare), safe navigation and effective communications, and oceanographic surveys. Specific examples of how sonar systems are used for Navy activities are discussed in the following sections.

Anti-Submarine Warfare. Systems used in anti-submarine warfare include sonars, torpedoes, and acoustic countermeasure devices. These systems are employed from a variety of platforms (surface ships, submarines, helicopters, and fixed-wing aircraft). Surface ships conducting anti-submarine warfare are typically equipped with hull-mounted sonar (passive and active) for the detection of submarines (or submarine targets during training and testing events). Helicopters use dipping sonar or sonobuoys (passive and active) to locate submarines (or targets). Fixed-wing aircraft deploy both active and passive expendable sonobuoys to assist in detecting and tracking submarines (or targets). Submarines are equipped with hull-mounted sonars to detect, localize, and track other submarines and surface ships. Submarines primarily use passive sonar; active sonar is used mostly for navigation. There are also unmanned vehicles currently being developed to deploy anti-submarine warfare systems.

Anti-submarine warfare activities often use mid-frequency (1 to 10 kHz) active sonar, though low-frequency and high-frequency active sonar systems are also used for specialized purposes. The Navy is currently developing and testing sonar systems that may utilize lower frequencies and longer duty cycles—albeit at lower source levels—than current systems. However, these new systems would only be operational if they significantly increase the Navy's ability to detect and identify quiet submarine threats.

Typical active sonar systems and acoustic sensors used during anti-submarine warfare sonar training and testing exercises include the following:

• Surface Ship Sonar Systems: A variety of surface ships operate hull-mounted or tethered midfrequency active sonar during training exercises and testing activities (Figure A.1-2). Only cruisers and destroyers have surface ship sonar systems. The littoral combat ship and new frigate will have a tethered variable depth sonar system. Unmanned surface vessels can also include sonar systems, such as the variable depth sonar and mine hunting sonar.

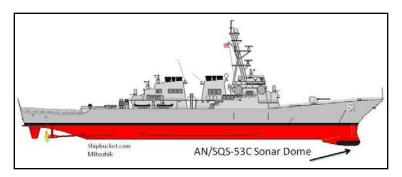


Figure A.1-2: Guided Missile Destroyer with an AN/SQS-53 Sonar

• **Submarine Sonar Systems:** Submarines are equipped with hull-mounted mid-frequency and high-frequency active sonar (Figure A.1-3) used to detect and target enemy submarines and surface ships. A submarine's mission relies on its stealth; therefore, a submarine uses its active sonar sparingly because each sound emission gives away the submarine's location.

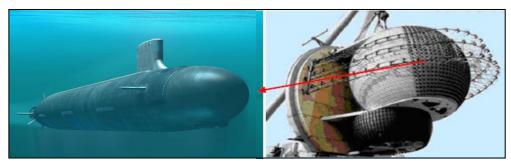


Figure A.1-3: Submarine AN/BQQ-10 Active Sonar Array

- Aircraft Sonar Systems: Aircraft sonar systems include sonobuoys and dipping sonars.
  - Sonobuoys: Active sonobuoys are expendable devices that contain a data transmitter and a hydrophone. The sounds collected by the sonobuoy are transmitted back to the operator (aboard ship or aircraft) for analysis. Sonobuoys are either active or passive and allow for short- and long-range detection of surface ships and submarines. These systems are deployed by ship, helicopter, and fixed-wing patrol aircraft (Figure A.1-4).

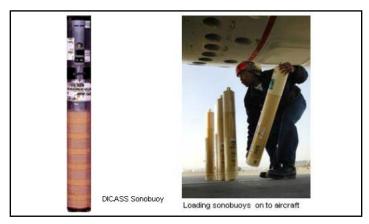


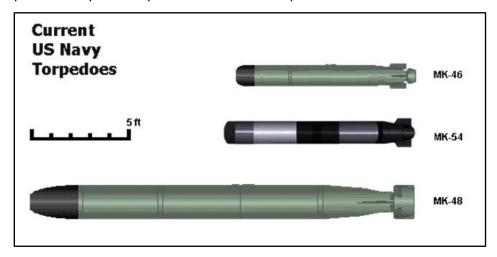
Figure A.1-4: Sonobuoy (e.g., AN/SSQ-62)

 Dipping Sonars: Dipping sonars are recoverable devices lowered into the water via cable from manned and unmanned helicopters (Figure A.1-5). The sonar detects underwater targets and determines the distance and movement of the target relative to the position of the helicopter.



Figure A.1-5: Helicopter Deploys Dipping Sonar

• Exercise Torpedoes: Some torpedoes used in training and testing activities may transmit active sonar signals. Surface ships, aircraft, and submarines primarily use torpedoes in anti-submarine warfare (Figure A.1-6). Recoverable, non-explosive torpedoes, categorized as either lightweight or heavyweight, are used during training and testing. Torpedoes operate autonomously, or in the case of heavyweight torpedoes, use a guidance system to operate the torpedo remotely through an attached wire (guidance wire). The autonomous guidance systems operate either passively (listening for sounds generated by the target) or actively (pinging to search for the target). Torpedo training in the Study Area is mostly simulated—solid masses that approximate the weight and shape of a torpedo are fired rather than fully functional torpedoes. Testing in the Study Area mostly uses fully functional exercise torpedoes.



**Figure A.1-6: Current United States Navy Torpedoes** 

• Anti-Submarine Warfare Targets: Anti-submarine warfare targets are autonomous undersea vehicles used to simulate target submarines (Figure A.1-7). The targets are equipped with one or

more of the following devices: (1) acoustic projectors emitting sounds to simulate submarine acoustic signatures, (2) echo repeaters to simulate the characteristics of the echo of a sonar signal reflected from a submarine, or (3) magnetic sources that mimic those of a submarine.



Figure A.1-7: Anti-Submarine Warfare Targets

**Mine Warfare.** Mine warfare training and testing activities use a variety of different sonar systems that are typically high-frequency (greater than 10 kHz) and very high-frequency (greater than 100 kHz). These sonar systems are used to detect, locate, and characterize moored and bottom mines (Figure A.1-8). The majority of mine warfare sonar sensors can be deployed by more than one platform (e.g., helicopter, unmanned underwater vehicle, or surface ship) and may be interchangeable among platforms. Surface ships and submarines use sonar to detect mines and objects, while minesweeping ships use a specialized variable-depth mine detection and classification high-frequency active sonar system to detect mines.

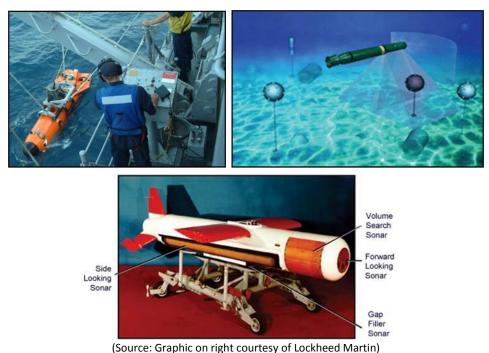


Figure A.1-8: Mine Warfare Systems

afety. Navigation. Communications, and Oceanographic Systems. Naval ships

**Safety, Navigation, Communications, and Oceanographic Systems.** Naval ships, submarines, and unmanned surface and subsurface vehicles rely on equipment and instrumentation that use active sonar

during both routine operations and training and testing events. Sonar systems are used to gauge water depth; detect and map objects, navigational hazards, and the ocean floor; and transmit communication signals.

Other Acoustic Systems. The Navy uses a variety of other acoustic sensors to protect ships anchored or at the pier, as well as shore facilities. These systems, both active and passive, detect potentially hostile swimmers, broadcast warnings to alert Navy divers of potential hazards, and gather information regarding ocean characteristics (ocean currents and wave measurements). They are generally stationary systems in Navy harbors and piers. Navy marine mammals (Atlantic bottlenose dolphins [*Tursiops truncatus*] and California sea lions [*Zalophus californianus*]) are also used to detect hostile swimmers around Navy facilities. A trained animal is deployed under behavioral control of a handler to find an intruding swimmer. Upon finding the "target" of the search, the animal returns to the boat and alerts the animal handlers, and the animals are given a localization marker or leg cuff that they attach to the intruder. Swimmers that have been marked with a leg cuff are reeled in by security support craft personnel via a line attached to the cuff. In addition, the Navy's research and acquisition community uses various sensors for tracking during testing activities and to collect data for test analysis.

#### A.1.2 MUNITIONS

Most munitions used during training and testing events fall into three basic categories: projectiles, missiles, and bombs. Munitions can be further defined by their net explosive weight, which is the actual weight in pounds of the explosive substance without the packaging, casings, bullets, etc. Net explosive weight is also the trinitrotoluene (TNT) equivalent of energetic material, which is the standard measure of strength of bombs and other explosives. For example, a 2,000-pound (lb.) bomb may have anywhere from 600 to 1,000 lb. of net explosive weight.

**Projectiles.** Projectiles are fired during gunnery exercises and testing events from a variety of weapons, ranging from pistols and rifles to large-caliber, turret-mounted guns on the decks of Navy ships. Projectiles can be either high-explosive munitions (e.g., certain cannon shells), or non-explosive practice munitions (e.g., rifle/pistol bullets). Explosive rounds can be fused to either explode on impact or in the air (i.e., just prior to impact). Projectiles are broken down into three basic categories in this EIS/OEIS:

• Small-Caliber Projectiles: These projectiles are up to and including 0.50 caliber. Small-caliber projectiles (e.g., bullets) are primarily fired from pistols, rifles, and machine guns (i.e., small arms) and mostly during training events for an individual Sailor to become and remain proficient (Figure A.1-9).





Figure A.1-9: Shipboard Small Arms Training

• Medium-Caliber Projectiles: These projectiles are larger than 0.50 caliber but smaller than 57 millimeter (mm) (approximately 2- to ¼-inch (in.) diameter). The most common size medium-caliber projectiles are 20 mm, 25 mm, and 40 mm. Medium-caliber projectiles are fired from

machine guns operated by one to two crewman and mounted on the deck of a ship, wing-mounted guns on aircraft, and fully automated guns mounted on ships for defense against missile attack (Figure A.1-10). Medium-caliber projectiles also include 40 mm grenades, which can be fired from hand-held grenade launchers or crew-served deck-mounted guns. Medium-caliber projectiles can be non-explosive practice munitions or high-explosive projectiles. High-explosive projectiles are usually fused to detonate on impact; however, advanced high-explosive projectiles can detonate based on time, distance, or proximity to a target.





Figure A.1-10: Shipboard Medium-Caliber Guns

• Large-Caliber Projectiles: These include projectiles 57 mm and larger. The largest projectile currently in service has a 5-in. (12.7-centimeter) diameter, but larger weapons are under development. The most widely used large-caliber projectiles are 57 mm and 5 in. (Figure A.1-11). The most common 5-in. projectile is approximately 26 in. long and weighs 70 lb. Large-caliber projectiles are fired exclusively from turret-mounted guns located on ship decks and can be used to fire on surface ships and boats, in defense against missiles and aircraft, and against land-based targets. Large-caliber projectiles can be non-explosive practice munitions or explosive munitions. High-explosive projectiles can detonate on impact or in the air.





Figure A.1-11: Shipboard Large-Caliber Gun and Projectiles

**Missiles.** Missiles are rocket or jet-propelled munitions used to attack ships, aircraft, and land-based targets, as well as defend ships against other missiles. Guidance systems and advanced fusing technology ensure that missiles reliably impact on or detonate near their intended target. Missiles are categorized according to their intended target, as described below, and can be further classified according to net explosive weight. Rockets are included within the category of missiles.

• **Air Missiles:** Air missiles are fired from ships and aircraft against enemy aircraft and incoming missiles (Figure A.1-12). Air missiles are configured to explode in the air near, or on impact with, their intended target. Missiles are the primary ship-based defense against incoming missiles.





Figure A.1-12: Rolling Airframe Missile and Air-to-Air Missile

• Surface Missiles: Surface missiles are fired from aircraft, ships, and submarines against surface ships (Figure A.1-13). Surface missiles are typically configured to detonate on impact or just above the intended target.



Figure A.1-13: Anti-Surface Missile Fired from MH-60 Helicopter

- Anti-Radiation Missiles: The AGM-88 High-Speed Anti-Radiation Missile, used to destroy enemy radar sites, is fired at a floating sea-borne target that replicates a land-based radar site.
- Rockets: Rockets are fired from helicopters against water and land-based targets. Rockets can
  either be laser guided or unguided, and while most contain inert warheads there are highexplosive variants that detonate on impact or flechette warheads that open at the conclusion of
  rocket motor burnout and contain approximately 1,180 60-grain flechettes.

**Bombs.** Bombs are unpowered munitions dropped from aircraft on land and water targets. The majority of bombs used during training and testing in the Study Area are non-explosive. However, explosive munitions are occasionally used for proficiency inspections and testing requirements. Bombs fall into two categories: general-purpose bombs and subscale practice bombs. Similar to missiles, bombs are further classified according to their net explosive weight.

• **General-Purpose Bombs:** General-purpose bombs consist of precision-guided and unguided full-scale bombs, ranging in size from 250 to 2,000 lb. (Figure A.1-14). Common bomb nomenclature

used includes: MK 80 series, which is the Navy's standard model; Guided Bomb Units and Joint Direct Attack Munitions, which are precision-guided (including laser guided) bombs; and the Joint Standoff Weapon, which is a long-range "glider" precision weapon. General-purpose bombs can be either non-explosive practice munitions or high explosive.





Figure A.1-14: F/A-18 Bomb Release and Loading General Purpose Bombs

• **Subscale Bombs:** Subscale bombs (Figure A.1-15) are non-explosive practice munitions containing a spotting (smoke) charge to aid in scoring the accuracy of hitting the target during training and testing activities. Common subscale bombs are 25 lb. and less and are steel-constructed. Laser guided training rounds are another variation of a subscale practice bomb. They weigh approximately 100 lb. and are cost-effective non-explosive weapons used in training aircrew in laser-guided weapons employment.





Figure A.1-15: Subscale Bombs for Training

**Other Munitions.** There are other munitions used in naval at-sea training and testing events that do not fit into one of the above categories and are discussed below:

- **Demolition Charges:** Divers place explosive charges in the marine environment during some training and testing activities. These activities may include the use of timed charges, in which the charge is placed, a timer is started, and the charge detonates at the set time. Munitions of up to 60-lb. blocks of composition 4 (C-4) plastic explosive, with the necessary detonators and cords, are used to support mine neutralization, demolition, and other warfare activities. The vast majority of underwater detonations involve explosive charges of 20 lb. or less in size. All demolition charges are further classified according to the net explosive weight of the charge.
- **Anti-Swimmer Grenades:** Maritime security forces use hand grenades to defend against enemy scuba divers.

- **Torpedoes:** Explosive torpedoes are required in some training and testing events. Torpedoes are described as either lightweight or heavyweight and are further categorized according to the net explosive weight.
- Extended Echo Ranging Sonobuoys: Extended Echo Ranging sonobuoys include mini soundsource seeker sonobuoys that use small explosive charges as the active sound source instead of electrically produced sounds. Extended Echo Ranging sonobuoys are only used in testing activities.

#### A.1.3 TARGETS

Training and testing require an assortment of realistic and challenging targets. Targets vary from items as simple and ordinary as an empty steel drum used for small-caliber weapons training from the deck of a ship, to sophisticated, unmanned aerial drones used in air defense training. For this EIS/OEIS, targets are organized by warfare area.

Air Warfare Targets: Air warfare targets, tow target systems, and aerial targets are used in training and testing events that involve detection, tracking, defending against, and attacking enemy missiles and aircraft. Aerial tow target systems include textile (nylon banner) and rigid (fiberglass shapes) towed targets used for gunnery events. Aerial targets include expendable ballistic targets and recoverable radio-controlled drones used for gunnery and missile exercises (Figure A.1-16). Parachute flares are used as air-to-air missile targets. Manned high-performance aircraft may be used as targets—to test ship and aircraft defensive systems and procedures—without the actual firing of munitions.





Figure A.1-16: Deployment and Recovery of Air Warfare Targets

Surface Warfare Targets: Floating, towed, and mobile targets are used as surface warfare targets during gunnery events. Targets include floating steel drums, inflatable shapes or target balloons (e.g., Killer Tomato™) (Figure A.1-17), and towed sleds. High-speed targets, such as jet skis and motorboats, are also used (Figure A.1-18).



Figure A.1-17: Deploying a "Killer Tomato™" Floating Target

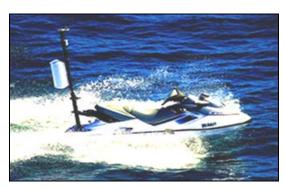




Figure A.1-18: Ship Deployable Surface Target and High-Speed Maneuverable Seaborne Target

**Anti-Submarine Warfare Targets:** Anti-submarine warfare uses multiple types of targets, including the following:

- **Submarines:** Submarines may act as tracking and detection targets during training and testing events.
- Motorized Autonomous Targets: Motorized autonomous targets simulate the acoustic and
  magnetic characteristics of a submarine, providing realism for exercises when a submarine is not
  available. There are two types of mobile targets, one is designed for recovery and reuse, while
  the other is expendable.
- **Stationary Artificial Targets:** Stationary targets either resemble submarine hulls or are simulated systems with acoustic properties of enemy submarines. These targets either rest on the seafloor or are suspended at varying depths in the water column.

**Mine Warfare Targets:** Mine targets are used in training activities that involve the detection, location, and neutralization of mines in the water. There are a wide variety of mine targets that mimic floating, bottom, and moored mines. All mine targets are made out of inert material.

#### A.1.4 DEFENSIVE COUNTERMEASURES

Naval forces depend on effective defensive countermeasures to protect against missile and torpedo attack. Defensive countermeasures are devices designed to confuse, distract, and confound precision-guided munitions. Defensive countermeasures fall into five basic categories:

- Chaff: Chaff consists of reflective, aluminum-coated glass fibers used to obscure ships and aircraft from radar-guided systems. Chaff, which is stored in canisters, is either dispensed from aircraft or fired into the air from the decks of surface ships when an attack is imminent. The glass fibers create a radar cloud that masks the position of the ship or aircraft.
- **Flares:** Flares are pyrotechnic devices used to defend against heat-seeking missiles, where the missile seeks out the heat signature from the flare rather than the aircraft's engines. Similar to chaff, flares are also dispensed from aircraft and fired from ships.
- Acoustic Countermeasures: Acoustic countermeasures are used by surface ships and submarines to defend against torpedo attack (Figure A.1-19). Acoustic countermeasures are either released from ships and submarines or towed at a distance behind the ship.
- **Electromagnetic Countermeasures:** Electromagnetic countermeasures are used by surface ships and aircraft to defend against missile attacks. Electromagnetic countermeasures are also used in anti-submarine warfare activities.
- Biodegradable Polymer: Biodegradable polymer is a biodegradable vessel entanglement technology used to slow or stop specific maritime targets by entangling the propulsion mechanism.

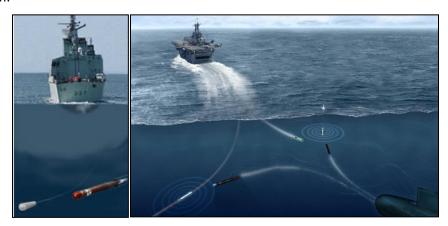


Figure A.1-19: Acoustic Countermeasures

#### A.1.5 MINE WARFARE SYSTEMS

Mine warfare systems fall into two broad categories: mine detection and mine neutralization.

**Mine Detection Systems.** Mine detection systems are used to locate, classify, and map suspected mines. Once located, the mines can either be neutralized or avoided. These systems are specialized to either locate mines on the surface, in the water column, or on the sea floor.

• **Towed or Hull-Mounted Mine Detection Systems:** These detection systems use acoustic and laser or video sensors to locate and classify suspect mines. Helicopters, ships, and unmanned vehicles are used for towed systems, which can rapidly assess large areas (Figure A.1-20).

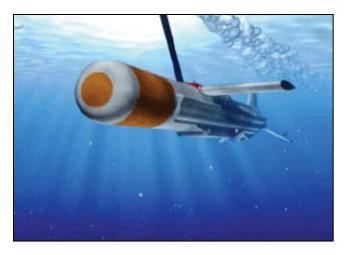


Figure A.1-20: Towed Mine Detection System

• **Airborne Laser Mine Detection Systems:** Airborne laser detection systems work in concert with neutralization systems. The detection system initially locates mines, and a neutralization system is then used to relocate and neutralize the mine (Figure A.1-21).

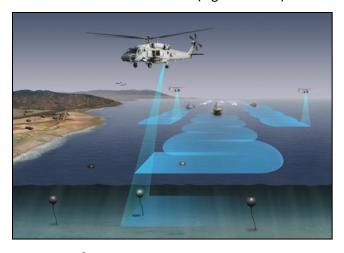


Figure A.1-21: AN/AES-1 Airborne Laser Mine Detection System

- Unmanned/Remotely Operated Vehicles: These vehicles use acoustic, video, or lasers, or combinations thereof, to locate and classify mines. Unmanned/remotely operated vehicles provide unique mine warfare capabilities in nearshore littoral areas, surf zones, ports, and channels.
- Marine Mammal System: Navy personnel and Navy marine mammals work together to detect specified underwater objects. The Navy deploys trained bottlenose dolphins and California sea lions as part of the marine mammal minehunting and object recovery system.

**Mine Neutralization Systems.** These systems disrupt, disable, or detonate mines to clear ports and shipping lanes, as well as littoral, surf, and beach areas in support of naval amphibious operations. Mine neutralization systems can clear individual mines or a large number of mines quickly.

• **Towed Influence Mine Sweep Systems:** These systems use towed equipment that mimics a particular ship's magnetic and acoustic signature, triggering the mine and causing it to explode (Figure A.1-22).

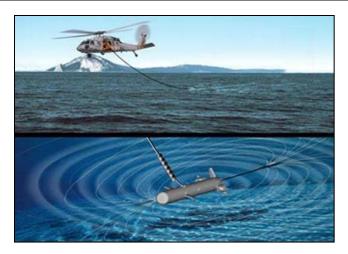


Figure A.1-22: Organic and Surface Influence Sweep

- Towed Mechanical Mine Sweeping Systems: These systems tow a sweep wire to snag the line
  that attaches a moored mine to its anchor and then uses a series of cables and cutters to sever
  those lines. Once these lines are cut, the mines float to the surface where explosive ordnance
  personnel can neutralize the mines.
- Unmanned/Remotely Operated Mine Neutralization Systems: Surface ship and helicopters
  operate these systems, which place explosive charges near or directly against mines to destroy
  the mine (Figure A.1-23).

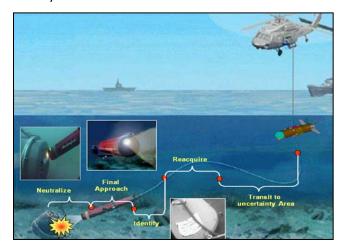


Figure A.1-23: Airborne Mine Neutralization System

- Projectiles: Small- and medium-caliber projectiles fired from surface ships or hovering helicopters are used to neutralize floating and near-surface mines.
- Diver-Placed Explosive Charges: Operating from small craft, divers place explosive charges, which may use time-delay fusing, near or on mines to destroy the mine or disrupt its ability to function.

#### A.1.6 MILITARY EXPENDED MATERIALS

Navy training and testing events may introduce or expend various items, such as non-explosive munitions and targets, into the marine environment as a direct result of using these items for their intended purpose. In addition to the items described below, some accessory materials—related to the

carriage or release of these items—may be released. These materials, referred to as military expended materials, are not recovered and potentially result in environmental impacts. These impacts are analyzed in detail in Chapter 3 (Affected Environment and Environmental Consequences) of this EIS/OEIS. This section includes descriptions of a representative sample of military expended materials. A more comprehensive discussion can be found in Chapter 3 (Affected Environment and Environmental Consequences).

Military expended materials analyzed in this document include the following:

- **Sonobuoys:** Sonobuoys consist of decelerators/parachutes, wires, and the sonobuoys themselves.
- **Bathythermographs:** Bathythermographs as used by the Navy are similar to sonobuoys in that they consist of decelerators/parachutes, wires, and the buoy themselves. In the case of bathythermographs, the buoys are used to measure temperature information of the water column and transmit that information to the platform (usually a ship or aircraft) that deployed the bathythermograph.
- Torpedo Launch Accessories: Torpedoes are usually recovered; however, materials such as
  decelerators/parachutes used with air-dropped torpedoes, guidance wire used with submarinelaunched torpedoes, and ballast weights are expended. Explosive-filled torpedoes expend
  torpedo fragments.
- Projectiles and Bombs: Non-explosive projectiles, non-explosive bombs, or fragments from
  explosive projectiles and bombs are expended during training and testing events. These items
  are primarily constructed of lead (most small-caliber projectiles) or steel (medium- and largecaliber projectiles and all bombs). Casings are expended as a result of firing either non-explosive
  or explosive projectiles.
- Blank Ammunition: Blank ammunition is used in some training activities when the sound or flash of gunfire adds to the realism of the training activity but safety of personnel or nearby civilians is critical. Blank ammunition contains gunpowder, but no projectile is sent downrange upon firing the weapon. Casings are expended as a result of firing blank ammunition.
- Missiles and Rockets: Non-explosive missiles and missile fragments from explosive missiles are
  expended during training and testing events. Propellant, and any explosive material involved, is
  consumed during firing/detonation. Rockets are similar to missiles and both non-explosive and
  fragments may be expended.
- Countermeasures: Countermeasures (acoustic, chaff, flares, and biodegradable polymer) are
  expended as a result of training or testing events, with the exception of towed acoustic
  countermeasures. Chaff activities also include an expended canister, end caps, and pistons.
  Flares expend only end caps and pistons.
- Targets: Some targets are designed to be expended; other targets, such as aerial drones and remote-controlled boats, are recovered for re-use. Targets struck with munitions will result in target fragments.

#### A.2 Training Activities

The Navy's training activities are organized generally into seven primary mission areas and a miscellaneous category ("Other Training") that includes those activities that do not fall within a primary mission area but are an essential part of Navy training. The locations listed are the areas where the training typically takes place, but they can occur through the AFTT Study Area shown on Figure 2.1-1

(Atlantic Fleet Training and Testing Study Area) in Chapter 2 (Description of Proposed Action and Alternatives). In addition, because the Navy conducts a number of activities within larger training exercises, descriptions of those larger exercises are also included here. It is important to note that these larger exercises are composed entirely of individual activities described in the primary mission areas.

#### A.2.1 Major Training Exercises

A major anti-submarine warfare training exercise comprises several "unit-level" range exercises conducted by several units operating together while commanded and controlled by a single commander. These exercises typically employ an exercise scenario developed to train and evaluate the strike group in naval tactical tasks. In a major training exercise, most of the operations and activities being directed and coordinated by the strike group commander are identical in nature to the operations conducted during individual, crew, and smaller-unit training events. In a major training exercise, however, these disparate training tasks are conducted in concert, rather than in isolation.

Major training exercises are listed below.

#### A.2.1.1 Composite Training Unit Exercise

Major Training Exercises – Large Integrated Anti-Submarine Warfare						
Composite Training Unit Exercise						
Short	Aircraft carrier and carrier air wing integrate with	Typical Duration				
Description	surface and submarine units in a challenging					
	multi-threat operational environment that	21 days				
	certifies them ready to deploy.					
Long Description	Intermediate level carrier strike exercise designed t deployment or Joint Task Force Exercise. Typically e and helicopters, two submarines, and various unma	employs seven surface ships, fixed-wing aircraft				
	Each strike group performs a rehearsal called Composite Training Unit Exercise before deployment. Prior to the Composite Training Unit Exercise, each ship and aircraft in the strike group trains in their specialty. The Composite Training Unit Exercise is an intermediate-level strike group exercise designed to forge the group into a cohesive fighting team. Composite Training Unit Exercise normally consists of an 18-day schedule of event-driven exercise, and a 3-day Final Battle Problem.					
	the Carrier Strike Group, this exercise integrates the	omposite Training Unit Exercise is an integration phase, at-sea, major training exercise. For arrier Strike Group, this exercise integrates the aircraft carrier and carrier air wing with se and submarine units in a challenging operational environment. Special operations training also be integrated with the exercise scenario.				
	For Composite Training Unit Exercise only, the anti-submarine warfare activities were analyzed as a Composite Training Unit Exercise. Other warfare area training conducted during the Composite Training Unit Exercise is analyzed elsewhere as unit-level training (gunnery exercises, missile exercises, etc.).					
Typical	Platforms: Aircraft carriers, fixed-wing aircraft, rotary-wing aircraft, submarines, surface					
Components	combatants					
	Targets: Sub-surface targets					
	Systems being Trained/Tested: Sonar systems					

<b>Major Training</b>	Major Training Exercises – Large Integrated Anti-Submarine Warfare						
Composite Trai	ning Unit Exercise						
Standard	Vessel safety	Typical Loca	itions				
Operating	Aircraft safety	Range Complexes/Testing Ranges: Inshore Waters/Pierside:					
Procedures	Towed in-water device	Gulf of Mex	_	_			
(Section 2.3.3)	safety		ico	None			
		Jacksonville	Daint				
		Navy Cherry					
<u> </u>		Virginia Cap					
Stressors to	Acoustic:	-	sturbance and Str	— ·			
Biological	Sonar and other		l aerial target stril				
Resources	transducers		l in-water device s				
and Habitats	Aircraft noise	Military exp	ended material	In-water electromagnetic			
	Vessel noise			devices			
		Ingestion:					
	Explosive:		ended materials				
	None	than mu	nitions	Wires and cables			
				Decelerators/parachutes			
Stressors to	Air Quality:			Water Quality:			
Physical	Criteria air pollutants		Metals	Chemicals other than explosives			
Resources			-				
Stressors to	None						
Human							
Resources							
Military	Ingestible Material:		Military	Sub-surface targets (mobile)			
Expended	Decelerator/parachute - Sm	iall	Recoverable				
Material			Material				
	Non-Ingestible Material:						
	Acoustic countermeasures,	-					
	bathythermographs, expe						
	bathythermograph wires,	, sonobuoys					
	(non-explosive), sonobuo	y wires					
Sonar and	Low-Frequency:	Anti-Suk	omarine Warfare:				
Other	LF6	ASW1	ASW4				
Transducer		ASW2	ASW5				
Bins	Mid-Frequency:	ASW3					
	MF1 MF5						
	MF3 MF11						
	MF4 MF12						
	High-Frequency:						
	HF1						
In-Water	Analyzed in individual unit-l	evel training e	vents.				
Explosive							
Bins							
Procedural	Acoustic Stressors: (Section	5.3.2)	Physica	l Disturbance and Strike: (Section 5.3.4)			
Mitigation	Active sonar		Vessel movement				
	Towed in-water devices						

<b>Major Training</b>	Major Training Exercises – Large Integrated Anti-Submarine Warfare					
<b>Composite Trai</b>	Composite Training Unit Exercise					
Assumptions	For Composite Training Unit Exercise, only the anti-submarine warfare activities were analyzed as a					
Used for	Composite Training Unit Exercise. Other warfare area training conducted during the Composite					
Analysis	Training Unit Exercise was analyzed as unit-level training (gunnery exercise, missile exercise, etc.).					
Stressors to human resources were not analyzed for this activity since it occurs greater than 12 from shore.						
	Additional activities utilizing sources not listed in the Sonar and Other Transducer Bins section above may occur during this exercise. All acoustic sources that may be used during training and testing activities have been accounted for in the modeling and analysis presented in this EIS/OEIS.					

#### A.2.1.2 Fleet Exercise/Sustainment Exercise

Included in the Fleet Response Training Plan is a requirement to conduct post-deployment training, and maintenance. This ensures that the components of a strike group maintain an acceptable level of readiness after returning from deployment. A sustainment exercise is an exercise designed to challenge the strike group in all warfare areas. Marine mammal systems may be used during the exercise. This exercise is similar to a Composite Training Unit Exercise but is of shorter duration.

Major Training	Major Training Exercises – Medium Integrated Anti-Submarine Warfare						
	Fleet Exercise/Sustainment Exercise						
Short	Aircraft carrier and carrier air wing integrates with   Typical Duration				cal Duration		
Description	surface and submarine units in a challenging						
	threat operational environment to maintain			Up to	o 10 days		
	to deploy.						
Long	Fleet Exercises and Sustainn	nent Exercises	are similar	in sco	pe to Composite Training Unit Exercises		
Description					leet Exercises are integrated joint and		
	_	-	•		y across maritime warfare disciplines.		
					r Strike Group maintains an acceptable		
		•		n ordei	r to maintain a surge capability. Marine		
	mammal systems may be us	_					
		explosives in t	the Fleet Ex	ercise	s and Sustainment Exercises is included in		
	unit-level events.	_					
Typical		_	craft, rotar	y-wing	aircraft, submarines, surface combatants		
Components	Targets: Sub-surface targets						
	Systems being Trained/Test	-					
Standard	Vessel safety	Typical Loca	itions				
Operating	Aircraft safety	Range Com	plexes/Test	ting Ra	anges: Inshore Waters/Pierside:		
Procedures		Towed in-water device					
(Section 2.3.3)	safety	Navy Cherry Point					
	Virginia Capes						
Stressors to	Acoustic:	Physical Disturbance and Strike: Energy:					
Biological	Sonar and other	Aircraft and	l aerial targ	et stril	ke In-air electromagnetic		
Resources	transducers	Vessels and	l in-water d	evice s	strike devices		
and Habitats	Aircraft noise	Military exp	ended mat	erial	In-water electromagnetic		
	Vessel noise				devices		
		Ingestion:					
	Explosives:	Military exp		erials ·	=		
	None	than mui	nitions		Wires and cables		
		_	-		Decelerators/parachutes		
Stressors to	Air Quality:		Sedimen	ts and	Water Quality:		
Physical	Criteria air pollutants		Metals		Chemicals other than explosives		
Resources							
Stressors to	None						
Human							
Resources							
Military	Ingestible Material:		Military		Sub-surface targets (mobile)		
Military Expended	Ingestible Material: d Decelerator/parachute - Small			hle	Sub-surface targets (MODIIE)		
Material	· ·	an	Recovera Material	DIC			
Material	Non-Ingestible Material:						
	Acoustic countermeasures, s	-					
	(non-explosive), sonobuo	y wires					

Major Training	Major Training Exercises – Medium Integrated Anti-Submarine Warfare						
Fleet Exercise/Sustainment Exercise							
Sonar and Other Transducer Bins	Low-Frequency:         Anti-Submarine Warfare:           LF6         ASW1 ASW4           Mid-Frequency:         ASW2 ASW3           MF1 MF5         ASW3           MF3 MF11 High-Frequency:         High-Frequency:           MF4 MF12 HF1						
In-Water Explosive Bins	Analyzed in individual unit-level training events.						
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar  Physical Disturbance and Strike: (Section 5.3.4) Vessel movement Towed in-water devices						
Assumptions Used for Analysis	Only the anti-submarine warfare activities were analyzed as a Fleet Exercise/Sustainment Exercise.  Other warfare area training conducted during the Fleet Exercise/Sustainment Exercise was analyzed as unit-level training (gunnery exercise, missile exercise, etc.).  Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.  Additional activities utilizing sources not listed in the Sonar and Other Transducer Bins section above may occur during this exercise. All acoustic sources that may be used during training and testing activities have been accounted for in the modeling and analysis presented in this EIS/OEIS.						

#### A.2.2 INTEGRATED/COORDINATED TRAINING

Integrated or coordinated anti-submarine warfare training exercises are similar to major training exercises in that they are composed of several basic, unit-level exercises, training conducted by an individual unit, but are generally on a smaller scale, are of shorter duration, and use fewer hours of active sonar than a major training exercise.

#### A.2.2.1 Navy Undersea Warfare Training Assessment Course

Small Integrate	Small Integrated Anti-Submarine Warfare Training						
	Navy Undersea Warfare Training Assessment Course						
Short	Multiple ships, aircraft, and submarines integrate				cal Duration		
Description	the use of their sensors, including sonobuoys, to						
	search for, detect, classify, localize, and track a			2-5 c	lays		
	threat submarine.						
Long	The Navy Undersea Warfare	Training Asse	essment Co	urse is	a tailored course of instruction designed		
Description					rated anti-submarine warfare warfighting		
			_		rse is a coordinated training scenario that		
		-			helicopters, a submarine, and one		
		_	_		ng one submarine. The scenario consists		
					e submarine may practice simulated		
					d, towed array, and dipping sonar is		
	employed by ships and helic						
Typical	Platforms: Fixed-wing aircra	•	g aircraft, si	ıbmar	ines, surface combatants		
Components	Targets: Sub-surface targets						
Standard	Systems being Trained/Test	Typical Loca					
0.0011010101	Vessel safety Aircraft safety	Турісаї Loca	itions				
Operating Procedures	Towed in-water device	Range Com	plexes/Test	ing Ra	inges: Inshore Waters/Pierside:		
(Section 2.3.3)	safety	Jacksonville			None		
(30001011 2.3.3)	Navy Cherry Point						
		Virginia Capes					
Stressors to	Acoustic:	Physical Dis			= -		
Biological	Sonar and other	Aircraft and	_				
Resources	transducers	Vessels and					
and Habitats	Aircraft noise	Military exp	ended mat	erial s			
	Vessel noise				Entanglement:		
	Fundacionas	Ingestion:		haulala	Wires and cables		
	<b>Explosives:</b> None	than mu	pended mat	teriais	<ul><li>other Decelerators/parachutes</li></ul>		
Stressors to		than mu	_	<b>.</b>	Mates Ovelites		
Physical	Air Quality: Criteria air pollutants		Metals	ts and	Water Quality: Chemicals other than explosives		
Resources	Criteria aii poliutarits		ivietais		Chemicals other than explosives		
Stressors to	None						
Human	None						
Resources							
Military	Ingestible Material:	•	Military		•		
Expended	Decelerator/parachute - Small Reco			ble	Sub-surface targets (mobile)		
Material	,,	Material Sub-surface targets (mostic)					
	Non-Ingestible Material:						
	Sub-surface targets (mobile)	, sonobuoys					
	(non-explosive), sonobuo	v wires					

Small Integrated Anti-Submarine Warfare Training								
Navy Undersea	Navy Undersea Warfare Training Assessment Course							
Sonar and	Mid-Frequency:	High-Frequency:	Anti-Submarine Warfare:					
Other	MF1 MF5	HF1	ASW1					
Transducer	MF3 MF12	Low Eroguanav	ASW3					
Bins	MF4	<b>Low-Frequency:</b> LF6	ASW4					
In-Water	Analyzed in individual unit-l	evel training events.	-					
Explosive		·						
Bins								
Procedural	Acoustic Stressors: (Section	5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Active sonar		Vessel movement					
Measures		Towed in-water devices						
Assumptions	Two MK-39 Expendable Mobile Anti-Submarine Warfare Training Targets may be used in place of an							
Used for	actual submarine target.							
Analysis	Air deployed sonobuoys will have a decelerator/parachute.							
	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM							
	from shore.							
	_		he Sonar and Other Transducer Bins section above					
			rces that may be used during training and testing					
	activities have been acco	unted for in the model	ing and analysis presented in this EIS/OEIS.					

## A.2.2.2 Surface Warfare Advanced Tactical Training

Small Integrated Anti-Submarine Warfare Training						
Surface Warfare Advanced Tactical Training						
Short	Multiple ships and aircraft c	oordinate the	use of <b>Tvr</b>	ical Duration		
Description	sensors, including sonobuoy	ys, to search, detect,				
	and track a threat submarin					
	Advanced Tactical Training 6	exercises are r	not Up	to 15 days		
	dedicated anti-submarine w					
	involve multiple warfare are	eas.				
Long	Surface Warfare Advanced 1	Factical Training (SWATT) is an intermediate training exercise designed				
Description		or proficiency and exercise combined force responses to surface warfare,				
	anti-submarine warfare, air	warfare and electromagnetic spectrum operations.				
	Surface Warfare Advanced 1	actical Training is conducted after a carrier strike group's first Group				
	Sail, and before Composite	Training Unit (	Exercise, and cor	nsists of multiple surface warfare, anti-		
	submarine and air warfare li	ive fire events	. Multiple ships	and aircraft search for, locate, and track		
	one submarine. Occurs once	e per carrier strike group training cycle.				
	Use of other munitions and	explosives in SWATT are included in unit-level events.				
Typical	Platforms: Surface combatants, fixed-wing aircraft, rotary-wing aircraft, unmanned vehicles,					
Components	submarines					
	Targets: Sub-surface targets	ets				
	Systems being Trained/Tested: Sonar systems					
Standard	Vessel safety	Typical Loca	itions			
Operating	Aircraft safety	Pange Com	nleves/Testing F	Ranges: Inshore Waters/Pierside:		
Procedures	Towed in-water device	Range Complexes/Testing Ranges: Inshore Waters/Pierside: Jacksonville None				
(Section 2.3.3)	safety	Navy Cherry Point				
		Virginia Cap				
Stressors to	Acoustic:	-	sturbance and S	trike: Energy:		
Biological	Sonar and other	=	in-water device	<del></del>		
Resources	transducers		ended material	3		
and Habitats	Aircraft noise	, , ,		In-water electromagnetic		
	Vessel noise	Ingestion:		devices		
		_	ended materials	s – other		
	Explosives:	than mui		Entanglement:		
	None			Wires and cables		
				Decelerators/parachutes		
Stressors to	Air Quality:	- · · · · · · · · · · · · · · · · · · ·				
Physical	Criteria air pollutants		Metals	Chemicals other than explosives		
Resources						
Stressors to	None					
Human						
Resources						
Military	Ingestible Material:		Military	Sub-surface targets (mobile)		
Francis de l	Target fragments,		Recoverable			
Expended						
Expended Material	decelerators/parachutes -	- small	Material			
-	decelerators/parachutes -	- small	Material			
-	decelerators/parachutes - Non-Ingestible Material:		Material			
-	decelerators/parachutes - Non-Ingestible Material: Sonobuoys (non-explosive),	sonobuoy	Material			
-	decelerators/parachutes - Non-Ingestible Material:	sonobuoy easures,	Material			

Small Integrated Anti-Submarine Warfare Training							
Surface Warfare Advanced Tactical Training							
Sonar and	Mid-Frequency: A			marine Warfare:	High-Frequency:		
Other	MF1 MF5MF1K	MF6	ASW2	ASW4	HF1		
Transducer	MF3 MF12		ASW3				
Bins	MF4				Acoustic Modems:		
					M3		
In-Water	Analyzed in individual unit-level training events.						
Explosive							
Bins							
Procedural	Acoustic Stressors: (5	Section 5.3	3.2)	Physical Dis	sturbance and Strike: (Section 5.3.4)		
Mitigation	Active sonar			Vessel move	Vessel movement		
Measures				Towed in-w	Towed in-water devices		
Assumptions	Only the anti-submarine warfare activities were analyzed as a SWATT. Other warfare area training						
Used for	conducted during SWATT was analyzed as unit-level training (gunnery exercises, missile exercises,						
Analysis	etc.).						
	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM						
	from shore.						
		_			Other Transducer Bins section above		
	may occur during t	this exerci	se. All acou	stic sources that may	be used during training and testing		
	activities have been accounted for in the modeling and analysis presented in this EIS/OEIS.						

## A.2.2.3 Anti-Submarine Warfare Tactical Development Exercise

Medium Coordinated Anti-Submarine Warfare Training							
Anti-Submarine	Anti-Submarine Warfare Tactical Development Exercise						
Short	Multiple ships, aircraft, and	submarines co	oordinate .	Typical Dur	ation		
Description	their efforts to search for, d	, detect, and track					
	submarines with the use of	f all sensors. Anti-					
	Submarine Warfare Tactical	Il Development Exercise 5-7 days					
	is a dedicated anti-submarin						
Long	Multiple ships, aircraft, and submarines coordinate their efforts to search for, detect, and track						
Description	submarines with the use of	f all sensors. Anti-Submarine Warfare Tactical Development Exercise is a					
	fleet training exercise involv	ving surface ships, submarines, and aircraft. Active and passive sonar an					
	sonobuoys are used to cond	luct anti-submarine warfare training exercises. The purpose of the					
	exercise is to assess fleet an	ti-submarine warfare performance and capability among various units					
	operating together in a spec	ific threat env	vironment.				
Typical	Platforms: Fixed-wing aircra	ft, rotary-wing	g aircraft, sur	face comba	tants, submarines		
Components	Targets: Sub-surface targets						
	Systems being Trained/Test	ed: Sonar syst	tems, sonobu	oys, acoust	ic countermeasures		
Standard	Vessel safety	Typical Loca	itions				
Operating	Aircraft safety	Dance Care		- D	Inchara Matara / Diagrida		
Procedures	Towed in-water device	Jacksonville	plexes/Testir	ig Kanges:	Inshore Waters/Pierside: None		
(Section 2.3.3)	safety	Navy Cherry			None		
		Virginia Cap					
Stressors to	Acoustic:		sturbance an	d Chuilea.	Francis		
	Sonar and other	•	d aerial target		Energy:		
Biological Resources	transducers		_		In-air electromagnetic		
and Habitats	Aircraft noise	Vessels and in-water device strike devices					
allu Habitats	Vessel noise	Military expended material In-water electromagnetic					
	vesser noise	devices					
	Explosives:	Ingestion:  Military expended materials – other  Entanglement:					
	None	than munitions  than munitions  Wires and cables					
		Decelerators/parachute					
Stressors to	Air Quality:		Sediments	and Water			
Physical	Criteria air pollutants		Metals		Chemicals other than explosives		
Resources	•				•		
Stressors to	None	-	-				
Human							
Resources							
Military	Ingestible Material:	<del>-</del>	Military		-		
Expended	Target fragments,			e Sub-s	urface targets (mobile)		
Material	decelerators/parachutes -						
	Non-Ingestible Material:						
	Sonobuoys (non-explosive),	puoys (non-explosive), sonobuoy					
	wires, acoustic countermeasures						
Sonar and	Low-Frequency:	High-Fre	equency: Aco		Acoustic Modems:		
Other	LF6	HF1			M3		
Transducer	Mid-Frequency:	Anti-Sub	omarine Warf	are:			
Bins	MF1 MF5	ASW1	ASW4				
	MF3 MF11	ASW3					
	MF4 MF12						

Medium Coord	Medium Coordinated Anti-Submarine Warfare Training					
Anti-Submarine	Anti-Submarine Warfare Tactical Development Exercise					
In-Water	Analyzed in individual unit-level training evo	ents.				
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)				
Mitigation	Active sonar	Vessel movement				
Measures		Towed in-water devices				
Assumptions	Only the anti-submarine warfare activities v	vere analyzed as an Anti-Submarine Warfare Tactical				
Used for	Development Exercise. Other warfare area training conducted during the exercise was analyzed as					
Analysis	unit-level training.					
	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM					
	from shore.					
	Additional activities utilizing sources not listed in the Sonar and Other Transducer Bins section above					
	may occur during this exercise. All acoustic sources that may be used during training and testing					
	activities have been accounted for in the modeling and analysis presented in this EIS/OEIS.					

## A.2.2.4 Amphibious Ready Group Marine Expeditionary Unit Exercise

Small Coordinate	ted Anti-Submarine Warfare 1	Training				
	ady Group Marine Expedition		cise			
Short		-		Typical Dura	ation	
Description	Navy and Marine Corps forces conduct advanced training at sea in preparation for deployment.  5-7 days			5-7 days	414011	
Long	Amphibious ships and embarked Marine Expeditionary Units train to a multitude of scenarios to				to a multitude of scenarios to	
Description	test the capabilities of the amphibious force. Operations include ship to shore movement with tiltrotor aircraft and Landing Craft Air Cushion vessels. Marine Corps forces conduct more advanced amphibious operations to include small boat raids; visit, board, search, and seizure training; helicopter and mechanized amphibious raids; and non-combatant evacuation operations.  This exercise generally occurs during an Expeditionary Strike Group Composite Training Unit Exercise. All military expended materials, explosives, and use of other munitions in Amphibious Ready Group Marine Expeditionary Unite Exercise are included in unit-level events.					
Typical Components	Platforms: Amphibious warfare ships, fixed-wing aircraft, rotary-wing aircraft, small boats, surface combatants, tiltrotor aircraft  Targets: None  Systems Being Trained/Tested: Sonar systems					
Standard	Vessel	Typical Locations				
Operating Procedures (Section 2.3.3)	Aircraft safety Towed in-water device safety	Range Complexes/Testing Ranges: Navy Cherry Point			Inshore Waters/Pierside: None	
Stressors to Biological Resources and Habitats	Acoustic: Sonar and other transducers Aircraft noise Vessel noise	Aircraft and aerial target strike  Vessels and in-water device strike  Military expended material  Ingestion:  Military expended materials – other than munitions			Energy: In-air electromagnetic devices In-water electromagnetic devices	
	<b>Explosives:</b> None				Entanglement: Wires and cables Decelerators/parachutes	
Stressors to	Air Quality:		Sediments	and Water		
Physical Resources	Criteria air pollutants		Metals		Chemicals other than explosives	
Stressors to Human Resources	None					
Military	Ingestible Material:	-	Military	None		
Expended Material	Non-Ingestible Material: Sonobuoys, acoustic counter		Recoverabl Material	le		
Sonar and	Low-Frequency: High-Frequency:					
Other Transducer Bins	LF6 Mid-Frequency: MF1 MF11 MF3 MF12	HF1 <b>Anti-Subma</b> r ASW1		fare:		
In-Water Explosive Bins	Analyzed in individual unit-le	vel training e	vents.			

Small Coordina	Small Coordinated Anti-Submarine Warfare Training				
Amphibious Re	ady Group Marine Expeditionary Unit Exe	rcise			
Procedural	Acoustic Stressors: (Section 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)			
Mitigation	Active sonar	Vessel movement			
Measures		Towed in-water devices			
Assumptions	Only the anti-submarine warfare activities were analyzed as Amphibious Ready Group Marine				
Used for	Expeditionary Unit training. Other warfare area training conducted during the exercise was				
Analysis	analyzed as unit-level training.				
	Sonar is not used during every exercise.				
	tressors to human resources were not analyzed for this activity since it occurs greater than 12 NM				
	from shore.				
	Additional activities utilizing sources not listed in the Sonar and Other Transducer Bins section				
	above may occur during this exercise.	All acoustic sources that may be used during training and			
	testing activities have been accounted	for in the modeling and analysis presented in this			
	EIS/OEIS.				

## A.2.2.5 Group Sail

Small Coordinate	ted Anti-Submarine Warfare					
Group Sail	ica Anti-Sasinaline vvallale					
Short	Surface ships and helicopter	s integrate to	search	Typical	Duration	
Description	for, detect, and track threat	_		Турісат	Duration	
Description	Sails are not dedicated anti-		-	2-3 days	S	
	exercises and involve multip			2 J day.	3	
Long	•			eir senso	rs, including sonobuoys, to search for,	
Description	detect, classify, localize, and	_			rs, melaamig seriesaays, to scaren ler,	
2 000					ercise and involves multiple warfare	
	•				ed as a Group Sail. Other warfare area	
	training conducted during a			-		
	_	-	-		ded to introduce coordinated	
	operations after unit-level tr	raining and pr	ior to integ	rated trai	ning. This exercise stresses planning,	
	coordination, and communic	cations during	multiple w	arfare tra	aining scenarios.	
					e, and attack one submarine. Typically,	
	one ship and helicopter are		_			
				actice sin	nulated attacks against the ships.	
	Multiple acoustic sources ma	-				
Typical	Platforms: Fixed-wing aircra	-	g aircraft, s	urface co	mbatants, submarines	
Components	Targets: Sub-surface targets					
	Systems being Trained/Test			buoys, ac	coustic countermeasures	
Standard	Vessel safety	Typical Loca	tions			
Operating	Aircraft safety	Range Com	plexes/Test	ing Rang	es: Inshore Waters/Pierside:	
Procedures		Jacksonville	•		None	
(Section 2.3.3)		Navy Cherry Point				
		Virginia Capes				
Stressors to	Acoustic:	Physical Dis	turbance a	nd Strike	: Energy:	
Biological	Sonar and other	Aircraft and	aerial targ	et strike	In-water electromagnetic	
Resources	transducers	Vessels and				
and Habitats	Aircraft noise	Military exp	ended mat	erial	In-air electromagnetic	
	Vessel noise				devices	
	l	Ingestion:				
	Explosives:	Military exp		erials – o	_	
	None	than mur	nitions		Wires and cables	
Ctroscous to	Air Qualitur	-	Codina a	to and 141	Decelerators/parachutes	
Stressors to Physical	Air Quality: Criteria air pollutants		Seaimen Metals	is and Wa	ater Quality: Chemicals other than explosives	
Resources	Citteria ali poliutalits		ivietals		chemicals other than explosives	
Stressors to	None		-			
Human	INOTIC					
Resources						
Military	Ingestible Material:		Military	Çı	ub-surface targets (mobile)	
Expended	Decelerators/parachutes - Si	mall	Recovera		as samue targets (mosne)	
Material	_ 300.0.0.010/ paraoriace3 31		Material			
	Non-Ingestible Material:					
	Acoustic countermeasures, s	sonobuoys				
	(non-explosive), sonobuoy	-				
	expendable bathythermog	graphs,				
	expendable bathythermog					
	sub-surface targets (mobi	le)				

Small Coordina	ted Anti-Su	bmarine Warfare				
<b>Group Sail</b>						
Sonar and	Mid-Frequ	uency:	Anti-Subn	narine Warfare:	High-Frequency:	
Other	MF1	MF5	ASW2	ASW4	HF1	
Transducer	MF3	MF11	ASW3			
Bins	MF4	MF12				
In-Water	Analyzed i	in individual unit-l	evel training ev	ents.	-	
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section 5.3.2) Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Active son	ar		Vessel mov	ement	
Measures						
Assumptions	While the preference will be to train against an actual submarine or MK 30 recoverable target,					
Used for	assume only MK 39 expendable targets will be used.					
Analysis	One MK 39 Expendable Mobile Anti-Submarine Warfare Training Target may be used in place of an actual submarine target.					
	Only the anti-submarine warfare activities were analyzed as Group Sail training. Other warfare area					
	training	training conducted during the exercise was analyzed as unit-level training.				
	Additiona	l activities utilizing	g sources not list	ed in the Sonar and	Other Transducer Bins section above	
	may oc	cur during this ex	ercise. All acous	tic sources that may	be used during training and testing	
	activitie	es have been acco	unted for in the	modeling and analy	sis presented in this EIS/OEIS.	

#### A.2.3 AIR WARFARE TRAINING

Air warfare is the primary mission area that addresses combat operations by air and surface forces against hostile aircraft. Navy ships contain an array of modern anti-aircraft weapon systems, including naval guns linked to radar-directed fire-control systems, surface-to-air missile systems, and radar-controlled cannon for close-in point defense. Strike/fighter aircraft carry anti-aircraft weapons, including air-to-air missiles and aircraft cannon. Air warfare training encompasses events and exercises to train ship and aircraft crews in employment of these weapons systems against simulated threat aircraft or targets. Air warfare training includes surface-to-air gunnery, surface-to-air and air-to-air missile exercises, and aircraft force-on-force combat maneuvers.

#### A.2.3.1 Air Combat Maneuver

Air Warfare						
Air Combat Ma	neuver					
Short	Fixed-wing aircrews aggress	sively maneuver	r against	Typi	cal Durat	tion
Description	threat aircraft to gain tactic	al advantage.	1-2 hours			
Long Description	Basic flight maneuvers in which fixed-wing aircrew engage in offensive and defensive maneuvering against each other. During air combat maneuver engagements, no munitions are fired, however countermeasures such as chaff and flares may be used. These maneuvers typically involve two aircraft; however, based upon the training requirement, air combat maneuver exercises may involve over a dozen aircraft.					
Typical	Platforms: Fixed-wing aircra	aft				
Components	Targets: Air targets					
	Systems being Trained/Tes	ted: None				
Standard	Aircraft safety	Typical Locati	ions			
Operating Procedures (Section 2.3.3)		Range Complexes/Testing Ranges: Inshore Waters/Pierside: Jacksonville None Key West Navy Cherry Point Virginia Capes				·
Stressors to	Acoustic:	Physical Disturbance and Strike: Energy:			Energy:	
Biological	Aircraft noise	Aircraft and	aerial targ	et stri	ke	In-air electromagnetic
Resources						devices
and Habitats	Explosives:	Ingestion:				
	None	None				Entanglement:
	A' 0 I'I		o !:			None
Stressors to Physical Resources	Air Quality: Criteria air pollutants		<b>Sedimen</b> None	ts and	water C	quality:
Stressors to	Cultural Resources:	Socioecon	omic Reso	ources	:	Public Health and Safety:
Human	Physical disturbance and	Accessibility			Physical interactions	
Resources	strike	Airborne acoustics				In-air energy
		Physical di		e and s	trike	
Military	Ingestible Material:		Military		None	
Expended	None		Recovera	ble		
Material	Non Ingostible Materials		Material			
	Non-Ingestible Material: None					
	NOTIC					

Air Warfare	
Air Combat Ma	neuver
Sonar and	None
Other	
Transducer	
Bins	
In-Water	None
Explosive	
Bins	
Procedural	None
Mitigation	
Measures	
Assumptions	No munitions are fired. Flares and chaff may be used. All flares and chaff are accounted for in flare
Used for	exercise and chaff exercise.
Analysis	

#### A.2.3.2 Air Defense Exercise

Air Warfare					
Air Defense Exer	cise				
Short	Aircrew and ship crews cor	nduct defensiv	e measures agai	nst	Typical Duration
Description					1-4 hours
Long	Fixed-wing aircrew and ship	p personnel pe	erform measures	designe	d to defend against attacking
Description	threat aircraft or missiles o	r reduce the e	ffectiveness of si	uch atta	ck. This exercise involves full
	detection through engagen	nent sequence	e. Aircraft operat	e at vary	ring altitudes and speeds.
		-			rcraft controllers on ships, in fixed-
	_				and direct friendly aircraft to
					re personnel on ships use search to the point of engagement.
Typical	Platforms: Fixed-wing aircr			siles up	to the point of engagement.
Components	Targets: Air targets	rait, surface co	Jiiibataiits		
	Systems being Trained/Te	sted: None			
Standard	Vessel safety	Typical Loca	tions		
Operating Procedures	Aircraft safety	Range Com	plexes/Testing R	anges:	Inshore Waters/Pierside:
(Section 2.3.3)		Gulf of Mex			None
(**************************************		Jacksonville			
		Navy Cherry Virginia Cap			
Stressors to	Acoustic:		turbance and St	riko:	Energy:
Biological	Aircraft noise	-	aerial target stri		In-air electromagnetic
Resources	Vessel noise		n-water device s		devices
and Habitats					
	Explosives:	Ingestion:			Entanglement:
	None	None			None
Stressors to	Air Quality:		Sediments and	d Water	Quality:
Physical Resources	Criteria air pollutants		None		
Stressors to	Cultural Resources:	Socioeco	nomic Resources	::	Public Health and Safety:
Human	Physical disturbance and	Accessibi			Physical interactions
Resources	strike	Airborne	•		In-air energy
		Physical o	disturbance and s	trike	
Military	Ingestible Material:		Military	None	
Expended	None		Recoverable		
Material	Non-Ingestible Material:		Material		
Sonar and	None None	-			-
Other	NOTIC				
Transducer Bins					
In-Water	None				
<b>Explosive Bins</b>					
Procedural	Physical Disturbance and S	Strike: (Section	n 5.3.4)		
Mitigation	Vessel movement				
Measures					
Assumptions	No munitions are fired.				
Used for Analysis					
Allalysis	<u> </u>				

## A.2.3.3 Gunnery Exercise Air-to-Air Medium-Caliber

Air Warfare						
Gunnery Exerci	se Air-to-Air Medium-Caliber					
Short	Fixed-wing aircrews fire me	dium-caliber g	uns at air	Typic	cal Duration	
Description	targets.		,	1-2 hours		
Long		er aircraft in	a gunnery r	oattern	to achieve a weapons firing solution	
Description	with integrated medium-caliber guns. Typically involves two or more fixed-wing aircraft and a					
	=		-		he target banner is recovered after the	
	exercise.					
Typical	Platforms: Fixed-wing aircra	ıft				
Components	Targets: Air targets					
	Systems being Trained/Test	t <b>ed:</b> Medium-	caliber gun	systen	ns	
Standard	Aircraft safety	Typical Loca	tions			
Operating	Weapons firing safety	Range Com	nloves/Tes	ting Da	anges: Inshore Waters/Pierside:	
Procedures		Jacksonville	piekes/ ies	tilig iva	None	
(Section 2.3.3)		Key West			None	
		Navy Cherry	Point			
		Virginia Capes				
Stressors to	Acoustic:	Physical Dis		nd Str	ike: Energy:	
Biological	Aircraft noise	Aircraft and			<del>-</del> -	
Resources	Weapons noise	Military exp	_			
and Habitats						
	Explosives:	Ingestion:			Entanglement:	
	None	Military exp		terials -	– None	
		munition	-			
Stressors to	Air Quality:			ts and	Water Quality:	
Physical	Criteria air pollutants		Metals			
Resources	Cultural December	C!			Bull's Harlib and Cafeton	
Stressors to Human	Cultural Resources: Physical disturbance and		nomic Reso	ources:	: Public Health and Safety: Physical interactions	
Resources	strike	Accessibi	acoustics		In-air energy	
Resources	SUINC		disturbance	and st	= ·	
Military	Ingestible Material:	Titysical	Military	and st	Towed air targets	
Expended	Medium-caliber projectiles (	non-	Recovera	hle	rowed all targets	
Material	explosive), medium-calibe		Material			
	Non-Ingestible Material:					
	None					
Sonar and	None					
Other						
Transducer						
Bins						
In-Water	None					
Explosive						
Bins				-	<del></del>	
Procedural	Physical Disturbance and St	rike: (Section	5.3.4)			
Mitigation	Vessel movement					
Measures						

Air Warfare	
<b>Gunnery Exerci</b>	se Air-to-Air Medium-Caliber
Assumptions	This activity is conducted at an altitude of 15,000 ft. and above, during the daytime, and
Used for	approximately 40 NM from shore. A towed air target is a banner target and will be recovered. Only
Analysis	non-explosive munitions used.

## A.2.3.4 Gunnery Exercise Surface-to-Air Large-Caliber

Air Warfare						
	se Surface-to-Air Large-Calibe	or .				
-			at air	Tunical Dun	ation	
Short	Surface ship crews fire large-caliber guns at air			Typical Duration		
Description	targets. 1-2 hours					
Long		gainst threat	aircraft or m	nissiles with la	arge-caliber guns to disable or	
Description	destroy the threat.					
		•			ssile that is detected by the ship's	
				s at the threa	at before it reaches the ship. The	
	target is towed by a contract					
Typical		amphibious v	varfare ship:	s, fixed-wing	aircraft, surface combatants	
Components	Targets: Air targets					
	Systems being Trained/Test			tems		
Standard	Vessel safety	Typical Loca	ations			
Operating	Aircraft safety	Range Com	nlexes/Test	ing Ranges:	Inshore Waters/Pierside:	
Procedures	Weapons firing safety	Jacksonville	=	gugeo.	None	
(Section		Virginia Cap			110110	
2.3.3)						
Stressors to	Acoustic:	-	sturbance a		Energy:	
Biological	Aircraft noise	Aircraft and aerial target strike In-air electromagnetic Vessels and in-water device strike devices				
Resources	Vessel noise					
and Habitats	Weapons noise	Military expended material				
		Entanglement:				
	Explosives:	Ingestion: None				
	None	Military expended material – other				
	4: 0 1::	than munitions				
Stressors to	Air Quality:			ts and Water	Quality:	
Physical	Criteria air pollutants	Metals				
Resources	Ness	<del></del>				
Stressors to	None					
Human Resources						
	Ingestible Materials		Military	None		
Military Expended	Ingestible Material: Air Target (Decoy) - fragmer	n+c	Military Recoveral	None		
Material	All Target (Decoy) - Tragiller	11.5	Material	ole		
Iviaterial	Non-Ingestible Material:		Iviaterial			
	Large-caliber projectiles (no	n-				
	explosive), large-caliber c					
Sonar and	None				- <del>-</del>	
Other	Hone					
Transducer						
Bins						
In-Water	None					
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section	5.3.2)	Pł	hysical Distur	bance and Strike: (Section 5.3.4)	
Mitigation	Weapons firing noise	,		essel movem		
Measures	capono mmg noise		V	2321 1110 42111		
1416030163						

Air Warfare	
<b>Gunnery Exerci</b>	se Surface-to-Air Large-Caliber
Assumptions	The target is a fiberglass finned target that is towed approximately 3 NM behind the towing aircraft.
Used for	All projectiles are assumed to be non-explosive.
Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM
	from shore.

# A.2.3.5 Gunnery Exercise Surface-to-Air Medium-Caliber

Air Warfare							
<b>Gunnery Exerci</b>	se Surface-to-Air Medium-Cal	iber					
Short	Surface ship crews fire medi	um-caliber gu	ıns at air	Турі	cal Dura	tion	
Description	targets.				1-2 hours		
Long		Surface ship crews defend against threat aircraft or missiles with medium-caliber guns to disable or					
Description	•	destroy the threat.					
	-					-ship missile that is detected by	
						to disable or destroy the threat	
Typical	before it reaches the ship. The Platforms: Aircraft carriers,						
Components	Targets: Air targets	ampinolous w	railaie siiip	13, 3ui i	ace com	batants, nxed-wing anciart	
остронона	Systems being Trained/Test	t <b>ed:</b> Medium-	caliber gun	syster	ns		
Standard	Vessel safety	Typical Loca		,			
Operating	Aircraft safety	Range Com	nlexes/Tes	ting Ra	anges:	Inshore Waters/Pierside:	
Procedures	Weapons firing safety	Jacksonville	-	B	anges.	None	
(Section 2.3.3)		Navy Cherry					
		Virginia Cap	es				
		Other AFTT	Areas				
Stressors to	Acoustic:	Physical Dis				Energy:	
Biological	Aircraft noise	Aircraft and aerial target strike In-air electromagnetic  Vessels and in-water device strike devices			_		
Resources and Habitats	Vessel noise Weapons noise	Military exp			strike	devices	
and nabitats	weapons noise	wiiitary exp	Jenueu ma	leriai		Entanglement:	
	Explosives:	Ingestion:				None	
	None	Military exp	ended mat	terials	_		
		munition	ıs				
		Military exp		terials	– other		
		than mu					
Stressors to	Air Quality:		Sedimer Metals		<b>I Water (</b> er mater		
Physical Resources	Criteria air pollutants		ivietais	Othe	er mater	idis	
Stressors to	None	-	_			-	
Human	110110						
Resources							
Military	Ingestible Material:		Military		None		
Expended	Medium-caliber projectiles (		Recovera	ble			
Material	explosive), medium-calibe	_	Material				
	air target (decoy) fragmer	its					
	Non-Ingestible Material:						
	None						
Sonar and	None						
Other							
Transducer Bins							
In-Water	None						
Explosive							
Bins							

Air Warfare	
<b>Gunnery Exerci</b>	se Surface-to-Air Medium-Caliber
Procedural	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Vessel movement
Measures	
Assumptions	The target is a fiberglass finned target that is towed approximately 3 NM behind the towing aircraft.
Used for	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM
Analysis	from shore.

## A.2.3.6 Missile Exercise Air-to-Air

Air Warfare							
Missile Exercise Air-to-	Air						
Short Description	Fixed-wing aircrews fi	re air-to-air missiles	Typical Duration				
	at air targets		1-2 hours				
Long Description	explosive warheads or target drone, a tactica Target drones deploy	wo or more fixed-wing aircraft and a target. Missiles are either r non-explosive practice munitions. The target is an unmanned aerial al air-launched decoy, or a parachute suspended illumination flare. parachutes and are recovered by small boat or rotary-wing aircraft; decoys and illumination flares are expended and not recovered. These cur at high altitudes.					
Typical Components	Platforms: Fixed-wing		aircraft, small boa	ts			
	Targets: Air targets, fla						
0. 1 10	Systems being Traine		rocket systems				
Standard Operating Procedures	Vessel safety Aircraft safety	Typical Locations					
(Section 2.3.3)	Weapons firing safety	Range Complexes/* Gulf of Mexico Jacksonville Key West Navy Cherry Point Virginia Capes	Testing Ranges:	Inshore Waters/Pierside: None			
Stressors to Biological Resources and Habitats	Acoustic: Aircraft noise Vessel noise Weapons noise	Physical Disturbanc Aircraft and aerial to Military expended n Vessel & in-water de	arget strike naterial	Energy: In-air electromagnetic devices			
	Explosives: In-air explosives	Ingestion: Military expended n munitions Military expended n than munitions	naterials –	Entanglement: Decelerators/ parachutes			
Stressors to Physical	Air Quality:		Sediments a	and Water Quality:			
Resources	Criteria air pollutants	<u>-</u>					
Stressors to Human Resources	None						

Air Warfare					
Missile Exercise Air-to	-Air				
Military Expended Material	Ingestible Material: Missiles (explosive) and air target (decoy) and (drone) fragments  Non-Ingestible Material: Illumination flares, missiles (non- explosive), decelerators/para chutes – medium, large and extra-	Military Recoverable Material	Air target (drone)		
6 101	large				
Sonar and Other Transducer Bins	None				
In-Water Explosive Bins	None				
Procedural Mitigation Measures	Physical Disturbance a Vessel movement	and Strike: (Section 5.3.4)			
Assumptions Used for Analysis	munitions may be ເ All propellant and exp	For analysis, all missiles are assumed to be explosive, although non-explosive practice munitions may be used. All missiles explode at high altitude.  All propellant and explosives are consumed.  Stressors to human resources were not analyzed for this activity since it occurs greater than			



Figure A.2-1: BQM-74 (Aerial Target)



Figure A.2-2: LUU-2B/B Illuminating Flare (Aerial Target)



Figure A.2-3: Tactical Air-Launched Decoy (Aerial Target)

## A.2.3.7 Missile Exercise – Man-Portable Air Defense System

Air Warfare								
	Man-Portable Air Defense	System						
Short	Personnel employ a shou	lder fired surface to air	Typical Dura	ation				
Description	missile at air targets.		Varies					
Long Description	_	an-Portable Air Defense Systems, a shoulder fired surface to air						
6		ssiles or aircraft. An exercise involves personnel firing the Man-						
	_		=	targets. Activity is typically				
		ces firing from shore locations at targets over the water. Small						
	boats are used to ensure							
Typical	Platforms: Small boats							
Components	Targets: Air targets							
	Systems being Trained/T	ested: Man-Portable De	efense Systems					
Standard	Vessel safety	Typical Locations	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
Operating	Weapons firing safety							
Procedures	Unmanned aerial,	Range Complexes/Te	sting Ranges:	Inshore Waters/Pierside:				
(Section 2.3.3)	surface and	Navy Cherry Point		None				
	subsurface vehicle							
	safety							
Stressors to	Acoustic:	Physical Disturbance	and Strike:	Energy:				
Biological	Aircraft noise	Aircraft and aerial tar	get strike	None				
Resources and	Weapons noise	Vessels and in-water	device strike					
Habitats	Vessel noise	Military expended ma	terial	Entanglement:				
			None					
	Explosives:	Ingestion:						
	In-air explosives	Military expended ma	terial –					
		munitions						
		Military expended ma	iteriai – otner					
Chunana un ha	Air Ovalitor	than munitions	-t	Ovalita				
Stressors to	Air Quality:		nts and Water	•				
Physical Resources	Criteria air pollutants		es and explosives other than e					
Resources			naterials	explosives				
		Metals	iateriais					
Stressors to	Cultural Resources:	Socioeconomic Res	controes.	Public Health and Safety:				
Human	Physical disturbance and	Accessibility	ources.	Physical interactions				
Resources	strikes	Airborne acoustics		. Hysical interactions				
		Physical disturbanc	e and strikes					
Military	Ingestible Material:	Military	None	-				
Expended	Missile (explosive) fragme	-						
Material	target (drone) fragmen							
	Non-Ingestible Material:							
	None							
Sonar and Other	None	-						
Transducer Bins								
In-Water	None							
<b>Explosive Bins</b>								

Air Warfare	Air Warfare				
Missile Exercise – Man-Portable Air Defense System					
Procedural	Physical Disturbance and Strike: (Section				
Mitigation	5.3.4)				
Measures	Non-explosive missiles and rockets				
	Vessel movement				
Assumptions	For analysis, all missiles are assumed to be explosive, although non-explosive practice munitions				
Used for	may be used. All missiles explode in-air at low altitude.				
Analysis	All propellant and explosives are consumed.				

#### A.2.3.8 Missile Exercise Surface-to-Air

Air Warfare					
Missile Exercise	Surface-to-Air				
Short	Surface ship crews fire surfa	ce-to-air miss	iles at air	Typi	cal Duration
Description	targets.				hours
Long	Surface ship crews defend against threat missiles and aircraft with ship launched surface-to-air				
Description	-				inti-ship missile, or land attack missile,
_					e-to-air missiles are fired (high-
	•	· · · · · · · · · · · · · · · · · · ·			ally is a remote controlled drone. Target
		=	_		or rotary-wing aircraft; when used,
	tactical air-launched decoys		-	boat	or rotary wing uncrart, when asca,
Typical	Platforms: Aircraft carriers,			s surf	face compatants
Components	Targets: Air targets	ampinolous w	railale silip.	3, 3ui i	ace combatants
Components	Systems being Trained/Test	ed: Surface-t	o-air missile	svste	ems
Standard	Vessel safety	Typical Loca		. 57500	
Operating	Aircraft safety				
Procedures	Weapons firing safety	Range Com	-	ing Ra	anges: Inshore Waters/Pierside:
(Section 2.3.3)	311 17	Gulf of Mexi	ico		None
,		Jacksonville			
		Navy Cherry	Point		
		Northeast			
Churana ha	A	Virginia Cap			
Stressors to	Acoustic: Aircraft noise	Physical Dis			<del></del>
Biological Resources	Vessel noise	Aircraft and Vessel and	-		_
and Habitats	Weapons noise	Military exp			trike devices
and nabitats	Weapons noise	ivilitally exp	Jenueu mat	Cilai	Entanglement:
	Explosives:	Ingestion:			Decelerators/parachutes
	In-air explosives	Military exp	ended mat	erial –	· · · · · · · · · · · · · · · · · · ·
	•	munition			
		Military exp	ended mat	erial –	- other
		than mu	nitions		
Stressors to	Air Quality:	-	Sedimen	ts and	l Water Quality:
Physical	Criteria air pollutants		-		explosive byproducts
Resources					er than explosives
			Other ma	iterials	S
			Metals		
Stressors to	None				
Human					
Resources	Ingostible Meterials		Militaria		Air target (dress)
Military Expended	Ingestible Material: Missile (explosive) fragments	s air targot	Military Recoveral	hle	Air target (drone)
Material	(drone) and (decoy) fragments		Material	OIE .	
	(anone) and (accoy) magn		acciiai		
	Non-Ingestible Material:				
	Decelerators/parachutes - la	rge			
Sonar and	None	-			
Other					
Transducer					
Bins					

Air Warfare	
Missile Exercise	Surface-to-Air
Explosive	None
Bins	
Procedural	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Vessel movement
Measures	
Assumptions	Assumes that all surface-to-air missiles are high-explosive. Missile explodes well above the water's
Used for	surface. All explosive and propellant are consumed.
Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM
	from shore.

#### A.2.4 AMPHIBIOUS WARFARE TRAINING

Amphibious warfare is a type of naval warfare involving the utilization of naval firepower, logistics, and Marine Corps landing forces to project military power ashore. Amphibious warfare encompasses a broad spectrum of activities involving maneuver from the sea to objectives ashore, ranging from reconnaissance or raid missions involving a small unit to large-scale amphibious operations involving over 1,000 Marines and Sailors and multiple ships and aircraft embarked in a strike group.

Amphibious warfare training includes tasks at increasing levels of complexity, from individual, crew, and small unit events to large task force exercises. Individual and crew training include the operation of amphibious vehicles and naval gunfire support training. Small-unit training activities include shore assaults, boat raids, airfield or port seizures, and reconnaissance. Larger-scale amphibious exercises involve ship-to-shore maneuver, shore bombardment and other naval fire support, and air strike and close air support training.

#### A.2.4.1 Amphibious Assault

Amphibious Wa	arfare					
Amphibious Ass	sault					
Short	Large unit forces move asho	re from amphibious	Typical Duration			
Description	ships at sea for the immedia	ite execution of inland	Up to 2 weeks			
_	objectives.		·			
Long	_			e immediate execution of inland		
Description	objectives. Amphibious assa	•	•	_		
	operations, obtaining a site	for an advanced naval or	airbase, or dei	nying the enemy use of an area.		
	Unit-level training exercises	involve one or more amp	hibious ships,	and their associated watercraft		
	and aircraft, to move person	nel and equipment from	ship to shore	without the command and		
				ne goal is to practice loading,		
	unloading, and movement a	<u> </u>	•			
Typical	•	fare ships, fixed-wing aird	raft, rotary-wi	ing aircraft, small boats, tiltrotor		
Components	aircraft					
	Targets: None					
	Systems being Trained/Tes					
Standard	Vessel safety	Typical Locations				
Operating	Aircraft safety	Range Complexes/Testing Ranges: Inshore Waters/Pierside:				
Procedures (Section 2.3.3)		Navy Cherry Point		None		
Stressors to	Acoustic:	Physical Disturbance a	nd Strike:	Energy:		
Biological	Aircraft noise	Aircraft and aerial targ		In-air electromagnetic		
Resources	Vessel noise	Vessel and in-water de		devices		
and Habitats	Vessel Holse	vesser and in water ac	vice strike	devices		
	Explosives:	Ingestion:		Entanglement:		
	None	None		None		
Stressors to	Air Quality:	Sedimen	ts and Water	Quality:		
Physical	Criteria air pollutants	None				
Resources						
Stressors to	<b>Cultural Resources:</b>	Socioeconomic Reso	ources:	Public Health and Safety:		
Human	Physical disturbance and	Accessibility		Physical interactions		
Resources	strikes	Airborne acoustics		In-air energy		
		Physical disturbance	and strikes			

Amphibious Wa	Amphibious Warfare							
Amphibious As	Amphibious Assault							
Military	Ingestible Material:	Military	None					
Expended	None	Recoverable						
Material		Material						
	Non-Ingestible Material:							
	None							
Sonar and	None							
Other								
Transducer								
Bins								
In-Water	None							
Explosive								
Bins								
Procedural	Physical Disturbance and Strike: (Section	5.3.4)						
Mitigation	Vessel movement							
Measures								
Assumptions	Typical exercise: 1-3 amphibious ships (e.g	., LHA or LHD. LP	D, LSD); 2-8 landing craft (landing					
Used for	craft, air cushion; landing craft, utility); 4-:							
Analysis	MH-53, H-46/MV-22, AH-1, UH-1, AV-8); a	•						

## A.2.4.2 Amphibious Marine Expeditionary Unit Integration Exercise

Amphibious Warfar	e						
•	Expeditionary Unit Integ	gration Exerci	se				
Short Description	Navy and Marine Corps	forces conduc	ct <b>T</b>	ypical Dura	tion		
	integration training at s deployment.		ion for	Up to 3 weeks			
Long Description	Amphibious ships and N	/Jarine Expedit	tionary Unit i	ntegrate for	the first time at sea to practice		
	amphibious tactics, tech	nniques, and p	rocedures. N	avy and Ma	rine Corps forces conduct basic		
				visit, board	l, search, and seizure training;		
_	helicopter and mechani						
Typical		warfare ships	, fixed-wing a	ircraft, rota	ry-wing aircraft, small boats,		
Components	tiltrotor aircraft						
	Targets: None	_					
	Systems being Trained,						
Standard	Vessel safety	Typical Loca	tions				
Operating	Aircraft safety	Range Com	olexes/Testin	g Ranges:	Inshore Waters/Pierside:		
Procedures		Navy Cherry		9aBes.	None		
(Section 2.3.3)							
Stressors to	Acoustic:	=	turbance and		Energy:		
Biological	Aircraft noise		aerial target		In-air electromagnetic		
Resources and	Vessel noise	Vessel and i	n-water devi	ce strike	devices		
Habitats	Familia di cara				Entonologoata		
	Explosives: None	<b>Ingestion:</b> None			Entanglement: None		
Chuanananaha		None	Cadinaanta	and Matau			
Stressors to	Air Quality:			and Water	Quality:		
Physical Resources	Criteria air pollutants		None				
Stressors to	Cultural Resources:	Sociooso	nomic Resou	***************************************	Public Health and Safety:		
Human Resources	Physical disturbance and			ces.	Physical interactions		
Human Resources	strike	Airborne			In-air energy		
	Strike		listurbance ai	nd strike	in an energy		
Military	Ingestible Material:	, 55	Military	None			
Expended	None		Recoverable				
Material			Material				
	Non-Ingestible Materia	l:					
	None						
Sonar and Other	ivone		None				
Transducer Bins					•		
		<b></b>					
In-Water		I		- <del>-</del>			
In-Water Explosive Bins	None						
	None	nd Strike: (Sec	tion 5.3.4)				
Explosive Bins	None	nd Strike: (Sec	tion 5.3.4)				
Explosive Bins Procedural	None  None  Physical Disturbance an	nd Strike: (Sec	tion 5.3.4)				
Explosive Bins Procedural Mitigation	None  Physical Disturbance and Vessel movement	·	, 	der descript	ions of appropriate unit-level		

## A.2.4.3 Amphibious Raid

A was bibias a Ma	· ·						
Amphibious Wa							
Amphibious Ra	1						
Short	Small unit forces move from		· · · · · · · · · · · · · · · · · · ·	Typica	al Durat	tion	
Description	sea for a specific short-term mission. These are quick operations with as few personnel as			4-8 hours			
	possible.						
Long	Small unit forces swiftly mov	•				·-	•
Description	mission, including a planned						
	information, create a diversi		-	-			
	material. Amphibious raid fo	orces are kept a	ıs small as <sub>l</sub>	possible	e to ma	ximize stealth an	d speed of
	the operation.						
	An event may employ assaul	lt amphibian ve	ehicle units	, small	boats, s	small unit live-fire	and non-
	live-fire operations. Surveilla	ance or reconna	aissance ur	nmanne	ed surfa	ce and aerial veh	icles may be
	used during this exercise.						
Typical	Platforms: Amphibious warf	fare ships, sma	II boats, un	manne	d aeria	l systems	
Components	Targets: None						
	Systems being Trained/Test	ted: None					
Standard	Vessel safety	Typical Locat	ions				
Operating	Unmanned aerial, surface,	Range Comp	loves/Test	ing Rar	1000	Inshore Waters	/Dierside:
Procedures	and subsurface vehicle	Jacksonville	ickes/ rest	ilig ivai	iges.	None	, rierside.
(Section 2.3.3)	safety	Navy Cherry Point					
Stressors to	Acoustic:	Physical Dist		nd Stril	ke:	Energy:	
Biological	Aircraft noise	Aircraft and				In-air electro	magnetic
Resources	Vessel noise	Vessel and ir	n-water dev	vice str	ike	devices	
and Habitats							
	Explosives:	Ingestion:				Entangleme	nt:
	None	None				None	
Stressors to	Air Quality:		Sediment	ts and \	Water C	Quality:	
Physical	Criteria air pollutants		None				
Resources	Cultural Resources:	Casiasasa	amia Dasa			Dublic Heelth o	ad Cafatan
Stressors to Human	Physical disturbance and	Accessibili	omic Reso	urces:		Public Health and Physical interaction	-
Resources	strike	Airborne a	•			In-air energy	110113
nesources	Strike		isturbance	and str	ike	in an energy	
Military	Ingestible Material:	, 5153.7 G	Military		None		
Expended	None		Recoverab				
Material			Material				
	Non-Ingestible Material:						
	None						
Sonar and	None						
Other							
Transducer Bins							
In-Water	None	<del></del>		-		<del> </del>	
Explosive	INOTIC						
Bins							
Dillo	<u> </u>						

Amphibious Wa	arfare
Amphibious Ra	id
Procedural	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Vessel movement
Measures	
Assumptions	Weapons firing during this exercise is discussed in appropriate unit-level training
Used for	descriptions (e.g., surface-to-surface and air-to-surface small-caliber gunnery exercises).
Analysis	

## A.2.4.4 Amphibious Vehicle Maneuvers

Amphibious Warfa	re					
Amphibious Vehicl						
Short	Small boat crews practice	e the employm	ent of	Typical Duration		
Description	amphibious vehicles.	1		1-4 hours		
Long Description	Navy personnel train to I	earn handling o	characteris	stics of a variety of amphibious craft, to include		
	_	•		sault vehicles, and Lighter Amphibious		
		_		ving of vehicles into the water, basic in-water		
	vehicle maneuvers, and t			ck to shore.		
Typical	Platforms: Amphibious vehicles, small boats					
Components	Targets: None	Tostod: None				
Standard	Systems being Trained/1 Vessel safety	Typical Locati	ions			
Operating	vesser sarety	Typical Locati	10115			
Procedures		Range Comp	lexes/Test	_		
(Section 2.3.3)		Ranges:		Lower Chesapeake Bay		
,		Virginia Cape	!S	St. Johns River		
Character 1	A	Jacksonville		and Chatters		
Stressors to	Acoustic: Vessel noise	Physical Dist Vessel and in		<del></del>		
Biological Resources	vesserrioise	vessei allu ili	i-water de	vice strike Notie		
and Habitats	Explosives:	Ingestion:		Entanglement:		
	None	None		None		
Stressors to	Air Quality:	-	Sedimen	ts and Water Quality:		
Physical	Criteria air pollutants		None	•		
Resources						
Stressors to	Cultural Resources:	Socioecon	omic	Public Health and Safety:		
Human	Physical disturbance and	Resour		Physical interactions		
Resources	strike	Accessibilit	•			
		Physical di	sturbance	and		
B.4:1:4	In sectible Meterial.	strike	NA:1:4	Name		
Military Expended	Ingestible Material: None		Military Recoveral	None		
Material	None		Material	DIE		
Widterial	Non-Ingestible Material:		Material			
	None					
Sonar and Other	None	•				
Transducer Bins						
In-Water	None					
Explosive Bins						
Procedural	Physical Disturbance and	d Strike: (Sectio	on 5.3.4)			
Mitigation	Vessel movement					
Measures						
Assumptions	None					
Used for Analysis						

## A.2.4.5 Humanitarian Assistance Operations

Amphibious Warfare								
Humanitarian Assista								
Short Description	Military units evacuate	noncombata	ents from	Typic	cal Dura	tion .		
Short Beschiption	hostile or unsafe areas							
	humanitarian assistan	-	disaster.	12 h	ours			
Long Description	Military units evacuate	noncombatants from hostile or unsafe areas to safe havens or to						
, <b>0</b> , , , , , ,	•					mbatant Evacuation Operation is		
	-					operating in conjunction with		
	Navy ships and aircraft	t. Non-comba	. Non-combatants are evacuated when their lives are endangered by					
			ural disaster. Military units train for evacuations in hostile					
				_	-	ere is no opposition to		
		-	-		nding cra	afts could be expected to		
	participate in this oper							
Typical		s warfare ship	s, rotary-wi	ng air	craft, til	trotor aircraft, small boats		
Components	Targets: None	1/=						
	Systems being Trained							
Standard	Vessel safety	Typical Loca	itions					
Operating	Aircraft safety	Range Com	plexes/Test	ing Ra	nges:	Inshore Waters/Pierside:		
Procedures (Section 2.3.3)		Navy Cherry	-		_	None		
,	Acquetic	Dhysical Dis		a d C+ u	ilea	Faces ::		
Stressors to Biological	Acoustic: Aircraft noise	-	sturbance au Laerial targe			Energy: In-air electromagnetic		
Resources and	Vessel noise		in-water dev			devices		
Habitats	vessel floise	vesser and	iii-watei uei	rice st	TINE	devices		
Tiabitats	Explosives:	Ingestion:				Entanglement:		
	None	None				None		
Stressors to	Air Quality:	-	Sediment	s and	Water	Quality:		
Physical Resources	Criteria air pollutants		None					
Stressors to	Cultural Resources:	Socioeco	nomic Reso	urces		Public Health and Safety:		
Human Resources	Physical disturbance	Accessibi				Physical interactions		
	and strike		acoustics			In-air energy		
		Physical o	disturbance	and st	trike			
Military Expended	Ingestible Material:		Military		None			
Material	None		Recoverab	ole				
			Material					
	Non-Ingestible Materi	al:						
	None	<u> </u>				-		
Sonar and Other	None							
Transducer Bins								
In-Water Explosive Bins	None							
Procedural	Physical Disturbance a	nd Strike: (Se	ection 5.3.4)					
Mitigation	Vessel movement							
Measures								
Assumptions Used	None							
for Analysis								

# A.2.4.6 Marine Expeditionary Unit Certification Exercise

Amphibious Wa	arfare					
Marine Expedit	ionary Unit Certification Exer	cise				
Short	Amphibious Ready Group ex	kercises are cor	nducted	Typical D	uration	
Description	to validate the Marine Expe	-				
	readiness for deployment ar					
	raids; visit, board, search, and seizure training;  belicenter and mechanized amphibious raids; and					
	helicopter and mechanized amphibious raids; and non-combatant evacuation operations.					
Long	Marine Corps amphibious forces move from amphibious ships at sea, by watercraft or aircraft, and					
Description	introduce a landing force, establish a beachhead, and occupy the area or move further inland for					u
·	an extended period.		,	. ,		
	The amphibious assault cond	ducted by a Ma	arine Exnedit	tionary II	nit involves employment of the	
					pport units in close coordination	
					e landing is conducted in waves and	ıd
	_				he beachhead. A typical exercise	
		•		_	eam coming ashore via landing	
	•		low-on wave	es include	e fire support assets, armored units	s,
Typical	and service support element		L wing aircra	ft rotany	-wing aircraft, small boats, tiltroto	
Typical Components	aircraft	are snips, fixed	i-wing aircra	iit, rotary	-wing aircraft, small boats, tiltroto	γr
components	Targets: None					
	Systems being Trained/Test	ed: None				
Standard	Vessel safety	Typical Locat	ions			
Operating	Aircraft safety					
Procedures	·	Range Complexes/Testing Ranges: Inshore Waters/Pierside: Navy Cherry Point None				
(Section 2.3.3)					None	
Stressors to	Acoustic:	Physical Dist			Energy:	
Biological Resources	Aircraft noise Vessel noise	Aircraft and a Vessel and ir	_		In-air electromagnetic	
and Habitats	vessernoise	vessei and ii	i-water devic	ce strike	devices	
and naticals	Explosives:	Ingestion:			Entanglement:	
	None	None			None	
Stressors to	Air Quality:		Sediment a	and Wate	er Quality:	
Physical	Criteria air pollutants		None			
Resources	- t- t-					
Stressors to	Cultural Resources:		omic Resou	rces:	Public Health and Safety:	
Human Resources	Physical disturbance and strike	Accessibili Airborne a	•		Physical interactions In-air energy	
Resources	Strike		isturbance a	nd strike	in all chergy	
Military	Ingestible Material:	· 1	Military	Noi	ne	
Expended	None		Recoverable	е		
Material			Material			
	Non-Ingestible Material:					
Sonar and	None					
Other	None					
Transducer						
Bins						

Amphibious Wa	Amphibious Warfare					
Marine Expedit	Marine Expeditionary Unit Certification Exercise					
In-Water	None					
Explosive						
Bins						
Procedural	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Vessel movement					
Measures						
Assumptions	Weapons firing during this exercise is discussed in appropriate unit-level exercise descriptions (e.g.,					
Used for	surface-to-surface and air-to-surface small-caliber gunnery exercises).					
Analysis						

## A.2.4.7 Naval Surface Fire Support Exercise – At Sea

Amphibious Wa	arfare						
Naval Surface F	ire Support Exercise – At Sea						
Short	Surface ship crews fire large-	-caliber guns a	at a	Typical Du	ration		
Description	passive acoustic hydrophone	_		1-2 hours of firing, 8 hours total			
Long	Surface ship crews use large-	caliber guns t				is	
Description	simulated at sea. Rounds are	scored by pa	ssive acousti	c buoys loc	ated at or near the target a	rea.	
	The nortable scoring system	is composed (	of huovs (Int	egrated Ma	aritime Portable Acquistic Sc	oring	
		The portable scoring system is composed of buoys (Integrated Maritime Portable Acoustic Scoring and Simulation System) set in a pre-designed pattern at specific intervals, which are retrieved after					
	the exercise. A scoring system provides a realistic presentation, such as a land mass with topography, to the vessel's combat system. This virtual land target area overlays the hydrophone						
	array. The vessel fires its mur		_		_		
	impact of the round landing i						
	triangulates the exact point o	-		_			
	vessel were firing at an actua support forces ashore.	ii ianu target.	Surface Ship	crews use	iarge-camper (main pattery)	guns to	
Typical	Platforms: Surface combatar	nts					
Components	Targets: Surface targets	1103					
	Systems being Trained/Test	ed: Large-cali	ber gun syst	ems			
Standard	Vessel safety	Typical Loca	tions				
Operating	Weapons firing safety	Range Com	olovos/Tosti	ng Pangos:	Inshore Waters/Piersid	0:	
Procedures		Jacksonville	piexes/ resti	iig naiiges.	None	e.	
(Section 2.3.3)		Navy Cherry	Point		110110		
		Virginia Cap					
Stressors to	Acoustic:	Physical Dis	turbance an	d Strike:	Energy:		
Biological	Vessel noise		n-water dev		In-air electromagnet	ic	
Resources	Weapons noise	Military exp	ended mate	rial	devices		
and Habitats	Fymlosiyos	lugastian.			Futonalomout.		
	Explosives: None	Ingestion: None			<b>Entanglement:</b> None		
Stressors to	Air Quality:	None	Sediments	and Wate			
Physical	Criteria air pollutants		Metals	and wate	· Quanty.		
Resources							
Stressors to	None						
Human							
Resources							
Military	Ingestible Material:		Military		ace target (stationary)		
Expended Material	None		Recoverab	le			
iviateriai	Non-Ingestible Material:		Material				
	Large-caliber projectiles, larg	e-caliber					
	casings	,					
Sonar and	None						
Other							
Transducer							
Bins							
In-Water	None						
Explosive							
Bins							

Amphibious Wa	Amphibious Warfare						
Naval Surface F	Naval Surface Fire Support Exercise – At Sea						
Procedural Mitigation	Acoustic Stressors: (Section 5.3.2) Weapons firing noise	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement					
Measures		Small-, medium-, and large-caliber non-explosive practice munitions					
Assumptions Used for Analysis	Stressors to human resources were not ar from shore.	nalyzed for this activity since it occurs greater than 12 NM					

## A.2.4.8 Naval Surface Fire Support Exercise – Land-Based Target

Amphibious Wa	arfare						
Naval Surface F	ire Support Exercise – Land-B	ased Target					
Short	Surface ship crews fire large	-caliber guns at l	and- <b>Typ</b>	ical Dura	tion		
Description	based targets in support of	forces ashore.	1-2	hours			
Long	Surface ship crews use large	-caliber guns to s	support forces	ashore.			
Description	•	_			he target area and a land-hased		
	One or more ships position themselves from three to six NM from the target area and a land-based spotter relays type and exact location of the target. After observing the fall of the shot, the spotter						
		djustments needed to reach the target. Once the rounds are on target, the spotter afficient number to effectively destroy the target.					
	This exercise occurs on land						
		•	•	•	rucks, trains, or aircraft on the		
	ground.						
Typical	Platforms: Surface combata	nts					
Components	Targets: Land targets						
a	Systems being Trained/Test						
Standard Operating	Vessel safety Weapons firing safety	Typical Locatio	ns				
Procedures	Weapons litting salety	Range Comple	_	anges:	Inshore Waters/Pierside:		
(Section 2.3.3)		Navy Cherry Po	oint		None		
Stressors to	Acoustic:	Physical Distu	rbance and St	rike:	Energy:		
Biological	Vessel noise	Vessel and in-v	water device s	trike	In-air electromagnetic		
Resources	Weapons noise	Military expen	ded material		devices		
and Habitats					_		
	Explosives: None	Ingestion: None			Entanglement:		
Stressors to	Air Quality:	-	Sediments and	1 Water (	None		
Physical	Criteria air pollutants		Metals	ı water c	Quanty.		
Resources							
Stressors to	Cultural Resources:	Socioecono	mic Resources	5:	Public Health and Safety:		
Human	Physical disturbance and	Accessibility			Physical interactions		
Resources	strike	Airborne acoustics In-air energy					
					iii dii chergy		
Military			urbance and s		- In an energy		
	Ingestible Material:	N	lilitary	trike None			
Expended Material	Ingestible Material: None	N R	lilitary ecoverable				
Material	None	N R	lilitary				
=	=	N R N	lilitary ecoverable				
=	None  Non-Ingestible Material:	N R N	lilitary ecoverable				
Material  Sonar and Other	None  Non-Ingestible Material:  Large-caliber projectiles (cas	N R N	lilitary ecoverable		The chergy		
Material  Sonar and Other Transducer	None  Non-Ingestible Material:  Large-caliber projectiles (cas	N R N	lilitary ecoverable				
Material  Sonar and Other Transducer Bins	None  Non-Ingestible Material:  Large-caliber projectiles (cas  None	N R N	lilitary ecoverable		in all clicity		
Sonar and Other Transducer Bins In-Water	None  Non-Ingestible Material:  Large-caliber projectiles (cas	N R N	lilitary ecoverable				
Sonar and Other Transducer Bins In-Water Explosive	None  Non-Ingestible Material:  Large-caliber projectiles (cas  None	N R N	lilitary ecoverable		in all clicity		
Sonar and Other Transducer Bins In-Water Explosive Bins	None  Non-Ingestible Material: Large-caliber projectiles (cas None  None	sings only)	filitary ecoverable faterial	None			
Sonar and Other Transducer Bins In-Water Explosive	None  Non-Ingestible Material:  Large-caliber projectiles (cas  None	sings only)	filitary ecoverable faterial Physica	None	pance and Strike: (Section 5.3.4)		

Amphibious Warfare					
Naval Surface Fire Support Exercise – Land-Based Target					
Assumptions	Projectile impact is on land and is not further analyzed. No land based impacts are included in this				
Used for	document.				
Analysis	Firing point from sea is Area 15B. Impact occurs at G-10 Impact Area, Camp Lejeune.				

#### A.2.5 ANTI-SUBMARINE WARFARE TRAINING

Anti-submarine warfare involves helicopter and maritime patrol aircraft, ships, and submarines. These units operate alone or in combination to locate, track, and neutralize submarines. Controlling the undersea battlespace is a unique naval capability and a vital aspect of sea control. Undersea battlespace dominance requires proficiency in anti-submarine warfare. Every deploying strike group and individual surface combatant must possess this capability.

Various types of active and passive sonar are used by the Navy to determine water depth, and identify, track, and target submarines. Passive sonar "listens" for sound waves by using underwater microphones, called hydrophones, which receive, amplify, and process underwater sounds. No sound is introduced into the water when using passive sonar. Passive sonar can indicate the presence, character, and movement of submarines. However, passive sonar provides only a bearing (direction) to a sound-emitting source; it does not provide an accurate range (distance) to the source. Active sonar is needed to locate objects because active sonar provides both bearing and range to the detected contact (such as an enemy submarine).

The Navy's anti-submarine warfare training plan, including the use of active sonar in at-sea training scenarios, includes multiple levels of training. Individual-level anti-submarine warfare training addresses basic skills such as detection and classification of contacts; distinguishing discrete acoustic signatures including those of ships, submarines, and marine life; and identifying the characteristics, functions, and effects of controlled jamming and evasion devices.

More advanced, integrated anti-submarine warfare training exercises involving active sonar are conducted in coordinated, at-sea operations during training exercises involving submarines, ships, aircraft, and helicopters. This training integrates the full anti-submarine warfare continuum, from detecting and tracking a submarine to attacking a target using either exercise torpedoes or simulated weapons. Training events include detection and tracking exercises against "enemy" submarine contacts, torpedo employment exercises against the target, and exercising command and control tasks in a multi-dimensional battlespace.

## A.2.5.1 Torpedo Exercise – Helicopter

Anti-Submarine	<b>Warfare</b>						
Anti-Submarine	Warfare Torpedo Exercise –	Helicopter					
Short	Helicopter crews search for,	track, and de	etect	Typic	cal Duration		
Description	submarines. Recoverable air		pedoes	2-5 h	nours		
	are employed against subma						
Long	Helicopters using sonobuoys and dipping sonar search for, detect, classify, localize, and track a simulated threat submarine with the goal of determining a firing solution that could be used to						
Description		troy the submarine. Sonobuoys (both passive and active) are typically					
	•	ployed by a helicopter operating at altitudes below 3,000 ft. Dipping sonar (both passive and					
	active) is employed from an altitude of about 50 ft. after the search area has been narrowed bas on the sonobuoy search. The anti-submarine warfare target used for this exercise may be a MK-3						
	•		_	_	t, a MK-30 target, or a live submarine.		
	· ·	_		_	coordinated larger exercise involving		
	•	_	-		Jnmanned aerial systems, such as the recovered by a special recovery		
	-		-		ise is an instrumented underwater range,		
		-	_		ng on training requirements and		
	available assets.		·	-			
Typical	Platforms: Rotary-wing airci		ed aerial syst	ems,	small boats		
Components	Targets: Sub-surface targets						
	Systems being Trained/Test	-		uoys,	torpedo systems		
Standard	Vessel safety Aircraft safety	Typical Loca	itions				
Operating Procedures	Unmanned aerial, surface,	Range Com	plexes/Testi	ng Ra	inges: Inshore Waters/Pierside:		
(Section 2.3.3)	and subsurface vehicle	Jacksonville			None		
,	safety	Virginia Cap	es				
Stressors to	Acoustic:	Physical Dis	sturbance ar	nd Str	ike: Energy:		
Biological	Sonar and other		d aerial targe		<u> </u>		
Resources	transducers		in-water dev		rike devices		
and Habitats	Aircraft noise Vessel noise	Military exp	ended mate	erial	Entanglament		
	vessei noise	Ingestion:			Entanglement: Wires and cables		
	Explosives:	_	ended mate	rials -			
	None	than mu			7,6		
Stressors to	Air Quality:		Sediment	s and	Water Quality:		
Physical	Criteria air pollutants		Metals		Chemicals other than explosives		
Resources			Other mat	terials	<u>-</u>		
Stressors to	None						
Human							
Resources Military	Ingestible Material:	-	Military		Sub-surface targets (mobile),		
Expended	Decelerators/parachutes- sn	mall	Recoverab	le	lightweight torpedoes (non-		
Material			Material		explosive)		
	Non-Ingestible Material:				. ,		
	Lightweight torpedo accesso						
	sonobuoys (non-explosive						
	wires, marine markers, su	b-surface					
	targets (mobile)						

Anti-Submarine	<b>Warfare</b>							
Anti-Submarine	Anti-Submarine Warfare Torpedo Exercise – Helicopter							
Sonar and	Mid-Frequency:	Torpedoes:						
Other	MF4 MF5	TORP1						
Transducer								
Bins								
In-Water	None	<u>-</u>						
Explosive								
Bins								
Procedural	Acoustic Stressors: (Section 5.3.	.2)	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Active sonar		Vessel movement					
Measures								
Assumptions	Stressors to human resources w	ere not analyzed	for this activity since it occurs greater than 12 NM					
Used for	from shore.							
Analysis								

## A.2.5.2 Torpedo Exercise – Maritime Patrol Aircraft

Anti-Submarine	e Warfare						
Anti-Submarine	Warfare Torpedo Exercise –	<b>Maritime Patrol Aircraft</b>					
Short	Maritime patrol aircraft cre-	ws search for, track,	Typical Dura	ition			
Description	and detect submarines. Rec	overable air launched					
	torpedoes are employed ag	ainst submarine	2-8 hours				
	targets.						
Long	Fixed-wing maritime patrol aircraft employ sonobuoys to search for, detect, classify, localize, and track a simulated threat submarine with the goal of determining a firing solution that could be						
Description		=	_	firing solution that could be			
	used to launch a torpedo and destroy the submarine.						
	Sonobuoys (both passive an	d active) are typically em	ployed by a m	aritime patrol aircraft operating			
				he High Altitude Anti-Submarine			
	•		_	to remain clear of high threat			
	•			spected threat submarine and atterns will cover many different			
	•	-	-	e classified. The anti-submarine			
			-	Mobile Anti-Submarine Warfare			
	_		-	may involve a single aircraft, or be			
	undertaken in the context o	of a coordinated larger ex	ercise involvin	g multiple aircraft and vessels,			
				y helicopter or small boat. The			
				nge, but it may be conducted in			
	other OPAREAs depending of			assets.			
Typical	Platforms: Fixed-wing aircra		mall boats				
Components	Targets: Sub-surface targets Systems being Trained/Tes		<b>D</b> S				
Standard	Aircraft safety	Typical Locations	<u> </u>				
Operating	Vessel safety						
Procedures	,	Range Complexes/Test	ting Ranges:	Inshore Waters/Pierside:			
(Section 2.3.3)		Jacksonville		None			
Ct	A	Virginia Capes		<b>F</b>			
Stressors to Biological	Acoustic: Sonar and other	Physical Disturbance a Aircraft and aerial targ		Energy: In-air electromagnetic			
Resources	transducers	Military expended mat		devices			
and Habitats	Aircraft noise	Vessel and in-water de		devices			
	Vessel noise						
		Ingestion:		Entanglement:			
	Explosives:	Military expended mat	erials – other	Wires and cables			
	None	than munitions		Decelerators/parachutes			
Stressors to	Air Quality:		ts and Water	•			
Physical	Criteria air pollutants	Metals		nemicals other than explosives			
Resources	Nene	Other ma	ateriais				
Stressors to Human	None						
Resources							
codi eco							

Anti-Submarine	e Warfare					
Anti-Submarine Warfare Torpedo Exercise – Maritime Patrol Aircraft						
Military	Ingestible Material:	Military	Sub-surface targets (mobile),			
Expended	Decelerators/parachutes – small and	Recoverable	lightweight torpedoes (non-			
Material	medium	Material	explosive)			
Sonar and	Non-Ingestible Material: Lightweight torpedo accessories, sonobuoys (non-explosive), expended bathythermograph, expended bathythermograph wire, sonobuoy wires, sub-surface targets (mobile) Mid-Frequency: Torpedo	es:				
Other	MF5 TORP1	<b>C</b> 3.				
Transducer						
Bins						
In-Water	None					
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section 5.3.2)	•	I Disturbance and Strike: (Section 5.3.4)			
Mitigation Measures	Active sonar Vessel movement					
Assumptions	Submarine may provide service as the target.					
Used for	If target is air-dropped, one parachute per target.					
Analysis	Stressors to human resources were not an from shore.	alyzed for this ac	tivity since it occurs greater than 12 NM			

# A.2.5.3 Torpedo Exercise - Ship

Anti-Submarine	e Warfare					
	Warfare Torpedo Exercise –	Ship				
Short	Surface ship crews search fo		detect	Tvpi	cal Duration	
Description	submarines. Exercise torpedoes are used during this exercise.			2-5 hours		
Long Description	Surface ships search for, detect, and track threat submarines to determine a firing position to launch a torpedo and attack the submarine. A surface ship operates at slow speeds while employing hull-mounted or towed array sonar. Passive or active sonar is employed depending on the type of threat submarine, the tactical situation, and environmental conditions. The antisubmarine warfare target used for this exercise is a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, MK-30 Target, or live submarine. This exercise may involve a single ship, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft, ships, and submarines, including a major range event.  The exercise torpedo is recovered by helicopter or small craft. The preferred range for this exercise					
	on training requirements and			onau	cted in other range complexes depending	
Typical Components	Platforms: Rotary-wing aircr Targets: Sub-surface targets	orms: Rotary-wing aircraft, small boats, surface combatants				
Standard	Vessel safety	Typical Loca	tions			
Operating	Aircraft safety	Paras Carrellana / Tastina Parasas Inakara Matara / Biaraida				
Procedures	Towed in-water device	Range Complexes/Testing Ranges: Inshore Waters/Pierside:  Jacksonville None				
(Section 2.3.3)	safety	Virginia Cap	es		None	
Stressors to	Acoustic:	Physical Dis		nd Stı	ike: Energy:	
Biological	Sonar and other	Aircraft and			<del>-</del> -	
Resources	transducers	Vessel and	in-water de	vice st	rike devices	
and Habitats	Aircraft noise	Military exp	ended mat	erial		
	Vessel noise				Entanglement:	
		Ingestion:			Wires and cables	
	Explosives:	Military exp		erials	– other	
	None	than mu				
Stressors to	Air Quality:			ts and	Water Quality:	
Physical	Criteria air pollutants		Metals		Chemicals other than explosives	
Resources		<del></del>	Other ma	iterial		
Stressors to	None					
Human Resources						
Military	Ingestible Material:		Military		Sub-surface targets (mobile),	
Expended	Decelerators/parachutes - si	mall	Recovera	ble	lightweight torpedoes (non-	
Material	2 coc.c. a.c. 3, parasinace		Material		explosive)	
	Non-Ingestible Material:				- ,	
	Sonobuoys (non-explosive),					
	wires, expendable					
	bathythermographs, expe					
	bathythermograph wires,					
	torpedo accessories, sub-	surface				
	targets (mobile)					

Anti-Submarine	Anti-Submarine Warfare				
Anti-Submarine	Warfare Torpedo Exercis	e – Ship			
Sonar and	Mid-Frequency:	Anti-Submarine Warfare:			
Other	MF1	ASW3			
Transducer					
Bins		Torpedoes:			
		TORP1			
In-Water	None				
Explosive					
Bins					
Procedural	Acoustic Stressors: (Section	ion 5.3.2)			
Mitigation	Active sonar				
Measures					
	Physical Disturbance and	Strike: (Section 5.3.4)			
	Vessel movement				
	Towed in-water devices				
Assumptions	Submarines may provide	service as the target. Torpedoes are recovered.			
Used for	Stressors to human resou	urces were not analyzed for this activity since it occurs greater than 12 NM			
Analysis	from shore.				

# A.2.5.4 Torpedo Exercise – Submarine

Anti-Submarine	· Warfare					
	Warfare Torpedo Exercise –	Submarine				
Short	Submarine crews search for		rtect	Typi	cal Duration	
Description	submarines. Exercise torpedoes are used during			8 hours		
1	this exercise.	-1-4414	1 41	hl		
Long Description					narine to develop firing position to	
Description	-	_	-		at slow speeds and various depths	
	=		=		a threat submarine. Passive sonar is	
	· · · · · · · · · · · · · · · · · · ·	=	ercise torpe	edoes	can be fired and active sonar can be	
	used during this training exe	rcise.				
	This exercise may involve a s	single submari	ne, or be u	nderta	ken in the context of a coordinated	
	larger exercise involving mul	tiple aircraft,	ships, and s	subma	rines, including a major range event. The	
	exercise torpedo is recovere	d by helicopte	er or small o	raft. T	he preferred range for this exercise is an	
		-	•	icted i	n other range complexes depending on	
	training requirements and a					
Typical	Platforms: Rotary-wing airci	-	its, submari	ines		
Components	Targets: Sub-surface targets					
	Systems being Trained/Test	ted: Sonar sys	tems, acou	stic co	untermeasures, torpedoes	
Standard	Vessel safety	Typical Loca	tions			
Operating	Aircraft safety	Range Com	nlexes/Test	ting Ra	anges: Inshore Waters/Pierside:	
Procedures	Towed in-water device	Jacksonville	pickes/ res	iiig itt	None Naters/Fierside:	
(Section 2.3.3)	safety	Northeast			None	
		Virginia Cap	es			
Stressors to	Acoustic:	Physical Dis		nd Str	ike: Energy:	
Biological	Sonar and other	Vessel and i				
Resources	transducers	Military exp	ended mat	erial		
and Habitats	Aircraft noise	Aircraft and			ke Entanglement:	
	Vessel noise				Wires and cables	
		Ingestion:				
	Explosives:	None				
	None					
Stressors to	Air Quality:		Sedimen	ts and	Water Quality:	
Physical	Criteria pollutants		Metals			
Resources		<u>-</u>	_			
Stressors to	None					
Human						
Resources		ı				
Military	Ingestible Material:		Military		Sub-surface targets (mobile),	
Expended	None		Recovera	ble	heavyweight torpedoes (non-	
Material	Non Ingostible 84-4		Material		explosive)	
	Non-Ingestible Material:	++0****				
	Guidance wires, heavyweigh	t torpedo				
	accessories, expended	adad				
	bathythermograph, exper bathythermograph wires,					
	countermeasures	acoustic				
	countermeasures					

Anti-Submarine	Anti-Submarine Warfare				
Anti-Submarine	Warfare Torpedo Exercise -	- Submarine			
Sonar and	Mid-Frequency:	Anti-Submarin	e Warfare:		
Other	MF3	ASW4			
Transducer					
Bins	High-Frequency:	Torpedoes:			
	HF1	TORP2			
In-Water	None				
Explosive					
Bins					
Procedural	Acoustic Stressors: (Section	5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)		
Mitigation	Active sonar		Vessel movement		
Measures			Towed in-water devices		
Assumptions	Torpedoes are recovered.				
Used for	Guidance wire has a low ter	nsile strength and bre	aks easily. Weights and flex tubing sink rapidly.		
Analysis	Stressors to human resourc from shore.	es were not analyzed	for this activity since it occurs greater than 12 NM		

# A.2.5.5 Tracking Exercise – Helicopter

Anti-Submarine	. Warfare					
	Warfare Tracking Exercise –	Heliconter				
Short				mical Durat	ion.	
Description	Helicopter crews search for,	track, and de		pical Durat	ion	
•	submarines.			4 hours		
Long	Helicopters using sonobuoys				-	
Description		simulated threat submarine with the goal of determining a firing solution that could be used to				
	launch a torpedo and destro	ch a torpedo and destroy the submarine.				
	Sonobuoys (both passive and	d active) are t	ypically employ	ed by a heli	copter operating at altitudes	
	below 3,000 ft. Dipping sona	r (both passiv	e and active) is	employed t	from an altitude of about 50	
	ft. after the search area has	been narrowe	ed based on the	sonobuoy	search.	
	The anti-submarine warfare	target used for	or this exercise	may be a M	1K-39 Expendable Mobile Anti-	
	_	_	_		rine. This exercise may involve a	
	_	_	_		g multiple aircraft and ships,	
			•		e MQ-8 Fire Scout, may also be	
	·			_	, but it may be conducted in	
	other range complexes depe				liable assets.	
Typical	Platforms: Rotary-wing aircu Targets: Sub-surface targets		ed aeriai system	S		
Components	•		tems sonohuo	vc		
Standard	Vessel safety	sted: Sonar systems, sonobuoys  Typical Locations				
Operating	Aircraft safety	Typical Loca	10113			
Procedures	Unmanned aerial, surface,	_	plexes/Testing	Ranges:	Inshore Waters/Pierside:	
(Section 2.3.3)	and subsurface vehicle	Jacksonville			None	
	safety	Navy Cherry				
		Virginia Cap Other AFTT				
Stressors to	Acoustic:		sturbance and S	Striko:	Enormy	
Biological	Sonar and other	•	l aerial target st		Energy: In-air electromagnetic	
Resources	transducers		in-water device		devices	
and Habitats	Aircraft noise		ended materia		461.666	
	Vessel noise	, ,			Entanglement:	
		Ingestion:			Decelerators/parachutes	
	Explosives:	Military exp	ended materia	ls – other	Wires and cables	
	None	than mu	-			
Stressors to	Air Quality:		Sediments a		=	
Physical	Criteria air pollutants		Metals		cals other than explosives	
Resources			Other materi	als		
Stressors to	None					
Human Resources						
	Ingestible Material:	-	Military	Sub cur	face targets (mobile)	
Military Expended	Decelerators/parachutes - si	mall	Recoverable	Sub-sur	iace targets (modile)	
Material	2 cociciators, paracriates si		Material			
	Non-Ingestible Material:					
	Sonobuoys (non-explosive),	sonobuoy				
	wires, sub-surface targets	-				
	marine marker					

Anti-Submarine	e Warfare	
Anti-Submarine	e Warfare Tracking Exercise – Helicopter	
Sonar and	Mid-Frequency:	
Other	MF4	
Transducer	MF5	
Bins		
In-Water	None	
Explosive		
Bins		
Procedural	Acoustic Stressors: (Section 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Active sonar	Vessel movement
Measures		
Assumptions	Tracking exercise can occur in all locations.	-
Used for	Submarines may provide service as the target.	
Analysis	Stressors to human resources were not analyzed f	or this activity since it occurs greater than 12 NM
	from shore.	

# A.2.5.6 Tracking Exercise – Maritime Patrol Aircraft

Anti Cubmarina	Anti-Submarine Warfare					
	Warfare Tracking Exercise –	Maritime Pat	rol Aircraft			
Short	Maritime patrol aircraft crev	ws search for,	<i>'</i>	ypical Dur	ation	
Description	and detect submarines.			-8 hours		
Long	Fixed-wing maritime patrol a	=	-		-	
Description			_		ng a firing solution that could	
	be used to launch a torpedo	and destroy t	the submarine.			
	Sonobuoys (both passive and active) are typically employed by a maritime patrol aircraft operating					
	at altitudes below 3,000 ft. F	lowever, sond	buoys may be	released	at higher altitudes. Sonobuoys are	
	deployed in specific patterns	based on the	e expected thre	eat subma	rine and specific water conditions.	
	=	-		-	ifferent size areas. For certain	
	-		-		submarine warfare target used for	
		-			Warfare Training Target, a MK-30	
	target, or a live submarine. T		-	-		
	_	ger exercise in	ivolving multip	le aircraft	and vessels, including a major	
The stand	range event.	£t.				
Typical Components	Platforms: Fixed-wing aircraft Torgoto, Sub-surface torgoto					
Components		Targets: Sub-surface targets				
Standard	Vessel safety	g Trained/Tested: Sonobuoys, acoustic countermeasures  Typical Locations				
Operating	Aircraft safety	Typical Loca	itions			
Procedures	Weapons firing safety	Range Complexes/Testing Ranges: Inshore Waters/Pierside: Jacksonville None				
(Section 2.3.3)	Unmanned aerial, surface,					
(00000000)	and subsurface vehicle	Navy Cherry	Point			
	safety	Northeast				
		Virginia Cap		- "		
Stressors to	Acoustic:	-	sturbance and		Energy:	
Biological Resources	Sonar and other transducers		l aerial target s in-water device		In-air electromagnetic devices	
and Habitats	Aircraft noise		pended materia		devices	
aliu Habitats	Vessel noise	ivilitally exp	Denueu matem	aı	Entanglement:	
	Vessel Holse	Ingestion:			Decelerators/parachutes	
	Explosives:	_	ended materia	als – other	· ·	
	None	than mu				
Stressors to	Air Quality:	-	Sediments a	nd Water	Quality:	
Physical	Criteria air pollutants		Metals	Ch	nemicals other than explosives	
Resources			Other mater	rials		
Stressors to	None					
Human						
Resources						
Military	Ingestible Material:		Military		surface targets (mobile)	
Expended	Decelerators/parachutes - sr	mall	Recoverable			
Material	Non Innostible 84-4		Material			
	Non-Ingestible Material:	-anahu				
	Sonobuoys (non-explosive), s wires, expended bathythe	•				
	expended bathythermogra					
	sub-surface targets (mobi					
	sub-surface targets (1110b)	ic)				

Anti-Submarine	· Warfare			
Anti-Submarine	Warfare Tracking Exercise -	- Maritime Patrol Aircraft		
Sonar and	Mid-Frequency:	Anti-Submarine Warfare:		
Other	MF5	ASW2		
Transducer		ASW5		
Bins				
In-Water	None			
Explosive				
Bins				
Procedural	Physical Disturbance and S	trike: (Section 5.3.4)		
Mitigation	Vessel movement			
Measures				
Assumptions	Tracking exercise can occur	in all locations.		
Used for	Submarine may provide ser	vice as the target.		
Analysis	If target is air-dropped, one parachute per target.			
	Stressors to human resourc	es were not analyzed for this activity since it occurs greater than 12 NM		
	from shore.			

# A.2.5.7 Tracking Exercise – Submarine

Anti-Submarine	Warfare					
Anti-Submarine	Warfare Tracking Exercise –	Submarine				
Short	Submarine crews search for	, track, and de	etect Ty	pical Dura	tion	
Description	submarines.	•		hours		
Long	Submarine crews search for,	detect, and t	rack a threat su	ubmarine to	o develop firing position to	
Description	launch a torpedo.					
·	•					
	A single submerged submari	=	· · · · · · · · · · · · · · · · · · ·		·	,
					Imost exclusively. The target	
				submarine	warfare training target, MK 3	30
	recoverable training target, of This exercise may involve a s			rtakan in tl	ha contout of a coordinated	
	larger exercise involving mul					
Typical	Platforms: Submarines	tiple all clart,	silips, aliu subi	narmes, m	cidding a major range event.	
Components	<b>Targets:</b> Sub-surface targets					
Components	Systems being Trained/Test		stems acquistic	counterme	Pasures	
Standard	Vessel safety	Typical Loca		counterine	Lasures	
Operating	vesser sarety	Typical Loca	10113			
Procedures		_	plexes/Testing	Ranges:	Inshore Waters/Pierside:	
(Section 2.3.3)		Gulf of Mex			None	
,		Jacksonville				
		Navy Cherry	Point			
		Northeast				
		Virginia Cap Other AFTT				
Ctuasaana ta	Acoustic:			Chuilean	Гранти	
Stressors to Biological	Sonar and other	-	sturbance and in-water device		Energy: None	
Resources	transducers		pended materia		None	
and Habitats	Vessel noise	willitary exp	Jenaca materia	••	Entanglement:	
	7 6656. 116.66	Ingestion:			Wires and cables	
	Explosives:	None				
	None					
Stressors to	Air Quality:		Sediments a	nd Water (	Quality:	
Physical	None		Metals		-	
Resources						
Stressors to	None					
Human						
Resources			•			
Military	Ingestible Material:		Military	Sub-su	rface targets (mobile)	
Expended	None		Recoverable			
Material			Material			
	Non-Ingestible Material: Sub-surface targets (mobile)	avpandad				
	bathythermograph, exper					
	bathythermograph wire, a					
	countermeasures					
Sonar and	Mid-Frequency:	Anti-Suk	l marine Warfa	re:	-	
Other	MF3	ASW4	aiiiic vvaila			
	···· <del>-</del>					
Transducer						
Transducer Bins	High-Frequency:					

Anti-Submarine	Anti-Submarine Warfare				
Anti-Submarine	Warfare Tracking Exercise – Submarine				
In-Water	None				
Explosive					
Bins					
Procedural	Acoustic Stressors: (Section 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)			
Mitigation	Active sonar	Vessel movement			
Measures					
Assumptions	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM				
Used for	from shore. For biological resource analysis, vessel noise and vessel strike are only analyzed for				
Analysis	the periods while the submarines are su	urfaced, typically brief in nature. Mitigation measures			
	related to vessel movement are only co	nsidered during the period of surfacing as well.			

# A.2.5.8 Tracking Exercise – Ship

Anti-Submarine	· Warfare					
	Warfare Tracking Exercise – S	Ship				
Short	Surface ship crews search for	<u> </u>	lotost	Typical D	uration	
Description	submarines.	i, track, and t		2-4 hours		
-						
Long Description	-			arines to	determine a firing position to	
Description	launch a torpedo and attack t	the submarine.				
	A surface ship operates at slo	w speeds wh	ile employin	g sonobud	oys, hull-mounted sonars, or	
	towed array sonar. Passive or			-	=	
	•	=			The target for this exercise is	
	· ·		ıbmarine Wa	rfare Trai	ning Target, MK-30 Recoverable	
	Training Target, or live subma	arine.				
	This exercise may involve a si	ngle ship, or	be undertak	en in the c	context of a coordinated larger	
	exercise involving multiple ai				=	
Typical	Platforms: Surface combatar				<u> </u>	
Components	Targets: Sub-surface targets					
	Systems being Trained/Test	ed: Sonar sys	tems, acoust	ic counte	rmeasures	
Standard	Vessel safety	Typical Loca	tions			
Operating	Towed in-water device	Panga Cami	nlovos/Tosti	ag Bangar	u Inchara Waters/Diersides	
Procedures	safety	Gulf of Mexi	plexes/Testi	ng Kanges		
(Section 2.3.3)		Gulf of Mexico None Jacksonville				
		Navy Cherry	Point			
		Northeast				
		Virginia Cap	es			
		Other AFTT	Areas			
Stressors to	Acoustic:	Physical Dis	turbance an	d Strike:	Energy:	
Biological	Sonar and other		in-water dev		In-air electromagnetic	
Resources	transducers	Military exp	ended mate	rial	devices	
and Habitats	Vessel noise					
		Ingestion:			Entanglement:	
	Explosives:	No			Wires and cables	
	None		6 11 1	1347 -	Decelerators/parachutes	
Stressors to	Air Quality:		Seaiments Metals	and wat	er Quality:	
Physical Resources	Criteria air pollutants			other tha	n explosives	
Resources			Other mat		ii explosives	
Stressors to	None		Other mat	Criais		
Human	None					
Resources						
Military	Ingestible Material:		Military	Sub	o-surface targets (mobile)	
Expended	Decelerators/parachutes – sr	mall	Recoverab		<b>5</b> , ,	
Material	·		Material			
	Non-Ingestible Material:					
	Sub-surface targets (mobile),					
	expendable bathythermog					
	expendable bathythermog					
	sonobuoy (non-explosive),	sonobuoy				
	wires					

Anti-Submarine	Anti-Submarine Warfare							
Anti-Submarine	Anti-Submarine Warfare Tracking Exercise – Ship							
Sonar and	Mid-Frequency:	Anti-Subma	rine Warfare:					
Other	MF1	ASW1						
Transducer	MF11	ASW3						
Bins	MF12							
In-Water	None							
Explosive								
Bins								
Procedural	Acoustic Stressors: (Sect	ion 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Active sonar		Vessel movement					
Measures			Towed in-water devices					
Assumptions	A submarine may provid	e service as the targe	t.					
Used for	Stressors to human reso	urces were not analy	zed for this activity since it occurs greater than 12 NM					
Analysis	from shore.							

#### A.2.6 ELECTRONIC WARFARE

Electronic warfare is the mission area of naval warfare that aims to control use of the electromagnetic spectrum and to deny its use by an adversary. Typical electronic warfare activities include threat avoidance training, signals analysis for intelligence purposes, and use of airborne and surface electronic jamming devices to defeat tracking systems.

#### A.2.6.1 Counter Targeting Chaff Exercise – Aircraft

Short   Fixed-wing aircraft and helicopter aircrews deploy chaff to disrupt threat targeting and missile guidance radars.   1-2 hours	ives elicit				
Chaff to disrupt threat targeting and missile guidance radars.  Fixed-wing aircraft and helicopter aircrews deploy chaff to disrupt threat targeting and missile guidance radars.  Fixed-wing aircraft and helicopter aircrews detect electronic targeting signals from threat rada missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud dece the inbound missile and the aircraft clears away from the threat.  Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to frequency responses, which deceive enemy radars. Chaff is employed to create a target that we	ives elicit				
Fixed-wing aircraft and helicopter aircrews deploy chaff to disrupt threat targeting and missile guidance radars.  Fixed-wing aircraft and helicopter aircrews detect electronic targeting signals from threat rada missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud deceive inbound missile and the aircraft clears away from the threat.  Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to frequency responses, which deceive enemy radars. Chaff is employed to create a target that we	ives elicit				
Long Description  Fixed-wing aircraft and helicopter aircrews deploy chaff to disrupt threat targeting and missile guidance radars.  Fixed-wing aircraft and helicopter aircrews detect electronic targeting signals from threat rada missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud dece the inbound missile and the aircraft clears away from the threat.  Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to frequency responses, which deceive enemy radars. Chaff is employed to create a target that we	ives elicit				
Description  guidance radars.  Fixed-wing aircraft and helicopter aircrews detect electronic targeting signals from threat rada missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud dece the inbound missile and the aircraft clears away from the threat.  Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to frequency responses, which deceive enemy radars. Chaff is employed to create a target that we	ives elicit				
Fixed-wing aircraft and helicopter aircrews detect electronic targeting signals from threat rada missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud dece the inbound missile and the aircraft clears away from the threat.  Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to frequency responses, which deceive enemy radars. Chaff is employed to create a target that we	ives elicit				
missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud dece the inbound missile and the aircraft clears away from the threat.  Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to frequency responses, which deceive enemy radars. Chaff is employed to create a target that we	ives elicit				
the inbound missile and the aircraft clears away from the threat.  Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to frequency responses, which deceive enemy radars. Chaff is employed to create a target that we	elicit				
Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to frequency responses, which deceive enemy radars. Chaff is employed to create a target that we					
frequency responses, which deceive enemy radars. Chaff is employed to create a target that w					
frequency responses, which deceive enemy radars. Chaff is employed to create a target that w					
	ill lure				
enemy radar and weapons system away from the actual friendly platform.					
Typical Platforms: Fixed-wing aircraft, rotary-wing aircraft  Targets: None					
Components Targets: None Systems being Trained/Tested: None					
Standard Aircraft safety Typical Locations					
Operating Typical Educations					
Procedures Range Complexes/Testing Ranges: Inshore Waters/Pierside:					
(Section 2.3.3) Gulf of Mexico None					
Jacksonville					
Key West					
Navy Cherry Point					
Virginia Capes  Stressors to Acoustic: Physical Disturbance and Strike: Energy:					
Stressors to Acoustic: Physical Disturbance and Strike: Energy:  Biological Aircraft noise Aircraft and aerial target strike In-air electromagnetic					
Resources Military expended material devices					
and Habitats   Explosives:					
None Ingestion: Entanglement:					
Military expended materials – other None					
than munitions					
Stressors to Air Quality: Sediments and Water Quality:					
Physical Criteria air pollutants Metals Other materials					
Resources					
Stressors to None					
Human					
Military   Ingestible Material:   Military   None					
Material   plastic endcap, chaff fibers   Material					
plastic chacap, chair ribers					
Non-Ingestible Material:					
None					

Electronic Warf	Electronic Warfare						
Counter Target	Counter Targeting Chaff Exercise – Aircraft						
Sonar and	None						
Other							
Transducer							
Bins							
In-Water	None						
Explosive							
Bins							
Procedural	None						
Mitigation							
Measures							
Assumptions	Chaff is usually expended while conducting other training activities, such as air combat maneuvering.						
Used for	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM						
Analysis	from shore.						

# A.2.6.2 Counter Targeting Chaff Exercise – Ship

Electronic Warf	are						
Counter Target	ing Chaff Exercise – Ship						
Short	Surface ship crews deploy cl	haff to disrupt thi	reat <b>Ty</b>	pical Duration			
Description	targeting and missile guidan	-		! hours			
Long Description	Surface ship crews deploy cl against an attack.	naff to disrupt threat targeting and missile guidance radars to defend					
	Surface ship crews detect electronic targeting signals from threat radars or missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud deceives the inbound missile and the vessel clears away from the threat. The typical exercise duration is approximately 1.5 hours. Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to elicit frequency responses, which deceive enemy radars. Chaff is employed create a target that will lure enemy radar and weapons system away from the actual friendly platform.  Ships may also train with advanced countermeasure systems, such as the MK 53 Decoy Launching System (Nulka).						
Typical	Platforms: Surface combata	nts, amphibious v	warfare ship	s			
Components	Targets: Air target Systems being Trained/Tes	ted: None					
Standard	Vessel safety	Typical Location	ns				
Operating		Range Complex	xes/Testing	Ranges: Inshore Waters/F	Pierside:		
Procedures		Gulf of Mexico	Acsy resting	None None	ierside.		
(Section 2.3.3)		Jacksonville					
		Navy Cherry Po	int				
		Virginia Capes					
Stressors to	Acoustic:	Physical Disturbance and Strike: Energy:					
Biological	Vessel noise	Vessel and in-v			agnetic		
Resources and Habitats	Weapons noise	Military expend	ded material	devices			
	Explosives:	Ingestion:		Entanglement	:		
	None	Military expend		s – other None			
		than munitio					
Stressors to	Air Quality:			nd Water Quality:			
Physical Resources	Criteria air pollutants	Λ 	Metals	Other materials			
Stressors to	None	- <del></del>		· ———			
Human Resources							
Military	Ingestible Material:	M	lilitary	None			
Expended	Chaff-ship fibers	Re	ecoverable				
Material		M	1aterial				
	Non-Ingestible Material:						
	Chaff-ship cartridges, air tar	get (decoy)					
Sonar and Other	None						
Transducer							
Bins							
פוווט							

Electronic Warf	Electronic Warfare					
<b>Counter Target</b>	Counter Targeting Chaff Exercise – Ship					
In-Water	None					
Explosive						
Bins						
Procedural	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Vessel movement					
Measures						
Assumptions	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM					
Used for	from shore.					
Analysis						

# A.2.6.3 Counter Targeting Flare Exercise

Electronic Warf	are						
	ing – Flare Exercise						
Short	Fixed-wing aircraft and helic	copter aircrew	s deploy	Typic	al Durat	ion	
Description	flares to disrupt threat infra	•		1-2 h			
Long	systems.					breat infrared missile guidance	
Long Description	systems.	copter aircrews deploy flares to disrupt threat infrared missile guidance					
	Aircraft detect electronic targeting signals from threat radars or missiles or a threat missile plume when launched and dispense flares and immediately maneuver to defeat the threat. This exercise trains aircraft personnel in the use of defensive flares designed to confuse infrared sensors or infrared homing missiles, thereby causing the sensor or missile to lock onto the flares instead of the real aircraft. Typically an aircraft will expend five flares in an exercise while operating above 3,000 ft. Flare exercises are often conducted with chaff exercises, rather than as a stand-alone exercise.						
Typical	Platforms: Fixed-wing aircra	ıft, rotary-win	g aircraft				
Components	Targets: None Systems being Trained/Test	ted: None					
Standard	Aircraft safety	Typical Loca	tions				
Operating Procedures (Section 2.3.3)		Range Com Gulf of Mexi Jacksonville Key West Navy Cherry Virginia Cap	Inshore Waters/Pierside: None				
Stressors to	Acoustic:		sturbance a	nd Stri	ike:	Energy:	
Biological	Aircraft noise	Aircraft and	l aerial targe	et strik	æ	In-air electromagnetic	
Resources		Military exp	ended mate	erial		devices	
and Habitats	Explosives:						
	None	Ingestion:				Entanglement:	
			ended mate	erials -	- other	None	
		than mur					
Stressors to	Air Quality:		Sediment			Quality:	
Physical	Criteria air pollutants		Other ma				
Resources			Chemical	s othe	r than ex	plosives	
Stressors to Human	None						
Resources		<del> </del>					
Military	Ingestible Material:		Military		None		
Expended Material	Per flare: one casing, one con pad or one plastic piston, endcap, one O-ring	·					
	Non-Ingestible Material: None	<u> </u>					
Sonar and	None			_	_		
Other							
Transducer							
Bins							

<b>Electronic Warf</b>	are
Counter Target	ing – Flare Exercise
In-Water	None
Explosive	
Bins	
Procedural	None
Mitigation	
Measures	
Assumptions	Approximately five flares per aircraft are expended per exercise.
Used for	All combustible material in flares is assumed to be consumed before contact of the casing with the
Analysis	water.
	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM
	from shore.

# A.2.6.4 Electronic Warfare Operations

Electronic Warf	are							
Electronic Warf	are Operations							
Short	Aircraft and surface ship cre	ews control portion	ons of	Typical Dura	tion			
Description	the electromagnetic spectru	•		- <b>/</b> ·				
	systems to degrade or deny	the enemy's abi	lity to	1-2 hours				
	take defensive actions.							
Long	Aircraft and surface ship cre	ews control the e	lectromag	netic spectru	m used by enemy systems to			
Description	degrade or deny the enemy	's ability to take	defensive	actions. Elect	ronic Warfare Operations can be			
			_		active jamming and deception			
	,	rs to mask the friendly inbound strike aircraft mission. Surface ships						
	=	_		-	r missile radars, evaluate courses			
	_	· · · · · ·			then use ship maneuvers and			
	either chaff, flares, active el	ectronic counter	measures,	, or a combina	ation of them to defeat the			
Tourisal	threat.	-ftf						
Typical Components	Platforms: Fixed-wing aircra Targets: Air targets, electron							
Components	Systems being Trained/Tes	_						
Standard	Vessel safety	Typical Locatio						
Operating	Aircraft safety							
Procedures	7 in crare surecy	Range Comple	xes/Testir	ng Ranges:	Inshore Waters/Pierside:			
(Section 2.3.3)		Jacksonville			None			
,		Navy Cherry Point						
_	-	Virginia Capes						
Stressors to	Acoustic:	Physical Distu			Energy:			
Biological	Aircraft noise	Aircraft and ac	_		In-water electromagnetic			
Resources and Habitats	Vessel noise	Vessel and in-	water devi	ce strike	devices			
and Habitats	Explosives:	Ingestion:			Entanglement:			
	None	None			None			
Stressors to	Air Quality:	9	Sediments	and Water (	Duality:			
Physical	Criteria air pollutants		None		<b></b>			
Resources	'							
Stressors to	Cultural Resources:	Socioecono	mic Resou	ırces:	Public Health and Safety:			
Human	None	Accessibility	1		Physical interactions			
Resources					In-air energy			
Military	Ingestible Material:	N	/lilitary	None				
Expended	None		ecoverabl	le				
Material		N	/laterial					
	Non-Ingestible Material:							
_	None							
Sonar and	None							
Other								
Transducer Bins								
In-Water	None							
Explosive	None							
Bins								
Procedural	Physical Disturbance and St	rike: (Section 5.3	3 4)					
Mitigation	Vessel movement	.inc. (Section 3.3	·· <del>··</del> /					
Measures	. 5555576611							
	<u> </u>							

Electronic Warfare						
<b>Electronic Warf</b>	are Operations					
Assumptions	All chaff and flares involved in this exercise are covered under chaff exercises and flare exercises,					
Used for	respectively.					
Analysis						

# A.2.6.5 High-Speed Anti-Radiation Missile Exercise (Air-to-Surface)

Electronic Warf	are							
High Speed Ant	i-Radiation Missile Exercise (A	Air-to-Surface	)					
Short	Aircrews launch a High-Spee	d Anti-Radiat	ion	Typic	al Duration			
Description	Missile against threat radar			1-2 h				
Long			lated threat					
Description	_	ws detect radar signals from a simulated threat radar site and launch a High-Speed Anti- tion Missile (high-explosive) to destroy or disable the threat radar site. One or more fighter						
Description		ar site from high altitude. Once the target is located with onboard						
		s a High-Speed Anti-Radiation Missile at the electronic signal. At-sea						
		inst a target vessel or a specially configured target barge that has a						
					fter being fired from the launch aircraft.			
Typical	Platforms: Fixed-wing aircra	ft, support cr	aft					
Components	Targets: Barge with an elect	ronic emitter						
	Systems being Trained/Test	t <b>ed:</b> Missile sy	stems					
Standard	Aircraft safety	Typical Loca	tions					
Operating	Vessel safety	Pango Com	plexes/Testi	na Pa	nges: Inshore Waters/Pierside:			
Procedures		Jacksonville	piexes/ resti	iig Na	None			
(Section 2.3.3)		Navy Cherry	Point		None			
		Virginia Cap						
Stressors to	Acoustic:		sturbance an	nd Stri	ike: Energy:			
Biological	Aircraft noise	-	l aerial targe		= -			
Resources	Vessel noise		in-water dev		devices			
and Habitats	Weapons noise	Military exp	ended mate	erial				
					Entanglement:			
	Explosives:	Ingestion:			None			
	In-air explosives	Military exp	ended mate	erials –	-			
		munition	-					
			ended mate	erials –	- other			
<u> </u>		than mui						
Stressors to	Air Quality:				Water Quality:			
Physical Resources	Criteria air pollutants		Metals	other	r than explosives Other materials			
Stressors to	None		IVIELAIS		- Ctrief materials			
Human	None							
Resources								
Military	Ingestible Material:		Military		None			
Expended	Missile (explosive) fragments	s. target	Recoverab		None			
Material	fragments	-, 8	Material					
	J							
	Non-Ingestible Material:							
	Anchor- other							
Sonar and	None			_	·			
Other								
Transducer								
Bins	None							
In-Water Explosive	None							
Bins								
פוווט								

Electronic Warf	Electronic Warfare						
High Speed Ant	High Speed Anti-Radiation Missile Exercise (Air-to-Surface)						
Procedural	Explosive Stressors: (Section 5.3.3) Explosive	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	missiles and rockets	Vessel movement					
Measures							
Assumptions	All chaff and flares involved in this exercise are covered under chaff exercises and flare exercises,						
Used for	respectively.						
Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM						
	from shore.						

## A.2.7 EXPEDITIONARY WARFARE

# A.2.7.1 Dive and Salvage Operations

<b>Expeditionary Warfa</b>	re						
Dive and Salvage Ope	erations						
Short Description	Navy divers perform of	live operation	ns and <b>Typ</b>	ical Dura	tion		
	salvage training.		12	hours			
Long Description	Navy divers will conduct a variety of salvage training to include				de debeaching operations,		
	underwater repairs to ships, underwater survey operations, and other underwater training as						
	required.						
Typical	Platforms: Support cr	aft, unmanne	d underwater ve	hicles			
Components	Targets: None						
	Systems being Traine			ng aids			
Standard	Vessel safety	Typical Loca	itions				
Operating Procedures	Unmanned aerial,	Range Com	plexes/Testing F	Ranges:	Inshore Waters/Pierside:		
(Section 2.3.3)	surface, and subsurface	Gulf of Mex	ico		Naval Station Norfolk, Virginia		
(3800001 2.3.3)	vehicle safety	Jacksonville			Lower Chesapeake Bay		
	vernicle safety	Key West			Naval Station Mayport		
		Navy Cherry			James River and tributaries		
		Virginia Cap					
Stressors to	Acoustic:	-	sturbance and S		Energy:		
Biological	Vessel noise		in-water device :	strike	None		
Resources and	Fundacius a	Seafloor de	vices		Futourlaneaut		
Habitats	Explosives: None	Ingestion:			Entanglement: None		
	None	None			None		
Stressors to	Air Quality:		Sediments an	d Water	Quality:		
Physical Resources	Criteria air pollutants		None		•		
Stressors to	Cultural Resources:	Socioeco	nomic Resource	:s:	Public Health and Safety:		
Human Resources	Physical disturbance	Accessibi	•		Physical interactions		
	and strike	Physical	disturbance and	strike			
Military Expended	Ingestible Material:		Military	None			
Material	None		Recoverable				
	Non longethic Markey		Material				
	Non-Ingestible Mater None	iai:					
Sonar and Other	None	÷			-		
Transducer Bins	INOTIE						
In-Water Explosive	None			-			
Bins							
Procedural	Physical Disturbance	and Strike: (S	ection 5.3.4)				
Mitigation	Vessel movement						
Measures							
Assumptions Used	The practice salvage p	latform can b	e sunk and then	refloated	d and removed.		
for Analysis							

A.2.7.2 Maritime Security Operations – Anti-Swimmer Grenades

	A.2.7.2 Maritime Security Operations – Anti-Swimmer Grenades  Expeditionary Warfare						
	rity Operations – Anti-Swin						
Short	Small boat crews engage i	•		Typical Dur	ation		
Description	activities by using anti-sw	_	s to	1 hour			
	defend against hostile div						
Long			-		atterns while surveying the area for		
Description	evidence of scuba activity. Crews train in the safe handling and use of anti-swimmer grenades to						
	counter the diver threat.						
Typical	Platforms: Small boats	poats					
Components	Targets: None						
	Systems being Trained/To	ested: Grenade	!S				
Standard	Vessel safety	Typical Locati					
Operating	,						
Procedures		Range Compl	lexes/Te	sting	Inshore Waters/Pierside:		
(Section		Ranges:			None		
2.3.3)		Gulf of Mexico	0				
2.3.3)		Jacksonville					
		Navy Cherry Point					
		Northeast					
		Virginia Capes					
Stressors to	Acoustic:	Physical Dist	urbance	and Strike:	Energy:		
Biological	Vessel noise	Vessel and in			None		
Resources	Weapons noise	Military expe	nded ma	aterial			
and Habitats		, .			Entanglement:		
	Explosives:	Ingestion:			None		
	In-water explosives	Military expe	nded ma	aterials –			
	•	munitions					
Stressors to	Air Quality:	;	Sedimer	ts and Wate	r Quality:		
Physical	Criteria air pollutants		Explosiv	es Me	tals		
Resources			Chemica	Is other than	explosives		
Stressors to	Cultural Resources:	Socioecono	omic Re	ources:	Public Health and Safety:		
Human	Physical disturbance and	Accessibilit	:V		Physical interactions		
Resources	, strike		•	e and strike	In-water energy		
	Explosives	,			G,		
Military	Ingestible Material:		Military		None		
Expended	Grenade fragments		Recover	able			
Material	G. e.i.a.a.e ii.a.g.ii.e.ii.a		Materia				
···ateriai	Non-Ingestible Material:						
	None						
Sonar and	None	-			<u> </u>		
Other	None						
Transducer							
Bins							
In-Water	E2				<del>.</del>		
Explosive	EZ						
•							
Bins	Dhysical Distant	Chatter /C //	<del></del>	las!::= 0:	constant and a second		
Procedural	Physical Disturbance and	Strike: (Section		-	ssors: (Section 5.3.3)		
Mitigation	5.3.4)		N		rity operations – anti-swimmer		
Measures	Vessel movement grenades						

Expeditionary	Expeditionary Warfare					
Maritime Security Operations – Anti-Swimmer Grenades						
Assumptions	Exercises would usually be conducted in established underwater detonation areas.					
Used for						
Analysis						

# A.2.7.3 Personnel Insertion/Extraction – Air

Expeditionary V	Varfare					
Personnel Inser	tion/Extraction – Air					
Short	Personnel are inserted into	and extracted	from an	Typical D	uration	
Description	objective area by fixed-wing	aircraft or he	licopters.	2-4 hours		
Long	Personnel are inserted into	a water object	tive via fixed	d-wing airc	raft using parachutes or by	
Description					ct an infiltration to an objective	
					sks. The insertion/extraction	
			g. Upon com	pletion of	training objectives, personnel are	
	extracted by helicopters or small boats.					
Typical	_	Platforms: Fixed-wing aircraft, rotary-wing aircraft, small boats				
Components	Targets: None	sada Niana				
Chandand	Systems being Trained/Tes		<b>4</b> :			
Standard Operating	Vessel safety Aircraft safety	Typical Loca	tions			
Procedures	All Craft Safety	Range Com	plexes/Test	ing Ranges	: Inshore Waters/Pierside:	
(Section 2.3.3)		Jacksonville			Naval Station Mayport, Florida	
(3000.077 2.3.3)		Key West			St. Andrew Bay	
		Virginia Cap	es		North Bay	
					Lower Chesapeake Bay	
					James River and tributaries	
Character	A	Dhil Dia		l Ct!l	York River	
Stressors to Biological	Acoustic: Aircraft noise	Physical Dis Aircraft and			<b>Energy:</b> None	
Resources	Vessel noise	Vessel and i	_		None	
and Habitats	vessei iloise	Military exp			Entanglement:	
and nabitats	Explosives:	willtary exp	ended mate	zi iai	None	
	None	Ingestion:				
		None				
Stressors to	Air Quality:		Sediment	s and Wat	er Quality:	
Physical	Criteria air pollutants		Metals			
Resources			Chemicals	s other tha	n explosives	
Stressors to	Cultural Resources:	Socioeco	nomic Reso	urces:	Public Health and Safety:	
Human	Physical disturbance and	Accessibi	•		Physical interactions	
Resources	strike	Physical c	disturbance		<del>.</del>	
Military	Ingestible Material:		Military	No	ne	
Expended	None		Recoverat	ole		
Material	Non Ingastible Material		Material			
	Non-Ingestible Material: Marine markers					
Sonar and	None					
Other	NOTE					
Transducer						
Bins						
In-Water	None			-	•	
Explosive						
Bins						
Procedural	Physical Disturbance and St	rike: (Section .	5.3.4)			
Mitigation	Vessel movement	•	•			
Measures						

Expeditionary \	Expeditionary Warfare				
Personnel Insertion/Extraction – Air					
Assumptions	Exercises are typically conducted in waters near land.				
Used for					
Analysis					

## A.2.7.4 Personnel Insertion/Extraction – Surface and Subsurface

<b>Expeditionary Warfare</b>						
Personnel Insertion/Extr	action – Surface and	d Subsurface				
Short Description	Personnel are inse	rted into and		Турі	cal Dura	tion
	extracted from an objective area		a by	2.41	2-4 hours	
	small boats or sub					
Long Description				-	-	rsonnel are inserted in the
	-			-		arbor, beach, moored vessel,
	, , , , , , , , , , , , , , , , , , ,	a variety of ta	isks. The ins	ertior	ı/extract	ion activities are confined to in-
Torrigat Comments	water training.		l		:-1	
Typical Components	Platforms: Small b Targets: None	oats, mannet	i underwate	er ven	icies	
	Systems being Tra	ined/Tested	None			
Standard Operating	Vessel safety	Typical Loca				
Procedures	vesser sarety	Typical Loca	itions			
(Section 2.3.3)		Range Com	-	ting R	anges:	Inshore Waters/Pierside:
(		Gulf of Mex				Lower Chesapeake Bay
		Jacksonville	!			James River and tributaries
		Key West	. Daint			York River
		Navy Cherry Northeast	Point			
		Virginia Cap	nes			
Stressors to Biological	Acoustic:	Physical Dis		nd St	rike:	Energy:
Resources and	Vessel noise	Vessel and				None
Habitats	Weapons noise	Seafloor de				
	'	Military exp	ended mat	erial		Entanglement:
	Explosives:					None
	None	Ingestion:				
		Military exp	ended mat	erials	-	
		munitions				
Stressors to Physical	Air Quality:		Sedimen	ts and	l Water (	Quality:
Resources	Criteria air polluta		Metals			
Stressors to Human	Cultural Resource		economic R	esour	ces:	Public Health and Safety:
Resources	Physical disturband and strike		al disturbar	) CO 2D	Ч	Physical interactions
	and strike	stril		ice aii	u	
			ne acoustic	S		
Military Expended	Ingestible Materia		Military		None	
Material	Small caliber (casi		Recovera	ble		
			Material			
	Non-Ingestible Ma	aterial:				
	None	<u>.</u>				
Sonar and Other	None					
Transducer Bins	<u> </u>					
In-Water Explosive	None					
Bins	BI 1 151		/c ·· -	2.41	-	<del>_</del>
Procedural Mitigation	Physical Disturbar Vessel movement	ice and Strike	: (Section 5	.3.4)		
Measures Assumptions Used for		ally conducts	d in waters	nos-1	and	
Assumptions Used for	Exercises are typic	any conducte	u in waters	near I	anu.	
Analysis						

# A.2.7.5 Personnel Insertion/Extraction – Swimmer/Diver

Expeditionary \	<b>V</b> arfare						
	rtion/Extraction Training – Sw	vimmer/Diver					
Short	Divers and swimmer infiltra			Typical Du	ration		
Description	or moored vessels and cond	-		Up to 12 h			
Long		-		•	els and conduct a variety of tasks.		
Description		•	•		•		
2 coon paron	Activity may include Navy personnel learning advanced self-contained underwater breathing apparatus (SCUBA) diving to include: tactics, techniques, and procedures and emergency						
		rocedures. Small boats are used for safety.					
Typical	Platforms: Small boats						
Components	Targets: None						
, , , , , , , , , , , , , , , , , , ,	Systems being Trained/Tes	ted: None					
Standard	Vessel safety	Typical Locat	tions				
Operating	1 2000. 50. 50.						
Procedures		Range Comp	olexes/Testi	ng Ranges:			
(Section		Key West			Lower Chesapeake Bay		
2.3.3)		Virginia Capes					
Stressors to	Acoustic:	Physical Dis	turbance an	d Strike:	Energy:		
Biological	Vessel noise	Vessel and i			None		
Resources							
and Habitats	Explosives:	Ingestion:			Entanglement:		
	None	None			None		
Stressors to	Air Quality:	-	Sediments	and Wate	er Quality:		
Physical	Criteria air pollutants		None		•		
Resources							
Stressors to	Cultural Resources:	Socioecor	າomic Resoເ	ırces:	Public Health and Safety:		
Human	None	Accessibil	ity		Physical interactions		
Resources		Physical d	isturbance a	and strike			
Military	Ingestible Material:		Military	Non	e		
Expended	None		Recoverab	le			
Material			Material				
	Non-Ingestible Material:						
	None						
Sonar and	None						
Other							
Transducer							
Bins							
In-Water	None						
Explosive							
Bins			<u> </u>	_			
Procedural	Physical Disturbance and St	rike: (Section :	5.3.4)				
Mitigation	Vessel movement						
Measures							
Assumptions	None						
Used for							
Analysis							

# A.2.7.6 Underwater Construction Team Training

Expeditionary \	<b>W</b> arfare							
	nstruction Team Training							
Short	Navy divers conduct underv	vater renair and	d Tvi	oical Dura	tion			
Description	construction.	rater repair and		Up to 12 days				
Long		tting welding :		ly, and installation of deep-water structures,				
Description	mooring systems, underwat	_	-					
Typical	Platforms: Small boats	ier motramente	tion, and othe	575001115	as needed.			
Components	Targets: None							
Components		ems being Trained/Tested: None						
Standard	Vessel safety	Typical Locat	ions					
Operating	resser surery							
Procedures			lexes/Testing	Ranges:	Inshore Waters/Pierside:			
(Section		Gulf of Mexic	:0		Various harbors			
2.3.3)		Jacksonville						
/		Key West						
		Virginia Cape						
Stressors to	Acoustic:	•	urbance and S		Energy:			
Biological	Vessel noise		-water device	strike	None			
Resources		Seafloor devi	ces					
and Habitats	Explosives:				Entanglement:			
	None	Ingestion:			None			
		None						
Stressors to	Air Quality:		Sediments ar	nd Water	Quality:			
Physical	Criteria air pollutants		None					
Resources					-			
Stressors to	Cultural Resources:		omic Resource	es:	Public Health and Safety:			
Human	None	Accessibili	•		Physical interactions			
Resources			sturbance and					
Military	Ingestible Material:		Military	Bottor	n placed instruments			
Expended	None		Recoverable					
Material			Material					
	Non-Ingestible Material:							
	None							
Sonar and	None							
Other								
Transducer								
Bins	N.							
In-Water	None							
Explosive								
Bins	al I lati I			-	<del>_</del>			
Procedural	Physical Disturbance and St	rike: (Section 5	.3.4)					
Mitigation	Vessel movement							
Measures	N.		<del>-</del>					
Assumptions	None							
Used for								
Analysis	<u>l</u>							

#### A.2.8 MINE WARFARE

Mine warfare is the naval warfare area involving the detection, avoidance, and neutralization of mines to protect Navy ships and submarines and offensive mine laying in naval operations. A naval mine is a self-contained explosive device placed in water to destroy ships or submarines. Naval mines are deposited and left in place until triggered by the approach of an enemy ship or are destroyed or removed. Naval mines can be laid by purpose-built minelayers, other ships, submarines, or airplanes. Mine warfare training includes mine countermeasures exercises and mine-laying exercises.

#### A.2.8.1 Airborne Mine Countermeasure – Mine Detection

Mine Warfare							
Airborne Mine	Countermeasures – Mine Det	ection					
Short Description	Helicopter aircrews detect n laser mine detection system	=	Typical Duration 2 hours				
Long Description	Towed devices employ active These devices are similar in structures/items. Airborne of Devices used include the AN bottom and floating/moored	er aircrews use towed and airborne devices to detect, locate, and classify potential mines. evices employ active acoustic sources, such as high-frequency and side scanning sonar. vices are similar in function to systems used to map the seafloor or locate submerged s/items. Airborne devices utilize laser systems to locate mines located below the surface. used include the AN/AQS-20/A, towed mine-hunting sonar used to detect and classify and floating/moored mines in deep and shallow water, and the Airborne Laser Mine in System, developed to detect and classify floating and near-surface, moored mines.					
Typical Components	Platforms: Rotary-wing airco Targets: Mine shapes Systems being Trained/Test	. •					
Standard Operating Procedures (Section 2.3.3)	Aircraft safety Towed in-water device safety	Typical Locations  Range Complexes/Tes Gulf of Mexico Jacksonville Navy Cherry Point Virginia Capes Naval Surface Warfare Panama City Divisio	Center,	Inshore Waters/Pierside: None			
Stressors to Biological Resources and Habitats	Acoustic: Sonar and other transducers Aircraft noise  Explosives: None	Physical Disturbance and Strike: Aircraft and aerial target strike Vessel and in-water device strike Seafloor devices Ingestion: None		Aircraft and aerial target strike Vessel and in-water device strike Seafloor devices Ingestion:		Energy: In-water electromagnetic devices  Entanglement: None	
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: None					
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Reso Accessibility Airborne acoustics Physical disturbance		Public Health and Safety: Physical interactions In-air energy In-water energy			

Mine Warfare							
Airborne Mine	Airborne Mine Countermeasures – Mine Detection						
Military	Ingestible Material:	Military	Mine shapes (non-explosive)				
Expended	None	Recoverable					
Material		Material					
	Non-Ingestible Material:						
	None						
Sonar and	High-Frequency:						
Other	HF4						
Transducer							
Bins							
In-Water	None						
Explosive							
Bins							
Procedural	Acoustic Stressors: (Section 5.3.2)	Physica	I Disturbance and Strike: (Section 5.3.4)				
Mitigation	Active sonar	Towed	in-water devices				
Measures							
Assumptions	Sonar mine detection systems towed from helicopters.						
Used for	Airborne laser systems used to detect mine shapes.						
Analysis	Laser systems are similar to commercial Light Detection And Ranging (LIDAR) systems. The in-air						
	energy stressor was used in analysis of	potential impacts	on human resources.				
	Mine shapes may be deployed via ship and	d will be recovere	ed.				

## A.2.8.2 Airborne Mine Countermeasure – Towed Mine Neutralization

Mine Warfare							
Airborne Mine	Countermeasures – Towed M	line Neutraliza	ation				
Short	Helicopter aircrews tow syst	tems through	the Ty	pical Dur	ation		
Description	water that are designed to o	_	er				
	mines.		1.3	5-4 hours			
Long	•				nat are designed to detonate when		
Description	they detect ships/submaring		•	_			
	_				floating moored mines. Training		
	may be conducted with non	i-explosive tra	ining mine snap	oes.			
		following: MK 105 sled, which creates a magnetic field used to trigger					
		in conjunction with the MK 103 cable cutter system and the MK 104 acoustic					
		/SPU-1/W (Magnetic Orange Pipe), a magnetic pipe that is used to trigger					
Tunical	magnetically influenced mir						
Typical Components	Platforms: Rotary-wing airca Targets: Mine shapes	ratt					
Components	Systems being Trained/Tes	<b>ted:</b> Towed m	ine neutralizati	on systen	ns		
Standard	Aircraft safety	Typical Locations					
Operating	Towed in-water device			_			
Procedures	safety		plexes/Testing	Ranges:	Inshore Waters/Pierside:		
(Section 2.3.3)		Gulf of Mexico None Jacksonville					
		Navy Cherry Point					
		Virginia Capes					
Stressors to	Acoustic:	<del></del>	turbance and	Strike:	Energy:		
Biological	Aircraft noise	-	aerial target st		In-water electromagnetic		
Resources		Vessel and	n-water device	strike	devices		
and Habitats	Explosives:	Seafloor de	vices				
	None				Entanglement:		
		Ingestion:			None		
Stressors to	Air Quality:	None	Sediments a	nd Water	Quality		
Physical	Criteria air pollutants		None	iiu watei	Quanty.		
Resources	Circeita dii ponatanto		110116				
Stressors to	Cultural Resources:	Socioeco	nomic Resourc	es:	Public Health and Safety:		
Human	Physical disturbance and	Accessibi	lity		Physical interactions		
Resources	strike	Physical o	listurbance and	l strike	In-water energy		
Military	Ingestible Material:		Military	Mine	shapes (non-explosive)		
Expended	None		Recoverable				
Material	Non Ingostible Metavial		Material				
	Non-Ingestible Material: None						
Sonar and	None	<del>.</del>			- <del>-</del>		
Other							
Transducer							
Bins							
In-Water	None						
Explosive							
Bins							

Mine Warfare	Mine Warfare					
Airborne Mine	Airborne Mine Countermeasures – Towed Mine Neutralization					
Procedural	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Towed in-water devices					
Measures						
Assumptions	Mechanical sweeping (cable cutting), acoustic and magnetic influence sweeping devices are towed					
Used for	from helicopters.					
Analysis	Cable cutters utilize an insignificant charge (similar to a shotgun shell).					
	Acoustic sweeps generate ship-type noise via a mechanical system.					
	Towing systems though minefields (or without mines, to train to deploy, tow, and recover) may involve instrumented mines.					
	Mine shapes are recovered.					

# A.2.8.3 Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercise

Mine Warfare	Mine Warfare						
Civilian Port De	fense – Homeland Security Ar	nti-Terrorism/Force Prot	tection Exercise	es			
Short	Maritime security personnel	train to protect	Typical Dura	tion			
Description	civilian ports and harbors ag	ainst enemy efforts to	Multiple day	-			
	interfere with access to thos	se ports.	Multiple days	5			
Long	Naval forces provide mine w	-		<del>-</del>			
Description	F			elicopter), surface (surface ships),			
			·	nine countermeasures will be of mine threats. Various mine			
	_			the detection, classification, and			
				ques, such as helicopter towed			
				be utilized. Marine mammal			
	systems may be used during		,				
			o Donartmont	of Hamaland Sacurity stratogic			
	goals and evolving world eve	· · · · · · · · · · · · · · · · · · ·	o Department	of Homeland Security strategic			
Typical			upport craft su	urface combatants, unmanned			
Components	underwater vehicles	is, rotary wing an crart, s	apport crart, se	arrace compatants, annumed			
	Targets: Mine shapes						
	Systems being Trained/Test	ted: Mine detection syste	ems, towed mir	ne neutralization systems,			
	airborne mine neutralization systems						
Standard	Vessel safety	Typical Locations					
Operating	Aircraft safety	Range Complexes/Tes	ting Ranges:	Inshore Waters/Pierside:			
Procedures	Unmanned aerial, surface,	Virginia Capes	tilig italiges.	Beaumont, Texas			
(Section 2.3.3)	and subsurface vehicle	Viiginia Capes		Boston, Massachusetts			
	safety Towed in-water device			Corpus Christi, Texas			
	safety			Delaware Bay, Delaware			
	Salety			Earle, New Jersey			
				Hampton Roads, Virginia			
				Kings Bay, Georgia			
				Morehead City, North Carolina			
				Naval Station Mayport, Florida			
				Port Canaveral, Florida			
				Savannah, Georgia Tampa, Florida			
				Wilmington, North Carolina			
Stressors to	Acoustic:	Physical Disturbance a	and Strike:	Energy:			
Biological	Sonar and other	Aircraft and aerial targ		In-water electromagnetic			
Resources	transducers	Vessel and in-water de		devices			
and Habitats	Aircraft noise	Seafloor devices					
	Vessel noise	Military expended mat	terial				
	Weapons noise			Entanglement:			
		Ingestion:		Wires and cables			
	Explosives:	Military expended mat	terials –				
	In-water explosives	munitions	ramiala -+l				
		Military expended mat	terials – other				
		than munitions					

Mine Warfare						
Civilian Port De	efense – Homeland Security Anti-1	errorism/	Force Protection	n Exercises		
Stressors to Physical	Air Quality: Criteria air pollutants		Sediments and Metals	l Water Quality: Explosives and explosive byproducts		
Resources	Criteria ali poliutarits	Chemicals other than explosives				
nesources		Other materials				
Stressors to	Cultural Resources:	Socioeco	nomic Resources	<del>-</del>		
Human	Physical disturbance and	Accessibi		Physical interactions		
Resources	strike	Airborne	•	In-air energy		
	Explosives	Physical c	listurbance and s	<u>.</u>		
Military	Ingestible Material:	•	Military	Mine shapes (non-explosive)		
Expended	Mine neutralizer fragments		Recoverable	,		
Material			Material			
	Non-Ingestible Material:					
	Fiber optic cable, fiber optic can					
Sonar and	High-Frequency:	Syntheti	c Aperture Sonar	rs:		
Other	HF4	SAS2				
Transducer						
Bins			-			
In-Water	E2 E4					
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section 5.3	2)	-	ve Stressors: (Section 5.3.3)		
Mitigation	Active sonar		-	ve mine neutralization activities involving		
Measures	Physical Disturbance and Strike	(Costion		y divers		
	Vessel movement	(Section .	5.3.4)			
	Towed in-water devices					
Assumptions		ll he laid ir	n various nlaces c	on the hottom and will be retrieved		
Used for	Non-permanent mine shapes will be laid in various places on the bottom and will be retrieved.  Shapes are varied, from about 1 m circular to about 2.5 m long by 1 m wide. They will be recovered					
Analysis	using normal assets, with dive			one of an index may min selective ed		
,	Explosives may be used if require			tralization exercises.		
	ļ · · · · · · · · · · · · · · · · · · ·			est coast, assume that an east coast		
	exercise will occur every othe	-	_			

## A.2.8.4 Coordinated Unit-Level Helicopter Airborne Mine Countermeasures Exercise

Mine Warfare								
Coordinated Ur	nit-Level Helicopter Airborne I	Mine Counter	measures E	xercis	se			
Short	A detachment of helicopters	aircrews trai	n as a	Турі	cal Dura	tion		
Description	unit in the use of airborne m	nine counterm	neasures,					
	such as towed mine detection	on and neutra	lization	Mult	tiple days	S		
	systems.							
Long	Naval aircrews train, as a sq						-	
Description	employed include towed mi		-		-	=-	ps, magnetic	
	and acoustic mine sweeps, a	and other airb	orne system	ns and	l sensors			
	Mine shapes will be used. If	shapes will be used. If necessary, permanently placed mine shapes will be supplemented with						
	approximately 24 additional, temporarily placed mine shapes. Training mine shapes could be							
	bottom placed, moored, or floating.							
Typical	Platforms: Rotary-wing aircr	raft						
Components	Targets: Mine shapes							
	Systems being Trained/Test			ms, to	owed mir	ne neutralization syst	ems	
Standard	Aircraft safety	Typical Loca	tions					
Operating Procedures	Towed in-water device	Range Com	plexes/Test	ing Ra	anges:	Inshore Waters/Pie	erside:	
(Section 2.3.3)	safety	Gulf of Mexico None				None		
(3600001 2.3.3)		Jacksonville						
		Navy Cherry						
		Virginia Capes						
Stressors to	Acoustic:	Physical Dis			rike:	Energy:		
Biological	Sonar and other	Military exp			•	In-water electroi	magnetic	
Resources	transducers	Aircraft and Vessel and i	_			devices		
and Habitats	Aircraft noise	Seafloor de		vice si	гіке	Entanglement:		
	Explosives:	Seanoor de	VICES			None		
	None	Ingestion:				TTOTIC		
		None						
Stressors to	Air Quality:	<u>-</u>	Sediment	ts and	Water (	Quality:		
Physical	Criteria air pollutants		Metals					
Resources			Other ma	terial	S			
Stressors to	Cultural Resources:		nomic Reso	urces	:	Public Health and S	-	
Human	Physical disturbance and	Accessibi	=			Physical interaction	S	
Resources	strike	Airborne				In-air energy		
		Physical c	disturbance	and s		In-water energy	,	
Military	Ingestible Material: None		Military Recoveral	ala.	Mine s	hapes (non-explosive	)	
Expended Material	None		Material	oie				
Wiaterial	Non-Ingestible Material:		Waterial					
	Mine shapes (non-explosive)	)						
Sonar and	High-Frequency:							
Other	HF4							
Transducer								
Bins						<del></del>		
In-Water	None			_				
Explosive								
Bins								

Mine Warfare	Mine Warfare						
Coordinated Unit-Level Helicopter Airborne Mine Countermeasures Exercise							
Procedural	Acoustic Stressors: (Section 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Active sonar	Vessel movement					
Measures		Towed in-water devices					
Assumptions	Multiple helicopters conduct airborne mine countermeasure training using an assortment of mine						
Used for	warfare gear similar to unit-level events, except that a squadron trains together.						
Analysis	Assume up to 24 temporary mine shapes w	rill be deployed to support each of these exercises.					

## A.2.8.5 Mine Countermeasures – Ship Sonar

Mine Warfare								
Mine Counterm	neasure – Ship Sonar							
Short	Ship crews detect and avoid	mines while		Typical Dura	ntion			
Description	navigating restricted areas o	or channels usi	ng active	1.5-4 hours				
	sonar.			1.5-4 110013				
Long					zardous objects while navigating			
Description					hip utilizes unmanned surface			
					ınting) equipment. Systems will			
	operate from a shallow zone	_	40 ft. to de	ep water. Exe	rcises could be embedded			
	within major training exercis							
Typical		Platforms: Surface combatants, unmanned surface vehicles						
Components	Targets: Mine shapes							
	Systems being Trained/Tes	T .						
Standard	Vessel safety	Typical Locat	tions					
Operating	Unmanned aerial, surface,	Range Comp	olexes/Test	ing Ranges:	Inshore Waters/Pierside:			
Procedures	and subsurface vehicle	Gulf of Mexi			None			
(Section 2.3.3)	safety	Jacksonville						
	Towed in-water device	Virginia Cap	es					
<u></u>	safety	Dhariaal Dia	l	F				
Stressors to	Acoustic:	Physical Dis			Energy:			
Biological Resources	Sonar and other transducers	Vessel and in Seafloor dev		vice strike	In-air electromagnetic			
and Habitats	Vessel noise	Seanoor dev	devices					
aliu Habitats	vessei noise		In-water electromagnetic devices					
	Explosives:	Ingestion:			devices			
	None	None			Entanglement:			
	None	None			None			
Stressors to	Air Quality:		Sedimen	ts and Water	Ouality:			
Physical	Criteria air pollutants		None		<b></b>			
Resources	•							
Stressors to	Cultural Resources:	Socioecor	nomic Reso	ources:	Public Health and Safety:			
Human	Physical disturbance and	Accessibil	ity		Physical interactions			
Resources	strike	Physical d	listurbance	and strike	In-air energy			
	Explosives	Airborne	acoustics		In-water energy			
Military	Ingestible Material:		Military	Mine	shapes (non-explosive)			
Expended	None		Recovera	ble				
Material			Material					
	Non-Ingestible Material:							
	None							
Sonar and	High-Frequency:							
Other	HF4							
Transducer								
Bins								
In-Water	None							
Explosive								
Bins								
Procedural	Acoustic Stressors: (Section	5.3.2)	P	hysical Distur	bance and Strike: (Section 5.3.4,			
Mitigation	Active sonar			essel moveme				
Measures			Т	owed in-wate	r devices			

Mine Warfare	Mine Warfare					
Mine Counterm	Mine Countermeasure – Ship Sonar					
Assumptions	No explosives are used.					
Used for	It is assumed that the system will be operated in areas free of obstructions and will be towed well					
Analysis	above the seafloor. Towed systems are always operated in a manner to avoid entanglement and damage. Exercises take place in water depths of 40 ft. and greater.					
	Existing placed mine shapes to be used. There is the potential for temporary placement of mine					
	shapes.					

## A.2.8.6 Mine Countermeasures – Mine Neutralization – Remotely Operated Vehicle

Mine Warfare								
Mine Countern	neasures – Mine Neutralizatio	n – Remotely C	Operated Ve	ehicles				
Short	Ship, small boat, and helicop	oter crews locat	te and	Typical Dur	ation			
Description	disable mines using remotel	y operated						
	underwater vehicles.			1.5-4 hours				
Long			-	•	ehicles to neutralize potential			
Description					ems to locate and target mine			
	shapes. Explosive mine neut	•		_	vents.			
Typical	Platforms: Rotary-wing aircr	aft, small boats	s, surface co	ombatants				
Components	Targets: Mine shapes  Systems being Trained/Tested: Airborne mine neutralization systems, in-water explosives							
Chandond				ization syst	erris, in-water explosives			
Standard Operating	Vessel safety Aircraft safety	Typical Locati	ions					
Procedures	Towed in-water device	Range Compl	lexes/Testir	ng Ranges:	Inshore Waters/Pierside:			
(Section 2.3.3)	safety	Gulf of Mexic	0		None			
(3000.011 2.3.3)	salety	Jacksonville						
		Navy Cherry						
		Virginia Capes						
Stressors to	Acoustic: Aircraft noise	Physical Disturbance and Strike:			Energy:			
Biological Resources	Vessel noise	Aircraft and aerial target strike Vessel and in-water device strike			In-air electromagnetic devices			
and Habitats	Sonar and other	Military expe			In-water electromagnetic			
	transducers	Seafloor devi			devices			
	Explosives:	Ingestion:			Entanglement:			
	In-water explosives	Military expe		rials –	Wires and cables			
		munitions						
		Military expe		rials – other	•			
Chucasanaha	Ain Ovalitan	than muni		1 \A/- 4	· O olita			
Stressors to Physical	Air Quality: Criteria air pollutants			and Water	ive byproducts			
Resources	Criteria ali poliutarits		Metals	and explosi	ive byproducts			
1100001000				other than	explosives			
			Other mat					
Stressors to	Cultural Resources:	Socioecon	omic Resou	rces:	Public Health and Safety:			
Human	Physical disturbance and	Accessibilit	ty		Physical interactions			
Resources	strike	Airborne a			In-air energy			
	Explosives	Physical di	sturbance a		In-water energy			
Military	Ingestible Material:		Military		shapes (non-explosive)			
Expended	Mine neutralizer fragments	Recoverable						
Material	Non-Ingestible Material:	Material						
	Fiber optic cables, fiber optic	ptic cans						
Sonar and	High-Frequency:				-			
Other	HF4							
Transducer								
Bins								

Mine Warfare		
Mine Countern	neasures – Mine Neutralization – Remotely Operat	ed Vehicles
In-Water	E4	
Explosive		
Bins		
Procedural	Acoustic Stressors: (Section 5.3.2)	Explosive Stressors: (Section 5.3.3)
Mitigation	Active sonar	Explosive mine countermeasure and
Measures		neutralization activities
	Physical Disturbance and Strike: (Section 5.3.4)	
	Vessel movement	
	Towed in-water devices	
Assumptions	None	
Used for		
Analysis		

## A.2.8.7 Mine Laying

Mine Warfare							
Mine Laying							
Short	Fixed-wing aircraft drop nor	n-explosive mi	ne T	ypical Dura	tion		
Description	shapes.	· capitolite iiii		hour			
Long	Fixed-wing aircraft lay offen	sive or defens			vantage for friendly forces.		
Description	Fixed-wing aircraft lay a pre-				•		
					one or more training shapes		
	per pass (four shapes total).						
Typical	Platforms: Fixed-wing aircra						
Components	Targets: None						
	Systems being Trained/Test	ted: None					
Standard	Aircraft safety	Typical Loca	tions				
Operating		Range Com	plexes/Testing	g Ranges:	Inshore Waters/Pierside:		
Procedures		Jacksonville		6 manges.	None		
(Section 2.3.3)		Navy Cherry					
		Virginia Capes					
Stressors to	Acoustic:	Physical Dis	turbance and	Strike:	Energy:		
Biological	Aircraft noise	-	aerial target	In-air electromagnetic			
Resources		Military expended materials devices					
and Habitats	Explosives:	Seafloor devices					
	None	Entanglement:					
		Ingestion:			None		
		None					
Stressors to	Air Quality:			and Water (	Quality:		
Physical	Criteria air pollutants		Metals				
Resources	Cultural Resources:	Cosinosa	nomic Resour		Dublic Health and Cafetur		
Stressors to Human	None	None	nomic Resour	ces:	Public Health and Safety: None		
Resources	None	None			None		
Military	Ingestible Material:		Military	None			
Expended	None		Recoverable				
Material	None		Material				
	Non-Ingestible Material:						
	Mine shapes (non-explosive	)					
Sonar and	None						
Other							
Transducer							
Bins							
In-Water	None						
Explosive							
Bins							
Procedural	Physical Disturbance and St		5.3.4)				
Mitigation	Non-explosive bombs and m	ine shapes					
Measures							

Mine Warfare	
Mine Laying	
Assumptions	Mine laying is similar to non-explosive bombing exercises.
Used for	These exercises primarily occur during major training exercises.
Analysis	Mine laying will typically take place in waters less than 100 ft. in depth.
	Assume 12 mine shapes are used per exercise.
	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM
	from shore.

## A.2.8.8 Mine Neutralization – Explosive Ordnance Disposal

Mine Warfare							
Mine Neutraliza	ation Explosive Ordnance Disp	posal					
Short	Personnel place limpet mine	es or disable th	nreat	Typic	cal Duration		
Description	mines using explosive charg				o 8 hours		
Long	Navy divers, typically explos	ive ordnance	disposal pe	rsonne	el, disable threat mines with explosive		
Description					sit or placing or detonating limpet mines		
	on steel structures.						
	Personnel detect identify e	valuate and r	neutralize n	nines ir	n the water with an explosive device and		
					rom 4 to 60 pounds of TNT equivalent.		
	These operations are norma		-	_			
		-		_	el also identify and place limpet mine		
	charges on a steel structure	a steel structure in the water and detonate an explosive charge of up to 2.2 pounds of					
	TNT equivalent. These opera	ations are nor	mally condi	ucted c	during daylight hours for safety reasons.		
Typical	Platforms: Small boats						
Components	Targets: Mine shapes, sub-s			n struct	ture		
	Systems being Trained/Test		•				
Standard	Vessel safety	Typical Locations					
Operating Procedures		Range Com	plexes/Test	ting Ra	anges: Inshore Waters/Pierside:		
(Section 2.3.3)		Gulf of Mex	ico		Lower Chesapeake Bay		
(3600001 2.3.3)		Jacksonville			Truman Harbor		
		Key West			Demolition Key		
		Navy Cherry Point					
_		Virginia Cap					
Stressors to	Acoustic:	Physical Dis			<del>-</del> -		
Biological Resources	Vessel noise	Vessel and i Military exp			rike None		
and Habitats	Explosives:	Seafloor de		eriais	Entanglement:		
and nabitats	In-water explosives	Scarioor ac	VICCS		None		
	water expressives	Ingestion:					
		Military exp	ended mat	erials -	– other		
		than mur	nitions				
Stressors to	Air Quality:	-	Sedimen	ts and	Water Quality:		
Physical	Criteria air pollutants		· ·	es and e	explosive byproducts		
Resources			Metals				
					er than explosives		
Chusasanaha	Cultural Resources:	Casiasas	Other ma				
Stressors to Human	Physical disturbance and	Accessibi		ources:	: Public Health and Safety: Physical interactions		
Resources	strike	Airborne	-		In-water energy		
nesources	Explosives		disturbance	and st			
Military	Ingestible Material:	,	Military		Mine shapes (non-explosive), metal		
Expended	Mine shape (explosive) fragi	ments	Recovera	ble	plates, sub-surface I-beam		
Material			Material		demolition structure		
	Non-Ingestible Material:						
	None						
Sonar and	None						
Other							
Transducer							
Bins							

Mine Warfare	Mine Warfare							
Mine Neutralization Explosive Ordnance Disposal								
In-Water	E3	E4	E5	E6	E7			
Explosive								
Bins								
Procedural	Physical Disturbance and Strike: (Section 5.3.4) Explosive Stressors: (Section 5.3.3)							
Mitigation	Vessel m	novement			Explosive mine neutralization activities involving			
Measures	Navy divers							
Assumptions	Time-delayed fuses may be used (up to 10 minutes) for charges up to 29 lb. net explosive weight in							
Used for	some locations. Charge placed anywhere in water column, including bottom.							
Analysis	For limpet mines, the detonation is enclosed by steel on the four sides and concrete on the bottom.							
	Almo	st all acou	stic energy v	will be vented to the	air.			
	Some m	ine shape:	and all of t	he sub-surface I-bea	am demolition structures will be recovered.			

# A.2.8.9 Underwater Mine Countermeasure Raise, Tow, Beach and Exploitation Operations

Mine Warfare							
	ne Countermeasure Raise, To	w Reach and I	Exploitatio	n One	erations		
Short	Personnel locate mines, per	-	LAPIOICACIO		cal Duration		
Description	neutralization, raise and tov		heach	туріс	ai baration		
Description	and conduct exploitation op		beach,	Up to 4 hours			
	intelligence gathering.	Deracions for		Op it	5 4 Hours		
Long		sive ordnance d	isposal per	sonne	el, locate mines using unmanned		
Description					h techniques. Mines are then neutralized,		
2 000	or prevented from working as they are intended. Explosive ordnance disposal personnel ensure the						
	neutralization measures are effective and the shapes are safe to bring to the beach. A lift balloon is						
			-		n. The final step, exploitation, is		
	intelligence gathering, ident	tifying the mine	and how i	t work	ks, and then disassembling it or disposing		
	of it.						
Typical	Platforms: Small boats						
Components	Targets: Mine shapes						
	Systems being Trained/Tested: None						
Standard	Vessel safety	Typical Locati	ions				
Operating		Range Comp	lexes/Test	ing Ra	inges: Inshore Waters/Pierside:		
Procedures		Gulf of Mexic			James River and tributaries		
(Section 2.3.3)		Jacksonville			Lower Chesapeake Bay		
		Key West			York River		
		Navy Cherry	Point		Naval Submarine Base Kings		
		Virginia Cape	es		Вау		
Stressors to	Acoustic:	Physical Dist	urbance a	nd Stri	ike: Energy:		
Biological	Vessel noise	Vessel and in	ı-water dev	vice st	rike None		
Resources		Seafloor devi	ices				
and Habitats	Explosives:				Entanglement:		
	None	Ingestion:			None		
	41 a 11:	None					
Stressors to	Air Quality:			s and	Water Quality:		
Physical Resources	Criteria air pollutants		None				
Stressors to	Cultural Resources:	Socioecon	omio Doso		: Public Health and Safety:		
Human	Physical disturbance and	Accessibilit		urces.	Physical interactions		
Resources	strike	Airborne a	•		Thysical interactions		
Resources	Strike	Physical di		and st	trike		
Military	Ingestible Material:		Military		Mine shapes (non-explosive)		
Expended	None		Recoverab	ole	·······o		
Material			Material				
	Non-Ingestible Material:						
	None						
Sonar and	None						
Other							
Transducer							
Bins							

Mine Warfare	Mine Warfare					
Underwater Mi	ine Countermeasure Raise, Tow, Beach and Exploitation Operations					
In-Water	None					
Explosive						
Bins						
Procedural	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Vessel movement					
Measures						
Assumptions	Exercises primarily conducted in W-50 in Virginia Capes Range Complex and beaches at Dam Neck					
Used for	Annex.					
Analysis	Mine shapes are recovered as part of the exercise.					

#### A.2.9 SURFACE WARFARE TRAINING

Surface warfare is a type of naval warfare in which aircraft, surface ships, and submarines employ weapons and sensors in operations directed against enemy surface ships or small boats. Aircraft-to-surface warfare is conducted by long-range attacks using air-launched cruise missiles, precision-guided munitions, or aircraft cannon. Surface warfare also is conducted by warships employing torpedoes, naval guns, and surface-to-surface missiles. Submarines attack surface ships using torpedoes or submarine-launched, anti-ship cruise missiles. Training in surface warfare includes surface-to-surface gunnery and missile exercises, air-to-surface gunnery and missile exercises, and submarine missile or torpedo launch events. Gunnery and missile training generally involves expenditure of ordnance against a towed target. A sinking exercise is a specialized training exercise that provides an opportunity for ship, submarine, and aircraft crews to use multiple weapons systems to deliver high-explosive ordnance on a deactivated vessel, which is deliberately sunk.

Surface warfare also encompasses maritime security, that is, the interception of a suspect surface ship by a Navy ship for the purpose of boarding-party inspection or the seizure of the suspect ship. Training in these tasks is conducted in visit, board, search and seizure exercises.

#### A.2.9.1 Bombing Exercise Air-to-Surface

Surface Warfard	Surface Warfare							
Bombing Exerci	Bombing Exercise Air-to-Surface							
Short	Fixed-wing aircrews deliver	bombs against surface	Typical Duration					
Description	targets.		1 hour					
Long Description	Fixed-wing aircraft conduct bombing exercises against stationary floating targets (e.g., MK-58 smoke buoy), towed targets, or maneuvering targets. An aircraft clears the area, deploys a smoke buoy, and then delivers high-explosive or non-explosive practice bombs on the target. A range boat may be used to deploy towed or maneuvering targets for an aircraft to attack.  Exercises for strike fighters typically involve a flight of two aircraft delivering unguided or guided munitions that may be either high-explosive or non-explosive. The following munitions may be employed by strike fighter aircraft in the course of bombing exercise: Unguided munitions including non-explosive subscale bombs (MK-76 and BDU-45), explosive and non-explosive general purpose bombs (MK-80 series), and MK-20 cluster bombs (explosive, non-explosive). Precision-guided munitions include laser-guided bombs (explosive, non-explosive), laser-guided training rounds (non-explosive), Joint Direct Attack Munitions (explosive, non-explosive).							
Typical	Platforms: Fixed-wing aircra	ift, support craft						
Components	Targets: Surface targets Systems being Trained/Test	<b>ted:</b> Bombs, non-explosi	ive practice munitions, aircraft platforms					
Standard	Vessel safety	Typical Locations						
Operating Procedures (Section 2.3.3)	Aircraft safety Weapons firing safety	Range Complexes/Tes Gulf of Mexico Jacksonville Navy Cherry Point Virginia Capes	sting Ranges: Inshore Waters/Piersid None	e:				

Surface Warfar	e			
Bombing Exerci	ise Air-to-Surface			
Stressors to	Acoustic:	-	sturbance and St	<u>.</u> ,
Biological	Aircraft noise		l aerial target stri	_
Resources	Vessel noise		in-water device s	trike devices
and Habitats	Weapons noise	Military exp	ended materials	
	Explosives:	Ingestion:		Entanglement:
	In-water explosives	_	ended materials	
	In-air explosives	munition		
		Military exp	ended materials	– other
		than mu		
Stressors to	Air Quality:	-	Sediments and	Water Quality:
Physical	Criteria air pollutants		•	explosive byproducts Metals
Resources				er than explosives
			Other material	S
Stressors to	None			
Human				
Resources		-		
Military	Ingestible Material:		Military	Surface targets (mobile)
Expended	Surface targets (mobile and s	• •	Recoverable	
Material	fragments, bomb (explosiv	e)	Material	
	fragments			
	Non-Ingestible Material:			
	Marine markers, bombs (non	-explosive)		
Sonar and	None	<u> </u>		
Other				
Transducer				
Bins				
In-Water	E9 E10	E1	2	
Explosive				
Bins				
Procedural	Physical Disturbance and Str	ike: (Section		ve Stressors: (Section 5.3.3)
Mitigation	Vessel movement		Explosi	ve bombs
Measures	Non-explosive bombs and mi	•		
Assumptions	1	non-explosiv	e bombs are the	sub-scale bombs such as the MK-76 and
Used for	BDU-48.		1. 16 .1.	
Analysis		s were not ar	nalyzed for this ac	tivity since it occurs greater than 12 NM
	from shore.			

#### A.2.9.2 Fast Attack Craft and Fast Inshore Attack Craft

Surface Warfare	9					
Fast Attack Craf	t and Fast Inshore Attack Cra	ıft				
Short	Navy ships and helicopters of	defend agains	t small	Typi	cal Dura	tion
Description	boat attacks. 2-4 hour					
Long	Navy ships and helicopters of	detect, coord	nate, and d	efend	against	multiple high speed small boats
Description					_	ve proper targeting of attack craft.
-	Only blank ordnance is used	in this activit	y. Activities	cond	lucted in	the open ocean are called Fast
	Attack Craft, while those in	littoral water	s are called I	Fast I	nshore A	ttack Craft.
Typical	Platforms: Amphibious war	fare ships, sui	rface comba	tants	, rotary-	wing aircraft
Components	Targets: None					
	Systems being Trained/Tes	ted: None				
Standard	Vessel safety	Typical Loca	itions			
Operating	Aircraft safety	Range Com	plexes/Test	ing R	anges:	Inshore Waters/Pierside:
Procedures	Weapons firing safety	Jacksonville	-			Naval Station Mayport, Florida
(Section		Virginia Cap	oes			
2.3.3) Stressors to	Acoustic:	Physical Di	sturbance a	nd S+	riko:	Energy:
Biological	Aircraft noise	-	in-water de			In-air electromagnetic
Resources	Vessel noise		l aerial targe			devices
and Habitats	Weapons noise		ended mate		NC	devices
		, . ,				
	Explosives:	Ingestion:				Entanglement:
	None	Military exp	ended mate	erials	_	None
		munition	ıs			
Stressors to	Air Quality:		Sediment	s and	l Water (	Quality:
Physical	Criteria air pollutants		Metals			
Resources	- 1. 1-					
Stressors to	Cultural Resources:		nomic Reso	urces	<b>::</b>	Public Health and Safety:
Human	Physical disturbance and strike	Accessibi	acoustics			Physical interactions
Resources	Strike		disturbance	and c	trika	In-air energy
Military	Ingestible Material:	Titysicart	Military	ana s	None	
Expended	Small-caliber projectiles (cas	sings only)	Recoverab	ole	None	
Material		,gs	Material			
	Non-Ingestible Material:					
Camanand	None					
Sonar and Other	None					
Transducer						
Bins						
In-Water	None					
Explosive						
Bins						
Procedural	Physical Disturbance and St	rike: (Section	5.3.4)			
Mitigation	Vessel movement					
Measures	Small-, medium-, and large-o					
	explosive practice munition	ons				

Surface Warfar	Surface Warfare				
Fast Attack Craft and Fast Inshore Attack Craft					
Assumptions	None				
Used for					
Analysis					

## A.2.9.3 Gunnery Exercise Air-to-Surface Medium-Caliber

Surface Warfar	e				
	se Air-to-Surface Medium-Cali	ber			
Short	Fixed-wing and helicopter air	crews fire me	edium-	Typical Dura	ation
Description	caliber guns at surface target			1 hour	
Long			rface targets		m-caliber guns. Targets simulate
Description	enemy ships, boats, swimme		_		= = =
·	target firing high-explosive o		_		=
	Helicopters will fly a racetrac	k pattern aro	und an at-se	ea target. Air	crew will engage the target with
	medium-caliber weapons. Ta	rgets range f	rom a smoke	e float, or an	empty steel drum, to high speed
	remote controlled boats and	•			
Typical	Platforms: Fixed-wing aircraf	-	_		
Components	Targets: Surface targets (e.g.		ne markers,	empty steel	drums, high speed remote
	controlled boats and jet-skis)				
	Systems being Trained/Test			ystems	
Standard	Vessel safety	Typical Loca	tions		
Operating	Aircraft safety	Range Comp	olexes/Testi	ng Ranges:	Inshore Waters/Pierside:
Procedures	Weapons firing safety	Gulf of Mex		0 0	None
(Section 2.3.3)		Jacksonville			
		Navy Cherry	/ Point		
		Virginia Cap	es		
Stressors to	Acoustic:	-	turbance an		Energy:
Biological	Aircraft noise		aerial targe		In-air electromagnetic
Resources	Vessel noise	Vessel and i			energy
and Habitats	Weapons noise	Military exp	ended mate	rials	
	Explosives:	Ingestion:			Entanglement:
	De minimis explosives	_	ended mate	rials –	None
	De minimo expresives	munition		11015	None
		Military exp	ended mate	rials – other	
		than mur			
Stressors to	Air Quality:		Sediment	and Water (	Quality:
Physical	Criteria air pollutants		Metals		
Resources			Other mat		
			Chemicals	other than 6	explosives
Stressors to	None				
Human					
Resources		-		[ c	
Military	Ingestible Material:		Military		ce targets (mobile)
Expended Material	Medium-caliber projectiles (r explosive), medium-calibe		Recoverab Material	ie	
Material	surface target (stationary)		Material		
	surface target (stationary)	iraginents			
	Non-Ingestible Material:				
	Marine markers				
Sonar and	None				•
Other					
Transducer					
Bins					

Surface Warfar	Surface Warfare					
<b>Gunnery Exerci</b>	se Air-to-Surface Medium-Caliber					
In-Water	None					
Explosive Bins						
Procedural Mitigation Measures	Physical Disturbance and Strike: (Section 5.3.4)  Vessel movement  Small-, medium-, and large-caliber non-explosive practice munitions  Explosive Stressors: (Section 5.3.3)  Explosive medium-caliber and large-caliber projectiles					
Assumptions Used for Analysis	Most medium-caliber air-to-surface gunnery exercises will be with non-explosive training projectiles. High-explosive rounds will supplement when non-explosive training projectiles are not available. Fixed-wing projectile casings remain with aircraft and rotary-wing projectile casings are expended into the water.  Two fixed-wing aircraft (400 rounds each) or one helicopter (400 rounds) per activity.  One target used per exercise; expendable smoke floats (50 percent), stationary targets (45 percent), or remote-controlled targets (5 percent).  De minimis explosives used during this activity are not quantitatively analyzed and, therefore, not included under munitions.  Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.					

## A.2.9.4 Gunnery Exercise Air-to-Surface Small-Caliber

Surface Warfar	e					
Gunnery Exerci	se Air-to-Surface Small-Calibe	r				
Short	Helicopter and tiltrotor aircr	ews, use sma	ll-caliber	Typi	cal Dura	tion
Description	guns to engage surface targets.			1 hour		
Long			etrack patte			at-sea target. Targets simulate
Description	•	•				will engage the target with small-
		_			-	drum, to high speed remote
	controlled boats and jet-skis	_	,		•	
Typical	Platforms: Rotary-wing aircr	aft, tiltrotor a	aircraft			
Components	Targets: Surface targets (e.g			, empt	y steel c	drums, high speed remote
	controlled boats and jet-skis					
	Systems being Trained/Test	ed: None				
Standard	Vessel safety	Typical Loca	tions			
Operating	Aircraft safety	Danga Cam	nlovos/Tost	ina Da		Inchara Matara/Diagrida
Procedures	Weapons firing safety	Range Com Jacksonville	=	ing Ka	inges:	Inshore Waters/Pierside: None
(Section 2.3.3)		Navy Cherry				None
		Virginia Cap				
Stressors to	Acoustic:	Physical Dis		nd Str	ike:	Energy:
Biological	Aircraft noise	Aircraft and				In-air electromagnetic
Resources	Vessel noise	Vessel and	_			devices
and Habitats	Weapons noise	Military exp	ended mat	erial	_	
	·	, .				
	Explosives:	Ingestion:				Entanglement:
	None	Military exp	ended mat	erials ·	_	None
		munition	_			
		Military exp		erials ·	– other	
		than mui				
Stressors to	Air Quality:		Sedimen	ts and		
Physical	Criteria air pollutants		Metals		Other n	naterials
Resources						
Stressors to	Cultural Resources:		nomic Reso	urces	:	Public Health and Safety:
Human	Physical disturbance and	Accessibi	•			Physical interactions
Resources	strike		acoustics	and o	tuile a	In-air energy
B.d.:Lite.m.	In markible Makeviel.	•	disturbance			a tarasta (mahila)
Military Expended	Ingestible Material: Small-caliber projectiles (nor		Military Recovera		Surrace	e targets (mobile)
Material	small-caliber casings, surfa	•	Material	DIE		
Wiaterial	(stationary) fragments	ace target	iviateriai			
	(Stationary) magnitudes					
	Non-Ingestible Material:					
	Marine markers					
Sonar and	None				·	
Other						
Transducer						
Bins						
In-Water	None					
Explosive						
Bins						

Surface Warfar	Surface Warfare				
<b>Gunnery Exerci</b>	se Air-to-Surface Small-Caliber				
Procedural	Physical Disturbance and Strike: (Section 5.3.4)				
Mitigation	Vessel movement				
Measures	Small-, medium-, and large-caliber non-explosive				
	practice munitions				
Assumptions	Most exercises will occur proximate to naval stations where MH-60 helicopters are home based and				
Used for	target services are available.				
Analysis					

## A.2.9.5 Gunnery Exercise Surface-to-Surface Boat Medium-Caliber

Surface Warfard	e					
Gunnery Exercis	se Surface-to-Surface Boat Mo	edium-Caliber				
Short	Small boat crews fire mediu	m-caliber guns at	Typical Dura	ition		
Description	surface targets.	_	1 hour			
Long	Small boat crews fire mediu	m-caliber guns at surface	targets. Boat	crews may use high or low		
Description	speeds to approach and engage targets simulating other boats, floating mines, or nearshore land					
	_	r (up to and including 40	mm) weapons	. A commonly used target is an		
	empty steel drum.					
	A number of different types	-	-	_		
	mission. Boats are most use		_			
				entering and leaving ports, as		
		-	•	rfare operations. The boats used		
	T		_	craft, rigid-hull inflatable boats, e boats use inboard or outboard		
	diesel or gasoline engines w					
Typical	Platforms: Small boats	ren entire properter or we	ace, jet propui			
Components	Targets: Surface targets (e.g	., empty steel drums)				
	Systems being Trained/Test		systems			
Standard	Vessel safety	Typical Locations				
Operating	Weapons firing safety	Range Complexes/Tes	ting Ranges:	Inshore Waters/Pierside:		
Procedures		Gulf of Mexico	ting nunges.	None		
(Section 2.3.3)		Jacksonville				
		Navy Cherry Point				
		Northeast				
		Virginia Capes				
Stressors to	Acoustic:	Physical Disturbance a		Energy:		
Biological	Vessel noise	Vessel and in-water de		None		
Resources and Habitats	Weapons noise	Military expended mat	teriai	Entanglement:		
and Habitats	Explosives:	Ingestion:		None		
	In-water explosives	Military expended mat	terial –	None		
		munitions				
		Military expended mat	terial – other			
		than munitions				
Stressors to	Air Quality:		ts and Water			
Physical	Criteria air pollutants Explosives and explosive byproducts					
Resources		Metals				
		Chemica Other ma	ls other than e	explosives		
Stressors to	Cultural Resources:	Socioeconomic Reso		Public Health and Safety:		
Human	Physical disturbance and	Accessibility	Jui Ces.	Physical interactions		
Resources	strike	Airborne acoustics		In-water energy		
	Explosives	Physical disturbance	and strike			
	Explosives	Physical disturbance	and strike			

Surface Warfar	Surface Warfare							
<b>Gunnery Exerci</b>	Gunnery Exercise Surface-to-Surface Boat Medium-Caliber							
Military Expended Material	Ingestible Material:  Medium-caliber projectile (explosive) fragments, medium-caliber casings, surface target (stationary) fragments  Non-Ingestible Material: Surface targets (stationary)	Military Recoverable Material	Surface target (mobile)					
Sonar and Other Transducer Bins	None							
In-Water Explosive Bins	E1							
Procedural Mitigation Measures	Physical Disturbance and Strike: (Section 5.3.4)  Vessel movement  Small-, medium-, and large-caliber non-explosive practice munitions  Explosive Stressors: (Section 5.3.3)  Explosive medium-caliber and large-caliber projectiles							
Assumptions Used for Analysis	Approximately 500 rounds expended per One target used per exercise, typically a s		uch as a 50-liter steel drum.					

## A.2.9.6 Gunnery Exercise Surface-to-Surface Boat Small-Caliber

Surface Warfar	e					
	se Surface-to-Surface Boat Sm	nall-Caliber				
Short	Small boat crews fire small-o	caliber guns a	t surface	Typic	cal Duration	
Description	targets.			1 hour		
Long	_	caliber guns a	t surface tar	gets. I	Boat crews may use high or low speeds to	
Description	approach and engage target	s simulating o	other boats,	swimı	mers, floating mines, or nearshore land weapons. A commonly used target is an	
	A number of different types of boats are used depending on the unit using the boat and their mission. Boats are most used to protect ships in harbors and high value units, such as: aircraft carriers, nuclear submarines, liquid natural gas tankers, etc., while entering and leaving ports, as well as to conduct riverine operations, and various naval special warfare operations. The boats used by these units include: small unit river craft, combat rubber raiding craft, rigid-hull inflatable boats, patrol craft, and many other versions of these types of boats. These boats use inboard or outboard, diesel or gasoline engines with either propeller or water jet propulsion.					
Typical	Platforms: Small boats					
Components	Targets: Surface targets (e.g		l drums)			
	Systems being Trained/Test					
Standard	Vessel safety	Typical Loca	itions			
Operating Procedures	Weapons firing safety	Range Com Gulf of Mex	plexes/Testi	ing Ra	anges: Inshore Waters/Pierside: None	
(Section 2.3.3)		Jacksonville			None	
		Navy Cherry				
		Northeast	y i omic			
		Virginia Cap	oes			
Stressors to	Acoustic:		sturbance ar	nd Str	ike: Energy:	
Biological	Vessel noise	Vessel and	in-water dev	ice st	rike None	
Resources	Weapons noise	Military exp	ended mate	erial		
and Habitats					Entanglement:	
	Explosives:	Ingestion:			None	
	None		ended mate	erials -	_	
		munition	_	-ا-ئس	athar	
		Military exp	oended mate	eriais -	– otner	
Stressors to	Air Quality:	than mu		s and	Water Quality:	
Physical	Criteria air pollutants		Metals	Juilu	Other materials	
Resources	Circoita dii poliataitto				Care materials	
Stressors to	Cultural Resources:	Socioeco	nomic Reso	urces	: Public Health and Safety:	
Human	Physical disturbance and	Accessibility Physical interactions				
Resources	strike	Airborne acoustics				
		Physical o	disturbance a	and st	trike	
Military	Ingestible Material:		Military		Surface target (mobile)	
Expended	Small-caliber (non-explosive)	) projectiles,	Recoverab	le		
Material	small-caliber casings		Material			
	Non-to-coattlet AA to to to					
	Non-Ingestible Material:					
	Surface target (stationary)					

Surface Warfar	Surface Warfare				
<b>Gunnery Exerci</b>	se Surface-to-Surface Boat Small-Caliber				
Sonar and	None				
Other					
Transducer					
Bins					
In-Water	None				
Explosive					
Bins					
Procedural	Physical Disturbance and Strike: (Section 5.3.4)				
Mitigation	Vessel movement				
Measures	Small-, medium-, and large-caliber non-explosive				
	practice munitions				
Assumptions	The majority of exercises will occur proximate to naval stations.				
Used for	Exercises will occur relatively nearshore due to short range of boats and safety concerns. Exercises				
Analysis	mostly occur within 3 NM of the shoreline, but can occur further from shore.				

## A.2.9.7 Gunnery Exercise Surface-to-Surface Ship Large-Caliber

Surface Warfar	e				
Gunnery Exerci	se Surface-to-Surface Ship – L	arge-Caliber			
Short	Surface ship crews fire large	-caliber guns at	Typical Dura	tion	
Description	surface targets.	•	Up to 3 hour		
Long Description	caliber (typically 57 mm and	l 5-inch) guns. Targets inc e target, or a specially co	clude the QST- nfigured remo	sea with their main battery large- 35 seaborne powered target, high te controlled watercraft. Some	
	The exercise proceeds with tracked by radar and when we "warning shots." As threats	within a predetermined r	ange, it is enga		
	This exercise may involve a sexercise involving multiple s			ne context of a coordinated larger e.	
	Large-caliber guns will also k weapon maintenance.	oe fired during weapon c	ertification eve	ents and in conjunction with	
	During all exercises, either high-explosive or non-explosive rounds may be used. High-explosive rounds can either be fused for detonation on impact (with water surface or targets), or for proximit to the target (in air detonation).				
Typical Components	Platforms: Surface combatants Targets: Surface targets (e.g., QST-35 seaborne powered targets, high speed maneuverable surface targets, or specially configured remote controlled water craft) Systems being Trained/Tested: Large-caliber gun systems				
Standard	Vessel safety	Typical Locations			
Operating Procedures (Section 2.3.3)	Weapons firing safety	Range Complexes/Tes Gulf of Mexico Jacksonville Navy Cherry Point Virginia Capes Other AFTT Areas	ting Ranges:	Inshore Waters/Pierside: None	
Stressors to	Acoustic:	Physical Disturbance a	and Strike:	Energy:	
Biological Resources and Habitats	Vessel noise Weapons noise	Vessel and in-water de Military expended mat	vice strike	In-air electromagnetic devices In-water electromagnetic	
	Explosives: In-water explosives In-air explosives	Ingestion: Military expended material munitions Military expended material		devices  Entanglement: None	
Stressors to	Air Quality:	Sedimen	ts and Water	Quality:	
Physical Resources	Criteria air pollutants	Metals	es and explosiv Is other than e aterials		
Stressors to Human Resources	None				

Surface Warfar	e						
Gunnery Exercise Surface-to-Surface Ship – Large-Caliber							
Military Expended Material	Ingestible Material: Surface target (stationary)fragments, large-caliber projectile (explosive) fragments  Non-Ingestible Material: Large-caliber projectiles (non-explosive), large-caliber casings, kinetic energy round, sabot- kinetic energy round	Military Recoverable Material	Surface target (mobile)				
Sonar and Other Transducer Bins	None						
In-Water Explosive Bins	E3 E5						
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Weapons firing noise  Physical Disturbance and Strike: (Section of Vessel movement Small-, medium-, and large-caliber non-expractice munitions	Explosiv proj 5.3.4)	ve Stressors: (Section 5.3.3) ve medium-caliber and large-caliber jectiles				
Assumptions Used for Analysis	For analytical purposes assume all high-ex water surface or target.  After impacting the water, the high-explos surface. Non-explosive rounds, and frag bottom of the ocean.  Assume each non-explosive projectile will firing will also expend a metallic sleeve Stressors to human resources were not an from shore.	sive rounds are ex gments from the h be up to 5 in. in c used to convey th	spected to detonate within 33 ft. of the nigh-explosive rounds will sink to the diameter and 30 in. in length, and each ne projectile down the gun barrel.				

## A.2.9.8 Gunnery Exercise Surface-to-Surface Ship Medium-Caliber

Surface Warfar	e					
Gunnery Exercis	se Surface-to-Surface Ship Me	edium-Caliber	f			
Short	Surface ship crews fire medi	um-caliber gu	ıns at <b>T</b> y	pical Dura	ition	
Description	surface targets.		2-3 hours			
Long	Surface ship crews fire medi	dium-caliber guns at surface targets.				
Description	Ships use medium-caliber weapons to practice defensive marksmanship, typically against a					
	stationary floating target (a					
	targets. Some targets are ex	pended durin	g the exercise a	and are no	t recovered.	
	Shipboard protection systen	ns (Close-In W	/eapon System	utilizing n	nedium-caliber projectiles would	
	train against high speed mol	bile targets.				
Typical	Platforms: Patrol combatan	-				
Components	Targets: Surface targets (e.g				ed mobile targets)	
Chandand	Systems being Trained/Test			tems		
Standard Operating	Vessel safety Weapons firing safety	Typical Loca	itions			
Procedures	Weapons ming salety	_	plexes/Testing	Ranges:	Inshore Waters/Pierside:	
(Section 2.3.3)		Virginia Cap			None	
		Navy Cherry Jacksonville	•			
		Gulf of Mex				
		Other AFTT	Areas			
Stressors to	Acoustic:	Physical Dis	sturbance and	Strike:	Energy:	
Biological	Vessel noise		in-water device		In-air electromagnetic	
Resources	Weapons noise	Military exp	oended materia	ıl	devices	
and Habitats	Explosives:	Ingestion:				
	In-water explosives	_	ended materia	ls –	Entanglement:	
	·	munition			None	
			oended materia	ls – other		
	A. A. III	than mu				
Stressors to Physical	Air Quality: Criteria air pollutants		Sediments a		<b>Quality:</b> <i>y</i> e byproducts	
Resources	Criteria ali poliutarits		Metals	ia explosiv	re byproducts	
			Chemicals ot	her than e	explosives	
			Other mater	ials		
Stressors to	Cultural Resources:		nomic Resourc	es:	Public Health and Safety:	
Human Resources	Explosives Physical disturbance and	Accessibi	lity acoustics		Physical interactions	
Resources	strike		acoustics disturbance and	l strike	In-air energy In-water energy	
Military	Ingestible Material:	, 5	Military		te targets (mobile)	
Expended	Surface target (stationary) fr	agments,	Recoverable		. ,	
Material	medium-caliber projectile	le (explosive) Material				
	fragments, medium-calibe	er casings				
	Non-Ingestible Material:					
	None					
Sonar and	None					
Other						
Transducer						
Bins						

Surface Warfar	Surface Warfare						
<b>Gunnery Exerci</b>	se Surface-to-Surface Ship Medium-Caliber	•					
In-Water	E1						
Explosive							
Bins							
Procedural	Acoustic Stressors: (Section 5.3.2)	Explosive Stressors: (Section 5.3.3)					
Mitigation	Large-caliber weapons firing	Explosive medium-caliber and large-caliber					
Measures		projectiles					
	Physical Disturbance and Strike: (Section	5.3.4)					
	Vessel movement						
Assumptions	One target used per exercise. Approximately 50 percent of targets are "Killer Tomatoes" (usually						
Used for	recovered). Approximately 35 percent are high-speed maneuvering targets, which are recovered.						
Analysis	Approximately 15 percent of targets are other stationary targets such as a steel drum that are not						
	recovered. Number or rounds per exer	cise varies depending on munitions used.					

## A.2.9.9 Gunnery Exercise Surface-to-Surface Ship Small-Caliber

Surface Warfar	e					
<b>Gunnery Exerci</b>	Gunnery Exercise Surface-to-Surface Ship Small-Caliber					
Short	Surface ship crews fire small	l-caliber guns	at	Typical	l Duration	
Description	surface targets.	J		2-3 ho		
Long	_	l-caliber guns at surface targets.				
Description	Shins use small saliber wear	pons to practice defensive marksmanship, typically against stationary				
					oon (Killer Tomato, see Figure A.2-4), a	
		•			board box. Some targets are expended	
	during the exercise and are		_		<b>0</b>	
					targets on deck. Small-caliber	
	projectiles fired during these		•			
	Shipboard protection systen targets.	ns utilizing sm	all-caliber pr	ojectile	es will train against high speed mobile	
Typical	Platforms: Navy ships					
Components	Targets: Surface targets (e.g		_		l drums, cardboard boxes)	
	Systems being Trained/Test			ems		
Standard	Vessel safety	Typical Loca	tions			
Operating Procedures	Weapons firing safety	Range Com	plexes/Testii	ng Ran	ges: Inshore Waters/Pierside:	
(Section		Gulf of Mex	tico		None	
2.3.3)		Jacksonville				
2.3.3)		Navy Cherry				
		Virginia Cap				
		Other AFTT				
Stressors to	Acoustic:	-	turbance an		<del>-</del> -	
Biological Resources	Vessel noise		in-water devi		5	
and Habitats	Weapons noise	willtary exp	ended mate	lidis	devices In-water electromagnetic	
and nabitats	Explosives:	Ingestion:			devices	
	None	_	ended mate	rials –	devices	
		munition			Entanglement:	
		Military exp	ended mate	rials – c	_	
		than mui	nitions			
Stressors to	Air Quality:		Sediments	and W	Vater Quality:	
Physical Resources	Criteria air pollutants		Metals		Other materials	
Stressors to	Cultural Resources:	Socioeco	nomic Resou	ırces:	Public Health and Safety:	
Human	Physical disturbance and	Accessibi			Physical interactions	
Resources	strike	Airborne	acoustics		In-air energy	
		Physical o	disturbance a	ınd stri	ke	
Military	Ingestible Material:		Military		Surface target (mobile)	
Expended	Small-caliber projectiles (nor		Recoverable	le		
Material	small-caliber casings, surfa (stationary) fragments	ace target	Material			
	Non-Ingestible Material:					
	None					

Surface Warfar	e
<b>Gunnery Exerci</b>	se Surface-to-Surface Ship Small-Caliber
Sonar and	None
Other	
Transducer	
Bins	
In-Water	None
Explosive	
Bins	
Procedural	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Vessel movement
Measures	Small-, medium-, and large-caliber non-explosive
	practice munitions
Assumptions	Small-caliber gun rounds per exercise: 1,000 to 3,000 non-explosive practice munitions. The majority
Used for	of the activities will occur proximate to Navy homeports in Jacksonville, Florida and Norfolk,
Analysis	Virginia.



Figure A.2-4: "Killer Tomato" Stationary Floating Target



Figure A.2-5: QST-35 Seaborne Powered Target (on Left) and High-Speed Maneuvering Surface Target (on Right)

## A.2.9.10 Integrated Live Fire

Surface Warfar	9						
Integrated Live							
Short	Naval forces defend against	a swarm of surface	Typical Dura	ition			
Description	threats (ships or small boats		,,,				
	rockets, and small-, medium	6-8 hours					
	guns.	_					
Long	Naval forces use coordinate	d tactics and deliver high	-explosive ord	nance against a swarm of surface			
Description		maritime threats. Events within this activity include: exercises for strike fighters typically involve					
	flight of two to four aircraft delivering unguided or guided munitions that may be either hi						
	T T T T T T T T T T T T T T T T T T T	_	_	bs may be surface detonating or			
	designed to detonate as an		· · · · · · · · · · · · · · · · · · ·	•			
		-	=	targets. If explosive, helicopter			
	and helicopter aircrew enga		-	elow the water's surface; fighter			
	-			nd 5-inch) guns; this exercise may			
			-	rdinated larger exercise involving			
	multiple ships, including a m		THERE OF G COO	ramatea larger exercise involving			
Typical	Platforms: Fixed-wing aircra		urface combat	tants, support craft			
Components	Targets: Surface targets (e.g						
			_	nd large-caliber gun systems,			
	aircraft platforms						
Standard	Vessel safety	Typical Locations					
Operating	Aircraft safety	Range Complexes/Tes	ting Ranges:	Inshore Waters/Pierside:			
Procedures	Weapons firing safety	Jacksonville	ting numbes.	None			
(Section 2.3.3)		Virginia Capes					
Stressors to	Acoustic:	Physical Disturbance a	and Strike:	Energy:			
Biological	Aircraft noise	Aircraft and aerial targ		In-air electromagnetic			
Resources	Vessel noise	Vessel and in-water de	vice strike	devices			
and Habitats	Weapons noise	Military expended mat	erial				
	Explosives:	Ingestion:		Entanglement:			
	In-water explosives	Military expended mat	erials –	None			
	In-air explosives	munitions					
		Military expended mat	erials – other				
		than munitions					
Stressors to	Air Quality:		ts and Water				
Physical	Criteria air pollutants	•	es and explosiv	ve pyproducts			
Resources		Metals	ls other than o	ynlosiyos			
	Chemicals other than explosives Other materials						
Stressors to	None	Other mi	uteriui3	<del>-</del>			
Human							
Resources							

Surface Warfar	Surface Warfare							
Integrated Live	ated Live Fire							
Military Expended Material	Ingestible Material:  Bomb (explosive) fragments, missile   (explosive) fragments, medium-   caliber projectiles (non-explosive),   medium-caliber and large-caliber   projectile (explosive) fragments,   medium-caliber casings, rocket   (explosive) fragments, surface target   (stationary and mobile) fragments  Non-Ingestible Material:  Bombs (non-explosive), , large-caliber   casings	Military Recoverable Material	Surface targets (mobile)					
Sonar and Other Transducer Bins	None							
In-Water Explosive Bins	E1 E3 E6		E10					
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Weapons firing  Physical Disturbance and Strike: (Section 5.2) Vessel movement Small-, medium-, and large-caliber non-expractice munitions Non-explosive missiles and rockets Non-explosive bombs	Explosi pro 5.3.4) Explosi Explosi	ve Stressors: (Section 5.3.3) ve medium-caliber and large-caliber jectiles ve missiles and rockets ve bombs					
Assumptions Used for Analysis	Stressors to human resources were not an from shore.	alyzed for this ac	tivity since it occurs greater than 12 NM					

## A.2.9.11 Laser Targeting – Aircraft

Surface Warfar	<u> </u>					
Laser Targeting						
Short	Fixed-wing and helicopter a	ircrews illuminate	Tv	pical Dura	ation	
Description	enemy targets with lasers.	ircrews mammate		2 hours		
Long	, ,	ircrew illuminate			sers for engagement by aircraft	
Description	_	nircrew illuminate enemy targets with lasers for engagement by aircra missiles. This exercise may be conducted alone or in conjunction with				
Description	_	other exercises utilizing precision guided munitions, such as surface missiles and guided rockets				
		_			te activity (e.g., air-to-surface	
	-				ethal deterrents during maritime	
	security operations (force p		also be asec	1 43 11011 10	that acteries daring martine	
Typical	Platforms: Fixed-wing aircra		rcraft unma	nned aer	ial systems	
Components	Targets: Surface targets	irt, rotary wing ar	rerare, arrive	arrica acr	iai systems	
Components	Systems being Trained/Test	ted: Aircraft platf	orms			
Standard	Aircraft safety	Typical Location				
Operating	Unmanned aerial, surface,	Typical Location	15			
Procedures	and subsurface vehicle	Range Complex	ces/Testing	Ranges:	Inshore Waters/Pierside:	
		Jacksonville			None	
(Section 2.3.3)	safety	Virginia Capes				
Stressors to	Acoustic:	Physical Distur	bance and S	Strike:	Energy:	
Biological	Aircraft noise	Aircraft and ae			In-air electromagnetic	
Resources	Vessel noise	Vessel and in-w	_		devices	
and Habitats					In-water electromagnetic	
	Explosives:	Ingestion:			devices	
	None	Military expend	ded materia	ls – other		
		than muniti			Entanglement:	
					None	
Stressors to	Air Quality:	S	ediments ar	nd Water	Quality:	
Physical	Criteria air pollutants		1etals		•	
Resources	·	C	ther materi	als		
Stressors to	None				-	
Human						
Resources						
Military	Ingestible Material:	M	ilitary	Surfac	e target (mobile)	
Expended	None		ecoverable		5 ( ,	
Material		M	aterial			
	Non-Ingestible Material:					
	None					
Sonar and	None	-		•	-	
Other						
Transducer						
Bins						
In-Water	None					
Explosive						
Bins						
Procedural	Physical Disturbance and St	rike: (Section 5.3.	4)			
Mitigation	Vessel movement					
Measures						
Assumptions	Laser targeting for missile/ro	ocket guidance wi	Il occur in a	reas wher	e these exercises also occur.	
Used for		_			since it occurs greater than 12	
Analysis	NM from shore.		,		3. 2.2.2. 2.	

## A.2.9.12 Laser Targeting – Ship

Surface Warfare							
Laser Targeting -							
Short		to air and surface	Tun	ical Duration			
Description	Surface ship crews illumina			ical Duration			
-	targets with high-energy las	ser systems. 1-2 hours wer energy laser systems that are used to create critical failures in					
Long							
Description	_	ets. System directs a directed energy beam that can penetrate thin layers					
		es (less than 1 nautical mile) that can render air and surface targets as can also be used in a low power setting as non-lethal deterrent during					
			-	power capability would not be used			
	against manned platforms of			somer capability modula not be asea			
Typical			shins co	mbat logistics, specialized high-speed			
Components	vehicles, support craft, surf		c 3111p3) co	mat logistics) specialized high speca			
	Targets: Air targets, surface						
	Systems being Trained/Tes	-	system				
Standard	High-powered laser safety	Typical Locations	•				
Operating	Unmanned aerial,						
Procedures	surface, and	Range Complexes	/Testing R	_			
(Section 2.3.3)	subsurface vehicle	Jacksonville		None			
	safety	Virginia Capes					
Stressors to	Acoustic:	Physical Disturba	nce and St	rike: Energy:			
Biological	Aircraft noise	Military expended	l material	High-energy lasers			
Resources and	Vessel noise	Vessel and in-wat	er device s	strike In-air electromagnetic			
Habitats		Aircraft and aeria	target str	ike devices			
	Explosives:						
	None	Ingestion:					
		Military expended					
		than munitions		None			
Stressors to	Air Quality:			d Water Quality:			
Physical	Criteria air pollutants	Nor	e				
Resources		-		<u> </u>			
Stressors to	None						
Human							
Resources				T - 4			
Military	Ingestible Material:	Milit	-	Surface target (mobile)			
Expended	Air target (drone) fragment		verable				
Material	Non-Ingestible Material:	Mat	eriai				
	None						
Sonar and	None						
Other							
Transducer							
Bins							
In-Water	None						
<b>Explosive Bins</b>		<u>.</u>					
Procedural	Physical Disturbance and St	trike: (Section 5.3.4)					
Mitigation	Vessel movement						
Measures							
Assumptions		-		eas where these exercises also occur.			
Used for		es were not analyze	d for this a	activity since it occurs greater than 12 NM			
Analysis	from shore.						

## A.2.9.13 Maritime Security Operations

Surface Warfare	Surface Warfare					
Maritime Secur	ity Operations					
Short	Helicopter, surfa	ace ship, and small boat crews	Typical Duration			
Description	sea, to include v	of maritime security operations at risit, board, search and seizure; iction operations; force protection; operations.	Up to 3 hours			
Long Description	Helicopter and surface ship crews conduct a suite of maritime security operations (e.g., visit, board, search and seizure, maritime interdiction operations, force protection, and anti-piracy operations). These activities involve training of boarding parties delivered by helicopters and surface ships to surface vessels for the purpose of simulating vessel search and seizure operations. Various training scenarios are employed and may include small arms with non-explosive blanks and surveillance or reconnaissance unmanned surface and aerial vehicles. The entire exercise may last two to three hours.					
		rd, Search, and Seizure: Military pers Illy under hostile conditions.	onnel from ships and aircraft board suspect			
	Maritime Interdi detaining suspec		train in pursuing, intercepting, and ultimately			
		ructure Protection and Harbor Defer Ir at sea structures, harbors, piers, ar	nse: Naval personnel train to defend oil nd other infrastructure.			
	• .	isabling Fire: Naval personnel train ir Il boats (typically operating at high s	the use of weapons to force fleeing or peeds) to come to a stop.			
	assessing threat	-	ultiple approaching, circling small craft, gst crewmates and other vessels to ensure			
	-	-	ng and interrupting piracy activity. Training ultiple small, maneuverable, and fast craft.			
Typical Components	Targets: Surface		rcraft, surface combatants, small boats			
Standard	Vessel safety	Typical Locations				
Operating Procedures (Section 2.3.3)	Aircraft safety	Range Complexes/Testing Ranges Gulf of Mexico Jacksonville Navy Cherry Point Northeast Virginia Capes	Inshore Waters/Pierside: James River and tributaries Lower Chesapeake Bay Naval Station Norfolk, Virginia Naval Station Mayport, Florida Narragansett Bay, Rhode Island Port Canaveral, Florida			
Stressors to Biological Resources and Habitats	Acoustic: Physical Disturbance and Strike: Aircraft noise Aircraft and aerial target strike Vessel noise Vessel and in-water device strike Weapons Military expended material noise		Energy: In-air electromagnetic devices In-water electromagnetic devices			
	<b>Explosives:</b> None	Ingestion: Military expended materials – mun Military expended materials – othe munitions				

Surface Warfard	e				
Maritime Secur	ity Operations				
Stressors to Physical Resources	Air Quality: Criteria air pollutants		Sediments and Metals	d Water Qu Other mat	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Accessibi Airborne	•	F I	Public Health and Safety: Physical interactions n-water energy
Military Expended Material	Ingestible Material: Small caliber projectile (casing of compression pad or plastic pit endcap – chaff and flare, flare Non-Ingestible Material: Marine marker	ston,	Military Recoverable Material	None	
Sonar and Other Transducer Bins	None				
In-Water Explosive Bins	None				
Procedural Mitigation Measures	Physical Disturbance and Strike Vessel movement	: (Section	5.3.4)		
Assumptions Used for Analysis	as naval forces need to be ab Maritime Security Operations Security Operations exercises vessels maneuvering to overt maneuvering around naval ve Maritime Security Operations	to protect terdiction g. oil platfo le to tailor s exercises s involve vo cake suspe essels), and s training e ville, Floric exercises. re exercises nclude firir	naval vessels fro operations and v orms). Maritime is training exercise typically do not essel movement, ct vessel and/or s d some event invexercises are con- la including during ess is accounted for a small caliber b	m small bo risit, board, security op es to respondinvolve live sometimes small boats olve helico ducted prong times of or in gunne lank ammu	at attack, counter piracy and search, and seizure), and serations need to remain broad and to emergent threats. If the of weapons. All Maritime is at high rates of speed (navaluations) to see the search of the se

### A.2.9.14 Missile Exercise Air-to-Surface

Surface Warfar	e						
Missile Exercise	Air-to-Surface						
Short	Fixed-wing and helicopter a	rcrews fire ai	r-to- <b>1</b>	ypical Dura	ation		
Description	surface missiles at surface to	argets.	1	hour			
Long	Fighter, maritime patrol airo	raft, and helic	copter aircrew	s fire precis	sion-guided missiles against		
Description	surface targets. Aircraft invo	involved may be unmanned.					
	Fixed-wing aircraft (fighters	nters or maritime patrol aircraft) approach an at-sea surface target from high					
		xplosive precision guided missiles.					
	Helicopters designate at-sea	surface targe	ets with a lase	r or ontics f	or a precision guided high-		
	_	_		-	aunched missiles typically pass		
	through the target's "sail," a			-			
Typical	Platforms: Fixed-wing aircra			-			
Components	Targets: Surface targets						
	Systems being Trained/Test	t <b>ed:</b> Air-to-sur	face missile s	ystems			
Standard	Aircraft safety	Typical Loca	tions				
Operating	Weapons firing safety	Range Com	plexes/Testin	g Ranges:	Inshore Waters/Pierside:		
Procedures (Section 2.3.3)	Vessel safety Unmanned aerial, surface,	lacksonvillo Nono					
(3000001 2.3.3)	and subsurface vehicle	Navy Cherry	y Point				
	safety	Virginia Capes					
	,						
Stressors to	Acoustic:	Physical Disturbance and Strike: Energy:					
Biological	Aircraft noise		l aerial target		In-air electromagnetic		
Resources	Weapons noise		ended mater		devices		
and Habitats	Vessel noise	Vessel and	in-water devic	ce strike			
	Explosives:	Ingestion:			Entanglement:		
	In-water explosives	_	ended mater	ials –	None		
		munition	ıs				
			ended mater	ials – other			
		than mu					
Stressors to	Air Quality:		Sediments				
Physical Resources	Criteria air pollutants		Chemicals of	-	ve byproducts		
Resources			Metals	_	Other materials		
Stressors to	None						
Human	-						
Resources							
Military	Ingestible Material:		Military		ce targets (mobile)		
Expended	Missile (explosive) fragment		Recoverable	2			
Material	target (stationary) fragme	ents	Material				
	Non-Ingestible Material:						
	None						
Sonar and	None						
Other	-						
Transducer							
Bins							

Surface Warfar	e					
Missile Exercise Air-to-Surface						
In-Water	E6	E8	E10			
Explosive						
Bins						
Procedural	Physical Disturb	ance and Strike	: (Section 5.3.4)	Explosive Stressors: (Section 5.3.3)		
Mitigation	Non-explosive n	nissiles and rock	ets	Explosive missiles and rockets		
Measures	Vessel moveme	nt				
Assumptions	Assume one missile and one target are used per exercise.					
Used for	While missiles could explode above the water's surface after contacting targets, analysis assumes					
Analysis	that all warheads explode at or just below the water's surface.					
	Stressors to hur	nan resources w	ere not analyzed f	or this activity since it occurs greater than 12 NM		
	from shore.					

### A.2.9.15 Missile Exercise Air-to-Surface - Rocket

Surface Warfar	Α						
	Air-to-Surface—Rocket						
Short		h nracisian qui	dod and	Typical F	Nuration		
	Helicopter aircrews fire both		ded and	Typical D	Duration		
Description	unguided rockets at surface			1 hour			
Long			_	-	otics for precision-guided high		
Description	explosive or non-explosive p						
Typical	-	latforms: Rotary-wing aircraft, unmanned aerial systems					
Components	Targets: Surface targets						
	Systems being Trained/Tes			systems			
Standard	Aircraft safety	Typical Locations					
Operating	Weapons firing safety	Range Complexes/Testing Ranges: Inshore Waters/Pierside:					
Procedures	Unmanned aerial, surface,	Gulf of Mexi		ing Nange	None		
(Section 2.3.3)	and subsurface vehicle	Jacksonville	CO		None		
	safety	Navy Cherry	Doint				
	Towed in-water device	Virginia Cape					
	safety	Virginia Cape	<b>E</b> 3				
Stressors to	Acoustic:	Physical Dist	turbance a	nd Strike:	Energy:		
Biological	Aircraft noise	Aircraft and	aerial targe	et strike	In-air electromagnetic		
Resources	Weapons noise	Vessel and ir	n-water dev	/ice	devices		
and Habitats	Vessel noise	Military expended material					
					Entanglement:		
	Explosives:	Ingestion:			None		
	In-water explosives	Military expe	ended mate	erials –			
	In-air explosives	munitions	5				
		Military expe	ended mate	erials – otl	ner		
		than mun	itions				
Stressors to	Air Quality:		Sediment	s and Wa	ter Quality:		
Physical	Criteria air pollutants		Explosive	s and expl	osive byproducts		
Resources			Chemicals	s other tha	an explosives		
			Metals		Other materials		
Stressors to	None	<del></del>	-		<del>-</del>		
Human							
Resources							
Military	Ingestible Material:		Military	Su	rface target (mobile)		
Expended	Rocket (explosive) fragment	s, surface	Recoverab		<b>3</b> ( <del>-</del> /		
Material	target (stationary) fragme		Material				
	flechettes	,					
	Non-Ingestible Material:	l					
	Rockets (non-explosive), roc	ket (non-					
	explosive): flechette						
Sonar and	None				•		
Other							
Transducer							
Bins							
In-Water	E3						
Explosive	LJ						
Bins							
כוווט							

Surface Warfar	Surface Warfare						
Missile Exercise	Missile Exercise Air-to-Surface—Rocket						
Procedural	Physical Disturbance and Strike: (Section 5.3.4) Explosive Stressors: (Section 5.3.3)						
Mitigation	Non-explosive missiles and rockets Explosive missiles and rockets						
Measures	Vessel movement						
Assumptions	Assume all explosive rockets detonate in the water.						
Used for	Rockets may be used in conjunction with force protection events.						
Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.						
	Assume 5 percent of nonexplosive practice munitions in Virginia Capes Range Complex and						
	Jacksonville Range Complex are flechette rockets.						

### A.2.9.16 Missile Exercise Surface-to-Surface

Surface Warfar	e					
Missile Exercise	Surface-to-Surface					
Short	Surface ship crews defend a	gainst surface	threats	Typica	al Duration	
Description	(ships or small boats) and er missiles.	ngage them w	ith	2-5 hours		
Long Description	enemy ships or boats.	rface ships launch missiles at surface maritime targets with the goal of destroying or disabling emy ships or boats. Let detecting and confirming a surface threat, the ship will fire a precision guided surface missile.				
	surface missiles. While past	Harpoon exer se events to c	cises occur	red duri	over the horizon) Harpoon (or similar) ing sinking exercises, the requirement f a sinking exercise target is unavailable,	
	Events with littoral combat and patrol combatant ships will involve shorter range surface missiles, such as Hellfire and Griffin. Events with littoral combat and patrol combatant ships would be to certify ship's crew to defend against "close-in" (less than 10 miles) surface threats.  These exercises are live fire, meaning that a missile is fired down range. Surface missiles could be equipped with either high-explosive or non-explosive warheads.					
Typical	Platforms: Surface combata	nts				
Components	Targets: Surface targets	gets: Surface targets				
	Systems being Trained/Test	ested: Surface-to-surface missile systems				
Standard	Vessel safety	Typical Loca	tions			
Operating	Weapons firing safety	Range Com	plexes/Test	ting Rar	nges: Inshore Waters/Pierside:	
Procedures		Jacksonville	=		None	
(Section 2.3.3)		Virginia Cap	es			
Stressors to	Acoustic:	Physical Dis	sturbance a	nd Strik	ke: Energy:	
Biological	Vessel noise	Vessel and	in-water de	vice stri	ike In-air electromagnetic	
Resources and Habitats	Weapons noise	Military exp	ended mat	erials	devices	
	Explosives:	Ingestion:			Entanglement:	
	In-water explosives	Military exp	ended mat	erials –	None	
		munition	-			
		Military exp		erials –	other	
<u> </u>	4: 0 !!!	than mui			W O. I''	
Stressors to	Air Quality:				Water Quality:	
Physical Resources	Criteria air pollutants		-		xplosive byproducts than explosives	
Resources			Metals	is other	Other materials	
Stressors to	None					
Human						
Resources						
Military	Ingestible Material:	·	Military		Surface target (mobile)	
Expended	Missile (explosive) fragments	s, surface	Recovera	ble		
Material	target (stationary) fragme	nts	Material			
	Non-to-coattlet Advis 1.1					
	Non-Ingestible Material:					
	None					

Surface Warfar	е
Missile Exercise	Surface-to-Surface
Sonar and	None
Other	
Transducer	
Bins	
In-Water	E6 E10
Explosive	
Bins	
Procedural	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Vessel movement
Measures	
Assumptions	Assume one missile and one target used per exercise.
Used for	While missile could explode above the water's surface after contacting target, analysis assumes all
Analysis	warheads explode at or just below the surface.
	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM
	from shore.

# A.2.9.17 Sinking Exercise

Surface Warfar	2			
Sinking Exercise				
Short	Aircraft, ship, and submaring	e crews deliberately	Typical Dura	tion
Description	sink a seaborne target, usua ship made environmentally according to U.S. Environme standards, with a variety of	Ily a decommissioned safe for sinking ental Protection Agency		ossibly over 1-2 days
Long Description	typically conducted by aircra a full-size ship target.	s deliberately sunk using aft, surface vessels, and sommissioned ship made o	multiple weapo submarines to t environmentall	on systems. A sinking exercise is train in live ordnance delivery on ly safe for sinking according to
Typical	from shore and in water dep Ship, aircraft, and submarine	oths greater than 6,000 for e crews attack with coord e. Typically, the exercise ctable and ultimately end	eet. dinated tactics lasts for 4 to 8 ds when the tai	and deliver a variety of inert hours and possibly over 1 to 2
Components	Targets: Ship hulks Systems being Trained/Test small-caliber gun systems			systems, bombs, torpedoes,
Standard	Vessel safety	Typical Locations		
Operating Procedures (Section 2.3.3)	Aircraft safety Weapons firing safety	Range Complexes/Tes Virginia Capes sinking		Inshore Waters/Pierside: None
Stressors to Biological Resources and Habitats	Acoustic: Sonar and other transducers Aircraft noise	Physical Disturbance a Aircraft and aerial targ Vessel and in-water de Military expended mat	et strike vice strike	Energy: In-air electromagnetic devices
	Vessel noise Weapons noise	Ingestion: Military expended mat		Entanglement: Wires and cables
	Explosives: In-water explosives	munitions Military expended mat than munitions	terials – other	
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Explosive	its and Water ( es and explosiv Is other than e Ot	e byproducts
Stressors to Human Resources	None			

Surface Warfar	e	Surface Warfare					
Sinking Exercise							
Military Expended Material	Ingestible Material: Bomb (explosive) fragments, missile (explosive) fragments, large-caliber projectiles (explosive) fragments, heavyweight torpedo (explosive) fragments, heavyweight torpedo accessories  Non-Ingestible Material: large-caliber casings, guidance wires; ship hulks	Military Recoverable Material	None				
Sonar and Other Transducer Bins	Torpedoes: TORP2						
In-Water Explosive Bins	E5 E8 E9		E10	E11			
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Weapons firing noise  Physical Disturbance and Strike: (Section of Vessel movement Small-, medium-, and large-caliber non-expractice munitions Non-explosive missiles and rockets Non-explosive bombs	5.3.4) Explosion professive Explosion Sinkin	sive Stressors: (Se sive medium-calib ojectiles sive missiles and re sive bombs g exercises sives torpedoes	er and large-caliber			
Assumptions Used for Analysis	Exercises occur greater than 50 NM from so daylight hours only. Due to the distance analyzed for this activity.  The participants and assets typically included 1 full-size target ship hulk  1-5 CG, DDG, or LCS ships  1-10 F/A-18, or maritime patrol aircraft  1 or 2 MH-60 helicopters  1 E-2 aircraft for Command and Control  1 submarine  1-3 range clearance aircraft  1-2 Harpoon surface-to-surface or air-toly aircraft  2-4 Maverick or Hellfire air-to-surface  2-12 MK-80 series general purpose both  200 rounds large-caliber projectiles  1-2 MK-48 heavyweight submarine-lau	e from shore, str de: de: ol co-surface missil missiles mbs	essors to human				

### A.2.10 OTHER TRAINING EXERCISES

### A.2.10.1 Elevated Causeway System

Other Training	Other Training Exercises					
<b>Elevated Cause</b>	way System					
Short			, Т	ypical Dura	tion	
Description	A temporary pier is construc			p to 20 day	s for construction and up to 10	
	Supporting pilings are drive then later removed.	n into the sand a	nn i	-	oval (the pier can be in place for	
	their later removed.		u	p to 60 days	s)	
Long		An Elevated Causeway System (a temporary pier) is constructed off the beach. The pier is built for				
Description					pport pilings are driven into the	
	=				d and secured onto the piles with	
		-		_	rd causeway sections together	
			_	-	es, is removed at the conclusion	
	of training. The Elevated Ca				n individual training event hore training event, which can last	
	up to 30 days.	s, or during a joir	it Logistics	Over-the-si	note training event, which can last	
Typical	Platforms: Combat logistics	shins fleet sunn	ort shins s	unnort craf	†	
Components	Targets: None	этгрэ, пест зарр	ort 3mp3, 3	аррог стаг		
oopoo		ted: Elevated Cau	useway Sys	tem, includ	ing impact hammer and vibratory	
	extractor					
Standard	Pile driving safety	Typical Location	ns			
Operating		Panga Campla	vos/Tostin	z Dangası	Inchara Waters/Diercides	
Procedures		Range Complexes/Testing Ranges: Inshore Waters/Pierside: Navy Cherry Point Lower Chesapeake Bay				
(Section		ivavy Cherry PC	אווונ		Lower Chesapeake bay	
2.3.3)						
Stressors to	Acoustic:	Physical Distur			Energy:	
Biological	Vessel noise	Vessel and in-v	vater devic	e strike	None	
Resources and Habitats	Pile driving	Pile driving			Entanglament	
aliu nabitats	Explosives:	Ingestion:			Entanglement: None	
	None	None			None	
Stressors to	Air Quality:		ediments a	and Water (	Quality:	
Physical	Criteria air pollutants		lone			
Resources	'					
Stressors to	Cultural Resources:	Socioeconor	mic Resour	ces:	Public Health and Safety:	
Human	Physical disturbance and	Accessibility			Physical interactions	
Resources	strike	Airborne acc			In-water energy	
		Physical dist		d strike	In-air energy	
Military	Ingestible Material:		lilitary	None		
Expended	None		ecoverable			
Material		Material				
	Non-Ingestible Material:					
Conor and	None					
Sonar and Other	Pile driving and removal					
Transducer						
Bins						
בוווט						

Other Training	Exercises	
<b>Elevated Cause</b>	way System	
In-Water	None	
Explosive		
Bins		
Procedural	Physical Disturbance and Strike: (Section 5.3.4)	Acoustic Stressors: (Section 5.3.2)
Mitigation	Vessel movement	Pile driving
Measures		
Assumptions	None	•
Used for		
Analysis		

# A.2.10.2 Precision Anchoring

Other Training Ex	xercises					
Precision Anchor						
Short			Т	ypical Dura	ntion	
Description	Releasing of anchors in des	signated location	nns —	Jp to 1 hour		
Long	Ship crews choose the best	t available anch		•		
Description	T	determine its position when anchor is dropped to demonstrate calculating and plotting the				
		anchor's position within 100 yards of center of planned anchorage.				
Typical	Platforms: Navy ships					
Components	Targets: None					
	Systems being Trained/Te	sted: None				
Standard	Vessel safety	Typical Locat	ions			
Operating		Panga Comp	loves/Testin	a Danger	Inchara Waters/Diercides	
Procedures		Range Comp Gulf of Mexic		g Kaliges.	Inshore Waters/Pierside: Naval Station Mayport, Florida	
(Section 2.3.3)		Jacksonville	CO		James River and tributaries	
		Virginia Cape	20		James River and tributaries	
Stressors to	Acoustic:	Physical Dist		Strike	Energy:	
Biological	Vessel noise	Vessel and in			In-air electromagnetic	
Resources and	vesser noise	Seafloor dev		C Strike	devices	
Habitats	Explosives:	Seamon devices devices				
	None	Ingestion:			Entanglement:	
		None			None	
Stressors to	Air Quality:	-	Sediments	and Water	Quality:	
Physical	Criteria air pollutants		None			
Resources						
Stressors to	<b>Cultural Resources:</b>	Socioecon	omic Resour	ces:	Public Health and Safety:	
Human	Physical disturbance and	Accessibili	ty		Physical interactions	
Resources	strike	Airborne a	coustics		In-air energy	
		Physical di	isturbance ar	nd strike		
Military	Ingestible Material:		Military	None		
Expended	None		Recoverable	•		
Material			Material			
	Non-Ingestible Material:					
	None				<del>.</del>	
Sonar and	None					
Other						
Transducer Bins						
In-Water	None	<del></del>		-	<del>.</del>	
Explosive Bins	NOTE					
Procedural	Physical Disturbance and S	Strike (Section	5 3 4)	<del></del>	<del></del>	
Mitigation	Vessel movement	ine. (Section	J.J. <del>4</del> /			
Measures	v cosci inovement					
Assumptions	None		-			
Used for	110110					
Analysis						

### A.2.10.3 Search and Rescue

Other Training	Evereices					
Other Training Search and Res						
Short	Helicopter and ship crews re	escue military	1	Typical Dura	tion	
Description	personnel at sea.	escue mintary				
				Up to 2 hours		
Long Description		and deploy re er. Surface ship Ship crews wo	scue swimm os would cor ould launch a	er and rescunduct man over small boat, or	direct the recovery of the	
Typical Components	submarines, small boats Targets: None Systems being Trained/Tes	<b>ted:</b> None		aircraft carrie	rs, amphibious warfare ships,	
Standard	Vessel safety	Typical Locations				
Operating Procedures (Section 2.3.3)	Aircraft safety	Range Comp Jacksonville Virginia Cap		ng Ranges:	Inshore Waters/Pierside: Mayport , Florida Kings Bay, Georgia James River and tributaries	
Stressors to Biological Resources and Habitats	Acoustic: Vessel noise Aircraft noise  Explosives:	Physical Dis Vessel and in Aircraft and Military exp	n-water dev aerial targe	ice strike t strike	Energy: In-air electromagnetic devices	
	None	<b>Ingestion:</b> None			Entanglement: None	
Stressors to Physical Resources	Air Quality: Criteria air pollutants		<b>Sediments</b> Metals	and Water (	Quality: Chemicals other than explosives	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Accessibil Airborne	•		Public Health and Safety: Physical interactions In-air energy	
Military Expended Material	Ingestible Material: None  Non-Ingestible Material: Marine markers		Military Recoverab Material	None		
Sonar and Other Transducer Bins	None			·		
In-Water Explosive Bins	None					
Procedural Mitigation Measures	Physical Disturbance and St Vessel movement	rike: (Section 5	5.3.4)			

Other Training	Exercises
Search and Res	cue
Assumptions	Locations are typical, but ships may conduct man overboard training throughout the Study Area.
Used for	
Analysis	

# A.2.10.4 Submarine Navigation

Other Training	Exercises					
Submarine Nav						
Short	Submarine crews operate so	nar for navigation and	Tyni	ical Durat	ion	
Description	detection while transiting in	_				
	during reduced visibility.	Up to 2 hours			5	
Long		perate sonar for navigation. The ability to navigate using sonar is critical				
Description	for detection while transitin	g into and out of port	during p	eriods of	reduced visibility. During this	
	activity the submarine will b	e surfaced.				
Typical	Platforms: Submarines					
Components	Targets: None					
	Systems being Trained/Tes	ted: Sonar systems				
Standard	Vessel safety	Typical Locations				
Operating		Range Complexes/T	esting R	anges:	Inshore Waters/Pierside:	
Procedures		None	J	Ū	Groton, Connecticut	
(Section 2.3.3)					Kings Bay, Georgia	
					Naval Station Mayport, Florida	
					Naval Base Norfolk, Virginia	
					Port Canaveral, Florida	
Stressors to	Acoustic:	Physical Disturbanc	e and St	rike:	Energy:	
Biological	Sonar and other	Vessel and in-water	device s	trike	None	
Resources	transducers					
and Habitats	Vessel noise	Ingestion:			Entanglement:	
		None			None	
	Explosives:					
Ct	None	C!!		114-4	N P	
Stressors to	Air Quality: None	Seaim None	ents and	d Water C	quality:	
Physical Resources	None	None				
Stressors to	Cultural Resources:	Socioeconomic R	esources	<u> </u>	Public Health and Safety:	
Human	Physical disturbance and	Accessibility			Physical interactions	
Resources	strike	Airborne acoustic	S		In-water energy	
		Physical disturbar	ice and s	trike	G,	
Military	Ingestible Material:	Militar	у	None		
Expended	None	Recove	rable			
Material	Non-Ingestible Material:	Materi	al			
	None					
Sonar and	Mid-Frequency:	High-Frequency:				
Other	MF3	HF1				
Transducer	-					
Bins						
In-Water	None		-			
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section	5.3.2)	Physica	al Disturb	ance and Strike: (Section 5.3.4)	
Mitigation	Active sonar		Vessel	movemer	nt	
Measures						

Other Training Exercises					
Submarine Nav	rigation				
Assumptions	For biological resource analysis, vessel noise and vessel strike are only analyzed for the periods while				
Used for	the submarines are surfaced, typically brief in nature. Mitigation measures related to vessel				
Analysis	movement are only considered during the period of surfacing as well.				
	For human resource stressor analysis, physical disturbance and strike and physical interactions are				
	only analyzed for the periods while the submarine are surfaced, typically brief in nature.				

# A.2.10.5 Submarine Sonar Maintenance and Systems Checks

Other Training	Exercises							
Submarine Son	ar Maintenance and Systems	Checks						
Short	Maintenance of submarine	sonar and oth	er	Typic	al Dura	tion		
Description	system checks are conducte	d pierside or a	at sea.	Up to 1 hour				
Long	A submarine performs perio	dic maintenai	nce on the A	AN/BQ	Q-10 an	nd submarine high-frequency		
Description	sonar systems while in port	sonar systems while in port or at sea. Submarines conduct maintenance to their sonar systems in						
	shallow water near their homeport, however, sonar maintenance could occur anywhere as the							
	system's performance may	warrant.						
Typical	Platforms: Submarines							
Components	Targets: None							
	Systems being Trained/Tes	-					_	
Standard	Vessel safety	Typical Loca	tions					
Operating		Range Com	plexes/Test	ing Ra	nges:	Inshore Waters/Pierside:		
Procedures		Jacksonville	-	•	J	Groton, Connecticut		
(Section 2.3.3)		Northeast				Kings Bay, Georgia		
		Virginia Cap			Norfolk, Virginia			
		Other AFTT	Areas			Port Canaveral, Florida		
Stressors to	Acoustic:	Physical Dis	sturbance a	nd Stri	ike:	Energy:		
Biological	Sonar and other	Vessel and i	in-water de	vice sti	rike	None		
Resources	transducers							
and Habitats	Vessel noise	Ingestion:				Entanglement:		
	Fordards and	None				None		
	<b>Explosives:</b> None							
Stressors to	Air Quality:	-	Codimoni	te and	Matar	Quality		
Physical	None		Sediment None	is and	water	Quanty.		
Resources	None		None					
Stressors to	Cultural Resources:	Socioeco	nomic Reso	urces:	<u> </u>	Public Health and Safety:		
Human	None	None				In-water energy		
Resources								
Military	Ingestible Material:	<del>-</del>	Military		None	-		
Expended	None		Recoveral	ble				
Material	Non-Ingestible Material:		Material					
	None							
Sonar and	Mid-Frequency:						_	
Other	MF3							
Transducer								
Bins								
In-Water	None							
Explosive								
Bins								
Procedural	Acoustic Stressors: (Section	5.3.2)		-		bance and Strike: (Section 5.3.4)	)	
Mitigation	Active sonar		Ve	essel n	noveme	ent		
Measures							_	
Assumptions	"Other AFTT Areas" refers to		_	range	comple	exes and testing ranges.		
Used for	Activities occurring within 12	2 NM are piers	side.					
Analysis								

### A.2.10.6 Submarine Under Ice Certification

Other Training E	xercises						
	er Ice Certification						
Short	Submarine crews operate s	sonar while tra	ensiting	Typic	cal Durat	tion	
Description	under ice. Ice conditions ar						
	training and certification events.			Up to 6 hours per day over 5 days			
Long	Submarine crews train to o	Submarine crews train to operate under ice. Ice conditions are simulated during training an					
Description	certification exercises. A sir	ngle exercise is	s comprised	d of 30	) hours o	f training, sprea	ad out over 5 days
	in 6-hour training sessions.	·					
Typical	Platforms: Submarines						
Components	Targets: None						
	Systems being Trained/Te	sted: Sonar sy	stems				
Standard	Vessel safety	Typical Locat	tions				
Operating		Damas Camar	alawaa /Taab	: D.		Inchese Mate	ua /Diamaida
Procedures		Range Comp	oiexes/ i est	ing Ka	inges:	Inshore Wate	rs/Pierside:
(Section 2.3.3)		Jacksonville	Doint			None	
		Navy Cherry Point Northeast					
		Virginia Capes					
Stressors to	Acoustic:	Physical Disturbance and Strike: Energy:					
Biological	Sonar and other	Vessel and i				None	
Resources and	transducers	Military exp			TIKE	None	
Habitats	Vessel noise	willitary exp	chaca mate	ciiais		Entanglem	ent·
Tidorcato	Vesser Holse	Ingestion:				Wires and	
	Explosives:	None				wii es ana	cables
	None	None					
Stressors to	Air Quality:	-	Sediment	ts and	Water C	Duality:	
Physical	None		Metals			<b>.</b>	
Resources							
Stressors to	None	-	-		-		
Human							
Resources							
Military	Ingestible Material:		Military		None		
Expended	None		Recoverab	ole			
Material			Material				
	Non-Ingestible Material:						
	Expended bathythermogra	ph					
Sonar and	High-Frequency:						
Other	HF1						
Transducer							
Bins							
In-Water	None						
<b>Explosive Bins</b>							
Procedural	Acoustic Stressors: (Section	n 5.3.2)		-			e: (Section 5.3.4)
Mitigation	Active sonar		Ve	essel r	novemer	nt	
Measures							
Assumptions	Stressors to human resource	ces were not a	nalyzed for	this a	ctivity sir	nce it occurs gr	eater than 12 NM
Used for	from shore.						
Analysis							

# A.2.10.7 Surface Ship Object Detection

Mine Warfare						
Surface Ship Ob	ject Detection					
Short	Ship crews detect and avoid	mines while		Typical Dura	ation	
Description	navigating restricted areas c	or channels usi	ng active	Un to 2 hours		
	sonar.			Up to 2 hours		
Long	Surface ship crews detect ar	nd avoid mines or other underwater hazardous objects while navigatir				
Description		_			Ship utilizes unmanned surface	
				•	unting) equipment. Systems will	
		e greater than	40 ft. to de	ep water. Exe	ercises could be embedded within	
	major training exercises.					
Typical	Platforms: Surface combata	nts, unmanned	d surface ve	ehicles		
Components	Targets: Mine shapes					
	Systems being Trained/Test					
Standard	Vessel safety	Typical Locat	tions			
Operating	Unmanned aerial, surface,	Range Comp	lexes/Test	ing Ranges:	Inshore Waters/Pierside:	
Procedures	and subsurface vehicle	None	•	0 0	Mayport, Florida	
(Section 2.3.3)	safety Towed in-water device				Norfolk, Virginia	
	safety					
Stressors to	Acoustic:	Physical Dist	turbance a	nd Strika:	Energy:	
Biological	Sonar and other	Physical Disturbance and Strike: Vessel and in-water device strike			In-air electromagnetic	
Resources	transducers	Seafloor dev		rice strike	devices	
and Habitats	Vessel noise	Scanoor acv	1003		In-water electromagnetic	
	Vessel Helse	Ingestion:			devices	
	Explosives:	None			461.665	
	None				Entanglement:	
					None	
Stressors to	Air Quality:		Sediment	s and Water	Quality:	
Physical	Criteria air pollutants		None			
Resources						
Stressors to	<b>Cultural Resources:</b>	Socioecor	nomic Reso	urces:	Public Health and Safety:	
Human	Physical disturbance and	Accessibil	ity		Physical interactions	
Resources	strike	Airborne a			In-air energy	
		Physical d	isturbance	and strike	In-water energy	
Military	Ingestible Material:		Military		shapes (non-explosive)	
Expended	None		Recoverab	ole		
Material	Non-Ingestible Material:		Material			
	None					
Sonar and	Mid-Frequency:	High-Fred	quency:	•		
Other	MF1K	HF8	-			
Transducer						
Bins						
In-Water	None	-		-	-	
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section	5.3.2)	Pl	nysical Distur	bance and Strike: (Section 5.3.4)	
Mitigation	Active sonar			essel movem		
Measures			To	wed in-wate	r devices	

Mine Warfare	
Surface Ship Ok	pject Detection
Assumptions	None
Used for	
Analysis	

# A.2.10.8 Surface Ship Sonar Maintenance and Systems Checks

Other Training	Exercises					
Surface Ship So	nar Maintenance and System	s Checks				
Short	Maintenance of surface ship	sonar and ot	her	Typic	al Dura	ition
Description	system checks are conducte				4 hour	
Long		face ships performing periodic mainten			nance to the AN/SQS-53 sonar and	
Description		port or at sea. This maintenance takes up to 4 hours. Surface ships				
·	operate active sonar system	•				
	however, sonar maintenanc	e could occur	anywhere as	s the	system'	s performance may warrant.
Typical	Platforms: Surface combata	nts				
Components	Targets: None					
	Systems being Trained/Tes	<b>ted:</b> Sonar sys	tems			
Standard	Vessel safety	Typical Loca	tions			
Operating		Panga Cam	nlovos /Tosti	na Da	naosi	Inchara Waters/Diercide
Procedures		Jacksonville	plexes/Testi	iig Ka	nges.	Inshore Waters/Pierside: Naval Station Mayport, Florida
(Section 2.3.3)		Navy Cherry				Naval Station Norfolk, Virginia
						Mavar Station Norrolk, Virginia
		Virginia Capes Other AFTT Areas				
Stressors to	Acoustic:		sturbance an	nd Str	ike:	Energy:
Biological	Sonar and other	=	in-water dev			In-air electromagnetic
Resources	transducers	vesser and i	iii watei aev	ice st	ike	devices
and Habitats	Vessel noise	Ingestion:				actions
		None				
	Explosives:					Entanglement:
	None					None
Stressors to	Air Quality:	-	Sediments	s and	Water	Quality:
Physical	Criteria air pollutants		None			
Resources						
Stressors to	Cultural Resources:	Socioeco	nomic Resoເ	urces:		Public Health and Safety:
Human	None	None				In-water energy
Resources		<del>-</del>				
Military	Ingestible Material:		Military		None	
Expended	None		Recoverab	le		
Material	Non-Ingestible Material:		Material			
	None					
Sonar and	Mid-Frequency:	High-Fre	quency:			
Other	MF1	HF8	•			
Transducer						
Bins						
In-Water	None					
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section	5.3.2)		-		bance and Strike: (Section 5.3.4)
Mitigation	Active sonar		Ve	essel n	noveme	ent
Measures						
Assumptions	"Other AFTT Areas" refers to		_	range	comple	exes and testing ranges.
Used for	Activities occurring within 12	2 NM are piers	side.			
Analysis						

# A.2.10.9 Waterborne Training

Short   Description   Personnel launch, operate, and recover a variety of small boats to achieve certifications such as coxswain, crewman, and safety observer.   Up to 12 hours	Other Training	Exercises						
Of small boats to achieve certifications such as coxswain, crewman, and safety observer.  Up to 12 hours  In the first of include but not limited to rigid hull inflated to rigid hull infla								
Description   Of small boats to achieve certifications such as coxswain, crewman, and safety observer.   Up to 12 hours	Short	Personnel launch, operate, a	and recover a v	ariety 1	ypical Dura	ntion		
Waterborne Training may include qualification and certification as safety observer, safety swimmer coxswain, and crewman utilizing a variety of small crafts to include but not limited to rigid hull inflatables, aluminum chambered boat, stand-up paddleboards, kayaks, and jet skis. Boat crews train to launch and recover, moor to buoys, anchor, and operate a variety of missions in shallow waters.    Typical Components	Description	of small boats to achieve cer	small boats to achieve certifications such as					
coxswain, and crewman utilizing a variety of small crafts to include but not limited to rigid hull inflatables, aluminum chambered boat, stand-up paddleboards, kayaks, and jet skis. Boat crews train to launch and recover, moor to buoys, anchor, and operate a variety of missions in shallow waters.  Typical Components  Standard Operating Procedures (Section 2.3.3)  Vessel safety  Typical Locations  Range Complexes/Testing Ranges: Northeast Jacksonville Virginia Capes  Virginia Capes  Typical Locations  Range Complexes/Testing Ranges: Northeast Jacksonville Virginia Capes  Vork River James River and tributaries Lower Chesapeake Bay Narragansett Bay, Rhode Islan  Stressors to Biological Resources and Habitats  Explosives: None  Military expended materials - munitions  None	Long			tion and cert	ification as	safety observer safety swimmer		
inflatables, aluminum chambered boat, stand-up paddleboards, kayaks, and jet skis. Boat crews train to launch and recover, moor to buoys, anchor, and operate a variety of missions in shallow waters.  Typical Components  Platforms: Small boats Targets: None Systems being Trained/Tested: None  Standard Operating Procedures (Section 2.3.3)  Stessors to Biological Resources and Habitats  Resources and Habitats  inflatables, aluminum chambered boat, stand-up paddleboards, kayaks, and jet skis. Boat crews train to launch and recover, moor to buoys, anchor, and operate a variety of missions in shallow waters.  Platforms: Small boats Targets: None  Range Complexes/Testing Ranges: Northeast Jacksonville Virginia Capes  Northeast Jacksonville Virginia Capes  York River James River and tributaries Lower Chesapeake Bay Narragansett Bay, Rhode Islant  None  Military expended materials - munitions  Fintanglement: None  Military expended materials - munitions	_		•					
train to launch and recover, moor to buoys, anchor, and operate a variety of missions in shallow waters.  Typical Components  Standard Operating Procedures (Section 2.3.3)  Stessors to Biological Resources and Habitats  Explosives:  None  Train to launch and recover, moor to buoys, anchor, and operate a variety of missions in shallow waters.  Platforms: Small boats  Targets: None  Systems being Trained/Tested: None  Typical Locations  Physical Locations  Physical Locations  Stressors to Biological Resources and Habitats  Explosives:  None  Ingestion: Military expended materials - munitions  None  Military expended materials - munitions						=		
Typical Components  Platforms: Small boats Targets: None Systems being Trained/Tested: None  Vessel safety  Vessel safety  Platforms: Small boats Targets: None Systems being Trained/Tested: None  Procedures (Section 2.3.3)  Stressors to Biological Resources and Habitats  Range Complexes/Testing Ranges: Cooper River St. Johns River York River James River and tributaries Lower Chesapeake Bay Narragansett Bay, Rhode Island In-water device strike Military expended material  Explosives:  None  Physical Disturbance and Strike: Energy: None  Military expended material  Entanglement: None  Military expended materials  - munitions								
Targets: None Systems being Trained/Tested: None  Vessel safety  Vessel safety  Typical Locations  Range Complexes/Testing Ranges: Northeast Jacksonville Virginia Capes  Vork River James River and tributaries Lower Chesapeake Bay Narragansett Bay, Rhode Islan  Stressors to Biological Resources and Habitats  Resources Acoustic: Vessel noise  Vessel and in-water device strike Military expended material  Explosives: None  Ingestion: None  Military expended materials - munitions		waters.						
Systems being Trained/Tested: None  Vessel safety  Procedures (Section 2.3.3)  Stressors to Biological Resources and Habitats  Possel noise  Standard  Vessel safety  Typical Locations  Typical Locations  Range Complexes/Testing Ranges: Northeast Jacksonville Virginia Capes  Physical Disturbance and Strike: Military expended material  Explosives: None  Ingestion: Military expended materials - munitions  None  Typical Locations  Inshore Waters/Pierside: Cooper River St. Johns River York River James River and tributaries Lower Chesapeake Bay Narragansett Bay, Rhode Islandary None  Energy: None  Entanglement: None	Typical	Platforms: Small boats						
Standard Operating Procedures (Section 2.3.3)   Step   S	Components							
Range Complexes/Testing Ranges: Northeast   Cooper River   St. Johns River   York River   James River and tributaries   Lower Chesapeake Bay   Narragansett Bay, Rhode Islan								
Range Complexes/Testing Ranges: Northeast Jacksonville Virginia Capes  St. Johns River York River James River and tributaries Lower Chesapeake Bay Narragansett Bay, Rhode Islar  Stressors to Biological Resources and Habitats Resources And Habitats None Resources Res		Vessel safety	Typical Locations					
Northeast   Jacksonville   St. Johns River   York River   James River and tributaries   Lower Chesapeake Bay   Narragansett Bay, Rhode Islar			Range Comp	lexes/Testin	g Ranges:	Inshore Waters/Pierside:		
Jacksonville   Virginia Capes   York River   James River and tributaries   Lower Chesapeake Bay   Narragansett Bay, Rhode Island			Northeast			Cooper River		
Stressors to Biological Resources and Habitats  Explosives: None    Ingestion:   Military expended materials   Military expend	(3600011 2.3.3)					St. Johns River		
Stressors to Biological Resources and Habitats  Explosives: None    Ingestion: Military expended materials - munitions    Lower Chesapeake Bay Narragansett Bay, Rhode Island			Virginia Cape	Virginia Capes				
Stressors to Biological Resources and Habitats None  Restance Narragansett Bay, Rhode Island Restance and Strike: None								
Stressors to Biological Resources and Habitats  None  Lingestion: None  Military expended materials None  Military expended materials - munitions  Energy: None  Energy: None  None  Mone  Energy: None  None  None  Entanglement: None						•		
Biological Resources and Habitats  Explosives: None  Ingestion: Military expended materials - munitions  None  None  None  None  None  None  None	Character	A						
Resources and Habitats  Explosives: None  Ingestion: Military expended material  None Military expended materials - munitions			-					
and Habitats  Explosives:  None  Ingestion:  Military expended materials - munitions  Entanglement:  None  None	_	vesserrioise				Notie		
None Ingestion: None Military expended materials - munitions		Explosives:	willtary expended material			Entanglement:		
Military expended materials - munitions			Ingestion:			_		
			Military expe	ended mater	ials			
Stressors to Air Quality: Sediments and Water Quality:			- munitions					
		-			and Water	Quality:		
Physical Criteria air pollutants Metals	-	Criteria air pollutants		Metals				
Resources D. Lii and D		a la la						
Stressors to Cultural Resources: Socioeconomic Resources: Public Health and Safety:  Human Physical disturbance and Accessibility Physical interactions					ces:			
Human     Physical disturbance and     Accessibility     Physical interactions       Resources     strike     Airborne acoustics		'		•		Physical interactions		
Physical disturbance and strike	Resources	Strike			nd strike			
Military Ingestible Material: Military None	Military	Ingestible Material:						
Expended Small caliber (casings only) Recoverable	•							
Material Material	Material			Material				
Non-Ingestible Material:		Non-Ingestible Material:						
None						-		
Sonar and None		None						
Other								
Transducer Bins								
In-Water None		None						
Explosive								
Bins	-							

Other Training	Exercises		
Waterborne Training			
Procedural	Physical Disturbance and Strike: (Section 5.3.4)		
Mitigation	Vessel movement		
Measures			
Assumptions	None		
Used for			
Analysis			

#### A.3 TESTING ACTIVITIES

#### A.3.1 Naval Air Systems Command Testing Activities

Naval Air Systems Command activities will generally fall under fleet primary mission areas, such as the testing of airborne mine warfare and anti-submarine warfare weapons and systems. Naval Air Systems Command activities include, but are not limited to, the testing of new aircraft platforms (e.g., the F-35 Joint Strike Fighter aircraft), weapons, and systems (e.g., newly developed sonobuoys) that will ultimately be integrated into fleet training activities. In addition to testing new platforms, weapons, and systems, Naval Air Systems Command also conducts lot acceptance testing of sonobuoys and follow-on testing and evaluation of updated systems in support of fleet operational units. In general, the potential environmental effects from most Naval Air Systems Command testing events are similar to the associated fleet training exercises.

While many of these systems tested by Naval Air Systems Command will ultimately be used by the fleet, testing activities involving the same or similar systems may be conducted in different locations and manners than when conducted by the fleet. Because of these differences, the results of the analysis for testing activities may differ from the results for training activities.

#### A.3.1.1 Air Warfare

#### A.3.1.1.1 Air Combat Maneuver Test

Air Warfare							
Air Combat Ma	neuver Test						
Short	Aircrews engage in flight mai	neuvers designed to Typical Duration					
Description	gain a tactical advantage dur	ing combat.	Up to 2 fligh	t hours per aircraft per event			
Long	Air combat maneuver is the g	general term used to de	scribe an air-to	o-air test event involving two or			
Description	more aircraft, each engaged	in continuous proactive and reactive changes in aircraft attitude,					
	altitude, and airspeed. No we	eapons are fired during air combat maneuver activities.					
Typical	Platforms: Fixed-wing aircraf	ft					
Components	Targets: None						
	Systems being Trained/Test	ed: Aircraft platforms					
Standard	Aircraft safety	Typical Locations					
Operating	l l	Range Complexes/Tes	ting Panges:	Inshore Waters/Pierside:			
Procedures		Virginia Capes	tilig italiges.	None			
(Section 2.3.3)		viigiilia Capes		None			
Stressors to	Acoustic:	Physical Disturbance a		Energy:			
Biological	Aircraft noise	Aircraft and aerial targ	et strike	In-air electromagnetic			
Resources				devices			
and Habitats	Explosives:	Ingestion:					
	None	Military expended mat	erials – other	Entanglement:			
		than munitions		None			
Stressors to	Air Quality:		t and Water C	•			
Physical	Criteria air pollutants	Metals	Other ma	iterials			
Resources							
Stressors to	Cultural Resources:	Socioeconomic Re	esources:	Public Health and Safety:			
Human	Physical disturbance and strik	•		Physical interactions			
Resources		Airborne acoustics	-	In-air energy			
		Physical disturban	ce and strike				

Air Warfare	Air Warfare					
Air Combat Ma	Air Combat Maneuver Test					
Military	Ingestible Material:	Military	None			
Expended	Per chaff-air: one chaff-air cartridge,	Recoverable				
Material	one plastic endcap, chaff fibers	Material				
	Per flare: one casing, one compression					
	pad or one plastic piston, one plastic end cap, one O-ring					
	Non-Ingestible Material:					
	None					
Sonar and	None		-			
Other						
Transducer						
Bins						
In-Water	None					
Explosive						
Bins		<del> </del>				
Procedural	None					
Mitigation						
Measures	All agreementials represented in flaggering account	- d + - b				
Assumptions Used for	All combustible material in flares is assum water.	eu to be consume	ed before contact or the casing with the			
Analysis	water.					

### A.3.1.1.2 Air Platform - Vehicle Test

Short   Testing performed to quantify the flying qualities, handling, airworthiness, stability, controllability, and integrity of an air platform or vehicle. No explosive weapons are released during an air platform/vehicle test.    Long   The air platform/vehicle test describes the testing performed to quantify the flying qualities, handling, airworthiness, stability, controllability, and integrity of an air platform/vehicle. Integration of non-weapons system including aerial refueling tests are also conducted as part of an air platform/vehicle test. Test results are compared against design and performance specifications for compliance. The test results are also used to define stability and controllability characteristics and limitations and to improve and update existing analytical and predictive models. A wide variety of fixed-wing and rotary-wing aircraft, including unmanned aerial systems may undergo air platform/vehicle testing. No weapons are released during an Air Platform/Vehicle Test. Aircraft may employ laser detection for targeting systems and trailing antenna. Events may involve two or more fighter jet aircraft and a towed target tractor by a contracted aircraft (e.g., Learjet for laser targeting tests).  Typical Components    Platforms: Fixed-wing aircraft, rotary-wing aircraft, unmanned aerial systems Targets: None
handling, airworthiness, stability, controllability, and integrity of an air platform or vehicle. No explosive weapons are released during an air platform/vehicle test.  The air platform/vehicle test describes the testing performed to quantify the flying qualities, handling, airworthiness, stability, controllability, and integrity of an air platform/vehicle. Integration of non-weapons system including aerial refueling tests are also conducted as part of an air platform/vehicle test. Test results are compared against design and performance specifications for compliance. The test results are also used to define stability and controllability characteristics and limitations and to improve and update existing analytical and predictive models. A wide variety of fixed-wing and rotary-wing aircraft, including unmanned aerial systems may undergo air platform/vehicle testing. No weapons are released during an Air Platform/Vehicle Test. Aircraft may employ laser detection for targeting systems and trailing antenna. Events may involve two or more fighter jet aircraft and a towed target tractor by a contracted aircraft (e.g., Learjet for laser targeting tests).  Typical Components  Targets: None Systems being Trained/Tested: Aircraft platforms  Standard Operating Procedures (Section 2.3.3)  Aircraft safety  Unmanned aerial, surface, and subsurface vehicle safety  Jacksonville  Key West Navy Cherry Point
and integrity of an air platform or vehicle. No explosive weapons are released during an air platform/vehicle test.  Long Description  The air platform/vehicle test describes the testing performed to quantify the flying qualities, handling, airworthiness, stability, controllability, and integrity of an air platform/vehicle. Integration of non-weapons system including aerial refueling tests are also conducted as part of an air platform/vehicle test. Test results are compared against design and performance specifications for compliance. The test results are also used to define stability and controllability characteristics and limitations and to improve and update existing analytical and predictive models. A wide variety of fixed-wing and rotary-wing aircraft, including unmanned aerial systems may undergo air platform/vehicle testing. No weapons are released during an Air Platform/Vehicle Test. Aircraft may employ laser detection for targeting systems and trailing antenna. Events may involve two or more fighter jet aircraft and a towed target tractor by a contracted aircraft (e.g., Learjet for laser targeting tests).  Typical Components  Standard Operating Procedures (Section 2.3.3)  Aircraft safety  Unmanned aerial, surface, and subsurface vehicle safety  Inshore Waters/Pierside:  Range Complexes/Testing Ranges: Inshore Waters/Pierside:  None  Safety West Navy Cherry Point
handling, airworthiness, stability, controllability, and integrity of an air platform/vehicle. Integration of non-weapons system including aerial refueling tests are also conducted as part of an air platform/vehicle test. Test results are compared against design and performance specifications for compliance. The test results are also used to define stability and controllability characteristics and limitations and to improve and update existing analytical and predictive models. A wide variety of fixed-wing and rotary-wing aircraft, including unmanned aerial systems may undergo air platform/vehicle testing. No weapons are released during an Air Platform/Vehicle Test. Aircraft may employ laser detection for targeting systems and trailing antenna. Events may involve two or more fighter jet aircraft and a towed target tractor by a contracted aircraft (e.g., Learjet for laser targeting tests).  Typical Components  Platforms: Fixed-wing aircraft, rotary-wing aircraft, unmanned aerial systems  Targets: None Systems being Trained/Tested: Aircraft platforms  Standard Operating Procedures (Section 2.3.3)  Aircraft safety Unmanned aerial, surface, and subsurface vehicle safety  Unmanned aerial, surface, Gulf of Mexico Jacksonville Key West Navy Cherry Point
of non-weapons system including aerial refueling tests are also conducted as part of an air platform/vehicle test. Test results are compared against design and performance specifications for compliance. The test results are also used to define stability and controllability characteristics and limitations and to improve and update existing analytical and predictive models. A wide variety of fixed-wing and rotary-wing aircraft, including unmanned aerial systems may undergo air platform/vehicle testing. No weapons are released during an Air Platform/Vehicle Test. Aircraft may employ laser detection for targeting systems and trailing antenna. Events may involve two or more fighter jet aircraft and a towed target tractor by a contracted aircraft (e.g., Learjet for laser targeting tests).  Typical Components  Platforms: Fixed-wing aircraft, rotary-wing aircraft, unmanned aerial systems  Targets: None Systems being Trained/Tested: Aircraft platforms  Aircraft safety Unmanned aerial, surface, and subsurface vehicle safety  Unmanned aerial, surface, and subsurface vehicle safety  Inshore Waters/Pierside: None  Range Complexes/Testing Ranges: Inshore Waters/Pierside: None  Range Complexes/Testing Ranges: None  Systems being Trained/Tested: Aircraft platforms
Components Systems being Trained/Tested: Aircraft platforms  Standard Operating Procedures (Section 2.3.3)  Aircraft safety Unmanned aerial, surface, and subsurface vehicle safety  Safety  Typical Locations  Range Complexes/Testing Ranges: Inshore Waters/Pierside:  Gulf of Mexico Jacksonville Key West Navy Cherry Point
Components Systems being Trained/Tested: Aircraft platforms  Standard Operating Procedures (Section 2.3.3)  Aircraft safety Unmanned aerial, surface, and subsurface vehicle safety  Safety  Typical Locations  Range Complexes/Testing Ranges: Inshore Waters/Pierside:  Gulf of Mexico Jacksonville Key West Navy Cherry Point
Standard Operating Procedures (Section 2.3.3)Aircraft safety Unmanned aerial, surface, and subsurface vehicle safetyTypical Locations(Section 2.3.3)Range Complexes/Testing Ranges: Gulf of Mexico Jacksonville Key West Navy Cherry PointInshore Waters/Pierside: None
Operating Procedures (Section 2.3.3) Unmanned aerial, surface, and subsurface vehicle safety  Range Complexes/Testing Ranges: Inshore Waters/Pierside: Gulf of Mexico Jacksonville Key West Navy Cherry Point
Procedures (Section 2.3.3) and subsurface vehicle safety  Gulf of Mexico Jacksonville Key West Navy Cherry Point
(Section 2.3.3) safety Jacksonville Key West Navy Cherry Point
Key West Navy Cherry Point
Navy Cherry Point
Navy Cherry Point
Stressors to Acoustic: Physical Disturbance and Strike: Energy:
Biological Aircraft noise Aircraft and aerial target strike In-air electromagnetic
Resources Military expended material devices
and Habitats Explosives:
None Ingestion: Entanglement:
Military expended materials – other None
than munitions
Stressors to Air Quality: Sediments and Water Quality:
Physical Criteria air pollutants Metals Other materials
Resources
Stressors to Cultural Resources: Socioeconomic Resources: Public Health and Safety:
Human Physical disturbance and strike Accessibility Physical interactions
Resources Airborne acoustics In-air energy

Air Warfare	Air Warfare				
Air Platform - V	Air Platform - Vehicle Test				
Military Expended Material	Ingestible Material: Per one chaff-air: one chaff-air cartridge, one plastic endcap, chaff fibers Per one flare: one compression pad or one plastic piston, one plastic end cap, one O-ring  Non-Ingestible Material:	Military Recoverable Material	None		
	Bomb (Non-explosive)				
Sonar and Other Transducer Bins	None				
In-Water Explosive Bins	None				
Procedural Mitigation Measures	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement				
Assumptions Used for Analysis	None				

# A.3.1.1.3 Air Platform Weapons Integration Test

Air Warfare						
Air Platform Weapo	una Interpretion Toot					
•						
Short Description	Testing performed to qu	-		pical Duration		
	compatibility of weapor					
	from which they would		I IIn	to 2.5 flight hours per aircraft per event		
	released. Non-explosive	weapons or	snapes			
	are used.					
Long Description	T	ons integration test describes the testing performed to quantify the				
		ons with the aircraft from which they would be released. Tests evaluate e weapon and its carriage, suspension, and launch equipment with the				
		•				
	=	_		gnated aircraft. Additional tests assess the		
	T	-	-	m the aircraft at combat velocities,		
		•	•	pared against design specifications for performance characteristics and to improve		
Typical	and update existing ana					
Typical	Platforms: Fixed-wing a	ircrait, unma	imed aeriai syste	ems		
Components	Targets: None	/Tastad: N/un	itions firing/laun	aching systems		
6	Systems being Trained		_	iching systems		
Standard	Aircraft safety	Typical Loca				
Operating	Unmanned aerial,	_	plexes/Testing F	_		
Procedures	surface, and subsurface vehicle	Virginia Cap	oes	None		
(Section 2.3.3)						
	safety					
Chusasaus ha	A	Dhusiaal Dist		die. France.		
Stressors to	Acoustic:	-	urbance and Str			
Biological	Aircraft noise	Aircraft and a	aerial target strik	ke In-air electromagnetic		
Biological Resources and		Aircraft and a				
Biological	Aircraft noise Weapons noise	Aircraft and a Military expe	aerial target strik	ke In-air electromagnetic devices		
Biological Resources and	Aircraft noise Weapons noise  Explosives:	Aircraft and a Military expense Ingestion:	aerial target strik	ke In-air electromagnetic devices  Entanglement:		
Biological Resources and Habitats	Aircraft noise Weapons noise  Explosives: None	Aircraft and a Military expe	aerial target strik Inded material	ke In-air electromagnetic devices  Entanglement: None		
Biological Resources and Habitats	Aircraft noise Weapons noise  Explosives: None  Air Quality:	Aircraft and a Military expense Ingestion:	eerial target strik Inded material Sediments an	ke In-air electromagnetic devices  Entanglement:		
Biological Resources and Habitats Stressors to Physical	Aircraft noise Weapons noise  Explosives: None	Aircraft and a Military expense Ingestion:	serial target strikended material  Sediments an Metals	In-air electromagnetic devices  Entanglement: None  Ind Water Quality:		
Biological Resources and Habitats  Stressors to Physical Resources	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants	Aircraft and a Military expe	Sediments an Metals	In-air electromagnetic devices  Entanglement: None  Id Water Quality:		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources:	Aircraft and a Military experimental Militar	Sediments an Metals Other materia	In-air electromagnetic devices  Entanglement: None  Id Water Quality:  Public Health and Safety:		
Biological Resources and Habitats  Stressors to Physical Resources	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and	Aircraft and a Military experimental Militar	Sediments an Metals Other materia nomic Resource	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources:	Aircraft and a Military experimental Militar	Sediments an Metals Other material nomic Resource lity acoustics	In-air electromagnetic devices  Entanglement: None  Id Water Quality:  Public Health and Safety:		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike	Aircraft and a Military experimental Militar	Sediments an Metals Other material nomic Resource lity acoustics disturbance	Entanglement: None  Id Water Quality:  als  Public Health and Safety: Physical interactions In-air energy		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike  Ingestible Material:	Aircraft and a Military experimental Militar	Sediments an Metals Other material nomic Resource lity acoustics disturbance	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions In-air energy  Air target (drone), surface target		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military Expended	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike	Aircraft and a Military experimental Militar	Sediments an Metals Other material nomic Resource lity acoustics disturbance Military Recoverable	Entanglement: None  Id Water Quality:  als  Public Health and Safety: Physical interactions In-air energy		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike  Ingestible Material: None	Aircraft and a Military experimental Military experimental Airborne Socioeco di Accessibi Airborne Physical o	Sediments an Metals Other material nomic Resource lity acoustics disturbance	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions In-air energy  Air target (drone), surface target		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military Expended	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike  Ingestible Material: None  Non-Ingestible Materia	Aircraft and a Military experimental Military experimental Aircraft and a Military experimental Aircraft and aircraft a	Sediments an Metals Other material nomic Resource lity acoustics disturbance Military Recoverable	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions In-air energy  Air target (drone), surface target		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military Expended	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike  Ingestible Material: None  Non-Ingestible Materia Bomb (non-explosive), r	Aircraft and a Military experience Ingestion: None  Socioeco Accessibi Airborne Physical of	Sediments an Metals Other material nomic Resource lity acoustics disturbance Military Recoverable	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions In-air energy  Air target (drone), surface target		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military Expended	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike  Ingestible Material: None  Non-Ingestible Materia Bomb (non-explosive), r	Aircraft and a Military experience Ingestion: None  Socioeco Accessibi Airborne Physical of	Sediments an Metals Other material nomic Resource lity acoustics disturbance Military Recoverable	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions In-air energy  Air target (drone), surface target		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military Expended Material	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike  Ingestible Material: None  Non-Ingestible Materia Bomb (non-explosive), r (non-explosive), air to (drone)	Aircraft and a Military experience Ingestion: None  Socioeco Accessibi Airborne Physical of	Sediments an Metals Other material nomic Resource lity acoustics disturbance Military Recoverable	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions In-air energy  Air target (drone), surface target		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military Expended Material	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike  Ingestible Material: None  Non-Ingestible Materia Bomb (non-explosive), r	Aircraft and a Military experience Ingestion: None  Socioeco Accessibi Airborne Physical of	Sediments an Metals Other material nomic Resource lity acoustics disturbance Military Recoverable	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions In-air energy  Air target (drone), surface target		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military Expended Material  Sonar and Other Transducer Bins	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike  Ingestible Material: None  Non-Ingestible Materia Bomb (non-explosive), r (non-explosive), r air ta (drone) None	Aircraft and a Military experimental Militar	Sediments an Metals Other material nomic Resource lity acoustics disturbance Military Recoverable	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions In-air energy  Air target (drone), surface target		
Biological Resources and Habitats  Stressors to Physical Resources Stressors to Human Resources  Military Expended Material	Aircraft noise Weapons noise  Explosives: None Air Quality: Criteria air pollutants  Cultural Resources: Physical disturbance and strike  Ingestible Material: None  Non-Ingestible Materia Bomb (non-explosive), r (non-explosive), air to (drone)	Aircraft and a Military experimental Militar	Sediments an Metals Other material nomic Resource lity acoustics disturbance Military Recoverable	Entanglement: None  Id Water Quality:  Public Health and Safety: Physical interactions In-air energy  Air target (drone), surface target		

Air Warfare			
Air Platform Weapons Integration Test			
Procedural	Physical Disturbance and Strike: (Section		
Mitigation	5.3.4)		
Measures	Non-explosive bombs and mine shapes		
Assumptions	None		
Used for Analysis			

# A.3.1.1.4 Air-to-Air Weapons System Test

Air Warfare						
	oons System Test					
Short	Test to evaluate the effective	eness of air-launched	Typical Dura	ation		
Description	weapons against designated					
-		=	ours per aircraft per event			
Long	•	e air-to-air weapons systems test evaluates the performance of air-launched weapons systems				
Description		th as the BQM-34, a high-performance target simulating a strike fighter				
	_	ir weapons systems test, a strike fighter aircraft locates, tracks, and, in target used to simulate another strike fighter aircraft using non-explosive				
		xplosive weapons is planned.				
Typical	Platforms: Fixed-wing aircra	craft				
Components	Targets: Air targets		-   -   -   -   -   -   -   -			
	Systems being Trained/Tes		inching system	15		
Standard	Aircraft safety	Typical Locations				
Operating		Range Complexes/Te	sting Ranges:	Inshore Waters/Pierside:		
Procedures		Gulf of Mexico		None		
(Section 2.3.3)		-				
Stressors to	Acoustic:	Physical Disturbance		Energy:		
Biological	Aircraft noise	Aircraft and aerial tar		In-air electromagnetic		
Resources	Weapons noise	Military expended ma	terial	devices		
and Habitats						
	Explosives:	Ingestion:		Entanglement:		
	None	None		Decelerators/parachutes		
Stressors to	Air Quality:	Sedime	nt and Water (	Quality:		
Physical	Criteria air pollutants	Metals				
Resources		Other m	naterials			
Stressors to	Cultural Resources:	Socioeconomic Res	ources:	Public Health and Safety:		
Human	Physical disturbance and	Accessibility		Physical interactions		
Resources	strike	Airborne acoustics		In-air energy		
		Physical disturbanc	e and strike			
Military	Ingestible Material:	Military	Air ta	rget (drone)		
Expended	None	Recover	able			
Material		Material				
	Non-Ingestible Material:					
	Missiles (non-explosive), air	target				
	(drone), decelerator/para	chute-				
	extra-large					
Sonar and	None	- <del></del>	-			
Other						
Transducer						
Bins						
In-Water	None					
Explosive						
Bins						
Procedural	Physical Disturbance and St	rike: (Section 5.3.4)	-	·		
Mitigation	Non-explosive missiles and r					
Measures						
Assumptions	None					
Used for						
Analysis						
,	l .					

# A.3.1.1.5 Air-to-Air Gunnery Test – Medium-Caliber

Air Warfare							
Air-to-Air Guni	nery Test – Medium-Caliber						
Short	Test performed to evaluate	the effectiveness of	Typical Dura	ation			
Description	air-to-air guns against desigi	nated airborne					
	targets. Fixed-wing aircraft r	may be used.	2 flight hours per aircraft per event				
Long	This event is similar to the training event gunnery exercise air-to-air. An air-to-air gunnery test						
Description		_	_	ed aerial banner that serves as the			
	target. Non-explosive rounds are fired, and the targets fired upon are typically towed aerial banners.						
Typical	Platforms: Fixed-wing aircra	ıft					
Components	Targets: Air targets						
a	Systems being Trained/Test		in systems				
Standard	Aircraft safety	Typical Locations					
Operating Procedures	Weapons firing safety	Range Complexes/Te	esting	Inshore Waters/Pierside:			
(Section		Ranges:		None			
2.3.3)		Virginia Capes					
Stressors to	Acoustic:	Physical Disturbance	and Strike:	Energy:			
Biological	Aircraft noise	Aircraft and aerial tar		In-air electromagnetic devices			
Resources	Weapons noise	Military expended ma	_	_			
and Habitats		Ingestion:		Entanglement: None			
	Explosives:	Military expended ma	aterials –	None			
	None	munitions	accitats				
Stressors to	Air Quality:		Sediments a	nd Water Quality:			
Physical	Criteria air pollutants		Metals				
Resources							
Stressors to	None						
Human							
Resources		-		<u> </u>			
Military	Ingestible Material:		Military	None			
Expended	Medium-caliber projectiles (	non-explosive),	Recoverab				
Material	medium-caliber casings		le Material				
	Non-Ingestible Material:						
	None	_					
Sonar and	None						
Other							
Transducer							
Bins	None		-	<del>.</del>			
In-Water Explosive	None						
Bins							
Procedural	Physical Disturbance and St	rike: (Section 5 3 4)					
Mitigation	Small-, medium-, and large-o						
Measures	practice munitions						
Assumptions	None						
Used for							
Analysis							

#### A.3.1.1.6 Air-to-Air Missile Test

Air Warfare							
Air-to-Air Missi	le Test						
Short	Test performed to evaluate	the effectiven	ess of	Typic	al Duratio	n	
Description	air-launched missiles agains	t designated airborne					
·	targets. Fixed-wing aircraft v			2.5 flight hours per aircraft per event		er event	
Long	This event is similar to the to	aining event missile exercise (air-to-air). Tests are a type of air-to-air				e of air-to-air	
Description	weapons system test in whi	ch air-to-air mi	ssiles (non	-explos	ive) are fi	red from fixed	-wing aircraft
	against unmanned aerial dro	ones such as B	QM-34 and	BQM-	74.		
Typical	Platforms: Fixed-wing aircra	ft					
Components	Targets: Air targets						
	Systems being Trained/Tes	ted: Missile fir	ing/launchi	ing syst	ems		
Standard	Aircraft safety	Typical Locat	tions				
Operating	Weapons firing safety	Range Comp	lexes/Test	ing Rai	nges: I	nshore Water	s/Pierside:
Procedures		Virginia Cap	es		N	lone	
(Section 2.3.3)		_				-	
Stressors to	Acoustic:	Physical Dis				Energy:	
Biological	Aircraft noise	Aircraft and	_		9	In-air electro	omagnetic
Resources	Weapons noise	Military exp	ended mat	erial		devices	
and Habitats	Front action of					F	
	Explosives: None	Ingestion:				Entangleme	
Character to		None	C1!	1 14	/-+-·· O··-		s/parachutes
Stressors to	Air Quality:		Metals	t and v	Vater Qua	iity:	
Physical Resources	Criteria air pollutants		Other ma	toriale			
Stressors to	Cultural Resources:	Socioocor	nomic Reso		Б	ublic Health a	and Safatur
Human	Physical disturbance and	Accessibil		urces.		hysical interac	•
Resources	strike	Airborne a	•			n-air energy	Lions
Resources	Strike		isturbance	and str		i dii chergy	
Military	Ingestible Material:		Military		Air target	: (drone)	
Expended	None		Recoveral	ble	J	,	
Material			Material				
	Non-Ingestible Material:						
	Missiles (non-explosive),						
	decelerator/parachute - la	arge and					
	extra-large						
Sonar and	None						
Other							
Transducer							
Bins							
In-Water	None						
Explosive							
Bins	Nama						
Procedural	None						
Mitigation Measures							
	None						
Assumptions Used for	None						
Analysis							
Allalysis							

# A.3.1.1.7 Intelligence, Surveillance, and Reconnaissance Test

Air Warfare						
Intelligence, Surv	eillance, and Reconnaissance	Test				
Short	Aircrews use all available se	nsors to collect d	ata on threat	Typical Duration		
Description	vessels.			2-20 flight hours per event		
Long	An air warfare intelligence,	surveillance, and	reconnaissance (ISI			
Description	_	es of aircraft, including unmanned aerial systems that can carry				
		ications equipment, or other payloads. New systems are tested at sea				
	to ensure proper communic	cations between aircraft and ships.				
	ISR aircraft systems act as ev	systems act as eyes in the sky, relaying raw imagery back to military personnel on the				
		•		shared with U.S. Navy or other		
	U.S. military aircraft or vesse	els. New ISR tech	nology systems pro	vide combat identification (friend		
	or foe) and are used for airc	raft and ship-bas	ed communications	S.		
Typical	Platforms: Fixed-wing aircra	oft, rotary-wing ai	rcraft, fixed-wing u	ınmanned aerial systems		
Components	Targets: Air targets					
	Systems being Trained/Tes					
Standard	Aircraft safety	Typical Locatio				
Operating	Unmanned aerial, surface,	Range Comple	xes/Testing	Inshore Waters/Pierside:		
Procedures	and subsurface vehicle	Ranges:		None		
(Section 2.3.3)	safety	Jacksonville	- t a			
		Navy Cherry Po	oint			
Stressors to	Acoustic:	Virginia Capes	bance and Strike:	Enormy		
Biological	Acoustic: Aircraft noise	-	rial target strike	Energy: In-air electromagnetic devices		
Resources and	Aircraft floise	All Craft and act	iai taiget strike	in-air electromagnetic devices		
Habitats	Explosives:	Ingestion:		Entanglement:		
	None	None		None		
Stressors to	Air Quality:	Sediment	s and Water Qualit	y:		
Physical	Criteria air pollutants	None				
Resources						
Stressors to	Cultural Resources:	Socioeconomic		Public Health and Safety:		
Human	None	Accessibility		Physical interactions		
Resources		Airborne acous		In-air energy		
		Physical disturb	ance and strike			
Military	Ingestible Material:		_	Air target (drone)		
Expended Material	None		Recoverable Material			
Wiaterial	Non-Ingestible Material:		Waterial			
	None					
Sonar and	None	-				
Other						
Transducer Bins						
In-Water	None	<u> </u>				
Explosive Bins						
Procedural	None					
Mitigation						
Measures						
Assumptions	Surface targets consist of Na	ivy vessels accou	nted for in unit leve	el training activities.		
Used for						
Analysis						

#### A.3.1.2 Anti-Submarine Warfare

Anti-submarine warfare activities involve helicopter and maritime patrol aircraft, ships, and submarines, conducting operations alone or in combination, to enhance or evaluate the ability to locate, track, and neutralize submarines. Anti-submarine warfare tests are intended to evaluate the capabilities of a variety of active and passive sonar systems. Some systems are used to characterize the environment by measuring water depth, for example, whereas others are designed to locate mines and identify, track, and target submarines. Passive sonar systems "listen" for sound by using underwater microphones, called hydrophones, which receive, filter, amplify, and process underwater sound in search of certain acoustic signatures. No sound is introduced into the water when using passive sonar. Passive sonar can indicate the presence, character, and movement of a submarine, to the extent that the submarine generates noise.

Active sonar is the most effective means for locating quiet, modern submarines because active sonar is not dependent on the sound being generated by the submarine. Active sonar transmits pulses of sound that travel through the water, reflect off objects, and return to a receiver. By knowing the speed of sound in water and the time taken for the sound wave to travel to the object and back, active sonar systems can quickly calculate direction and distance from the sonar platform to the underwater object. Being able to accurately track moving submarines is essential to U.S. ship survivability.

Advanced, large-scale anti-submarine warfare events (i.e., anti-submarine warfare coordinated events) involving active sonar are conducted in coordinated, at-sea activities during multidimensional fleet training events involving submarines, ships, fixed-wing aircraft, and helicopters. These integrated training events offer opportunities to conduct testing activities and to train aircrews in the use of new or newly enhanced systems during a large-scale, complex exercise. Coordinated anti-submarine warfare events often involve the full anti-submarine warfare continuum from detecting and tracking a submarine to attacking a target using either exercise torpedoes or simulated weapons. Training events include detection and tracking exercises against "enemy" submarine contacts, torpedo employment exercises against the target, and exercising command and control tasks in a multidimensional battlespace.

The torpedoes released during a torpedo employment exercise are non-explosive. No other weapons are fired during Naval Air Systems Command anti-submarine warfare tests. Anti-submarine warfare sonar systems are deployed from certain classes of surface ships, submarines, helicopters, and fixed-wing patrol aircraft. Helicopters equipped with dipping sonar or sonobuoys are utilized to locate suspect submarines or submarine targets within the training or testing area. In addition, fixed-wing patrol aircrafts are used to deploy both active and passive sonobuoys to assist in locating and tracking submarines during the duration of the test.

Anti-submarine warfare tests include sonobuoy lot acceptance tests, which evaluate the integrity of a series, or lot, of sonobuoys before the lot is turned over to the fleet; dipping sonar tests in both shallow and deep water; torpedo tests (non-explosive warhead); and sonobuoy tests with both coherent (acoustic) and incoherent (explosive) sonobuoys. The types of sound sources tested by Naval Air Systems Command during anti-submarine warfare sonar tests in the Study Area are identified in Table A.1-1, and descriptions of anti-submarine warfare tests are provided in the sections below.

# A.3.1.2.1 Anti-Submarine Warfare Torpedo Test

Anti-Submarine	warfare				
Anti-Submarine	Warfare Torpedo Test				
Short	This event is similar to the to	raining event torpedo	Typical Dura	tion	
Description	exercise. Test evaluates anti systems onboard rotary-win aircraft and the ability to se classify, localize, track, and a	ng and fixed-wing arch for, detect,	2-6 flight hou		
	similar target.	accack a sasimarine or			
Long Description	Similar target.  Similar to a torpedo exercise, an anti-submarine warfare torpedo test evaluates anti-submarine warfare systems onboard rotary-wing (e.g., MH-60R helicopter) and fixed-wing (maritime patrol aircraft P-8) aircraft and the ability to search for, detect, classify, localize, track, and attack a submarine or similar target (e.g., MK-39 EMATT, or MK-30). Both sonobuoys and torpedoes (using the High Altitude Anti-Submarine Warfare Weapon Capability kit) may be delivered at high altitudes to remain clear of high threat areas. The focus of the anti-submarine warfare torpedo test is the operation of non-explosive torpedoes (e.g., MK-46 or MK-54), but other anti-submarine warfare systems are often used during the test. MK-39 (EMATT) or MK-30 targets simulate a submarine threat and are deployed at varying depths and speeds. If available, tests may be conducted using an actual submarine as the target. This activity can be conducted in shallow or deep waters and aircraft can originate from a land base or from a surface ship. The torpedo test culminates with the release of an exercise torpedo against the target and is intended to evaluate the targeting, release, and tracking process of deploying torpedoes from aircraft. All exercise torpedoes used in testing are either running (EXTORP) or non-running (REXTORP) and are non-explosive. Eighty five percent of torpedoes are recovered. A parachute assembly used for aircraft-launched torpedoes is jettisoned and sinks. Ballast (typically lead weights) may be released from the torpedoes to allow for recovery, leaving the ballast to sink to the bottom.				
Typical Components	Platforms: Fixed-wing aircra Targets: Sub-surface targets				
-	Systems being Trained/Tes		launching syste	ems	
Standard	Aircraft safety	Typical Locations			
Operating Procedures (Section 2.3.3)	Weapons firing safety	Range Complexes/Test Jacksonville Virginia Capes	ting Ranges:	Inshore Waters/Pierside: None	
Stressors to Biological Resources and Habitats	Acoustic: Sonar and other transducers Aircraft noise Weapons noise  Explosives: None	Physical Disturbance a Aircraft and aerial targ Vessel and in-water de Military expended mat Ingestion: Military expended mat than munitions	et strike vice strike erial	Energy: In-air electromagnetic devices  Entanglement: Wires and cables Decelerators/parachutes	
Stressors to Physical Resources	Air Quality: Criteria air pollutants				
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Reso Accessibility Airborne acoustics Physical disturbance		Public Health and Safety: Physical interactions In-air energy In-water energy	

Anti-Submarin	e Warfare					
Anti-Submarin	e Warfare Torpedo Test					
Military Expended Material	Ingestible Material: Decelerators/parachutes - small  Non-Ingestible Material: Expendable bathythermographs, expendable bathythermograph wires, sonobuoys (non-explosive), sonobuoy wires, sub-surface targets (mobile), lightweight torpedo accessories	Military Recoverable Material	Lightweight torpedoes (non-explosive), sub-surface targets (mobile)			
Sonar and Other Transducer Bins	Mid-Frequency: Torpedo MF5 TORP1	es:				
Explosive Bins	None					
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar					
Assumptions Used for Analysis	Assume one torpedo accessory package (k Assume one target per torpedo.	pallast, etc.) per t	orpedo.			

## A.3.1.2.2 Anti-Submarine Warfare Tracking Test – Helicopter

Anti-Submarine	warfare					
Anti-Submarine	Warfare Tracking Test – Hel	icopter				
Short	This event is similar to the t	-	Typical Dura	tion		
Description	submarine tracking exercise	_	Typical Baration			
	evaluates the sensors and s					
	and track submarines and to		2 flight hours	s ner event		
	helicopter systems used to	s per event				
	systems perform to specific					
Long			nter an Anti-9	Submarine Warfare Tracking Test		
Description	Similar to an anti-submarine tracking exercise—helicopter, an Anti-Submarine Warfare Tracking Test — helicopter evaluates the sensors and systems used to detect and track submarines and to ensure					
	•	•		to specifications. Typically, one		
				sing the dipping sonar (e.g.,		
			_	sonobuoys (e.g., AN/SSQ-53D/E),		
				gets (e.g., MK-39 EMATT or MK-		
				ng test event. If available, tests		
		_		civity would be conducted in		
	,		-	a surface ship. Helicopter anti-		
	•			systems used to detect and track		
				e tracking systems perform to		
				be conducted as part of an anti-		
	submarine tracking coordin	•	•	and the same of part of the same		
Typical	Platforms: Rotary-wing airc		0			
Components	Targets: Sub-surface targets					
	Systems being Trained/Tes		onar systems			
Standard	Aircraft safety	Typical Locations	<u> </u>			
Operating	·	Range Complexes/Test	ing Ranges:	Inshore Waters/Pierside:		
Procedures		Gulf of Mexico	0 0	None		
(Section 2.3.3)		Jacksonville				
		Key West				
		Northeast				
		Virginia Capes				
Stressors to	Acoustic:	Physical Disturbance a	nd Strike:	Energy:		
Biological	Sonar and other	Aircraft and aerial targe		In-air electromagnetic		
Resources	transducers	Military expended mat		devices		
and Habitats	Aircraft noise	Vessel and in-water de				
				Entanglement:		
	Explosives:	Ingestion:		Wires and cables		
	In-water explosives	Military expended mat	erials – other	Decelerators/parachutes		
	'	than munitions				
Stressors to	Air Quality:	<del>.</del>	ts and Water	Quality:		
Physical	Criteria air pollutants		s other than e			
Resources		Metals				
		Other ma	iterials			
Stressors to	Cultural Resources:	Socioeconomic Reso		Public Health and Safety:		
Human	Physical disturbance and	Accessibility		Physical interactions		
Resources	strike	Airborne acoustics		In-air energy		
. icoources	Explosives	Physical disturbance	and strike	In-water energy		
	EVALOSIACS	i irysicai disturbance	unu sunc	iii watei elleigy		

Anti-Submarine	: Warfare		
Anti-Submarine	Warfare Tracking Test – Helicopter		
Military Expended Material	Ingestible Material: Decelerators/parachutes - small, sonobuoy (explosive) fragments  Non-Ingestible Material: Sonobuoys (non-explosive), sonobuoy wires, subsurface target (stationary)	Military Recoverable Material	Sub-surface targets (mobile)
Sonar and Other Transducer Bins	Mid-Frequency: MF4 MF5		
In-Water Explosive Bins	E3		
Procedural Mitigation Measures	Active sonar	<del>-</del>	ve Stressors: (Section 5.3.3) ve sonobuoys
Assumptions Used for Analysis	None	•	

## A.3.1.2.3 Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft

Anti-Submarine	· Warfare						
Anti-Submarine	Warfare Tracking Test – Mar	ritime Patrol Aircraft					
Short	The test evaluates the sense	ors and systems used	Typical Dura	tion			
Description	by maritime patrol aircraft t		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
	submarines and to ensure t	hat aircraft systems	4-6 flight hours per event				
	used to deploy the tracking	systems perform to	4-6 flight hou	urs per event			
	specifications and meet operational requirements.						
Long	Similar to an Anti-Submarin	e Warfare Tracking Exerci	se-Maritime P	atrol Aircraft, an Anti-Submarine			
Description	Warfare Tracking Test—Ma	ritime Patrol Aircraft evalu	uates the sens	ors and systems used to detect			
				deploy the tracking systems			
				or P-8 fixed-wing aircraft conduct			
				g., AN/SSQ-62 DICASS), explosive			
	–			OIFAR), and smoke devices (e.g.,			
	MK-58). Targets (e.g., MK-3						
		-		arine as the target. This activity			
	would be conducted in deep						
	· · · · · · · · · · · · · · · · · · ·	king tests could be condu	cted as part o	f a coordinated event with fleet			
Tambari	training activities.	.fr					
Typical	Platforms: Fixed-wing aircra Targets: Sub-surface targets						
Components	_		y launching sy	stems, data transmission systems			
Standard	Aircraft safety		y lauricrinig sy	sterris, data transmission systems			
Operating	All Craft Safety	Typical Locations	ina Danasa.	Inchara Matara/Diarcida			
Procedures		Range Complexes/Test Gulf of Mexico	ing Kanges:	Inshore Waters/Pierside: None			
(Section 2.3.3)		Jacksonville		None			
(Cookien Liele)		Key West					
		Navy Cherry Point					
		Northeast					
		Virginia Capes					
Stressors to	Acoustic:	Physical Disturbance a	nd Strike:	Energy:			
Biological	Sonar and other	Aircraft and aerial targe		In-air electromagnetic			
Resources	transducers	Vessel and in-water dev		devices			
and Habitats	Aircraft noise	Military expended mate	erials				
				Entanglement:			
	Explosives:	Ingestion:		Wires and cables			
	In-water explosives	Military expended mate	erials – other	Decelerators/parachutes			
		than munitions					
Stressors to	Air Quality:		s and Water (				
Physical	Criteria air pollutants		s and explosiv	* *			
Resources			s other than e	-			
		Metals		her materials			
Stressors to	Cultural Resources:	Socioeconomic Reso	urces:	Public Health and Safety:			
Human	Physical disturbance and	Accessibility		Physical interactions			
Resources	strike	Airborne acoustics	1	In-air energy			
	Explosives	Physical disturbance	and strike	In-water energy			

Anti-Submarine	e Warfare		
Anti-Submarine	e Warfare Tracking Test – Maritime Patrol A	Aircraft	
Military Expended Material	Ingestible Material: Decelerators/parachutes - small, sonobuoy (explosive) fragments	Military Recoverable Material	Sub-surface target (mobile)
	Non-Ingestible Material: Sonobuoys (non-explosive), sonobuoy wires, sub-surface target (mobile)		
Sonar and Other Transducer Bins	Mid-Frequency: Anti-Sub MF5 MF6 ASW2	marine Warfare: ASW5	
In-Water Explosive Bins	E1 E3		
Procedural Mitigation Measures	None		
Assumptions Used for Analysis	None		

# A.3.1.2.4 Kilo Dip

Anti-Submarine	Marfara					
Kilo Dip	: warrare					
Short	Functional check of a helico		ping <b>Typ</b>	oical Dura	tion	
Description	sonar system (e.g., AN/AQS					
	conducting a testing or train	ing event using the 1.5 flight h			ırs per event	
	dipping sonar system.					
Long	A kilo dip is the operational					
Description	,, ,	-		•	(e.g., MH-60) would transit to an	
		• • •		•	ose to shore) and would deploy	
		•		-	nined depth or series of depths	
					depth, the sonar transducer	
		-	-	_	gnal (i.e., ping) to check that all	
	systems are functioning pro	•	-			
			-		nsit to a second dip point before	
	the procedure is repeated.		ursor to moi	e compre	hensive testing.	
Typical	Platforms: Rotary-wing airc	ratt				
Components	Targets: None					
	Systems being Trained/Tes					
Standard	Aircraft safety	Typical Location				
Operating		Range Complex	es/Testing F	Ranges:	Inshore Waters/Pierside:	
Procedures		Gulf of Mexico None				
(Section 2.3.3)		Jacksonville				
		Key West				
		Northeast				
		Virginia Capes				
Stressors to	Acoustic:	Physical Disturb	bance and S	trike:	Energy:	
Biological	Sonar and other	Aircraft and aer	rial target str	ike	In-air electromagnetic	
Resources	transducers				devices	
and Habitats	Aircraft noise	Ingestion:				
		None				
	Explosives:					
	None					
Stressors to	Air Quality:	Se	ediments an	d Water (	Quality:	
Physical	Criteria air pollutants	N	one			
Resources						
Stressors to	Cultural Resources:	Socioecono	omic Resour	ces:	Public Health and Safety:	
Human	None	Accessibilit	:y		Physical interactions	
Resources		Airborne ad	coustics		In-air energy	
		Physical dis	sturbance an	d strike	In-water energy	
Military	Ingestible Material:	Mi	ilitary	None		
Expended	None	Re	coverable			
Material		Ma	aterial			
	Non-Ingestible Material:					
	None					
Sonar and	Mid-Frequency:					
Other	MF4					
Transducer						
Bins						

Anti-Submarine	e Warfare
Kilo Dip	
In-Water	None
Explosive	
Bins	
Procedural	Acoustic Stressors: (Section 5.3.2)
Mitigation	Active sonar
Measures	
Assumptions	None
Used for	
Analysis	

## A.3.1.2.5 Sonobuoy Lot Acceptance Test

Anti-Submarine	Warfare					
Sonobuoy Lot A	cceptance Test					
Short	Sonobuoys are deployed fro	m surface ves	sels and	Typica	l Dura	tion
Description	aircraft to verify the integrit					
	a lot or group of sonobuoys	in advance of	delivery	6 fligh	t hours per event	
	to the fleet for operational u	ıse.		_		
Long	Sonobuoys are deployed fro	m surface ves	sels and air	craft to	verify	the integrity and performance of
Description	a lot or group of sonobuoys	ys in advance of delivery to the fleet for operational use. Lot acceptance				
	testing would occur for mult	tiple types of	sonobuoys	includin	g non-	impulsive (e.g., AN/SSQ-62
	DICASS) and explosive (e.g.,	MK-61 SUS).				
Typical	Platforms: Fixed-wing aircra	ıft, surface co	mbatants			
Components	Targets: None					
	Systems being Trained/Test	ted: Sonobuo	y systems			
Standard	Vessel safety	Typical Loca	tions			
Operating	Aircraft safety	Range Com	plexes/Test	ting Ran	ges:	Inshore Waters/Pierside:
Procedures		Key West				None
(Section 2.3.3)						
Stressors to	Acoustic:	Physical Dis	sturbance a	nd Strik	œ:	Energy:
Biological	Sonar and other	Aircraft and	_			In-air electromagnetic
Resources	transducers	Vessel and			ke	devices
and Habitats	Aircraft noise	-				_
	Vessel noise					Entanglement:
		Ingestion:				Wires and cables
	Explosives:	Military exp		erials –	other	Decelerators/parachutes
_	In-water explosives	than mui				
Stressors to	Air Quality:		Sedimen			
Physical	Criteria air pollutants		-		-	re byproducts
Resources			Metals	is other		xplosives ther materials
Chuana na ha	Cultural Description	Casiassa			U	
Stressors to Human	Cultural Resources:		nomic Reso	ources:		Public Health and Safety:
Resources	Physical disturbance and strike	Accessibi	acoustics			Physical interactions In-energy
Resources	Explosives		disturbance	and stri	iko	In-water energy
Military	•	Titysical C				iii-water energy
Expended	Ingestible Material: Decelerators/parachutes - sr	mall	Military Recovera		None	
Material	sonobuoy (explosive) frag		Material	DIE		
Wiaterial	soliobuoy (explosive) irag	illelits	iviateriai			
	Non-Ingestible Material:					
	Sonobuoys (non-explosive),	sonobuov				
	wires	,				
Sonar and	Low-Frequency:	High-Fre	quency:			
Other	LF4	HF5	HF6			
Transducer		-				
Bins	Mid-Frequency:	Anti-Sub	marine Wa	rfare:		
	MF5 MF6	ASW2	ASV			
In-Water	E1 E3	E4				
Explosive						

Anti-Submarine	Anti-Submarine Warfare				
Sonobuoy Lot A	Acceptance Test				
Procedural	Acoustic Stressors: (Section 5.3.2)	Explosive Stressors: (Section 5.3.3)			
Mitigation	Active sonar	Explosive sonobuoys			
Measures					
	Physical Disturbance and Strike: (Section 5.3.4)				
	Vessel movement				
Assumptions	Assume one parachute per sonobuoy				
Used for					
Analysis					

#### A.3.1.3 Electronic Warfare

#### A.3.1.3.1 Chaff Test

Electronic Warf	are					
Chaff Test						
Short	This event is similar to the tr	raining event chaff	Typical Duration	on		
Description	exercise. Chaff tests evaluat enhanced chaff, chaff disper	nsing equipment, or				
	modified aircraft systems ag deployment. Tests may also					
	aircrews in the use of new c		2-4 flight hours	s per event		
	equipment. Chaff tests are o			5 per 616		
	flare tests and air combat m	aneuver events, as				
	well as other test events, an					
	conducted as standalone tes			1 66 1:		
Long Description	Chaff tests are conducted to evaluate newly developed or enhanced chaff dispensing equipment, to ensure other newly developed or modified aircraft systems are compatible with chaff deployment, and to train pilots and aircrew in the use of new chaff dispensing equipment. Fixed-wing, rotary-wing, and tiltrotor aircraft deploy chaff to disrupt threat targeting and missile guidance radars and to defend against an attack (Electronic Protect deployment). Chaff tests are often conducted with flare tests or air combat maneuver events, as well as other tests, rather than as a standalone test. Weapons are not typically fired during chaff tests. Chaff is employed for a number of different tactical reasons, but the end goal is to create a target that will distract enemy radar and weapon systems away from the friendly platform. Chaff may also be employed offensively (Electronic Attack deployment), such as before a major strike to "hide" inbound striking aircraft. Different chaff types (e.g., RR-129A/AL, RR-144A/AL, and RR-170A/AL) are used by a variety of different Navy aircraft; however all chaff consists of a radar reflector material made of thin, narrow, metallic strips cut in various lengths, and is intended to elicit frequency responses which deceive enemy radars. Defensive chaff tests are the most common type of chaff test. In most cases, the chaff test is conducted to evaluate systems on the aircraft deploying the chaff, but it is also critical to view the effect of the chaff from the "enemy" perspective so that radar system operators may practice corrective procedures to overcome the chaff jamming effect. Chaff tests are often designed to gain experience and data from both perspectives. Chaff is typically deployed from an aircraft as the aircraft makes evasive maneuvers to defeat a simulated threat missile or threat aircraft. The chaff					
	deploys in a cloud of the highly reflective filaments and deceives the guidance system of an inbound missile, allowing the aircraft to escape the threat.					
Typical	Platforms: Fixed-wing aircra		ltrotor aircraft			
Components	Targets: None					
Charada I	Systems being Trained/Test		ng systems			
Standard Operating	Aircraft safety	Typical Locations	ing Pangas	Inchara Matara/Diaraida		
Procedures		Range Complexes/Test Gulf of Mexico		Inshore Waters/Pierside: None		
(Section 2.3.3)		Jacksonville		NOTE		
		Virginia Capes				
Stressors to	Acoustic:	Physical Disturbance a		Energy:		
Biological	Aircraft noise	Aircraft and aerial targe		In-air electromagnetic		
Resources	Fymlosiyası	Military expended mat	erial	devices		
and Habitats	Explosives: None	Ingestion:		Entanglement:		
	. Tone	Military expended mate than munitions	erials – other	None		

Electronic War	fare				
Chaff Test					
Stressors to Physical Resources	Air Quality: Criteria air pollutants		Sediments and Metals	d Water ( Other ma	
Stressors to Human Resources	Physical disturbance and A strike A	Accessibi Airborne	nomic Resources lity acoustics listurbance and s		Public Health and Safety: Physical interactions In-air energy
Military Expended Material	Ingestible Material: Per chaff cartridge: one plastic en chaff fibers  Non-Ingestible Material: None		Military Recoverable Material	None	
Sonar and Other Transducer Bins	None				
In-Water Explosive Bins	None				
Procedural Mitigation Measures	None				
Assumptions Used for Analysis	None				

## A.3.1.3.2 Electronic System Evaluation

Electronic Warf	are					
Electronic Syste	ms Evaluation					
Short	Test that evaluates the effect	ctiveness of el	ectronic 1	ypical Dura	ation	
Description	systems to control, deny, or					
	portions of the electromagn	rtions of the electromagnetic spectrum. In				
	general, electronic warfare testing will assess the					
	performance of three types		warrare	2-6 flight flours per event		
	systems: electronic attack, e	electronic prot	ect, and			
	electronic support.	•	1. 1.			
Long Description	Electronic systems evaluations are performed to determine the effectiveness of designated electronic warfare systems to control, deny, or monitor critical portions of the electromagne spectrum. In general, electronic warfare testing will assess the performance of three types of electronic warfare systems; specifically, electronic attack, electronic protect, and electronic states.					
	Aircraft electronic attack systems are designed to confuse the enemy or deny the enemy the use of its electronically-targeted weapons systems. The suppression of enemy air defenses and active jamming against hostile aircraft and surface combatant radars are examples of the application of electronic attack. Aircraft electronic protect systems are designed to intercept, identify, categorize, and defeat threat weapons systems that are already targeting that or other friendly aircraft. Aircraft electronic support systems employ passive tactics to intercept, exploit, locate (target), collect, collate, and decipher information from the radio frequency spectrum for the purpose of determining the intentions of the radiating source. Test results are compared against design					
	specifications to evaluate th	•		-		
	analytical and predictive mo	· · · · ·	le characteris	tics and to	improve and update existing	
Typical	Platforms: Fixed-wing aircra					
Components	Targets: Air targets, electron		rgets			
•	Systems being Trained/Tes		_	ems, radar	systems	
Standard	Aircraft safety	Typical Loca	tions			
Operating Procedures (Section 2.3.3)		Range Comp Jacksonville Virginia Cap		g Ranges:	Inshore Waters/Pierside: None	
Stressors to	Acoustic:	Physical Dis	turbance and	Strike:	Energy:	
Biological Resources	Aircraft noise	Aircraft and	aerial target	strike	In-air electromagnetic devices	
and Habitats	Explosives:	Ingestion:				
	None	None			<b>Entanglement:</b> None	
Stressors to	Air Quality:	-	Sediments	and Water	Quality:	
Physical Resources	Criteria air pollutants		None			
Stressors to	Cultural Resources:	Socioeconomic Resources: Public Health and Safety:			Public Health and Safety:	
Human	None	Accessi	•		Physical interactions	
Resources			e acoustics	and strike	In-air energy	
Military	Ingostible Metarial:	Pnysica	l disturbance		rgat (drana)	
Military Expended Material	Ingestible Material: None		Military Recoverable Material		rget (drone)	
	Non-Ingestible Material: None					

Electronic Warf	fare
<b>Electronic Syste</b>	ems Evaluation
Sonar and	None
Other	
Transducer	
Bins	
In-Water	None
Explosive	
Bins	
Procedural	None
Mitigation	
Measures	
Assumptions	None
Used for	
Analysis	

#### A.3.1.3.3 Flare Test

Electronic Warf	are						
Flare Test							
Short	This event is similar to the to	raining event flare	Гуріcal Durat	ion			
Description	exercise. Flare tests evaluate		ypicai saiac				
·	enhanced flares, flare dispe	•					
	modified aircraft systems ag						
	deployment. Tests may also						
	aircrew in the use of newly		2 flight hours	per event			
	flare deployment systems. F	lare tests are often					
	conducted with chaff tests a						
	maneuver events, as well as						
	are not typically conducted	•					
Long		· · · · · · · · · · · · · · · · · · ·	•	or modified flare deployment			
Description	systems, to ensure that other		•				
	deployment, and to train pil		-	· · · · ·			
				ts and air combat maneuver			
			-	as stand-alone tests. During a pons are typically fired. Flare			
	dispensers may also be jetti:						
	dispenser in the event of an		ichaca to ass	sess the sale release of the			
	-						
				(electronic protect deployment)			
	•	•	•	ng missiles, thereby causing the			
	missile to lock onto the flare			_			
	threat. In a typical scenario,	<del>-</del>					
	threat radars or missiles, or aircrew may visually identify a threat missile plume when a missile is launched. At a strategically appropriate time, the pilot dispenses flares and immediately maneuvers						
	the aircraft to distract and defeat the threat. During a typical flare test, an aircraft will dispense						
	flares 3,000 ft. above mean sea level and flares are completely consumed while in the air.						
	Aircraft flares use a magnesium extruded flare grain. Flare types commonly deployed during Naval Air Systems Command testing activities include but are not limited to: MJU-57, MJU-49, and MJU-38						
	for high speed aircraft and N			.0: MIJU-57, MIJU-49, and MIJU-38			
Tymical			π.				
Typical Components	Platforms: Rotary-wing aircraft, tiltrotor aircraft Targets: None						
Components	Systems being Trained/Tested: Flares, flare dispensing systems						
Standard	Aircraft safety	Typical Locations	, 0 , 0 . 0				
Operating	7 therate surcey	Range Complexes/Testin	g Ranges:	Inshore Waters/Pierside:			
Procedures		Gulf of Mexico	g Kanges.	None			
(Section 2.3.3)		Virginia Capes		None			
Stressors to	Acoustic:	Physical Disturbance and	d Strike:	Energy:			
Biological	Aircraft noise	Aircraft and aerial target		In-air electromagnetic			
Resources		Military expended mater		devices			
and Habitats	Explosives:						
	None	Ingestion:		Entanglement:			
		Military expended mater	ials – other	None			
		than munitions					
Stressors to	Air Quality:	Sediment a	ınd Water Qı	uality:			
Physical	Criteria air pollutants	Other mate	erials				
Resources							

Electronic War	fare				
Flare Test					
Stressors to Human	Cultural Resources: Physical disturbance and	Accessibi		Public Health and Safety: Physical interactions	
Resources	strike		acoustics		In-air energy
		Physical o	disturbance and s	trike	
Military Expended	Ingestible Material: Per flare: one casing, one com	nression	Military Recoverable	None	
Material	pad or one plastic piston, o endcap, one O-ring	-	Material		
	Non-Ingestible Material: None				
Sonar and Other Transducer	None	•			
Bins					
Explosive Bins	None				
Procedural Mitigation Measures	None				
Assumptions Used for Analysis	Other components associated the seafloor.	l with chaff a	and flare use are r	not expe	cted to float and would sink to

#### A.3.1.4 Mine Warfare

Mine warfare involves the detection, avoidance, and neutralization of mines to protect Navy ships and submarines and offensive mine laying in naval operations. A naval mine is a self-contained, explosive device placed in the water at predetermined depths to destroy ships or submarines. Naval mines are deposited and left in place until triggered by the approach of or contact with an enemy ship or until removed or otherwise destroyed. Naval mines can be laid by minelayers, other ships, submarines, and aircraft. Naval Air Systems Command mine warfare testing events include airborne mine countermeasures events, mine-laying events (similar to mine exercises), and mine neutralization events. The AN/ASQ-235 airborne mine neutralization system was developed to destroy mines or otherwise rendering them non-functional. The airborne laser mine detection system test, airborne dipping sonar minehunting test, and airborne sonobuoy minehunting test evaluate the capabilities of mine warfare systems to detect, classify, and fix the location of floating, near-surface moored, and bottom moored mines.

#### A.3.1.4.1 Airborne Dipping Sonar Minehunting Test

Mine Warfare						
Airborne Dippir	ng Sonar Minehunting Test					
Short	A mine-hunting dipping son	ar system that	is <b>T</b>	ypical Dura	tion	
Description	deployed from a helicopter	and uses high-				
	frequency sonar for the dete	ection and	2	flight hours	s per event	
	classification of bottom and	moored mines	j.			
Long	Tests of a mine-hunting dipp	oing sonar syste	em to evaluat	te the searc	h capabilities of this helicopter-	
Description	deployed, mine hunting, det	tection, and cla	ssification sy	stem. The s	onar identifies mine-like objects.	
Typical	Platforms: Rotary-wing aircr	raft				
Components	Targets: Mine shapes (on es	tablished mine	warfare train	ning range)		
	Systems being Trained/Test	<b>ted:</b> Dipping so	nar systems			
Standard	Aircraft safety	Typical Locat	ions			
Operating		Range Comp	lexes/Testing	g Ranges:	Inshore Waters/Pierside:	
Procedures		Virginia Cape	S		None	
(Section 2.3.3)		Naval Surface	Warfare Cer	nter,		
		Panama City Division				
Stressors to	Acoustic:		urbance and		Energy:	
Biological	Sonar and other	Aircraft and	aerial target s	strike	In-air electromagnetic	
Resources	transducers	Seafloor devices devices			devices	
and Habitats	Aircraft noise					
		Ingestion: Entanglement:				
		None None				
Stressors to	Air Quality:		Sediment a	nd Water Q	uality:	
Physical	Criteria air pollutants		None			
Resources						
Stressors to	Cultural Resources:	Socioeconomic Resources:			Public Health and Safety:	
Human	Physical disturbance and stri	•			Physical interactions	
Resources			e acoustics		In-air energy	
	Physical disturbance and strike In-water energy				In-water energy	
Military	Ingestible Material:		Military	None		
Expended	None		Recoverable			
Material			Material			
	Non-Ingestible Material:					
	None					

Mine Warfare	
Airborne Dippir	ng Sonar Minehunting Test
Sonar and	High-Frequency:
Other	HF4
Transducer	
Bins	
In-Water	None
Explosive	
Bins	
Procedural	Acoustic Stressors: (Section 5.3.2)
Mitigation	Active sonar
Measures	
Assumptions	The activity uses an established mine warfare training range and does not require the placement of
Used for	moored mines.
Analysis	

## A.3.1.4.2 Airborne Laser Based Mine Detection System Test

Mine Warfare					
Airborne Laser-	Based Mine Detection System	n Test			
Short	An airborne mine hunting te	st of a laser-based	Typical Duration		
Description	mine detection system, that helicopter (e.g., MH-60) and system's ability to detect, classification of floating and near mines. The system uses a low locate mines.	2.5 flight hours per event			
Long Description	During an airborne mine detection system test, a helicopter (e.g., MH-60) evaluates the search capabilities of the AN/AES-1 Airborne Laser Mine Detection System. The Airborne Laser Mine Detection System is a mine hunting system designed to detect, classify, and localize floating and near-surface, moored sea mines using a laser system. The Airborne Laser Mine Detection System will be integrated into the helicopter to provide a rapid wide-area reconnaissance and assessment of mine threats in littoral zones, confined straits, choke points, and amphibious objective areas for Carrier and Expeditionary Strike Groups.				
	The Airborne Laser Mine Detection System uses pulsed laser light to image the entire near-surface volume potentially containing mines. Airborne Laser Mine Detection System is capable of day or night operations without stopping to deploy or recover equipment and without towing any equipment in the water. With untethered operations, it can attain high area search rates. This design uses the forward motion of the aircraft to generate image data negating the requirement for complex scanning mechanisms and ensuring high system reliability. Airborne Laser Mine Detection System also provides accurate target geo-location to support follow on neutralization of the detected mines.				
Typical	Platforms: Rotary-wing aircr	aft			
Components	Targets: Mine shapes (on established mine warfare training range)				
	Systems being Trained/Tested: Low-energy laser systems				
Standard	Aircraft safety	Typical Locations			
Operating	·	Range Complexes/Tes	ting Ranges: Inshore Waters/Pierside:		
Procedures		Virginia Capes	None		
(Section 2.3.3)		Naval Surface Warfare	Center,		
		Panama City Division			
Stressors to	Acoustic:	Physical Disturbance	and Strike: Energy:		
Biological	Aircraft noise	Aircraft and aerial targ	get strike In-air electromagnetic		
Resources		Seafloor devices	devices		
and Habitats	Explosives:				
	None	Ingestion:	Entanglement:		
	None None				
Stressors to	Air Quality:		nts and Water Quality:		
Physical	Criteria air pollutants None				
Resources		<del></del>			
Stressors to	Cultural Resources:	esources: Public Health and Safety:			
Human	Physical disturbance and stri	Physical interactions			
Resources		Airborne acoustic Physical disturban			
Military	Ingestible Material:		None		
Military Expended	Ingestible Material: None	Military Recovera			
Material	INOTIC	Material			
Material	Non-Ingestible Material:	Iviaterial			
	_				
	None				

Mine Warfare	
Airborne Laser-	Based Mine Detection System Test
Sonar and	None
Other	
Transducer	
Bins	
In-Water	None
Explosive	
Bins	
Procedural	None
Mitigation	
Measures	
Assumptions	The activity uses an established mine warfare training range and does not require the placement of
Used for	moored mines.
Analysis	

## A.3.1.4.3 Airborne Mine Neutralization Systems Test

Mine Warfare							
Airborne Mine	Neutralization System Test						
Short	A test of the airborne mine	neutralization system	Typical Dura	ntion			
Description	evaluates the system's abilit		,,				
	destroy mines from an airbo	-					
	countermeasures capable h	elicopter (e.g., MH-60).					
	The airborne mine neutraliz	ation system uses up	2.5 flight ho	urs per event			
	to four unmanned underwa	ter vehicles equipped					
	with high-frequency sonar, v	video cameras, and					
	explosive and non-explosive	neutralizers.					
Long	Mine neutralization tests ev	aluate aircraft and aircra	ft systems inte	ended to neutralize or otherwise			
Description	destroy mines through the ι	use of explosives or other	munitions. Fo	or most neutralization tests, mine			
				ced mine neutralization systems.			
				d underwater vehicles equipped			
			-	ly detected submerged mines.			
			•	ives to neutralize the mines after			
	they are located. Data from			· ·			
	-	-	•	ition the neutralizing charge onto			
	the most vulnerable area of						
		· · · · · · · · · · · · · · · · · · ·		sed. A mine shape, rather than an			
	explosive mine, serves as th						
	neutralizer and the mine sha	=	_				
The stand	neutralizer against an inert						
Typical	Platforms: Rotary-wing aircraft, support craft, unmanned underwater vehicles						
Components	Targets: Mine shapes Systems being Trained/Tested: Mine neutralization systems						
Standard							
	Aircraft safety	Typical Locations					
Operating Procedures	Unmanned aerial, surface,	Range Complexes/Test	ing Ranges:	Inshore Waters/Pierside:			
(Section 2.3.3)	and subsurface vehicle	Virginia Capes	C	None			
(360001 2.3.3)	safety	Naval Surface Warfare	-				
Chuh-	,	Panama City Division		F			
Stressors to	Acoustic:	Physical Disturbance a		Energy:			
Biological Resources	Aircraft noise Vessel noise	Aircraft and aerial targ Vessel and in-water de		In-air electromagnetic devices			
and Habitats	vessei noise	Military expended mat		devices			
and nabitats	Explosives:	Seafloor devices	eriai	Entanglement:			
	In-water explosives	Seamoor devices		Wires and cables			
	in-water explosives	Ingestion:		wires and cables			
		Military expended mat	erials – other				
		than munitions	0				
Stressors to	Air Quality:		ts and Water	Quality:			
Physical	Criteria air pollutants			ve byproducts			
Resources	·		s other than e				
		Metals		ther materials			
Stressors to	Cultural Resources:	Socioeconomic Reso	urces:	Public Health and Safety:			
Human	Physical disturbance and	Accessibility		Physical interactions			
Resources	strike	Airborne acoustics		In-air energy			
	Explosives	Physical disturbance	and strike	In-water energy			

Mine Warfare			
Airborne Mine	Neutralization System Test		
Military	Ingestible Material:	Military	Neutralizers (non-explosive), mine
Expended	Mine (explosive) fragments, neutralizer	Recoverable	shapes (non-explosive)
Material	(explosive) fragments	Material	
	Non-Ingestible Material:		
	Fiber optic cans, fiber optic cables,		
	anchor – mines, neutralizer (non-		
	explosive)		
Sonar and	None		
Other			
Transducer			
Bins			
In-Water	E4 E11		
Explosive			
Bins			
Procedural	Physical Disturbance and Strike: (Section	5.3.4) <b>Explosi</b>	ve Stressors: (Section 5.3.3)
Mitigation	Vessel movement	Explosi	ve mine countermeasure and
Measures		neut	ralization activities
Assumptions	None		
Used for			
Analysis			

## A.3.1.4.4 Airborne Sonobuoy Minehunting Test

Mine Warfare					
Airborne Sonol	ouoy Minehunting Test				
Short	A mine-hunting system mad	e up of sonok	ouoys is	Typical Dura	ation
Description	deployed from a helicopter.	-		· ·	
	using high-frequency sonar,	is used for de	etection	2 flight hour	rs per event
	and classification of bottom	and moored	mines.		
Long					es of this helicopter-deployed,
Description	mine hunting, detection, and	d classificatio	n system. T	he sonar ider	tifies mine-like objects.
Typical	Platforms: Rotary-wing aircr	aft			
Components	Targets: Mine shapes (on es			raining range	e)
	Systems being Trained/Test	t <b>ed:</b> Sonobuo	y systems		
Standard	Aircraft safety	Typical Loca	tions		
Operating		Range Com	plexes/Test	ing Ranges:	Inshore Waters/Pierside:
Procedures		Virginia Cap	es		None
(Section		Naval Surfa	ce Warfare	Center,	
2.3.3)		Panama	City Divisio	n	
Stressors to	Acoustic:	Physical Dis			Energy:
Biological	Sonar and other	Aircraft and	_		In-air electromagnetic
Resources	transducers	Military exp		erial	devices
and Habitats	Aircraft noise	Seafloor de	vices		_
	l _   .   .				Entanglement:
	Explosives:	Ingestion:			Wires and cables
	None	than mui		erials – other	Decelerators/parachutes
Stressors to	Air Quality:	than ma		t and Water (	Quality:
Physical	Criteria air pollutants		Metals		cals other than explosives
Resources			Other ma		cuis other than explosives
Stressors to	Cultural Resources:	Socioe	conomic Re	sources:	Public Health and Safety:
Human	Physical disturbance and stri	ke Accessi	bility		Physical interactions
Resources	-		ne acoustics		In-air energy
		Physica	l disturban	ce and strike	In-water energy
Military	Ingestible Material:		Military	Mine	shape (non-explosive)
Expended	Decelerators/parachutes - Sr	mall	Recoveral	ble	
Material			Material		
	Non-Ingestible Material:				
	Sonobuoys (non-explosive), s	sonobuoy			
	wires	<u>-</u>			_
Sonar and	High-Frequency:				
Other	HF6				
Transducer					
Bins	Name				
In-Water	None				
Explosive Bins					
Procedural	Acoustic Stressors: (Section :	5 3 2)			
Mitigation	Active sonar	J.J.2/			
Measures	Active John				

Mine Warfare	
Airborne Sonol	puoy Minehunting Test
Assumptions	None
Used for	
Analysis	

## A.3.1.4.5 Mine-Laying Test

Mine Warfare					
Mine Laying Te	net .				
Short	Fixed-wing aircraft evaluate t	•	_	Typical Dura	ition
Description	mine laying equipment and s	•	-		
	mines. A mine test may also t			2 flight hour	s per event
	mines using a new or enhanc	ea mine deploy	ment	_	
	system.	1			
Long	During a mine laying test, fixe	-		•	
Description		•	•	_	explosive mine shapes. A mine test
	may also train aircrew in the		-	_	
					on-explosive mine shapes (i.e., MK pattern and dropping one or more
					nd are typically not recovered
	after the test.	xpiosive mine si	napes are e	ехрепиавіе а	nd are typically not recovered
Tunical		·+			
Typical Components	Platforms: Fixed-wing aircraf Targets: Mine shapes	ι			
Components	Systems being Trained/Test	ad: Mino laving	cyctoms		
Standard	Aircraft safety		-		
Operating	All Craft Safety	Typical Location		D	La ab a Wat a /Bi a i d a .
Procedures		Range Comple Jacksonville	exes/ resti	ng Kanges:	Inshore Waters/Pierside:
(Section			•		None
2.3.3)		Virginia Cape:	5		
Stressors to	Acoustic:	Physical Distu	irhance ar	d Strike:	Energy:
Biological	Aircraft noise	Aircraft and a			In-air electromagnetic
Resources	All clare hoise	Military expe	_		devices
and Habitats	Explosives:	willitary exper	naca mate	iiui	devices
	None	Ingestion:			Entanglement:
		None			None
Stressors to	Air Quality:	-	Sediment	and Water C	Quality:
Physical	Criteria air pollutants		Metals		•
Resources	·				
Stressors to	Cultural Resources:	Socioecono	omic Resou	urces:	Public Health and Safety:
Human	Physical disturbance and strik				Physical interactions
Resources	•	Airborne ad	-		In-air energy
		Physical dis	sturbance a	and strike	
Military	Ingestible Material:	1	Military	None	-
Expended	None	1	Recoverab	le	
Material		1	Material		
	Non-Ingestible Material:				
	Mine shapes (non-explosive)				
Sonar and	None				
Other					
Transducer					
Bins					
In-Water	None				
Explosive					
Bins					
Procedural	Physical Disturbance and Stri	ike: (Section 5.3	3.4)		
Mitigation	Non-explosive bombs and mi	ne shapes			
Measures					

Mine Warfare	
Mine Laying To	est
Assumptions	When a test event occurs and aircrew receives training, the event will be analyzed as a testing event.
Used for	
Analysis	

#### A.3.1.5 Surface Warfare

Surface warfare is a type of naval warfare in which aircraft, surface ships, and submarines employ weapons, sensors, and operations directed against enemy surface vessels. Naval Air Systems Command surface warfare tests include air-to-surface missile, gunnery, and bombing tests, rocket tests, laser targeting tests, and high-energy laser weapons tests.

A sinking exercise is a specialized fleet training event that provides an opportunity for Naval Air Systems Command aircrew along with ship and submarine crews to deliver explosive ordnance on a deactivated vessel that has been cleaned and environmentally remediated. The vessel is deliberately sunk using multiple weapons systems. A Naval Air Systems Command testing event may take place in conjunction with a sinking exercise to test aircraft or aircraft systems in the delivery of explosive ordnance on a surface target.

#### A.3.1.5.1 Air-to-Surface Bombing Test

Surface Warfare									
	Air-to-Surface Bombing Test								
Short	This event is similar to the to		Typical Durat	tion					
Description	exercise air-to-surface. Fixed delivery of bombs against su with the goal of evaluating to carry and delivery system, a systems that may have been enhanced.	urface maritime targets he bomb, the bomb nd any associated n newly developed or	2 flight hours per event						
Long Description	evaluating the bomb, the both have been newly developed during this type of test; how typically include non-explosi	craft test the delivery of bombs against surface maritime targets with the goal of bomb, the bomb carry and delivery system, and any associated systems that may wly developed or enhanced. Both explosive and non-explosive bombs will be released pe of test; however, the vast majority of releases will be non-explosive bombs and de non-explosive general purpose bombs (e.g., MK 82 and MK 83) and guided bomb 3U-12 and GBU-32) of various sizes. Surface targets may also be used.							
Typical	Platforms: Fixed-wing aircra	ft, unmanned aerial syst	ems						
Components	Targets: Surface targets Systems being Trained/Test	ted: Bomb releasing syste	ems						
Standard	Aircraft safety	Typical Locations							
Operating Procedures (Section 2.3.3)	Unmanned aerial, surface, and subsurface vehicle safety	Range Complexes/Test Virginia Capes	ting Ranges:	Inshore Waters/Pierside: None					
Stressors to	Acoustic:	Physical Disturbance a	nd Strike:	Energy:					
Biological	Aircraft noise	Aircraft and aerial targ	et strike	In-air electromagnetic					
Resources		Military expended mat	erials	devices					
and Habitats	Explosives:								
	In-water explosives	Ingestion:		Entanglement:					
		Military expended mat munitions	erials –	None					
		munitions Military expended materials – other than munitions							
Stressors to	Air Quality:		ts and Water C						
Physical	Criteria air pollutants	•	es and explosive	e byproducts Metals					
Resources		Other ma Chemica	aterials Is other than ex	plosives					

Surface Warfar	e			
Air-to-Surface E	Bombing Test			
Stressors to	Cultural Resources:	Socioeco	nomic Resources	: Public Health and Safety:
Human	Physical disturbance and	Accessibi	lity	Physical interactions
Resources	strike		acoustics	In-air energy
	Explosives	Physical o	disturbance and s	trike In-water energy
Military	Ingestible Material:		Military	Surface target (mobile)
Expended	Bomb (explosive) fragments, su		Recoverable	
Material	target (mobile and stationary	<i>(</i> )	Material	
	fragments			
	Non-Ingestible Material:			
	Bombs (non-explosive)			
Sonar and	None			
Other				
Transducer				
Bins		-	-	
In-Water	E9			
Explosive				
Bins		/c .:	524) 5 1 :	(6.17. 5.2.2)
Procedural	Physical Disturbance and Strike			ve Stressors: (Section 5.3.3)
Mitigation Measures	Non-explosive bombs and mine	snapes	Explosiv	ve bombs
	None		-	
Assumptions Used for	None			
Analysis				

## A.3.1.5.2 Air-to-Surface Gunnery Test

Surface Warfar	Α						
Air-to-Surface (							
Short		raining avent	Turnory Tyr	aical Duratio	on		
Description	This event is similar to the to exercise air-to-surface. Fixed	_		oical Duration	OII		
Description	aircrews evaluate new or en						
	against surface maritime tar						
	gun, gun ammunition, or ass	_	1 7-7	2-2.5 flight hours per event			
	required specifications or to	-					
	operation of a new or enhar						
Long		g aircrews evaluate new or enhanced aircraft guns against surface					
Description		at the gun, gun ammunition, or associated systems meet required					
Description	=	aircrew in the operation of a new or enhanced weapons system. Non-					
	T	-			t; however, a small number of		
			_		may be used include 7.62 mm,		
	20 mm, 30 mm, 0.30-caliber	_	-		may be used melade 7.02 mm,		
Typical	Platforms: Rotary-wing airci						
Components	Targets: Surface targets	rait, fixea wiii	g an crart, thirlot	.or uncluit			
Components	Systems being Trained/Test	ted: Gun syste	ems				
Standard	Aircraft safety	Typical Loca					
Operating	Weapons firing safety		plexes/Testing F	Pangos	Inshore Waters/Pierside:		
Procedures	weapons ming surety	Jacksonville		-	None		
(Section 2.3.3)		Virginia Capes					
· ,	Acquetic			<b>Autles</b>	Fnorm:		
Stressors to	Acoustic: Aircraft noise		sturbance and Solation   Solation		Energy:		
Biological Resources					In-air electromagnetic devices		
and Habitats	Weapons noise	willtary exp	ended material		devices		
and Habitats	Explosives:	Ingestion:			Entanglement:		
	In-water explosives	_	ended materials	c _	None		
	iii-watei explosives	munition		3	None		
			ended material	s – other			
		than mui		3 Other			
Stressors to	Air Quality:	trair ma	Sediments an	d Water O	uality:		
Physical	Criteria air pollutants		Explosives and		=		
Resources	Criteria dii poliatarits		Other materia	=	by products wicturs		
Resources			Chemicals oth		alosives		
Stressors to	Cultural Resources:	Socioeco	nomic Resource		Public Health and Safety:		
Human	Physical disturbance and	Accessibi			Physical interactions		
Resources	strike	Airborne	•		In-air energy		
Resources	Explosives		disturbance and		In-water energy		
Military	Ingestible Material:	Thysical C	Military	-	targets (mobile)		
Expended	Medium-caliber projectile (e	vnlosive)	Recoverable	Juliace	targets (mobile)		
Material	fragments, small- and me	•	Material				
Widterial	caliber projectiles (non-ex		Widteria				
	small-caliber casings, med	-					
	casings, surface targets (s						
	fragments						
	Non-Ingestible Material:						
	None						
	None						

Surface Warfar	e	
Air-to-Surface (	Gunnery Test	
Sonar and	None	
Other		
Transducer		
Bins		
In-Water	E1	
Explosive		
Bins		
Procedural	Physical Disturbance and Strike: (Section 5.3.4)	Explosive Stressors: (Section 5.3.3)
Mitigation	Small-, medium-, and large-caliber non-explosive	Explosive medium-caliber and large-caliber
Measures	practice munitions	projectiles
Assumptions	None	
Used for		
Analysis		

#### A.3.1.5.3 Air-to-Surface Missile Test

<b>Surface Warfare</b>							
Air-to-Surface Mi	issile Test						
Short	This event is similar to the tr	aining event i	missile <b>Ty</b>	pical Duration			
	exercise air-to-surface. Test	_		1			
=	fixed-wing and rotary-wing a	-					
	missiles at surface maritime	targets to eva	aluate 2-4	4 flight hours per event			
	the weapons system or as pa	art of another					
	integration test.						
Long	Similar to a missile exercise	air-to-surface	, an air-to-surfa	ace missile test may involve both fixed-wing			
Description	and rotary-wing aircraft laur	otary-wing aircraft launching missiles at surface maritime targets to evaluate the weapons					
	system or as part of another	stem or as part of another systems integration test. Air-to-surface missile tests can include high					
	-		-	ng missile) weapons. Laser targeting systems			
				ould be utilized during testing.			
	<b>Platforms:</b> Fixed-wing aircra	ft, rotary-win	g aircraft, tiltro	tor aircraft			
<u>-</u>	Targets: Surface targets						
	Systems being Trained/Test	ed: Missile fir	ing/launching s	systems			
	Aircraft safety	Typical Loca	tions				
	Weapons firing safety	Range Complexes/Testing Ranges: Inshore Waters/Pierside:					
Procedures		Gulf of Mexico None					
(Section 2.3.3)		Jacksonville					
		Virginia Capes					
	Acoustic:	<u>-</u>	turbance and S	<u> </u>			
0	Aircraft noise		aerial target st				
	Weapons noise	Military exp	ended material	l devices			
and Habitats							
	Explosives:	Ingestion:		Entanglement:			
	In-water explosives		ended material	lls – None			
		munition	-	la athan			
		than mur	ended material	is – other			
Stressors to	Air Quality:	tilali illul		d Water Quality			
	Criteria air pollutants			d Water Quality: nd explosive byproducts			
Resources	Criteria ali poliutarits		•	ther than explosives			
Resources			Metals	Other materials			
Stressors to	Cultural Resources:	Socioaco	nomic Resource				
	Physical disturbance and	Accessibi		Physical interactions			
Resources	strike	Airborne	•	In-air energy			
	Explosives		disturbance and	— ·			
	Ingestible Material:	, 5. 5 61	Military	Surface targets (mobile)			
=	Missile (explosive) fragments	s. surface	Recoverable				
Material	target (mobile and station	-	Material				
	fragments	- //					
	<u> </u>						
	Non-Ingestible Material:						
	Missiles (non-explosive)						
Sonar and	None						
Other							
Transducer							
Bins							

Surface Warfar	Surface Warfare							
Air-to-Surface I	Air-to-Surface Missile Test							
In-Water	E6	E9	E10					
Explosive								
Bins								
Procedural	Physical Dis	turbance and Strike	e: (Section 5.3.4)	Explosive Stressors: (Section 5.3.3)				
Mitigation	Non-explosi	ve missiles and rock	ets	Explosive missiles and rockets				
Measures								
Assumptions	None			•				
Used for								
Analysis								

## A.3.1.5.4 High-Energy Laser Weapons Test

Confess Marken							
Surface Warfar							
	ser Weapons Test		T				
Short	High-energy laser weapons			Typica	l Duration		
Description	the specifications, integration	•					
	of an aircraft mounted, app			2 E flio	ght hours per event		
	high-energy laser. The laser	is intended to	o be used	2.3 1118	gnt nours per event		
	as a weapon to disable sma	II surface vess	sels.				
Long	During a high-energy laser v	veapons test,	aircrew wo	uld eval	luate the specifications, integration,		
Description	and performance of an airc	raft mounted,	approxima	tely 25 l	kilowatt high-energy laser that is		
	intended to be used as a we	o be used as a weapon against stationary and mobile, unmanned surface targets. The					
	high-energy laser would be	employed fro	m a helicop	oter (e.g	., MH-60) either hovering or in forward		
	flight, and is designed to dis	able the surfa	ace vessel, r	enderin	ng it immobile. The high-energy laser		
	would have a range of up to	six kilometer	rs. Unmann	ed surfa	ace targets would be used during the		
	high-energy laser test.						
Typical	Platforms: Rotary-wing airc	raft					
Components	Targets: Surface targets						
Components	Systems being Trained/Tested: High-energy lasers						
Standard	Aircraft safety	Typical Loca					
Operating	Laser safety			ting Pan	ges: Inshore Waters/Pierside:		
Procedures	Laser surety	Range Complexes/Testing Ranges: Inshore Waters/Pierside: Virginia Capes None					
(Section		viiginia capes None					
2.3.3)							
Stressors to	Acoustic:	Physical Dis	turbanco a	nd Strik	ke: Energy:		
	Aircraft noise	Aircraft and					
Biological Resources	Aircraft floise		_		In-air electromagnetic devices		
and Habitats	Evalosivos	Military exp	ienueu mai	eriai			
and nabitats	Explosives: None	Ingostion			High-energy lasers		
	None	Ingestion:	andad mat	oriole	other Enterglement		
		Military exp		eriais –	_		
<u> </u>	4: 0 1:	than mui			None		
Stressors to	Air Quality:				Vater Quality:		
Physical	Criteria air pollutants		Metals	Oti	her materials		
Resources							
Stressors to	Cultural Resources:		conomic Re	sources	•		
Human	Physical disturbance and str		=		Physical interactions		
Resources			e acoustics		In-air energy		
		Physica	l disturban				
Military	Ingestible Material:		Military		Surface target (mobile)		
Expended	Surface target (mobile and s	tationary)	Recovera	ble			
Material	fragments	Material					
	Non-Ingestible Material:	Naterial:					
	None						
Sonar and	None						
Other							
Transducer							
Bins							

Surface Warfar	Surface Warfare			
High-Energy La	ser Weapons Test			
In-Water	None			
Explosive				
Bins				
Procedural	None			
Mitigation				
Measures				
Assumptions	None			
Used for				
Analysis				

# A.3.1.5.5 Laser Targeting Test

Surface Warfar	P						
Laser Targeting							
Short				Typic	al Dura	tion	
Description	Aircrews illuminate enemy t	argets with las	ers.				
Long	During a laser targeting test	aircrews use	aser targe	4 flight hours per event geting devices integrated into aircraft or			
Description			_	_		to train aircrew in the use of	
	• • • • • • • • • • • • • • • • • • •		-	-		lluminate designated targets for	
	engagement with laser-guide	ed weapons. N	lo explosiv	e muni	itions a	re released during a laser	
	targeting test.						
Typical	<b>Platforms:</b> Fixed-wing aircraft, rotary-wing aircraft, tiltrotor aircraft, unmanned aerial systems						
Components	Targets: Surface targets						
Charada ad	Systems being Trained/Test			ms			
Standard	Aircraft safety	Typical Locat					
Operating Procedures		Range Comp		ting Ka	nges:	Inshore Waters/Pierside:	
(Section 2.3.3)		Virginia Cape	25			None	
Stressors to	Acoustic:	Physical Dist	turbance a	nd Stri	ike:	Energy:	
Biological	Aircraft noise	Aircraft and				In-air electromagnetic	
Resources		Military expe	ended mat	erial		devices	
and Habitats	Explosives:						
	None	Ingestion:				Entanglement:	
		None				None	
Stressors to	Air Quality:		Sedimen	ts and	Water	Quality:	
Physical Resources	Criteria air pollutants		Metals Other ma	tariale			
Stressors to	Cultural Resources:	Socioec	onomic Re			Public Health and Safety:	
Human	Physical disturbance and stri			.504.60		Physical interactions	
Resources	,		e acoustics	5		In-air energy	
		Physical	disturban	ce and	strike		
Military	Ingestible Material:		Military		Surfac	e targets (stationary)	
Expended	None		Recovera	ble			
Material	Non-Ingestible Material:		Material				
Cananand	Bombs (non-explosive)						
Sonar and Other	None						
Transducer							
Bins							
In-Water	None	-		-			
Explosive							
Bins							
Procedural	Physical Disturbance and St		5.3.4)				
Mitigation Measures	Non-explosive bombs and m	ine shapes					
Assumptions	Military expended material r	nay ha non-ov	nlosiva ho	mhs or	other	ruided munitions	
Used for	winitary experiued materiari	nay be non-ex	Piggive poi	1103 01	ש ושונים	gaiaca mamaons.	
Analysis							
	<u>L</u>						

#### A.3.1.5.6 Rocket Test

Surface Warfare							
Rocket Test							
Short	Rocket tests are conducted t	to evaluate th	e	Typic	cal Duration		
Description	integration, accuracy, perfor						
	=	aration of guided and unguided 2.75-inch					
	rockets fired from a hovering	_	lying	1.5-2	2.5 Hours per event		
	helicopter or tiltrotor aircraf						
Long					uracy, performance, and safe separation		
Description	= =	of laser-guided and unguided 2.75-inch rockets fired from a hovering or forward flying helicopter.					
		Rocket tests would involve the release of primarily live motor/non-explosive warhead rockets. Some explosive warhead rockets would be tested, and during a jettison test, rockets with a non-explosive					
	-	d non-explosive warhead would be jettisoned along with the rocket launcher. Rocket tests					
					shanced weapons systems. Rocket types		
					nder the Advanced Precision Kill		
					under Low-cost Guided Imaging Rocket		
				-	ad rocket types also include flechette		
	rockets. All rockets planned	ockets. All rockets planned for testing are 2.75-inch rockets. Some rocket tests may be conducted					
	in conjunction with upgrade	conjunction with upgrades to or integration of the Forward Looking Infrared targeting system.					
Typical	Platforms: Rotary-wing aircraft, tiltrotor aircraft						
Components	Targets: Surface targets						
		Trained/Tested: Rocket firing/launching systems					
Standard	Aircraft safety	Typical Loca					
Operating	Weapons firing safety	Range Com		ing Ra			
Procedures (Section 2.3.3)		Jacksonville			None		
	Accustics	Virginia Cap		l C4	ilia. Facuru		
Stressors to Biological	Acoustic: Aircraft noise	-	s <b>turbance a</b> i I aerial targe		= -		
Resources	Weapons noise		ended mate		devices		
and Habitats			,		33.1333		
	Explosives:	Ingestion:			Entanglement:		
	In-water explosives	Military exp	ended mate	erials -	– None		
		munition					
			ended mate	erials -	– other		
		than mu					
Stressors to Physical	Air Quality: Criteria air pollutants				Water Quality: explosive byproducts		
Resources	Criteria ali poliutarits		•		er than explosives		
Resources			Metals	3 Ottic	Other materials		
Stressors to	Cultural Resources:	Socioeco	nomic Reso	urces			
Human	Physical disturbance and	Accessibi	lity		Physical interactions		
Resources	strike	Airborne	acoustics		In-air energy		
	Explosives	Physical o	disturbance	and st	trike In-water energy		
Military	Ingestible Material:		Military		Surface targets (mobile and stationary)		
Expended	Rocket (explosive) fragments	•	Recoverat	ole			
Material	target (mobile and station	iary)	Material				
	fragments, flechettes						
	Non-Ingestible Materials						
	Non-Ingestible Material: Rockets (non-explosive)						
	nockets (Horr-explosive)						

Surface Warfar	e	
Rocket Test		
Sonar and	None	
Other		
Transducer		
Bins		
In-Water	E3	
Explosive		
Bins		
Procedural	Physical Disturbance and Strike: (Section 5.3.4)	Explosive Stressors: (Section 5.3.3)
Mitigation	Non-explosive missiles and rockets	Explosive missiles and rockets
Measures		
Assumptions	Assume 25 percent of non-explosive practice mun	itions are flechette rockets.
Used for		
Analysis		

## A.3.1.6 Other Testing Activities

## A.3.1.6.1 Acoustic and Oceanographic Research

Other Testing	Activities							
	Oceanographic Research							
Short	Active transmissions with	in the band 10 h	ertz	Typical Dur	ation			
Description	(Hz)-100 kilohertz (kHz) fr		-					
·	from ships and aircraft.	•	,	8 flight hou	rs per event			
Long	Active acoustic transmissi	ions within the band 10 Hz-100 kHz used for engineering tests of						
Description		coustic sources, validation of ocean acoustic models, characterization of acoustic interactions						
	with the ocean bottom an							
Typical	<b>Platforms:</b> Fixed-wing aird	•	5					
Components	Targets: Sub-surface targe							
	Systems being Trained/To			de minimis s	onar systems			
Standard	Vessel safety	Typical Locatio						
Operating	Aircraft safety	Range Comple		ng Ranges:	Inshore Waters/Pierside:			
Procedures		Gulf of Mexico			None			
(Section		Jacksonville						
2.3.3)		Key West						
		Northeast						
Character to	A	Virginia Capes		l Ct!l	Forester			
Stressors to Biological	Acoustic: Aircraft noise	Physical Distu Aircraft and a			Energy: In-air electromagnetic			
Resources	Vessel noise	Vessel and in-	_		devices			
and Habitats	Vesserrioise	Military exper	In-water electromagnetic					
una maditats	Explosives:	, ,	iaca mate	devices				
	None	Ingestion:						
		None			Entanglement:			
Ctuassaus ta	Air Ouglitur		Cadiman	to and Mata	None • Overlitus			
Stressors to Physical	Air Quality: Criteria air pollutants		Other ma	ts and Wate	r Quanty:			
Resources	Criteria ali poliutarits		Other me	icciiais				
Stressors to	Cultural Resources:	Socioeco	nomic Res	ources:	Public Health and Safety:			
Human	Physical disturbance and	Accessibil			Physical interactions			
Resources	strike	Airborne	•		In-air energy			
		Physical d	listurbanc	e and				
		strike						
Military	Ingestible Material:		Military	Subsu	rface target (mobile)			
Expended	None		Recovera	ble				
Material	Non-Ingestible Material:		Material					
	Subsurface target (mobile	·)						
Sonar and	None							
Other								
Transducer								
Bins								
In-Water	None							
Explosive								
Bins								
Procedural	Physical Disturbance and	Strike: (Section 5	5.3.4)					
Mitigation	Vessel movement							
Measures								

Other Testing	Other Testing Activities				
Acoustic and Oceanographic Research					
Assumptions	None				
Used for					
Analysis					

# A.3.1.6.2 Air Platform Shipboard Integration Test

Other Testing	Activities							
	hipboard Integration Test							
Short	Aircraft are tested to determine	e operabili	ty from shipboard	Typical Duration				
Description	platforms, performance of ship	-	-					
	and to verify and evaluate communications and tactical data  2-12 flight hours per event							
	links.							
Long	• · · · · · · · · · · · · · · · · · · ·	poard integration test is performed to evaluate the compatibility of an aircraft						
Description	to operate from designated shipboard platforms, perform shipboard physical operations, and to verify and evaluate communications and tactical data links. This test function also includes an							
	assessment of carrier-shipboard suitability, such as hazards of electromagnetic radiation to							
	-		• •	and high energy radio frequency.				
Typical	Platforms: Fixed-wing aircraft,	unmanned	l aerial systems, tiltro	otor aircraft				
Components	Targets: None							
	Systems being Trained/Tested							
Standard	Aircraft safety	Typical Lo						
Operating Procedures	,	_	omplexes/Testing	Inshore Waters/Pierside:				
(Section	,	Ranges: Virginia	Canes	None				
2.3.3)		Viigiiila	Capes					
Stressors to	Acoustic:	Physical	Disturbance and Stri	ke: Energy:				
Biological	Aircraft noise	Aircraft and aerial target strike In-air electromagnetic						
Resources				devices				
and Habitats	Explosives: None	Ingestion None	1:	Entanglament				
	None	None		Entanglement: None				
Stressors to	Air Quality:			Sediments and Water Quality:				
Physical	Criteria air pollutants			None				
Resources				<u>.                                    </u>				
Stressors to	Cultural Resources:		nomic Resources:	Public Health and Safety:				
Human Resources	None	Accessibi	acoustics	Physical interactions In-air energy				
Resources			disturbance and strik					
Military	Ingestible Material:		Military	None				
Expended	None		Recoverable					
Material			Material					
	Non-Ingestible Material:							
Sonar and	None							
Other	None							
Transducer								
Bins								
In-Water	None	-						
Explosive								
Bins								
Procedural	None							
Mitigation Measures								
Micasares	<u> </u>							

Other Testing	Other Testing Activities				
Air Platform Shipboard Integration Test					
Assumptions	None				
Used for					
Analysis					

## A.3.1.6.3 Maritime Security

Surface Warfar	e							
Maritime Secur	ity Operations							
Short	Maritime patrol aircraft par	rticipate in maritime	е Тур	ical Dura	ation			
Description	security activities and fleet	training events. Air	craft					
	identify, track, and monitor	compliance with United 2-8 flight hours per event						
	vessels suspected of non-co							
	Nations-allied sanctions or							
	engagement.							
Long	Crews from Navy fixed-wing	g aircraft identify, track, and monitor foreign merchant vessels suspected						
Description	of not complying with Unite	nited Nations-allied sanctions or conflict rules of engagement. This all Air Systems Command maritime patrol aircraft may participate in						
	event is non-firing. Naval Ai							
	security activities and train	ing events.						
Typical	Platforms: Fixed-wing aircr	aft						
Components	Targets: Mobile surface ves	ssels						
	Systems being Trained/Tes	<b>sted:</b> Radar systems	;					
Standard	Vessel safety	Typical Locations	;					
Operating	Aircraft safety	Range Complexe	s /Tosting F	Pangos:	Bays/Estuaries/Pierside:			
Procedures		Jacksonville	sy resume i	variges.	None			
(Section 2.3.3)		Navy Cherry Poir	nt		None			
		Virginia Capes						
Stressors to	Acoustic:	Physical Disturb	ance and S	trike	Energy:			
Biological	Aircraft noise	Aircraft and aeri			In-air electromagnetic			
Resources	Vessel noise	Vessel and in-wa	•		devices			
and Habitats	vesser noise	vesser and in we	iter device.	JUINC	devices			
	Explosives:	Ingestion:			Entanglement:			
	None	None			None			
Stressors to	Air Quality:	Se	diments an	d Water	Quality:			
Physical	Criteria air pollutants		ne		•			
Resources								
Stressors to	Cultural Resources:	Socioeconom	ic Resource	es:	Public Health and Safety:			
Human	Physical disturbance and	Accessibility			Physical interactions			
Resources	strike	Airborne acou	stics		In-air energy			
		Physical distur	bance and	strike				
Military	Ingestible Material:	Mil	itary	None				
Expended	None	Red	overable					
Material	Non-Ingestible Material:	Ma	terial					
	None							
Sonar and	None							
Other	None							
Transducer								
Bins								
In-Water	None							
Explosive	-							
Bins								
Procedural	None	<del>-</del>	<del>-</del>	-	-			
Mitigation	- ··-							
Measures								

Surface Warfar	Surface Warfare				
Maritime Security Operations					
Assumptions	None				
Used for					
Analysis					

## A.3.1.6.4 Shipboard Electronic Systems Evaluation

Other Testing A	Activities							
_	tronic Systems Evaluation							
Short	Tests measure ship antenna	radiation patterns	and <b>Typi</b>	ical Duration				
Description	test communication systems	s with a variety of						
	aircraft.			) flight hours per event				
Long	•	s evaluation tests measure ship antenna radiation patterns and						
Description	-	nmunication systems linking vessels and aircraft. Aircraft capable of landing on a ship carrier or littoral combat ship) temporarily deploy to a nearshore ship and conduct a						
		r a period of days to test newly installed or modified systems onboard the						
		th shipboard electronic systems. Follow-on test and evaluation of						
	unmanned aerial systems w	ould consist of dyna	amic interfa	ace testing, shipboard electromagnetic				
				e capability of aircraft to conduct launch				
	•	•	-	orm missions in a maritime environment.				
	flights occurring between m			bove mean sea level with the majority of				
	_							
		· · ·		recision guidance to aircraft landing on air				
				st of shipboard compatibility (dynamic aluation, amphibious assault scenarios.				
				rould also involve flight and wind envelope				
	•			, Amphibious Transport Dock, and Dock				
	Landing Ship class vessels.							
Typical	Platforms: Rotary-wing aircr	raft, unmanned aeri	al systems					
Components	Targets: None							
Chandand	Systems being Trained/Tes	Ī	n systems					
Standard Operating	Aircraft safety Unmanned aerial, surface,	Typical Locations	/T + ! D					
Procedures	and subsurface vehicle	Range Complexe Gulf of Mexico	s/ resting R	anges: Inshore Waters/Pierside: None				
(Section 2.3.3)	safety	Jacksonville		None				
	,	Key West						
		Virginia Capes						
Stressors to	Acoustic:	Physical Disturba		<u> </u>				
Biological	Aircraft noise	Aircraft and aeria	l target stri					
Resources	Fundaciona.	la acatica.		devices				
and Habitats	Explosives: None	Ingestion: None		Entanglement:				
	None	None		None				
Stressors to	Air Quality:	Sec	liments and	d Water Quality:				
Physical	Criteria air pollutants	No		•				
Resources								
Stressors to	Cultural Resources:	Socioeconor	nic Resourc	•				
Human	None	Accessibility Physical interactions						
Resources		Airborne acc		In-air energy				
Military	Ingestible Material:	Physical dist	tary	None				
Expended	None		overable	None				
Material			erial					
	Non-Ingestible Material:							
	None							

Other Testing A	Other Testing Activities						
Shipboard Elect	Shipboard Electronic Systems Evaluation						
Sonar and	None						
Other							
Transducer							
Bins							
In-Water	None						
Explosive							
Bins							
Procedural	None						
Mitigation							
Measures							
Assumptions	Surface targets consist of Navy vessels accounted for in unit level training activities.						
Used for							
Analysis							

# A.3.1.6.5 Undersea Range System Test

Other Testing A	ctivities						
Undersea Range	e System Test						
Short	Following installation of a N	avy undersea w	varfare	Typic	al Durat	tion	
Description	training and testing range, to (components of the range) a include node surveys and te	are conducted t					
	transmission functionality.						
Long Description	The bottom-mounted bi-directional nodes are surveyed post-installation utilizing a range pinger and tested to establish system parameters and baseline hearing ranges. Each acoustic projector is activated at full power while listening is occurring on adjacent hydrophones. The nodes may also be activated during periodic operational and maintenance checks and following significant weather events to confirm that nodes are located correctly and functioning properly prior to ongoing training or testing.						
Typical	Platforms: Surface combata	nts					
Components	Targets: None Systems being Trained/Test	<b>ted:</b> Undersea r	ange instr	ument	ation		
Standard	Vessel safety	Typical Locati	_				
Operating Procedures (Section 2.3.3)	·	Range Complexes/Testing Ranges: Inshore Waters/Pierside: Jacksonville None					
Stressors to Biological	Acoustic: Sonar and other	Physical Disturbance and Strike: Energy:  Vessel and in-water device strike In-air electromagnetic					
Resources	transducers					devices	
and Habitats	Vessel noise	Ingestion: None				Entanglement:	
	<b>Explosives:</b> None					None	
Stressors to	Air Quality:		Sediment	ts and	Water C	Quality:	
Physical	Criteria air pollutants		None				
Resources							
Stressors to	None						
Human							
Resources Military	Ingestible Material:		Military		None		
Expended Material	None		Recoveral Material	ble	None		
	Non-Ingestible Material: None						
Sonar and Other Transducer Bins	None						
In-Water Explosive Bins	None			-			
Procedural Mitigation Measures	Physical Disturbance and St Vessel movement	rike: (Section 5	•	<b>cousti</b> ctive s		ors: (Section 5.3.2)	

Other Testing Activities					
Undersea Range System Test					
Assumptions	The duration of the node survey varies.				
Used for	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM				
Analysis	from shore.				

## A.3.2 NAVAL SEA SYSTEMS COMMAND TESTING ACTIVITIES

#### A.3.2.1 Anti-Submarine Warfare

## A.3.2.1.1 Anti-Submarine Warfare Mission Package Testing

Anti-Submarine	: Warfare							
Anti-Submarine	Warfare Mission Package Te	sting						
Short	Ships and their supporting p	latforms (e.g.	,	Typi	ical Duration			
Description	helicopters, unmanned aeri				weeks, with 4-8 hours of active sonar use			
	localize, and attack submari	•	,		intervals of non-activity in between			
Long	Littoral combat ships condu	ct detect-to-e	ct detect-to-engage operations against modern diesel-electric and					
Description					h manned and unmanned). Active and			
	_		e used to detect and track submarine targets, culminating in the					
	deployment of lightweight t				= -			
Typical	Platforms: Rotary-wing airc	raft, surface co	ombatants,	unma	anned aerial systems, unmanned surface			
Components	vehicles				,			
	Targets: Sub-surface targets	5						
	Systems being Trained/Tes	<b>ted:</b> Sonar sys	tems, count	erme	easure systems, torpedo systems,			
	sonobuoys							
Standard	Vessel safety	Typical Loca	tions					
Operating	Aircraft safety	Range Com	plexes/Test	ing Ra	anges: Inshore Waters/Pierside:			
Procedures	Unmanned aerial, surface,	Jacksonville			Newport, Rhode Island			
(Section 2.3.3)	and subsurface vehicle	Virginia Cap	es					
	safety	Naval Under	sea Warfar	e Cent	ter			
	Towed in-water device	Division, I	Newport					
	safety							
Stressors to	Acoustic:	Physical Dis			<u> </u>			
Biological	Sonar and other	Aircraft and	_					
Resources	transducers	Vessel and i			trike devices			
and Habitats	Aircraft noise	Military exp	ended mate	eriai	Catanalamant			
	Vessel noise	Ingestion:			Entanglement: Wires and cables			
	Explosives:	Military exp	anded mate	arialc				
	None	than mur		ciiais	other becelerators, paracriates			
Stressors to	Air Quality:	trair mar		s and	d Water Quality:			
Physical	Criteria air pollutants				er than explosives Metals			
Resources	, , , , , , , , , , , , , , , , , , ,		Other ma		•			
Stressors to	Cultural Resources:	Socioeco	nomic Reso	urces	s: Public Health and Safety:			
Human	Physical disturbance and	Accessibi	lity		Physical interactions			
Resources	strike		acoustics		In-air energy			
		Physical o	disturbance	and s	strike In-water energy			
Military	Ingestible Material:		Military		Lightweight torpedoes (non-explosive)			
Expended	Decelerators/parachutes - s	mall	Recoveral	ole				
Material			Material					
	Non-Ingestible Material:							
	Sonobuoys (non-explosive),	sonobuoy						
	wires, expendable							
	bathythermographs, expe							
	bathythermograph wires,	lightweight						
	torpedo accessories							

Anti-Submarine	Anti-Submarine Warfare								
Anti-Submarine Warfare Mission Package Testing									
Sonar and	Mid-Frequ	uency:	Anti-Subm	arine Warfare:	Torpedoes:				
Other	MF1	MF5	ASW1	ASW3	TORP1				
Transducer	MF4	MF12	ASW2	ASW5					
Bins									
In-Water	None	-	<del>-</del>	<del>-</del>	· ·				
Explosive									
Bins									
Procedural	Acoustic S	Stressors: (Section	5.3.2)	Physical Dis	turbance and Strike: (Sed	ction 5.3.4)			
Mitigation	Active son	ar		Vessel move	ement				
Measures				Towed in-wa	ater devices				
Assumptions	All sonobu	loys have parachu	ites unless other	wise noted. Sub-sur	face targets are submarii	nes.			
Used for									
Analysis									

## A.3.2.1.2 At-Sea Sonar Testing

Anti-Submarine	· Warfare							
At-Sea Sonar Te								
Short	At-sea testing to ensure system	ems are fully	Typical Durat	ion				
Description	functional in an open ocean	=	From 4 hours					
Long	At-sea sonar testing is requir	ed to calibrate or docum						
Description	systems while the ship or submarine is in an open ocean environment. At-sea sonar testing is							
	conducted to verify the ship	meets design acoustic sp	pecifications, de	efine the underwater				
	characteristics of the ship, determine effects of systems and equipment on ship's acoustic characteristics, and provide technical background necessary to initiate development of design							
	•			ort measurement, photonics,				
	•	•	-	passive detection capability is				
				ped with a noise augmentation				
				of other vessel types or classes.				
Typical	Platforms: Submarines, surfa		craft					
Components	Targets: Sub-surface targets,	=						
	Systems being Trained/Test							
	modems, torpedo systems, ι		ion systems, el	ectromagnetic devices				
Standard	Vessel safety	Typical Locations						
Operating	Towed in-water device	Range Complexes/Tes	ting Ranges:	Inshore Waters/Pierside:				
Procedures	safety	Gulf of Mexico		None				
(Section 2.3.3)		Jacksonville						
		Navy Cherry Point						
		Northeast						
		Virginia Capes	Camban					
		Naval Undersea Warfar	e Center					
		Division, Newport South Florida Ocean Mo	assurament					
		Facility	easurement					
		Offshore of Fort Pierce,	Florida					
Stressors to	Acoustic:	Physical Disturbance a		Energy:				
Biological	Sonar and other	Vessel and in-water de		In-water electromagnetic				
Resources	transducers	Military expended mat		devices				
and Habitats	Vessel noise	winterly expended mat	.c. iai	In-air electromagnetic				
		Ingestion:		devices				
	Explosives:	Military expended mat	erials – other					
	None	than munitions		Entanglement:				
				Wires and cables				
				Decelerators/parachutes				
Stressors to	Air Quality:	Sedimen	ts and Water C	Quality:				
Physical	Criteria air pollutants	Metals	Chem	nicals other than explosives				
Resources		Other ma	aterials					
Stressors to	Cultural Resources:	Socioeconomic Re	esources:	Public Health and Safety:				
Human	Physical disturbance and strik	ke Accessibility		Physical interactions				
Resources		Airborne acoustics		In-air energy				
		Physical disturban	ce and strike	In-water energy				

Anti-Submarin	e Warfare		
At-Sea Sonar T	esting		
Military Expended Material	Ingestible Material: Decelerators/parachutes - small  Non-Ingestible Material: Acoustic countermeasures, expendable bathythermographs, expendable bathythermograph wires, heavyweight torpedo accessories, lightweight torpedo accessories, guidance wires, sonobuoys (non-explosive), sonobuoy wires, subsurface target (mobile)	Military Recoverable Material	Electromagnetic devices, heavyweight torpedoes (non-explosive), surface launched lightweight (non-explosive) torpedoes
Sonar and Other Transducer Bins	MF1 MF5 LF5 MF1K MF9	quency:	Anti-Submarine Warfare: ASW3 ASW4  Acoustic Modems: M3
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar	Vessel	al Disturbance and Strike: (Section 5.3.4) movement in-water devices
Assumptions Used for Analysis	Active sonar use is intermittent througho	ut the duration of	f the event.

## A.3.2.1.3 Countermeasure Testing

Anti-Submarine	Warfare				
Countermeasur	e Testing				
Short	Countermeasure testing inv	olves the testing of	Typical Dura	tion	
Description	systems that will detect, loc	_	7.		
	incoming weapons, includin	_	From 4 hours to 6 days, depending on the		
	targets. Testing includes sur		countermeasure being tested		
	defense systems and marine	e vessel stopping	countermeas	sare being tested	
	payloads.				
Long	_	<u> </u>		etect, localize, and track incoming	
Description	weapons, including marine	•	-	• •	
	torpedo subsystems. Some			s, and countermeasure anti-	
	-		-	marine). While surface vessels are	
			•	ert rates. Testing of the maritime	
	vessel stopping payloads wi		-	_	
				I potentially stop the advance of	
	the vessel.	•	,		
Typical	Platforms: Aircraft carriers,	support craft, surface co	mbatants		
Components	Targets: Sub-surface targets, surface targets				
	Systems being Trained/Tested: Sonar systems, countermeasures, torpedo systems				
Standard	Vessel safety	Typical Locations			
Operating	Towed in-water device	Range Complexes/Tes	ting Ranges:	Inshore Waters/Pierside:	
Procedures	safety	Key West		None	
(Section 2.3.3)		Gulf of Mexico			
		Jacksonville			
		Northeast Virginia Capes			
		Naval Undersea Warfar	e Center		
		Division, Newport	c center		
Stressors to	Acoustic:	Physical Disturbance a	and Strike:	Energy:	
Biological	Sonar and other	Vessel and in-water de		In-air electromagnetic	
Resources	transducers	Military expended mat	erial	devices	
and Habitats	Vessel noise				
		Ingestion:		Entanglement:	
	Explosives:	Military expended mat	erials – other	Wires and cables	
	None	than munitions		Decelerators/parachutes	
		<del></del>		Biodegradable polymer	
Stressors to	Air Quality:		ts and Water		
Physical	Criteria air pollutants	Metals		icals other than explosives	
Resources Stressors to	Cultural Resources:	Other ma		Dublic Hoolth and Safatur	
Stressors to Human	Physical disturbance and	Accessibility	ources:	Public Health and Safety: Physical interactions	
Resources	strike	Airborne acoustics		In-air energy	
ilesources	SUINC	Physical disturbance	and strike	In-water energy	
		, sicar distarbance	. G.IG SUINC		

Anti-Submarine	Anti-Submarine Warfare						
Countermeasur	re Testing						
Military	Ingestible Material:	Military	Heavyweight torpedoes (non-explosive)				
Expended	Biodegradable polymer	Recoverable					
Material		Material					
	Non-Ingestible Material:						
	Anti-torpedo torpedoes, anti-torpedo						
	torpedo accessories, heavyweight						
	torpedo accessories, guidance wires,						
	sub-surface targets (mobile)		-				
Sonar and		marine Warfare:					
Other	HF5 ASW3		TORP1 TORP2				
Transducer							
Bins							
In-Water	None						
Explosive							
Bins	•		·				
Procedural	Acoustic Stressors: (Section 5.3.2)	•	I Disturbance and Strike: (Section 5.3.4)				
Mitigation	Active sonar Vessel movement						
Measures			in-water devices				
Assumptions	Not all events will include the use of sonar	and other transd	ucers.				
Used for							
Analysis							

## A.3.2.1.4 Pierside Sonar Testing

Pierside Sonar Testing   Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities.   Typical Duration   Up to 3 weeks total per ship, with run independently and not continuduring this time	ter rior to at-sea ittently over
Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities.  Up to 3 weeks total per ship, with run independently and not conting during this time  Ships and submarines would activate mid- and high-frequency tactical sonars, underwate communications systems, and navigational devices to ensure they are fully functional process to ensure they are fully functional process. Event duration varies; with average durations of 3 weeks with active sonar used intermited.	ter rior to at-sea ittently over
functional in a controlled pierside environment prior to at-sea test activities.  Long Description  Ships and submarines would activate mid- and high-frequency tactical sonars, underwat communications systems, and navigational devices to ensure they are fully functional prior test events. Testing may also include the firing of inert torpedo shapes.  Event duration varies; with average durations of 3 weeks with active sonar used intermi	ter rior to at-sea ittently over
Long Description  Ships and submarines would activate mid- and high-frequency tactical sonars, underwated communications systems, and navigational devices to ensure they are fully functional protection test events. Testing may also include the firing of inert torpedo shapes.  Event duration varies; with average durations of 3 weeks with active sonar used intermited.	ter rior to at-sea ittently over
Description communications systems, and navigational devices to ensure they are fully functional protection test events. Testing may also include the firing of inert torpedo shapes.  Event duration varies; with average durations of 3 weeks with active sonar used intermination.	rior to at-sea ittently over
test events. Testing may also include the firing of inert torpedo shapes.  Event duration varies; with average durations of 3 weeks with active sonar used intermi	ittently over
Event duration varies; with average durations of 3 weeks with active sonar used intermi	-
	-
combatant sea trials.	
Typical Platforms: Moored platforms, submarines, surface combatants	
Components Targets: None Systems being Trained/Tested: Sonar systems, acoustic modems, underwater commun	ication
systems	ication
Standard None Typical Locations	
Operating Range Complexes/Testing Ranges: Inshore Waters/Pic	erside:
Procedures None Bath, Maine	
(Section 2.3.3) Groton, Connecticu	ıt
Kings Bay, Georgia Newport, Rhode Isl	land
Norfolk, Virginia	latiu
Pascagoula, Mississ	sinni
Port Canaveral, Flo	
Kittery, Maine	Tida
Stressors to Acoustic: Physical Disturbance and Strike: Energy:	
Biological Sonar and other None None	
<b>Resources</b> transducers	
and Habitats Ingestion: Entanglement:	
Explosives: None None	
None Stressors to Air Quality: Sediments and Water Quality:	
Physical None None None	
Resources	
Stressors to Cultural Resources: Socioeconomic Resources: Public Health and S	Safety:
HumanNoneIn-water energy	
Resources	
Military Ingestible Material: Military None	
Expended None Recoverable Material	
Non-Ingestible Material:	
None	
Sonar and Mid-Frequency: High-Frequency: Acoustic Modems:	
Other MF1 MF9 HF1 HF8 M3	
Transducer MF1K MF10 HF3	
Bins MF3 Anti-Submarine W ASW3	arfare:

Anti-Submarine	Anti-Submarine Warfare				
Pierside Sonar	Testing				
In-Water	None				
Explosive					
Bins					
Procedural	Acoustic Stressors: (Section 5.3.2)				
Mitigation	Active sonar				
Measures					
Assumptions	Event duration is 3 weeks with active sonar used intermittently.				
Used for	The facility platform may be a dock or other structure.				
Analysis					

## A.3.2.1.5 Submarine Sonar Testing/Maintenance

Anti-Submarine	e Warfare					
Submarine Son	ar Testing/Maintenance					
Short	Pierside testing of submarir	ne systems oc	curs	Typic	cal Dura	tion
Description	periodically following major	r maintenance	periods	Up to	o three v	weeks, with intermittent use of
	and for routine maintenance.			activ	e sonar	
Long					_	g and maintenance is required.
Description		•				navigation systems, fathometers,
	underwater communications systems, underwater distress beacons, range finders, and other similar					
The state of	systems, will be tested.					
Typical Components	Platforms: Submarines Targets: None					
Components	Systems being Trained/Tes	t <b>ed:</b> Sonar sv	stems acou	istic m	odems	
Standard	Vessel safety	Typical Loca		istic iii	odems	
Operating	vesser surery	Range Com		ting Ra	anges:	Inshore Waters/Pierside:
Procedures		None	ріскез, гез	6	anges.	Norfolk, Virginia
(Section						Kittery, Maine
2.3.3)						,,
Stressors to	Acoustic:	Physical Dis	sturbance a	nd Str	rike:	Energy:
Biological	Sonar and other	None				None
Resources	transducers					
and Habitats		Ingestion:				Entanglement:
	Explosives:	None				None
	None					
Stressors to	Air Quality:		Sediment	ts and	Water	Quality:
Physical	Criteria air pollutants		None			,
Resources						
Stressors to	Cultural Resources:	Socioe	conomic Re	sourc	es:	Public Health and Safety:
Human	None	None				In-water energy
Resources						Physical interactions
Military	Ingestible Material:		Military		None	
Expended Material	None		Recoveral Material	ble		
Material	Non-Ingestible Material:		iviateriai			
	None					
Sonar and	Mid-Frequency:	High-Fre	quency:			Acoustic Modems:
Other	MF3	HF1	HF3			M3
Transducer						
Bins						
In-Water	None					
Explosive						
Bins	Acquetic Characters (Co. 1)	F 2 2)				
Procedural Mitigation	Acoustic Stressors: (Section Active sonar	5.3.2)				
Measures	ACTIVE SOLIGI					
Assumptions	Sonar would not be used co	ntinuously thi	roughout th	e dura	ation of	the test
Used for	John Would Hot be used to	minuousiy tili	ougnout th	ic duit	2011 01	ine test.
Analysis						
	•					

## A.3.2.1.6 Surface Ship Sonar Testing/Maintenance

Anti-Submarin	e Warfare					
	onar Testing/Maintenance					
Short	Pierside and at-sea testing	of shin systen	ns	Tvni	cal Dura	tion
Description	occurs periodically following			Up to 3 weeks, with intermittent use of		
	periods and for routine ma			active sonar		
Long	'	ne maintenance periods, pierside and at-sea testing and maintenan				
Description						urces such as tactical sonar,
2000		fathometers, underwater communications systems, underwater of				
	beacons, range finders, an					•
Typical	Platforms: Surface combat		<u> </u>			
Components	Targets: None					
•	Systems being Trained/Te	sted: Sonar sy	stems, aco	ustic	counter	measures, underwater
	communication systems	•				
Standard	Vessel safety	Typical Loca	tions			
Operating	·	Range Com		ing		Inshore Waters/Pierside:
Procedures		Ranges:	•	Ū		Mayport, Florida
(Section		Jacksonville				Norfolk, Virginia
2.3.3)		Virginia Cap	es			
Stressors to	Acoustic:	Physical Dis	turbance a	nd S	trike:	Energy:
Biological	Sonar and other	Vessel and i	n-water de	vice s	strike	In-air electromagnetic
Resources	transducers					devices
and Habitats	Vessel noise	Ingestion:				
		None				Entanglement:
	Explosives:					None
	None	-				
Stressors to	Air Quality:		Sediment	s and	l Water	Quality:
Physical	Criteria air pollutants		None			
Resources						
Stressors to	Cultural Resources:		nomic Reso	urce	s:	Public Health and Safety:
Human	None	Accessibil	•			Physical interactions
Resources		Airborne				In-air energy
		Physical d	listurbance	and		In-water energy
Military	Ingestible Material:		Military		None	
Expended	None		Recoverab	le		
Material	New transatible Materials		Material			
	Non-Ingestible Material: None					
Sonar and		Andi Cub	marine Wa			
Other	Mid-Frequency: MF1 MF9	Anti-Sub ASW3	maine wa	iidit	•	
Transducer	MF1K MF10	MOVVO				
Bins	IAIL TIC IAIL TO					
In-Water	None	<del>.</del>				
Explosive	TAOTIC					
Bins						
Procedural	Acoustic Stressors: (Section	n 5 3 2)	Ph	vsica	l Distur	bance and Strike: (Section
Mitigation	Active sonar	. 3.3.2)		5.3.4		and dine of the journal
Measures	, tolive John				noveme	ent
			٧.	JJC1		

Anti-Submarin	Anti-Submarine Warfare				
Surface Ship Sonar Testing/Maintenance					
Assumptions	Sonar will not be continuously active for the duration of the test.				
Used for					
Analysis					

## A.3.2.1.7 Torpedo (Explosive) Testing

Anti-Submarine	: Warfare							
Torpedo (Explo	sive) Testing							
Short	Air, surface, or submarine cr	rews employ explosive	Typical Dura	ation				
Description	and non-explosive torpedoe	es against artificial	1.2 days dur	1-2 days during daylight hours				
	targets.							
Long				e launched at a suspended target				
Description		r rotary-wing aircraft or s	surface comba	tants. Event duration is 1 to 2				
	days during daylight hours.							
Typical	=	ift, moored platforms, ro	tary-wing airci	raft, submarines, support craft,				
Components	surface combatants							
	Targets: Sub-surface targets	_						
	=	<b>ted:</b> Sonar systems, acou	stic counterm	easures, sonobuoys, torpedo				
6	systems							
Standard	Vessel safety	Typical Locations						
Operating Procedures	Aircraft safety Weapons firing safety	Range Complexes/Tes	ting Ranges:	Inshore Waters/Pierside:				
(Section 2.3.3)	weapons ming salety	Gulf of Mexico		None				
(3600011 2.3.3)		Jacksonville Kov Wost						
		Key West						
		Navy Cherry Point Northeast						
		Virginia Capes						
		Offshore of Fort Pierce, Florida						
Stressors to	Acoustic:	Physical Disturbance a		Energy:				
Biological	Sonar and other	Aircraft and aerial targ		In-air electromagnetic				
Resources	transducers	Vessel and in-water de		devices				
and Habitats	Aircraft noise	Military expended mat	erial					
	Vessel noise			Entanglement:				
		Ingestion:		Wires and cables				
	Explosives:	Military expended mat	erials –	Decelerators/parachutes				
	In-water explosives	munitions						
		Military expended mat	erials – other					
		than munitions						
Stressors to	Air Quality:		t and Water C	•				
Physical	Criteria air pollutants	Explosives and explosive byproducts						
Resources			Chemicals other than explosives					
Chucasania	Cultural Deservers	Metals		ther materials				
Stressors to Human	Cultural Resources:	Socioeconomic Reso	ources:	Public Health and Safety:				
Resources	Physical disturbance and strike	Accessibility Airborne acoustics		Physical interactions In-air energy				
resources	Explosives	Physical disturbance	and strike	In-water energy				
	Lyhiosives	r i i y sicai di stui Dalice	anu sunke	III-water ellergy				

Anti-Submarine	e Warfare				
Torpedo (Explo	sive) Testing				
Military Expended Material	Ingestible Material:  Decelerators/parachutes - small, target fragments, heavyweight torpedo (explosive) fragments, lightweight torpedo (explosive) fragments  Non-Ingestible Material:  Sonobuoys (non-explosive), sonobuoy wire, anti-torpedo torpedoes, anti-torpedo torpedoes, aguidance wires, expendable bathythermographs, expendable bathythermograph wires, heavyweight torpedo accessories, lightweight torpedo accessories,	Military Recoverable Material	Heavyweight torpedoes (non- explosive), lightweight torpedoes (non-explosive)		
Sonar and Other	surface targets (mobile and stationary), sub-surface targets (mobile)  Mid-Frequency: High-Fre  MF1 MF5 HF1	quency:	Torpedoes: TORP1 TORP2		
Transducer Bins	MF3 MF6 HF5 MF4  Anti-Sub ASW3	marine Warfare:			
In-Water Explosive Bins	E8 E11				
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar  Physical Disturbance and Strike: (Section 5.3.4) Vessel movement  Explosive Stressors: (Section 5.3.3)  Explosive terredoes				
Assumptions Used for Analysis	Explosive torpedoes  All sonobuoys have parachutes unless otherwise noted. Only one heavyweight torpedo test could occur in 1 day; two heavyweight torpedo tests could occur on consecutive days. Two lightweight torpedo tests could occur in a single day. All non-explosive torpedoes are recovered.				

## A.3.2.1.8 Torpedo (Non-Explosive) Testing

Anti-Submarine	e Warfare					
Torpedo (Non-	Explosive) Testing					
Short	Air, surface, or submarine c	rews employ non-	Typical Dura	tion		
Description	explosive torpedoes against	submarines, surface	Up to 2 weel			
	vessels or artificial targets.		·			
Long				st surface or subsurface targets		
Description				orpedo testing evaluates the		
	performance and the effect					
		• •	•	edoes. Not all torpedo tests surface ships and helicopters		
			• • • • • • • • • • • • • • • • • • • •	ent duration is dependent on		
	number of torpedoes fired.	and outlitted for torped	o recovery. Eve	ent duration is dependent on		
Typical	Platforms: Fixed-wing patro	l aircraft, moored platfor	ms, rotary-wir	ng aircraft, submarines, support		
Components	craft, surface combatants					
	Targets: Sub-surface targets					
			stic counterme	easures, sonobuoys, torpedoes		
Standard	Vessel safety	Typical Locations				
Operating	Aircraft safety	Range Complexes/Tes	ting Ranges:	Inshore Waters/Pierside:		
Procedures	Weapons firing safety	Gulf of Mexico		None		
(Section 2.3.3)		Navy Cherry Point				
		Northeast				
		Virginia Capes Naval Undersea Warfare Center				
		Division, Newport				
		Offshore of Fort Pierce, Florida				
Stressors to	Acoustic:	Physical Disturbance a		Energy:		
Biological	Sonar and other	Aircraft and aerial targ		In-air electromagnetic		
Resources	transducers	Vessel and in-water de	vice strike	devices		
and Habitats	Aircraft noise	Military expended mat	erial			
	Vessel noise			Entanglement:		
		Ingestion:		Wires and cables		
	Explosives:	Military expended mat	erials – other	Decelerators/parachutes		
_	None	than munitions		<del></del>		
Stressors to	Air Quality:		t and Water C	•		
Physical Resources	Criteria air pollutants	Metals Other ma		nemicals other than explosives		
Stressors to	Cultural Resources:	Socioeconomic Reso		Public Health and Safety:		
Human	Physical disturbance and	Accessibility		Physical interactions		
Resources	strike	Airborne acoustics		In-air energy		
		Physical disturbance	and strike	In-water energy		

Anti-Submarine	Anti-Submarine Warfare						
Torpedo (Non-	Explosive) Testing						
Military	Ingestible Material:		Military	Heavyweight torpedoes (non-			
Expended	Decelerators/parachutes - small		Recoverable	explosive), lightweight torpedoes			
Material	Non-Ingestible Material: Acoustic countermeasures, expendation bathythermographs, expendation bathythermograph wires, heavyweight torpedo accessor guidance wires, lightweight to accessories, sonobuoys (non-explosive), sonobuoy wires, surface targets (mobile and stationary)	ories, orpedo	Material	(non-explosive), acoustic countermeasures			
Sonar and	Mid-Frequency:	High-Fre	quency:	Torpedoes:			
Other	MF1 MF5	HF1	HF6	TORP1			
Transducer	MF3 MF6			TORP2			
Bins	MF4	Anti-Sub	marine Warfare:	TORP3			
		ASW3	ASW4				
In-Water Explosive Bins	None						
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3. Active sonar	2)	-	I Disturbance and Strike: (Section 5.3.4) movement			
Assumptions	All torpedoes are recovered.						
Used for	Events can last up to two weeks	and use u	p to 40 torpedoe	s. Typically, no more than eight			
Analysis	torpedoes are fired per day d	uring dayl	ight hours.				

#### A.3.2.2 Electronic Warfare

# A.3.2.2.1 Radar and Other System Testing

Electronic Warf	are					
	er System Testing					
Short	Test may include use of milita	ary or commercial	Typical Dura	tion		
Description	radar, communication system	-	Typical Dula	Cion		
Description	high-energy lasers. Testing m	-				
	ship against drones, small bo	-	12 hours per	day over a 7-day period		
	or other targets.					
Long		av include use of militar	v or commerci	al radar, communication systems		
Description	(or simulators), or high-energ	= -	•			
				erial vehicles, missiles, or small		
	craft (floating cardboard triw	alls, towed, anchored, c	r self-propelle	d vessels). High-energy laser		
	testing may include tracking,	scoring, and neutralizat	ion runs with s	single or multiple targets.		
Typical	Platforms: Combat logistics s	hips, rotary-wing aircra	ft, small boats,	submarines, surface combatants		
Components	Targets: Air targets, surface t	argets				
	Systems being Trained/Test	ed: Radar, high-energy l	asers			
Standard	Vessel safety	Typical Locations				
Operating	Aircraft safety	Range Complexes/Test	ting Ranges:	Inshore Waters/Pierside:		
Procedures	High-energy laser safety	Gulf of Mexico		Groton, Connecticut		
(Section 2.3.3)	Towed in-water device	Jacksonville		Joint Expeditionary Base Little		
	safety	Key West		Creek, Virginia		
		Navy Cherry Point		Norfolk, Virginia		
		Northeast				
		Virginia Capes				
		Naval Surface Warfare				
		Panama City Division				
		Naval Undersea Warfar Division, Newport	e Center			
		South Florida Ocean Mo	easurement			
		Facility	casarement			
Stressors to	Acoustic:	Physical Disturbance a	nd Strike:	Energy:		
Biological	Aircraft noise	Aircraft and aerial targ		In-air electromagnetic		
Resources	Vessel noise	Vessel and in-water de		devices		
and Habitats	Weapons noise	Military expended mat	erial	In-water electromagnetic		
				devices		
	Explosives:	Ingestion:		High-energy lasers		
	In-air explosives	Military expended mat	erials –			
		munitions		Entanglement:		
		Military expended mat	erials – other	None		
		than munitions				
Stressors to	Air Quality:	Sediments and Water Quality:				
Physical	Criteria air pollutants	Metals Other materials				
Resources	Cultural Deservers	Coalog P		Dublic Health and Cafety		
Stressors to	Cultural Resources:	Socioeconomic Re	sources:	Public Health and Safety:		
Human	Physical disturbance and strik	<ul><li>Accessibility</li><li>Airborne acoustics</li></ul>		Physical interactions		
Resources		Physical disturban		In-air energy In-water energy		
		r i i y sicai ui stui Dali	ce and Strike	m-water energy		

Electronic Warf	Electronic Warfare				
Radar and Othe	er System Testing				
Military Expended Material	Ingestible Material: Per chaff: one chaff-air cartridge, one plastic endcap, chaff fibers; air target (drone) fragments, missile (explosive) fragments  Non-Ingestible Material: Missiles (non-explosive), kinetic energy rounds, sabots, air target (drone)	Military Recoverable Material	Surface target (mobile and stationary), air target (drone)		
Sonar and Other Transducer Bins	None				
In-Water Explosive Bins	None				
Procedural Mitigation Measures	Physical Disturbance and Strike: (Section 5.3.4)  Vessel movement  Non-explosive missiles and rockets				
Assumptions Used for Analysis	All explosive missiles detonate in air during this test event.  High-energy lasers will not be tested pierside.				

#### A.3.2.3 Mine Warfare

# A.3.2.3.1 Mine Countermeasure and Neutralization Testing

Mine Warfare					
Mine Countern	neasure and Neutralization Te	esting			
Short			Typical Dura	tion	
Description	Air, surface, and subsurface	vessels neutralize	1-10 days, w	, with intermittent use of	
	threat mines and mine-like	objects.	countermeas	sure/neutralization systems during	
			this period		
Long			_	equired to ensure systems can	
Description	•	•		e restrict passage through an area	
	and to ensure U.S. Navy mir	_		•	
	deployed with a variety of s operate in water depths up	• •	•		
		·	•	ence mines, employing radar or	
		= -		ignatures of surface ships in order	
	to detonate threat mines, d	=	_		
	explosive charges to destroy			,	
Typical	Platforms: Surface combata	ints, submarines, unman	ned autonomo	ous vehicle, moored platforms,	
Components	fixed-wing aircraft, rotary-w	ing aircraft			
	Targets: Mine shapes				
		ested: Electromagnetic devices, radar, low energy lasers			
Standard	Vessel safety	Typical Locations			
Operating	Aircraft safety	Range Complexes/Tes	ting Ranges:	Inshore Waters/Pierside:	
Procedures (Section	Unmanned aerial, surface, and subsurface vehicle	Virginia Capes	•	None	
2.3.3)	safety	Naval Surface Warfare	· ·		
2.3.3/	Towed in-water device	Panama City Division	1		
	safety				
Stressors to	Acoustic:	Physical Disturbance	and Strike:	Energy:	
Biological	Sonar and other	Aircraft and aerial targ	get strike	In-water electromagnetic	
Resources	transducers	Vessel and in-water de	evice strike	devices	
and Habitats	Aircraft noise	Military expended ma	terial	In-air electromagnetic	
	Vessel noise	Seafloor devices		devices	
	Explosives:	Ingestion:			
	In-water explosives	Military expended ma	terials – other	Entanglement:	
		than munitions		Wires and cables	
Stressors to	Air Quality:	Sedimer	t and Water Q	Quality:	
Physical	Criteria air pollutants		es and explosiv	7.7	
Resources		Chemicals other than explosives			
	0 1 10	Other m		etals	
Stressors to	Cultural Resources: Physical disturbance and	Socioeconomic Res	ources:	Public Health and Safety:	
Human Resources	strike	Accessibility Airborne acoustics		Physical interactions In-air energy	
Resources	Explosives	Physical disturbance	and strike	In-water energy	
	LAPIUSIVES	i ilysicai disturbance	, unu sunc	iii water energy	

Mine Warfare	Mine Warfare					
Mine Countern	Mine Countermeasure and Neutralization Testing					
Military	Ingestible Material:	Military	Mine shapes (non-explosive)			
Expended	Neutralizer (explosive) fragments, mine	Recoverable				
Material	shape (explosive)	Material				
	Non-Ingestible Material:					
	Fiber optic cables, fiber optic cans,					
	mine shapes (non-explosive), anchor					
	- mine					
Sonar and	None					
Other						
Transducer						
Bins						
In-Water	E4 E11					
Explosive						
Bins						
Procedural	Physical Disturbance and Strike: (Section		sive Stressors: (Section 5.3.3)			
Mitigation	Vessel movement	•	ive mine countermeasure and			
Measures	Towed in-water devices	ne	utralization activities			
Assumptions	None					
Used for						
Analysis						

## A.3.2.3.2 Mine Countermeasure Mission Package Testing

Mine Warfare					
Mine Counterm	neasure Mission Package Test	ing			
Short			Тур	ical Dura	ition
Description	Vessels and associated aircr	aft conduct m		1-2 weeks with intervals of mine	
·	countermeasure operations				sure mission package use during
				this time	
Long	Littoral Combat Ships condu	ct mine detec	tion using unma	nned sub	omersible and aerial vehicles,
Description	_		_		ort helicopters, and laser systems.
·	Mines are then neutralized				-
Typical	Platforms: Rotary-wing airc				
Components	underwater vehicles, unmar				,
·	Targets: Mine shapes				
	Systems being Trained/Tes	ted: Sonar sys	stems		
Standard	Vessel safety	Typical Loca			
Operating	Aircraft safety		plexes/Testing R	anges:	Inshore Waters/Pierside:
Procedures	Unmanned aerial, surface,	Gulf of Mexi	-		None
(Section 2.3.3)	and subsurface vehicle	Jacksonville			
	safety	Virginia Cap	es		
	Towed in-water device		ce Warfare Cente	er,	
	safety	Panama (	City Division		
		South Florid	a Ocean Measur	ement	
		Facility			
Stressors to	Acoustic:	Physical Dis	sturbance and St	rike:	Energy:
Biological	Sonar and other	Aircraft and	l aerial target str	ike	In-air electromagnetic
Resources	transducers	Vessel and i	in-water device s	strike	devices
and Habitats	Aircraft noise	Military exp	ended material		
	Vessel noise	Seafloor de	vices		
					Entanglement:
	Explosives:	Ingestion:			Wires and cables
	In-water explosives		ended materials	– other	
		than mui			
Stressors to	Air Quality:		Sediments and		
Physical	Criteria air pollutants		Explosives and	-	
Resources			Chemicals oth		
<u> </u>			Other materia		
Stressors to	Cultural Resources:		conomic Resour	ces:	Public Health and Safety:
Human	Physical disturbance and stri				Physical interactions
Resources	Explosives		ne acoustics	ما د+سناده	In-air energy
Militani	Ingestible Meterials	Physical disturbance and strike In-water energy			
Military Expended	Ingestible Material:	aants	Military Recoverable	I willes	shapes (non-explosive)
Material	Neutralizer (explosive) fragn	ients	Material		
Iviaterial	Non-Ingestible Material:		iviate lai		
	Fiber optic cables, fiber optic	can mine			
	shapes (non-explosive)	can, mine			
Sonar and	High-Frequency:	Synthoti	l ic Aperture Sona	rs.	<del>.</del>
Other	HF4	SAS2	ic Aperture 30Na	13.	
Transducer	1111 <b>-</b> f	3732			
Bins					
21113					

Mine Warfare		
Mine Counterm	neasure Mission Package Testing	
In-Water	E4	
Explosive		
Bins		
Procedural	Acoustic Stressors: (Section 5.3.2)	Explosive Stressors: (Section 5.3.3)
Mitigation	Active sonar	Explosive mine countermeasure and
Measures		neutralization activities
	Physical Disturbance and Strike: (Section 5.3.4)	
	Vessel movement	
	Towed in-water devices	
Assumptions	8 charges per event	
Used for	The in-air low-energy laser stressor was used in ar	nalysis of potential impacts on human resources.
Analysis		

## A.3.2.3.3 Mine Detection and Classification Testing

Mine Warfare					
Mine Detection	and Classification Testing				
Short	Air, surface, and subsurface v	essels detect and	Typical Dura	ntion	
Description	classify mines and mine-like objects. Vessels also			ays, with up to 12 hours of acoustic	
	assess their potential susceptibility to mines and			· · · · · · · · · · · · · · · · · · ·	
	mine-like objects.		-	<u> </u>	
Long				te the capability of generating	
Description	_	=		systems that can detect, and	
	an underwater sensor system	•		epths. Surface craft may deploy	
	mine-like objects. In order to		-		
	=	· ·		mines including a laser airborne	
			•	nsitive electro-optic receivers to	
			-	pment has traditionally been	
	designed for operation from	a manned helicopter; ho	owever, the Na	avy is developing the capability to	
	operate from unmanned aeri	al systems.			
Typical	Platforms: Moored platforms				
Components	support craft, surface comba		d vehicles, uni	manned aerial systems,	
	unmanned underwater vehic	les			
	Targets: Mine shapes				
	Systems being Trained/Test		energy lasers		
Standard	Vessel safety	Typical Locations			
Operating Procedures	Aircraft safety Unmanned aerial, surface,	Range Complexes/Test	ting Ranges:	Inshore Waters/Pierside:	
(Section 2.3.3)	and subsurface vehicle	Gulf of Mexico None			
(3600001 2.3.3)	safety	Navy Cherry Point Virginia Capes			
	Surcey	Naval Surface Warfare	Center		
		Panama City Division	•		
		South Florida Ocean Me			
		Facility			
		Offshore of Riviera Bea	ch, Florida		
Stressors to	Acoustic:	Physical Disturbance a	nd Strike:	Energy:	
Biological	Sonar and other	Aircraft and aerial targ		In-air electromagnetic	
Resources	transducers	Vessel and in-water de	vice strike	devices	
and Habitats	Aircraft noise	Seafloor devices		In-water electromagnetic	
	Vessel noise			devices	
	Explosives:	Ingestion:		Entanglement:	
	None	None None			
Stressors to	Air Quality:	Sedimen	ts and Water	Quality:	
Physical	Criteria air pollutants	None		•	
Resources					
Stressors to	Cultural resources:	Socioeconomic Re	sources:	Public Health and Safety:	
Human	Physical disturbance and strik			Physical interactions	
Resources		Airborne acoustics		In-air energy	
		Physical disturban	ce and strike	In-water energy	

Mine Warfare						
Mine Detection	Mine Detection and Classification Testing					
Military	Ingestible Material:	Military	Mine shapes (non-explosive)			
Expended	None	Recoverable				
Material		Material				
	Non-Ingestible Material:					
	None					
Sonar and	Mid-Frequency: High-F	requency:				
Other	MF1 MF9 HF1	HF8				
Transducer	MF1K HF4					
Bins						
In-Water	None					
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section 5.3.2)	Physica	al Disturbance and Strike: (Section 5.3.4)			
Mitigation	Active sonar	Vessel	movement			
Measures						
Assumptions	Some mine shapes could be deployed for a specific event, and then retrieved afterwards. However,					
Used for	some mine shapes are left in place so that multiple events can use the same shapes without					
Analysis	needing to redeploy.					
	The in-air low-energy laser stressor was used in analysis of potential impacts on human resources.					

#### A.3.2.4 Surface Warfare

# A.3.2.4.1 Gun Testing – Large-Caliber

Surface Warfare					
Gun Testing – L	arge-Caliber				
Short	Surface crews test large-cali	iber guns to defen	nd <b>T</b>	ypical Dura	ation
Description	against surface targets with large-caliber guns. 1-2 weeks				
Long	Surface combatants conduc	t surface warfare	by detectir	ng, tracking	g, and prosecuting small-boat
Description			•	-	package for the Littoral Combat
				-	f its embarked support aircraft,
	medium range surface-to-su				
Typical	Platforms: Surface combata	ints		_	
Components	Targets: Surface targets				
	Systems being Trained/Tes	ted: None			
Standard	Vessel safety	Typical Location	าร		
Operating	Weapons firing safety	Range Complex	ces/Testing	Ranges:	Inshore Waters/Pierside:
Procedures	Towed in-water device	Gulf of Mexico	_		None
(Section 2.3.3)	safety	Jacksonville			
		Key West			
		Navy Cherry Poi	nt		
		Northeast			
		Virginia Capes			
		Naval Surface W		nter,	
		Panama City I			
Stressors to	Acoustic:	Physical Disturb			Energy:
Biological	Vessel noise	Vessel and in-w			In-air electromagnetic
Resources	Weapons noise	Military expend	ded materia	al	devices
and Habitats					
	Explosives:	Ingestion: Entanglement:  Military expended materials – None			
	In-water explosives		ied materia	ais –	None
	In-air explosives	munitions			
		Military expended materials – other than munitions			
Stressors to	Air Quality:		ediments a	and Water	Quality:
Physical	Criteria air pollutants	Ex	xplosives a	nd explosiv	ve byproducts
Resources		Cl	hemicals o	ther than e	explosives
		0	ther mater	rials N	<u>Metals</u>
Stressors to	Cultural Resources:	Socioeconom	nic Resour	ces:	Public Health and Safety:
Human	Explosives	Accessibility			Physical interactions
Resources	Physical disturbance and	Airborne aco			In-air energy
	strike	Physical distu			In-water energy
Military	Ingestible Material:		ilitary		ce target (mobile)
Expended	Large-caliber projectile (exp		ecoverable		
Material	fragments, surface target	(stationary) M	aterial		
	fragments				
	Non-Ingestible Material:				
	Surface target (stationary), I	arge-caliber			
	(non-explosive) projectile	_			
	caliber casings	,,			
	camper cashings				

Surface Warfar	e	
Gun Testing – L	arge-Caliber	
Sonar and	None	
Other		
Transducer		
Bins		
In-Water	E3 E5	
Explosive		
Bins		
Procedural	Acoustic Stressors: (Section 5.3.2)	Explosive Stressors: (Section 5.3.3)
Mitigation	Weapons firing	Explosive medium- and large-caliber munitions
Measures		
	Physical Disturbance and Strike: (Section 5.3.4)	
	Vessel movement	
	Small-, medium-, and large-caliber non-explosive	
	practice munitions	
Assumptions	None	
Used for		
Analysis		

## A.3.2.4.2 Gun Testing – Medium-Caliber

Surface Warfard	e				
Gun Testing – N	/ledium-Caliber				
Short	Comfo on annua defend annia	-+f +	ملدني مدم	Typical Dura	ation
Description	Surface crews defend agains medium-caliber guns.	st surface targ	gets with	1-2 weeks, v	with intervals of surface warfare
	medium-canber guns.			mission pac	kage use during this time
Long Description			-	cting, tracking	g, and prosecuting small-boat package on the Littoral Combat
Description					f its embarked support aircraft,
	medium range surface-to-su				
Typical	Platforms: Surface combata				
Components	Targets: Surface targets	, , , , ,	0,		
·	Systems being Trained/Tes	ted: None			
Standard	Vessel safety	Typical Loca	ations		
Operating	Weapons firing safety			ing Ranges:	Inshore Waters/Pierside:
Procedures	Towed in-water device	Gulf of Mex	-		None
(Section 2.3.3)	safety	Jacksonville			
		Key West			
		Navy Cherry	/ Point		
		Northeast			
		Virginia Cap			
		Naval Surfac		•	
		Panama (	City Division		
Stressors to	Acoustic:	•	sturbance a		Energy:
Biological	Vessel noise	Vessel and			In-air electromagnetic
Resources	Weapons noise	Military exp	pended mat	erial	devices
and Habitats					
	Explosives:	Ingestion:			Entanglement:
	In-water explosives	Millitary exp	oended mat	eriais –	None
	In-air explosives		_	orials other	
		than mu		erials – other	
Stressors to	Air Quality:	than ma		ts and Water	Quality:
Physical	Criteria air pollutants				ve byproducts
Resources	Criteria dii poliatarits		=	s other than o	
			Other ma		1etals
Stressors to	Cultural Resources:	Socioeco	nomic Reso	ources:	Public Health and Safety:
Human	Physical disturbance and	Accessibi			Physical interactions
Resources	strike	Airborne	acoustics		In-air energy
	Explosives	Physical disturbance and strike In-water energy			In-water energy
Military	Ingestible Material:		Military	Surfac	ce targets (mobile)
Expended	Medium-caliber projectile (e		Recovera	ble	
Material	fragments, surface target		Material		
	fragments, medium-calibo				
	explosive) projectiles, me	dium-			
	caliber projectile casings				
	Non Ingestible 88-4				
	Non-Ingestible Material:				
	Surface targets (stationary)				

Surface Warfar	e	
Gun Testing – N	Nedium-Caliber	
Sonar and	None	
Other		
Transducer		
Bins		
In-Water	E1	
Explosive		
Bins		
Procedural	Physical Disturbance and Strike: (Section 5.3.4)	Explosive Stressors: (Section 5.3.3)
Mitigation	Vessel movement	Explosive medium-caliber and large-caliber
Measures	Small-, medium-, and large-caliber non-explosive	projectiles
	practice munitions	
Assumptions	50 or 1,400 rounds are expended per event.	
Used for	Events with 1,400 rounds have 700 explosive and 7	700 non-explosive rounds per event.
Analysis		

## A.3.2.4.3 Gun Testing – Small-Caliber

Surface Warfard	9						
Gun Testing – S							
Short	Surface crews defend agains	st surface targ	ats with	Typi	cal Dura	tion	
Description	small-caliber guns	or surface targ	Ct3 With		y-2 week		
Long		from surface v	rom surface vessels. This testing also in				
Description	)	nt, surface craft surface targets will make threat profile approaches to					
Description	-	ate small-caliber gun testing with non-explosive rounds against the					
		gun testing includes other class ship sea trials and surface warfare					
	mission package testing.	San testing inc	idaes other	ciass	Simp sea	titiais and sarrace w	arrare
Typical	Platforms: Sea basing ships,	surface comb	atants sma	all boa	ts rotar	v-wing aircraft	
Components	Targets: Surface targets	sarrace comb	atanto, 5111a	500	13, 10141	, mile amerare	
, , , , , , , , , , , , , , , , , , ,	Systems being Trained/Test	ted: None					
Standard	Vessel safety	Typical Loca	tions				
Operating	Weapons firing safety	Range Com		ing Ra	ngos:	Inshore Waters/Pi	ierside:
Procedures	Towed in-water device	Gulf of Mexi		ing ive	iliges.	None	iei side.
(Section 2.3.3)	safety	Jacksonville	CO			None	
(	,	Key West					
		Navy Cherry	Point				
		Northeast					
		Virginia Cape	es				
		Naval Surfac		Center			
			ity Division		•		
Stressors to	Acoustic:	Physical Dis	turbance a	nd Str	ike:	Energy:	
Biological	Vessel noise	Vessel and i				In-air electroma	agnetic
Resources	Weapons noise	Military exp	ended mate	erial		devices	J
and Habitats	•	, .					
	Explosives:	Ingestion:				<b>Entanglement:</b>	
	None	Military exp	ended mate	erials -	_	None	
		munition	_				
		Military exp		erials -	– other		
		than mur					
Stressors to	Air Quality:		Sediment			•	
Physical	Criteria air pollutants		Metals	Ot	ther mat	erials	
Resources		<del>-</del>	-			<u>-</u>	
Stressors to	Cultural Resources:		nomic Reso	urces	:	Public Health and	•
Human	Physical disturbance and	Accessibil				Physical interaction	ns
Resources	strike	Airborne				In-air energy	
		Physical c	listurbance	and st		In-water energy	
Military	Ingestible Material:		Military		Surface	e target (mobile)	
Expended	Small-caliber projectiles (nor		Recoverab	ole			
Material	small-caliber projectile ca	sings, chaff-	Material				
	ship fibers						
	Non-Ingestible Material:						
	Surface target (stationary), o	haff-shin					
	cartridge	παιτ-σιπμ					
Sonar and	None						
Other	NOTE						
Transducer							
Bins							
Dillo							

Surface Warfar	e
Gun Testing – S	Small-Caliber
In-Water Explosive Bins	None
Procedural Mitigation Measures	Physical Disturbance and Strike: (Section 5.3.4)  Vessel movement  Small-, medium-, and large-caliber non-explosive practice munitions
Assumptions Used for Analysis	500-1,000 rounds are expended per event. Ships may not be conducting tests consistently for the duration of the event.

## A.3.2.4.4 Kinetic Energy Weapon Testing

Surface Warfar	۵					
	Weapon Testing					
		. ,	1	<b>T</b>	I D	A
Short	A kinetic energy weapon use				cal Dura	tion
Description	released in a burst to accelerate a projectile. 1 day					
Long	=					accelerate a projectile to more
Description	than seven times the speed		range of up	to 20	0 miles.	
Typical	Platforms: Surface combata					
Components	Targets: Air targets, surface	_				
	Systems being Trained/Test			n		
Standard	Vessel safety	Typical Loca				
Operating	Weapons firing safety	Range Com	plexes/Testi	ing Ra	inges:	Inshore Waters/Pierside:
Procedures		Gulf of Mex	tico			None
(Section 2.3.3)		Jacksonville				
		Key West				
		Navy Cherry	y Point			
		Northeast				
		Virginia Cap	es			
Stressors to	Acoustic:	Physical Dis	sturbance a	nd Str	ike:	Energy:
Biological	Vessel noise	Aircraft and	l aerial targe	et strik	ке	In-air electromagnetic
Resources	Weapons noise	Vessel and i	in-water dev	vice st	rike	devices
and Habitats		Military exp	ended mate	erial		
	Explosives:					Entanglement:
	In-air explosives	Ingestion:				None
		Military exp	ended mate	erials -	-	
		munition	S			
		Military exp	ended mate	erials -	– other	
		than mui	nitions			
Stressors to	Air Quality:		Sediment	s and	Water (	Quality:
Physical	Criteria air pollutants		Metals	Oth	er matei	rials
Resources						
Stressors to	<b>Cultural Resources:</b>	Socioeco	nomic Reso	urces:		Public Health and Safety:
Human	Physical disturbance and	Accessibi	lity			Physical interactions
Resources	strike	Airborne	acoustics			In-air energy
		Physical o	disturbance	and st	trike	In-water energy
Military	Ingestible Material:	-	Military		None	-
Expended	Surface target (stationary) ar	nd air target	Recoverab	ole		
Material	(drone) fragments, large c	aliber	Material			
	(explosive) fragments					
	Non-Ingestible Material:					
	Air target (drone), kinetic en					
	rounds, sabot – kinetic en					
	rounds, surface target (sta	ationary),				
	large caliber casings					
Sonar and	None					
Other						
Transducer						
Bins						

Surface Warfar	e
Kinetic Energy	Weapon Testing
In-Water Explosive Bins	None
Procedural Mitigation Measures	Physical Disturbance and Strike: (Section 5.3.4)  Vessel movement  Small-, medium-, and large-caliber non-explosive practice munitions
Assumptions Used for Analysis	Assume one target is expended per event. Explosive rounds are designed to detonate above the surface target.

## A.3.2.4.5 Missile and Rocket Testing

Surface Warfar	e						
Missile and Roo	ket Testing						
Short	Missile and rocket testing in	cludes various	s missiles	Typi	cal Dura	tion	
Description	or rockets fired from subma						
	combatants. Testing of the I	aunching syst	em and	1 da	y-2 week	XS	
	ship defense is performed.						
Long	Missile and rocket testing in	cludes various	s missiles o	r rocke	ets (stand	dard missiles, Water Piercing	
Description	Missile Launch) fired from su	submarines and surface combatants. Testing may occur during surface					
	combatant sea trials and sur	face warfare	mission pag	kage t	testing. T	his activity includes both air	
	warfare and surface warfare	events.					
Typical	Platforms: Submarines, surf	ace combatar	nts				
Components	Targets: Air targets, land tar	gets, surface	targets				
	Systems being Trained/Test	t <b>ed:</b> Missile ar	nd rocket fi	ring sy	stems		
Standard	Vessel safety	Typical Loca	tions				
Operating	Weapons firing safety	Range Com	plexes/Tes	ting Ra	nges:	Inshore Waters/Pierside:	
Procedures	Towed in-water device	Gulf of Mex			0	None	
(Section 2.3.3)	safety	Jacksonville					
		Key West					
		Navy Cherry	/ Point				
		Northeast					
		Virginia Cap	es				
Stressors to	Acoustic:	Physical Dis	turbance a	nd Str	ike:	Energy:	
Biological	Vessel noise	Aircraft and	aerial targ	et stril	ke	In-air electromagnetic	
Resources	Weapons noise	Vessel and i	n-water de	vice st	rike	devices	
and Habitats		Military exp	ended mat	erial			
	Explosives:					Entanglement:	
	In-water explosives	Ingestion:				None	
	In-air explosives	Military exp		erials ·	_		
		munition	-				
		Military exp		erials ·	– other		
		than mur					
Stressors to	Air Quality:		Sedimen				
Physical	Criteria air pollutants		=		=	e byproducts	
Resources			Other ma		-	on to atoms	
			Chemica	is otne	er than ex	kpiosives	
Chusasaus ta	Cultural Resources:	Casiana	Metals nomic Reso			Dublic Health and Cafety	
Stressors to Human	Physical disturbance and	Accessibi		Jurces	•	Public Health and Safety: Physical interactions	
Resources	strike		-				
Resources	Explosives		borne acoustics In-air energy sical disturbance and strike In-water energy				
Military	Ingestible Material:	, 51001 0	Military	۵۵ 5		get (drone)	
Expended	Missile (explosive) fragments	s. rocket	Recovera	ble		<u>, , ,                   </u>	
Material	(explosive) fragments, air		Material				
-	target fragments						
	Non-Ingestible Material:						
	Air target (drone), air target	(decoy),					
	missiles and rockets (non-						
	•	· · ·					

Surface Warfar	е					
Missile and Roo	ket Testing					
Sonar and	None					
Other						
Transducer						
Bins						
In-Water	E6 E10					
Explosive						
Bins						
Procedural	Physical Disturbance and Strike: (Section 5.3.4) Explosive Stressors: (Section 5.3.3)					
Mitigation	Vessel movement Explosive missiles and rockets					
Measures	Non-explosive missiles and rockets					
Assumptions	Targets used during non-explosive tests will be recovered.					
Used for	Explosive missiles will detonate either in the air or at the water's surface.					
Analysis	Ships will not be conducting test constantly for the duration of the allotted time.					
	This activity includes both air warfare and surface warfare events, but it captured under the Surface					
	warfare Protective Measures Assessment Protocol for simplicity.					

## A.3.2.5 Unmanned Systems

# A.3.2.5.1 Underwater Search, Deployment, and Recovery

Other Testing A	Activities							
	earch, Deployment, and Recov	ery						
Short	Various underwater, bottom	n crawling, ro	botic, Typ	oical Dura	ation			
Description	vehicles are utilized in under	rwater search	١,	1 day				
	recovery, installation, and so	canning activi	ties.	ay				
Long	Subsurface activities include	e a variety of underwater vehicles, robotic or autonomous systems, and						
Description	items placed on the seafloor	oor. Diving activities and special operations training also occur. Other ve manned and unmanned underwater vehicles. All subsurface vehicles hile most objects (e.g., non-explosive mines) remain for a period of time						
	subsurface activities involve							
	are retrieved after use, while							
	to be used as testing fixtures	S.						
Typical	Platforms: Moored platform	ns, remotely o	perated vehicle	es				
Components	Targets: Mine shapes							
	Systems being Trained/Test	<b>ted:</b> None						
Standard	Vessel safety	Typical Loca	tions					
Operating	Unmanned aerial, surface,	Range Com	plexes/Testing	Ranges:	Inshore Waters/Pierside:			
Procedures	and subsurface vehicle	South Florid	a Ocean Measu	rement	None			
(Section	safety	Facility						
2.3.3)		_						
Stressors to	Acoustic:	-	sturbance and S		Energy:			
Biological	None	Vessel and	in-water device	strike	None			
Resources		Seafloor de	vices					
and Habitats	Explosives:				Entanglement:			
	None	Ingestion:			None			
		None						
Stressors to	Air Quality:		Sediments an	nd Water	Quality:			
Physical	Criteria air pollutants		None					
Resources								
Stressors to	Cultural Resources:		conomic Resoui	rces:	Public Health and Safety:			
Human	Physical disturbance and stri		•		Physical interactions			
Resources		Physica	l disturbance ar		In-water energy			
Military	Ingestible Material:		Military	Mine	shapes (non-explosive)			
Expended	None		Recoverable					
Material	Non-Ingestible Material:		Material					
	None							
Sonar and	None	<del>-</del>						
Other								
Transducer								
Bins								
In-Water	None							
Explosive								
Bins		_	<u>-</u>	_				
Procedural	Physical Disturbance and St	rike: (Section	5.3.4)					
Mitigation	Vessel movement							
Measures								
Assumptions	-		n the bottom w	here they	y may remain for a period of time			
Used for	They will eventually be re							
Analysis				e minimis	s and not quantitatively analyzed			
	and, therefore, are not included under systems.							

## A.3.2.5.2 Unmanned Aerial System Testing

Unmanned Systems						
Unmanned Aer	rial System Testing					
Short	Unmanned aerial systems a	re launched fr	om a	Typica	l Dura	tion
Description	platform (e.g., fixed platform	m or submerge	_			
	submarine) to test the capa	bility to exten	d the			
	surveillance and communication	ations range o	f	1-12 hours		
	unmanned underwater veh	icles, manned	and			
	unmanned surface vehicles,	, and submarir	nes.			
Long						of controlled, sustained, level
Description	flight. Anticipated scenarios					
	system launcher testing and	_	-			
	communications range of di					
						rial system launcher systems, a
	subsurface capsule release					
			_	-		capsule then drops a weight,
						nanned aerial system. Personnel
	use radio frequency commu					
						ns test, an aerostat (helium filled
			onary buoy (	or an t	ınmanı	ned surface vehicle to test the
Typical	extended range of commun Platforms: Submarines, sho		ty support	croft i	ınmanı	and agrial systems
Typical Components	Targets: Land targets, surfa-		ty, support (	craft, t	ınmanı	ned aeriai systems
Components	Systems being Trained/Tes	_				
Standard	Vessel safety		tions			
Operating	Unmanned aerial, surface,	Typical Local		D		lash and Makana/Bianaida
Procedures	and subsurface vehicle	Range Comp	olexes/Testi	ng Kar	iges:	Inshore Waters/Pierside:
(Section	safety	Northeast				None
2.3.3)	Salety	Virginia Cap Naval Undei		o Cont	or	
2.3.3)		Division,		Centi	EI	
Stressors to	Acoustic:	Physical Dis		d Stril	<b>'0</b> '	Energy:
Biological	Vessel noise	Vessel and i				In-air electromagnetic
Resources	Vesser Holse	Aircraft and				devices
and Habitats	Explosives:	Military exp	_		-	devices
	None	william, exp	ciraca mate	11015		Entanglement:
		Ingestion:				None
		Military exp	ended mate	rials –	other	
		than mun				
Stressors to	Air Quality:	-	Sediments	and \	Nater (	Quality:
Physical	Criteria air pollutants		Metals	С	ther m	aterials
Resources						
Stressors to	Cultural Resources:	Socioecoi	nomic Resou	ırces:		Public Health and Safety:
Human	Physical disturbance and	Accessibility Physical interactions				Physical interactions
Resources	strike	Airborne acoustics In-water energy				
		Physical d	listurbance a	and str	ike	
Military	Ingestible Material:		Military		None	
Expended	Endcaps and pistons (non-ch	naff and	Recoverab	le		
Material	flare)		Material			
	Non-Ingestible Material:					
	Canister – miscellaneous					

Unmanned Sys	tems
Unmanned Aer	ial System Testing
Sonar and	None
Other	
Transducer	
Bins	
In-Water	None
Explosive	
Bins	
Procedural	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Vessel movement
Measures	
Assumptions	Other components associated with chaff and flare use are not expected to float and would sink to
Used for	the seafloor.
Analysis	

# A.3.2.5.3 Unmanned Surface Vehicle System Testing

Unmanned Syst	tems					
Unmanned Surf	face Vehicle System Testing					
Short	Testing involves the product	tion or upgrade of	Турі	cal Duration		
Description	unmanned surface vehicles.	This may include	Unt	to 10 days. Some propulsion systems		
	testing of mine detection ca	-		ers) could operate continuously for		
	the basic functions of individ	tiple months.				
	complex events with multip			•		
Long		=		single-vehicle and multi-vehicle technical		
Description	· ·			Most unmanned vehicle mission n, and recovery operations. Unmanned		
		-		onomous, modular, multi-mission		
	_			flatable boats, cooperative autonomous		
	research platform (autonom	ous kayaks), and remo	te-conti	rolled jet skis. Unmanned surface vehicles		
	-	•		launched, the vehicles may be towed or		
				may deploy, tow, operate, or recover		
		_		tion sensors. Systems on the unmanned		
	illumination for electro-opti		ice radio	o-frequency transmissions or provide laser		
Typical	Platforms: Unmanned surfa		aft			
Components	Targets: Surface targets	ce vemeres, support or	a.c			
	Systems being Trained/Test	ted: Unmanned surfac	e vehicle	es		
Standard	Vessel safety	Typical Locations				
Operating	Unmanned aerial, surface,	Range Complexes/T	esting R	anges: Inshore Waters/Pierside:		
Procedures	and subsurface vehicle	Naval Undersea War		ter None		
(Section 2.3.3)	safety	Division, Newport				
Stressors to	Acoustic:	Physical Disturbanc		<u>~-</u>		
Biological Resources	Vessel noise	Vessel and in-water	device s	trike In-air electromagnetic devices		
and Habitats	Explosives:	Ingestion:		In-water electromagnetic		
	None	None		devices		
				Entanglement:		
		<u>-</u>		None		
Stressors to	Air Quality:		ents and	l Water Quality:		
Physical	Criteria air pollutants	None				
Stressors to	Cultural Resources:	Socioeconomic Ro	SOURCOS	: Public Health and Safety:		
Human	None	Accessibility	esoui ces	Physical interactions		
Resources		Airborne acoustic	S	In-air energy		
		Physical disturbance and strike In-water energy				
Military	Ingestible Material:	Militar	у	Surface targets (stationary)		
Expended	None	Recove				
Material	Nam Immastible 84-4	Materi	al			
	Non-Ingestible Material: None					
Sonar and	None					
Other	NOTE					
Transducer						
Bins						

Unmanned Sys	Unmanned Systems				
Unmanned Sur	face Vehicle System Testing				
In-Water	None				
Explosive					
Bins					
Procedural	Physical Disturbance and Strike: (Section 5.3.4)				
Mitigation	Vessel movement				
Measures					
Assumptions	None				
Used for					
Analysis					

## A.3.2.5.4 Unmanned Underwater Vehicle Testing

Unmanned Syst	tems						
_	lerwater Vehicle Testing						
Short	Testing involves the produc	tion or upgrade of <b>T</b>	ypical Duration				
Description	unmanned underwater vehi testing of mine detection ca the basic functions of individual complex events with multip	pabilities, evaluating (light dual platforms, or	Up to 35 days. Some propulsion systems (gliders) could operate continuously for multiple months.				
Long Description  Typical	parameters, to full mission, vehicle operations include a Unmanned underwater veh anti-submarine warfare targ surface craft, submarines, p propelled to the test area. Urecover remote sensors and be acoustically active, producelectro-optical detection. Veunmanned platforms on whinclude unmanned underwar Payload testing assesses van mine warfare, bottom mappy vehicles interacting in formatics.	hicle testing ranges from single-vehicle tests to evaluate hydrodynamic n, multiple vehicle functionality assessments. Most unmanned underwater a launch, transit, mission profile execution, and recovery operations. hicles include modular, multi-mission platforms and their payloads, and regets. Unmanned underwater vehicles may be launched from aircraft, piers, or land. Once launched, the vehicles are either towed or self-Unmanned underwater vehicles may also deploy, tow, operate, or and payload systems. Systems on or towed by the unmanned vehicle may duce radio-frequency transmissions or provide laser illumination for vehicle development involves the production and upgrade of new which to attach various payloads used for different purposes. Platforms can vater vehicles, unmanned surface vehicles, and unmanned aerial systems. Farious systems that can be incorporated onto unmanned platforms for oping, and other missions. This type of test can also include multiple mations or acting as individual units and includes tests and demonstrations vehicles in detecting and classifying mine-like or other buried objects.					
Components	vehicles, moored platforms  Targets: Mine warfare targe		ace targets				
Standard	Vessel safety	Typical Locations					
Operating Procedures (Section 2.3.3)	Unmanned aerial, surface, and subsurface vehicle safety Towed in-water device safety	Range Complexes/Testing Gulf of Mexico Jacksonville Naval Surface Warfare Cer Panama City Division Naval Undersea Warfare Cor Division, Newport South Florida Ocean Meas Facility Offshore of Riviera Beach,	Non nter, Center surement	ore Waters/Pierside: ae			
Stressors to Biological Resources and Habitats	Acoustic: Sonar and other transducers Vessel noise  Explosives: In-water explosives	Physical Disturbance and Vessel and in-water devices Seafloor devices Military expended materi Ingestion of Expended M Military expended materi munitions Military expended materi than munitions	e strike li al Elaterial: C als – V	inergy: n-air electromagnetic devices intanglement: Decelerators/parachutes Vires and cables			

Unmanned Sys	tems				
	derwater Vehicle Testing				
Stressors to	Air Quality:		Sediments and	Water Quality:	
Physical	Criteria air pollutants	Criteria air pollutants Explosives and e		explosive byproducts	
Resources			Chemicals othe	r than explosives	
			Metals		
			Other materials	5	
Stressors to	Cultural Resources:	Socioeco	nomic Resources:	: Public Health and Safety:	
Human	Physical disturbance and	Accessibi	lity	Physical interactions	
Resources	strike		acoustics	In-air energy	
	Explosives	Physical o	disturbance and st	trike In-water energy	
Military	Ingestible Material:		Military	Surface target (stationary and mobile),	
Expended	Surface and sub-surface target		Recoverable	sub-surface target (stationary),	
Material	fragments, lightweight torpe	edo	Material	bottom-placed instruments, mine	
	(explosive) fragments,			shapes (non-explosive), lightweight	
	decelerators/parachutes - sı	mall		torpedo (non-explosive), anchor-	
				other	
	Non-Ingestible Material:				
	Anchors -other, lightweight tor	-			
	accessories, sonobuoys (nor				
	explosive), sonobuoy wires,				
	countermeasures, surface to (stationary and mobile), sub	_			
	target (stationary)	-surrace			
Sonar and	Low-Frequency:	Forward	-Looking Sonar:	Synthetic Aperture Sonars:	
Other	LF5	FLS2	Looking Johan.	SAS1	
Transducer		1 LJZ		SAS2	
Bins	Mid-Frequency:	High-Fre	auency:	SAS3	
	MF9	HF1	.4,		
	MF10	HF4		Very High-Frequency	
		HF5		VHF1	
	Anti-Submarine Warfare	HF6			
	ASW4	HF7			
In-Water	E8			<del>-</del>	
Explosive					
Bins					
Procedural	Acoustic Stressors: (Section 5.3	3.2)	-	l Disturbance and Strike: (Section 5.3.4)	
Mitigation	Active sonar			novement	
Measures	Towed in-water devices				
Assumptions	•	-	•	and then retrieved afterwards. However,	
Used for	•	n place so t	hat multiple event	ts can use the same shapes without	
Analysis	needing to redeploy.			le. I	
	Multiple vehicles may operate	simultaned	ously in one or mu	Itiple areas.	

### A.3.2.6 Vessel Evaluation

# A.3.2.6.1 Aircraft Carrier Sea Trials – Propulsion Testing

Vessel Evaluati	on				
	Sea Trials – Propulsion Testi				
Short			tions Tyr	ical Dura	tion
Description	Ship is run at high speeds in			oical Dura	ition
•	(e.g., straight-line and reciprocal paths).  1-2 days  Propulsion testing is one part of the total aircraft carrier sea trial activity. Propulsion testing include			ativitus Danasslaina tantina includes	
Long					· · · · · · · · · · · · · · · · · · ·
Description	ship maneuvering, including full-power runs (speeds in excess of 30 knots) and endurance runs in both straight line and reciprocal paths.				
Tomical	Platforms: Aircraft carriers	rocai patris.			
Typical					
Components	Targets: None	stad. Nana			
Chandand	Systems being Trained/Tes		••		
Standard	Vessel safety	Typical Loca		_	
Operating			olexes/Testing	Ranges:	Inshore Waters/Pierside:
Procedures		Virginia Cap	es		None
(Section 2.3.3)					
Stressors to	Acoustic:	Dhysical Dist	boncoond Ca	uilea.	En every
Biological	Vessel noise		urbance and St -water device s		Energy: In-air electromagnetic
Resources	vesserrioise	vessei aliu ii	i-water device s	urke	devices
and Habitats	Explosives:	Ingestion:			
and nabitats	None	None			Entanglement:
	None	None Entanglement: None			
Stressors to	Air Quality:		Sediments an	d Water	
Physical	Criteria air pollutants		None	iu watei	Quanty.
Resources	Criteria dii poliatarits		None		
Stressors to	Cultural Resources:	Socioeco	nomic Resource	es:	Public Health and Safety:
Human	None	Accessibil			Physical interactions
Resources		Airborne	=		In-air energy
		Physical d	isturbance and	strike	In-water energy
Military	Ingestible Material:		Military	None	<u> </u>
Expended	None		Recoverable		
Material			Material		
	Non-Ingestible Material:				
	None				
Sonar and	None				
Other					
Transducer					
Bins					
In-Water	None				
Explosive					
Bins				<u>.</u>	
Procedural	Physical Disturbance and St	trike: (Section	5.3.4)		
Mitigation	Vessel movement				
Measures					
Assumptions	Ships may not be traveling i				
Used for	Ships will operate across the	•			
Analysis	Ships will not be conducting test constantly for the duration of the allotted time.				

## A.3.2.6.2 Large Ship Shock Trial

Vessel Fredrick						
Vessel Evaluation						
Large Ship Shoo	1					
Short	Underwater detonations aga			Typical Duration		
Description	carrier or surface combatant	τ.		Typically over 4 weeks, with one detonation		
				per week. However, smaller charges may be detonated on consecutive days.		
					· · · · · · · · · · · · · · · · · · ·	
Long			-		for the Navy may undergo an tions that sends a shock wave	
Description	through the ship's hull to sin					
				_	from the ship (charges are set	
	closer to the ship as the trial			as anstarrocs	Trom the simp (enarges are see	
Typical	Platforms: Aircraft carriers, s			g aircraft. ro	otary-wing aircraft	
Components	Targets: None			<b>6</b> ,	, , ,	
·	Systems being Trained/Test	t <b>ed:</b> None				
Standard	Vessel safety		ocations			
Operating	Aircraft safety	Range C	omplexes/Te	sting I	nshore Waters/Pierside:	
Procedures		Ranges:	-	_	None	
(Section 2.3.3)		Gulf of I	Mexico			
		Jackson	ville			
		Virginia				
Stressors to	Acoustic:		Disturbance a		Energy:	
Biological	Vessel noise		nd in-water de		In-air electromagnetic	
Resources	Aircraft noise		and aerial targ		devices	
and Habitats		Military	expended mat	terial		
	Explosives:	Ingostion			Entanglement:	
	In-water explosives	Ingestion	n: expended ma	torials —	None	
		-	than munition			
Stressors to	Air Quality:		Sediments an		alitv:	
Physical	Criteria air pollutants		Explosives and			
Resources	'		Chemicals oth	-		
		(	Other materia	ls		
Stressors to	None					
Human						
Resources						
Military	Ingestible Material:		/lilitary	None		
Expended	Ship shock charge fragments		Recoverable			
Material	Non Ingestible Materials	I N	<b>Material</b>			
	Non-Ingestible Material: None					
Sonar and	None					
Other	None					
Transducer						
Bins						
In-Water	E17					
Explosive						
Bins						
Procedural	Physical Disturbance and St	rike: (Sect	ion Explos	ive Stresso	rs: (Section 5.3.3)	
Mitigation	5.3.4)		Ship sh	nock trials		
Measures	Vessel movement					

Vessel Evaluation	Vessel Evaluation			
Large Ship Shock Trial				
Assumptions	Four charges are used per event.			
Used for	Only one event will occur per 5-year period.			
Analysis	Ship shock trials will occur in waters deeper than 650 ft.			
	Modeling scenario: Four 40,000-lb. charges			
	Stressors to human resources were not analyzed for this activity since it occurs greater than			
	12 NM from shore.			

## A.3.2.6.3 Air Defense Testing

Vessel Evaluation	on			
Air Defense Tes	ting			
Short	Tests the ship's capability to	detect, identify, track, Typical Du		tion
Description	and successfully engage live	and simulated targets.		
	Gun systems are tested usin	g non-explosive and	7 days	
	explosive rounds.			
Long				ick environments, using a mix of
Description			-	, and successfully engage live and
	_	=		n the presence of debris, long
		=		ng, track load in the presence of
				ly include firing of the 5-inch
The stand	0.62-caliber gun, and will po	•	illimeter gun.	
Typical	Platforms: Surface combata	nts		
Components	Targets: Air targets	tad. Padar systems gun	systems	
Chandoud	Systems being Trained/Test Vessel safety		systems	
Standard Operating	Weapons firing safety	Typical Locations		
Procedures	Weapons ining safety	Range Complexes/Tes Jacksonville	ting Ranges:	Inshore Waters/Pierside: None
(Section 2.3.3)		Virginia Capes		None
(30001011 2.3.3)		Gulf of Mexico		
		Northeast		
Stressors to	Acoustic:	Physical Disturbance a	ınd Strike:	Energy:
Biological	Vessel noise	Aircraft and aerial targ		In-air electromagnetic
Resources	Weapons noise	Vessel and in-water de		devices
and Habitats		Military expended mat	erial	
	Explosives:			Entanglement:
	In-air explosives	Ingestion:		None
		Military expended ma	terials –	
		munitions		
		Military expended ma	terials – other	
		than munitions		
Stressors to	Air Quality:		ts and Water	
Physical Resources	Criteria air pollutants	Metals Other materials		ther materials
Stressors to	Cultural Resources:	Socioeconomic Reso	ources:	Public Health and Safety:
Human	Physical disturbance and	Accessibility		Physical interactions
Resources	strike	Airborne acoustics		In-air energy
		Physical disturbance	and strike	In-water energy

Vessel Evaluation	on			
Air Defense Tes	sting			
Military Expended Material	Ingestible Material: Chaff-ship fibers, missile (explosive) fragments; large-caliber projectile (explosive) fragments, medium- caliber (non-explosive) projectiles, air target (drone) and (drone) fragments	Military Recoverable Material	Air target (drone)	
Sonar and	Non-Ingestible Material: Large-caliber projectiles (non-explosive), larger caliber projectile casings, missiles (non-explosive), canisters, large-caliber projectile casings, air target (drone) and (decoy), chaff- ship cartridge  None			
Other Transducer Bins				
In-Water Explosive Bins	None			
Procedural Mitigation Measures	eapons firing Vesse Small plosive Stressors: (Section 5.3.3) pro		movement medium-, and large-caliber non-explosive tice munitions plosive missiles and rockets	
Assumptions Used for Analysis	Ships will not be conducting test constantly for the duration of the allotted time.  This activity incorporates components of both surface warfare and air defense events.			

## A.3.2.6.4 Hydrodynamic and Maneuverability Testing

Other Testing Activities					
	d Maneuverability Testing				
Short	Submarines maneuver in	the submerged	Typical Du	ration	
Description	operating environment.	tile subiliergeu	10 days		
-				an autorability of a submarine in	
Long Description		•	ontroi and m	aneuverability of a submarine in	
	the submerged operating	g environment.			
Typical	Platforms: Submarines				
Components	Targets: None	Tarkadı Culus asıllılar			
	Systems being Trained/				
Standard	Vessel safety	Typical Locations			
Operating		Range Complexes/Testi	ng Ranges:	Inshore Waters/Pierside:	
Procedures		Gulf of Mexico		None	
(Section 2.3.3)		Jacksonville			
		Key West			
		Navy Cherry Point			
		Northeast			
		Virginia Capes			
Stressors to	Acoustic:	Physical Disturbance ar		Energy:	
Biological	Vessel noise	Vessel and in-water dev	ice strike	None	
Resources and					
Habitats	Explosives:	Ingestion:		Entanglement:	
	None	None		None	
Stressors to	Air Quality:	Sediment	s and Water	Quality:	
Physical	None	None			
Resources					
Stressors to	<b>Cultural Resources:</b>	Socioeconomic Reso	urces:	Public Health and Safety:	
Human	None	Accessibility		Physical interactions	
Resources		Physical disturbance a	and strike	In-water energy	
Military	Ingestible Material:	Military	None		
Expended	None	Recoverab	le		
Material		Material			
	Non-Ingestible Material:				
	None				
Sonar and Other	None				
Transducer Bins					
In-Water	None				
<b>Explosive Bins</b>					
Procedural	Physical Disturbance and Strike: (Section 5.3.4)				
Mitigation	Vessel movement				
Measures	vesser movement				
Assumptions	For biological resource analysis, vessel noise and vessel strike are only analyzed for the periods				
Used for	_	• •		Mitigation measures related to	
Analysis		only considered during th			
•		-	-	cal disturbance and strike and	
				the submarine are surfaced,	
	typically brief in natur			·	

## A.3.2.6.5 In-Port Maintenance Testing

Vessel Evaluation	Vessel Fuelvation				
	In-Port Maintenance Testing				
		1.			
Short	Each combat system is teste			Typical Du	ıration
Description	are functioning in a technica				
	manner and are operationally ready to			3 weeks	
	support at-sea testing.  Each combat system is tested to ensure they are functioning in a technically acceptable				
Long			-		
Description					nbat System Ship Qualification Trial
		•	•		Repair/Requirements Cards, and
	The state of the s	-			tablishing testing standards for
					supervision of subject matter
	experts, complete all action			_	, where required. Trouble
The section of	Observation Reports are wri				
Typical	Platforms: Amphibious ward	rare snips, s	surrace co	ombatants	
Components	Targets: None	<b>tod</b> . Dodor	low ones	rav lacore	
Chample	Systems being Trained/Tes			gy lasers	
Standard	Vessel safety	Typical Lo			
Operating		Range Co	omplexes	/Testing	Inshore Waters/Pierside:
Procedures		Ranges:			Mayport, Florida
(Section 2.3.3)		None			Norfolk, Virginia
Stressors to	Acoustic:	=	Disturban	ice and Str	
Biological	None	None			In-air electromagnetic
Resources	Front a division				devices
and Habitats	Explosives:	Ingestion	:		Fotos elements
	None	None			Entanglement:
Chunanamata	Air Oveliav		- d: t-	d 18/a4a	None
Stressors to	Air Quality:			and Wate	er Quality:
Physical Resources	None	IN	lone		
	Cultural Description	Casiaa		D	. Dublic Hoolkh and Cofession
Stressors to Human	Cultural Resources: None	None	conomic	Resources	
Resources	None	None			In-air energy
	Ingestible Meterial:		lilito m r	Non	In-water energy
Military Expended	Ingestible Material: None		lilitary ecoverabl		e
Material	None		laterial	ie	
iviaterial	Non-Ingestible Material:	141	iateriai		
	None				
Sonar and	None				_ <del>-</del>
Other	HOLIC				
Transducer					
Bins					
In-Water	None				
Explosive	110116				
Bins					
Procedural	Physical Disturbance and St	rike: (Section	on 5.3.4)		
Mitigation	Vessel movement		5.5. 1)		
Measures	35551 3 7 6 6 6				
Assumptions	None				
Used for	- · <del>-</del>				
Analysis					
•					

## A.3.2.6.6 Propulsion Testing

Vessel Evaluati	nn .					
Propulsion Test						
Short			one Tuni	ical Dura	tion	
Description	Ship is run at high speeds in			ical Dura	tion	
•	(straight-line and reciprocal paths). 1 day			•	this avant the chip is tested for	
Long Description		Propulsion testing is one part of the total sea trial activity. During this event, the ship is tested for maneuverability, including full power and endurance runs.				
Typical					ng ships, surface combatants,	
Components	small boats, specialized hig	•	support silips,	sea Dasii	ing simps, surface combatants,	
Components	Targets: None	ii speed veriicies				
	Systems being Trained/Tes	sted. None				
Standard	Vessel safety	Typical Location	ns			
Operating	vesser sarety	Range Complex		angesi	Inshore Waters/Pierside:	
Procedures		Gulf of Mexico	_	anges.	None	
(Section		Jacksonville			None	
2.3.3)		Key West				
,		Navy Cherry Po	nint			
		Northeast	51110			
		Virginia Capes				
Stressors to	Acoustic:		Physical Disturbance and Strike: Energy:			
Biological	Vessel noise	Vessel and in-v			In-air electromagnetic	
Resources					devices	
and Habitats	Explosives:	Ingestion:			461.665	
	None	None			Entanglement:	
					None	
Stressors to	Air Quality:	S	ediments and	d Water	Quality:	
Physical	Criteria air pollutants	N	lone		•	
Resources						
Stressors to	<b>Cultural Resources:</b>	Socioecon	omic Resourc	es:	Public Health and Safety:	
Human	None	Accessibili	ty		Physical interactions	
Resources		Airborne a	coustics		In-air energy	
		Physical di	isturbance and	d strike	In-water energy	
Military	Ingestible Material:		lilitary	None		
Expended	None		ecoverable			
Material		М	laterial			
	Non-Ingestible Material:					
	None			<u> </u>		
Sonar and	None					
Other						
Transducer						
Bins	N					
In-Water	None					
Explosive						
Bins	Dhusiaal District 10	huilen /Cartirus 5 2	. 4)		<u>-</u>	
Procedural	Physical Disturbance and Some Vessel movement	trike: (Section 5.3	5.4)			
Mitigation	vessei movement					
Measures						

Vessel Evaluati	Vessel Evaluation			
Propulsion Testing				
Assumptions	Ships will not be conducting test constantly for the duration of the allotted time.			
Used for	Ships may not be traveling in a straight line.			
Analysis	Ships will operate across the full spectrum of capable speeds.			
	During surface combatant sea trials full-power runs are conducted for a total of 4 hours, and endurance runs are conducted for a total of 2 hours.			
	Testing may occur near Pascagoula, Mississippi when in the Gulf of Mexico.			

# A.3.2.6.7 Signature Analysis Operations

Vessel Evaluation	Vessel Evaluation				
Signature Analy					
Short	Surface ship and submarine	tecting of	Turn	ical Duration	
Description	electromagnetic, acoustic, o signature measurements.		dar	iodically over multiple days	
Long Description	Signature analysis activities include electromagnetic, acoustic, optical, and radar signature measurements, recording, and post-run analyses of data of Navy surface and subsurface vessels. These activities include electromagnetic signature measurement, calibration, and detection of submarines, acoustic and magnetic signature detection of unmanned underwater vehicles and surface ships, radar, and optical detection of surface ships. Testing includes intelligence, surveillance, reconnaissance missions.				
Typical Components	systems, sonar systems			shore based facility acoustic modems, optical and radar	
Standard Operating Procedures (Section 2.3.3)	Vessel safety	Jacksonville	plexes/Testing F	None	
Stressors to Biological Resources and Habitats	Acoustic: Sonar and other transducers Vessel noise  Explosives:	Physical Disturbance and Strike:  Vessel and in-water device strike Military expended material Seafloor devices  Entanglement: Ingestion:  Energy: In-air electromagnetic devices Entanglement: Decelerators/parachutes			
Stressors to	None Air Quality:	than mu	•	s – other Wires and cables  d Water Quality:	
Physical Resources	Criteria air pollutants		Metals Other materia	Chemicals other than explosives	
Stressors to Human Resources	Cultural Resources: Physical disturbance and str	ike Accessi Airborr	conomic Resour bility ne acoustics al disturbance an	Physical interactions In-air energy	
Military Expended Material	Ingestible Material: Decelerators/parachutes - s  Non-Ingestible Material: Anchors-other, expendable bathythermographs, expendable bathythermograph wires, (non-explosive), sonobuo	mall endable , sonobuoys	Military Recoverable Material	Anchors – other	
Sonar and Other Transducer Bins	Mid-Frequency: MF9 MF10  Low-Frequency: LF4 LF6	HF1	equency: omarine Warfare	Acoustic Modems: M3	

Vessel Evaluati	on	
Signature Analy	ysis Operations	
In-Water	None	
Explosive		
Bins		
Procedural	Acoustic Stressors: (Section 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Active sonar	Vessel movement
Measures		
Assumptions	None	-
Used for		
Analysis		

## A.3.2.6.8 Surface Warfare Testing

Vessel Evaluation	on						
Surface Warfare	e Testing						
Short	Tests the capabilities of ship	board sensors to	Typical Dura	tion			
Description	detect, track, and engage su		7.				
	may include ships defending	g against surface					
	targets using explosive and	non-explosive rounds,					
	gun system structural test fi	ring and	7 days				
	demonstration of the respon						
	against land based targets (s	simulated by sea based					
	locations).						
Long	Surface warfare events are §						
Description	T			ensors to detect and track surface			
				e targets with simulated and live			
	_		=	rfare gun capability to receive			
				d aimpoint corrections (spots),			
	direct fire on the surface or		_	ering ranges, and deliver surface			
Typical	Platforms: Support craft, su		ing can also inc	idde structural test liftiig.			
Components	Targets: Electronic warfare						
Components	Systems being Trained/Test	_	onic warfare sv	ystems			
Standard	Vessel safety	Typical Locations	one warrare sy	300113			
Operating	Weapons firing safety	Range Complexes/Test	ting Ranges:	Inshore Waters/Pierside:			
Procedures	weapons ming salety	Gulf of Mexico	ting Nanges.	None			
(Section 2.3.3)		Jacksonville		None			
,		Key West					
		Northeast					
		Virginia Capes					
Stressors to	Acoustic:	Physical Disturbance a	ınd Strike:	Energy:			
Biological	Vessel noise	Vessel and in-water de	vice strike	In-air electromagnetic			
Resources	Weapons noise	Military expended mat	erial	devices			
and Habitats							
	Explosives:	Ingestion:		Entanglement:			
	In-water explosives	Military expended mat	terials –	None			
	In-air explosives	munitions					
		Military expended mat	terials – other				
		than munitions					
Stressors to	Air Quality:		ts and Water	•			
Physical	Criteria air pollutants	Metals Other materials Explosives and explosive byproducts					
Resources		•	ls other than e				
Stressors to	Cultural Resources:	Socioeconomic Resc		Public Health and Safety:			
Human	Physical disturbance and	Accessibility	Jui Ces.	Physical interactions			
Resources	strike	Airborne acoustics		In-air energy			
ilesources	Explosives	Physical disturbance	and strike	In-water energy			
	LAPIUSIVES	i frysicai disturbance	unu sunc	m water energy			

Vessel Evaluation	on		
Surface Warfar	e Testing		
Military Expended Material	Ingestible Material: Large- and medium-caliber projectile (explosive) fragments, medium- caliber projectiles (non-explosive), missile (explosive) fragments, surface target (mobile and stationary) fragments  Non-Ingestible Material: Large-caliber projectiles (non- explosive), missiles (non-explosive)	Military Recoverable Material	Surface target (mobile and stationary)
Sonar and Other Transducer Bins In-Water Explosive Bins	None E1 E5 E8		
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Weapons firing  Physical Disturbance and Strike: (Section of Vessel movement Small-, medium-, and large-caliber nonexplosive practice munitions Non-explosive missiles and rockets	Explosi proj	ve Stressors: (Section 5.3.3) ve medium-caliber and large-caliber ectiles ve missiles and rockets
Assumptions Used for Analysis	Ships will not be conducting tests constant	tly for the duration	on of the allotted time.

## A.3.2.6.9 Undersea Warfare Testing

Vessel Evaluation	on						
Undersea Warf							
Short	Ships demonstrate capabilit	y of countermeasure	Typical Durat	tion			
Description	systems and underwater su	·	71.				
	engagement and communic	=					
	tests ships ability to detect,	•	Up to 10 days	5			
	undersea targets.						
Long	Undersea warfare events m	ay be comprised of tracki	ng and firing ev	vents or tests of hull-mounted			
Description	sonar system capabilities to	detect and avoid torpedo	type targets.	Tracking and firing events ensure			
	the operability of the under	sea warfare suite and its i	nterface with t	the rotary wing helicopter. Tests			
	include demonstrating the a	ability of the ship to search	h, detect and t	rack a target and conduct			
	attacks with exercise torped	loes. Detection and avoid	ance events ma	ay use surface craft and			
	underwater platforms to te	st the capability of mid- a	nd high-freque	ncy acoustic sources. Subsurface			
	moving targets, rocket and	air-dropped weapons, sor	nobuoys, towed	d arrays and sub-surface			
	torpedo-like devices may be	e used. Approximately 1 w	eek of in-port	training may precede the event.			
Typical	Platforms: Rotary-wing airc	raft, submarines, support	craft, surface of	combatants			
Components	Targets: Sub-surface targets	s, surface targets					
	Systems being Trained/Tes	ted: Acoustic countermea	isures, sonar sy	ystems, sonobuoys			
Standard	Vessel safety	Typical Locations					
Operating	Aircraft safety	Range Complexes/Test	ing Ranges:	Inshore Waters/Pierside:			
Procedures		Gulf of Mexico		None			
(Section 2.3.3)		Jacksonville					
		Navy Cherry Point					
		Northeast					
		Virginia Capes					
		South Florida Ocean Me	easurement				
		Facility					
Stressors to	Acoustic:	Physical Disturbance a		Energy:			
Biological	Sonar and other	Aircraft and aerial targe		In-air electromagnetic			
Resources	transducers	Vessel and in-water dev		devices			
and Habitats	Aircraft noise	Military expended mate	erial				
	Vessel noise			Entanglement:			
		Ingestion:		Wires and cables			
	Explosives:	Military expended materials – other Decelerators/parachutes					
	None	than munitions					
Stressors to	Air Quality:		ts and Water C	•			
Physical	Criteria air pollutants	Metals		emicals other than explosives			
Resources	a !:	Other ma		- III II I			
Stressors to	Cultural Resources:	Socioeconomic Reso	urces:	Public Health and Safety:			
Human	Physical disturbance and	Accessibility		Physical interactions			
Resources	strike	Airborne acoustics	- بالسفم المسا	In-air energy			
		Physical disturbance	and strike	In-water energy			

Vessel Evaluation	on					
Undersea Warf	are Testing					
Military	Ingestible	Material:		Military	Heavyweight torpedoes (non-	
Expended	Decelerato	ors/parachutes - s	small	Recoverable	explosive), lightweight torpedoes	
Material				Material	(explosive), surface target	
	_	tible Material:			(stationary), sub-surface target	
		ountermeasures,			(mobile)	
		accessories, guid				
		ght torpedo acce				
		ys (non-explosiv				
		urface target (sta				
	sub-surf	ace targets (mob			_	
Sonar and	Mid-Frequ	ency:	High-Fre	quency:	Torpedoes:	
Other	MF1	MF5	HF4	HF8	TORP1 TORP2	
Transducer	MF1K	MF9				
Bins	MF4	MF10	Anti-Sub	marine Warfare:		
			ASW3	ASW4		
In-Water	None					
Explosive						
Bins						
Procedural	Acoustic Stressors: (Section 5.3.2) Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Active sonar Vessel movement					
Measures						
Assumptions	Five target	Five targets are utilized per event.				
Used for		All sonobuoys have a parachute unless otherwise noted.				
Analysis	Ships will not be conducting test constantly during the duration of the allotted time.					

## A.3.2.6.10 Small Ship Shock Trial

Vessel Evaluation	on					
Small Ship Shoo						
Short	Underwater detonations are	used to test	Tyn	ical Duration		
Description	new ships or major upgrades			Typically over 4 weeks, with one detonation		
				per week. However, smaller charges may be detonated on consecutive days.		
Long	Each new class (or major upg	grade) of surfa			·	
Description	at-sea shock trial. A shock tri					
	through the ship's hull to sim			_		
	underwater detonations per				tances from the ship	
The section of	(charges are set closer to the					
Typical Components	Platforms: Support craft, sur Targets: None	tace compata	nts, fixed	wing aircraft, r	otary-wing aircraft	
Components	Systems being Trained/Test	<b>ed:</b> None				
Standard	Vessel safety	Typical Local	ions			
Operating	Aircraft safety	Range Comp		ting Insh	ore Waters/Pierside:	
Procedures		Ranges:	rickes, re	Non		
(Section 2.3.3)		Jacksonville				
		Virginia Cap	es			
Stressors to	Acoustic:	<b>Physical Dist</b>	urbance a	nd Strike:	Energy:	
Biological	Vessel noise	Vessel and in			n-air electromagnetic	
Resources	Aircraft noise	Aircraft and a	_		devices	
and Habitats	Evalorivos	Military expe	nded mat		Futoualousout.	
	Explosives: In-water explosives	Ingestion:			<b>Entanglement:</b> None	
	iii water explosives	Military expe	nded mat		None	
		other than				
Stressors to	Air Quality:	Sedi	ments an	l Water Quality	y:	
Physical	Criteria air pollutants	-		explosive bypr		
Resources				er than explosiv	ves	
		Other materials				
Stressors to Human	None					
Resources						
Military	Ingestible Material:	Milita	ırv	None		
Expended	Ship shock charge fragments		erable			
Material		Mate	rial			
	Non-Ingestible Material:					
	None					
Sonar and	None					
Other Transducer						
Bins						
In-Water	E16	=		<del>.</del>	<del>-</del>	
Explosive						
Bins						
Procedural	Physical Disturbance and Str	ike: (Section	Explos	ive Stressors: (	Section 5.3.3)	
Mitigation	5.3.4)		Ship sh	ock trials		
Measures	Vessel Movement					

Vessel Evaluation	Vessel Evaluation				
Small Ship Shock Trial					
Assumptions	Four charges are utilized per event				
Used for	Three events will occur during the 5-year period.				
Analysis	Will occur in waters deeper than 650 ft.				
	Modeling scenario: Four 10,000-lb. charges				
	Stressors to human resources were not analyzed for this activity since it occurs greater than				
	12 NM from shore.				

## A.3.2.6.11 Submarine Sea Trials – Propulsion Testing

Vessel Evaluat	ion					
Submarine Sea	Trials - Propulsion Testing					
Short	Submarine is run at high sp	peeds in vario	us	Typica	al Dura	tion
Description	formations, and at various depths.  Up to 5 days					
Long	Propulsion testing is one part of the total submarine sea trial activity. During this activity,					
Description	submarines undergo a controlled deep dive to test depth, emergency surfacing, full-power					
·	operations, high speed tur	•		-	_	
Typical	Platforms: Submarines					
Components	Targets: None					
	Systems being Trained/Te	sted: None				
Standard	Vessel safety	Typical Loca	ations			
Operating	·	Range Com		sting	_	Inshore Waters/Pierside:
Procedures		Ranges:				None
(Section		Jacksonville	9			
2.3.3)		Northeast				
		Virginia Ca	oes			
Stressors to	Acoustic:	Physical Di		and Str	ike:	Energy:
Biological	Vessel noise	Vessel and	in-water de	evice st	rike	None
Resources						
and Habitats	Explosives:	Ingestion:				Entanglement:
	None	None				None
Stressors to	Air Quality:	-	Sedimen	ts and	Water	Quality:
Physical	None		None			
Resources						
Stressors to	Cultural Resources:	Socioe	conomic Re	esource	es:	Public Health and Safety:
Human	None	Access	ibility			Physical interactions
Resources		Physica	al disturban	nce and		In-water energy
		str	ike			
Military	Ingestible Material:		Military		None	
Expended	None		Recovera	ble		
Material			Material			
	Non-Ingestible Material:					
	None					
Sonar and	None					
Other						
Transducer						
Bins						
In-Water	None					
Explosive						
Bins						
Procedural	Physical Disturbance and S	Strike: (Sectio	n 5.3.4)			
Mitigation	Vessel movement					
Measures						

Vessel Evaluat	ion
Submarine Sea	a Trials – Propulsion Testing
Assumptions	Subs will not be conducting test constantly for the duration of the allotted time.
Used for	Subs may not be traveling in a straight line.
Analysis	Subs will operate across the full spectrum of capable speeds.
	For biological resource analysis, vessel noise and vessel strike are only analyzed for the periods while the submarines are surfaced, typically brief in nature. Mitigation measures related to vessel movement are only considered during the period of surfacing as well.  For human resource stressor analysis, airborne acoustics, physical disturbance and strike and physical interactions are only analyzed for the periods while the submarine are surfaced, typically brief in nature.

## A.3.2.7 Submarine Sea Trials – Weapons System Testing

Vessel Evaluation	nn .					
	Trials – Weapons System Tes	ting				
Short	Submarine weapons and so		tested	Typi	cal Duration	
Description	at-sea to meet the integrate	-		Typical Daration		
Description	certification requirements.	a combat syste		Up to 7 days		
Long	•	nar systems are	e tested at	-sea to	meet the integrated combat system	
Description		-			integrated combat system through	
•	· · · · · · · · · · · · · · · · · · ·		-	_	activities, launching "water slugs" and	
	exercise torpedoes.	•				
Typical	Platforms: Moored platforn	ns, submarines,	, support c	raft		
Components	Targets: Sub-surface targets	5				
	Systems being Trained/Tes	<b>ted:</b> Acoustic m	nodems, so	onar sy	stems, underwater communication	
	systems					
Standard	Vessel safety	Typical Locat	ions			
Operating	Weapons firing safety	Range Comp	lexes/Test	ing Ra	inges: Inshore Waters/Pierside:	
Procedures		Gulf of Mexic	0		None	
(Section 2.3.3)		Jacksonville				
		Northeast				
		Virginia Cape				
		South Florida	Ocean Me	easure	ment	
		Facility	aut Dianaa	ام سنما	_	
<u> </u>		Offshore of F				
Stressors to	Acoustic:	Physical Dist Vessel and in			<b>0</b> ,	
Biological Resources	Sonar and other transducers				rike None	
and Habitats	Vessel noise	Military expe	ilueu iliat	eriai		
and nabitats	vesser noise	Ingestion:			Entanglement:	
	Explosives:	None			Wires and cables	
	None					
Stressors to	Air Quality:		Sedimen	ts and	Water Quality:	
Physical	Criteria air pollutants				r than explosives	
Resources	·		Metals		Other materials	
Stressors to	Cultural Resources:	Socioecon	omic Reso	urces	: Public Health and Safety:	
Human	Physical disturbance and	Accessibili	ty		Physical interactions	
Resources	strike	Physical disturbance and strike In-water energy				
Military	Ingestible Material:		Military		Heavyweight torpedoes (non-	
Expended	None		Recovera	ble	explosive), sub-surface target	
Material			Material		(mobile)	
	Non-Ingestible Material:					
	Heavyweight torpedo access	ssories,				
Canana	guidance wire	11:			Tamadaaa	
Sonar and Other	Mid-Frequency:	High-Freq HF1	luency:		Torpedoes:	
Transducer	MF3 MF10 MF9	ULI			TORP2	
Bins	IVII J				Acoustic Modems:	
Dillo					M3	
					IVI3	

Vessel Evaluation	on	
Submarine Sea	Trials – Weapons System Testing	
In-Water	None	
Explosive		
Bins		
Procedural	Acoustic Stressors: (Section 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Active sonar	Vessel movement
Measures		
Assumptions	Submarines will not be conducting test co	nstantly for the duration of the allotted time.
Used for		
Analysis		

## A.3.2.7.1 Total Ship Survivability Trials

Vessel Evaluati	on						
Total Ship Surv	ivability Trials						
Short	Series of simulated "realisti	c" weapon hit		Typical Dura	ation		
Description	scenarios with resulting dar	mage and		5 days hanr	pening once over a 5-year period.		
	recoverability exercises aga						
Long		ograde) of surface ships constructed for the Navy will undergo an at-sea					
Description	Total Ship Survivability Tria				-		
	•	-		-	uent tactical threat during which		
	•				containing and controlling the		
	_			_	The TSST has been described as the TSST is to demonstrate that		
	_			_	ility to realign, repair, and contain		
	damage following a simulat		-				
	assessment. It does not eva	-	-				
Typical	Platforms: Aircraft carriers	'	,		, , , ,		
Components	Targets: None						
·	Systems being Trained/Tes	sted: None					
Standard	Vessel safety	Typical Loca	tions				
Operating		Range Comp		ing Ranges:	Inshore Waters/Pierside:		
Procedures		Jacksonville			None		
(Section		Virginia Cap	es				
2.3.3)							
Stressors to	Acoustic:	Physical Dis			Energy:		
Biological	Vessel noise	Vessel and i	n-water dev	ice strike	In-air electromagnetic		
Resources					devices		
and Habitats	Explosives:	Ingestion:			Futan alam anti		
	None	None			Entanglement: None		
Stressors to	Air Quality:	<del>-</del>	Sadiment	s and Water			
Physical	Criteria air pollutants		None	Jana Water	Quanty.		
Resources	Criteria an ponatants		TTOTIC				
Stressors to	Cultural Resources:	Socioeco	nomic Reso	urces:	Public Health and Safety:		
Human	None	Accessibil			Physical interactions		
Resources		Airborne	acoustics		In-air energy		
		Physical d	disturbance	and strike	In-water energy		
Military	Ingestible Material:	-	Military	None			
Expended	None		Recoverab	ole			
Material	Non-Ingestible Material:		Material				
	None						
Sonar and	None			<u> </u>	•		
Other							
Transducer							
Bins							
In-Water	None						
Explosive							
Bins			<u>-</u>				
Procedural	Physical Disturbance and S	trike: (Section	5.3.4)				
Mitigation	Vessel movement						
Measures							

Vessel Evaluati	on
<b>Total Ship Surv</b>	ivability Trials
Assumptions	None
Used for	
Analysis	

## A.3.2.7.2 Vessel Signature Evaluation

Vessel Evaluation	on							
Vessel Signatur								
Short	Surface ship, submarine and	l auviliary syst	em Tvr	oical Dura	ation			
Description	signature assessments. This							
·	electronic, radar, acoustic, i	-	iagnetic i ···	-	days, up to 20 days depending			
	signatures.		on	the test t	peing conducted			
Long	_	_	•		complished on new ships and			
Description	periodically throughout a sh							
		dentification of Mine Susceptibility assessments are passive electromagnetic nents performed on mine countermeasure ships and on the Littoral Combat						
		-			ermine their mine susceptibility			
	<b>■</b>			-	ship-board global positioning			
	sensor tracking system. Sign	_		-				
	vessel's signature is within s							
	-				nometers, tracking devices, radar			
	• · · · · · · · · · · · · · · · · · · ·				ed in this activity is the Shipboard nts of antenna radiation patterns,			
					ems, and Tactical Air Navigation			
	Systems.			,	, , , , , , , , , , , , , , , , , , ,			
Typical	Platforms: Aircraft carriers,	amphibious w	arfare ships, fix	ed wing a	ircraft, rotary-wing aircraft, sea			
Components		ecial mission	ships, specialize	d high sp	eed vehicles, submarines, support			
	craft, surface combatants							
	Targets: None Systems being Trained/Test	tad: Padar cyc	toms alastrom	agnotic de	ovices			
Standard	Systems being Trained/Tes  Vessel safety	Typical Loca		agnetic de	evices			
Operating	Aircraft safety		plexes/Testing I	Sanges:	Inshore Waters/Pierside:			
Procedures	, , , , , , , , , , , , , , , , , , , ,	Gulf of Mex	-	turiges.	Joint Expeditionary Base Little			
(Section 2.3.3)		Jacksonville	!		Creek, Virginia			
		Virginia Cap	oes					
Stressors to	Acoustic:	-	sturbance and S		Energy:			
Biological	Sonar and other		l aerial target st		In-water electromagnetic			
Resources and Habitats	transducers Aircraft noise	vessel and	in-water device	strike	devices In-air electromagnetic			
and Habitats	Vessel noise	Ingestion:			devices			
	7 00001 110100	None			461.665			
	Explosives:							
	None	_	_		<u> </u>			
Stressors to	Air Quality:		Sediments an	d Water	Quality:			
Physical	Criteria air pollutants		None					
Resources Stressors to	Cultural Resources:	Sociooco	nomic Resource		Public Health and Safety:			
Human	None	Accessibi		:5.	Physical interactions			
Resources			acoustics		In-air energy			
		Physical o	disturbance and	strike	In-water energy			
Military	Ingestible Material:		Military	None				
Expended	None		Recoverable					
Material	Non-to-seath Advisor		Material					
	Non-Ingestible Material: None							
	None							

Vessel Evaluation	Vessel Evaluation					
Vessel Signatur	Vessel Signature Evaluation					
Sonar and	None					
Other						
Transducer						
Bins						
In-Water	None					
Explosive						
Bins						
Procedural	Physical Disturbance and Strike: (Section 5.3.4)					
Mitigation	Vessel movement					
Measures						
Assumptions	None					
Used for						
Analysis						

## A.3.2.8 Other Testing

# A.3.2.8.1 Chemical and Biological Simulant Testing

Other Testing Activities									
	iological Simulant Testing								
Short	Chemical-biological agent si	mulants are dep	oloyed .	Typical Dura	ation				
Description	against surface ships.		:	3 days					
Long	The capabilities of surface s	hip defense sys	tems to det	ect and prot	tect in the event of chemical and				
Description		sted. Testing involves the deployment of harmless compounds (i.e.,							
	· ·	chemical and biological warfare agents. Because chemical and							
	biological warfare agents re	-		-					
	-	-			iological warfare agents to test				
		•		_	gical agent detectors monitor for the military personnel and civilians				
	•	•	•	•	a response by sensors in the				
	detection equipment withou	_							
			.,						
	Navy Chemical Agent Simula	ant 82 (commoi	nly referred	to as NCAS-	82), glacial acetic acid, triethyl				
	_ · · · · · · · · · · · · · · · · · · ·				erant commonly known as R134),				
	-	_	-		are also referred to as gaseous				
		-		-	with glacial acetic acid or triethyl				
	phosphate releases. The typ	_		-	· · · · · · · · · · · · · · · · · · ·				
					AS2, and Aspergillus niger. The craft as a fine mist or aerosol.				
Typical	Platforms: Fixed-wing aircra			tor or by an	craft as a fine finist of acrosof.				
Components	Targets: None	irt, surface com	ivatants						
	Systems being Trained/Tes	ted: None							
Standard	Vessel safety	Typical Locati	ions						
Operating	Aircraft safety	Range Comp	lexes/Testin	g Ranges:	Inshore Waters/Pierside:				
Procedures		Jacksonville			None				
(Section 2.3.3)		Navy Cherry	Point						
		Northeast							
		Virginia Cape		1 - 1					
Stressors to	Acoustic:	Physical Dist			Energy:				
Biological Resources	Aircraft noise Vessel noise	Aircraft and a Vessel and in	_		In-air electromagnetic devices				
and Habitats	vesserrioise	vessei allu ili	i-water devi	Le strike	devices				
and Habitats	Explosives:	Ingestion:			Entanglement:				
	None	None			None				
Stressors to	Air Quality:	-	Sediments	and Water	Quality:				
Physical	Criteria air pollutants		Chemicals	other than e	explosives				
Resources									
Stressors to	Cultural Resources:		conomic Res	ources:	Public Health and Safety:				
Human	None	Accessibility Physical interactions							
Resources			e acoustics	o and	In-air energy				
		Pnysica stril	l disturbanc	e and	In-water energy				
Military	Ingestible Material:		Military	None					
Expended	None		Recoverable						
Material			Material						
	Non-Ingestible Material:		•						
	None								

Other Testing A	Other Testing Activities							
Chemical and B	Chemical and Biological Simulant Testing							
Sonar and	None							
Other								
Transducer								
Bins								
In-Water	None							
<b>Explosive Bins</b>								
Procedural	Physical Disturbance and Strike: (Section 5.3.4)							
Mitigation	Vessel movement							
Measures								
Assumptions	Examples of chemical simulants include glacial acetic acid and triethyl phosphate.							
Used for	Examples of biological simulants are spore-forming bacteria, non-spore-forming bacteria, the							
Analysis	protein ovalbumin, MS2 bacteriophages, and the fungus Aspergillus niger.							

#### A.3.2.8.2 Insertion/Extraction

Other Testing A	activities							
Insertion/Extra								
Short	Testing of submersibles capa	able of insertir	ng and	Typical	Duration			
Description	extracting personnel and pa							
	areas from strategic distanc	es.		Up to 30 days				
Long	Testing of submersibles capa	able of insertir	ng and extra	acting per	sonnel and payloads into o	denied		
Description	areas from strategic distanc	ces. Testing could include the use of forces deployed from submerged						
	submarines while at sea.							
Typical	Platforms: Submarines							
Components	Targets: None							
	Systems being Trained/Test	<b>ted:</b> Submersib	oles, sonar	systems,	acoustic modems			
Standard	Vessel safety	Typical Locat	tions					
Operating		Range Comp	olexes/Test	ing Range	es: Inshore Waters/Pie	rside:		
Procedures		Key West			None			
(Section 2.3.3)		Naval Surface	e Warfare (	Center,				
		Panama C	ity Division					
Stressors to	Acoustic:	Physical Dis	turbance a	nd Strike	Energy:			
Biological	Sonar and other	Vessel and i	n-water de	vice strike	None			
Resources	transducers							
and Habitats	Vessel noise	Ingestion:			Entanglement:			
		None			None			
	Explosives:							
	None	-						
Stressors to	Air Quality:			ts and Wa	iter Quality:			
Physical	None		None					
Resources								
Stressors to	Cultural Resources:		nomic Reso	urces:	Public Health and Sa	-		
Human	None	Accessibil	-		Physical interactions	•		
Resources		Physical d	isturbance					
Military	Ingestible Material:		Military		one			
Expended	None		Recoveral	ole				
Material	Non Ingastible Material		Material					
	Non-Ingestible Material:							
Cananand	None		Madama		<del>-</del>			
Sonar and Other	<b>Mid-Frequency:</b> MF9	M3	Modems:					
Transducer	IVIF9	IVIS						
Bins								
In-Water	None							
Explosive	NOTE							
Bins								
Procedural	Physical Disturbance and St	rike: (Section !	5 3 4)	-	•			
Mitigation	Vessel movement	(Section s	<sub></sub>					
Measures	1 33361 III O FEITICITE							

Other Testing A	Other Testing Activities						
Insertion/Extra	Insertion/Extraction						
Assumptions	Test will not occur constantly throughout duration of allotted time.						
Used for	For biological resource analysis, vessel noise and vessel strike are only analyzed for the periods while						
Analysis	the submarines are surfaced, typically brief in nature. Mitigation measures related to vessel movement are only considered during the period of surfacing as well.						
	For human resource stressor analysis, airborne acoustics, physical disturbance and strike and physical interactions are only analyzed for the periods while the submarine are surfaced, typically						
	brief in nature.						

# A.3.2.8.3 Line Charge Testing

Other Testing A	Activities						
Line Charge Tes							
Short	Surface vessels deploy line of	charges to test the	Tyr	pical Duration			
Description	capability to safely clear an forces.	_	arv	1 day			
Long Description	Line charges are tested to verify the capability to safely clear surf zone areas for sea-based expeditionary operations. Testing is performed on various surf zone clearing systems that use either line charges or explosive arrays to neutralize mine threats. This is a systems development test and only assesses the in-water components of testing. Line charges consist of a 350-ft. detonation cord with explosives lined from one end to the other end in a series of 5-lb. increments.						
Typical Components	Platforms: Moored platform Targets: None Systems being Trained/Tes						
Standard	Vessel safety	<b>Typical Locations</b>					
Operating Procedures (Section 2.3.3)	,	Range Complexes/Testing Ranges: Inshore Waters/Pierside: Naval Surface Warfare Center, Panama City Division					
Stressors to Biological Resources and Habitats	Acoustic: Vessel noise  Explosives: In-water explosives	Physical Disturbance and Strike:  Vessel and in-water device strike Military expended material  Ingestion: Military expended materials – other than munitions  Entanglement: None					
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Exp Che	osives an	nd Water Quality: nd explosive byproducts ther than explosives ials			
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike Explosives	Socioeconomic Accessibility Airborne acous Physical disturb	<b>Resource</b>	Public Health and Safety: Physical interactions In-water energy			
Military Expended Material	Ingestible Material: Line charge fragments Non-Ingestible Material: None	Milit	ary verable	None			
Sonar and Other Transducer Bins	None	•					
In-Water Explosive Bins	E14						
Procedural Mitigation Measures	Physical Disturbance and St Vessel movement	trike: (Section 5.3.4)	-	osive Stressors: (Section 5.3.3) Charge testing			

Other Testing A	Other Testing Activities					
Line Charge Tes	sting					
Assumptions	Test will not occur constantly over the duration of the allotted time.					
Used for						
Analysis						

## A.3.2.8.4 Acoustic Component Testing

Other Testing A	ctivities							
Acoustic Compo								
Short	Various surface vessels, mod	ored equipmen	t, and	Typical Dura	tion			
Description	materials are tested to evalu		ice in					
	the marine environment.	•		1 day to mul	tiple months			
Long	Various surface activities uti	ilizing the marir	ne environm	nent for testi	ng and evaluation. Sample			
Description	projects include buoy deplo	yments, vessel	entangleme	ent systems,	materials testing, and renewable			
	energy devices. Other surface	ce operations involve manned and unmanned surface vehicles.						
	Miscellaneous types of equi	-	-					
	acoustic, optical, and air qua	•						
					y. Surface operations utilize a			
	variety of vessels for deploy	ment of test eq	quipment ar	nd for the mo	onitoring of the air, surface,			
	subsurface.							
Typical		l systems, unm	anned surfa	ace vehicles,	unmanned underwater vehicles			
Components	Targets: None							
	Systems being Trained/Test			water commi	unication systems			
Standard	Unmanned aerial, surface,	Typical Locati		_				
Operating Procedures	and subsurface vehicle	Range Comp	-		Inshore Waters/Pierside:			
(Section 2.3.3)	safety	South Florida	Ocean Mea	asurement	None			
	A	Facility		-l Carrillon	F.,			
Stressors to	Acoustic:	Physical Dist			Energy:			
Biological Resources	Sonar and other transducers	Aircraft and a	_		None			
and Habitats	Vessel noise	vessei allu ili	i-water devi	ice strike	Entanglement:			
and napitats	vessel floise	Ingestion:			None			
	Explosives:	None			None			
	None	140116						
Stressors to	Air Quality:		Sediments	and Water	Ouality:			
Physical	Criteria air pollutants		None		.,			
Resources	·							
Stressors to	Cultural Resources:	Socioecon	omic Resou	ırces:	Public Health and Safety:			
Human	None	Accessibili	ty		Physical interactions			
Resources		Airborne a	coustics		In-water energy			
		Physical di	sturbance a	nd strike				
Military	Ingestible Material:		Military	None				
Expended	None		Recoverabl	le				
Material			Material					
	Non-Ingestible Material:							
	None							
Sonar and	Low-Frequency:		Looking Son	nar:	Synthetic Aperture Sonars:			
Other	LF5	FLS2			SAS2			
Transducer	Mid Fraguence	Uiah Fran	ono::					
Bins	Mid-Frequency:	High-Freq	juency:					
	MF9	HF5 HF7						
In-Water	None	111 /						
Explosive	IVOITE							
Bins								
Dillia	L							

Other Testing A	Other Testing Activities							
Acoustic Comp	Acoustic Component Testing							
Procedural	Acoustic Stressors: (Section 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)						
Mitigation	Active sonar	Vessel movement						
Measures								
Assumptions	None							
Used for								
Analysis								

## A.3.2.8.5 Non-Acoustic Component Testing

Other Testing Ac	tivities							
	mponent Testing							
Short	Testing of towed or floating	buovs for		Typical Dura	ation			
Description	communications through ra	-		- <b>/ </b>				
	two-way optical communica	-		3 days (4 ho	ours per day for 3 days)			
	aircraft and underwater syst							
Long		lio frequency communications could occur from towed antennas from						
Description	_				nes, or tethered buoys from			
	_				tests may include communication			
	•	d wing aircraft and manned or unmanned underwater systems, and may						
	also include ground truth se	_			, ,			
Typical					l underwater vehicles, manned			
Components	underwater vehicles	,						
	Targets: None							
	Systems being Trained/Test	ted: Commun	ication syste	ms				
Standard	Vessel safety	Typical Loca						
Operating	Aircraft safety		plexes/Testi	ng Ranges:	Inshore Waters/Pierside:			
Procedures	Unmanned aerial, surface,	Gulf of Mex		ing manifest	None			
(Section 2.3.3)	and subsurface vehicle	Virginia Car						
,	safety	lga cap						
Stressors to	Acoustic:	Physical Dis	sturbance an	d Strike:	Energy:			
Biological	Aircraft noise		l aerial targe		In-air electromagnetic			
Resources and	Vessel noise		in-water dev		devices			
Habitats								
	Explosives:	Ingestion:			Entanglement:			
	None	None			None			
Stressors to	Air Quality:		Sediments	and Water	Quality:			
Physical	Criteria air pollutants		None					
Resources								
Stressors to	Cultural Resources:	Socioeco	nomic Resou	ırces:	Public Health and Safety:			
Human	None	Accessibi	lity		Physical interactions			
Resources		Airborne	acoustics		In-air energy			
		Physical o	disturbance a	nd strike	In-water energy			
Military	Ingestible Material:		Military	None				
Expended	None		Recoverab	le				
Material	Non-Ingestible Material:		Material					
	None							
Sonar and	None	-			- <del>-</del>			
Other								
Transducer								
Bins								
In-Water	None			_	-			
Explosive Bins								
Procedural	Physical Disturbance and St	rike: (Section	5.3.4)					
Mitigation	Vessel Movement							
Measures								
Assumptions	None							
Used for								
Analysis								
	L							

# A.3.2.8.6 Payload Deployer Testing

Other Testing A	ctivities						
Payload Deploy							
Short	Launcher systems are tested		Tynical	Duration	<u> </u>		
Description	performance.	to evaluate	_	1-5 days			
Long		uate the nerfo				launchers whic	h are used to
Description	Testing is conducted to evaluate the performance of current or future launchers, which are used to deploy objects (e.g., torpedoes, decoys, countermeasures, sensors, unmanned underwater vehicles, and unmanned aerial vehicles). These tests may be performed from a fixed location or a mobile platform. The objects deployed may be operational equipment or mock equipment that is instrumented to evaluate the performance of the launcher system. Various methods may be employed to launch test items. The test items are typically recovered after the test and are usually						
Tourisal	equipped with an acoustic lo						
Typical Components	Platforms: In-water structur unmanned surface vehicles, Targets: None Systems being Trained/Tes	unmanned u			s, suppo	rt craft, surface (	compatants,
Standard	Vessel safety	Typical Loca	tions				
Operating Procedures (Section 2.3.3)	Unmanned aerial, surface, and subsurface vehicle safety	Range Complexes/Testing Ranges: Gulf of Mexico Northeast Naval Undersea Warfare Center Division, Newport				nshore Waters/F one	Pierside:
Stressors to	Acoustic:	-	sturbance an	d Strike	· ·	Energy:	
Biological Resources and Habitats	Vessel noise  Explosives:	Vessel and	in-water devi ended mater	ce strik		In-air electrom devices	agnetic
and nasitats	None	Ingestion: Military exp than mui	pended mater	rials – o	other	Entanglement Wires and cabl	
Stressors to	Air Quality:		Sediments	and W	ater Qua	lity:	
Physical Resources	Criteria air pollutants		Metals	(	Other ma	aterials	
Stressors to Human Resources	Cultural Resources: Physical disturbance and stri	ike Accessi Airborr	conomic Resorbility ne acoustics al disturbance		Pl In	ublic Health and hysical interaction l-air energy l-water energy	-
Military Expended Material	Ingestible Material: End caps and pistons – non chaff and flare  Non-Ingestible Material: Concrete slugs, heavyweight torpedo accessories, lightweight torpedo accessories, sabots, guidance wires			Н	leavywei explosi	ght torpedoes (r ve), lightweight ( xplosive)	
Sonar and Other Transducer Bins	None						

Other Testing A	activities
Payload Deploy	ver Testing
In-Water	None
Explosive	
Bins	
Procedural	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Vessel movement
Measures	
Assumptions	Instrumented operational equipment or mock equipment will be recovered.
Used for	Ships will not be conducting test constantly for the duration of the allotted time.
Analysis	Any acoustic sources used during this activity would be de minimis and not quantitatively analyzed and, therefore, are not included under systems.
	When chaff is used, 36 concrete slugs per event are expended.
	Other components associated with chaff and flare use are not expected to float and would sink to the seafloor.

## A.3.2.8.7 Semi-Stationary Equipment Testing

Other Testing A	ctivities			
	/ Equipment Testing			
Short	Semi-stationary equipment	(e.g. hydronhones)	is Tvp	ical Duration
Description	deployed to determine func			m 20 minutes to multiple days
Long		•		ked site, suspended over the side of a boat,
Description				r on the surface. Examples of semi-
	T			devices to listen to underwater sound),
				cean bottom, acoustic countermeasures, a
				gh the water column, and sonobuoys (i.e.,
	expendable sonar systems).	Some units produce	sound in	the water (e.g., acoustic
	countermeasures), while oth	ners only listen (e.g.,	passive so	onobuoys, vector sensors that measure
	-		-	an area that provides opportunistic data
				e to collect shipping noise data), or with
	specific geographic or ocean			
Typical	Platforms: : In-water structu	-		
Components	<u> </u>	• .	_	s, sub-surface targets, surface targets
			, acoustic	countermeasures, sonar systems,
	underwater communication	,		
Standard	Vessel safety	Typical Locations		
Operating	Towed in-water device	Range Complexes	_	=
Procedures	safety	Naval Surface War		er, Newport, Rhode Island
(Section 2.3.3)		Panama City Div		
		Naval Undersea W Division, Newpo		nter
Stressors to	Acoustic:	Physical Disturbar		triko: Enorgy:
Biological	Vessel noise	Vessel and in-water		<u>~-</u>
Resources	Sonar and other	Military expended		devices
and Habitats	transducers	winitary experiaca	material	acvices
		Ingestion:		Entanglement:
	Explosives:	None		None
	None			
Stressors to	Air Quality:	Sedi	ments and	d Water Quality:
Physical	Criteria air pollutants	Met	als	Other materials
Resources				
Stressors to	<b>Cultural Resources:</b>	Socioeconom	ic Resour	ces: Public Health and Safety:
Human	Physical disturbance and stri	•		Physical interactions
Resources		Airborne acou		In-air energy
		Physical distu		
Military	Ingestible Material:	Milit	_	Air target (drone), sub-surface (mobile
Expended	None		verable	and stationary) targets, surface
Material	Non Ingostible Metaulal	Mate	rial	(mobile and stationary) targets
	Non-Ingestible Material:	sub surface		
	Acoustic countermeasures, s (mobile and stationary) ta			
	surface (mobile and statio			
	targets	niai y)		
	turgets			

Other Testing A	ctivities					
Semi-Stationary	y Equipmen	t Testing				
Sonar and	Low-Frequ	uency:	Anti-Subm	arine Warfare:	Swimmer	Defense:
Other	LF4	LF5	ASW3	ASW4	SD1	SD2
Transducer						
Bins	Mid-Frequ	uency:	High-Frequ	iency:	Air Gun:	
	MF9	MF10	HF5	HF6	AG	
In-Water	None					
Explosive						
Bins						
Procedural	Acoustic S	Stressors: (Section	5.3.2)	Physical Dis	turbance and S	trike: (Section 5.3.4)
Mitigation	Active son	ıar		Vessel move	ement	
Measures	Air guns					
Assumptions	None					
Used for						
Analysis						

## A.3.2.8.8 Towed Equipment Testing

Other Testing A	Activities				
Towed Equipme					
Short	Surface vessels or unmanned	surface vehicle	es	Typical	Duration
Description	deploy and tow equipment to functionality of towed system				ly 2-8 hours
Long Description	body, test fully functional iten functional item. A typical test recover scenario that requires from and towed by range craf floating on the surface. Equipa transmissions.	ns, or test a pa operation for s range or com t or unmanne ment may be a	articular asp towed equ nmercial cra d surface vo acoustically	pect of a ipment to the suppose the suppos	characteristics and control of a tow system utilizing a mock-up of a esting involves a deployment, use, and ort. This equipment may be deployed The towed item may be underwater or r produce radio frequency
Typical Components	Platforms: Support craft, unm Targets: Sub-surface targets Systems being Trained/Teste			vater cor	mmunication systems
Standard	Vessel safety	Typical Locat		vater cor	initialiteation systems
Operating Procedures (Section 2.3.3)	Unmanned aerial, surface, and subsurface vehicle safety Towed in-water device safety	Range Comp Naval Under Division, N	olexes/Test sea Warfar		
Stressors to	Acoustic:	Physical Dis	turbance a	nd Strike	e: Energy:
Biological	Sonar and other transducers	Vessel and i		vice strik	e None
Resources and Habitats	Vessel noise	Seafloor dev Military exp		erial	Entanglement:
	Explosives:	, ,			None
	None	<b>Ingestion:</b> None			
Stressors to Physical Resources	Air Quality: Criteria air pollutants	•		<b>ts and W</b> Other m	later Quality: naterials
Stressors to	Cultural Resources:	Socioed	onomic Re	sources:	Public Health and Safety:
Human Resources	Physical disturbance and strike	Airborn	l disturbande acoustics		rike Physical interactions In-water energy
Military Expended Material	Ingestible Material: None  Non-Ingestible Material: Mine shapes (non-explosive), starget (stationary)	Accessil sub-surface	Military Recoveral Material		Aine shapes (non-explosive), subsurface target (stationary)
Sonar and Other Transducer Bins	Low-Frequency: LF4	<b>Mid-Fred</b> MF9	quency:		<b>High-Frequency:</b> HF6
In-Water Explosive Bins	None				

Other Testing A	Activities	
<b>Towed Equipm</b>	ent Testing	
Procedural	Acoustic Stressors: (Section 5.3.2)	Physical Disturbance and Strike: (Section 5.3.4)
Mitigation	Active sonar	Vessel movement
Measures		Towed in-water devices
Assumptions	None	
Used for		
Analysis		

## A.3.3 OFFICE OF NAVAL RESEARCH TESTING ACTIVITIES

#### A.3.3.1 Acoustic and Oceanographic Science and Technology

#### A.3.3.1.1 Acoustic and Oceanographic Research

Acoustic and O	ceanographic Science and Tec	hnology				
	ceanographic Research					
Short	Research using active transr	missions from	sources	Typic	cal Durat	ion
Description	deployed from ships, aircraf		_	7 7 1		
	underwater vehicles. Resear					
	used as proxies for current a	and future Na	vy	Up to	o 14 days	5
	systems.		,			
Long	Active acoustic transmission	s used for en	gineering te	sts of	acoustic	sources, validation of ocean
Description						rization of acoustic interactions
	with the ocean bottom, fish	and ocean su	rface. Stand	lard o	ceanogra	phic research sensing (acoustic
	Doppler current profiler, fat	hometer-like	systems) als	o to b	e emplo	yed.
Typical	Platforms: Special mission s	hips, unmann	ed underwa	iter ve	hicles, fi	xed-wing aircraft
Components	Targets: Sub-surface targets	5				
	Systems being Trained/Tes	ted: Air guns,	sonar system	ms, so	nobuoys	, underwater communication
	systems, low-power lasers					
Standard	Aircraft safety	Typical Loca	ntions			
Operating	Vessel safety	Range Com	plexes/Test	ing Ra	inges:	Inshore Waters/Pierside:
Procedures	Unmanned aerial, surface,	Gulf of Mex	(ico			None
(Section 2.3.3)	and subsurface vehicle	Northeast				
	safety	Virginia Cap	oes			
Stressors to	Acoustic:	Physical Dis	sturbance a	nd Str	ike:	Energy:
Biological	Sonar and other	Aircraft and	d aerial targe	et strik	ке	In-air electromagnetic
Resources	transducers	Vessel and	in-water de	vice st	rike	devices
and Habitats	Vessel noise	Military exp	pended mate	erials		
	Aircraft noise	Seafloor de	vices			Entanglement:
						Decelerators/parachutes
	Explosives:	Ingestion:				Wires and cables
	In-water explosives		ended mate	erials -	– other	
_		than mu	-			
Stressors to	Air Quality:		Sediment			-
Physical	Criteria air pollutants		Explosive Chemical		Meta	•
Resources	Cultural Deservaces		nomic Reso			er materials
Stressors to	Cultural Resources: Physical disturbance and			urces	:	Public Health and Safety:
Human Resources	strike	Accessibi	acoustics			Physical interactions In-air energy
Resources	Explosives		disturbance	and st	trika	In-water energy
Military	Ingestible Material:	Titysical	Military	and st		s – Other, subsurface targets
Expended	Buoy (explosive) fragments,		Recoveral	hla		ionary)
Material	Decelerators/parachutes	- Small	Material		(Stat	
	•					
	Non-Ingestible Material:					
	Sonobuoys (non-explosive),	•				
	wires, expended bathythe					
	expended bathythermogr	apn wires,				
	anchor-other					

Acoustic and O	ceanographic Science and Te	echnology	
Acoustic and O	ceanographic Research		
Sonar and	Low-Frequency:	Mid-Frequency:	Air Gun:
Other	LF3 LF5	MF8 MF9	AG
Transducer	LF4		
Bins		Anti-Submarine Warfare:	Broadband:
		ASW2	BB4
In-Water	E3		
Explosive			
Bins			
Procedural	Acoustic Stressors: (Section	n 5.3.2) Physical D	isturbance and Strike: (Section 5.3.4)
Mitigation	Active sonar	Vessel mo	vement
Measures	Air guns		
		Explosive S	Stressors: (Section 5.3.3)
		Explosive r	mine countermeasure and
		neutrali	zation activities
Assumptions	None		
Used for			
Analysis			

## A.3.3.1.2 Emerging Mine Countermeasure Technology Research

Test involves the use of broadband acoustic sources on unmanned underwater vehicles.   Up to 14 days					hnology	eanographic Science and Tec	Acoustic and Oc
Short Description Sources on unmanned underwater vehicles.  Long Description Mine countermeasure system testing on unmanned underwater vehicles to take place offshore and in coastal waters. Broadband acoustic sources on unmanned underwater vehicles will use downward directed acoustic transmissions to characterize the ocean bottom. Inert objects will placed on the bottom to test system performance.  Typical Components Targets: Mine shapes Systems being Trained/Tested: Sonar systems  Standard Operating Procedures (Section 2.3.3) Subsurface, and subsurface vehicle safety Virginia Capes  Stressors to Biological Resources and Habitats Vessel noise Seafloor device  Test involves the use of broadband acoustic Typical Logation.  Up to 14 days  Up to 14 days  Typical Locations ounmanned underwater vehicles to take place offshore and underwater vehicles will use downward directed acoustic transmissions to characterize the ocean bottom. Inert objects will use downward directed acoustic transmissions to characterize the ocean bottom. Inert objects will use downward underwater vehicles Sonar systems  Typical Locations  Range Complexes/Testing Ranges: Inshore Waters/Pierside: None  None  Stressors to Biological Resources and Habitats Vessel and in-water device strike In-air electromagnetic devices							
Description   Sources on unmanned underwater vehicles.   Up to 14 days		ation	Typical Dur	ctic -			
Mine countermeasure system testing on unmanned underwater vehicles to take place offshore and in coastal waters. Broadband acoustic sources on unmanned underwater vehicles will use downward directed acoustic transmissions to characterize the ocean bottom. Inert objects will placed on the bottom to test system performance.    Typical							
and in coastal waters. Broadband acoustic sources on unmanned underwater vehicles will use downward directed acoustic transmissions to characterize the ocean bottom. Inert objects will placed on the bottom to test system performance.  Typical Components		•					·
downward directed acoustic transmissions to characterize the ocean bottom. Inert objects will placed on the bottom to test system performance.  Typical Platforms: Special mission ships, unmanned underwater vehicles Targets: Mine shapes Systems being Trained/Tested: Sonar systems  Standard Operating Unmanned aerial, Procedures (Section 2.3.3) subsurface, and subsurface vehicle safety Virginia Capes  Stressors to Biological Resources and Habitats  downward directed acoustic transmissions to characterize the ocean bottom. Inert objects will placed on the bottom to test system performance.  Typical Components  Typical Locations  Typical Locations  Typical Locations  Inshore Waters/Pierside: None  None  Seafloor device strike In-air electromagnetic devices  Vessel and in-water device strike In-air electromagnetic devices					_	•	
Typical Platforms: Special mission ships, unmanned underwater vehicles  Targets: Mine shapes Systems being Trained/Tested: Sonar systems  Standard Operating Procedures (Section 2.3.3) Subsurface vehicle safety Virginia Capes  Stressors to Biological Resources and Habitats  Platforms: Special mission ships, unmanned underwater vehicles Targets: Mine shapes Systems being Trained/Tested: Sonar systems  Typical Locations  Typical Locations  Physical Locations  Range Complexes/Testing Ranges: Inshore Waters/Pierside: None  None  Stressors to Subsurface vehicle safety Virginia Capes  Stressors to Biological Sonar and other Vessel and in-water device strike transducers Military expended material devices  Vessel noise Seafloor device	l						Description
Typical Components Components Targets: Mine shapes Systems being Trained/Tested: Sonar systems  Standard Operating Procedures (Section 2.3.3) Stressors to Biological Resources and Habitats Platforms: Special mission ships, unmanned underwater vehicles Targets: Mine shapes Systems being Trained/Tested: Sonar systems  Typical Locations  Typical Locations Range Complexes/Testing Ranges: Inshore Waters/Pierside: None  None  Physical Disturbance and Strike: Sonar and other Vessel and in-water device strike Transducers Military expended material Vessel noise  Seafloor device	be	ean bottom. Inert objects will b	cterize the oc				
ComponentsTargets: Mine shapes Systems being Trained/Tested: Sonar systemsStandard Operating Procedures (Section 2.3.3)Vessel safety Unmanned aerial, surface, and subsurface vehicle safetyTypical LocationsNoneNoneStressors to Biological Resources and HabitatsAcoustic: Vessel noisePhysical Disturbance and Strike: Vessel and in-water device strike Military expended materialEnergy: In-air electromagnetic devices							
Standard Vessel safety Typical Locations  Operating Procedures (Section 2.3.3) Standard Subsurface vehicle safety  Stressors to Biological Resources and Habitats  Systems being Trained/Tested: Sonar and other Vessel and in-water device the Sonar and the Subsurface vehicle seafloor device  Typical Locations  Range Complexes/Testing Ranges: Inshore Waters/Pierside: None  None  None  Stressors to Physical Disturbance and Strike: Energy: In-air electromagnetic devices  Vessel noise Seafloor device			vater vehicles	ned underwa	ships, unman	•	= =
Standard Operating Procedures (Section 2.3.3)  Stressors to Biological Resources and Habitats  Vessel safety  Vessel safety  Unmanned aerial, surface, and subsurface vehicle safety  Virginia Capes  Typical Locations  Range Complexes/Testing Ranges: Inshore Waters/Pierside: None  Northeast Virginia Capes  Physical Disturbance and Strike: Energy: In-air electromagnetic devices  Military expended material devices  Vessel noise  Seafloor device					-4d- C		Components
Operating Procedures (Section 2.3.3)  Stressors to Biological Resources and Habitats  Unmanned aerial, surface, and subsurface vehicle safety  Unmanned aerial, surface, and subsurface vehicle safety  Northeast Virginia Capes  Physical Disturbance and Strike: Energy: In-air electromagnetic devices  Vessel and in-water device strike transducers  Wilitary expended material devices  Vessel noise  Complexes/Testing Ranges: None  Seafloor device strike device strike  In-air electromagnetic devices							
Procedures (Section 2.3.3) Subsurface vehicle safety  Stressors to Biological Resources and Habitats  Subsurface vehicle subsurface vehicle subsurface vehicle safety  Jacksonville Northeast Virginia Capes  Physical Disturbance and Strike: Vessel and in-water device strike In-air electromagnetic devices  Military expended material devices						•	
(Section 2.3.3)subsurface vehicle safetyNortheast Virginia CapesStressors to Biological Resources and HabitatsAcoustic: Sonar and other transducersPhysical Disturbance and Strike: Vessel and in-water device strike Military expended material Seafloor deviceEnergy: In-air electromagnetic devices		Inshore Waters/Pierside:	ing Ranges:			•	
Stressors to Biological Resources and Habitats  Safety  Virginia Capes  Physical Disturbance and Strike: Physical Disturbance and Strike: Seafloor device and Strike: Physical Disturbance and Strike: Seafloor device strike In-air electromagnetic devices  Vessel noise Seafloor device		None				-	
Stressors to Biological Resources and HabitatsAcoustic: Sonar and other transducersPhysical Disturbance and Strike: Vessel and in-water device strike Military expended material Seafloor deviceEnergy: In-air electromagnetic devices					Northeast		(Section 2.3.3)
Biological Resources and HabitatsSonar and other transducersVessel and in-water device strike Military expended material Seafloor deviceIn-air electromagnetic devices				es	Virginia Cap	safety	
Resources and HabitatstransducersMilitary expended materialdevicesSeafloor device		Energy:	nd Strike:	turbance and	Physical Dis	Acoustic:	Stressors to
Habitats Vessel noise Seafloor device		In-air electromagnetic	vice strike	n-water devi	Vessel and i	Sonar and other	Biological
		devices	erial	ended mater	Military exp	transducers	Resources and
Production of the control of the con				vice	Seafloor de	Vessel noise	Habitats
Entanglement:		Entanglement:					
Explosives: Ingestion: None		None			Ingestion:	Explosives:	
None None					None	None	
Stressors to Air Quality: Sediments and Water Quality:		Quality:	ts and Water	Sediments		Air Quality:	Stressors to
Physical Criteria air pollutants Other materials			aterials	Other mate		Criteria air pollutants	Physical
Resources							Resources
Stressors to Cultural Resources: Socioeconomic Resources: Public Health and Safety:		Public Health and Safety:	ources:	nomic Resou	Socioeco	Cultural Resources:	Stressors to
Human Physical disturbance and Accessibility Physical interactions				ity	Accessibi	Physical disturbance and	Human
ResourcesstrikeAirborne acousticsIn-air energy		In-air energy				strike	Resources
Physical disturbance and strike In-water energy		In-water energy	and strike	listurbance a	Physical c		
MilitaryIngestible Material:MilitaryMine shapes (non-explosive)		shapes (non-explosive)	Mine	Military		Ingestible Material:	
Expended None Recoverable			ble	Recoverable		None	Expended
Material Material				Material			Material
Non-Ingestible Material:						_	
Anchor - other						Anchor - other	
Sonar and Broadband:						Broadband:	Sonar and
Other BB1 BB2						BB1 BB2	Other
Transducer							Transducer
Bins							Bins
In-Water None						None	In-Water
Explosive Bins							<b>Explosive Bins</b>
Procedural Physical Disturbance and Strike: (Section 5.3.4)				5.3.4)	Strike: (Section	Physical Disturbance and S	Procedural
Mitigation Vessel movement						Vessel movement	Mitigation
Measures							Measures
Assumptions None							
Used for						None	Assumptions
Analysis						None	

## A.3.3.1.3 Large Displacement Unmanned Underwater Vehicle Testing

Acoustic and O	ceanographic Science and Te	chnology				
	ment Unmanned Undersea Ve					
Short	Autonomy testing and envir			Typic	al Durat	ion
Description	collection with Large Displa					
	Undersea Vehicles (Innovati			Up to	60 days	s per deployment
Long				ovativ	e Navv I	Prototype (LDUUV INP) testing
Description	includes launch, autonomo					
•						nd retrieval. LDUUV INP testing
						(modems, imaging sonars and
	fathometers) for safe naviga					(
Typical	Platforms: Unmanned under					
Components	Targets: Sub-surface targets	5				
	Systems being Trained/Tes		a vehicles, e	nviron	nmental	data collection systems
Standard	Vessel safety	Typical Loca				,
Operating	Unmanned aerial, surface,		plexes/Test	inσ Ra	nges.	Inshore Waters/Pierside:
Procedures	and subsurface vehicle	Gulf of Mex		iiig itu	inges.	None
(Section	safety	Jacksonville				None
2.3.3)	,	Navy Cherr	-			
/		Northeast	y i omic			
		Virginia Car	nes			
Stressors to	Acoustic:		sturbance a	nd Str	ike:	Energy:
Biological	Vessel noise	-	in-water dev			None
Resources	Vesser Holse		pended mate		TIKC	None
and Habitats		willitary exp	Jenaca mate	criai		Entanglement:
	Explosives:	Ingestion:				None
	None	None				110110
Stressors to	Air Quality:		Sediment	s and	Water C	Duality:
Physical	Criteria air pollutants		Other ma			Quanty.
Resources	Contents and politicality					
Stressors to	Cultural Resources:	Socioeco	nomic Reso	urces:		Public Health and Safety:
Human	Physical disturbance and	Accessibi				Physical interactions
Resources	strike		disturbance :	and st	rike	In-water energy
Military	Ingestible Material:		Military		-	face targets (stationary)
Expended	None		Recoverab	ole		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Material			Material			
	Non-Ingestible Material:	,				
	Subsurface targets (stationa	iry)				
Sonar and	None					
Other						
Transducer						
Bins						
In-Water	None					
Explosive						
Bins	BL 1 BL 1	· /c · ·	5 2 4)			
Procedural	Physical Disturbance and St	rike: (Section	5.3.4)			
Mitigation	Vessel movement					
Measures						
Assumptions	• · · · · · · · · · · · · · · · · · · ·	_	-	oe de r	mınimis	and not quantitatively analyzed
Used for	and therefore are not inc	luded under s	systems.			
Analysis						

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September 2018