APPENDIX A
ACTIVITY DESCRIPTIONS

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Draft

Supplemental Environmental Impact Statement/ Overseas Environmental Impact Statement Atlantic Fleet Training and Testing

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A ACTIVITY DESCRIPTIONS

The Action Proponents have been conducting military readiness activities throughout the northwestern Atlantic Ocean, Gulf of Mexico, and inshore waters for decades. The tempo and types of military readiness 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 ACTIVITIES

The Action Proponents use 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 Supplemental 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 Supplemental 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 Supplemental EIS/OEIS.

All sounds, including sonar, are categorized by frequency. For this Supplemental EIS/OEIS, active sonar is categorized into four frequency ranges: low-frequency[1], 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 from 10 kHz 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).

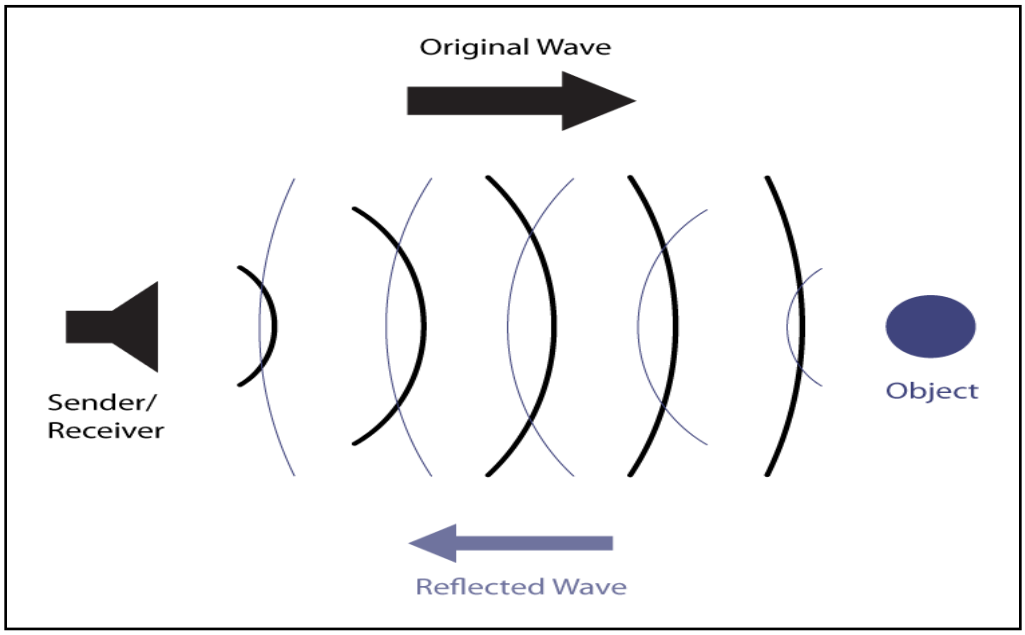


Figure A.1-1: Principle of an Active Sonar

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

[1] 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.

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 activities). 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.

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 mid-frequency 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 minehunting sonar.

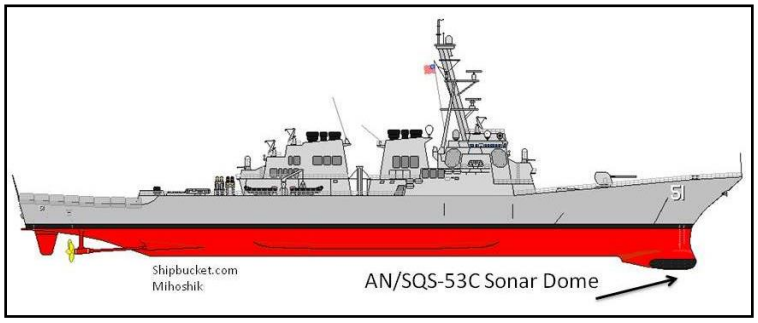


Figure A.1-2: Guided Missile Destroyer with an AN/SQS-53 Sonar

- **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.

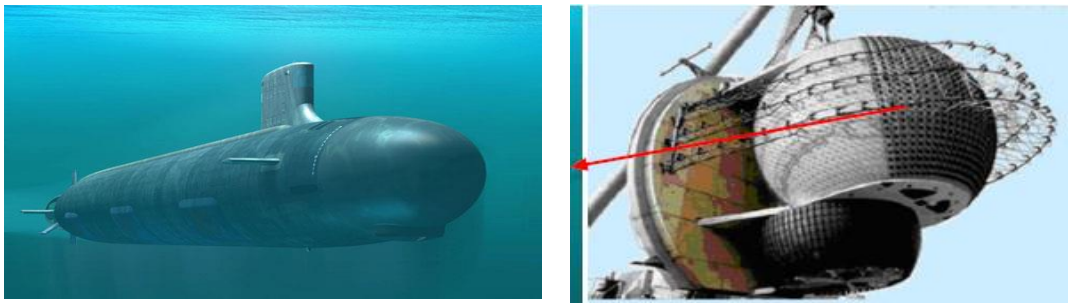


Figure A.1-3: Submarine AN/BQQ-10 Active Sonar Array

- **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 military readiness 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.

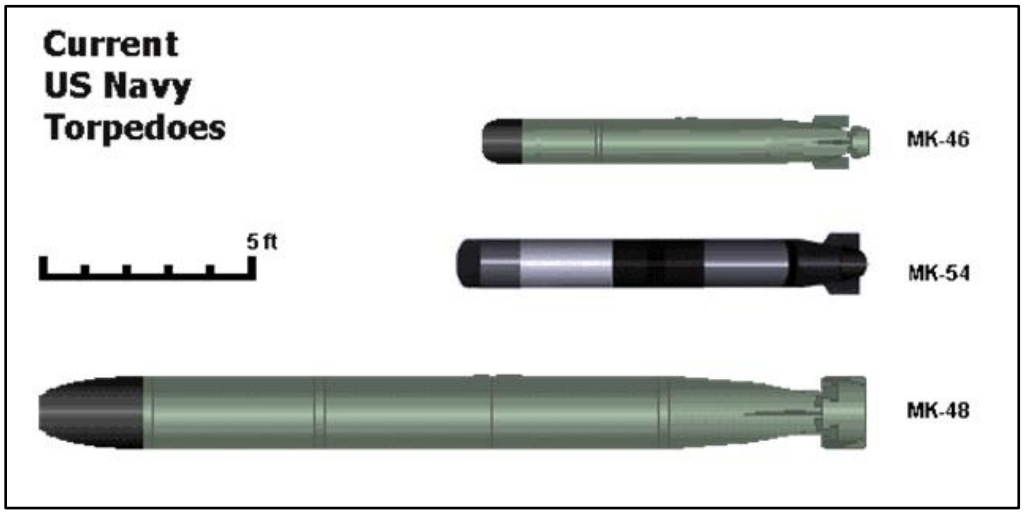
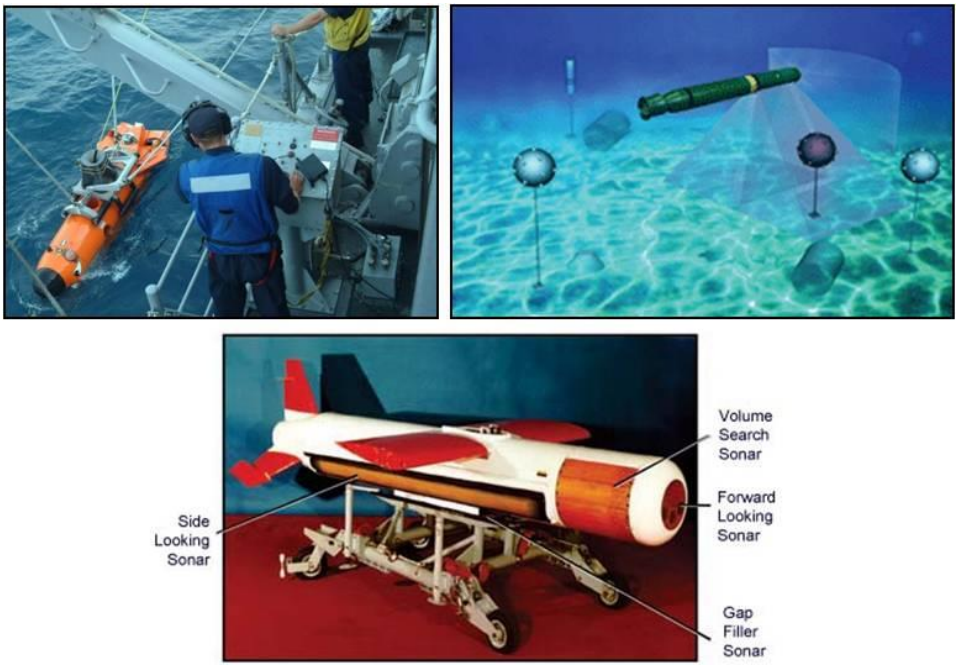


Figure A.1-6: Current U.S. Navy Torpedoes

- **Anti-Submarine Warfare Targets:** An anti-submarine warfare target is shown in (Figure A.1-7).

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

Mine Warfare. Mine warfare military readiness activities use a variety of different sonar systems that are typically high-frequency (10 kHz to 100 kHz) and very high-frequency (100 kHz to 200 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.



(Source: Graphic on right courtesy of Lockheed Martin)

Figure A.1-8: Mine Warfare Systems

Safety, Navigation, Communications, and Oceanographic Systems. Naval ships, submarines, and unmanned surface and sub-surface vehicles rely on equipment and instrumentation that use active sonar during both routine operations and training and testing activities. Sonar systems are used to gauge water depth; detect and map objects, navigational hazards, and the ocean floor; and transmit communication signals.

A.1.2 MUNITIONS

Most munitions used during training and testing activities 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 activities 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 Supplemental 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 activities 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 0.25-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.

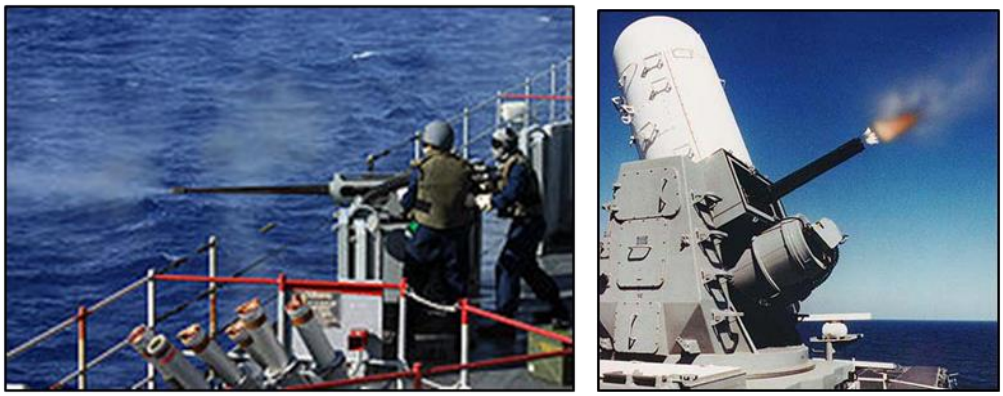


Figure A.1-10: Shipboard Medium-Caliber Guns

- **Large-Caliber Projectiles:** These include projectiles 57 mm and larger. The largest projectile currently in service has a 5-in. (12.7-centimeter) diameter. 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.

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

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

- **Anti-Surface Missiles:** Anti-surface missiles are fired from aircraft, ships, and submarines against surface ships (Figure A.1-13). Anti-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 seaborne 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 high-explosive 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 military readiness 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 activities 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 military readiness 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.
- **Torpedoes:** Explosive torpedoes are required in some training and testing activities. Torpedoes are described as either lightweight or heavyweight and are further categorized according to the net explosive weight.

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 Supplemental 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 activities 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 activities. 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 activities. 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).

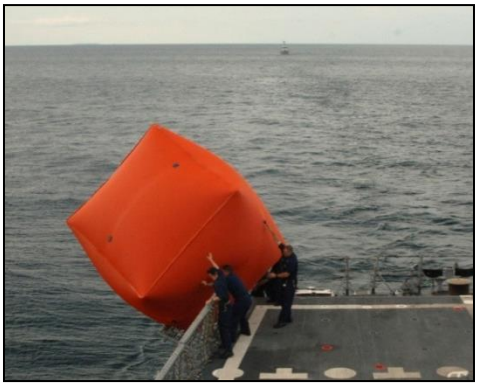


Figure A.1-17: Deploying a "Killer Tomato™" Floating Target


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 activities.
- **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.
- **Biodegradable Polymer:** Biodegradable polymer is a biodegradable vessel entanglement technology used to slow or stop specific maritime targets by entangling the propulsion mechanism.

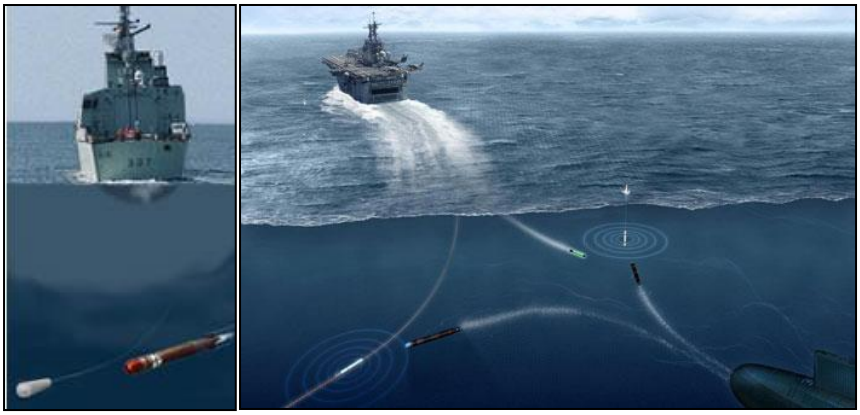


Figure A.1-19: Acoustic Countermeasures

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 deploy these 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).

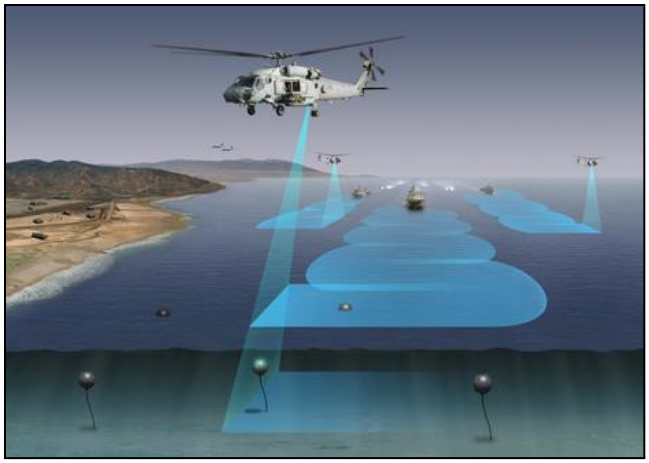


Figure A.1-21: AN/AES-1 Airborne Laser Mine Detection System

- **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 Systems:** 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).

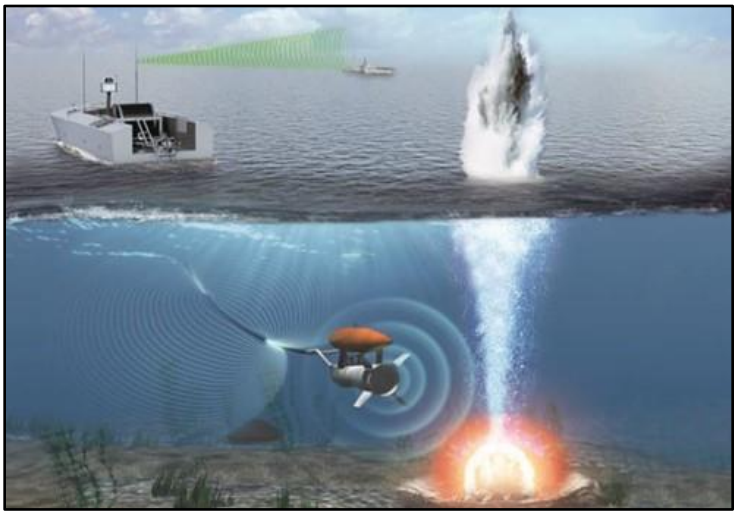


Figure A.1-22: Unmanned Influence Sweep Minehunting System

- **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).

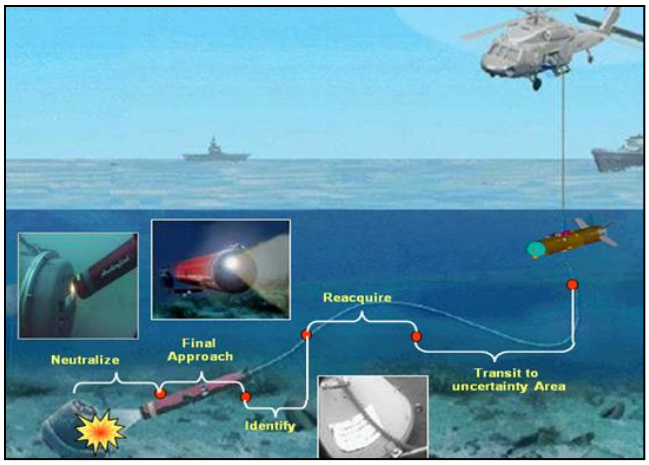


Figure A.1-23: Airborne Mine Neutralization System

- **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

Action Proponents' training and testing activities 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 Supplemental EIS/OEIS. This section includes descriptions of a representative sample of military expended materials. A more comprehensive discussion can be found in Chapter 3.

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 submarine-launched 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 activities. These items

are primarily constructed of lead (most small-caliber projectiles) or steel (medium- and large-caliber projectiles and all bombs). Casings are expended as a result of firing either non-explosive or explosive projectiles. Most casings are recovered.

- **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 activities. 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 activities, 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 reuse. Targets struck with munitions will result in target fragments.

A.1.7 Standard Operating Procedures

For training and testing to be effective, personnel must be able to safely use their sensors, platforms, weapons, and other devices to their optimum capabilities and as intended for use in missions and combat operations. The Action Proponents have developed standard operating procedures through decades of experience to provide for safety and mission success. Because they are essential to safety and mission success, standard operating procedures are part of the Proposed Action and are considered in the Chapter 3 (Affected Environment and Environmental Consequences) environmental analysis for applicable resources. Standard operating procedures recognized as providing a benefit to public safety or environmental resources are described below.

Airspace and sea space deconfliction allow for the necessary separation of multiple Action Proponents' units for safety and to prevent interference with equipment sensors. Deconfliction also allows for safe separation from non-participants within established commercial air traffic routes, commercial shipping lanes, and areas used for recreational activities. The Action Proponents evaluate the need to publish Notices to Airmen or Notices to Mariners to alert the public to stay clear of the area based on event locations and the activities involved. Some locations, such as those where explosive bombing activities routinely occur, have a standing Notice to Mariners. For other locations, such as ship shock trial boxes, the appropriate notices would be issued on an as-needed basis. Notices may also be issued prior to the use of unmanned surface vehicles, unmanned underwater vehicles, or unmanned aerial systems based on the event's scale, location, and timing. Additionally, when manned support vessels are already participating in activities involving unmanned vehicles, they will be responsible for ensuring safe operation of the vehicle, which may include ensuring (or requesting, if needed) clearance of non-participants from the event vicinity.

The Action Proponents do not typically conduct the activities listed in Table A.1-1 and Table A.1-2 in the coastal zone due to specific mission requirements. The coastal zone extends 3 nautical miles (NM) from shore everywhere in the Study Area except off Texas, the Florida Gulf coast, and Puerto Rico, where it extends 9 NM from shore.

Table A.1-1: Training Activities Typically Not Occurring in the Coastal Zone[1]

Air Warfare	*Mine Warfare*
• Air Combat Maneuvers[2] • Air Defense Exercise • Gunnery Exercises o all Air-to-Air o all Surface-to-Air • Missile Exercises o Air-to-Air o Surface-to-Air	• Mine Detection o Mine Countermeasure Exercise – Ship Sonar • Mine Laying o Aircraft o Submarine launched
Amphibious Warfare	*Surface Warfare*
• Naval Surface Fire Support Exercise-At Sea • Naval Surface Fire Support Exercise-Land-Based Target	• Gunnery Exercises o All Air-to-Surface o All Surface-to-Surface • Missile Exercise o Air-to-Surface (Missile and Rocket) o Surface-to-Surface • Laser Targeting o Aircraft o Ship • Integrated Live Fire • Bombing Exercise • Sinking Exercise[3]
Anti-Submarine Warfare	*Major Training Exercise*
• Torpedo Exercise o Helicopter o Maritime Patrol Aircraft o Submarine o Ship • Tracking Exercise o Helicopter o Maritime Patrol Aircraft o Submarine o Ship	• Composite Training Unit Exercise • Fleet Exercise/Sustainment Exercise
Integrated/Coordinated Anti-Submarine Warfare	*Other Training Activities*
• Anti-Submarine Warfare Tactical Development Exercise • Group Sail • Navy Undersea Warfare Training Assessment Course • Surface Warfare Advanced Tactical Training	• Submarine Navigation • Submarine Under Ice Certification
	Electronic Warfare
	• Counter Targeting o Chaff-Aircraft o Chaff-Ship o Flare-Aircraft

[1] The coastal zone extends 3 NM from shore everywhere in the Study Area except off Texas, the Florida Gulf coast, and Puerto Rico, where it extends 9 NM from shore.

[2] Air Combat Maneuver typically occurs outside the coastal zone, with an exception in the Key West Range Complex.

[3] This activity only occurs in a designated area, which is located outside of the coastal zone.

Table A.1-2: Testing Activities Typically Not Occurring in the Coastal Zone[1]

Air Warfare	*Surface Warfare*
• Air Combat Maneuver Test • Air Platform Weapons Integration Test • Air Platform Vehicle Test • Air-to-Air Weapons System Test o Air-to-Air Gunnery Test – Medium-Caliber o Air-to-Air Missile Test • Intelligence, Surveillance, and Reconnaissance Test	• Air-to-Surface Bombing Test • Air-to-Surface Gunnery Test • Air-to-Surface Missile Test • Air-to-Surface High-Energy Laser Test • Laser Targeting Test • Rocket Test • Gun Testing – Large-Caliber • Gun Testing – Medium-Caliber • Gun Testing – Small-Caliber • Missile and Rocket Testing • Maritime Security Operations
Anti-Submarine Warfare	
• Anti-Submarine Warfare Torpedo Test • Anti-Submarine Warfare Tracking Test – Rotary Wing • Kilo Dip • Sonobuoy Lot Acceptance Test	

Table A.1-2: Testing Activities Typically Not Occurring in the Coastal Zone (continued)

- Torpedo (Explosive) Testing[2]
- At-Sea Sonar Testing

Electronic Warfare

- Chaff Test
- Electronic Systems Evaluation
- Flare Test

Mine Warfare

- Mine-Laying Test

Vessel Evaluation

- Air Defense Testing
- Propulsion Testing
- Surface Warfare Testing
- Small Ship Shock Trial[2]
- Submarine Sea Trials – Propulsion Testing
- Submarine Sea Trials – Weapons System Testing
- Signature Analysis Operations

Other Testing Activities

- Air Platform Shipboard Integration Test
- Shipboard Electronic Systems Evaluation
- Acoustic Component Testing
- Simulant Testing
- Non-Acoustic Component Testing

Unmanned Systems

Underwater Search, Deployment, and Recovery

Acoustic and Oceanographic Science and Technology

- Acoustic and Oceanographic Research
- Electronic Systems Test
- Large Displacement Unmanned Underwater Vehicle Testing

[1] The coastal zone extends 3 nautical miles from shore everywhere in the Study Area except off Texas, the Florida Gulf coast, and Puerto Rico, where it extends 9 nautical miles from shore.

[2] This activity only occurs in designated areas, which are located outside of the coastal zone.

Training and testing activities are carefully planned in advance and conducted under strict procedures that place the ultimate responsibility for safety on the officer conducting the exercise or civilian equivalent. If an unauthorized (i.e., non-participating) vessel, aircraft, or person is detected within an applicable safety distance, the activity would be temporarily halted until the area is cleared and secured. The U.S. Navy Dive Manual (U.S. Department of the Navy, 2011) prescribes safe distances for divers from active sonar sources and in-water explosions. Safety distances for weapon firing are based on the farthest firing range capability of the weapon being used. Safety distances for the use of electromagnetic energy are specified in Department of Defense Instruction 6055.11 (U.S. Department of Defense, 2021) and Military Standard 464D (U.S. Department of Defense, 2020) as the standard safety buffers for in-water energy to protect military divers. Laser systems are approved for fielding by the Action Proponents' Laser Safety Review Board or equivalent. Only properly trained and authorized personnel operate high-energy lasers within designated areas. In-water explosive activities are scheduled to occur in areas located away from popular recreational dive sites, primarily for human safety.

Most explosive activities are conducted during daylight hours. Weapon firing activities that involve small boats deploying or retrieving targets are typically conducted in Beaufort Sea state number 4 conditions or better to ensure safe operating conditions for the small boat operators. Aircrew are not authorized to deploy ordnance through extensive cloud cover where visual clearance for non-participants is not possible. The two exceptions to this requirement are (1) when operating in the open ocean, clearance for non-participating aircraft and vessels through radar surveillance is acceptable; and (2) when the officer conducting the exercise or civilian equivalent accepts responsibility for the safeguarding of airborne and surface traffic. During activities that involve recoverable targets, the Action Proponents recover the target and any associated decelerators or parachutes to the maximum extent practical consistent with personnel and equipment safety.

As a general policy for aircraft, aircrew do not intentionally generate sonic booms below 30,000 ft. of altitude unless over water and more than 30 miles from inhabited land areas or islands. The Action Proponents may authorize deviations from this policy for tactical missions, phases of formal training syllabus flights, or research, test, and operational suitability test flights. Aircraft will fly in accordance with Federal Aviation Administration Regulations (Part 91, General Operating and Flight Rules, Annex 2 Rules of the Air to the Convention of International Civil Aviation) or with due regard for the safety of all air traffic, which govern such flight components as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. These rules include the use of tactical training and maintenance test-flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. Aircrew make every attempt to avoid large flocks of birds to reduce the safety risk involved with a potential bird strike. Since 2011, the Navy has required that all Navy flying units report all bird strikes through the Web-Enabled Safety System Aviation Mishap and Hazard Reporting System. Unmanned aerial systems are operated in accordance with Federal Aviation Administration air traffic organization policy.

Vessels are required to operate in accordance with applicable navigation rules, including Inland Waters Navigation Rules (33 Code of Federal Regulations [CFR] section 83.01 et seq.) and International Regulations for Preventing Collisions at Sea (72 COLREGS). These rules and regulations were formalized in the Convention on the International Regulations for Preventing Collisions at Sea (1972) and implemented through the International Navigational Rules Act of 1977 (33 U.S.C. sections 1601–1608). Applicable navigation requirements specified in the Inland Navigation Rules include, but are not limited to, Rule 5 (Lookouts) and Rule 6 (Safe Speed). These rules require that vessels, at all times, proceed at a safe speed so proper and effective action can be taken to avoid collision and so vessels can be stopped within a distance appropriate to the prevailing circumstances and conditions. Surface ships transit at speeds that are optimal for fuel conservation, to maintain ship schedules, and to meet mission requirements. Vessel captains use the totality of the circumstances to ensure the vessel is traveling at appropriate speeds in accordance with navigation rules. Depending on the circumstances, this may involve adjusting speeds during periods of reduced visibility or in certain locations.

Underway surface ships operated by or for the Action Proponents have personnel assigned to stand watch at all times (day and night) for safety of navigation, collision avoidance, range clearance, and man-overboard precautions. Personnel on underway small boats (e.g., crewmembers responsible for navigation) fulfill similar watch standing responsibilities to those positioned on surface ships. Standard watch personnel, also referred to as "Lookouts," include officers, enlisted personnel, and civilians operating in similar capacities. Following two ship collisions in 2017 that killed 17 Sailors, the Navy undertook a review of surface ship staffing, training, and personnel effectiveness. As a result, the Navy added additional Lookouts to watch teams for certain surface ship classes, increased the amount of time that Lookouts spend in bridge simulators, and developed watch rotations that align with the body's natural circadian rhythms. Personnel are trained in accordance with the U.S. Navy Lookout Training Handbook or equivalent to use correct scanning procedures while monitoring assigned sectors, to estimate the relative bearing, range, position angle, and target angle of sighted objects, and to rapidly communicate accurate sightings reports. The handbook was updated in 2022 to include a more robust chapter on environmental compliance, mitigation, and marine species observation tools and techniques (NAVEDTRA 12968-E). Watch teams may use radios to communicate with other ships operating in the vicinity to coordinate safe maneuvering. After sunset and prior to sunrise, Lookouts employ night visual search techniques, which could include the use of night vision devices. Addressed in Chief of Naval Operations Instruction 3120.32D, the "Darken Ship Bill" requires darkened ships to ensure that white lights are not visible from outside surface ships. Lookouts monitor their assigned sectors for any indication of danger to the ship and the personnel on board, such as a floating or partially submerged object or piece of debris, periscope, surfaced submarine, wisp of smoke, flash of light, or surface disturbance. As a standard collision avoidance procedure for surface vessels, Lookouts also monitor for marine mammals that have the potential to be in the direct path of the vessel.

The Action Proponents also avoid known navigation hazards that appear on nautical charts, such as submerged wrecks and obstructions. With limited exceptions (e.g., amphibious vessels operating in designated locations, bottom-crawling vehicles), manned vessels and unmanned vehicles avoid contact with the seafloor as a standard collision avoidance procedure to prevent damage to the platforms.

Unmanned surface vehicles or unmanned underwater vehicles that operate autonomously may have embedded sensors designed for avoidance of large objects. For example, select unmanned vehicles have sensors, such as a forward-looking sonar, to perform obstacle avoidance. The forward-looking sonar makes detections at a sufficient range for the onboard processor to determine if there is a need for an avoidance maneuver. If there is a need for an avoidance maneuver, the onboard vehicle control system would insert a new maneuver (in place of the currently executing activity) and continue to introduce new maneuvers if detections continue to be made. There are a number of possible maneuvers that could be implemented, from adjusting heading to stopping or hovering the vehicle.

As an additional standard collision avoidance procedure during specific stages of training or testing (e.g., during an initial training and testing phases), manned support vessels may escort unmanned surface vehicles and unmanned underwater vehicles. Lookouts on the support vessels may use radios to communicate with other vessels operating in the vicinity to coordinate safe maneuvering (e.g., communicating the positioning and safety distances for avoiding collisions with unmanned vehicles).

As a standard collision avoidance procedure for in-water devices towed by surface vessels (or by unmanned surface vehicles or unmanned underwater vehicles under positive control by manned support vessels), the Action Proponents search the intended path of the towed in-water device for floating debris, concentrations of floating vegetation, floating objects, or animals with potential to obstruct, tangle, or damage the device.

A.2 Training Activities

The Action Proponents' 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 Action Proponent training. The locations listed are the areas where the training typically takes place, but they can occur throughout the Study Area shown in 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 in this Section A.2.1 (Major Training Exercises).

A.2.1.1 Composite Training Unit Exercise

Major Training Exercise - Large Integrated Anti-Submarine Warfare		
Composite Training Unit Exercise		
Short Description	Aircraft carrier and carrier air wing integrate with surface and submarine units in a challenging multi-threat operational environment that certifies them ready to deploy.	
Long Description	The Composite Training Unit Exercise is an integration phase, at-sea, major training exercise, designed to forge the aircraft carrier strike group into a cohesive fighting team before deployment. Composite Training Unit Exercise normally consists of four-week, schedule of event-driven scenarios. An exercise typically consists of seven surface ships, multiple fixed-wing and rotary-wing aircraft, up to two submarines, and various unmanned vehicles. The exercise integrates the aircraft carrier and carrier air wing with surface and submarine units to achieve certification prior to deployment. 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 (e.g., gunnery exercise, missile exercise, etc.). Coast Guard cutters and aircraft may participate in this activity.	
Typical Components	**Platforms:** Aircraft Carrier, Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed **Munitions:** Sonobuoys	
Active Sonar	LFH, MFM, MFH, MF1, MF1C, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles	
Parameters for Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Navy Cherry Point Range Complex
	-	Jacksonville Range Complex
	Gulf of Mexico Range Complex	

A.2.1.2 Sustainment/Task Force 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 Exercise - Medium Integrated Anti-Submarine Warfare		
Sustainment/Task Force Exercise		
Short Description	Aircraft carrier and carrier air wing integrates with surface and submarine units in a challenging multi-threat operational environment to maintain ability to deploy.	
Long Description	Sustainment Exercises are similar in scope to Composite Training Unit Exercises but shorter in duration and therefore fewer active sonar hours. Sustainment Exercises are conducted to ensure that a carrier strike group maintains an acceptable level of readiness after returning from deployment in order to maintain a surge capability. Marine mammal systems may be used during the exercise. Only the anti-submarine warfare activities were analyzed as a Sustainment Exercise. All other warfare area training conducted during a Sustainment Exercise was analyzed as unit-level training (e.g., bombing exercises, gunnery exercises, missile exercises, etc.).	
Typical Components	**Platforms:** Aircraft Carrier, Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed **Munitions:** Sonobuoys	
Active Sonar	LFH, MFM, MFH, MF1, MF1C, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles	
Parameters for Analysis	Only the anti-submarine warfare activities were analyzed as a Sustainment Exercise. Other warfare area training conducted during the 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	-	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.2 Anti-Submarine Warfare 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 Integrated Anti-Submarine Warfare Training		
Navy Undersea Warfare Training and Assessment Course		
Short Description	Multiple ships, aircraft, and submarines integrate the use of their sensors, including sonobuoys, to search for, detect, classify, localize, and track a threat submarine.	
Long Description	The Navy Undersea Warfare Training and Assessment Course is a tailored course of instruction designed to improve Sea Combat Commander and strike group integrated anti-submarine warfare warfighting skill sets. The Navy Undersea Warfare Training and Assessment Course is a coordinated training scenario that typically involves five surface ships, two to three embarked helicopters, a submarine, and one maritime patrol aircraft searching for, locating, and attacking one submarine. The scenario consists of two 12-hour exercises that occur five times per year. The submarine may practice simulated attacks against the ships while being tracked. Hull-mounted, towed array, and dipping sonar is employed by ships and helicopters. The submarine also periodically operates its sonar.	
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed **Munitions:** Sonobuoys	
Active Sonar	LFH, MFM, MFH, MF1, MF1C, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	Two MK-39 Expendable Mobile Anti-Submarine Warfare Training Targets may be used in place of an actual submarine target. 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.2.2 Surface Warfare Advanced Tactical Training

Small Integrated Anti-Submarine Warfare Training		
Surface Warfare Advanced Tactical Training		
Short Description	Multiple ships and aircraft coordinate the use of sensors, including sonobuoys, to search, detect, and track a threat submarine. Surface Warfare Advanced Tactical Training (SWATT) exercises are not dedicated anti-submarine warfare exercises and involve multiple warfare areas.	
Long Description	SWATT is an intermediate training exercise designed primarily to increase operator proficiency and exercise combined force responses to surface warfare, anti-submarine warfare, air warfare and electromagnetic spectrum operations. SWATT is conducted after a carrier strike group's first Group Sail, and before Composite Training Unit Exercise, and consists of multiple surface warfare, anti-submarine and air warfare live-fire activities. Multiple ships and aircraft search for, locate, and track one submarine. Occurs once per carrier strike group training cycle. Use of other munitions and explosives in SWATT are included in unit-level events.	
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed **Munitions:** Sonobuoys	
Active Sonar	LFH, MFM, MFH, MF1, MF1C, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	Only the anti-submarine warfare activities were analyzed as a SWATT. Other warfare area training conducted during SWATT was analyzed as unit-level training (gunnery exercises, missile exercises, etc.). Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.2.3 Anti-Submarine Warfare Tactical Development Exercise

Medium Coordinated Anti-Submarine Warfare Training		
Anti-Submarine Warfare Tactical Development Exercise		
Short Description	Multiple ships, aircraft, and submarines coordinate their efforts to search for, detect, and track submarines with the use of all sensors. Anti-Submarine Warfare Tactical Development Exercise is a dedicated anti-submarine warfare exercise.	
Long Description	Multiple ships, aircraft, and submarines coordinate their efforts to search for, detect, and track submarines with the use of all sensors. Anti-Submarine Warfare Tactical Development Exercise is a fleet training exercise involving surface ships, submarines, and aircraft. Active and passive sonar and sonobuoys are used to conduct anti-submarine warfare training exercises. The purpose of the exercise is to assess fleet anti-submarine warfare performance and capability among various units operating together in a specific threat environment.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Submarine, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed **Munitions:** Sonobuoys	
Active Sonar	MFM, MFH, MF1, MF1C, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	Only the anti-submarine warfare activities were analyzed as an Anti-Submarine Warfare Tactical Development Exercise. Other warfare area training conducted during the exercise was analyzed as unit-level training. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.2.4 Amphibious Ready Group Marine Expeditionary Unit Composite Training Unit Exercise

Small Coordinated Anti-Submarine Warfare Training		
Amphibious Ready Group Marine Expeditionary Unit Composite Training Unit Exercise		
Short Description	Navy and Marine Corps forces conduct advanced training at sea in preparation for deployment.	
Long Description	Amphibious ships and embarked Marine Expeditionary Units train to a multitude of scenarios to 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. Surface combatants conduct anti-submarine warfare training to protect amphibious ships from underwater threats. All military expended materials, explosives, and use of other munitions in Amphibious Ready Group Marine Expeditionary Unit Exercise are included in unit-level events.	
Typical Components	**Platforms:** Amphibious Vehicles, Amphibious Warfare Ship, Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Surface Combatant, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Only the anti-submarine warfare activities were analyzed as Amphibious Ready Group Marine Expeditionary Unit training. Other warfare area training conducted during the exercise was analyzed as unit-level training. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex

A.2.2.5 Group Sail

Small Coordinated Anti-Submarine Warfare Training		
Group Sail		
Short Description	Surface ships and helicopters integrate to search for, detect, and track threat submarines. Group Sails are not dedicated anti-submarine warfare exercises and involve multiple warfare areas.	
Long Description	Multiple ships and helicopters integrate the use of their sensors, including sonobuoys, to search for, detect, classify, localize, and track threat submarines. While Group Sail is not a dedicated anti-submarine warfare exercise and involves multiple warfare areas, only the anti-submarine warfare activities were analyzed as a Group Sail. Other warfare area training conducted during a Group Sail is analyzed elsewhere as unit-level training. Group Sail is an intermediate training exercise primarily intended to introduce coordinated operations after unit-level training and prior to integrated training. This exercise stresses planning, coordination, and communications during multiple warfare training scenarios. Two or more ships and up to two helicopters search for, locate, and attack one submarine. Typically, one ship and helicopter are actively prosecuting while the other ship and helicopter are repositioning. Simultaneously, the submarine may practice simulated attacks against the ships. Multiple acoustic sources may be active at one time.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Submarine, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed **Munitions:** Sonobuoys	
Active Sonar	MFM, MFH, MF1, MF1C, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	While the preference will be to train against an actual submarine or MK 30 recoverable target, assume only MK 39 expendable targets will be used. 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 small coordinated Anti-Submarine Warfare training. Other warfare area training conducted during the exercise was analyzed as unit-level training.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

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 activities 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 Maneuvers

Air Warfare		
Air Combat Maneuvers		
Short Description	Fixed-wing aircrews aggressively maneuver against threat aircraft to gain tactical advantage.	
Long Description	Basic flight maneuvers in which fixed-wing aircrew engage in offensive and defensive maneuvering against each other. No ordnance is expended during this training, however countermeasures such as chaff and flares may be used. These maneuvers typically involve two aircraft; however, based upon the training requirement, air combat maneuvers may involve over a dozen aircraft.	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft **Targets:** None **Systems being Trained/Tested:** Captive Air Training Missile **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	No munitions are fired. Flares and chaff may be used. All flares and chaff are accounted for in flare exercise and chaff exercise.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Key West Range Complex	Key West Range Complex

A.2.3.2 Air Defense Exercise

Air Warfare		
Air Defense Exercise		
Short Description	Aircrew and ship crews conduct defensive measures against threat aircraft or simulated missiles.	
Long Description	Fixed-wing aircrew and ship personnel perform measures designed to defend against attacking threat aircraft or missiles or reduce the effectiveness of such attack. This exercise involves full detection through engagement sequence. Aircraft operate at varying altitudes and speeds. This exercise includes air intercept control exercises where aircraft controllers on ships, in fixed-wing aircraft, or at land-based locations, use search radars to track and direct friendly aircraft to intercept the threat aircraft. This exercise also includes detect-to-engage exercises, where personnel on ships use search radars to detect, classify, and track enemy aircraft or missiles up to the point of engagement. No ordnance is fired during this exercise, however countermeasures, such as chaff and flares, may be used. Coast Guard aircraft may participate in this activity.	
Typical Components	**Platforms:** Fixed Wing – Adversary Aircraft, Fixed Wing - Command and Control Aircraft, Fixed Wing – Strike Aircraft, Surface Combatant **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	No munitions are fired.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

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

Air Warfare		
Gunnery Exercise Air-to-Air		
Short Description	Fixed-wing aircrews fire medium-caliber guns at air targets.	
Long Description	Fixed-wing aircrews maneuver aircraft in a gunnery pattern to achieve a firing solution with integrated medium-caliber guns. Typically involves two or more fixed-wing aircraft and a target banner towed by a contract aircraft (e.g., Lear jet). The target banner is recovered after the exercise.	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft **Targets:** Air Targets - Other **Systems being Trained/Tested:** Medium-Caliber Gun Systems **Munitions:** Projectile - Medium-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	This activity is conducted at an altitude of 15,000 ft. and above, during the daytime, and approximately 40 NM from shore. A towed air target is a banner target and will be recovered. Only non-explosive munitions used.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Key West Range Complex	Key West Range Complex

A.2.3.4 Gunnery Exercise Air to Air - Small-Caliber

Air Warfare		
Gunnery Exercise Air-to-Air - Small-Caliber		
Short Description	Helicopter aircrews fire small-caliber guns at threat air targets.	
Long Description	Helicopter aircrews maneuver aircraft to engage a small airborne threat with crew-served weapons. Typically involves one helicopter and an airborne UAS or drone target.	
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Air Targets - Drone **Systems being Trained/Tested:** None **Munitions:** Projectile - Small-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Virginia Capes Range Complex
	-	Jacksonville Range Complex

A.2.3.5 Gunnery Exercise Surface-to-Air Large-Caliber

Air Warfare		
Gunnery Exercise Surface-to-Air Large-Caliber		
Short Description	Surface ship crews fire large-caliber guns at air targets.	
Long Description	Surface ship and Coast Guard cutter crews defend against threat aircraft or missiles with large-caliber guns to disable or destroy the threat. An exercise involves one ship and a simulated threat aircraft or missile that is detected by the ship's radar. Large-caliber guns fire non-explosive projectiles at the threat before it reaches the ship. The target is towed by a contract air services jet.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Other **Systems being Trained/Tested:** Large-Caliber Gun Systems **Munitions:** Projectile - Large-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Weapon firing noise	
Parameters for Analysis	The target is a fiberglass finned target that is towed approximately 3 NM behind the towing aircraft. For Navy exercises all projectiles are assumed to be non-explosive. USCG exercises may use explosive projectiles at medium altitudes. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore. This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.3.6 Gunnery Exercise Surface-to-Air Medium-Caliber

Air Warfare		
Gunnery Exercise Surface-to-Air Medium-Caliber		
Short Description	Surface ship crews fire medium-caliber guns at air targets.	
Long Description	Surface ship crews defend against threat aircraft or missiles with medium-caliber guns to disable or destroy the threat. An exercise involves one ship and a simulated threat aircraft or anti-ship missile that is detected by the ship's radar. Medium-caliber guns fire non-explosive projectiles to disable or destroy the threat before it reaches the ship. The target can be an unmanned aerial vehicle or be towed by a contract air services jet. This activity may include transportable Anti-Air weapon systems such as USMC Marine Air Defense Integrated System (MADIS) firing from ship or shore.	
Typical Components	**Platforms:** Aircraft Carrier, Surface Combatant **Targets:** Air Targets - Other **Systems being Trained/Tested:** Medium-Caliber Gun Systems **Munitions:** Projectile - Medium-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Weapon firing noise	
Parameters for Analysis	The target is a fiberglass finned target that is towed approximately 3 NM behind the towing aircraft. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

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

Air Warfare		
Missile Exercise - Man-Portable Air Defense System		
Short Description	Personnel employ a shoulder fired surface-to-air missile at air targets.	
Long Description	Personnel employ the Man-Portable Air Defense Systems, a shoulder fired surface-to-air missile, against threat missiles or aircraft. An exercise involves personnel firing the Man-Portable Air Defense System at remote piloted or ballistic aerial targets. Activity is typically conducted by combat forces firing from shore locations at targets over the water. Small boats are used to ensure range safety.	
Typical Components	**Platforms:** Fixed Range, Small Boat **Targets:** Air Targets - Drone **Systems being Trained/Tested:** None **Munitions:** Surface-to-Air Missiles	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	For analysis, all missiles are assumed to be explosive, although non-explosive practice munitions may be used. All missiles explode in-air at low altitude. All propellant and explosives are consumed.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex

A.2.3.8 Missile Exercise Air-to-Air

Air Warfare		
Missile Exercise Air-to-Air		
Short Description	Fixed-wing aircrews fire air-to-air missiles at air targets.	
Long Description	An exercise involves two or more fixed-wing aircraft and a target. Missiles are either explosive warheads or non-explosive practice munitions. The target is an unmanned aerial target drone or a parachute suspended illumination flare. Target drones deploy parachutes and are recovered by small boat or rotary-wing aircraft; tactical air-launched decoys and illumination flares are expended and not recovered. These exercises typically occur at high altitudes.	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft **Targets:** Air Targets - Drone, Air Targets - Flare **Systems being Trained/Tested:** Missile Firing/Launching Systems **Munitions:** Air-to-Air Missiles	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	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 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex

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.2.3.9 Missile Exercise Surface-to-Air

Air Warfare		
Missile Exercise Surface-to-Air		
Short Description	Surface ship crews defend against threat missiles and aircraft with missiles.	
Long Description	Surface ship crews defend against threat missiles and aircraft with ship-launched surface-to-air missiles. The exercise involves an aerial target that simulates a threat aircraft, anti-ship missile, or land attack missile, which is detected by the ship's radar. Ship-launched surface-to-air missiles are fired to disable or destroy the threat. The target typically is either a sub-sonic remote-controlled drone or a supersonic target. Target drones deploy parachutes and are recovered by small boat or rotary-wing aircraft. Supersonic targets are not recovered.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Drone **Systems being Trained/Tested:** Missile Firing/Launching Systems **Munitions:** Surface-to-Air Missiles	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Assumes that all surface-to-air missiles are high-explosive. Missile explodes well above the water's surface at medium altitudes. All explosive and propellant are consumed. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

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 Warfare		
Amphibious Assault		
Short Description	Large unit forces move ashore from amphibious ships at sea for the immediate execution of inland objectives.	
Long Description	Large unit forces move ashore from amphibious ships at sea for the immediate execution of inland objectives. Amphibious assault is conducted for the purposes of prosecuting further combat operations, obtaining a site for an advanced naval or airbase, or denying the enemy use of an area. Unit-level training exercises involve one or more amphibious ships, and their associated watercraft and aircraft, to move personnel and equipment from ship to shore without the command and control and supporting elements involved in a full-scale exercise. The goal is to practice loading, unloading, and movement and to develop the timing required for a full-scale exercise.	
Typical Components	**Platforms:** Amphibious Vehicles, Amphibious Warfare Vessel, Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Typical exercise: 1-3 amphibious ships (e.g., LHA or LHD, LPD, LSD); 2-8 landing craft (landing craft, air cushion; landing craft, utility); 4-14 amphibious assault vehicles; up to 22 aircraft (e.g., MH-53, H-46/MV-22, AH-1, UH-1, AV-8); a Marine Expeditionary Unit (2,200 Marines).	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex

A.2.4.2 Amphibious Operations in a Contested Environment

Amphibious Warfare		
Amphibious Operations in a Contested Environment		
Short Description	Navy and Marine Corps forces conduct operations in coastal and offshore waterways against air, surface, and sub-surface threats.	
Long Description	USMC forces establish Expeditionary Advanced Bases on land and protect against air, surface, and sub-surface attacks. Systems employed, but not limited to, include Marine Air Defense Integrated System (MADIS), Navy Marine Expeditionary Ship Interdiction System (NMESIS), Long-Range Unmanned Surface Vehicle (LRUSV) employing unmanned aerial systems, high-energy laser systems, 155 mm Howitzer artillery, and High Mobility Artillery Rocket Systems.	
Typical Components	**Platforms:** Amphibious Warfare Vessel, Marine Corps Asset, Fixed Range, Small Boat, Small unit support vehicles, Unmanned Surface Vehicle **Targets:** Air Targets - Drone, Surface Targets - Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** High-Energy Laser Systems, Unmanned Vehicle Systems **Munitions:** Grenades, Projectile - Large-Caliber, Projectile - Medium-Caliber, Rockets, Surface-to-Surface Missiles	
Active Sonar	No	
In-Water Explosives	E1, E2, E3, E6, E9, E10	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive gunnery Explosive missiles and rockets Towed in-water devices Unmanned vehicles Weapon firing noise	
Parameters for Analysis	This exercise includes in-air explosives at low altitudes. High-energy laser systems used in military readiness activities automatically shut down when target-lock is lost; meaning that if a high-energy laser beam aimed at a target on the surface, either from an aircraft or surface vessel, moves off the target, the system ceases projecting laser light, preventing any energy from striking the water or a nearby marine species.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Virginia Capes Range Complex
	-	Navy Cherry Point Range Complex

A.2.4.3 Amphibious Raid

Amphibious Warfare		
Amphibious Raid		
Short Description	Small unit forces move from amphibious ships at sea for a specific short-term mission. These are quick operations with as few personnel as possible.	
Long Description	Small unit forces swiftly move from amphibious vessels at sea into hostile territory for a specific mission, including a planned withdrawal. Raids are conducted to inflict loss or damage, secure information, create a diversion, confuse the enemy, or capture or evacuate individuals or material. Amphibious raid forces are kept as small as possible to maximize stealth and speed of the operation. An event may employ assault amphibian vehicle units, small boats, small unit live-fire and non-live-fire operations. Surveillance or reconnaissance unmanned surface and aerial vehicles may be used during this exercise.	
Typical Components	**Platforms:** Amphibious Vehicles, Amphibious Warfare Vessel, Rotary-Wing Aircraft, Unmanned Aerial Vehicle - Rotary Wing **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Unmanned vehicles	
Parameters for Analysis	Weapons firing during this exercise is discussed in appropriate unit-level training descriptions (e.g., surface-to-surface and air-to-surface small-caliber gunnery exercises).	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.4.4 Amphibious Ready Group Marine Expeditionary Unit Exercise

Amphibious Warfare		
Amphibious Ready Group Marine Expeditionary Unit Exercise		
Short Description	Amphibious Ready Group exercises are conducted to validate the Marine Expeditionary Unit's readiness for deployment and include small boat raids; visit, board, search, and seizure training; helicopter and mechanized amphibious raids; and non-combatant evacuation operations.	
Long Description	Marine Corps amphibious forces move from amphibious ships at sea, by watercraft or aircraft, and introduce a landing force, establish a beachhead, and occupy the area or move further inland for an extended period. The amphibious assault conducted by a Marine Expeditionary Unit involves employment of the advance force, combat, combat support, and combat service support units in close coordination with the expeditionary strike group and carrier strike group. The landing is conducted in waves and is focused on concentrating forces quickly in order to establish the beachhead. A typical exercise involves two reinforced companies from the battalion landing team coming ashore via landing crafts and amphibious assault vehicles. Follow-on waves include fire support assets, armored units, and service support elements.	
Typical Components	**Platforms:** Amphibious Warfare Vessel, Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed **Munitions:** None	
Active Sonar	LFH, MFM, MFH, MF1, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	Weapons firing during this exercise is discussed in appropriate unit-level exercise descriptions (e.g., surface-to-surface and air-to-surface small-caliber gunnery exercises).	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex

A.2.4.5 Amphibious Squadron Marine Expeditionary Unit Integration Training

Amphibious Warfare		
Amphibious Squadron Marine Expeditionary Unit Integration Training		
Short Description	Navy and Marine Corps forces conduct integration training at sea in preparation for deployment.	
Long Description	Amphibious ships and Marine Expeditionary Unit integrate for the first time at sea to practice amphibious tactics, techniques, and procedures. Navy and Marine Corps forces conduct basic amphibious operations to include small boat raids; visit, board, search, and seizure training; helicopter and mechanized amphibious raids.	
Typical Components	**Platforms:** Amphibious Warfare Vessel, Rotary-Wing Aircraft, Small Boat, Surface Combatant, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Weapons firing during this exercise is discussed under descriptions of appropriate unit-level exercises (e.g., surface-to-surface and air-to-surface small-caliber gunnery exercises).	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex

A.2.4.6 Amphibious Vehicle Maneuvers

Amphibious Warfare		
Amphibious Vehicle Maneuvers		
Short Description	Small boat crews practice the employment of amphibious vehicles.	
Long Description	Navy personnel train to learn handling characteristics of a variety of amphibious craft, to include air-cushioned, wheeled, and tracked vehicles. Training includes the driving of vehicles into the water, basic in-water vehicle maneuvers, and the driving of vehicles back to shore.	
Typical Components	**Platforms:** Amphibious Vehicles, Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	-	Jacksonville Range Complex Inshore
	-	JEB Little Creek Fort Story

A.2.4.7 Naval Surface Fire Support Exercise – At Sea

Amphibious Warfare		
Naval Surface Fire Support Exercise - At Sea		
Short Description	Surface ship crews fire large-caliber guns at a passive acoustic hydrophone scoring system.	
Long Description	Surface ship crews use large-caliber guns to support forces ashore; however, the land target is simulated at sea. Rounds are scored by passive acoustic buoys or fixed hydrophones located at or near the target area. 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 munitions into the target area and the acoustic noise resulting from the impact of the round landing in the water is detected by the hydrophones. The scoring system triangulates the exact point of impact of the round, allowing the exercise to be conducted as if the vessel were firing at an actual land target. Surface ship crews use large-caliber (main battery) guns to support forces ashore.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** Large-Caliber Gun Systems **Munitions:** Projectile - Large-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Non-explosive gunnery Weapon firing noise	
Parameters for Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

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

Amphibious Warfare		
Naval Surface Fire Support Exercise - Land-Based Target		
Short Description	Surface ship crews fire large-caliber guns at land-based targets in support of forces ashore.	
Long Description	Surface ship crews use large-caliber guns to support forces ashore. 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 relays any adjustments needed to reach the target. Once the rounds are on target, the spotter requests a sufficient number to effectively destroy the target. This exercise occurs on land ranges where explosive and non-explosive practice munitions are authorized and is often supported by target shapes such as tanks, trucks, trains, or aircraft on the ground.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Land Targets **Systems being Trained/Tested:** Large-Caliber Gun Systems **Munitions:** Projectile - Large-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations)** Manned surface vessels Weapon firing noise**:**	
Parameters for Analysis	Projectile impact is on land and is not further analyzed. No land-based impacts are included in this document. Firing point from sea is Area 15B. Impact occurs at G-10 Impact Area, Camp Lejeune.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex

A.2.4.9 Non-Combat Evacuation Operation

Amphibious Warfare		
Non-Combat Evacuation Operation		
Short Description	Military units evacuate non-combatants from hostile or unsafe areas or provide humanitarian assistance in times of disaster.	
Long Description	Military units evacuate non-combatants from hostile or unsafe areas to safe havens or to provide humanitarian assistance in times of disaster. Non-Combatant Evacuation Operation is conducted by military units (generally Marine Corps) usually operating in conjunction with Navy ships and aircraft. Non-combatants are evacuated when their lives are endangered by war, civil unrest, or natural disaster. Military units train for evacuations in hostile environments that require the use of force, though usually there is no opposition to evacuation from the host country. Helicopters and landing crafts could be expected to participate in this operation during day or night.	
Typical Components	**Platforms:** Amphibious Vehicles, Amphibious Warfare Vessel, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Previously called Humanitarian Assistance Operations. USCG may participate in this training.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex

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 activities 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 Anti-Submarine Warfare Torpedo Exercise – Helicopter

Anti-Submarine Warfare		
Anti-Submarine Warfare Torpedo Exercise - Helicopter		
Short Description	Helicopter crews search for, track, and detect submarines. Recoverable air-launched torpedoes are employed against submarine targets.	
Long Description	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 launch a torpedo and destroy the submarine. Sonobuoys (both passive and active) are typically employed 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 based on the sonobuoy search. The anti-submarine warfare target used for this exercise may be a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, a MK-30 target, or a live submarine. This exercise may involve a single aircraft, or occur during a coordinated larger exercise involving multiple aircraft and ships, including a major range event. Unmanned aerial systems, such as the MQ-8 Fire Scout, may also be used. The exercise torpedo is recovered by a special recovery helicopter or small craft. The preferred range for this exercise is an instrumented underwater range, but it may be conducted in other range complexes depending on training requirements and available assets.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Submarine, Unmanned Aerial Vehicle – Rotary Wing **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems – Dipping, Torpedo Launching Systems **Munitions:** Countermeasures, Sonobuoys Torpedoes – Exercise	
Active Sonar	MFM, MFH, HFH, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.5.2 Anti-Submarine Warfare Torpedo Exercise – Maritime Patrol Aircraft

Anti-Submarine Warfare		
Anti-Submarine Warfare Torpedo Exercise - Maritime Patrol Aircraft		
Short Description	Maritime patrol aircraft crews search for, track, and detect submarines. Recoverable air-launched torpedoes are employed against submarine targets.	
Long Description	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 used to launch a torpedo and destroy the submarine. Sonobuoys (both passive and active) are typically employed by a maritime patrol aircraft operating at altitudes below 3,000 ft. 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. Sonobuoys are deployed in specific patterns based on the expected threat submarine and specific water conditions. Depending on these two factors, these patterns will cover many different size areas. For certain sonobuoys, tactical parameters of use may be classified. The anti-submarine warfare target used for this exercise may be a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, a MK-30 target, or a live submarine. This exercise may involve a single aircraft, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft and vessels, including a major range event. The exercise torpedo is recovered by helicopter or small boat. The preferred range for this exercise is an instrumented underwater range, but it may be conducted in other OPAREAs depending on training requirements and available assets.	
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Submarine **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Torpedo Launching Systems **Munitions:** Countermeasures, Sonobuoys, Torpedoes – Exercise	
Active Sonar	MFM, HFH, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	Submarine may provide service as the target. If target is air-dropped, one parachute per target. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.5.3 Anti-Submarine Warfare Torpedo Exercise – Ship

Anti-Submarine Warfare		
Anti-Submarine Warfare Torpedo Exercise - Ship		
Short Description	Surface ship crews search for, track, and detect submarines. Exercise torpedoes are used during this exercise.	
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 anti-submarine 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 is an instrumented underwater range, but it may be conducted in other range complexes depending on training requirements and available assets.	
Typical Components	**Platforms:** Submarine, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Hull Mounted, Torpedo Launching Systems **Munitions:** Countermeasures, Torpedoes - Exercise	
Active Sonar	MF1, HFH, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	Submarines may provide service as the target. Torpedoes are recovered. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.5.4 Anti-Submarine Warfare Torpedo Exercise – Submarine

Anti-Submarine Warfare		
Anti-Submarine Warfare Torpedo Exercise - Submarine		
Short Description	Submarine crews search for, track, and detect submarines. Exercise torpedoes are used during this exercise.	
Long Description	Submarine crews search for, detect and track a threat submarine to develop firing position to launch a torpedo. A single submerged submarine operates at slow speeds and various depths while using its hull mounted or towed array sonar to track a threat submarine. Passive sonar is used almost exclusively. Non-explosive exercise torpedoes can be fired and active sonar can be used during this training exercise. This exercise may involve a single submarine, 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 is an instrumented underwater range, but it may be conducted in other range complexes depending on training requirements and available assets.	
Typical Components	**Platforms:** Submarine **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Torpedo Launching Systems **Munitions:** Countermeasures, Torpedoes - Exercise	
Active Sonar	HFH, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	Torpedoes are recovered. Guidance wire has a low tensile strength and breaks easily. Weights and flex tubing sink rapidly. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.5.5 Anti-Submarine Warfare Tracking Exercise – Helicopter

Anti-Submarine Warfare		
Anti-Submarine Warfare Tracking Exercise - Helicopter		
Short Description	Helicopter crews search for, track, and detect submarines.	
Long Description	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 launch a torpedo and destroy the submarine. Sonobuoys (both passive and active) are typically employed 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 based on the sonobuoy search. The anti-submarine warfare target used for this exercise may be a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, a MK-30 target, or a live submarine. This exercise may involve a single aircraft, or occur during a coordinated larger exercise involving multiple aircraft and ships, including a major range event. Unmanned aerial systems, such as the MQ-8 Fire Scout, may also be used. The preferred range for this exercise is an instrumented range, but it may be conducted in other range complexes depending on training requirements and available assets.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Unmanned Aerial Vehicle – Rotary Wing **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Dipping **Munitions:** Sonobuoys	
Active Sonar	MFM, MFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	Tracking exercise can occur in all locations. Submarines may provide service as the target. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex
	-	Other AFTT Areas

A.2.5.6 Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft

Anti-Submarine Warfare		
Anti-Submarine Warfare Tracking Exercise - Maritime Patrol Aircraft		
Short Description	Maritime patrol aircraft crews search for, track, and detect submarines.	
Long Description	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 used to launch a torpedo and destroy the submarine. Sonobuoys (both passive and active) are typically employed by a maritime patrol aircraft operating at altitudes below 3,000 ft. However, sonobuoys may be released at higher altitudes. Sonobuoys are deployed in specific patterns based on the expected threat submarine and specific water conditions. Depending on these two factors, these patterns will cover many different size areas. For certain sonobuoys, tactical parameters of use may be classified. The anti-submarine warfare target used for this exercise may be a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, a MK-30 target, or a live submarine. This exercise may involve a single aircraft, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft and vessels, including a major range event.	
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Sonobuoys	
Active Sonar	LFM, LFH, MFM	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	Tracking exercise can occur in all locations. Submarine may provide service as the target. If target is air-dropped, one parachute per target. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.5.7 Anti-Submarine Warfare Tracking Exercise – Ship

Anti-Submarine Warfare		
Anti-Submarine Warfare Tracking Exercise - Ship		
Short Description	Surface ship crews search for, track, and detect submarines.	
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 sonobuoys, hull-mounted sonars, or towed array sonar. Passive or active sonar is employed depending on the type of threat submarine, the tactical situation, and environmental conditions. The target for this exercise is either a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, MK-30 Recoverable Training 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.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Hull Mounted, Sonar Systems - Other, Sonar Systems - Towed **Munitions:** Countermeasures	
Active Sonar	LFH, MFH, MF1, MF1C, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	A submarine may provide service as the target. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Key West Range Complex
	-	Other AFTT Areas

A.2.5.8 Anti-Submarine Warfare Tracking Exercise – Submarine

Anti-Submarine Warfare		
Anti-Submarine Warfare Tracking Exercise - Submarine		
Short Description	Submarine crews search for, track, and detect submarines.	
Long Description	Submarine crews search for, detect, and track a threat submarine to develop firing position to launch a torpedo. A single submerged submarine operates at slow speeds and various depths while using its hull mounted sonar to track a threat submarine. Passive sonar is used almost exclusively. The target for this exercise is either an MK 39 Expendable Mobile Anti-Submarine Warfare Training Target, MK 30 recoverable training target, or live submarine. This exercise may involve a single submarine, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft, ships, and submarines, including a major range event.	
Typical Components	**Platforms:** Moored Platform, Submarine, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Navigation Systems, Sonar Systems - Hull Mounted, Sonar Systems - Other **Munitions:** None	
Active Sonar	LFH, MFH, HFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore. 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 Involving Visual Observations for Marine Species related to vessel movement are only considered during the period of surfacing as well.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Other AFTT Areas

A.2.6 ELECTRONIC WARFARE

The mission of electronic warfare is to degrade the enemy's ability to use electronic systems, such as communication systems and radar, and to confuse or deny them the ability to defend their forces and assets. Electronic warfare is also used to detect enemy threats and counter their attempts to degrade the electronic capabilities of the Navy.

Typical electronic warfare activities include threat avoidance training, signals analysis for intelligence purposes, and use of airborne and surface electronic jamming devices (that block or interfere with other devices) to defeat tracking, navigation, and communications systems.

A.2.6.1 Counter Targeting Chaff Exercise – Aircraft

Electronic Warfare	
Counter Targeting Chaff Exercise - Aircraft	
Short Description	Fixed-winged aircraft and helicopter aircrews deploy chaff to disrupt threat targeting and missile guidance radars.
Long Description	Fixed-winged aircraft and helicopter aircrews deploy chaff to disrupt threat targeting and missile guidance radars. Fixed-winged aircraft and helicopter aircrews 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 aircraft clears away from the threat. 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 to create a target that will lure enemy radar and weapons system away from the actual friendly platform.
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft **Targets:** None **Systems being Trained/Tested:** Chaff Dispensing Systems **Munitions:** Chaff Rounds
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Chaff is usually expended while conducting other training activities, such as air combat maneuvering. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.

Electronic Warfare		
Counter Targeting Chaff Exercise - Aircraft		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex

A.2.6.2 Counter Targeting Chaff Exercise – Ship

Electronic Warfare		
Counter Targeting Chaff Exercise - Ship		
Short Description	Surface ship crews deploy chaff to disrupt threat targeting and missile guidance radars.	
Long Description	Surface ship and Coast Guard cutter crews deploy chaff to disrupt threat targeting and missile guidance radars to defend against an attack. 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 Components	**Platforms:** Surface Combatant **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Chaff rounds	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore. This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.2.6.3 Counter Targeting Flare Exercise

Electronic Warfare		
Counter Targeting Flare Exercise		
Short Description	Fixed-winged aircraft and helicopter aircrews deploy flares to disrupt threat infrared missile guidance systems.	
Long Description	Fixed-winged aircraft and helicopter aircrews deploy flares to disrupt threat infrared missile guidance systems. 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 Components	**Platforms:** Fixed Wing – Strike Aircraft, Fixed-Wing – Patrol Aircraft, Fixed-Wing – Electronic Aircraft, Rotary-Wing Aircraft **Targets:** None **Systems being Trained/Tested:** Flare Dispensing Systems **Munitions:** Flares	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	Approximately five flares per aircraft are expended per exercise. All combustible material in flares is assumed to be consumed before contact of the casing with the water. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex

A.2.6.4 Electronic Warfare Operations

Electronic Warfare		
Electronic Warfare Operations		
Short Description	Aircraft and surface ship crews control portions of the electromagnetic spectrum used by enemy systems to degrade or deny the enemy's ability to take defensive actions.	
Long Description	Aircraft and surface ship crews control the electromagnetic spectrum used by enemy systems to degrade or deny the enemy's ability to take defensive actions. Electronic Warfare Operations can be active or passive, offensive or defensive. Fixed-wing aircraft employ active jamming and deception against enemy search radars to mask the friendly inbound strike aircraft mission. Surface ships detect and evaluate enemy electronic signals from enemy aircraft or missile radars, evaluate courses of action concerning the use of passive or active countermeasures, then use ship maneuvers and either chaff, flares, active electronic countermeasures, or a combination of them to defeat the threat.	
Typical Components	**Platforms:** Fixed Wing - Electronic Warfare Aircraft, Surface Combatant **Targets:** Air Targets - Other **Systems being Trained/Tested:** Electronic Warfare Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	All chaff and flares involved in this exercise are covered under chaff exercises and flare exercises, respectively.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.6.5 High-Speed Anti-Radiation Missile Exercise

Electronic Warfare		
High-Speed Anti-Radiation Missile Exercise		
Short Description	Aircrews launch a High-Speed Anti-Radiation Missile against threat radar sites.	
Long Description	Aircrews detect radar signals from a simulated threat radar site and launch a High-Speed Anti-Radiation Missile (high-explosive) to destroy or disable the threat radar site. One or more fighter jets approach the threat radar site from high altitude. Once the target is located with onboard sensors, the aircrew launches a High-Speed Anti-Radiation Missile at the electronic signal. At-sea exercises involve training against a target vessel or a specially configured target barge that has a tower with an electronic emitter that the missile will seek after being fired from the launch aircraft.	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft **Targets:** Electronic Warfare Targets **Systems being Trained/Tested:** None **Munitions:** Air-to-Surface Missiles	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive missiles and rockets	
Parameters for Analysis	All chaff and flares involved in this exercise are covered under chaff exercises and flare exercises, respectively. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.7 EXPEDITIONARY WARFARE

The mission of expeditionary warfare is to provide security and surveillance in the littoral (at the shoreline), riparian (along a river), or coastal environments. Expeditionary warfare is wide ranging and includes defense of harbors, operation of remotely operated vehicles, defense against swimmers, and boarding/seizure operations.

Expeditionary warfare training activities include underwater construction team training, dive and salvage operations, and insertion/extraction via air, surface, and sub-surface platforms.

A.2.7.1 Dive and Salvage Operations

Expeditionary Warfare		
Dive and Salvage Operations		
Short Description	Navy divers perform dive operations and salvage training.	
Long Description	Navy divers will conduct a variety of salvage training to include debeaching operations, underwater repairs to ships, underwater survey operations, and other underwater training as required.	
Typical Components	**Platforms:** Structure, Support Craft, Unmanned Bottom Crawler **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	The practice salvage platform can be sunk and then refloated and removed.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex
	-	Little Creek, VA
	-	NS Mayport

A.2.7.2 Personnel Insertion/Extraction – Air

Expeditionary Warfare		
Personnel Insertion/Extraction - Air		
Short Description	Personnel are inserted into and extracted from an objective area by fixed-wing aircraft or helicopters.	
Long Description	Personnel are inserted into a water objective via fixed-wing aircraft using parachutes or by helicopters via ropes or jumping into the water. They will conduct an infiltration to an objective (harbor, beach, moored vessel, etc.) and conduct a variety of tasks. The insertion/extraction activities are confined to in-water training. Upon completion of training objectives, personnel are extracted by helicopters or small boats.	
Typical Components	**Platforms:** Fixed Wing - Cargo and Transport Aircraft, Rotary-Wing Aircraft, Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Exercises are typically conducted in waters near land. USCG may also conduct this training.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	-	Virginia Capes Range Complex Inshore
	-	Jacksonville Range Complex Inshore
	-	Gulf of Mexico Range Complex Inshore

A.2.7.3 Personnel Insertion/Extraction – Surface and Sub-Surface

Expeditionary Warfare		
Personnel Insertion/Extraction - Surface and Sub-Surface		
Short Description	Personnel are inserted into and extracted from an objective area by small boats or sub-surface platforms.	
Long Description	Utilizing both small surface and sub-surface platforms, personnel are inserted in the water. They will conduct an infiltration to an objective (harbor, beach, moored vessel, etc.) and conduct a variety of tasks. The insertion/extraction activities are confined to in-water training.	
Typical Components	**Platforms:** Small Boat, Small Manned Underwater Vehicle, Submarine, Unmanned Aerial Vehicle – Fixed Wing **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Exercises are typically conducted in waters near land.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Northeast Range Complexes Inshore
	-	Virginia Capes Range Complex Inshore

A.2.7.4 Personnel Insertion/Extraction – Swimmer/Diver

Expeditionary Warfare		
Personnel Insertion/Extraction - Swimmer/Diver		
Short Description	Divers and swimmer infiltrate harbors, beaches, or moored vessels and conduct a variety of tasks.	
Long Description	Divers and swimmer infiltrate harbors, beaches, or moored vessels and conduct a variety of tasks. Activity may include Navy personnel learning advanced self-contained underwater breathing apparatus (scuba) diving to include tactics, techniques, and procedures and emergency procedures. Small boats are used for safety.	
Typical Components	**Platforms:** Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Signal, Underwater Sound Devices	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Virginia Capes Range Complex Inshore

A.2.7.5 Port Damage Repair Training

Expeditionary Warfare		
Port Damage Repair Training		
Short Description	Navy Expeditionary forces train to repair critical port facilities.	
Long Description	Navy Expeditionary forces support fleet mission through expedient repair of critical port facilities. Training includes diving operations, pile driving and removal, salvage operations, expeditionary dredging, and repairs to piers, quay walls, and other waterfront infrastructure.	
Typical Components	**Platforms:** Small Boat, Structure, Support Craft, Unmanned Bottom Crawler **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Pile driving and pile removal	
Parameters for Analysis	Pile driving activities would be conducted over five days, up to four times per year (20 days total). Per event, round timber or plastic piles would be installed using impact methods and round timber or plastic, and steel sheet piles would be installed using vibratory methods. All piles or sheets would be removed after the training event using vibratory methods. During pile driving activities, due to the system design, the Action Proponent performs soft starts during impact installation of each pile to ensure proper operation of the diesel impact hammer. During a soft start, the Action Proponent performs an initial set of strikes from the impact hammer at reduced energy before it can be operated at full power and speed. The energy reduction of an individual hammer cannot be quantified because it varies by individual driver. The number of strikes at reduced energy varies because raising the hammer at less than full power and then releasing it results in the hammer "bouncing" as it strikes the pile, which results in multiple "strikes."	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Gulfport, MS

A.2.7.6 Underwater Construction Team Training

Expeditionary Warfare		
Underwater Construction Team Training		
Short Description	Navy and Coast Guard divers conduct underwater repair and construction.	
Long Description	Navy and Coast Guard divers will perform cutting, welding, assembly, and installation of deep-water structures, mooring systems, underwater instrumentation, clearing of hazards, and other training as needed.	
Typical Components	**Platforms:** Small Boat, Unmanned Bottom Crawler **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex
	-	Virginia Capes Range Complex Inshore
	-	Jacksonville Range Complex Inshore
	-	Gulfport, MS

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 Detection	
Short Description	Helicopter aircrews detect mines using towed or laser mine detection systems.
Long Description	Helicopter aircrews use towed and airborne devices to detect, locate, and classify potential mines. Towed devices employ active acoustic sources, such as high-frequency and side scanning sonar. These devices are similar in function to systems used to map the seafloor or locate submerged structures/items. Airborne devices utilize laser systems to locate mines located below the surface. Devices used include the AN/AQS-20/A, towed minehunting sonar used to detect and classify bottom and floating/moored mines in deep and shallow water, and the Airborne Laser Mine Detection System, developed to detect and classify floating and near-surface, moored mines.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Mine Targets **Systems being Trained/Tested:** Electromagnetic Systems, Sonar Systems - Mine Warfare, Sonar Systems - Other **Munitions:** None
Active Sonar	HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices
Parameters for Analysis	Sonar mine detection systems towed from helicopters. Airborne laser systems used to detect mine shapes. 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 will be recovered.

Mine Warfare		
Airborne Mine Countermeasures - Mine Detection		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Key West Range Complex

A.2.8.2 Airborne Mine Countermeasure – Towed Mine Neutralization

Mine Warfare		
Airborne Mine Countermeasures - Towed Mine Neutralization		
Short Description	Helicopter aircrews tow systems through the water that are designed to disable or trigger mines.	
Long Description	Helicopter vehicle operators use towed devices to trigger mines that are designed to detonate when they detect ships/submarines by engine/propeller sounds or magnetic (steel construction) signature. Towed devices can also employ cable cutters to detach floating moored mines. Training may be conducted with non-explosive training mine shapes. Devices used include the following: MK 105 sled, which creates a magnetic field used to trigger mines and can be used in conjunction with the MK 103 cable cutter system and the MK 104 acoustic countermeasure, and AN/SPU-1/W (Magnetic Orange Pipe), a magnetic pipe that is used to trigger magnetically influenced mines.	
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Mine Targets **Systems being Trained/Tested:** Towed Mine Neutralization Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Towed in-water devices	
Parameters for Analysis	Mechanical sweeping (cable cutting), acoustic and magnetic influence sweeping devices are towed from helicopters. 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Key West Range Complex
	Virginia Capes Range Complex Inshore	Virginia Capes Range Complex Inshore

A.2.8.3 Airborne Mine Laying

Mine Warfare		
Airborne Mine Laying		
Short Description	Fixed-wing aircraft drop non-explosive mine shapes.	
Long Description	Fixed-winged aircraft lay offensive or defensive mines for a tactical advantage for friendly forces. Fixed-winged aircraft lay a precise minefield pattern for specific tactical situations. The aircrew typically makes multiple passes in the same flight pattern, and drop one or more training shapes per pass (four shapes total). Training shapes are non-explosive.	
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Bombs (non-explosive)	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines and non-explosive bombs	
Parameters for Analysis	Mine laying is similar to non-explosive bombing exercises. These exercises primarily occur during major training exercises. 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.8.4 Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercise

Mine Warfare	
Civilian Port Defense - Homeland Security Anti-Terrorism/Force Protection Exercise	
Short Description	Maritime security personnel train to protect civilian ports and harbors against enemy efforts to interfere with access to those ports.
Long Description	Naval forces (including USCG) provide mine warfare capabilities to support Department of Homeland Security sponsored exercises. The three pillars of mine warfare, airborne (helicopter), surface (surface ships), and undersea (divers, marine mammals, and unmanned vehicles) mine countermeasures will be brought to bear in order to ensure strategic U.S. ports remain free of mine threats. Various mine warfare sensors, which utilize active acoustics, will be employed in the detection, classification, and neutralization of mines. Along with traditional mine warfare techniques, such as helicopter towed mine countermeasures, new technologies (unmanned vehicles) will be utilized. Marine mammal systems may be used during this exercise. Exercise locations and scenarios will vary according to Department of Homeland Security strategic goals and evolving world events. Coast Guard cutters, small boats, and aircraft may participate in this activity.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Small Boat **Targets:** Mine Targets **Systems being Trained/Tested:** Acoustic Communications, Electromagnetic Systems, Sonar Systems - Mine Warfare, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	MFH, HFM, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles
Parameters for Analysis	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 using normal assets, with diver involvement. Explosives may be used if required for scheduled mine neutralization exercises. While goal is to conduct once per year, alternating east/west coast, assume that an east coast exercise will occur every other year with a total of four per seven-year period.

Mine Warfare		
Civilian Port Defense - Homeland Security Anti-Terrorism/Force Protection Exercise		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Boston, MA	Boston, MA
	Earle, NJ	Earle, NJ
	Delaware Bay, DE	Delaware Bay, DE
	Hampton Roads, VA	Hampton Roads, VA
	Morehead City, NC	Morehead City, NC
	Wilmington, NC	Wilmington, NC
	Savannah, GA	Savannah, GA
	Kings Bay, GA	Kings Bay, GA
	Mayport, FL	Mayport, FL
	Port Canaveral, FL	Port Canaveral, FL
	Tampa, FL	Tampa, FL
	Beaumont, TX	Beaumont, TX
	Corpus Christi, TX	Corpus Christi, TX

A.2.8.5 Coordinated Unit-Level Helicopter Airborne Mine Countermeasures Exercise

Mine Warfare		
Coordinated Unit-Level Helicopter Airborne Mine Countermeasures Exercise		
Short Description	A detachment of helicopters aircrews train as a unit in the use of airborne mine countermeasures, such as towed mine detection and neutralization systems.	
Long Description	Naval aircrews train, as a squadron, in the use of various airborne mine countermeasures. Systems employed include towed mine detection systems, mechanical (cable cutting) mine sweeps, magnetic and acoustic mine sweeps, and other airborne systems and sensors. Mine 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 Components	**Platforms:** Rotary-Wing Aircraft **Targets:** None **Systems being Trained/Tested:** Mine Detection Systems, Mine Neutralization Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines and non-explosive bombs Towed in-water devices	
Parameters for Analysis	Multiple helicopters conduct airborne mine countermeasure training using an assortment of mine warfare gear similar to unit-level events, except that a squadron trains together. Assume up to 24 temporary mine shapes will be deployed to support each of these exercises.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Key West Range Complex

A.2.8.6 Installation and Maintenance of Mine Training Areas

Mine Warfare		
Installation and Maintenance of Mine Training Areas		
Short Description	Inert mine shapes are installed, maintained, or removed from established mine training areas.	
Long Description	Mine warfare training is conducted in designated areas that contain inert mine shapes. These mine training areas will contain a variety of bottom and moored mine shapes. Target support vessels and divers routinely inspect these areas and will move and/or replace mine shapes for improved training scenarios. Coast Guard assets may assist in the installation and maintenance of these areas.	
Typical Components	**Platforms:** Support Craft **Targets:** Mine Targets **Systems being Trained/Tested:** Pinger **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Virginia Capes Range Complex
	-	Navy Cherry Point Range Complex
	-	Jacksonville Range Complex
	-	Key West Range Complex
	-	Virginia Capes Range Complex Inshore

A.2.8.7 Mine Countermeasures – Mine Neutralization – Remotely Operated Vehicle

Mine Warfare		
Mine Countermeasures - Mine Neutralization - Remotely Operated Vehicles		
Short Description	Ship, small boat, and helicopter crews locate and disable mines using remotely operated underwater vehicles.	
Long Description	Ship, small boat, and helicopter crews utilize remotely operated vehicles to neutralize potential mines. Remotely operated vehicles will use sonar and optical systems to locate and target mine shapes. Explosive mine neutralizers may be used during live-fire activities.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Small Boat, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Sonar Systems - Mine Warfare **Munitions:** Mine Warfare Devices	
Active Sonar	HFM	
In-Water Explosives	E4	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Explosive mine countermeasure and neutralization (no divers) Unmanned vehicles	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Key West Range Complex

A.2.8.8 Mine Countermeasures – Ship Sonar

Mine Warfare		
Mine Countermeasures - Ship Sonar		
Short Description	Ship crews detect and avoid mines while navigating restricted areas or channels using active sonar.	
Long Description	Surface ship crews detect and avoid mines or other underwater hazardous objects while navigating restricted areas or channels using active sonar. A Littoral Combat Ship utilizes unmanned surface vehicles and remotely operated vehicles to tow mine detection (hunting) equipment. Systems will operate from a shallow zone greater than 40 ft. to deep water. Exercises could be embedded within major training exercises.	
Typical Components	**Platforms:** Surface Combatant, Unmanned Surface Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Sonar Systems - Mine Warfare **Munitions:** None	
Active Sonar	HFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Unmanned vehicles Towed in-water devices	
Parameters for Analysis	No explosives are used. It is assumed that the system will be operated in areas free of obstructions and will be towed well 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.2.8.9 Mine Neutralization – Explosive Ordnance Disposal

Mine Warfare		
Mine Neutralization Explosive Ordnance Disposal		
Short Description	Personnel place limpet mines or disable threat mines using explosive charges.	
Long Description	Navy divers, typically explosive ordnance disposal personnel, disable threat mines with explosive charges to create a safe channel for friendly vessels to transit or placing or detonating limpet mines on steel structures. Personnel detect, identify, evaluate, and neutralize mines in the water with an explosive device and may involve detonation of one or more explosive charges from 4 to 60 pounds of TNT equivalent. These operations are normally conducted during daylight hours for safety reasons. Time-delay fuses may be used for these exercises. Personnel also identify and place limpet mine charges on a steel structure in the water and detonate an explosive charge of up to 2.5 pounds of TNT equivalent. These operations are normally conducted during daylight hours for safety reasons.	
Typical Components	**Platforms:** Small Boat **Targets:** Metal Plates and Frames, Mine Targets **Systems being Trained/Tested:** None **Munitions:** Demolition Devices	
Active Sonar	No	
In-Water Explosives	E5, E6, E7	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive mine neutralization (with divers)	
Parameters for Analysis	Time-delayed fuses may be used (up to 10 minutes) for charges up to 29 lb. net explosive weight in some locations. Charges are placed anywhere in water column, including bottom. For limpet mines, the detonation would be directed upwards towards the surface and away from the bottom with almost all acoustic energy released to the air. Some mine shapes and all of metal plates and frames will be recovered.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex
	Key West Range Complex Inshore	Key West Range Complex Inshore
	Virginia Capes Range Complex Inshore	Virginia Capes Range Complex Inshore

A.2.8.10 Submarine Mobile Mine and Mine Laying Exercise

Mine Warfare		
Submarine Mobile Mine and Mine-Laying Exercise		
Short Description	Submarine crews or UUVs deploy exercise mobile mines or mines.	
Long Description	Submarine crews or UUVs deploy exercise mobile mines or mines. Active sonar is used periodically. The UUV Mine-Laying Exercise involves an XLUUV deploying mines. During this event, an XLUUV transits to a designated mine deployment area and deploys mines. Mine training exercises may have a range support vessel (surface craft or a support helicopter) to recover mines. The exercise mines are recovered by helicopter or small craft.	
Typical Components	**Platforms:** Extra Large Unmanned Underwater Vehicle, Submarine **Targets:** Mine Targets **Systems being Trained/Tested:** Acoustic Communications, Pinger, Safety and Navigation, Unmanned Vehicle Systems **Munitions:** None	
Active Sonar	MFM, HFL, HFM, VHFL	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Unmanned vehicles	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Jacksonville Range Complex

A.2.8.11 Surface Ship Object Detection

Mine Warfare		
Surface Ship Object Detection		
Short Description	Ship crews detect and avoid mines while navigating restricted areas or channels using active sonar.	
Long Description	Surface ship crews detect and avoid mines or other underwater hazardous objects while navigating restricted areas or channels using active sonar. Exercises could be embedded within major training exercises.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Mine Targets **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None	
Active Sonar	MF1K	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Virginia Capes Range Complex
	-	Jacksonville Range Complex
	NS Norfolk	-
	NS Mayport	-

A.2.8.12 Underwater Mine Countermeasure Raise, Tow, Beach, and Exploitation Operations

Mine Warfare		
Underwater Mine Countermeasure Raise, Tow, Beach, and Exploitation Operations		
Short Description	Personnel locate mines, perform mine neutralization, raise and tow mines to the beach, and conduct exploitation operations for intelligence gathering.	
Long Description	Navy divers, typically explosive ordnance disposal personnel, locate mines using unmanned underwater vehicles, marine mammals, or other diver search techniques. Mines are then neutralized, 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 attached to the line and slowly tows the shape to the beach. The final step, exploitation, is intelligence gathering, identifying the mine and how it works, and then disassembling it or disposing of it.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Small Boat, Unmanned Underwater Vehicles **Targets:** Mine Targets **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Unmanned vehicles	
Parameters for Analysis	Mine shapes are recovered as part of the exercise.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex
	-	Virginia Capes Range Complex Inshore
	-	Jacksonville Range Complex Inshore

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 activities. 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 an Action Proponent 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 Warfare	
Bombing Exercise Air-to-Surface	
Short Description	Fixed-wing aircrews deliver bombs against surface targets.
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 Components	**Platforms:** Fixed Wing – Strike Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Bombs
Active Sonar	No
In-Water Explosives	E9, E10, E12
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines and non-explosive bombs Manned surface vessels Explosive bombs Towed in-water devices

Surface Warfare		
Bombing Exercise Air-to-Surface		
Parameters for Analysis	Approximately 90 percent of non-explosive bombs are the sub-scale bombs such as the MK-76 and BDU-48. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.2.9.2 Gunnery Exercise Air-to-Surface Medium-Caliber

Surface Warfare		
Gunnery Exercise Air-to-Surface Medium-Caliber		
Short Description	Fixed-wing and helicopter aircrews fire medium-caliber guns at surface targets.	
Long Description	Navy, Marine Corps, and Coast Guard fixed-wing and helicopter aircrews engage surface targets with medium-caliber guns. Targets simulate enemy ships, boats, swimmers, and floating/near- surface mines. Fighter aircraft descend on a target firing high-explosive or non-explosive practice munitions medium-caliber projectiles. Helicopters will fly a racetrack pattern around an at-sea target. Aircrew will engage the target with medium-caliber weapons. Targets range from a smoke float, or an empty steel drum, to high-speed remote-controlled boats and Jet Skis.	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** Medium-Caliber Gun Systems **Munitions:** Projectile - Medium-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Non-explosive gunnery Towed in-water devices	
Parameters 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. This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.2.9.3 Gunnery Exercise Air-to-Surface Small-Caliber

Surface Warfare		
Gunnery Exercise Air-to-Surface Small-Caliber		
Short Description	Helicopter and tiltrotor aircrews, use small-caliber guns to engage surface targets.	
Long Description	Navy, Marine Corps, and Coast Guard helicopters and tiltrotor aircraft, fly a racetrack pattern around an at-sea target. Targets simulate enemy ships, boats, and floating/near-surface mines. Each gunner will engage the target with small-caliber weapons. Targets range from a smoke float, an empty steel drum, to high-speed remote-controlled boats and Jet Skis.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Small-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Non-explosive gunnery	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.9.4 Gunnery Exercise Surface-to-Surface Boat Medium-Caliber

Surface Warfare		
Gunnery Exercise Surface-to-Surface Boat Medium-Caliber		
Short Description	Small boat crews fire medium-caliber guns at surface targets.	
Long Description	Navy and Coast Guard small boat crews fire medium-caliber guns at surface targets. Boat crews may use high or low speeds to approach and engage targets simulating other boats, floating mines, or nearshore land targets with medium-caliber (up to and including 40 mm) weapons. A commonly used target is an empty steel drum. 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 Components	**Platforms:** Small Boat **Targets:** Surface Targets - Floating, Surface Targets – Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** None **Munitions:** Grenades, Projectile - Medium-Caliber	
Active Sonar	No	
In-Water Explosives	E1	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive gunnery Non-explosive gunnery Towed in-water devices	
Parameters for Analysis	Approximately 500 rounds expended per exercise. One target used per exercise, typically a stationary target such as a 50-liter steel drum. This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Key West Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.2.9.5 Gunnery Exercise Surface-to-Surface Boat Small-Caliber

Surface Warfare		
Gunnery Exercise Surface-to-Surface Boat Small-Caliber		
Short Description	Small boat crews fire small-caliber guns at surface targets.	
Long Description	Navy and Coast Guard small boat crews fire small-caliber guns at surface targets. Boat crews may use high or low speeds to approach and engage targets simulating other boats, swimmers, floating mines, or nearshore land targets with small-caliber (up to and including 0.50 caliber) weapons. A commonly used target is an empty steel drum. 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 Components	**Platforms:** Small Boat **Targets:** Surface Targets - Floating, Surface Targets – Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** None **Munitions:** Projectile - Small-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Non-explosive gunnery Towed in-water devices	
Parameters for Analysis	The majority of exercises will occur proximate to naval stations. Exercises will occur relatively nearshore due to short range of boats and safety concerns. Exercises mostly occur within 3 NM of the shoreline, but can occur further from shore. This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.2.9.6 Gunnery Exercise Surface-to-Surface Ship Large-Caliber

Surface Warfare	
Gunnery Exercise Surface-to-Surface Ship - Large-Caliber	
Short Description	Surface ship crews fire large-caliber guns at surface targets.
Long Description	Navy and Coast Guard gun crews engage surface targets at sea with their main battery large-caliber (typically 57 mm, 76 mm, and 5-inch) guns. Targets include the QST-35 seaborne powered target, high-speed maneuverable surface target, or a specially configured remote-controlled watercraft. Some targets are expended during the exercise and are not recovered. The exercise proceeds with the target boat approaching from about 10-NM distance. The target is tracked by radar and when within a predetermined range, it is engaged first with large-caliber "warning shots." As threats get closer all weapons may be used to disable the threat. This exercise may involve a single firing ship, or be undertaken in the context of a coordinated larger exercise involving multiple ships, including a major training exercise. Large-caliber guns will also be fired during weapon certification events and in conjunction with weapon maintenance. 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 proximity to the target (in air detonation).
Typical Components	**Platforms:** Surface Combatant **Targets:** Surface Targets - Floating, Surface Targets – Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** Large-Caliber Gun Systems **Munitions:** Projectile - Large-Caliber
Active Sonar	No
In-Water Explosives	E3, E5
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive gunnery Non-explosive gunnery Towed in-water devices Weapon firing noise
Parameters for Analysis	For analytical purposes assume all high-explosive rounds are fused to detonate upon impact with the water surface or target. After impacting the water, the high-explosive rounds are expected to detonate within 33 ft. of the surface. Non-explosive rounds, and fragments from the high-explosive rounds will sink to the bottom of the ocean. Assume each non-explosive projectile will be up to 5 in. in diameter and 30 in. in length, and each firing will also expend a metallic sleeve used to convey the projectile down the gun barrel. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore. This training activity is conducted by Navy and USCG.

Surface Warfare		
Gunnery Exercise Surface-to-Surface Ship - Large-Caliber		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Other AFTT Areas

A.2.9.7 Gunnery Exercise Surface-to-Surface Ship Medium-Caliber

Surface Warfare		
Gunnery Exercise Surface-to-Surface Ship Medium-Caliber		
Short Description	Surface ship crews fire medium-caliber guns at surface targets.	
Long Description	Navy and Coast Guard crews fire medium-caliber guns at surface targets. Ships use medium-caliber weapons to practice defensive marksmanship, typically against a stationary floating target (a 10 ft. diameter red balloon [Killer Tomato]) and high-speed mobile targets. Some targets are expended during the exercise and are not recovered. Shipboard protection systems (Close-In Weapon System) utilizing medium-caliber projectiles would train against high-speed mobile targets.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Surface Targets - Floating, Surface Targets – Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** Medium-Caliber Gun Systems **Munitions:** Projectile - Medium-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Non-explosive gunnery Towed in-water devices	
Parameters for Analysis	One target is used per exercise. Approximately 50 percent of targets are “Killer Tomatoes” (usually recovered). Approximately 35 percent are high-speed maneuvering targets, which are recovered. Approximately 15 percent of targets are other stationary targets such as a steel drum that are not recovered. The number or rounds per exercise varies depending on munitions used. This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Other AFTT Areas

A.2.9.8 Gunnery Exercise Surface-to-Surface Ship Small-Caliber

Surface Warfare		
Gunnery Exercise Surface-to-Surface Ship Small-Caliber		
Short Description	Surface ship crews fire small-caliber guns at surface targets.	
Long Description	Navy and Coast Guard ship and boat crews fire small-caliber guns at surface targets. Ships use small-caliber weapons to practice defensive marksmanship, typically against stationary floating targets. The target may be a 10 ft. diameter red balloon (Killer Tomato, see Figure A.2-4, a 50-gallon steel drum, or other available target, such as a cardboard box. Some targets are expended during the exercise and are not recovered. Ship crew qualifications conducted at sea employ stationary targets on deck. Small-caliber projectiles fired during these exercises will be expended in the water. Shipboard protection systems utilizing small-caliber projectiles will train against high-speed mobile targets.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Surface Targets – Floating, Surface Targets - Towed **Systems being Trained/Tested:** None **Munitions:** Projectile - Small-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Non-explosive gunnery Towed in-water devices	
Parameters for Analysis	Small-caliber gun rounds per exercise: 1,000 to 3,000 non-explosive practice munitions. The majority of the activities will occur proximate to Navy homeports in Jacksonville, Florida and Norfolk, Virginia. This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complexes
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Other AFTT Areas

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

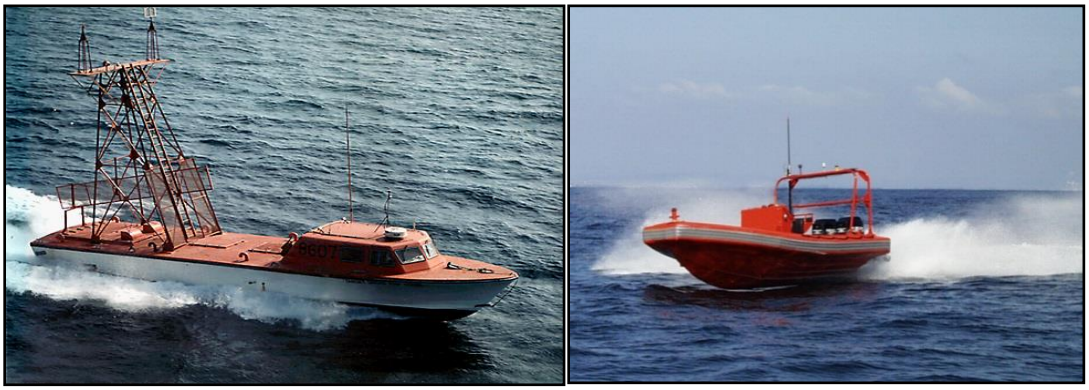


Figure A.2-5: QST-35 Seaborne Powered Target (on Left) and High-Speed Maneuvering Surface Target (on Right)

A.2.9.9 Integrated Live-Fire Exercise

Surface Warfare		
Integrated Live-Fire Exercise		
Short Description	Naval forces defend against a swarm of surface threats (ships or small boats) with bombs, missiles, rockets, and small-, medium-, and large-caliber guns.	
Long Description	Naval forces use coordinated tactics and deliver high-explosive ordnance against a swarm of surface maritime threats. Strike fighter aircraft may deliver high-explosive unguided or guided munitions against surface targets. Strike fighter aircraft, helicopter aircrews, and ship crews fire high-explosive precision-guided missiles against surface targets. Helicopter-launched missiles (including rockets) typically detonate at or just below the water's surface. Strike fighter and helicopter aircrew may engage surface targets with small- and medium-caliber guns. Ships' gun crews engage surface targets with large-caliber (typically 57 mm and 5-inch) guns. This exercise may involve a single firing ship or be undertaken in the context of a coordinated larger exercise involving multiple ships. Coast Guard cutters and aircraft may participate in this activity.	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Surface Combatant **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** Large-Caliber Gun Systems, Medium-Caliber Gun Systems, Missile Firing/Launching Systems **Munitions:** Bombs, Large-Caliber Projectiles, Medium-Caliber Projectiles, Air-to-Surface Missiles, Rockets	
Active Sonar	No	
In-Water Explosives	E10	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines and non-explosive bombs Manned surface vessels Explosive bombs Explosive gunnery Explosive missiles and rockets Non-explosive gunnery Non-explosive missiles and rockets Weapon firing noise	
Parameters for Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore. Ordnance other than bombs modeled in unit-level training activities.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.9.10 Laser Targeting – Aircraft

Surface Warfare		
Laser Targeting - Aircraft		
Short Description	Fixed-wing and helicopter aircrews illuminate enemy targets with lasers.	
Long Description	Fixed-winged and helicopter aircrew illuminate enemy surface targets with lasers for engagement by aircraft with laser-guided bombs or missiles. This exercise may be conducted alone or in conjunction with other exercises utilizing precision-guided munitions, such as surface missiles and guided rockets. Exercises where weapons are fired are addressed in the appropriate activity (e.g., air-to-surface missile exercise). Lower powered lasers may also be used as non-lethal deterrents during maritime security operations (force protection).	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft **Targets:** Surface Targets - Towed **Systems being Trained/Tested:** Laser Targeting Systems, Captive Air Training Missiles **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Towed in-water devices	
Parameters for Analysis	Laser targeting for missile/rocket guidance will occur in areas where these exercises also occur. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.9.11 Laser Targeting – Ship

Surface Warfare		
Laser Targeting - Ship		
Short Description	Surface ship crews illuminate and disable air and surface targets with high-energy laser systems.	
Long Description	Navy and Coast Guard ship crews employ high-power energy laser systems that are used to create critical failures in airborne and surface targets. The laser system directs an energy beam that can penetrate thin layers of metal at short distances (less than 1 nautical mile) that can render air and surface targets inoperative. Laser systems can also be used in a low power setting as non-lethal deterrent during maritime security operations (force protection). The low power capability would not be used against manned platforms during training.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Drone, Surface Targets – Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** High Energy Laser System **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Towed in-water devices	
Parameters for Analysis	Laser targeting for missile/rocket guidance will occur in areas where these exercises also occur. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore. High-energy laser systems used in military readiness activities automatically shut down when target-lock is lost; meaning that if a high-energy laser beam aimed at a target on the surface, either from an aircraft or surface vessel, moves off the target, the system ceases projecting laser light, preventing any energy from striking the water or a nearby marine species. This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.9.12 Long-Range Unmanned Surface Vessel Training

Surface Warfare		
Long-Range Unmanned Surface Vessel Training		
Short Description	Amphibious ships employ unmanned surface vessel to engage surface targets.	
Long Description	Amphibious ships will launch an unmanned surface vessel that will employ unmanned aerial vehicles and engage surface threats.	
Typical Components	**Platforms:** Amphibious Warfare Vessel, Fleet Support Vessel, Unmanned Surface Vehicle **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile – Medium-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Unmanned vehicles	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Virginia Capes Range Complex
	-	Jacksonville Range Complex

A.2.9.13 Maritime Security Operations

Surface Warfare	
Maritime Security Operations	
Short Description	Helicopter, surface ship, and small boat crews conduct a suite of maritime security operations at sea, to include visit, board, search and seizure; maritime interdiction operations; maritime interdiction operations; maritime infrastructure protection and harbor defense; ship force protection; anti-piracy operations; and drug interdiction by the Coast Guard.
Long Description	Navy and Coast Guard helicopter and surface ship crews conduct a suite of maritime security 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. Vessel Visit, Board, Search, and Seizure: Military personnel from ships and aircraft board suspect vessels, potentially under hostile conditions. Maritime Interdiction Operations: Ships and aircraft train in pursuing, intercepting, and ultimately detaining suspect vessels. Maritime Infrastructure Protection and Harbor Defense: Naval personnel train to defend oil platforms, similar at sea structures, harbors, piers, and other infrastructure. Warning Shot/Disabling Fire: Naval personnel train in the use of weapons to force fleeing or threatening small boats (typically operating at high speeds) to come to a stop. Ship Force Protection: Ship crews train in tracking multiple approaching, circling small craft, assessing threat potential, and communicating amongst crewmates and other vessels to ensure ships are protected against attack. Anti-Piracy Training: Naval personnel train in deterring and interrupting piracy activity. Training includes large vessels (pirate "mother ships"), and multiple small, maneuverable, and fast craft. Drug Interdiction: Coast Guard helicopter and surface ship crews train in the intercepting, boarding, and searching of suspected drug carrying vessels.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Rotary-Wing Aircraft, Small Boat, Surface Combatant **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Grenades, Projectile – Small-Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Non-explosive gunnery Unmanned vehicles

Surface Warfare		
Maritime Security Operations		
Parameters for Analysis	Maritime Security Operations is a broad term used to describe activities intended to train naval forces in the skills necessary to protect naval vessels from small boat attack, counter piracy and drug operations (maritime interdiction operations and visit, board, search, and seizure), and protect key infrastructure (e.g. oil platforms). These exercises need to remain broad as naval forces need to be able to tailor training exercises to respond to emergent threats. Exercises typically do not involve live fire of weapons. All exercises involve vessel movement, sometimes at high rates of speed (naval vessels maneuvering to overtake suspect vessel and/or small boats [targets] closing in and maneuvering around naval vessels), and some activities involve helicopters and boarding parties. These training exercises are conducted proximate to naval homeports in Norfolk, Virginia, and Jacksonville, Florida, including during times of transit into and out of port, as well as during major training exercises. Firing of weapons during offshore exercises is accounted for in gunnery exercises, surface-to-surface activities. Inshore exercises include firing small-caliber blank ammunition. Other components associated with chaff and flare use are not expected to float and would sink to the seafloor. This training exercise is conducted by Navy and USCG. When USCG is performing this exercise, additional platforms may include cutters, boats, and air assets.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Key West Range Complex
	-	Northeast Range Complexes Inshore
	-	Virginia Capes Range Complex Inshore
	-	Jacksonville Range Complex Inshore

A.2.9.14 Missile Exercise Air-to-Surface

Surface Warfare		
Missile Exercise Air-to-Surface		
Short Description	Fixed-wing and helicopter aircrews fire air-to-surface missiles at surface targets.	
Long Description	Fighter, maritime patrol aircraft, and helicopter aircrews fire precision-guided missiles against surface targets. Aircraft involved may be unmanned. Fixed-wing aircraft (fighters or maritime patrol aircraft) approach an at-sea surface target from high altitude, and launch high-explosive precision-guided missiles. Helicopters designate at-sea surface targets with a laser or optics for a precision-guided high-explosive or non-explosive practice munitions missile. Helicopter-launched missiles typically pass through the target's "sail," and, if explosive, detonate at or just below, the water's surface.	
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Fixed Wing – Patrol Aircraft, Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Unmanned Aerial Vehicle **Targets:** Surface Targets - Floating, Surface Targets - Towed **Systems being Trained/Tested:** Missile Firing/Launching Systems **Munitions:** Air-to-Surface Missiles	
Active Sonar	No	
In-Water Explosives	E6, E8, E9	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Explosive missiles and rockets Non-explosive missiles and rocket Unmanned vehicles	
Parameters for Analysis	Assume one missile and one target are used per exercise. While missiles could explode above the water's surface after contacting targets, analysis assumes that all warheads explode at or just below the water's surface. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Key West Range Complex

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

Surface Warfare		
Missile Exercise Air-to-Surface - Rocket		
Short Description	Helicopter aircrews fire both precision-guided and unguided rockets at surface targets.	
Long Description	Helicopters designate an at-sea surface target with a laser or optics for precision-guided high-explosive or non-explosive practice munitions rockets.	
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Missile Firing/Launching Systems **Munitions:** Rockets	
Active Sonar	No	
In-Water Explosives	E3	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Explosive missiles and rockets Non-explosive missiles and rockets	
Parameters for Analysis	Assume all explosive rockets detonate in the water. Rockets may be used in conjunction with force protection activities. 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.2.9.16 Missile Exercise Surface-to-Surface

Surface Warfare		
Missile Exercise Surface-to-Surface		
Short Description	Surface ship crews defend against surface threats (ships or small boats) and engage them with missiles.	
Long Description	Surface ships launch missiles at surface maritime targets with the goal of destroying or disabling enemy ships or boats. After detecting and confirming a surface threat, the ship will fire a precision-guided surface missile. Activities with destroyers and cruisers will involve long-range (over the horizon) surface missiles. Activities with littoral combat ships certify ship's crew to defend against "close-in" surface threats and will use shorter range surface missiles such as Griffin or Hellfire. 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 Components	**Platforms:** Surface Combatant **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** Missile Firing/Launching Systems **Munitions:** Surface-to-Surface Missiles	
Active Sonar	No	
In-Water Explosives	E6, E9	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive missiles and rockets Non-explosive missiles and rockets	
Parameters for Analysis	Assume one missile and one target used per exercise. While missile could explode above the water's surface after contacting target, analysis assumes all 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.9.17 Sinking Exercise

Surface Warfare	
Sinking Exercise	
Short Description	Aircraft, ship, and submarine crews deliberately sink a seaborne target, usually a decommissioned ship made environmentally safe for sinking according to U.S. Environmental Protection Agency standards, with a variety of ordnance.
Long Description	Ship personnel and aircrew deliver high-explosive ordnance on a seaborne target (large, deactivated vessel), which is deliberately sunk using multiple weapon systems. A sinking exercise is typically conducted by aircraft, surface vessels, and submarines to train in live ordnance delivery on a full-size ship target. The target is typically a decommissioned ship made environmentally safe for sinking according to U.S. Environmental Protection Agency standards. The location is greater than 50 nautical miles from shore and in water depths greater than 6,000 feet (ft.). Ship, aircraft, and submarine crews attack with coordinated tactics and deliver a variety of inert and high-explosive ordnance. Coast Guard cutters and aircraft may participate in this activity. Typically, the exercise lasts for 4 to 8 hours and possibly over 1 to 2 days, however it is unpredictable and ultimately ends when the target ship sinks.
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft, Submarine, Surface Combatant **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** Missile Firing/Launching Systems, Large-Caliber Gun Systems, Torpedo Launching System **Munitions:** Air-to-Surface Missiles, Bombs, Projectile - Large-Caliber, Torpedoes - HE
Active Sonar	HFH
In-Water Explosives	E5, E8, E9, E11
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels SINKEX Weapon firing noise
Parameters for Analysis	USCG may participate in this training. Exercises occur greater than 50 NM from shore and in water depths greater than 6,000 ft. during daylight hours only. Due to the distance from shore, stressors to human resources were not analyzed for this activity. The participants and assets typically include: • 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-to-surface missiles • 2-4 Maverick or Hellfire air-to-surface missiles • 2-12 MK-80 series general-purpose bombs • 200 rounds large-caliber projectiles • 1-2 MK-48 heavyweight submarine-launched torpedo

Surface Warfare		
Sinking Exercise		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes SINKEX Box	SINKEX Box

A.2.9.18 Small Boat Attack

Surface Warfare		
Small Boat Attack		
Short Description	Afloat units defend against small boat or personal watercraft attack.	
Long Description	For this activity, one or two small boats or personal watercraft conduct simulated attack activities on units afloat, training ship crews how to respond to small boat attack in harbors, restricted channels, and nearshore areas using non-lethal means or armament appropriate to the threat and location. Coast Guard small boats and aircraft may participate in this activity.	
Typical Components	**Platforms:** All Navy Ships and Boats **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Small-Caliber Blanks	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Non-explosive gunnery	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.10 Other Training Exercises

A.2.10.1 Ship-to-Shore Fuel Transfer System Training

Other Training Activities		
Ship-to-Shore Fuel Transfer System Training		
Short Description	This activity trains personnel in the transfer of petroleum (though only sea water is used during training) from ship to shore.	
Long Description	The Navy uses either the Offshore Petroleum Discharge System or the Distributed Littoral Operational Fuel Transfer System to transfer fuel from a ship to the shore. For training purposes, only sea water is used. They systems consist of five training subcomponents including the beach termination unit, operation utility boat technicians, boat coxswain, dive boat operation technician, and single anchor leg moor training. This activity trains personnel in the transfer of petroleum (though only sea water is used during training) from ship to shore. From approximately one mile offshore, technicians and underwater construction team divers roll out conduit from a ship offshore, deploy the single anchor leg mooring which sinks to and settles on the ocean floor, and use anchors at various points along the conduit to secure it to the seafloor.	
Typical Components	**Platforms:** Fixed Range **Targets:** None **Systems being Trained/Tested:** Fuel Transfer Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Navy Cherry Point Range Complex
	-	Virginia Capes Range Complex Inshore
	-	Jacksonville Range Complex

A.2.10.2 Precision Anchoring

Other Training Activities		
Precision Anchoring		
Short Description	Releasing of anchors in designated locations.	
Long Description	Navy and Coast Guard ship crews choose the best available anchoring sites. The ship uses all means available to 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 Components	**Platforms:** All Navy and Coast Guard Vessels **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.2.10.3 Search and Rescue

Other Training Activities		
Search and Rescue		
Short Description	Helicopter and ship crews rescue military personnel at sea.	
Long Description	Navy and Coast Guard helicopter, ship, and submarine crews practice the skills required to recover personnel lost at sea. Helicopters locate survivors and deploy rescue swimmer and rescue basket. Survivors are winched up to the hovering helicopter. Surface ships would conduct man-overboard drills and deploy a dummy figure in the water. Ship crews would launch a small boat, direct the recovery of the dummy, and recover the small boat. Submarine crews would maneuver the submarine to effect recovery of personnel.	
Typical Components	**Platforms:** All Navy Ships and Boats, Rotary-Wing Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Locations are typical, but ships may conduct man-overboard training throughout the Study Area. This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	-	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex
	-	Other AFTT Areas
	-	Virginia Capes Range Complex Inshore
	-	Jacksonville Range Complex Inshore

A.2.10.4 Submarine Navigation

Other Training Activities		
Submarine Navigation		
Short Description	Submarine crews operate sonar for navigation and detection while transiting into and out of port during reduced visibility.	
Long Description	Submarine crews train to operate sonar for navigation. The ability to navigate using sonar is critical for detection while transiting into and out of port during periods of reduced visibility. During this activity the submarine will be surfaced.	
Typical Components	**Platforms:** Submarine **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None	
Active Sonar	MFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	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 Involving Visual Observations for Marine Species related to vessel 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Northeast Range Complexes
	-	Virginia Capes Range Complex
	-	Jacksonville Range Complex
	NS Norfolk	-
	NSB Kings Bay	-
	NS Mayport	-
	Port Canaveral, FL	-

A.2.10.5 Submarine Sonar Maintenance and Systems Checks

Other Training Activities		
Submarine Sonar Maintenance and Systems Checks		
Short Description	Maintenance of submarine sonar and other system checks are conducted pierside or at sea.	
Long Description	A submarine performs periodic maintenance on the AN/BQQ-10 and submarine high-frequency 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 Components	**Platforms:** Submarine **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None	
Active Sonar	MFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	"Other AFTT Areas" refers to areas outside of existing range complexes and testing ranges. Activities occurring within 12 NM are pierside.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Northeast Range Complexes Inshore	Northeast Range Complexes Inshore
	Virginia Capes Range Complex Inshore	Virginia Capes Range Complex Inshore
	Jacksonville Range Complex Inshore	Jacksonville Range Complex Inshore
	-	Other AFTT Areas
	-	NSB New London

A.2.10.6 Submarine Under Ice Certification

Other Training Activities		
Submarine under Ice Certification		
Short Description	Submarine crews operate sonar while transiting under ice. Ice conditions are simulated during training and certification events.	
Long Description	Submarine crews train to operate under ice. Ice conditions are simulated during training and certification exercises. A single exercise is comprised of 30 hours of training, spread out over 5 days in 6-hour training sessions.	
Typical Components	**Platforms:** Submarine **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None	
Active Sonar	HFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.2.10.7 Surface Ship Sonar Maintenance and Systems Checks

Other Training Activities		
Surface Ship Sonar Maintenance and Systems Checks		
Short Description	Maintenance of surface ship sonar and other system checks are conducted pierside or at sea.	
Long Description	This scenario consists of surface ships performing periodic maintenance to the AN/SQS-53 sonar and other ship systems while in port or at sea. This maintenance takes up to 4 hours. Surface ships operate active sonar systems for maintenance while in shallow water near their homeport, however, sonar maintenance could occur anywhere as the system's performance may warrant.	
Typical Components	**Platforms:** Surface Combatant **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None	
Active Sonar	MF1, MF1K	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	"Other AFTT Areas" refers to areas outside of existing range complexes and testing ranges. Activities occurring within 12 NM are pierside.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Other AFTT Areas
	-	NS Norfolk
	-	NS Mayport

A.2.10.8 Unmanned Aerial System Training Certification – Submarine

Other Training Activities		
Unmanned Aerial System Training and Certification - Submarine		
Short Description	Submarine deploys unmanned aerial system while submerged to conduct surveillance.	
Long Description	Submarine deploys unmanned aerial system while submerged to conduct surveillance. For submarine launched UASs, a negatively buoyant capsule is deployed underwater and descends to a programmed depth. The capsule then drops a weight, inflates a flotation collar, rises to the surface, and launches an unmanned aerial system. Submarine-launched UASs are not typically recovered.	
Typical Components	**Platforms:** Submarine, Unmanned Aerial Vehicle - Fixed Wing **Targets:** Air Targets - Drone **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Virginia Capes Range Complex
	-	Navy Cherry Point Range Complex
	-	Jacksonville Range Complex

A.2.10.9 Unmanned Underwater Vehicle Training – Certification and Development

Other Training Activities		
Unmanned Underwater Vehicle Training - Certification and Development		
Short Description	Unmanned underwater vehicle certification involves training with unmanned platforms to ensure submarine crew proficiency. Tactical development involves training with various payloads, for multiple purposes to ensure that the systems can be employed effectively in an operational environment.	
Long Description	Unmanned underwater vehicle certification and tactical development involves the training with unmanned platforms on which various payloads are attached and used for different purposes. Unmanned underwater vehicles may be deployed by surface ships and Coast Guard cutters, small boats, submarines, aircraft, and target support vessels. Payload certification and development training assesses various systems that can be incorporated onto unmanned platforms for mine warfare, bottom mapping, and other missions. Training can range from basic remote control and autonomous navigation tests to deployment and activation of onboard systems which may include hydrodynamic instruments, launchers, and recovery capabilities. These vehicles are capable of expanding the communication and surveillance capabilities of submarines, and terrestrial commands.	
Typical Components	**Platforms:** Fleet Support Vessel, Moored Platform, Small Boat, Fixed Structure, Submarine, Unmanned Underwater Vehicle **Targets:** Mine Targets, Sub-surface Targets - Stationary **Systems being Trained/Tested:** Acoustic Communications, Acoustic Releases, Fathometer, Pinger, Safety and Navigation, Sonar Systems - Other, Unmanned Vehicle Systems **Munitions:** None	
Active Sonar	MFH, HFL, HFM, VHFL, VHFM, VHFH, Broadband (MF to HF), Broadband (HF to VHF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Unmanned vehicles	
Parameters for Analysis	This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Northeast Range Complexes
	-	Virginia Capes Range Complex
	-	Navy Cherry Point Range Complex
	-	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex
	-	Virginia Capes Range Complex Inshore

A.2.10.10 Waterborne Training

Other Training Activities		
Waterborne Training		
Short Description	Personnel launch, operate, and recover a variety of small boats to achieve certifications such as coxswain, crewman, and safety observer.	
Long Description	Waterborne Training includes qualification and certification as safety observer, safety swimmer, coxswain, and crewman utilizing a variety of Navy and Coast Guard small crafts. These craft include, but are not limited, to rigid-hull inflatables, aluminum chambered boats, patrol boats, stand-up paddleboards, kayaks, and Jet Skis. Small boat crews train to launch and recover, moor to buoys, anchor, and operate a variety of missions in shallow waters.	
Typical Components	**Platforms:** Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	This training activity is conducted by Navy and USCG.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Northeast Range Complexes
	-	Key West Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Northeast Range Complexes Inshore
	-	Virginia Capes Range Complex Inshore
	-	Jacksonville Range Complex Inshore
	-	Gulf of Mexico Range Complex Inshore
	-	NS Mayport
	-	Tampa, FL
	-	Pascagoula, MS
	-	Beaumont, TX

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 MQ-25 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 activities 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 Maneuvers Test

Air Warfare		
Air Combat Maneuvers Test		
Short Description	Aircrews engage in flight maneuvers designed to gain a tactical advantage during combat.	
Long Description	Air combat maneuver is the general term used to describe an air-to-air test event involving two or more aircraft, each engaged in continuous proactive and reactive changes in aircraft attitude, altitude, and airspeed. No weapons are fired during air combat maneuver activities.	
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Fixed Wing – Strike Aircraft **Targets:** None **Systems being Trained/Tested:** Aircraft Platforms **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	All combustible material in flares is assumed to be consumed before contact of the casing with the water.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex

A.3.1.1.2 Air Platform Vehicle Test

Air Warfare		
Air Platform Vehicle Test		
Short Description	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 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. Activities 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 - Command and Control Aircraft, Fixed Wing – Other Aircraft, Fixed Wing – Strike Aircraft, Unmanned Aerial Vehicle - Fixed Wing **Targets:** None **Systems being Trained/Tested:** Aircraft Platform/Vehicle **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex

A.3.1.1.3 Air Platform Weapons Integration Test

Air Warfare		
Air Platform Weapons Integration Test		
Short Description	Testing performed to quantify the compatibility of weapons with the aircraft from which they would be launched or released. Non-explosive weapons or shapes are used.	
Long Description	The air platform weapons integration test describes the testing performed to quantify the compatibility of weapons with the aircraft from which they would be released. Tests evaluate the compatibility of the weapon and its carriage, suspension, and launch equipment with the performance and handling characteristics of the designated aircraft. Additional tests assess the ability of the weapon to separate or launch safely from the aircraft at combat velocities, including at supersonic speeds. Test results are compared against design specifications for compliance. The test results are also used to define performance characteristics and to improve and update existing analytical and predictive models.	
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Fixed Wing – Strike Aircraft, Unmanned Aerial Vehicle - Fixed Wing **Targets:** Air Targets - Drone, Surface Targets - Maneuvering **Systems being Trained/Tested:** Munitions Firing/Launching Systems **Munitions:** Air-to-Air Missiles, Air-to-Surface Missiles, Bombs	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines and non-explosive bombs Non-explosive missiles and rockets	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	-	Gulf of Mexico Range Complex

A.3.1.1.4 Air-to-Air Gunnery Test – Medium-Caliber

Air Warfare		
Air-to-Air Gunnery Test - Medium-Caliber		
Short Description	Test performed to evaluate the effectiveness of air-to-air guns against designated airborne targets. Fixed-wing aircraft may be used.	
Long Description	An air-to-air gunnery test involves the firing of guns from fixed-wing aircraft against a towed aerial banner that serves as the target. Non-explosive rounds are fired, and the targets fired upon are typically towed aerial banners.	
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Fixed Wing – Strike Aircraft **Targets:** Air Targets - Decoy **Systems being Trained/Tested:** Medium-Caliber Gun Systems **Munitions:** Projectile - Medium-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	No	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex

A.3.1.1.5 Air-to-Air Missile Test

Air Warfare		
Air-to-Air Missile Test		
Short Description	Test performed to evaluate the effectiveness of air-launched missiles against designated airborne targets. Fixed-wing aircraft will be used.	
Long Description	These tests are a type of air-to-air weapons system test in which air-to-air missiles (non-explosive or in-air explosives) are fired from fixed-wing aircraft against unmanned aerial drones.	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft **Targets:** Air Targets - Drone **Systems being Trained/Tested:** Missile Firing/Launching Systems **Munitions:** Air-to-Air Missiles	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	This activity includes missiles that explode in-air at medium altitudes.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex

A.3.1.1.6 Air-to-Air Weapons System Test

Air Warfare		
Air-to-Air Weapons System Test		
Short Description	Test to evaluate the effectiveness of air-launched weapons against designated air targets.	
Long Description	The air-to-air weapons systems test evaluates the performance of air-launched weapons systems against air targets. During an air-to-air weapons systems test, a strike fighter aircraft locates, tracks, and, in some tests, fires on an air target used to simulate another strike fighter aircraft using non-explosive ordnance. No testing of explosive weapons is planned.	
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Fixed Wing – Strike Aircraft **Targets:** Air Targets - Decoy **Systems being Trained/Tested:** Munitions Firing/Launching Systems **Munitions:** Air-to-Air Missiles	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.3.1.1.7 Intelligence, Surveillance, and Reconnaissance Test

Air Warfare		
Intelligence, Surveillance, and Reconnaissance Test		
Short Description	Aircrews use all available sensors to collect data on threat vessels.	
Long Description	An air warfare intelligence, surveillance, and reconnaissance (ISR) test involves evaluating communications capabilities of aircraft, including unmanned aerial systems that can carry cameras, sensors, communications equipment, or other payloads. New systems are tested at sea to ensure proper communications between aircraft and ships. ISR aircraft systems act as eyes in the sky, relaying raw imagery back to military personnel on the ground or to ships at-sea. The data is processed, analyzed, and shared with U.S. Navy or other U.S. military aircraft or vessels. New ISR technology systems provide combat identification (friend or foe) and are used for aircraft and ship-based communications.	
Typical Components	**Platforms:** Fixed Wing - Command and Control Aircraft, Unmanned Aerial Vehicle - Fixed Wing **Targets:** Air Targets - Drone **Systems being Trained/Tested:** ISR Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	Surface targets consist of Navy vessels accounted for in unit-level training activities.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex

A.3.1.2 Anti-Submarine Warfare

Anti-submarine warfare activities involve fixed-wing and rotary-wing 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 aircrew 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, rotary-wing aircraft, 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 that follows 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 Description	Test evaluates anti-submarine warfare systems onboard rotary-wing and fixed-wing aircraft and the ability to search for, detect, classify, localize, track, and attack a submarine or similar target.	
Long Description	An anti-submarine warfare torpedo test evaluates anti-submarine warfare systems onboard rotary-wing and fixed-wing aircraft and the ability to search for, detect, classify, localize, track, and attack a submarine or similar target. 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, but other anti-submarine warfare systems are often used during the test. 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. 85 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 – Patrol Aircraft, Rotary-Wing Aircraft **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Torpedoes/Torpedo Launching Systems **Munitions:** Torpedoes - Exercise	
Active Sonar	HFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources	
Parameters for Analysis	Assume one torpedo accessory package (ballast, etc.) per torpedo. Assume one target per torpedo.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.3.1.2.2 Anti-Submarine Warfare Tracking Test – Fixed-Wing

Anti-Submarine Warfare		
Anti-Submarine Warfare Tracking Test – Fixed-Wing		
Short Description	The test evaluates the sensors and systems used by fixed-wing aircraft to detect and track submarines and to ensure that aircraft systems used to deploy the tracking systems perform to specifications and meet operational requirements.	
Long Description	An Anti-Submarine Warfare Tracking Test Fixed -Wing evaluates the sensors and systems used to detect and track submarines and to ensure that platform systems used to deploy the tracking systems perform to specifications and meet operational requirements. Targets may also be employed during an anti-submarine warfare scenario. If available, tests may be conducted using an actual submarine as the target. This activity would be conducted in deep (typically beyond 100 ft.) waters. Some anti-submarine warfare fixed-wing aircraft tracking tests could be conducted as part of a coordinated event with fleet training activities.	
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Fixed Wing – Patrol Aircraft **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonobuoys **Munitions:** None	
Active Sonar	LFM, LFH, MFM, HFM	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Explosive sonobuoys and other sub-surface explosives	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	SINKEX Box
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex
	-	Other AFTT Areas

A.3.1.2.3 Anti-Submarine Warfare Tracking Test – Rotary-Wing

Anti-Submarine Warfare		
Anti-Submarine Warfare Tracking Test – Rotary-Wing		
Short Description	The test evaluates the sensors and systems used to detect and track submarines and to ensure that rotary-wing aircraft systems used to deploy the tracking systems perform to specifications.	
Long Description	An Anti-Submarine Warfare Tracking Test–Rotary-Wing evaluates the sensors and systems used to detect and track submarines and to ensure that platform systems used to deploy the tracking systems perform to specifications. Targets may also be employed during an anti-submarine warfare tracking test event. If available, tests may be conducted using an actual submarine as the target. This activity would be conducted in shallow or deep waters and could initiate from a land base or from a surface ship. Rotary-Wing anti-submarine warfare tests are intended to evaluate the sensors and systems used to detect and track submarines and to ensure that platform systems used to deploy the tracking systems perform to specifications. Some anti-submarine rotary-wing tracking tests could be conducted as part of an anti-submarine tracking coordinated event with fleet training activities.	
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Dipping, Sonobuoys **Munitions:** None	
Active Sonar	MFM, MFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex

A.3.1.2.4 Kilo Dip Test

Anti-Submarine Warfare		
Kilo Dip Test		
Short Description	Functional check of a rotary-wing aircraft-deployed dipping sonar system prior to conducting a testing or training event using the dipping sonar system.	
Long Description	A kilo dip is the operational term used to describe a functional check of a rotary-wing aircraft-deployed dipping sonar system. During a functional check, a single rotary-wing aircraft would deploy the sonar transducer assembly via a reel mechanism to a predetermined depth or series of depths while the rotary-wing aircraft hovers over the dip point. Once at the desired depth, the sonar transducer would be activated and would briefly transmit a pulsed, acoustic signal (i.e., ping) to check that all systems are functioning properly. After the check is completed, the sonar transducer assembly would be reeled in, and in some instances the rotary-wing aircraft would transit to a second dip point before the procedure is repeated. A kilo dip is a precursor to more comprehensive testing.	
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Dipping **Munitions:** None	
Active Sonar	MFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex

A.3.1.2.5 Sonobuoy Lot Acceptance Test

Anti-Submarine Warfare		
Sonobuoy Lot Acceptance Test		
Short Description	Sonobuoys are deployed from surface vessels and aircraft to verify the integrity and performance of a lot or group of sonobuoys in advance of delivery to the fleet for operational use.	
Long Description	Sonobuoys are deployed from surface vessels and aircraft to verify the integrity and performance of a lot or group of sonobuoys in advance of delivery to the fleet for operational use. Lot acceptance testing would occur for multiple types of sonobuoys including non-impulsive and explosive.	
Typical Components	**Platforms:** Surface Vessel, Fixed Wing – Other Aircraft, Fixed Wing – Patrol Aircraft **Targets:** None **Systems being Trained/Tested:** Signal, Underwater Sound Buoys Sonobuoys **Munitions:** None	
Active Sonar	LFM, LFH, MFM, HFM	
In-Water Explosives	E1, E3	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Explosive sonobuoys and other sub-surface explosives	
Parameters for Analysis	Assume one parachute per sonobuoy	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Key West Range Complex	Key West Range Complex

A.3.1.3 Electronic Warfare

A.3.1.3.1 Chaff Test

Electronic Warfare	
Chaff Test	
Short Description	Chaff tests evaluate newly developed or enhanced chaff, chaff dispensing equipment, or modified aircraft systems against chaff deployment. Tests may also train pilots and aircrews in the use of new chaff dispensing equipment. Chaff tests are often conducted with flare tests and air combat maneuver activities, as well as other test activities, and are not typically conducted as standalone tests.
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 activities, 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 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 Components	**Platforms:** Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** Chaff **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	None

Electronic Warfare		
Chaff Test		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.3.1.3.2 Electronic Systems Test

Electronic Warfare		
Electronic Systems Test		
Short Description	Test that evaluates the effectiveness of electronic systems to control, deny, or monitor critical portions of the electromagnetic spectrum. In general, electronic warfare testing will assess the performance of three types of electronic warfare systems: electronic attack, electronic protect, and electronic support.	
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 electromagnetic spectrum. In general, electronic warfare testing will assess the performance of three types of electronic warfare systems; specifically, electronic attack, electronic protect, and electronic support. 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 the performance of the actually electronic warfare system. The test results are also used to define performance characteristics and to improve and update existing analytical and predictive models.	
Typical Components	**Platforms:** Fixed Wing - Command and Control Aircraft, Fixed Wing – Strike Aircraft **Targets:** Air Targets – Drone **Systems being Trained/Tested:** Electronic Warfare Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.3.1.3.3 Flare Test

Electronic Warfare		
Flare Test		
Short Description	Flare tests evaluate newly developed or enhanced flares, flare dispensing equipment, or modified aircraft systems against flare deployment. Tests may also train pilots and aircrew in the use of newly developed or modified flare deployment systems. Flare tests are often conducted with chaff tests and air combat maneuver activities, as well as other test activities, and are not typically conducted as standalone tests.	
Long Description	Flare tests are conducted to evaluate new flares, newly developed or modified flare deployment systems, to ensure that other newly enhanced aircraft systems are compatible with flare deployment, and to train pilots and aircrew in the use of newly developed or modified flare deployment systems. Flare tests are often conducted with chaff tests and air combat maneuver activities, as well as other test activities, and are not typically conducted as stand-alone tests. During a flare test, flares (and in some cases chaff) are deployed, but no weapons are typically fired. Flare dispensers may also be jettisoned during a flare test intended to assess the safe release of the dispenser in the event of an emergency. Rotary-wing and tiltrotor aircraft deploy flares as a defensive tactic (electronic protect deployment) to disrupt the infrared missile guidance systems used by heat-seeking missiles, thereby causing the missile to lock onto the flare instead of onto the aircraft and enabling the aircraft to avoid the threat. In a typical scenario, an aircraft may detect the electronic targeting signals emitted from 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.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** Flare Dispensing Systems **Munitions:** Flares	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

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 activities include airborne mine countermeasures activities, mine-laying activities (similar to mine exercises), and mine neutralization activities. 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 Dipping Sonar Minehunting Test		
Short Description	A minehunting dipping sonar system that is deployed from a rotary-wing aircraft and uses high-frequency sonar for the detection and classification of bottom and moored mines.	
Long Description	Tests of a minehunting dipping sonar system to evaluate the search capabilities of this rotary-wing aircraft-deployed, minehunting, detection, and classification system. The sonar identifies mine-like objects.	
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Mine Targets **Systems being Trained/Tested:** Sonar Systems - Mine Warfare **Munitions:** None	
Active Sonar	HFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources	
Parameters for Analysis	The activity uses an established mine warfare training range and does not require the placement of moored mines.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.1.4.2 Airborne Laser Mine Detection System Test

Mine Warfare		
Airborne Laser Mine Detection System Test		
Short Description	An Airborne Laser Mine Detection System test that is operated from a rotary-wing aircraft and evaluates the system's ability to detect, classify, and fix the location of floating and near-surface, moored mines. The system uses a low-energy laser to locate mines.	
Long Description	During an airborne mine detection system test, a rotary-wing aircraft evaluates the search capabilities of the AN/AES-1 Airborne Laser Mine Detection System. The Airborne Laser Mine Detection System is a minehunting 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 rotary-wing aircraft 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. Airborne Laser Mine Detection System also provides accurate target geo-location to support follow-on neutralization of the detected mines.	
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Mine Targets **Systems being Trained/Tested:** Low-Energy Laser Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	The activity uses an established mine warfare training range and does not require the placement of moored mines.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.1.4.3 Airborne Mine Neutralization System Test

Mine Warfare		
Airborne Mine Neutralization System Test		
Short Description	A test of the airborne mine neutralization system evaluates the system's ability to detect and destroy mines from an airborne mine countermeasures capable rotary-wing aircraft. The airborne mine neutralization system uses up to four unmanned underwater vehicles equipped with high-frequency sonar, video cameras, and explosive and non-explosive neutralizers.	
Long Description	Mine neutralization tests evaluate aircraft and aircraft systems intended to neutralize or otherwise destroy mines through the use of explosives or other munitions. For most neutralization tests, mine shapes or non-explosive mines are used to evaluate new or enhanced mine neutralization systems. The airborne mine neutralization system uses up to four unmanned underwater vehicles equipped with high-frequency sonar and video cameras to relocate previously detected submerged mines. The unmanned underwater vehicles are also equipped with explosives to neutralize the mines after they are located. Data from unmanned underwater vehicles are relayed to the operator in the rotary-wing aircraft through a fiber-optic cable enabling the operator to position the neutralizing charge onto the most vulnerable area of the mine. The explosive charge is then detonated to neutralize the mine. For most tests, recoverable non-explosive neutralizers are used. A mine shape, rather than an explosive mine, serves as the target and a range support vessel recovers the non-explosive neutralizer and the mine shape following the test. Testing scenarios include a non-explosive neutralizer against an inert mine shape, or an explosive neutralizer against an explosive mine.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Submarine **Targets:** Mine Targets **Systems being Trained/Tested:** Mine Warfare Devices **Munitions:** None	
Active Sonar	No	
In-Water Explosives	E4	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive mine countermeasure and neutralization (no divers)	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.1.4.4 Airborne Sonobuoy Minehunting Test

Mine Warfare		
Airborne Sonobuoy Minehunting Test		
Short Description	A minehunting system made up of sonobuoys is deployed from a rotary-wing aircraft. A field of sonobuoys, using high-frequency sonar, is used for detection and classification of bottom and moored mines.	
Long Description	Tests of minehunting sonobuoys to evaluate the search capabilities of this rotary-wing aircraft-deployed, minehunting, detection, and classification system. The sonar identifies mine-like objects.	
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Mine Targets **Systems being Trained/Tested:** Sonobuoys **Munitions:** None	
Active Sonar	MFM	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.1.4.5 Mine-Laying Test

Mine Warfare		
Mine-Laying Test		
Short Description	Fixed-wing aircraft evaluate the performance of mine-laying equipment and software systems to lay mines. A mine test may also train aircrew in laying mines using a new or enhanced mine deployment system.	
Long Description	During a mine-laying test, fixed-wing aircraft evaluate the performance of aircraft mine laying equipment or associated software systems to lay mines using non-explosive mine shapes. A mine test may also train aircrew in the technique of laying mines and in using a new or enhanced mine deployment system. Aircrew typically drop a series of about four non-explosive mine shapes, making multiple passes in the same flight pattern and dropping one or more shapes each time. The non-explosive mine shapes are expendable and are typically not recovered after the test.	
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft **Targets:** None **Systems being Trained/Tested:** Mine-Laying Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines	
Parameters for Analysis	When a test event occurs and aircrew receives training, the event will be analyzed as a testing event.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

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 Description	Fixed-wing aircraft test the delivery of bombs against surface maritime targets with the goal of evaluating the bomb, the bomb carry and delivery system, and any associated systems that may have been newly developed or enhanced.	
Long Description	Fixed-wing aircraft test the delivery of bombs against surface maritime targets with the goal of evaluating the bomb, the bomb carry and delivery system, and any associated systems that may have been newly developed or enhanced. Non-explosive bombs will be released during this type of test and typically include non-explosive general-purpose bombs and guided bomb units of various sizes. Surface targets may also be used.	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft, Unmanned Aerial Vehicle - Fixed Wing **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Bomb-Releasing Systems **Munitions:** Bombs	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines and non-explosive bombs Explosive bombs	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex

A.3.1.5.2 Air-to-Surface Gunnery Test

Surface Warfare		
Air-to-Surface Gunnery Test		
Short Description	Fixed-wing and rotary-wing aircrews evaluate new or enhanced aircraft guns against surface maritime targets to test that the gun, gun ammunition, or associated systems meet required specifications or to train aircrew in the operation of a new or enhanced weapons system.	
Long Description	Fixed-wing and rotary-wing aircrews evaluate new or enhanced aircraft guns against surface maritime targets to test that the gun, gun ammunition, or associated systems meet required specifications or to train aircrew in the operation of a new or enhanced weapons system. Non-explosive practice munitions are typically used during this type of test; however, a small number of high-explosive rounds may be used during final testing. Rounds that may be used include 7.62 millimeter (mm), 20 mm, 30 mm, 0.30-caliber, and 0.50-caliber gun ammunition.	
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Gunnery Systems **Munitions:** Projectile – Medium-Caliber, Projectile – Small-Caliber	
Active Sonar	No	
In-Water Explosives	E1	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive gunnery Non-explosive gunnery	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.3.1.5.3 Air-to-Surface Missile Test

Surface Warfare		
Air-to-Surface Missile Test		
Short Description	Test may involve both fixed-wing and rotary-wing aircraft launching missiles at surface maritime targets to evaluate the weapons system or as part of another systems integration test.	
Long Description	An air-to-surface missile test may involve both fixed-wing and rotary-wing aircraft launching missiles at surface maritime targets to evaluate the weapons system or as part of another systems integration test. Air-to-surface missile tests can include high explosive, non-explosive, or non-firing (captive air training missile) weapons. Laser targeting systems may also be used. Both stationary and mobile targets would be utilized during testing.	
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** Air Targets - Decoy, Air Targets - Drone, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Missile Firing/Launching Systems **Munitions:** Air-to-Surface Missiles	
Active Sonar	No	
In-Water Explosives	E6, E9	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines and non-explosive bombs Manned surface vessels Explosive missiles and rockets Non-explosive missiles and rockets	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.3.1.5.4 Air-to-Surface High-Energy Laser Test

Surface Warfare		
Air-to-Surface High-Energy Laser Test		
Short Description	High-energy laser tests would evaluate the specifications, integration, and performance of an aircraft mounted, approximately 25-kilowatt high-energy laser. The laser is intended to be used as a weapon to disable small surface vessels.	
Long Description	During a high-energy laser test, aircrew would evaluate the specifications, integration, and performance of an aircraft mounted, approximately 25-kilowatt high-energy laser that is intended to be used as a weapon against stationary and mobile, unmanned surface targets. The high-energy laser would be employed from a rotary-wing aircraft and is designed to disable the surface vessel, rendering it immobile. The high-energy laser would have a range of up to six kilometers. Unmanned surface targets would be used during the high-energy laser test.	
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** High-Energy Laser System **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	High-energy laser systems used in military readiness activities automatically shut down when target-lock is lost; meaning that if a high-energy laser beam aimed at a target on the surface, either from an aircraft or surface vessel, moves off the target, the system ceases projecting laser light, preventing any energy from striking the water or a nearby marine species.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex

A.3.1.5.5 Laser Targeting Test

Surface Warfare		
Laser Targeting Test		
Short Description	Aircrews illuminate enemy targets with lasers.	
Long Description	During a laser targeting test, aircrew use laser targeting devices integrated into aircraft or weapons systems to evaluate targeting accuracy and precision and to train aircrew in the use of newly developed or enhanced laser targeting devices designed to illuminate designated targets for engagement with laser-guided weapons. No explosive munitions are released during a laser targeting test.	
Typical Components	**Platforms:** Unmanned Aerial Vehicle - Fixed Wing **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** Laser Targeting Systems **Munitions:** Bombs	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines and non-explosive bombs	
Parameters for Analysis	Military expended material may be non-explosive bombs or other guided munitions.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex

A.3.1.5.6 Maritime Security Operations

Surface Warfare		
Maritime Security Operations		
Short Description	Fixed-wing aircraft participate in maritime security activities and fleet training events. Aircraft identify, track, and monitor foreign merchant vessels suspected of non-compliance with United Nations-allied sanctions or conflict rules of engagement.	
Long Description	Crews from Navy fixed-wing aircraft identify, track, and monitor foreign merchant vessels suspected of not complying with United Nations-allied sanctions or conflict rules of engagement. This training event is non-firing. Naval Air Systems Command fixed-wing may participate in maritime security activities and training activities.	
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft **Targets:** None **Systems being Trained/Tested:** Radar Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	None	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.3.1.5.7 Rocket Test

Surface Warfare		
Rocket Test		
Short Description	Rocket tests are conducted to evaluate the integration, accuracy, performance, and safe separation of guided and unguided rockets fired from a hovering or forward flying rotary-wing aircraft or tiltrotor aircraft.	
Long Description	Rocket tests are conducted to evaluate the integration, accuracy, performance, and safe separation of laser-guided and unguided rockets fired from a hovering or forward flying rotary-wing aircraft. 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 motor and non-explosive warhead would be jettisoned along with the rocket launcher. Rocket tests are also conducted to train aircrew on the use of new or enhanced weapons systems. Non-explosive warhead rocket types also include flechette rockets. Some rocket tests may be conducted in conjunction with upgrades to or integration of the Forward-Looking Infrared targeting system.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Tiltrotor Aircraft, Vehicle Launch Platform **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Rocket Firing/Launching Systems **Munitions:** Rockets	
Active Sonar	No	
In-Water Explosives	E3	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive missiles and rockets Non-explosive missiles and rockets	
Parameters for Analysis	Assume 25 percent of non-explosive practice munitions are flechette rockets.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex

A.3.1.6 Other Testing Activities

A.3.1.6.1 Acoustic and Oceanographic Research

Other Testing Activities		
Acoustic and Oceanographic Research		
Short Description	Active transmissions within the band 10 hertz (Hz)-100 kilohertz (kHz) from sources deployed from ships and aircraft.	
Long Description	Active acoustic transmissions within the band 10 Hz-100 kHz used for engineering tests of acoustic sources, validation of ocean acoustic models, characterization of acoustic interactions with the ocean bottom and ocean surface.	
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Small Boat **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** Low-Energy Lasers, De Minimis Sonar Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex

A.3.1.6.2 Air Platform Shipboard Integration Test

Other Testing Activities		
Air Platform Shipboard Integration Test		
Short Description	Aircraft are tested to determine operability from shipboard platforms, performance of shipboard physical operations, and to verify and evaluate communications and tactical data links.	
Long Description	The air platform shipboard integration test is performed to evaluate the compatibility of an aircraft 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 ordnance, hazard of electromagnetic radiation to personnel, and high-energy radio frequency.	
Typical Components	**Platforms:** Aircraft Carrier, Fixed Wing - Command and Control Aircraft, Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Surface Combatant, Tiltrotor Aircraft, Unmanned Aerial Vehicle - Fixed Wing, Unmanned Aerial Vehicle - Rotary Wing **Targets:** None **Systems being Trained/Tested:** Communication Systems **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	-	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex
	-	Key West Range Complex

A.3.1.6.3 Undersea Range System Test

Other Testing Activities		
Undersea Range System Test		
Short Description	Following installation of a Navy underwater warfare training and testing range, tests of the nodes (components of the range) will be conducted to include node surveys and testing of node 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 Components	**Platforms:** Fixed Range, Support Craft, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Signal, Underwater Sound Devices **Munitions:** None	
Active Sonar	MFM, HFM	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	The duration of the node survey varies. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Jacksonville Range Complex	Jacksonville Range Complex

A.3.2 Naval Sea Systems Command Testing Activities

A.3.2.1 Amphibious Warfare

A.3.2.1.1 Amphibious Vessel Testing

Amphibious Warfare		
Amphibious Vessel Testing		
Short Description	Amphibious vessels evaluate performance of amphibious vessels and landing gear.	
Long Description	Amphibious vessels evaluate performance of amphibious vessels and landing gear. Testing is required to ensure amphibious vessels can land troops, equipment, and vehicles on a beach as designed. Testing would not occur above the mean high tide line.	
Typical Components	**Platforms:** Amphibious vessels **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Testing locations would include beach landings on barrier islands, beaches on inland waterways, as well as beaches of the Gulf Coast. Current preferred locations would be within 50 NM of Mobile, Alabama.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Gulf of Mexico Range Complex Inshore

A.3.2.2 Anti-Submarine Warfare

A.3.2.2.1 Anti-Submarine Warfare Mission Package Testing

Anti-Submarine Warfare		
Anti-Submarine Warfare Mission Package Testing		
Short Description	Ships and their supporting platforms (e.g., rotary-wing aircraft and unmanned aerial systems) detect, localize, and prosecute submarines.	
Long Description	Ships conduct detect-to-engage operations against modern diesel-electric and nuclear submarines using airborne and surface assets (both manned and unmanned). Active and passive acoustic systems are used to detect and track submarine targets, culminating in the deployment of lightweight torpedoes to engage the threat.	
Typical Components	**Platforms:** Contracted Aircraft, Fleet Support Vessels, Rotary-Wing Aircraft, Fixed Structure, Surface Combatant **Targets:** Air Targets - Drone, Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed **Munitions:** Surface-to-Air Missiles, Torpedoes – Exercise, Sonobuoys	
Active Sonar	LFM, LFH, MFM, MFH, MF1, HFH, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	All sonobuoys have parachutes unless otherwise noted. Sub-surface targets are submarines. This activity includes missiles exploding at high altitudes.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Naval Undersea Warfare Center Division, Newport	-
	-	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex
	-	Bath, ME
	Newport, RI	-

A.3.2.2.2 At-Sea Sonar Testing

Anti-Submarine Warfare		
At-Sea Sonar Testing		
Short Description	At-sea testing to ensure systems are fully functional in an open ocean environment.	
Long Description	At-sea sonar testing is required to calibrate or document the functionality of sonar and torpedo systems while the ship or submarine is in an open ocean environment. Conduct detect-to-engage operations utilizing stationary targets as well as deployed expendable bathythermograph, passive sonobuoys and expendable mobile ASW training targets. At-sea sonar testing is conducted to verify the ship meets design acoustic specifications, define 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 improvements to reduce noise. Tests also consist of electronic support measurement, photonics, and sonar sensor accuracy testing. In some instances, a submarine's passive detection capability is tested when a second submarine utilizes its active sonar or is equipped with a noise augmentation system in order to replicate acoustic or electromagnetic signatures of other vessel types or classes.	
Typical Components	**Platforms:** Fixed Range, Submarine, Support Craft, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering, Surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Countermeasures, Pinger, Safety and Navigation, Sonar Systems - Hull Mounted, Sonar Systems - Other, Sonar Systems - Towed, Underwater Range Systems **Munitions:** Sonobuoys, Torpedoes - Exercise	
Active Sonar	MFL, MFM, MFH, MF1, MF1K, HFL, HFM, HFH, Broadband (LF to HF), Broadband (LF to MF), Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices	
Parameters for Analysis	Active sonar use is intermittent throughout the duration of the event.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Naval Undersea Warfare Center Division, Newport	-
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	SFOMF	SFOMF
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Key West Range Complex

A.3.2.2.3 Pierside Sonar Testing

Anti-Submarine Warfare	
Pierside Sonar Testing	
Short Description	Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities and complete any required troubleshooting.
Long Description	Ships and submarines would activate mid- and high-frequency tactical sonars, underwater communications systems, and navigational devices to ensure they are fully functional prior to at-sea test activities. Conduct required troubleshooting of above active sonar equipment to correct any noted system issues. Testing may also include the firing of inert torpedo shapes. Event duration varies; with average durations of 3 weeks, with active sonar used intermittently over 2 days during the total event duration. This also includes pierside sonar testing during surface combatant sea trials.
Typical Components	**Platforms:** All Navy Ships and Boats, Fixed Structure, Submarine, Surface Combatant **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Countermeasures, Fathometer, Navigation Systems, Safety and Navigation, Sonar Systems - Hull Mounted, Sonar Systems - Other **Munitions:** None
Active Sonar	MFM, MFH, HFM, HFH, Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels
Parameters for Analysis	Event duration is 3 weeks with active sonar used intermittently. The facility platform may be a dock or other structure. Some testing may occur in the Navigation Tracks within the Range Complexes.

Anti-Submarine Warfare		
Pierside Sonar Testing		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Northeast Range Complexes
	-	Virginia Capes Range Complex
	-	Jacksonville Range Complex
	Gulf of Mexico Range Complex Inshore	Gulf of Mexico Range Complex Inshore
	Bath, ME	Bath, ME
	NSB New London	NSB New London
	PNS	PNS
	Newport, RI	Newport, RI
	NS Norfolk	NS Norfolk
	NS Kings Bay	NS Kings Bay
	-	NS Mayport
	Port Canaveral, FL	Port Canaveral, FL
	Pascagoula, MS	Pascagoula, MS

A.3.2.2.4 Surface Ship Sonar Testing/Maintenance

Anti-Submarine Warfare		
Surface Ship Sonar Testing/Maintenance		
Short Description	Pierside and at-sea testing of ship systems occurs periodically following major maintenance periods and for routine maintenance.	
Long Description	Following major and routine maintenance periods, pierside and at-sea testing and maintenance is required. Multiple systems with active and passive acoustic sources such as tactical sonar, navigation systems, fathometers, underwater communications systems, underwater distress beacons, range finders, and other similar systems will be tested.	
Typical Components	**Platforms:** Surface Combatant **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Countermeasures, Sonar Systems - Hull Mounted, Sonar Systems - Other **Munitions:** None	
Active Sonar	LFL, MFM, MF1, MF1K, Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	Sonar will not be continuously active for the duration of the test.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Norfolk, VA	-
	Mayport, FL	-

A.3.2.2.5 Torpedo (Explosive) Testing

Anti-Submarine Warfare		
Torpedo (Explosive) Testing		
Short Description	Air, surface, or submarine crews employ explosive and non-explosive torpedoes against artificial targets.	
Long Description	Non-explosive and explosive torpedoes (carrying a warhead) will be launched at a suspended target by a submarine and fixed- or rotary-wing aircraft or surface combatants. Event duration is 1 to 2 days during daylight hours.	
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Fixed Wing – Patrol Aircraft, Moored Platform, Rotary-Wing Aircraft, Submarine, Support Craft, Surface Combatant **Targets:** Mine Targets, Sub-surface Targets - Maneuvering, Sub-surface Targets - Stationary, Surface Targets - Floating **Systems being Trained/Tested:** Countermeasures, Pinger, Signal, Underwater sound Devices, Sonar Systems - Dipping, Sonar Systems - Hull Mounted **Munitions:** Sonobuoys, Torpedoes - Exercise, Torpedoes - HE	
Active Sonar	MFM, MFH, MF1, HFH, Broadband (MF to HF)	
In-Water Explosives	E8, E11	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Explosive torpedoes	
Parameters for Analysis	All sonobuoys have parachutes unless otherwise noted. Only one heavyweight torpedo test could occur in a single 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	Key West Range Complex	Key West Range Complex

A.3.2.2.6 Torpedo (Non-Explosive) Testing

Anti-Submarine Warfare		
Torpedo (Non-Explosive) Testing		
Short Description	Air, surface, or submarine crews employ non-explosive torpedoes against targets, submarines, or surface vessels.	
Long Description	Aerial, surface, and subsurface assets fire exercise torpedoes against surface or subsurface targets or at no target and programmed with a particular run geometry. Torpedo testing evaluates the performance and the effectiveness of hardware and software upgrades of heavyweight or lightweight torpedoes. It also includes testing of experimental torpedoes. Not all torpedo tests involve acoustics. Exercise torpedoes are recovered, typically from surface ships and helicopters that are specifically crewed and outfitted for torpedo recovery. Event duration is dependent on number of torpedoes fired.	
Typical Components	**Platforms:** Contracted Aircraft, Fixed Wing - Command and Control Aircraft, Fixed Wing – Other Aircraft, Fixed Wing – Patrol Aircraft, Moored Platform, Rotary-Wing Aircraft, Submarine, Support Craft, Surface Combatant **Targets:** Mine Targets, Sub-surface Targets - Maneuvering, Sub-surface Targets - Stationary, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Countermeasures, Pinger, Safety and Navigation, Signal, Underwater sound Devices, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Underwater Range Systems **Munitions:** Sonobuoys, Torpedoes - Exercise	
Active Sonar	MFL, MFM, MFH, MF1, HFM, HFH, VHFH, Broadband (LF to HF), Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	All torpedoes are recovered. Events can last up to two weeks and use up to 40 torpedoes. Typically, no more than eight torpedoes are fired per day during daylight hours.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	NUWC Newport Testing Range	NUWC Newport Testing Range
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	SFOMF
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Key West Range Complex

A.3.2.3 Electronic Warfare

A.3.2.3.1 Radar and Other System Testing

Electronic Warfare	
Radar and Other Systems Testing	
Short Description	Test may include use of military or commercial radar, communication systems (or simulators), passive and active EW systems, electro-optical / infrared systems, or high and low-energy lasers. Testing may occur aboard a ship against drones, small boats, rockets, missiles, or other targets.
Long Description	At-sea and docked testing may use military or commercial radar, communication systems (or simulators), passive and active EW systems, electro-optical/infrared systems, or high and low-energy lasers. No subsurface transmission will occur during this testing. Testing of various air and surface targets may include stationary targets, unmanned aerial systems, missiles or small craft (floating cardboard tri-walls, towed, anchored, or self-propelled vessels) or large ships. High-energy laser testing may include tracking, scoring, and neutralization runs with single or multiple targets.
Typical Components	**Platforms:** Aircraft Carrier, Amphibious Warfare Vessel, Contracted Aircraft, Fixed Wing – Adversary Aircraft, Fixed Wing - Command and Control Aircraft, Fixed Wing – Patrol Aircraft, Fixed Wing – Strike Aircraft, Fleet Support Vessel, Patrol Combatant, Fixed Range, Rotary-Wing Aircraft, Small Boat, Fixed Structure, Submarine, Support Craft, Surface Combatant, Tiltrotor Aircraft, Unmanned Aerial Vehicle - Fixed Wing, Unmanned Bottom Crawler **Targets:** Air Targets - Drone, Air Targets - Other, Mine Targets, Sub-surface Targets - Maneuvering, Sub-surface Targets - Stationary, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Echosounders, High-Energy Laser Systems, Sonar Systems – Other **Munitions:** Projectile - Large-Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Non-explosive gunnery Non-explosive missiles and rockets Towed in-water devices Unmanned vehicles Weapon firing noise
Parameters for Analysis	All explosive missiles detonate in air during this test event. High-energy lasers will not be tested pierside. High-energy laser systems used in military readiness activities automatically shut down when target-lock is lost; meaning that if a high-energy laser beam aimed at a target on the surface, either from an aircraft or surface vessel, moves off the target, the system ceases projecting laser light, preventing any energy from striking the water or a nearby marine species.

Electronic Warfare		
Radar and Other Systems Testing		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	NUWC Newport Testing Range	NUWC Newport Testing Range
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	SFOMF	-
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	NSWC Panama City Testing Range	NSWC Panama City Testing Range
	Key West Range Complex	-
	Virginia Capes Range Complex Inshore	Virginia Capes Range Complex Inshore
	Groton, CT	-
	JEB Little Creek	-
	NS Norfolk	NS Norfolk

A.3.2.4 Mine Warfare

A.3.2.4.1 Mine Countermeasure and Neutralization Testing

Mine Warfare		
Mine Countermeasure and Neutralization Testing		
Short Description	Air, surface, and subsurface vessels neutralize threat mines and mine-like objects.	
Long Description	Mine countermeasure-neutralization and mine system testing is required to ensure systems can effectively neutralize threat (live or inert) mines that will otherwise restrict passage through an area and to ensure U.S. Navy mines remain effective against enemy ships. These systems may be deployed with a variety of ships, aircraft, submarines, or unmanned autonomous vehicles and operate in water depths up to 6,000 feet. Mines are neutralized by cutting mooring cables of buoyant mines, producing acoustic energy that fires acoustic-influence mines, employing radar or laser fields, producing electrical energy to replicate the magnetic signatures of surface ships in order to detonate threat mines, detonation of mines using remotely operated vehicles, and using explosive charges to destroy threat mines.	
Typical Components	**Platforms:** Moored Platform, Rotary-Wing Aircraft, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Mine Warfare Devices **Munitions:** None	
Active Sonar	No	
In-Water Explosives	E4	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Aerial-deployed mines and non-explosive bombs Manned surface vessels Explosive mine countermeasure and neutralization (no divers)	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.3.2.4.2 Mine Countermeasure Mission Package Testing

Mine Warfare		
Mine Countermeasures Mission Package Testing		
Short Description	Vessels and associated aircraft conduct mine countermeasure operations.	
Long Description	Ships conduct mine detection using unmanned submersible and aerial vehicles, magnetic and acoustic sensor systems deployed by vessel or support helicopters, and high-energy laser systems. Mines are then neutralized using magnetic, acoustic, and supercavitating systems.	
Typical Components	**Platforms:** Rotary-Wing Aircraft, Surface Combatant, Unmanned Aerial Vehicle - Rotary Wing, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Electromagnetic Systems, Mine Warfare Devices, Sonar Systems - Mine Warfare, Sonar Systems - Other, Unmanned Vehicle Systems **Munitions:** None	
Active Sonar	MFH, HFM, HFH	
In-Water Explosives	E4	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Aerial-deployed mines and non-explosive bombs Explosive mine countermeasure and neutralization (no divers) Unmanned vehicles	
Parameters for Analysis	Eight charges per event The in-air low-energy laser stressor was used in analysis of potential impacts on human resources.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	SFOMF	SFOMF
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.2.4.3 Mine Detection and Classification Testing

Mine Warfare	
Mine Detection and Classification Testing	
Short Description	Air, surface, and subsurface vessels and systems detect and classify mines and mine-like objects. Vessels also assess their potential susceptibility to mines and mine-like objects.
Long Description	Mine detection and classification systems require testing to evaluate the capability of generating underwater magnetic and acoustic signature fields as well as sonar systems that can detect, and classify a wide range of threat mines at tactically different water depths. Surface craft may deploy an underwater sensor system that uses ship signature to develop a susceptibility profile against mine-like objects. In order to develop better and safer methods of minesweeping, the Navy is currently testing new systems to detect locate, identify, and avoid mines including a laser airborne mine detection system that uses laser illumination coupled with sensitive electro-optic receivers to find mines in the upper part of the water column. This type of equipment has traditionally been designed for operation from a manned helicopter; however, the Navy is developing the capability to operate from unmanned aerial systems.
Typical Components	**Platforms:** Fleet Support, Moored Platform, Fixed Range, Rotary-Wing Aircraft, Small Boat, Submarine, Support Craft, Surface Combatant, Unmanned Aerial Vehicle - Fixed Wing, Unmanned Aerial Vehicle - Rotary Wing, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets, Sub-surface Targets - Stationary, Surface Targets - Floating **Systems being Trained/Tested:** Safety and Navigation, Sonar Systems - Hull Mounted, Sonar Systems - Mine Warfare, Sonar Systems - Other **Munitions:** Torpedoes - Exercise
Active Sonar	HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Aerial-deployed mines and non-explosive bombs Unmanned vehicles
Parameters for Analysis	Some mine shapes could be deployed for a specific event, and then retrieved afterwards. However, some mine shapes are left in place so that multiple events can use the same shapes without needing to redeploy. The in-air low-energy laser stressor was used in analysis of potential impacts on human resources.

Mine Warfare		
Mine Detection and Classification Testing		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	-
	Navy Cherry Point Range Complex	-
	Jacksonville Range Complex	Jacksonville Range Complex
	SFOMF	-
	Gulf of Mexico Range Complex	-
	NSWC Panama City Testing Range	NSWC Panama City Testing Range
	-	Port Canaveral, FL

A.3.2.5 Surface Warfare

A.3.2.5.1 Gun Testing – Large-Caliber

Surface Warfare		
Gun Testing - Large-Caliber		
Short Description	Surface crews test large-caliber guns to defend against surface targets. Demonstration of large-caliber guns including the Mk45 5-inch gun and Mk41 Vertical Launch Systems using surface-to-air missiles.	
Long Description	Surface combatants conduct surface warfare by detecting, tracking, and prosecuting small-boat threats. Gun testing may also include the surface warfare mission package, which provides a layered strike-defensive capability by use of its embarked support aircraft, medium-range surface-to-surface missiles, and 57-millimeter gun weapon system. Demonstration of the Mk45 5-inch gun against a simulated target utilizing inert Blind Loaded and Plugged (BL&P) rounds.	
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Drone, Air Targets - Other, Surface Targets - Floating, Surface Targets - Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** None **Munitions:** Projectile – Large-Caliber, Projectile – Small-Caliber	
Active Sonar	No	
In-Water Explosives	E3, E5	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive gunnery Non-explosive gunnery Towed in-water devices Weapon firing noise	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	-
	Jacksonville Range Complex	Jacksonville Range Complex
	Key West Range Complex	-
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.2.5.2 Gun Testing – Medium-Caliber

Surface Warfare		
Gun Testing - Medium-Caliber		
Short Description	Surface crews test medium-caliber guns to defend against surface targets. Demonstration of medium-caliber Mk15 Close-In Weapon System (CIWS).	
Long Description	Surface combatants conduct surface warfare by detecting, tracking, and prosecuting small-boat threats. Gun testing may also include the surface warfare mission package on the Littoral Combat Ship, which provides a layered strike-defensive capability by use of its embarked support aircraft, medium range surface-to-surface missiles, and 30-mm gun weapon system. Demonstration of the Mk15 Close-In Weapon System (CIWS) against a simulated target.	
Typical Components	**Platforms:** Aircraft Carrier, Contracted Aircraft, Fixed Wing – Patrol Aircraft, Fleet Support Vessel, Rotary-Wing Aircraft, Support Craft, Surface Combatant **Targets:** Air Targets - Other, Surface Targets - Floating, Surface Targets - Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** None **Munitions:** Projectile – Large-Caliber, Projectile – Medium-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive gunnery Non-explosive gunnery Towed in-water devices Weapon firing noise	
Parameters for Analysis	50 or 1,400 rounds are expended per event. Events with 1,400 rounds have 700 explosive and 700 non-explosive rounds per event. This activity includes explosives detonated in-air at low altitudes.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	-
	Jacksonville Range Complex	-
	Key West Range Complex	-
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.2.5.3 Gun Testing – Small-Caliber

Surface Warfare		
Gun Testing - Small-Caliber		
Short Description	Surface crews test small-caliber guns to defend against surface targets.	
Long Description	Small-caliber guns are fired from surface vessels. This testing also includes anti-terrorism/force protection. During this event, surface craft surface targets will make threat profile approaches to the ship. Ship will demonstrate small-caliber gun testing with non-explosive rounds against the threat target. Small-caliber gun testing includes other class ship sea trials and surface warfare mission package testing.	
Typical Components	**Platforms:** Fleet Support Vessel, Rotary-Wing Aircraft, Small Boat, Surface Combatant **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** None **Munitions:** Projectile - Small-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Non-explosive gunnery Towed in-water devices	
Parameters for Analysis	500-1,000 rounds are expended per event. Ships may not be conducting tests consistently for the duration of the event	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Key West Range Complex	Key West Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.2.5.4 Missile and Rocket Testing

Surface Warfare		
Missile and Rocket Testing		
Short Description	Missile and rocket testing includes various missiles or rockets fired from submarines and surface combatants. Testing of the launching system and ship defense is performed.	
Long Description	Missile and rocket testing includes various missiles or rockets (standard missiles, Water Piercing Missile Launch) fired from submarines and surface combatants. Testing may occur during surface combatant sea trials and surface warfare mission package testing. This activity includes both air warfare and surface warfare activities.	
Typical Components	**Platforms:** Aircraft Carrier, Fixed Wing - Electronic Warfare Aircraft, Fixed Wing – Patrol Aircraft, Fleet Support Vessel, Rotary-Wing Aircraft, Submarine, Support Craft, Surface Combatant, Unmanned Aerial Vehicle - Fixed Wing **Targets:** Air Targets - Decoy, Air Targets - Drone, Air Targets - Other, Land Targets, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Air-to-Surface Missiles, Projectile – Large-Caliber, Projectile – Medium-Caliber, Projectile – Small-Caliber, Rockets, Subsurface-to-Surface Missiles, Surface-to-Air Missiles	
Active Sonar	No	
In-Water Explosives	E6, E7, E8, E10	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive missiles and rockets Non-explosive missiles and rockets	
Parameters for Analysis	Targets used during non-explosive tests will be recovered. Explosive missiles will detonate either in the air (at low and medium altitudes) or at the water's surface. Ships will not be conducting test constantly for the duration of the allotted time. This activity includes both air warfare and surface warfare activities, but it captured under the Surface Warfare Protective Measures Assessment Protocol for simplicity.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	-
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Key West Range Complex	-
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.3.2.6 Unmanned Systems

A.3.2.6.1 Underwater Search, Deployment, and Recovery

Unmanned Systems		
Underwater Search, Deployment, and Recovery		
Short Description	Various underwater, bottom-crawling, or robotic vehicles are utilized in underwater search, recovery, installation, and scanning activities.	
Long Description	Subsurface activities include a variety of underwater vehicles, robotic or autonomous systems, and items placed on the seafloor. This includes remotely operated vehicles used to lay underwater communication cables and find existing cables for removal or repair. Diving activities and special operations training also occur. Other subsurface activities involve manned and unmanned underwater vehicles. All subsurface vehicles are retrieved after use, while most objects (e.g., non-explosive mines) remain for a period of time to be used as testing fixtures.	
Typical Components	**Platforms:** Fleet Support Vessel, Support Craft, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Acoustic Releases, Pinger, Safety and Navigation, Sonar Systems - Hull Mounted, Sonar Systems - Other **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Unmanned vehicles Crewed vessels	
Parameters for Analysis	Mines and other objects may be placed on the bottom where they may remain for a period of time. They will eventually be retrieved.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Virginia Capes Range Complex
	SFOMF	SFOMF

A.3.2.6.2 Unmanned Aerial System Testing

Unmanned Systems		
Unmanned Aerial System Testing		
Short Description	Unmanned aerial systems are launched from a platform (e.g., fixed platform, surface ship, or submerged submarine) to test the capability to extend the surveillance and communications range of unmanned underwater vehicles, manned and unmanned surface vehicles, and submarines.	
Long Description	Unmanned aerial systems are reusable, uncrewed vehicles capable of controlled, sustained, level flight. Anticipated scenarios of unmanned aerial system testing include both unmanned aerial system launcher testing and using unmanned aerial systems to extend the surveillance and communications range of distributed sensors, unmanned underwater vehicles, manned and unmanned surface vehicles, and submarines. To test unmanned aerial system launcher systems, a subsurface capsule release may be conducted. During testing, a negatively buoyant capsule is deployed underwater and descends to a programmed depth. The capsule then drops a weight, inflates a flotation collar, rises to the surface, and launches an unmanned aerial system. Personnel use radio-frequency communications to control and communicate with the unmanned aerial system during its flight. In the event of an extended communications test, an aerostat (helium filled balloon) may be tethered to either a stationary buoy or an unmanned surface vehicle to test the extended range of communications.	
Typical Components	**Platforms:** Fixed Structure, Submarine, Unmanned Aerial Vehicle - Fixed Wing **Targets:** Land Targets, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Unmanned vehicles	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	NUWC Newport Testing Range	NUWC Newport Testing Range
	Northeast Range Complexes	-
	Virginia Capes Range Complex	-

A.3.2.6.3 Unmanned Surface Vehicle System Testing

Unmanned Systems	
Unmanned Surface Vehicle System Testing	
Short Description	Testing involves the production or upgrade of unmanned surface vehicles. This may include testing of mine detection capabilities, evaluating the basic functions of individual platforms, or complex activities with multiple vehicles.
Long Description	Unmanned surface vehicle testing includes assessment of single-vehicle and multi-vehicle technical performance and functionality during mission operations. Most unmanned vehicle mission operations include launch, transit, mission profile execution, and recovery operations. Unmanned surface vehicles are generally remote-controlled, semi-autonomous, modular, multi-mission platforms. Unmanned surface vehicles include rigid hull-inflatable boats, cooperative autonomous research platform (autonomous kayaks), wave gliders, and remote-controlled Jet Skis. Unmanned surface vehicles may be launched from surface vessels, piers, or land. Once launched, the vehicles may be towed or self-propelled to the test area. Unmanned surface vehicles may deploy, tow, operate, or recover payload systems such as tow bodies containing multi-function sensors. Systems on the unmanned surface vehicle may be acoustically active or produce radio-frequency transmissions or provide laser illumination for electro-optical detection.
Typical Components	**Platforms:** Support Craft, Unmanned Surface Vehicle **Targets:** Electronic Warfare Targets, Sub-surface Targets - Stationary, Surface Targets - Floating **Systems being Trained/Tested:** Echosounders, Fathometer, Oceanographic - Other, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Unmanned vehicles
Parameters for Analysis	None

Unmanned Systems		
Unmanned Surface Vehicle System Testing		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	NUWC Newport Testing Range	NUWC Newport Testing Range
	-	Virginia Capes Range Complex
	-	Navy Cherry Point Range Complex
	-	Jacksonville Range Complex
	-	Key West Range Complex
	-	Gulf of Mexico Range Complex
	-	Other AFTT Areas
	-	Gulf of Mexico Range Complex Inshore
	-	NS Norfolk
	-	NS Mayport
	-	Pascagoula, MS

A.3.2.6.4 Unmanned Underwater Vehicle Testing

Unmanned Systems	
Unmanned Underwater Vehicle Testing	
Short Description	Testing involves the production or upgrade of unmanned underwater vehicles. This may include testing of mine detection capabilities, evaluating the basic functions of individual platforms, or complex activities with multiple vehicles.
Long Description	Unmanned underwater vehicle testing ranges from single-vehicle tests to evaluate hydrodynamic parameters, to full mission, multiple vehicle functionality assessments. Most unmanned underwater vehicle operations include a launch, transit, mission profile execution, and recovery operations. Unmanned underwater vehicles include modular, multi-mission platforms and their payloads, and anti-submarine warfare targets. Unmanned underwater vehicles may be launched from aircraft, surface craft, submarines, piers, or land. Once launched, the vehicles are either towed or self-propelled to the test area. Unmanned underwater vehicles may also deploy, tow, operate, or recover remote sensors and payload systems. Systems on or towed by the unmanned vehicle may be acoustically active, produce radio-frequency transmissions or provide laser illumination for electro-optical detection. Vehicle development involves the production and upgrade of new unmanned platforms on which to attach various payloads used for different purposes. Platforms can include unmanned underwater vehicles, unmanned surface vehicles, and unmanned aerial systems. Payload testing assesses various systems that can be incorporated onto unmanned platforms for mine warfare, bottom mapping, mast antenna testing, and other missions. This type of test can also include multiple vehicles interacting in formations or acting as individual units and includes tests and demonstrations of unmanned underwater vehicles in detecting and classifying mine-like or other buried objects.
Typical Components	**Platforms:** Extra Large Unmanned Underwater Vehicle, Large Displacement Unmanned Underwater Vehicle, Moored Platform, Patrol Combatant, Small Boat, Submarine, Support Craft, Surface Combatant, Unmanned Aerial Vehicle - Fixed Wing, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets, Sub-surface Targets - Maneuvering, Sub-surface Targets - Stationary, Surface Targets - Floating **Systems being Trained/Tested:** Acoustic Communications, Pinger, Safety and Navigation, Sonar Systems - Other, Unmanned Vehicle Systems **Munitions:** Sonobuoys, Torpedoes - Exercise
Active Sonar	LFL, MFL, MFM, MFH, HFM, HFH, VHFH, Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles
Parameters for Analysis	None

Unmanned Systems		
Unmanned Underwater Vehicle Testing		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	NUWC Newport Testing Range	NUWC Newport Testing Range
	-	Virginia Capes Range Complex
	Jacksonville Range Complex	-
	SFOMF	SFOMF
	-	Key West Range Complex
	Gulf of Mexico Range Complex	-
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.2.7 Vessel Evaluation

A.3.2.7.1 Air Defense Testing

Vessel Evaluation		
Air Defense Testing		
Short Description	Tests the ship's capability to detect, identify, track, and successfully engage live and simulated targets. Gun systems are tested using non-explosive and explosive rounds.	
Long Description	Air Defense activities are conducted in clear and varied electronic attack environments, using a mix of missile firings to verify the ship's capability to detect, identify, track, and successfully engage live and simulated targets. The tests include testing the radar's track load in the presence of debris, long-range engagement processing, low-elevation detection and tracking, track load in the presence of electronic attack and chaff, and missile performance. Tests currently include firing of the 5-inch 0.62-caliber gun, and will potentially include a 155-millimeter gun.	
Typical Components	**Platforms:** Aircraft Carrier, Amphibious Warfare Vessel, Contracted Aircraft, Fixed Wing – Adversary Aircraft, Fixed Wing - Electronic Warfare Aircraft, Fixed Wing – Patrol Aircraft, Fixed Wing – Strike Aircraft, Fleet Support Vessel, Surface Combatant **Targets:** Air Targets - Decoy, Air Targets - Drone, Air Targets - Other, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Large-Caliber, Projectile - Medium-Caliber, Rockets, Surface-to-Air Missiles	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Explosive gunnery Explosive missiles and rockets Non-explosive gunnery Non-explosive missiles and rockets Weapon firing noise	
Parameters for Analysis	Ships will not be conducting tests constantly for the duration of the allotted time. This activity incorporates components of both surface warfare and air defense activities. This activity includes in-air explosives detonated at low and medium altitudes.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	-
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	-

A.3.2.7.2 In-Port Maintenance Testing

Vessel Evaluation		
In-Port Maintenance Testing		
Short Description	Each combat system is tested to ensure they are functioning in a technically acceptable manner and are operationally ready to support at-sea testing.	
Long Description	Each combat system is tested to ensure they are functioning in a technically acceptable manner and are operationally ready to support at-sea Combat System Ship Qualification Trial events. The ship's test plans and procedures, Maintenance Repair/Requirements Cards, and computerized planned maintenance system are used in establishing testing standards for each system and pieces of equipment. Ship's crew, under supervision of subject matter experts, complete all actions and receive remedial training where required. Trouble Observation Reports are written on noted discrepancies.	
Typical Components	**Platforms:** All Navy Ships and Boats, Surface Combatant **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None	
Active Sonar	MF1	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	NS Norfolk	NS Norfolk
	NS Mayport	NS Mayport

A.3.2.7.3 Propulsion Testing

Vessel Evaluation		
Propulsion Testing		
Short Description	Ship is run at high speeds in various formations (straight-line and reciprocal paths).	
Long Description	The propulsion plant demonstration is a comprehensive test of the ship's main propulsion system. Propulsion testing is one part of the total sea trial activity. During this activity, the ship is tested for maneuverability, including full power and endurance runs. Additional testing will be performed involving the propulsion shafts, steering gear and reduction gears and countermeasure wash-down system. A sonar self-noise survey occurs during the trial and involves only passive monitoring of noise made by the ship at low to high speeds.	
Typical Components	**Platforms:** Aircraft Carrier, Amphibious Warfare Vessel, Fleet Support Vessel, Patrol Combatant, Small Boat, Surface Combatant **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** None **Munitions:** Projectile - Medium-Caliber, Projectile - Small-Caliber	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Ships will not be conducting test constantly for the duration of the allotted time. Ships may not be traveling in a straight line. 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Key West Range Complex	Key West Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	NSWC Panama City Testing Range
	-	Gulf of Mexico Range Complex Inshore
	-	New Orleans, LA

A.3.2.7.4 Signature Analysis Operations

Vessel Evaluation		
Signature Analysis Operations		
Short Description	Surface ship and submarine testing of electromagnetic, acoustic, optical, and radar signature measurements.	
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	**Platforms:** Amphibious Warfare Vessel, Moored Platform, Fixed Range, Fixed Structure, Submarine, Support Craft, Unmanned Bottom Crawler, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Acoustic Releases, Pinger, Safety and Navigation, Sonar Systems - Other **Munitions:** Sonobuoys	
Active Sonar	LFM, LFH, MFM, HFM, Broadband (LF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Jacksonville Range Complex	-
	SFOMF	SFOMF
	-	Hampton Roads, VA

A.3.2.7.5 Small Ship Shock Trial

Vessel Evaluation		
Small Ship Shock Trial		
Short Description	Underwater detonations are used to test new ships or major upgrades.	
Long Description	Each new class (or major upgrade) of surface ships constructed for the Navy may undergo an at-sea shock trial. A shock trial is a series of underwater detonations that sends a shock wave through the ship's hull to simulate near misses during combat. A series of up to three underwater detonations per event will be conducted at various distances from the ship (charges are set closer to the ship as the trial progressives).	
Typical Components	**Platforms:** Fixed Wing - Other, Rotary-Wing Aircraft, Support Craft, Surface Combatant **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Explosives	
Active Sonar	No	
In-Water Explosives	E16	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Ship shock trials	
Parameters for Analysis	One event may occur during the 7-year period, which will involve up to three 10,000-lb. charges with at least six full days between detonations. Testing will occur in waters deeper than 650 feet. The Action Proponent may conduct ship shock trials only within a designated ship shock trial area within the Study Area. Stressors to human resources were not analyzed for this activity since it occurs greater than 12 NM from shore.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex

A.3.2.7.6 Submarine Sea Trials – Propulsion Testing

Vessel Evaluation		
Submarine Sea Trials - Propulsion Testing		
Short Description	Submarine is run at high speeds in various formations, and at various depths.	
Long Description	Propulsion testing is one part of the total submarine sea trial activity. During this activity, submarines undergo a controlled deep dive to test depth, emergency surfacing, full-power operations, high-speed turns, and extreme depth changes.	
Typical Components	**Platforms:** Submarine **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Subs will not be conducting test constantly for the duration of the allotted time. Subs may not be traveling in a straight line. 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 Involving Visual Observations for Marine Species 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	-

A.3.2.7.7 Submarine Sea Trials – Weapons System Testing

Vessel Evaluation		
Submarine Sea Trials - Weapons System Testing		
Short Description	Submarine weapons and sonar systems are tested at-sea to meet the integrated combat system certification requirements.	
Long Description	Submarine weapons and sonar systems are tested at-sea to meet the integrated combat system certification requirements. This test involves subjecting the integrated combat system through rigorous testing which consists of passive and active sonar activities, launching "water slugs" and exercise torpedoes.	
Typical Components	**Platforms:** Moored Platform, Submarine, Support Craft **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Safety and Navigation, Sonar Systems - Hull Mounted, Sonar Systems - Other, Underwater Range Systems **Munitions:** Torpedoes - Exercise	
Active Sonar	MFL, MFH, HFM, HFH, Broadband (LF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	Submarines will not be conducting test constantly for the duration of the allotted time.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	SFOMF	-
	-	Northeast Range Complexes Inshore
	-	NSB Kings Bay
	-	Port Canaveral, FL

A.3.2.7.8 Surface Warfare Testing

Vessel Evaluation	
Surface Warfare Testing	
Short Description	Tests the capabilities of shipboard sensors to detect, track, and engage surface targets. Testing may include ships defending against surface targets using explosive and non-explosive rounds, gun system structural test firing and demonstration of the response to Call for Fire against land-based targets (simulated by sea-based locations).
Long Description	Surface warfare activities are gun weapons system tests conducted in a clear environment to demonstrate the capability of shipboard and remote (helicopter) sensors to detect and track surface or land-based (simulated by sea-based locations) targets and engage targets with simulated and live gun and missile firings. The event may qualify the ship's surface warfare gun capability to receive track data from the sensors, filter it, calculate ballistics, recommend aimpoint corrections (spots), generate gun orders, select ammunition properly for targets at differing ranges, and deliver surface direct fire on the surface or land-based targets. Testing can also include structural test firing.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Contracted Aircraft, Fixed Wing – Adversary Aircraft, Fixed Wing - Electronic Warfare Aircraft, Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Support Craft, Surface Combatant **Targets:** Air Targets - Drone, Air Targets - Other, Surface Targets - Floating, Surface Targets - Maneuvering, Surface Targets – Towed **Systems being Trained/Tested:** High-Energy Laser Systems **Munitions:** Projectile – Large-Caliber, Projectile – Medium-Caliber, Surface-to-Air Missiles, Torpedoes - Exercise
Active Sonar	HFH
In-Water Explosives	E3, E5, E6, E7, E8
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Explosive gunnery Explosive missiles and rockets Non-explosive gunnery Non-explosive missiles and rockets Towed in-water devices Weapon firing noise
Parameters for Analysis	Ships will not be conducting tests constantly for the duration of the allotted time. High-energy laser systems used in military readiness activities automatically shut down when target-lock is lost; meaning that if a high-energy laser beam aimed at a target on the surface, either from an aircraft or surface vessel, moves off the target, the system ceases projecting laser light, preventing any energy from striking the water or a nearby marine species.

Vessel Evaluation		
Surface Warfare Testing		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	-
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Key West Range Complex	-
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.3.2.7.9 Undersea Warfare Testing

Vessel Evaluation	
Undersea Warfare Testing	
Short Description	Ships demonstrate capability countermeasure systems, underwater surveillance, weapons engagement, and communications systems. This tests ships' ability to detect, track, and engage undersea targets. Testing also includes assessing equipment vulnerability and ordnance lethality.
Long Description	Undersea warfare activities may by composed of tracking and firing activities or tests of hull-mounted sonar system capabilities to detect and avoid torpedo type targets. Tracking and firing activities ensure the operability of the undersea warfare suite and its interface with the rotary-wing helicopter. Tests include demonstrating the ability of the ship to search, detect and track a target and conduct attacks with exercise torpedoes. Detection and avoidance activities may use surface craft and underwater platforms to test the capability of mid- and high-frequency acoustic sources. Subsurface moving targets, rocket and air-dropped weapons, sonobuoys, towed arrays, and sub-surface torpedo-like devices may be used. Approximately 1 week of in-port training may precede the event. Undersea warfare activities also include equipment testing to assess equipment vulnerability to ordnance, which will use explosive demolition charges.
Typical Components	**Platforms:** Fleet Support, Moored Platform, Rotary-Wing Aircraft, Small Boat, Submarine, Support Craft, Surface Combatant **Targets:** Air Targets - Other, Sub-surface Targets - Maneuvering, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Countermeasures, Safety and Navigation, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Mine Warfare **Munitions:** Air-to-Surface Missiles, Demolition Devices, Sonobuoys, Torpedoes – Exercise
Active Sonar	MFM, MFH, MF1, HFM, HFH, Broadband (LF to HF)
In-Water Explosives	E4, E7
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Explosive missiles and rockets Explosive sonobuoys and other sub-surface explosives Manned surface vessels Non-explosive missiles and rockets Towed in-water devices
Parameters for Analysis	Five targets are utilized per event. All sonobuoys have a parachute unless otherwise noted. Ships will not be conducting test constantly during the duration of the allotted time.

Vessel Evaluation		
Undersea Warfare Testing		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	SFOMF	SFOMF
	-	Key West Range Complex
	Gulf of Mexico Range Complex	-

A.3.2.7.10 Vessel Signature Evaluation

Vessel Evaluation		
Vessel Signature Evaluation		
Short Description	Surface ship, submarine, and auxiliary system signature assessments. This may include electronic, radar, acoustic, infrared and magnetic signatures.	
Long Description	Radar cross signature testing of surface ships and submarines is accomplished on new ships and periodically throughout a ship's life cycle to measure how detectable the ship is to radar. For example, Assessment Identification of Mine Susceptibility assessments are passive electromagnetic and acoustic measurements performed on mine countermeasure ships and on the Littoral Combat Ship mine countermeasure modules (i.e., auxiliary systems) to determine their mine susceptibility using seafloor deployed magnetometers and hydrophones, and a ship-board global positioning sensor tracking system. Signature testing of all surface ships and submarines verifies that each vessel's signature is within specifications, and may include the use of helicopter-deployed instrumentation, ship-mounted safety and navigation systems, fathometers, tracking devices, radar systems, and underwater communications equipment. Also included in this activity is the Shipboard Electronic Systems Evaluation Facility which conducts measurements of antenna radiation patterns, Federal Aviation Administration identification of Friend or Foe systems, and Tactical Air Navigation Systems.	
Typical Components	**Platforms:** Aircraft Carrier, All Navy Ships and Boats, Amphibious Warfare Vessel, Fixed Wing - Cargo and Transport Aircraft, Moored Platform, Patrol Combatant, Rotary-Wing Aircraft, Fixed Structure, Submarine, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Safety and Navigation, Sonar Systems - Hull Mounted **Munitions:** None	
Active Sonar	MFM, HFM, HFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	NUWC Newport Testing Range
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	SFOMF
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	JEB Little Creek	-
	-	Hampton Roads, VA

A.3.2.8 Other Testing

A.3.2.8.1 Acoustic and Oceanographic Research

Other Testing		
Acoustic and Oceanographic Research		
Short Description	Research using active transmissions from sources deployed from ships, aircraft, and unmanned underwater vehicles. Research sources can be used as proxies for current and future Navy systems	
Long Description	Active acoustic transmissions used for engineering tests of acoustic sources, validation of ocean acoustic models, tests of signal processing algorithms, and characterization of acoustic interactions with the ocean bottom, fish and ocean surface. Standard oceanographic research sensing (acoustic Doppler current profiler, fathometer-like systems) also to be employed. Occurs year round, daytime only.	
Typical Components	**Platforms:** Fleet Support, Fixed Structure, Submarine, Support Craft **Targets:** Sub-surface Targets - Stationary **Systems being Trained/Tested:** Acoustic Releases, Countermeasures, Echosounders, Sonar Systems - Other **Munitions:** None	
Active Sonar	LFM, Broadband (LF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Unmanned vehicles	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Northeast Range Complexes
	-	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex
	-	Key West Range Complex
	-	Other AFTT Areas

A.3.2.8.2 Acoustic Component Testing

Other Testing Activities		
Acoustic Component Testing		
Short Description	Various surface vessels, moored equipment, and materials are tested to evaluate performance in the marine environment.	
Long Description	Various surface activities utilizing the marine environment for testing and evaluation. Sample projects include buoy deployments, vessel entanglement systems, materials testing, and renewable energy devices. Other surface operations involve manned and unmanned surface vehicles. Miscellaneous types of equipment are deployed, including temperature, humidity, magnetic, acoustic, optical, and air quality instrumentation to measure, record, and analyze system effectiveness, dependability, operational parameters, and durability. Surface operations utilize a variety of vessels for deployment of test equipment and for the monitoring of the air, surface, subsurface.	
Typical Components	**Platforms:** Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Acoustic Releases, High-Energy Laser Systems, Pinger, Safety and Navigation, Sonar Systems - Other, Unmanned Vehicle Systems **Munitions:** None	
Active Sonar	LFL, MFL, MFH, HFM, HFH, VHFH, Broadband (LF to HF), Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Unmanned vehicles	
Parameters for Analysis	High-energy laser systems used in military readiness activities automatically shut down when target-lock is lost; meaning that if a high-energy laser beam aimed at a target on the surface, either from an aircraft or surface vessel, moves off the target, the system ceases projecting laser light, preventing any energy from striking the water or a nearby marine species.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	SFOMF	SFOMF

A.3.2.8.3 Countermeasure Testing

Other Testing	
Countermeasure Testing	
Short Description	Countermeasure testing involves the testing of systems that will detect, localize, track, and engage incoming weapons, including marine vessel targets and airborne missiles. Testing includes surface ship torpedo defense systems, marine vessel stopping payloads, and airborne decoys against air targets.
Long Description	Countermeasure testing involves the testing of systems that will detect, localize, track, and engage incoming weapons, including marine vessel targets and airborne missiles. At-sea testing of the Surface Ship Torpedo Defense systems includes towed acoustic systems, torpedo warning systems, and countermeasure anti-torpedo subsystems. Some countermeasure scenarios would employ non-explosive torpedoes against targets released by secondary platforms (helicopter or submarine). While surface vessels are in transit, countermeasure systems may be used to identify false alert rates. Testing of the maritime vessel stopping payloads will deliver the appropriate measure(s) to affect a target vessel's propulsion and associated control surfaces to significantly slow and potentially stop the advance of the vessel. At-sea testing of airborne decoys includes surface decoys as well as airborne countermeasure flight vehicles and payloads.
Typical Components	**Platforms:** Aircraft Carrier, All Navy Ships and Boats, Rotary-Wing Aircraft, Small Boat, Fixed Structure, Support Craft, Surface Combatant, Unmanned Aerial Vehicle - Rotary Wing, Unmanned Surface Vehicle **Targets:** Air Targets - Other, Sub-surface Targets - Maneuvering, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Biodegradable Polymer **Munitions:** Rockets, Torpedoes - Exercise
Active Sonar	MFM, MFH, HFH, VHFH, Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Unmanned vehicles
Parameters for Analysis	Not all activities will include the use of sonar and other transducers

Other Testing		
Countermeasure Testing		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	NUWC Newport Testing Range	NUWC Newport Testing Range
	Virginia Capes Range Complex	Virginia Capes Range Complex
	-	Navy Cherry Point Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	Key West Range Complex	Key West Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Virginia Capes Range Complex Inshore
	-	JEB Little Creek Fort Story

A.3.2.8.4 Intelligence, Surveillance, Reconnaissance

Other Testing Activities		
Intelligence, Surveillance, Reconnaissance		
Short Description	Maritime patrol aircraft (MPA) and unmanned aerial systems use all available sensors to collect data on threat vessels.	
Long Description	MPA and unmanned aerial systems operators use all available sensors to collect data on threat vessels. Passive sonobuoys are used to collect and analyze acoustic data, and photographic equipment is used to document the vessel with visual information.	
Typical Components	**Platforms:** Moored Platform, Small Boat, Support Craft, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Acoustic Communications, Acoustic Releases, Safety and Navigation, Sonar Systems - Other **Munitions:** None	
Active Sonar	MFM, Broadband (LF), Broadband (LF to HF), Broadband (MF to HF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Unmanned vehicles	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	-	Virginia Capes Range Complex
	-	Jacksonville Range Complex

A.3.2.8.5 Simulant Testing

Other Testing Activities		
Simulant Testing		
Short Description	The capability of surface ship and aircraft defense systems to detect and protect against chemical and biological attacks are tested.	
Long Description	The capabilities of surface ship defense systems to detect and protect in the event of chemical and biological attacks are tested. Testing involves the deployment of harmless compounds (i.e., simulants) as substitutes for chemical and biological warfare agents. Because chemical and biological warfare agents remain a security threat, the Department of Defense uses relatively harmless compounds (simulants) as substitutes for chemical and biological warfare agents to test equipment intended to detect their presence. Chemical and biological agent detectors monitor for the presence of chemical and biological warfare agents and protect military personnel and civilians from the threat of exposure to these agents. The simulants trigger a response by sensors in the detection equipment without irritating or injuring personnel involved in testing detectors. Navy Chemical Agent Simulant 82 (commonly referred to as NCAS-82), glacial acetic acid, triethyl phosphate, sulfur hexafluoride, 1,1,1,2 tetrafluoroethane (a refrigerant commonly known as R134), and 1,1-difluoroethane (a refrigerant commonly known as R-152a) are also referred to as gaseous simulants and can be released in smaller quantities in conjunction with glacial acetic acid or triethyl phosphate releases. The types of biological simulants that may be used include spore-forming bacteria, non-spore-forming bacteria, ovalbumin, bacteriophage MS2, and *Aspergillus niger*. The simulants are generally dispersed by hand at the detector or by aircraft as a fine mist or aerosol.	
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Surface Combatant **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels	
Parameters for Analysis	Examples of chemical simulants include glacial acetic acid and triethyl phosphate. Examples of biological simulants are spore-forming bacteria, non-spore-forming bacteria, the protein ovalbumin, MS2 bacteriophages, and the fungus *Aspergillus niger.*	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	-
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	-
	Jacksonville Range Complex	-

A.3.2.8.6 Insertion/Extraction

Other Testing Activities		
Insertion/Extraction		
Short Description	Testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances.	
Long Description	Testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances. Testing could include the use of forces deployed from submerged submarines while at sea.	
Typical Components	**Platforms:** Fleet Support Vessel, Submarine, Support Craft **Targets:** None **Systems being Trained/Tested:** Acoustic Communications **Munitions:** Sonobuoys	
Active Sonar	LFH, HFM, Broadband (LF to MF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels	
Parameters for Analysis	Test will not occur constantly throughout duration of allotted time. 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 Involving Visual Observations for Marine Species 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Key West Range Complex	Key West Range Complex
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.2.8.7 Line Charge Testing

Other Testing Activities		
Line Charge Testing		
Short Description	Surface vessels deploy line charges to test the capability to safely clear an area for expeditionary forces.	
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, Support Craft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Demolition Devices	
Active Sonar	No	
In-Water Explosives	E4	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Explosive line charges Manned surface vessels	
Parameters for Analysis	Test will not occur constantly over the duration of the allotted time.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	NSWC Panama City Testing Range	NSWC Panama City Testing Range

A.3.2.8.8 Non-Acoustic Component Testing

Other Testing Activities		
Non-Acoustic Component Testing		
Short Description	Testing of towed or floating buoys for communications through radio-frequencies or two-way optical communications between an aircraft and underwater system(s). Also, includes testing of non-acoustic and de minimis sources.	
Long Description	Testing associated with radio-frequency communications could occur from towed antennas from surface vessels, from single-transmit buoys released from submarines, or tethered buoys from submarines for two-way communication. Optical communications tests may include communication between helicopter or fixed wing aircraft and manned or unmanned underwater systems, and may also include ground truth sensors mounted on surface craft. Also, includes testing of non-acoustic and de minimis sources.	
Typical Components	**Platforms:** All Navy Ships and Boats, Amphibious Warfare Vessel, Fleet Support Vessel, Rotary-Wing Aircraft, Small Boat, Support Craft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Towed in-water devices	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex
	-	Hampton Roads, VA

A.3.2.8.9 Payload Deployer Testing

Other Testing Activities		
Payload Deployer Testing		
Short Description	Decoy launcher systems are tested to evaluate performance.	
Long 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, unmanned surface 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 equipped with an acoustic locator to aid in their recovery. Demonstration of the Mk36 Decoy Launcher System using inert concrete slugs.	
Typical Components	**Platforms:** Fleet Support Vessel, Large Displacement Unmanned Underwater Vehicle, Fixed Structure, Support Craft, Surface Combatant, Unmanned Surface Vehicle **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Manned surface vessels Unmanned vehicles	
Parameters for Analysis	Instrumented operational equipment or mock equipment will be recovered. Ships will not be conducting test constantly for the duration of the allotted time. 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.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	NUWC Newport Test Range	NUWC Newport Test Range
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.3.2.8.10 Semi-Stationary Equipment Testing

Other Testing Activities	
Semi-Stationary Equipment Testing	
Short Description	Semi-stationary equipment (e.g., hydrophones) is deployed to determine functionality.
Long Description	Semi-stationary equipment testing is performed from a fixed site, suspended over the side of a boat, moored to the bottom, suspended in the water column, or on the surface. Examples of semi-stationary equipment include moored hydrophones (i.e., devices to listen to underwater sound), line arrays (i.e., multiple hydrophones) deployed on the ocean bottom, acoustic countermeasures, a moored oceanographic sensor that moves vertically through the water column, and sonobuoys (i.e., expendable sonar systems). Some units produce sound in the water (e.g., acoustic countermeasures), while others only listen (e.g., passive sonobuoys, vector sensors that measure particle motion). Some tests could require deployment in an area that provides opportunistic data collection (e.g., placing a hydrophone near a shipping lane to collect shipping noise data), or with specific geographic or oceanographic requirements.
Typical Components	**Platforms:** Moored Platform, Fixed Structure, Support Craft **Targets:** Air Targets - Drone, Electronic Warfare Targets, Land Targets, Sub-surface Targets - Maneuvering, Sub-surface Targets - Stationary, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Air Gun, Countermeasures, Distributed Systems, Echosounders, Sonar Systems - Other **Munitions:** Demolition Devices
Active Sonar	MFM, HFM, HFH, VHFM, VHFH, Broadband (LF), Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	E4, AG230
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Explosive mine countermeasure and neutralization (no divers) Manned surface vessels
Parameters for Analysis	None

Other Testing Activities		
Semi-Stationary Equipment Testing		
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	NUWC Newport Testing Range	NUWC Newport Testing Range
	NSWC Panama City Testing Range	NSWC Panama City Testing Range
	-	Virginia Capes Range Complex Inshore
	Newport, RI	Newport, RI
	-	NSB New London
	-	NS Norfolk
	-	NS Mayport
	-	Port Canaveral, FL
	-	Key West Range Complex Inshore

A.3.2.8.11 Towed Equipment Testing

Other Testing Activities		
Towed Equipment Testing		
Short Description	Surface vessels or unmanned surface vehicles deploy and tow equipment to determine functionality of towed systems.	
Long Description	Testing is conducted on equipment to evaluate hydrodynamic characteristics and control of a tow body, test fully functional items, or test a particular aspect of a system utilizing a mock-up of a functional item. A typical test operation for towed equipment testing involves a deployment, use, and recover scenario that requires range or commercial craft support. This equipment may be deployed from and towed by range craft or unmanned surface vehicles. The towed item may be underwater or floating on the surface. Equipment may be acoustically active or produce radio-frequency transmissions.	
Typical Components	**Platforms:** Support Craft, Unmanned Surface Vehicle **Targets:** Mine Targets, Sub-surface Targets - Stationary **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems - Other, Underwater Range Systems **Munitions:** None	
Active Sonar	MFM, Broadband (LF)	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	NUWC Newport Testing Range	NUWC Newport Testing Range

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 Oceanographic Science and Technology		
Acoustic and Oceanographic Research		
Short Description	Research involving passive acoustic and oceanographic sensing, as well as active transmissions from sources deployed from ships, aircraft, and unmanned underwater vehicles. Research sources serve as proxies for current and future Navy systems.	
Long Description	Active acoustic transmissions used for engineering tests of acoustic sources, validation of ocean acoustic models, tests of signal processing algorithms, and characterization of acoustic interactions with the ocean bottom, fish and ocean surface. Standard oceanographic research sensing (acoustic Doppler current profiler, fathometer-like systems) are also employed.	
Typical Components	**Platforms:** Moored Platform, Small Boat, Support Craft, Unmanned Aerial Vehicle, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets – Stationary, Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Air Gun, Oceanographic - Other, Signal, Underwater sound Devices **Munitions:** None	
Active Sonar	LFM, LFH, MFM, MFH, HFM, HFH	
In-Water Impulsives	E1, E3, 3S3, AG232	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Explosive sonobuoys and other sub-surface explosives Manned surface vessels Unmanned vehicles	
Parameters for Analysis	Research activities may take place anywhere in the Study Area. Range complexes below represent a geographic sample of the coastal area for conservative estimates of effects. Air guns are not to be used within 3 NM of land. Explosives not to be used within 12 NM of land. Activity in Stellwagen Bank limited to de minimis acoustic sources only.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	-	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.3.3.1.2 Large Displacement Unmanned Underwater Vehicle Testing

Acoustic and Oceanographic Science and Technology		
Large Displacement Unmanned Undersea Vehicle Testing		
Short Description	Autonomy testing and environmental data collection with Large Displacement Unmanned Undersea Vehicles (Originally Innovative Navy Prototype).	
Long Description	Large Displacement Unmanned Undersea Vehicle (LDUUV) testing includes launch, autonomous transit (up to 60 days), environmental data collection (e.g., bathymetry, water column properties, ocean surface properties), and retrieval. LDUUV testing throughout the study area will include de minimis acoustic sources (modems, imaging sonars and fathometers) for safe navigation and data collection.	
Typical Components	**Platforms:** Large Displacement Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Stationary **Systems being Trained/Tested:** Acoustic Communications, Pinger, Sonar Systems - Other **Munitions:** None	
Active Sonar	No	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Unmanned vehicles	
Parameters for Analysis	This activity may take place anywhere within the Study Area. Range complexes below are a sample of areas this activity may occur. Any acoustic sources used during this activity would be de minimis and not quantitatively analyzed and therefore are not included under systems.	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Navy Cherry Point Range Complex	-
	Jacksonville Range Complex	Jacksonville Range Complex
	Gulf of Mexico Range Complex	Gulf of Mexico Range Complex

A.3.3.1.3 Mine Countermeasure Technology Research

Acoustic and Oceanographic Science and Technology		
Mine Countermeasure Technology Research		
Short Description	Test involves the use of broadband acoustic 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 be placed on the bottom to test system performance.	
Typical Components	**Platforms:** Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering, Surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Acoustic Releases, Safety and Navigation, Sonar Systems - Other **Munitions:** None	
Active Sonar	MFH	
In-Water Explosives	No	
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Visual Observations):** Active acoustic sources Unmanned vehicles	
Parameters for Analysis	None	
Location	**Phase III Requirement 2018-2025**	**Phase IV Requirement 2025-2032**
	Northeast Range Complexes	Northeast Range Complexes
	Virginia Capes Range Complex	Virginia Capes Range Complex
	Jacksonville Range Complex	Jacksonville Range Complex
	-	Gulf of Mexico Range Complex

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