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

Volume 4 — Appendices
May 2012

Lead Agency
Department of the Navy

Cooperating Agency
National Marine Fisheries Service

Action Proponents
United States Fleet Forces
Naval Air Systems Command
Naval Sea Systems Command
Office of Naval Research

For Additional Information
NAVFAC Atlantic
Attn: EV22, AFTT Project Managers
6506 Hampton Boulevard
Norfolk, VA 23508-1278
Phone: (757) 322-4645

This Page Intentionally Left Blank

APPENDICES

A – Navy Activities Descriptions

B – Notice of Intent

C – Agency Correspondence

D – Air Quality Example Emissions Calculations and Example Record of Non-Applicability

E – Public Participation

F – Training and Testing Activities Matrices

G – Statistical Probability Analysis for Estimating Direct Strike Impact and Number of Potential Exposures

This Page Intentionally Left Blank

APPENDIX A

NAVY ACTIVITIES DESCRIPTIONS

This Page Intentionally Left Blank

TABLE OF CONTENTS

APPENDIX A NAVY ACTIVITIES DESCRIPTIONS A-1

A.1 TRAINING ACTIVITIES A-1
A.1.1 ANTI-AIR WARFARE TRAINING A-1
A.1.1.1 Air Combat Maneuver A-2
A.1.1.2 Air Defense Exercise A-3
A.1.1.3 Gunnery Exercise (Air-to-Air) – Medium-Caliber A-4
A.1.1.4 Missile Exercise (Air-to-Air) A-5
A.1.1.5 Gunnery Exercise (Surface-to-Air) – Large-Caliber A-7
A.1.1.6 Gunnery Exercise (Surface-to-Air) – Medium-Caliber A-8
A.1.1.7 Missile Exercise (Surface-to-Air) A-9
A.1.2 AMPHIBIOUS WARFARE TRAINING A-10
A.1.2.1 Naval Surface Fire Support Exercise – Land-Based Target A-11
A.1.2.2 Naval Surface Fire Support Exercise At Sea A-12
A.1.2.3 Marine Expeditionary Unit Certification Exercise A-13
A.1.2.4 Amphibious Assault A-14
A.1.2.5 Amphibious Raid/Humanitarian Assistance Operations A-15
A.1.3 STRIKE WARFARE TRAINING A-16
A.1.3.1 High-Speed Anti-Radiation Missile Exercise (Air-to-Surface) A-16
A.1.4 ANTI-SURFACE WARFARE TRAINING A-17
A.1.4.1 Maritime Security Operations A-18
A.1.4.2 Maritime Security Operations- Anti-swimmer Grenades A-20
A.1.4.3 Gunnery Exercise Surface-to-Surface (Ship) – Small-Caliber A-21
A.1.4.4 Gunnery Exercise Surface-to-Surface (Ship) – Medium-Caliber A-23
A.1.4.5 Gunnery Exercise Surface-to-Surface (Ship) – Large-Caliber A-24
A.1.4.6 Gunnery Exercise Surface-to-Surface (Boat) – Small-Caliber A-26
A.1.4.7 Gunnery Exercise Surface-to-Surface (Boat) – Medium-Caliber A-27
A.1.4.8 Missile Exercise Surface-to-Surface A-28
A.1.4.9 Gunnery Exercise Air-to-Surface – Small-Caliber A-29
A.1.4.10 Gunnery Exercise Air-to-Surface – Medium-Caliber A-30
A.1.4.11 Missile Exercise Air-to-Surface – Rocket A-31
A.1.4.12 Missile Exercise Air-to-Surface A-32
A.1.4.13 Bombing Exercise Air-to-Surface A-33
A.1.4.14 Laser Targeting A-34
A.1.4.15 Sinking Exercise A-35
A.1.5 ANTI-SUBMARINE WARFARE TRAINING A-37
A.1.5.1 Tracking Exercise/Torpedo Exercise – Submarine A-38
A.1.5.2 Tracking Exercise/Torpedo Exercise – Surface A-40
A.1.5.3 Tracking Exercise/Torpedo Exercise – Helicopter A-41
A.1.5.4 Tracking Exercise– Maritime Patrol Aircraft A-43
A.1.5.5 Tracking Exercise – Maritime Patrol Aircraft Extended Echo Ranging Sonobuoys A-45
A.1.5.6 Anti-Submarine Warfare Tactical Development Exercise A-46
A.1.5.7 Integrated Anti-Submarine Warfare Course A-47
A.1.5.8 Group Sail A-48
A.1.5.9 Submarine Command Course Operations A-49

A.1.5.10 Anti-Submarine Warfare For Composite Training Unit Exercise A-50
A.1.5.11 Anti-Submarine Warfare for Joint Task Force Exercise/Sustainment Exercise A-52
A.1.6 ELECTRONIC WARFARE A-53
A.1.6.1 Electronic Warfare Operations A-53
A.1.6.2 Counter Targeting Flare Exercise A-54
A.1.6.3 Counter Targeting Chaff Exercise – Ship A-55
A.1.6.4 Counter Targeting Chaff Exercise – Aircraft A-56
A.1.7 MINE WARFARE A-57
A.1.7.1 Mine Countermeasure Exercise – Ship Sonar A-57
A.1.7.2 Mine Neutralization – Explosive Ordnance Disposal A-58
A.1.7.3 Underwater Mine Countermeasure Raise, Tow, Beach and Exploitation Operations A-59
A.1.7.4 Airborne Mine Countermeasure – Towed Mine Neutralization A-60
A.1.7.5 Airborne Mine Countermeasure – Mine Detection A-61
A.1.7.6 Mine Countermeasure – Mine Neutralization, Small- and Medium-Caliber A-62
A.1.7.7 Mine Countermeasure Mine Neutralization – Remotely Operated Vehicle A-63
A.1.7.8 Mine Laying A-64
A.1.7.9 Coordinated Unit Level Helicopter Airborne Mine Countermeasures Exercises A-65
A.1.7.10 Civilian Port Defense A-66
A.1.8 MAJOR EXERCISES A-67
A.1.8.1 Composite Training Unit Exercise A-67
A.1.8.2 Joint Task Force Exercise A-67
A.1.8.3 Sustainment Exercise A-67
A.1.9 OTHER TRAINING ACTIVITIES A-68
A.1.9.1 Search and Rescue A-68
A.1.9.2 Precision Anchoring A-69
A.1.9.3 Elevated Causeway System A-70
A.1.9.4 Submarine Navigational (SUB NAV) A-71
A.1.9.5 Submarine Under Ice Certification A-72
A.1.9.6 Surface Ship Object Detection A-73
A.1.9.7 Surface Ship Sonar Maintenance A-74
A.1.9.8 Submarine Sonar Maintenance A-75
A.1.9.9 Undersea Warfare Training Range A-76
A.2 NAVAL AIR SYSTEMS COMMAND TESTING ACTIVITIES A-77
A.2.1 ANTI AIR WARFARE A-78
A.2.1.1 Air Combat Maneuver Test A-78
A.2.1.2 Air Platform Vehicle Test A-79
A.2.1.3 Air Platform Weapons Integration Test A-80
A.2.1.4 Air-to-Air Weapons System Test A-81
A.2.1.5 Air-to-Air Missile Test A-82
A.2.1.6 Air-to-Air Gunnery Test – Medium-Caliber A-83
A.2.1.7 Intelligence, Surveillance, and Reconnaissance Test A-84
A.2.2 ANTI SURFACE WARFARE A-85
A.2.2.1 Air-to-Surface Missile Test A-85
A.2.2.2 Air-to-Surface Gunnery Test – Medium-Caliber A-87
A.2.2.3 Rocket Test A-88
A.2.2.4 Air-to-Surface Bombing Test A-89
A.2.2.5 Laser Targeting Test A-90
A.2.2.6 High Energy Laser Weapons Test A-91

A.2.3 ELECTRONIC WARFARE A-92
A.2.3.1 Electronic System Evaluation A-92
A.2.3.2 Chaff Test A-93
A.2.3.3 Flare Test A-95
A.2.4 ANTI-SUBMARINE WARFARE A-97
A.2.4.1 Anti-Submarine Torpedo Test A-98
A.2.4.2 Kilo Dip A-100
A.2.4.3 Sonobuoy Lot Acceptance Test A-101
A.2.4.4 Anti-Submarine Warfare Tracking Test – Helicopter A-102
A.2.4.5 Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft A-103
A.2.5 MINE WARFARE A-104
A.2.5.1 Airborne Mine Neutralization Systems Test – ASQ-235 (Airborne Mine Neutralization System) A-104
A.2.5.2 Airborne Projectile-based Mine Clearance System A-106
A.2.5.3 Airborne Towed Mine Sweeping Test A-107
A.2.5.4 Airborne Towed Mine Hunting Sonar Test A-108
A.2.5.5 Airborne Laser-based Mine Detection System Test A-109
A.2.5.6 Mine Laying Test A-110
A.2.6 OTHER TESTING ACTIVITIES A-111
A.2.6.1 Test and Evaluation – Catapult Launch A-111
A.2.6.2 Air Platform Shipboard Integrate Test A-112
A.2.6.3 Shipboard Electronic Systems Evaluation A-113
A.2.6.4 Maritime Security A-114
A.3 NAVAL SEA SYSTEMS COMMAND TESTING ACTIVITIES A-115
A.3.1 NEW SHIP CONSTRUCTION A-115
A.3.1.1 Surface Combatant Sea Trials – Pierside Sonar Testing A-115
A.3.1.2 Surface Combatant Sea Trials – Propulsion Testing A-116
A.3.1.3 Surface Combatant Sea Trials – Gun Testing – Large-Caliber A-117
A.3.1.4 Surface Combatant Sea Trials – Missile Testing A-118
A.3.1.5 Surface Combatant Sea Trials – Decoy Testing A-119
A.3.1.6 Surface Combatant Sea Trials – Surface Warfare Testing – Large-Caliber A-120
A.3.1.7 Surface Combatant Sea Trials – Anti-Submarine Warfare Testing A-121
A.3.1.8 Aircraft Carrier Sea Trials – Propulsion Testing A-122
A.3.1.9 Aircraft Carrier Sea Trials – Gun Testing – Small-Caliber A-123
A.3.1.10 Aircraft Carrier Sea Trials – Gun Testing – Medium-Caliber A-124
A.3.1.11 Aircraft Carrier Sea Trials – Missile Testing A-125
A.3.1.12 Aircraft Carrier Sea Trials – Bomb Testing A-126
A.3.1.13 Submarine Sea Trials – Pierside Sonar Testing A-127
A.3.1.14 Submarine Sea Trials – Propulsion Testing A-128
A.3.1.15 Submarine Sea Trials – Weapons System Testing A-129
A.3.1.16 Submarine Sea Trials – Anti-Submarine Warfare Testing A-130
A.3.1.17 Other Class Ship Sea Trials – Propulsion Testing A-131
A.3.1.18 Other Class Ship Sea Trials – Gun Testing – Small-Caliber A-132
A.3.1.19 Anti-Submarine Warfare Mission Package Testing A-133
A.3.1.20 Surface Warfare Mission Package Testing– Gun Testing Small-Caliber A-134
A.3.1.21 Surface Warfare Mission Package Testing – Gun Testing Medium-Caliber A-135
A.3.1.22 Surface Warfare Mission Package Testing – Gun Testing Large-Caliber A-136
A.3.1.23 Surface Warfare Mission Package Testing – Missile/Rocket Testing A-137

A.3.1.24 Mine Countermeasure Mission Package Testing A-138
A.3.1.25 Post-Homeporting Testing A-139
A.3.2 SHOCK TRIALS A-140
A.3.2.1 Aircraft Carrier Full Ship Shock Trial A-140
A.3.2.2 DDG 1000 Zumwalt Class Destroyer Full Ship Shock Trial A-141
A.3.2.3 Littoral Combat Ship Full Ship Shock Trial A-142
A.3.3 LIFECYCLE ACTIVITIES A-143
A.3.3.1 Ship Signature Testing A-143
A.3.3.2 Surface Ship Sonar Testing/Maintenance (in OPAREAs and Ports) A-144
A.3.3.3 Submarine Sonar Testing/Maintenance (in OPAREAs and Ports) A-145
A.3.3.4 Combat System Ship Qualification Trial – In-Port Maintenance Period A-146
A.3.3.5 Combat System Ship Qualification Trial – Air Defense A-147
A.3.3.6 Combat System Ship Qualification Trial – Surface Warfare A-148
A.3.3.7 Combat System Ship Qualification Trial – Undersea Warfare A-149
A.3.4 NAVAL SEA SYSTEM COMMAND RANGE ACTIVITIES NAVAL SURFACE WARFARE CENTER PANAMA CITY DIVISION TESTING RANGE A-150
A.3.4.1 Air Operations A-150
A.3.4.2 Surface Operations A-151
A.3.4.3 Subsurface Operations A-152
A.3.4.4 Sonar Operations A-153
A.3.4.5 Electromagnetic Operations A-154
A.3.4.6 Laser Operations A-155
A.3.4.7 Ordnance Operations A-156
A.3.4.8 Projectile Firing A-157
A.3.4.9 Unmanned Underwater Vehicle Demonstrations A-158
A.3.4.10 Mine Detection and Classification Testing A-159
A.3.4.11 Mine Countermeasure/Neutralization Testing A-160
A.3.4.12 Stationary Source Testing A-161
A.3.4.13 Special Warfare Testing A-162
A.3.4.14 Unmanned Underwater Vehicle Testing A-163
A.3.4.15 Ordnance Testing – Line Charge Testing A-164
A.3.4.16 Ordnance Testing – Gun Testing- Small-Caliber A-165
A.3.4.17 Ordnance Testing – Gun Testing- Medium-Caliber A-166
A.3.4.18 Ordnance Testing – Gun Testing- Large-Caliber A-167
A.3.4.19 Countermeasure Testing – Acoustic Systems Testing A-168
A.3.4.20 Countermeasure Testing – Anti-Torpedo Torpedo Defense System Testing A-169
A.3.5 NAVAL UNDERSEA WARFARE CENTER DIVISION, NEWPORT A-170
A.3.5.1 Launcher Testing A-170
A.3.5.2 Torpedo Testing A-171
A.3.5.3 Towed Equipment Testing A-172
A.3.5.4 Unmanned Underwater Vehicle Testing A-173
A.3.5.5 Unmanned Surface Vehicle Testing A-174
A.3.5.6 Unmanned Aerial System Testing A-175
A.3.5.7 Semi-Stationary Equipment Testing A-176
A.3.5.8 Unmanned Underwater Vehicles Demonstrations A-177
A.3.5.9 Pierside Integrated Swimmer Defense A-178
A.3.6 SOUTH FLORIDA OCEAN MANAGEMENT FACILITY A-179
A.3.6.1 Signature Analysis Operations A-179

A.3.6.2 Mine RDT&E Activities A-180
A.3.6.3 Surface Testing Activities A-181
A.3.6.4 Subsurface Testing Activities A-182
A.3.6.5 Unmanned Underwater Vehicles Demonstrations A-183
A.3.7 Additional Activities at Locations Outside of Naval Sea Systems Command ranges – Anti-Surface Warfare / Anti-Submarine Warfare Testing A-184
A.3.7.1 Missile Testing A-184
A.3.7.2 Kinetic Energy Weapon Testing A-185
A.3.7.3 Electronic Warfare Testing A-186
A.3.7.4 Torpedo (Non-Explosive) Testing A-187
A.3.7.5 Torpedo (Explosive) Testing A-188
A.3.7.6 Countermeasure Testing – Acoustic System Testing A-189
A.3.7.7 Countermeasure Testing – Anti-Torpedo Torpedo Defense System Testing A-190
A.3.7.8 Pierside Sonar Testing A-191
A.3.7.9 At-Sea Sonar Testing A-192
A.3.8 Mine Warfare Testing A-193
A.3.8.1 Mine Detection and Classification Testing A-193
A.3.8.2 Mine Countermeasure/Neutralization Testing A-194
A.3.9 Shipboard Protection Systems and Swimmer Defense testing A-195
A.3.9.1 Pierside Integrated Swimmer Defense A-195
A.3.9.2 Shipboard Protection Systems Testing A-196
A.3.9.3 Chemical/Biological Simulant Testing A-197
A.3.10 Unmanned Vehicle Testing A-198
A.3.10.1 Underwater Deployed Unmanned Aerial System Testing A-198
A.3.10.2 Unmanned Vehicle Development and Payload Testing A-199
A.3.11 Other Testing A-200
A.3.11.1 Special Warfare A-200
A.3.11.2 Radio Frequency Communications Testing A-201
A.3.11.3 Hydrodynamic Testing A-202
A.3.11.4 At-Sea Explosives Testing A-203

LIST OF TABLES

There are no tables in this section.

LIST OF FIGURES

Figure A-1: BQM-74 (Aerial Target) A-6
Figure A-2: LUU-2B/B Illuminating Flare (Aerial Target) A-6
Figure A-3: Tactical Air-Launched Decoy (Aerial Target) A-6
Figure A-4: "Killer Tomato" Stationary Floating Target A-22
Figure A-5: QST-35 Seaborne Powered Target (on Left) and High Speed Maneuvering Surface Target (on Right) A-22

APPENDIX A NAVY ACTIVITIES DESCRIPTIONS

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

A.1 TRAINING ACTIVITIES

The Navy's training activities are organized generally into eight primary mission areas and a miscellaneous category (Other Training) that includes those activities that do not fall within a primary mission area, but are an essential part of Navy training. 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 comprised entirely of individual activities described in the primary mission areas.

A.1.1 ANTI-AIR WARFARE TRAINING

Anti-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. Anti-air warfare training encompasses events and exercises to train ship and aircraft crews in employment of these weapons systems against simulated threat aircraft or targets. Anti-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.1.1.1 Air Combat Maneuver

Activity Name	Activity Description	
Anti-Air Warfare		
Air Combat Maneuver (ACM)	Aircrews engage in flight maneuvers designed to gain a tactical advantage during combat.	
Long Description	Basic flight maneuvers in which aircrew engage in offensive and defensive maneuvering against each other. During air combat maneuver engagements, no ordnance is fired, however countermeasures such as chaff and flares may be used. These maneuvers typically involve two aircraft; however, based upon the training requirement, air combat maneuver exercises may involve over a dozen aircraft.	
Information Typical to the Event	**Platform**: Fixed-wing aircraft (F/A-18, F-35, F-5) **Systems**: None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 1-2 hours.	**Location***: VACAPES: W-72, W-386 Navy Cherry Point: W-122 (Areas 1, 8, 15, 16) JAX: W-132, W-133, W-134, W-157 (Areas 3X, 4X), W-158, W-159 Key West: W 174 A/B/C/E/F/G, W-465 A/B, Bonefish ATCAA
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic**: Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). No munitions fired. Flare and chaff may be used. All flare and chaff accounted for in flare exercise and chaff exercise events. Alternative 2 events in Key West Range Complex account for the proposed increase in Key West Range Complex Environmental Impact Statement (underway).	

A.1.1.2 Air Defense Exercise

Activity Name	Activity Description	
Anti-Air Warfare		
Air Defense Exercises (ADEX)	Aircrew and ship crews conduct defensive measures against threat aircraft or missiles.	
Long Description	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 though engagement sequence. Aircraft operate at varying altitudes and speeds. This exercise may include 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, and 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.	
Information Typical to the Event	**Platform**: Fixed-wing aircraft (FA-18, F-35, E-2), surface ships (all) **Systems**: None **Ordnance/Munitions:** None **Targets:** Other aircraft; unmanned drones **Duration:** 1-4 hours.	**Location*:** VACAPES: W-386, W-72 Navy Cherry Point: W-122 JAX: W-132, W-133, W-134, W-157, W-158, W-159 GOMEX: W-151, W-155
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise; vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). No weapons are fired.	

A.1.1.3 Gunnery Exercise (Air-to-Air) – Medium-Caliber

Activity Name	Activity Description	
Anti-Air Warfare		
Gunnery Exercise (Air-to-Air) **Medium-caliber** **(GUNEX [A-A]) – Medium-caliber**	Aircrews defend against threat aircraft with cannons (machine gun).	
Long Description	Fighter jet aircrews defend against threat aircraft with cannons (machine gun). An event involves two or more fighter jet aircraft and a target banner towed by a contracted aircraft (e.g., Lear jet). The banner target is recovered after the event.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft (F/A-18, F-35) **Systems:** None **Ordnance/Munitions:** Medium-caliber (non-explosive) **Targets:** Towed banner **Duration:** Event duration is 1-2 hours.	**Location*:** VACAPES: W-72A, W-72B, W-386 Navy Cherry Point: W-122 (Area 9,10, 11, 12) JAX: W-157A, W-133 (Area 2X) Key West: W-174A
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material (non-explosive projectiles) strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** Medium-caliber projectiles; casings	
Detailed Military Expended Material Information	Projectiles; casings	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Only non-explosive munitions are used. Target is recovered.	

A.1.1.4 Missile Exercise (Air-to-Air)

Activity Name	Activity Description	
Anti-Air Warfare		
Missile Exercise (Air-to-Air) (MISSILEX [A-A])	Aircrews defend against threat aircraft with missiles.	
Long Description	An event involves two or more jet aircraft and a target. Missiles are either high-explosive warheads or non-explosive practice munitions. The target is either an unmanned aerial target drone, a Tactical Air-Launched Decoy, or a parachute suspended illumination flare. Target drones deploy parachutes and are recovered by boat or helicopter; tactical air-launched decoys and illumination flares are expended and not recovered. These events typically occur at high altitudes. Anti-air missiles may also be employed when training against threat missiles.	
Information Typical to the Event	**Platform**: Fixed-wing aircraft (F/A-18, F-35) **Systems**: None **Ordnance/Munitions:** Air-to-air missiles: AIM-7, AIM-9, AIM-120, AIM-132 (non-explosive and high-explosive) **Targets:** BQM-34, BQM-74, tactical air-launched decoy, LUU-2 illumination flare **Duration:** Event duration is 1-2 hours per event.	**Location***: VACAPES: W-72B, W-386 Navy Cherry Point: W-122 JAX: W-132, W-133, W-134, W-157, W-158 Key West: W-174A, W-174B, W-174F
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise; in-air explosives **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (target and missile fragment); aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Military expended materials (missile fragments, parachutes, flare casings, target fragments)	
Detailed Military Expended Material Information	Missile and target fragments; parachutes; flare casings	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). All missiles are explosive (Alternatives 1 and 2) and all missiles explode at high altitude. All propellant and explosives are consumed. Assume 1.5 flares per MISSILEX event	

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

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

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

A.1.1.5 Gunnery Exercise (Surface-to-Air) – Large-Caliber

Activity Name	Activity Description	
Anti-Air Warfare		
Gunnery Exercise (Surface-to-Air) – Large-Caliber (GUNEX [S-A]) – Large-Caliber	Surface ship crews defend against threat aircraft or missiles with large-caliber guns.	
Long Description	Surface ship crews defend against threat aircraft or missiles with guns to disable or destroy the threat. An event involves one ship and a simulated threat aircraft or anti-ship missile that is detected by the ship's radar. Large-caliber guns fire projectiles, either non-explosive, or high-explosive (configured to explode in air), to disable or destroy the threat before it reaches the ship. The target is towed by a commercial air services jet.	
Information Typical to the Event	**Platform**: Surface ship (DDG, FFG, LCS, CG); fixed-wing aircraft **Systems**: None **Ordnance/Munitions:** Large-caliber: 5-inch gun, 76 mm, 57 mm (non-explosive under No Action Alternative and high-explosive under Alternatives 1 and 2) **Targets:** Towed targets behind aircraft. **Duration:** Event duration is 1 to 2 hours.	**Location*:** VACAPES: W-386, W-72 JAX: Gunnery boxes AA, BB
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise; vessel noise; weapons firing noise; in-air explosives **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (projectiles); vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** Projectile fragments; target fragments	
Detailed Military Expended Material Information	Projectiles; projectile fragments; target fragments	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). All projectiles under the No Action Alternative are assumed to be non-explosive. All projectiles under Alternatives 1 and 2 are assumed to be high-explosive. All projectiles explode well above surface.	

A.1.1.6 Gunnery Exercise (Surface-to-Air) – Medium-Caliber

Activity Name	Activity Description	
Anti-Air Warfare		
Gunnery Exercise (Surface-to-Air) – Medium-Caliber (GUNEX [S-A]) – Medium-Caliber	Surface ship crews defend against threat aircraft or missiles with medium-caliber guns.	
Long Description	Surface ship crews defend against threat aircraft or missiles with guns to disable or destroy the threat. An event involves one ship and a simulated threat aircraft or anti-ship missile that is detected by the ship's radar. Medium-caliber guns fire projectiles, typically non-explosive, to disable or destroy the threat before it reaches the ship. The target is towed by a commercial air services jet.	
Information Typical to the Event	**Platform**: Surface ships (all); fixed-wing aircraft **Systems**: None **Ordnance/Munitions:** Medium-caliber (non-explosive) **Targets:** Towed targets behind aircraft **Duration:** Event duration is 1-2 hours.	**Location*:** VACAPES: W-386, W-72 Navy Cherry Point JAX: Gunnery areas: AA, BB Other AFTT Areas: Outside of established ranges where ships may conduct unit level training events while in transit
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise; vessel noise; weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (projectiles); vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** Projectiles; casings	
Detailed Military Expended Material Information	Projectiles; casings	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). All projectiles are non-explosive. Close-In Weapon System employed in all events. Pre-scheduled events occur in typical VACAPES/JAX locations. Routine Close-In Weapon System maintenance related firing can occur throughout the Study Area.	

A.1.1.7 Missile Exercise (Surface-to-Air)

Activity Name	Activity Description	
Anti-Air Warfare		
Missile Exercise (Surface-to-Air) (MISSILEX [S-A])	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 missiles. The event involves a simulated threat aircraft or anti-ship missile which is detected by the ship's radar. Ship launched anti-air missiles are fired (high-explosive) to disable or destroy the threat. The target typically is a remote controlled drone. Anti-air missiles may also be used to train against land attack missiles.	
Information Typical to the Event	**Platform**: Surface ships (all) **Systems**: None **Ordnance/Munitions:** Surface-to-air missiles (Sea Sparrow, Standard Missile SM-2, Rolling Airframe Missile [high-explosive]) **Targets:** Unmanned drone: BQM-34, BQM-74 **Duration:** Event duration is 1 to 2 hours.	**Location***: Northeast VACAPES: W-72, W-386 (Air D, G, H, K) Navy Cherry Point: W-122 JAX: W-132, W-133, W-134, W-157, W-158, W-159 GOMEX: OPAREAs
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise ; weapons firing noise; in-air explosives **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (missile fragments); vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** Missile fragments;	
Detailed Military Expended Material Information	Missile fragments;	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Assumes that all anti-air missiles are high-explosive. Missile explodes well above surface. All explosive and propellant are consumed. Targets are typically not destroyed and unmanned drones are recovered.	

A.1.2 AMPHIBIOUS WARFARE TRAINING

Amphibious warfare is a type of naval warfare involving the utilization of naval firepower and 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 one thousand 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.1.2.1 Naval Surface Fire Support Exercise – Land-Based Target

Activity Name	Activity Description	
Amphibious Warfare		
Naval Surface Fire Support Exercise – Land-based Target (FIREX [Land])	Surface ship crews use large-caliber guns to fire on land-based targets in support of forces ashore.	
Long Description	Surface ship crews use large-caliber (main battery) guns to support forces ashore. One or more ships position themselves up to six nautical miles (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 high-explosive and non-explosive practice ordnance is authorized and is often supported by target shapes such as tanks, truck, trains, or aircraft on the ground.	
Information Typical to the Event	**Platform**: Surface ships (CG, DDG) **Systems**: None **Ordnance/Munitions:** Large-caliber (5-inch rounds, explosive and non-explosive) **Targets:** Land target **Duration:** Event duration is 1 to 2 hours.	**Location**: Navy Cherry Point: Firing point from sea is Area 15B. Impact occurs at G-10 Impact Area, Camp Lejeune.
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise; weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Casings	
Assumptions Used for Analysis	Projectile impact is on land. This event can only be conducted in Navy Cherry Point, as the G-10 range is the only east coast location that can support Naval Surface Fire Support Exercises on a land-based target.	

A.1.2.2 Naval Surface Fire Support Exercise At Sea

Activity Name	Activity Description	
Amphibious Warfare		
Naval Surface Fire Support Exercise - At Sea (FIREX [At Sea])	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 hydrophones located at or near the target area.	
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 hydrophones located at or near the target area. The portable scoring system is comprised of sonobuoys (Integrated Maritime Portable Acoustic Scoring and Simulation buoys) set in a pre-designed pattern at specific intervals, which are retrieved after the exercise. An onboard scoring system provides a realistic presentation, such as a land mass with topography, to the ship's combat system. This virtual land target area overlays the sonobuoy array. The ship fires its ordnance into the target area and the acoustic noise resulting from the impact of the round landing in the water is detected by the sonobuoys. The global positioning system position and bearing of the impact is transmitted to the ship and the onboard scoring system triangulates the exact point of impact of the round, allowing the exercise to be conducted as if the ship were firing at an actual land target. Surface ship crews use large-caliber (main battery) guns to support forces ashore.	
Information Typical to the Event	**Platform**: Surface ships (CG, DDG), rigid hull inflatable boats (for recovering buoys) **Systems**: None **Ordnance/Munitions:** Large-caliber (5-inch rounds) explosive and non-explosive practice munitions **Targets:** Integrated Maritime Portable Acoustic Scoring and Simulation buoys	**Location***: VACAPES: 5C/D, 7C/D, 8C/D, 1C1/2 Navy Cherry Point: Area 4/5, 13/14 JAX: Surface Gunnery Areas BB & CC GOMEX: Pensacola OPAREA W-151 A/B and W-155A
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; vessel noise; weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (projectiles and projectile fragments); vessel strike **Entanglement:** None **Ingestion:** Projectile fragments	
Detailed Military Expended Material Information	Projectiles and projectile fragments	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Events occur greater than 12 nm from shore. Non-explosive practice munitions may be used when Integrated Maritime Portable Acoustic Scoring and Simulation buoys can detect projectile splash. High-explosives will be used during all other events. Assume all explosive rounds detonate on impact with water surface.	

A.1.2.3 Marine Expeditionary Unit Certification Exercise

Activity Name	Activity Description	
Amphibious Warfare		
Marine Expeditionary Unit (MEU) Certification Exercise (CERTEX)	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 a non-combatant evacuation operation.	
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 event 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. This exercise generally occurs during a composite training unit exercise.	
Information Typical to the Event	**Platform**: Surface ships; amphibious vehicles; fixed-wing aircraft; rotary-wing aircraft **Systems**: None **Ordnance/Munitions:** Small-caliber (non-explosive)**** **Targets:** None **Duration:** Event duration is up to 3 weeks.	**Locations:** Navy Cherry Point: Onslow Bay
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Amphibious Readiness Group Major Training Event ****Weapons firing during this event is discussed in appropriate activity descriptions (gunnery exercise, etc.).	

A.1.2.4 Amphibious Assault

Activity Name	Activity Description	
Amphibious Warfare		
Amphibious Assault	Forces move ashore from ships at sea for the immediate execution of inland objectives.	
Long Description	Landing forces embarked in ships, landing crafts, or helicopters launch an attack from the sea onto a hostile shore. 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 event. The goal is to practice loading, unloading, and movement and to develop the timing required for a full-scale exercise.	
Information Typical to the Event	**Platform**: Amphibious and landing ships (LHA, LHD, LPD, LSD); amphibious vehicles, rotary-wing aircraft **Systems**: None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is up to 2 weeks.	**Locations:** Navy Cherry Point: Onslow Bay
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None anticipated	
Assumptions Used for Analysis	Typical event:1-3 amphibious ships (LHA or LHD, LPD, LSD); 2-8 landing craft (landing craft, air cushioned; landing craft, utility); 4-14 amphibious assault vehicles; up to 22 aircraft (MH-53, H-46/MV-22, AH-1, UH-1, AV-8); a Marine Expeditionary Unit (2,200 Marines)	

A.1.2.5 Amphibious Raid/Humanitarian Assistance Operations

Activity Name	Activity Description	
Amphibious Warfare		
Amphibious Raid/Humanitarian Assistance Operations	Small unit forces move swiftly from 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 ships 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 boat units, small unit live-fire and non-live-fire operations. Surveillance or reconnaissance unmanned surface and aerial vehicles may be used during this event. Events are also conducted to train in the delivery of humanitarian assistance to remote locations or areas requiring assistance after natural disasters.	
Information Typical to the Event	**Platform**: Amphibious assault ships (LHA, LHD), amphibious transport dock and dock landing ships (LPD, LSD); amphibious vehicles (landing craft, air cushioned, and amphibious assault vehicles); small boats (rigid hull inflatable boats) **Systems**: Unmanned surface and aerial vehicles **Ordnance/Munitions:** Non-explosive practice munitions **Targets:** None **Duration:** Event duration is 4-8 hours.	**Locations:** Navy Cherry Point: Onslow Bay JAX: Naval Station Mayport
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise; weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None anticipated.	
Assumptions Used for Analysis	Firing of weapons during these events is accounted for in gunnery exercises, surface to surface activities. Events in JAX are conducted at Seminole Beach, Naval Station Mayport.	

A.1.3 STRIKE WARFARE TRAINING

Strike warfare includes training of fixed-wing fighter/attack aircraft or rotary wing aircraft in delivery of precision guided munitions, non-guided munitions, rockets, and other ordnance against land targets in all weather and light conditions. Training events typically involve a simulated strike mission with a flight of four or more aircraft. The strike mission may simulate attacks on "deep targets" (i.e., those geographically distant from friendly ground forces), or may simulate close air support of targets within close range of friendly ground forces. Laser designators from aircraft or ground personnel may be employed for delivery of precision guided munitions. Some strike missions involve no-drop events in which prosecution of targets is simulated, but video footage is often obtained by onboard sensors.

A.1.3.1 High-Speed Anti-Radiation Missile Exercise (Air-to-Surface)

Activity Name	Activity Description	
Strike Warfare		
High-Speed Anti-Radiation Missile Exercise (Air- to-Surface) (HARMEX [A-S])	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 events train 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.	
Information Typical to the Event	**Platform**: Fixed-wing aircraft (F/A-18, EA-6B, EA-18G) **Systems**: None **Ordnance/Munitions:** High-Speed Anti-Radiation Missile: high-explosive **Targets:** Barge with an electronic emitter **Duration:** Event duration is 1 to 2 hours.	**Location***: VACAPES: W-72, W-386 (Air E, F, I, J) Navy Cherry Point: W-122
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise; Vessel noise; in-air explosives **Energy:** In-air low energy laser **Physical Disturbance and Strike:** Vessel strike; Military expended material strike (missile fragments); aircraft strike (birds only) **Entanglement:** None **Ingestion:** Missile fragments	
Detailed Military Expended Material Information	Missile fragments	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). High-explosive missiles will explode well above the water's surface. The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.1.4 ANTI-SURFACE WARFARE TRAINING

Anti-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 boats. Aircraft-to-surface Anti-surface warfare is conducted by long-range attacks using air-launched cruise missiles, precision guided munitions or aircraft cannon. Anti-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 anti-surface warfare includes surface-to-surface gunnery and missile exercises, air-to-surface gunnery and missile exercises, and submarine missile or torpedo launch events. Gunnery and missile training generally involves expenditure of ordnance against a towed target. A sinking exercise is a specialized training event 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.

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

A.1.4.1 Maritime Security Operations

<table>
<tr><th>Activity Name</th><th colspan="2">Activity Description</th></tr>
<tr><td colspan="3">Anti-Surface Warfare</td></tr>
<tr><td>Maritime Security Operations (MSO)</td><td colspan="2">Helicopter and surface ship crews conduct a suite of maritime security operations (e.g., visit, search, board, and seizure; maritime interdiction operations; force protection; and anti-piracy operations).</td></tr>
<tr><td>Long Description</td><td colspan="2">Helicopter and surface ship crews conduct a suite of maritime security operations (e.g., visit search, board, and seizure; maritime interdiction operations; force protection; and anti piracy operation). These activities involve training of boarding parties delivered by helicopters and surface ships to surface vessels for the purpose of simulating vessel search and seizure operations. Various training scenarios are employed and may include small arms with non-explosive blanks and surveillance or reconnaissance unmanned surface and aerial vehicles. The entire exercise may last two to three hours.
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.
Oil Platform Defense: Naval personnel train to defend oil platforms, or other similar at sea structures
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 crafts.</td></tr>
<tr><td>Information Typical to the Event</td><td>Platform: Surface ship (any); helicopters; small boats; high speed vessels; unmanned vehicles (surface and aerial)
Systems: None
Ordnance/Munitions: Small-caliber (non-explosive)
Targets: Range support vessel; high performance boats; unmanned vessels
Duration: Event duration is up to 3 hours.</td><td>Location:

All OPAREAs and littoral areas proximate to homeports</td></tr>
<tr><td>Potential Impact Concerns
(Information regarding deconstruct categories and stressors)</td><td colspan="2">Acoustic: Vessel noise; aircraft noise
Energy: None
Physical Disturbance and Strike: Military expended material strike (projectiles); vessel strike; aircraft strike (birds only)
Entanglement: None
Ingestion: Small-caliber projectiles; casings</td></tr>
<tr><td>Detailed Military Expended Material Information</td><td colspan="2">Small-caliber projectiles; casings (see note below in assumptions)</td></tr>
</table>

Activity Name	Activity Description
Assumptions Used for Analysis	Firing of weapons during these events accounted for in gunnery exercises, surface to surface activities. This occurs during approximately 20 percent of Maritime Security Operations events. Maritime security operations is a broad term used to describe activities intended 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). The term "maritime security operations" needs to remain broad as naval forces need to be able to tailor training events to respond to emergent threats. Maritime security operations events typically do not involve live fire of weapons. All maritime security operations events involve vessel movement, sometimes at high rates of speed (naval vessels maneuvering to overtake suspect vessel or small boats (targets) closing in and maneuvering around naval vessels), and some event involve helicopters and boarding parties. Maritime security operations training events are conducted proximate to naval homeports (Norfolk, Jacksonville) including during times of transit in and out of port, as well as during major training events.

A.1.4.2 Maritime Security Operations- Anti-swimmer Grenades

Activity Name	Activity Description	
Anti-Surface Warfare		
Maritime Security Operations (MSO)-Anti-swimmer Grenades	Boat crews engage in force protection activities by using anti-swimmer grenades to defend against hostile divers	
Long Description	Boat crews engage in force protection activities by using anti-swimmer grenades to defend against hostile divers. Boat crews train to maneuver boats in specific search patterns, while surveying the area for evidence of SCUBA activity. Crews train in the safe handling and use of anti-swimmer grenades to counter the diver threat.	
Information Typical to the Event	**Platform**: Boats **Systems**: None **Ordnance/Munitions:** Anti-swimmer grenades (high-explosive) **Targets:** None **Duration:** Event duration is typically 1 hour.	**Location:** Northeast VACAPES: W-50, R-6606 Navy Cherry Point JAX: Charleston underwater detonation boxes GOMEX: Corpus Christi underwater detonation boxes Event could occur proximate to any homeport.
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike (grenade fragments) **Entanglement:** None **Ingestion:** Grenade fragments	
Detailed Military Expended Material Information	Fragments from high-explosive grenades	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Events will usually be conducted in established underwater detonation areas.	

A.1.4.3 Gunnery Exercise Surface-to-Surface (Ship) – Small-Caliber

Activity Name	Activity Description	
Anti-Surface Warfare		
Gunnery Exercise Surface-to-Surface (Ship) – Small-Caliber (GUNEX - S-S – [Ship]) Small-Caliber	Ship crews engage surface targets with ship's small-caliber guns designed to provide close range defense against patrol boats, smaller boats, swimmers, and floating mines.	
Long Description	This exercise involves ship crews engaging surface targets at sea with small-caliber (.50 caliber or smaller) weapons. Ships use small-caliber weapons to practice defensive marksmanship, typically against stationary floating targets. The target may be a 10-foot diameter red balloon (Killer Tomato), 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 events will be expended in the water. Shipboard protection systems utilizing small-caliber projectiles will train against high speed mobile targets.	
Information Typical to the Event	**Platform:** Surface ships **Systems:** None **Ordnance/Munitions:** Small-caliber projectiles (non-explosive) **Targets:** Recoverable or expendable floating target (stationary or towed); remote controlled high speed targets **Duration:** Event duration is 2-3 hours.	**Location:** AFTT Study Area beyond 3 nm from shoreline
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike (projectile; target) **Entanglement:** None **Ingestion:** Small-caliber projectiles; casings; target fragments	
Detailed Military Expended Material Information	Small-caliber projectiles; casings; target fragments	
Assumptions Used for Analysis	Small-caliber gun rounds per event: 1,000-3,000 non-explosive practice munitions The majority of the activity will occur proximate to Navy homeports in Jacksonville, Florida and Norfolk, Virginia.	

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

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

A.1.4.4 Gunnery Exercise Surface-to-Surface (Ship) – Medium-Caliber

Activity Name	Activity Description	
Anti-Surface Warfare		
Gunnery Exercise Surface-to-Surface (Ship) – Medium-Caliber (GUNEX - S-S [Ship]) - Medium-Caliber	Ship crews engage surface targets with ship's medium-caliber guns designed to provide close range defense against patrol boats, smaller boats, swimmers, and floating mines.	
Long Description	This exercise involves ship crews engaging surface targets at sea with medium-caliber (larger than .50 caliber up to 56 mm) weapons. Ships use medium-caliber weapons to practice defensive marksmanship, typically against stationary floating (a 10-foot 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 will train against high speed mobile targets.	
Information Typical to the Event	**Platform**: Surface ships **Systems**: None **Ordnance/Munitions:** Medium-caliber (high-explosive or non-explosive) **Targets:** Recoverable or expendable floating targets (stationary or towed); remote controlled high speed targets **Duration:** Event duration is 2-3 hours.	**Location*:** VACAPES: OPAREA, W-386, W-72 Cherry Point: OPAREA JAX: OPAREA, typically within Surface Gunnery Areas AA, BB, CC GOMEX: Typically Pensacola and Panama City OPAREAs Other AFTT Areas: Outside of established ranges where ships may conduct unit level training events while in transit
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; vessel noise; weapons firing noise **Energy:** None **Physical Disturbance and Strike:** vessel and in-water device strike, military expended material strike (medium-caliber projectiles and casings, projectile fragments, and target fragments) **Entanglement:** None **Ingestion:** Medium-caliber projectiles and casings; target fragments; projectile fragments	
Detailed Military Expended Material Information	Medium-caliber projectiles and casings; target fragments; projectile fragments Approximately 200 medium-caliber rounds are used per event. One target used per event. 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 steel drums.	
Assumptions used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). All projectiles under the No Action Alternative are non-explosive. Assume all Alternative 1 and 2 events include the use of some explosive rounds.	

A.1.4.5 Gunnery Exercise Surface-to-Surface (Ship) – Large-Caliber

Activity Name	Activity Description	
Anti-Surface Warfare		
Gunnery Exercise Surface-to-Surface (Ship) – Large-Caliber (GUNEX - S-S [Ship]) - Large-Caliber	Ship crews engage surface targets with ship's large-caliber guns designed to provide defense against ships, patrol boats, smaller boats.	
Long Description	This exercise involves ships' gun crews engaging 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 water craft. 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 event. Large-caliber guns will also be fired during weapon certification events and in conjunction with weapon maintenance. During all events, 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 target), or for proximity to the target (in air detonation).	
Information Typical to the Event	**Platform**: Surface ships (CG, DDG, LCS) **Systems**: None **Ordnance/Munitions:** Large-caliber (high-explosive and non-explosive) **Targets:** Remote controlled high speed targets **Duration:** Event duration is up to 3 hours.	**Location*:** VACAPES: OPAREA, W-386, W-72 Cherry Point: OPAREA JAX: OPAREA, typically within Surface Gunnery Areas AA, BB, CC GOMEX: Typically Pensacola, Panama City OPAREAs Other AFTT Areas: Outside of established ranges where ships may conduct unit level training events while in transit
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; vessel noise; weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike (projectile) **Entanglement:** None **Ingestion:** Target fragments; projectile fragments	
Detailed Military Expended Material Information	Large-caliber projectiles; casings; target fragments; projectile fragments	

Activity Name	Activity Description
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Activity always occurs beyond 3 nm of shoreline. For analytical purposes, assume all high-explosive rounds are fused to detonate upon impact with water surface or target. After impacting the water, the high-explosive rounds are expected to detonate within 3 feet (ft.) of the surface. Non-explosive rounds and fragments from the high-explosive rounds will sink to the bottom of the ocean. For Alternative 2, analysis considers the introduction of (2) kinetic weapon-equipped ships being introduced to the fleet. Increases in events (6) and projectiles expended (240) reflect the likely training requirements of this new weapon system. Assume each non-explosive projectile will be up to 5 inches in diameter and 30 inches in length, and each firing will also expend a metallic sleeve used to convey the projectile down the gun barrel. All projectiles under the No Action Alternative are non-explosive. Assume all Alternative 1 and 2 events include the use of some explosive rounds.

A.1.4.6 Gunnery Exercise Surface-to-Surface (Boat) – Small-Caliber

Activity Name	Activity Description	
Anti-Surface Warfare		
Gunnery Exercise Surface-to-Surface (Boat) – Small-Caliber (GUNEX – S-S [Boat]) - Small-Caliber	Boat crews engage surface targets with small-caliber weapons.	
Long Description	Boat crews engage surface targets with small-caliber weapons. Boat crews may use high or low speeds to approach and engage targets simulating other boats, swimmers, floating mines, or near shore land targets with small-caliber (up to and including .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.	
Information Typical to the Event	**Platform**: Boats **Systems**: None **Ordnance/Munitions:** Small-caliber (non-explosive) **Targets:** Recoverable or expendable floating targets **Duration:** Event duration is 1 hour.	**Location*:** Northeast: OPAREAs VACAPES: W-50, R-6606 Cherry Point: OPAREA JAX: Charleston OPAREA GOMEX: Panama City OPAREA, Corpus Christi OPAREA Other AFTT Areas: Outside of established ranges
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; military expended material strike (projectile) **Entanglement:** None **Ingestion:** Projectiles; casings	
Detailed Military Expended Material Information	Projectiles; casings	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). The majority of events will occur proximate to naval stations. Events will occur relatively nearshore due to short range of boats and safety concerns. Events mostly occur within 3 nm of the shoreline, but can occur further from shore.	

A.1.4.7 Gunnery Exercise Surface-to-Surface (Boat) – Medium-Caliber

Activity Name	Activity Description	
Anti-Surface Warfare		
Gunnery Exercise Surface-to-Surface (Boat) – Medium-Caliber **(GUNEX - S-S (Boat)) - Medium-Caliber**	Small boat crews engage surface targets with medium-caliber weapons.	
Long Description	Boat crews engage surface targets with medium-caliber weapons. Boat crews may use high or low speeds to approach and engage targets simulating other boats, floating mines, or near shore 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.	
Information Typical to the Event	**Platform**: Boats **Systems**: None **Ordnance/Munitions:** Medium-caliber (explosive and non-explosive) **Targets:** Recoverable or expendable floating targets (stationary or towed) **Duration:** Event duration is 1 hour.	**Location*:** Northeast VACAPES: W-50C, R-6606 Navy Cherry Point: W-122 JAX: Charleston OPAREA, underwater detonation boxes North and South GOMEX: Panama City OPAREA, underwater detonation Box E3, Corpus Christi
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; vessel noise; weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (projectile); vessel strike; in-water device strike **Entanglement:** None **Ingestion:** Projectile and target fragments; projectiles; casings	
Detailed Military Expended Material Information	Projectiles; casings; target fragments; projectile fragments One target is used per event, typically a stationary target such as a 50-gallon (189 liter) steel drum.	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). All projectiles under the No Action Alternative are non-explosive. Assume all Alternative 1 and 2 events include the use of some explosive rounds. Most events will involve boat crews training with MK 203 40 mm grenade launchers. The majority of events will occur proximate to naval stations.	

A.1.4.8 Missile Exercise Surface-to-Surface

Activity Name	Activity Description	
Anti-Surface Warfare		
Missile Exercise (Surface-to-Surface) (MISSILEX [S-S])	Surface ship crews defend against surface threats (ships or boats) 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 anti-surface missile. Events with destroyers and cruisers will involve long range (over the horizon) Harpoon (or similar) anti-surface missiles. While past Harpoon events occurred during sinking exercises, the requirement exists for non-sinking exercise events to certify ship crews. If a sinking exercise target is unavailable, a towed sled would likely be used. Events with littoral combat ships will involve shorter range anti-surface missiles, similar to Hellfire missiles. Events with littoral combat ships would be to certify ship's crew to defend against "close in" (less than 10 miles from shore) surface threats. These exercises are live fire, meaning that a missile is fired down range. Anti-surface missiles could be equipped with either high-explosive or non-explosive warheads.	
Information Typical to the Event	**Platform**: Surface ships (CG, DDG, LCS) **Systems**: None **Ordnance/Munitions:** Surface-to-surface and anti-ship missiles (explosive and non-explosive) **Targets:** High speed surface targets; towed sleds **Duration:** Event duration is 2-4 hours.	**Location*:** VACAPES: Typically W-386 (Air-K), W-72 JAX: Typically W-157A/W-159A (Missile Laser Training Area)
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; vessel noise; weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike (missile, target fragments, and missile fragment) **Entanglement:** None **Ingestion:** Missile fragments; target fragments	
Detailed Military Expended Material Information	Missiles; missile fragments; target fragments	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Assume one missile and one target are used per event. While missiles could explode above the water's surface after contacting the target, analysis assumes all warheads explode at or just below the water's surface. All projectiles under the No Action Alternative are non-explosive. Assume all Alternative 1 and 2 events include the use of some explosive rounds.	

A.1.4.9 Gunnery Exercise Air-to-Surface – Small-Caliber

Activity Name	Activity Description	
Anti-Surface Warfare		
Gunnery Exercise (Air-to-Surface)- Small-Caliber **(GUNEX [A-S])- Small-Caliber**	Helicopter aircrews, including embarked personnel, use small-caliber guns to engage surface targets.	
Long Description	Helicopters, carrying several air crewmen, fly a racetrack pattern around an at-sea target. 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.	
Information Typical to the Event	**Platform**: Helicopter **Systems**: None **Ordnance/Munitions:** Small-caliber (non-explosive) **Targets:** Recoverable or expendable floating targets (stationary or towed); remote high speed target **Duration:** Event duration is 1 hour.	**Location:** VACAPES: W-72A (Air 1A), W-50C Navy Cherry Point: W-122 (1/2/3/8/9/10/15/16/17) JAX: W-132, W-133, W-134, W-157, W-158
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** In-water device strike; military expended material strike (projectiles); aircraft strike (birds only) **Entanglement:** None **Ingestion:** Projectiles; target fragments; casings	
Detailed Military Expended Material Information	Projectiles; casings; target fragments One target used per event; expendable smoke floats (50 percent), stationary targets (45 percent), or remote controlled targets (5 percent)	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Most events will occur proximate to Naval Stations where H-60 helicopters are homebased and target services are available (Norfolk, Virginia; Jacksonville, Florida).	

A.1.4.10 Gunnery Exercise Air-to-Surface – Medium-Caliber

Activity Name	Activity Description	
Anti-Surface Warfare		
Gunnery Exercise (Air-to-Surface)-Medium-Caliber (GUNEX [A-S])-Medium-Caliber	Fixed-wing and helicopter aircrews, including embarked personnel, use small- and medium-caliber guns to engage surface targets.	
Long Description	Fighter and helicopter aircrew, including embarked personnel, engage surface targets with medium-caliber guns. Targets simulate enemy ships, boats, and floating/near-surface mines. Fighter aircraft descend on a target firing high-explosive or non-explosive practice munitions medium-caliber projectiles. Helicopters, carrying several air crewmen, fly a racetrack pattern around an at-sea target. Crew will engage the target with medium-caliber weapons. Targets range from a smoke float, an empty steel drum, to high speed remote controlled boats and jet-skis.	
Information Typical to the Event	**Platform**: Fixed-wing aircraft (F/A-18, F-35); helicopter (H-60) **Systems**: None **Ordnance/Munitions:** Medium-caliber (non-explosive and explosive) **Targets:** Recoverable or expendable floating targets (stationary or towed); remote high speed target **Duration:** Event duration is 1 hour.	**Location*:** VACAPES: W-386 (Air K) Navy Cherry Point: W-122 JAX: Gunnery areas AA, BB GOMEX: Pensacola OPAREA, W-155 hotbox
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (projectile); in-water device strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** Projectile and target fragments	
Detailed Military Expended Material Information	Projectiles; casings; projectile and target fragments One target used per event; expendable smoke float (50 percent), stationary target (45 percent), or remote controlled target (5 percent).	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). 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. All projectiles under the No Action Alternative are non-explosive. Assume all Alternative 1 and 2 events include the use of some explosive rounds.	

A.1.4.11 Missile Exercise Air-to-Surface – Rocket

Activity Name	Activity Description	
Anti-Surface Warfare		
Missile Exercise (Air-to-Surface)-Rocket (MISSILEX [A-S])-Rocket	Fixed-wing and helicopter aircrews fire both precision-guided and unguided rockets against surface targets.	
Long Description	Fighter, maritime patrol aircraft, and helicopter aircrews fire both precision-guided and unguided rockets 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 or non-explosive practice munitions precision guided rockets. Helicopters designate an at-sea surface target with a laser or optics for precision guided high-explosive or non-explosive practice munitions rockets.	
Information Typical to the Event	**Platform**: Fixed-wing aircraft (F/A-18, JSF, P-8, unmanned aerial vehicle); helicopters (H-60, Fire Scout) **Systems**: None **Ordnance/Munitions:** Rockets (explosive or non-explosive) **Targets:** Recoverable floating targets (stationary or towed) **Duration:** Event duration is 1 hour.	**Location*:** VACAPES: W-386 (Air-K), W-72A JAX: W-157A/W-159A (Missile Laser Training Area) GOMEX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; aircraft noise **Energy:** in-air low energy laser **Physical Disturbance and Strike:** In-water device strike; military expended material strike (rocket, rocket and target fragments); aircraft strike (birds only) **Entanglement:** None **Ingestion:** Target fragments; rocket fragments	
Detailed Military Expended Material Information	Rockets; target fragments; rocket fragments	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Assume all explosive rockets detonate in the water. Assume all rockets under the No Action Alternative are non-explosive. Assume all rockets under Alternatives 1 and 2 are explosive. Rockets may be used in conjunction with force protection events. The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.1.4.12 Missile Exercise Air-to-Surface

Activity Name	Activity Description	
Anti-Surface Warfare		
Missile Exercise (Air-to-Surface) (MISSILEX [A-S])	Fixed-wing and helicopter aircrews fire precision-guided missiles against surface targets.	
Long Description	Fighter, maritime patrol aircraft and helicopter aircrews fire both precision-guided missiles and unguided rockets 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 an at-sea surface target with a laser or optics for precision guided high-explosive or non explosive practice munitions missile. Helicopter launched missiles typically pass through the targets "sail" and, if explosive, detonate at or just below the water's surface.	
Information Typical to the Event	**Platform**: Fixed-wing aircraft and helicopters **Systems**: None **Ordnance/Munitions:** Air-to-surface missiles (high-explosive) **Targets:** Recoverable floating targets (stationary or towed); remotely operated targets **Duration:** Event duration is 1 hour.	**Location*:** VACAPES: Typically W-386 (Air-K), W-72A Navy Cherry Point: Typically W-122 (16,17) JAX: Typically W-157A, W-159A (Missile Laser Training Area)
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; aircraft noise **Energy:** In-air low energy laser **Physical Disturbance and Strike:** In-water device strike; military expended material strike (missile fragment); aircraft strike (birds only) **Entanglement:** Guidance wire*** **Ingestion:** Missile fragments; target fragments	
Detailed Military Expended Material Information	Missile fragments; target fragments; guidance wire***	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Assume one missile and one target are used per event. 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. ***In the Navy Cherry Point Range Complex, up to 8 TOW missiles could be used annually as part of this activity. Each TOW missile would have an associated guidance wire. No other missiles in this activity have a guidance wire associated with them. The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.1.4.13 Bombing Exercise Air-to-Surface

Activity Name	Activity Description	
Anti-Surface Warfare		
Bombing Exercise (Air-to-Surface) (BOMBEX [A-S])	Fixed-wing aircrews deliver bombs against surface targets.	
Long Description	Bombing exercises (air-to-surface) involve training of strike fighter aircraft in delivery of bombs against surface maritime targets. Fixed-wing aircraft conduct bombing exercises against stationary floating targets (e.g. MK-58 smoke buoy). An aircraft clears the area, deploys a smoke buoy or other floating target, and then delivers high-explosive or non-explosive practice munitions bomb(s) on the target. A range boat may be used to deploy 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 exercises. Unguided munitions include non-explosive sub scale bombs (MK-76 and BDU-45); explosive and non-explosive general purpose bombs (MK-80 series); MK-20 cluster bomb (explosive, non-explosive). Precision-guided munitions include laser-guided bombs (explosive, non-explosive); laser-guided training rounds (non-explosive); Joint Direct Attack Munition (explosive, non-explosive).	
Information Typical to the Event	**Platform**: Fixed-wing aircraft (F/A-18, JSF, P-8) **Systems**: None **Ordnance/Munitions:** Bombs (high-explosive, non-explosive) **Targets:** Expendable floating targets (e.g., smoke float) **Duration:** Event duration is 1 hour.	**Location*:** VACAPES: W-386 (Air-K, 7D & 8C), W-72A/B Navy Cherry Point: W-122 JAX: 157A/B, W-158A/B GOMEX: Pensacola OPAREA, W-151 A/C, W-155B
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; aircraft noise **Energy:** In-air low energy laser **Physical Disturbance and Strike:** Military expended material strike (non-explosive bomb); aircraft strike (birds only) **Entanglement:** None **Ingestion:** Bomb fragments; target fragments; smoke floats	
Detailed Military Expended Material Information	Bombs; bomb fragments; target fragments; smoke floats	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Approximately 90 percent of non-explosive bombs are sub-scale bombs such as the MK-76 and BDU-48. The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.1.4.14 Laser Targeting

Activity Name	Activity Description	
Anti-Surface Warfare		
Laser Targeting	Fixed-wing, helicopter, and ship crews illuminate enemy targets with lasers.	
Long Description	Fixed-wing and helicopter aircrew and shipboard personnel illuminate enemy targets with lasers for engagement by aircraft with laser guided bombs or missiles. This exercise may be conducted alone or in conjunction with other events utilizing precision guided munitions, such as anti-surface missiles and guided rockets. Events 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).	
Information Typical to the Event	**Platform**: Ships; boats; fixed-wing aircraft and helicopters **Systems**: None **Ordnance/Munitions:** None unless conducted with other events (e.g., missile exercise) **Targets:** None **Duration:** Event duration is 1-2 hours.	**Location*:** VACAPES: W-386 (Air-K), W-72A JAX: W-132 W-133, W-134, W-157, W-158
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise; aircraft noise **Energy:** In-air low energy laser **Physical Disturbance and Strike:** Vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Laser targeting for missile/rocket guidance will occur in areas where these events also occur. Use of lasers as force protection non-lethal deterrents will primarily occur proximate to Navy homeports (Norfolk, Virginia and Jacksonville, Florida). The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.1.4.15 Sinking Exercise

Activity Name	Activity Description	
Anti-Surface Warfare		
Sinking Exercise (SINKEX)	Aircraft, ship, and submarine crews deliver ordnance on a seaborne target, usually a deactivated ship, which is deliberately sunk using multiple weapon systems.	
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 ships, and submarines in order to take advantage of the ability to fire high-explosive ordnance 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 nm from shore and in water depths greater than 6,000 ft. Ship, aircraft, and submarine crews attack with coordinated tactics and deliver high-explosive ordnance to sink the target. Non-explosive practice munitions may be used during the initial stages to extend target life. 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 ship sinks.	
Information Typical to the Event	**Platform**: Ships; aircraft; submarines **Systems**: None **Ordnance/Munitions:** Potentially all available (explosive and non-explosive) **Targets:** Decommissioned ship made environmentally safe for sinking (according to U.S. Environmental Protection Agency standards) **Duration:** Event duration is 4 to 8 hours, possibly over 1 to 2 days. The duration of the event is unpredictable and the event ultimately ends when the ship sinks.	**Location:** Other AFTT Areas: sinking exercise box
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; vessel noise; aircraft noise; weapons firing noise **Energy**: None **Physical Disturbance and Strike:** Military expended material strike (non-explosive projectiles, projectile fragments); vessel strike; aircraft strike (birds only) **Entanglement:** Guidance wires **Ingestion:** Munitions fragments; small-caliber projectiles; casings	
Detailed Military Expended Material Information	Munitions fragments; non-explosive ordnance; guidance wires; munition fragments; casings; ship hulk (decommissioned ships made environmentally safe for sinking according to U.S. Environmental Protection Agency standards)	
Standard Operating Procedures and Mitigations		

Activity Name	Activity Description
Assumptions Used for Analysis	Events occur greater than 50 nm from shore and in water depths greater than 6,000 ft. The participants and assets could include: • 1 full-size target ship hulk • 1-5 CG, DDG, or FFG ships • 1-10 F/A-18, or MPA aircraft • 1 or 2 HH-60H, MH-60R/S, or SH-60B helicopters • 1 E-2 aircraft for Command and Control • 1 submarine • 1-3 range clearance aircraft • 2-4 Harpoon surface-to-surface or air-to-surface missiles • 2-8 air-to-surface Maverick missiles • 2-16 MK-82 general purpose bombs • 2-4 Hellfire air-to-surface missiles • 1 or 2 SLAM-ER air-to-surface missiles • 50-500 rounds 5-inch and 76 mm gun • 1-2 MK-48 heavyweight submarine-launched torpedo • 2-10,000 rounds .50 cal and 7.62 mm • Assume 2 guidance wires expended per event

A.1.5 ANTI-SUBMARINE WARFARE TRAINING

Anti-submarine warfare involves helicopter and maritime patrol aircraft, ships, and submarines. These units operate alone or in combination, in operations 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, locate mines, 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).

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 the 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. Active sonar is necessary to detect and track submarines that do not emit detectable levels of noise, either because of noise reduction design features or because of the presence of overwhelming background noise levels.

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 multi-dimensional training events involving submarines, ships, aircraft, and helicopters. This training integrates the full anti-submarine warfare continuum from detecting and tracking a submarine to attacking a target using either exercise torpedoes or simulated weapons. Training events include detection and tracking exercises against "enemy" submarine contacts; torpedo employment exercises against the target; and exercising command and control tasks in a multi-dimensional battlespace.

A.1.5.1 Tracking Exercise/Torpedo Exercise – Submarine

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Tracking Exercise/Torpedo Exercise – Submarine (TRACKEX/ TORPEX - Sub)	Submarine crews search for, track, and detect submarines. Exercise torpedoes may be used during this event.	
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 event. Tracking exercise/torpedo exercise – submarine could occur anywhere throughout the AFTT Study Area. 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 tracking exercise becomes a torpedo exercise when the submarine launches an exercise torpedo. 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 operating areas (OPAREAs) depending on training requirements and available assets.	
Information Typical to the Event	**Platform:** One or more submarines; support craft; rotary-wing aircraft **Systems:** Mid-frequency (primarily passive) and high-frequency sonars **Ordnance/Munitions:** Exercise torpedoes (non-explosive torpedo exercise only) **Targets:** MK-30 **Duration:** Event duration is 8 hours. **Typical Event Area Dimensions:** 30 x 40 nm	**Location*:** Northeast VACAPES Navy Cherry Point JAX (includes Undersea Warfare Training Range) Gulf of Mexico** Other AFTT Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (hull mounted sonar); high-frequency sonar (heavyweight torpedo) ; vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike (torpedo accessories); aircraft strike (birds only) **Entanglement:** Guidance wires **Ingestion:** None	
Detailed Military Expended Material Information	Torpedo accessories (guidance wires, ballast weights, flex tubing)	

Activity Name	Activity Description
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). ** Gulf of Mexico refers to the body of water. Torpedoes are recovered. Guidance wire has a low breaking strength. Weights and flex tubing sink rapidly. Tracking exercise and torpedo exercise can occur in all locations. Other AFTT Areas events typically refer to those events that occur while vessels are in transit. For the No Action Alternative, 72 torpedoes total for all events For Alternative 1 and Alternative 2, 80 torpedoes for all events

A.1.5.2 Tracking Exercise/Torpedo Exercise – Surface

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Tracking Exercise/ Torpedo Exercise – Surface (TRACKEX/ TORPEX - Surface)	Surface ship crews search for, track, and detect submarines. Exercise torpedoes may be used during this event.	
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 sonars. 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 an MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, MK-30 Recoverable Training Target, or live submarine. Tracking exercise/torpedo exercise – surface could occur anywhere throughout the AFTT Study Area. 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 tracking exercise becomes a torpedo exercise when the ship launches an exercise torpedo. The exercise torpedo is recovered by helicopter or small craft. The preferred range for this exercise is an instrumented underwater range, such as the Undersea Warfare Training Range, but it may be conducted in other OPAREAs depending on training requirements and available assets.	
Information Typical to the Event	**Platform:** One or more surface ships **Systems:** Mid-frequency sonars, Nixie **Ordnance/Munitions:** Exercise torpedoes (non-explosive torpedo exercise only) **Targets:** MK-39 or MK-30 **Duration:** Event duration is 2-4 hours. **Typical Event Area Dimensions:** 30 x 40 nm	**Location*:** Northeast VACAPES Navy Cherry Point JAX (includes Undersea Warfare Training Range) Gulf of Mexico** Other AFTT Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (hull mounted sonar, lightweight torpedo); vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	One MK-39 Expendable Mobile Anti-Submarine Warfare Training Target Torpedo accessories (ballast weights) from exercise torpedoes	
Assumptions used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). ** Gulf of Mexico refers to the body of water. Torpedoes are recovered. Tracking exercise and torpedo exercise can occur in all locations. A submarine may provide service as the target except for torpedo exercise events. Other AFTT Areas events typically refer to those events that occur while vessels are in transit. For the No Action Alternative, 18 torpedoes total for all events For Alternative 1 and Alternative 2, 18 torpedoes for all events	

A.1.5.3 Tracking Exercise/Torpedo Exercise – Helicopter

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Tracking Exercise/ Torpedo Exercise-Helicopter (TRACKEX/ TORPEX – Helo)	Helicopter crews search for, track, and detect submarines. Recoverable air launched torpedoes may be employed against submarine targets.	
Long Description	This exercise involves helicopters using sonobuoys and dipping sonar 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 are typically employed by a helicopter operating at altitudes below 3,000 ft. (914 m). Both passive and active sonobuoys are employed. The dipping sonar is employed from an altitude of about 50 ft. (15 m) after the search area has been narrowed based on the sonobuoy search. Both passive and active sonar are employed. The anti-submarine warfare target used for this exercise will likely be a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target or a live submarine. A MK 30 recoverable target may be used if available. This exercise may involve a single aircraft, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft and ships, including a major range event. The tracking exercise becomes a torpedo exercise when the helicopter launches an exercise torpedo. The exercise torpedo is recovered by a special recovery helicopter or small craft. The preferred range for this exercise is an instrumented underwater range, such as the Undersea Warfare Training Range, but it may be conducted in other OPAREAs depending on training requirements and available assets.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft; helicopters; surface ships **Systems:** Mid-frequency helicopter dipping sonar; sonobuoys **Ordnance/Munitions:** Exercise torpedoes (non-explosive) **Targets:** Expendable Mobile Anti-Submarine Warfare Training Target or MK-30 **Duration:** Event duration is 2-4 hours. **Typical Event Area Dimensions:** 20 x 30 nm	**Location:** VACAPES Navy Cherry Point JAX (includes Undersea Warfare Training Range) Other AFTT Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (Sonobuoy, dipping sonar, lightweight torpedo); aircraft noise; vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike; aircraft strike (birds only); **Entanglement:** Parachutes **Ingestion**: Parachutes	
Detailed Military Expended Material Information	1 MK-39 (expendable target) If target is air-dropped, 1 parachute per target (no more than 432/year) Torpedo accessories (ballast weights/parachutes) from exercise torpedoes Expended sonobuoys with parachutes	

Activity Name	Activity Description
Assumptions Used for Analysis	Tracking exercise and torpedo exercise can occur in all locations. For the No Action Alternative, 18 torpedoes total for all events For Alternative 1 and Alternative 2, 18 torpedoes for all events

A.1.5.4 Tracking Exercise– Maritime Patrol Aircraft

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Tracking Exercise/ Torpedo Exercise-Maritime Patrol Aircraft (TRACKEX/ TORPEX – MPA)	Maritime patrol aircraft crews search for, detect, and track submarines. Recoverable air launched torpedoes may be employed against submarine targets.	
Long Description	This exercise involves fixed-wing maritime patrol aircraft employing 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 are typically employed by a maritime patrol aircraft operating at altitudes below 3,000 ft. (914 m). 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. Both passive and active sonobuoys are employed. 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 ships, including a major range event. The tracking exercise becomes a torpedo exercise when the aircraft launches an exercise torpedo. 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 OPAREAs depending on training requirements and available assets.	
Information Typical to the Event	**Platform:** One or more aircraft, one or more surface ships **Systems:** Sonobuoys **Ordnance/Munitions:** Exercise torpedoes (non-explosive) **Targets:** MK-30, MK-39; submarine **Duration:** Event duration is from 2-8 hours. **Typical Event Area Dimensions:** Up to 60 x 60 nm	**Location:** Northeast VACAPES Navy Cherry Point JAX (includes Undersea Warfare Training Range) Gulf of Mexico**
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (sonobuoy, lightweight torpedo); vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only); vessel strike; in-water device strike; military expended material strike **Entanglement:** Parachutes **Ingestion:** Parachutes	
Detailed Military Expended Material Information	One MK-39 (expendable target) Torpedo accessories (ballast weights/parachutes) from exercise torpedoes Expended sonobuoys with parachutes	

Activity Name	Activity Description
Assumptions Used for Analysis	** Gulf of Mexico refers to the body of water. If target is air-dropped, one parachute per target (no more than 752/year) Tracking exercise and torpedo exercise can occur in all locations. A submarine may provide service as the target except for torpedo exercise events. Other AFTT Areas events typically refer to those events that occur while vessels are in transit.

A.1.5.5 Tracking Exercise – Maritime Patrol Aircraft Extended Echo Ranging Sonobuoys

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Tracking Exercise/ Torpedo Exercise-Maritime Patrol Advanced Extended Echo Ranging Sonobuoys (TRACKEX–MPA Sonobuoy)	Maritime patrol aircraft crews search for, detect, and track submarines with extended echo ranging sonobuoys. Recoverable air launched torpedoes may be employed against submarine targets.	
Long Description	This exercise involves fixed-wing maritime patrol aircraft employing Improved Extended Echo Ranging and Multistatic Active Coherent sonobuoy systems 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. The Improved Extended Echo Ranging events use the SSQ-110A sonobuoy as an impulsive source, while the Multistatic Active Coherent events utilize the SSQ-125 sonobuoy as a tonal source. Each exercise would include the use of approximately 10 SSQ-110A or SSQ-125 sonobuoys. 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 ships, including a major range event.	
Information Typical to the Event	**Platform:** One maritime patrol aircraft **Systems:** Improved Extended Echo Ranging and Multistatic Active Coherent sonobuoy systems **Ordnance/Munitions:** None **Targets:** MK-30, MK-39 **Duration:** Event duration is from 2-8 hours. **Typical Event Area Dimensions:** 60 x 60 nm	**Location:** Northeast VACAPES Navy Cherry Point JAX (includes Undersea Warfare Training Range) Gulf of Mexico**
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (sonobuoy); underwater explosives; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only); military expended material strike **Entanglement:** Parachutes **Ingestion:** Parachutes; sonobuoy fragments	
Detailed Military Expended Material Information	One MK-39 (expandable target) Expended sonobuoys with parachutes (estimate of 3,200 sonobuoys)	
Assumptions used for Analysis	** Gulf of Mexico refers to the body of water. If target is air-dropped, one parachute is used per target (no more than 320/year).	

A.1.5.6 Anti-Submarine Warfare Tactical Development Exercise

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Anti-Submarine Warfare Tactical Development Exercise	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 event.	
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.	
Information Typical to the Event	**Platform:** Surface ships; submarines; fixed-wing aircraft; helicopters **Systems:** Hull mounted sonar; dipping sonar; sonobuoys **Ordnance/Munitions:** None **Targets:** Expendable Mobile Anti-submarine Warfare Training Targets **Duration:** Event duration is from 5 to 7 days. **Typical Event Area Dimensions:** 30 x 30 nm	**Location:** JAX (includes Undersea Warfare Training Range)
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** sonar (hull-mounted sonar, dipping sonar, sonobuoys); acoustic countermeasures; vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike; aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Parachutes	
Detailed Military Expended Material Information	One MK-39 (expendable target); sonobuoys Expended countermeasures	
Assumptions Used for Analysis	Air-launched sonobuoys will have a parachute.	

A.1.5.7 Integrated Anti-Submarine Warfare Course

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Integrated Anti-Submarine Warfare Course (IAC)	Multiple ships, aircrafts and submarines integrate the use of their sensors, including sonobuoys, to search for, detect, classify, localize and track a threat submarine to launch a torpedo.	
Long Description	Integrated Anti-Submarine Warfare Course is a tailored course of instruction designed to improve Sea Combat Commander and strike group integrated anti-submarine warfare warfighting skill sets. Integrated Anti-Submarine Warfare 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 events 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.	
Information Typical to the Event	**Platform**: Surface ships; fixed-wing aircraft; helicopters; submarines; unmanned vehicles **Systems**: Hull mounted; towed array; dipping sonars; sonobuoys **Ordnance/Munitions:** Sonobuoys **Targets:** Expendable Mobile Anti-submarine Warfare Training Targets **Duration:** Event duration is from 2-5 days (two 12-hour events). **Typical Event Area Dimensions:** 120 x 60 nm	**Location:** VACAPES Navy Cherry Point JAX Gulf of Mexico**
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (dipping sonar, hull-mounted sonar, sonobuoys); acoustic countermeasures; vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike ; aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Parachutes	
Detailed Military Expended Material Information	Expended countermeasures	
Assumptions Used for Analysis	Two MK-39 targets may be used in place of an actual submarine target. Air deployed sonobuoys will each have a parachute. ** Gulf of Mexico refers to the body of water.	

A.1.5.8 Group Sail

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Group Sail	Multiple ships and helicopters integrate the use of sensors, including sonobuoys, to search for, detect, and track a threat submarine. Group Sails are not dedicated anti-submarine warfare events 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 a threat submarine to launch a torpedo. Group Sail is an intermediate training exercise primarily intended to introduce coordinated operations after unit level training and prior to composite training. This event stresses planning, coordination, and communications during multiple warfare training scenarios. Two or more ships and up to two helicopters searching for, locating, and attacking 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.	
Information Typical to the Event	**Platform**: Submarine; helicopters; surface ships **Systems**: Hull mounted sonar; towed array and dipping sonar; sonobuoys (some explosive sonobuoys may be used) **Ordnance/Munitions:** None **Targets:** Expendable Mobile Anti-submarine Warfare Training Targets **Duration:** Event duration is from 2-3 days. **Typical Event Area Dimensions:** 30 x 30 nm	**Location:** VACAPES Navy Cherry Point JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (hull mounted sonar, towed array, dipping sonar, sonobuoys); acoustic countermeasures; vessel noise; aircraft noise; underwater explosives **Energy:** None **Physical Disturbance and Strike:** vessel strike; in-water device strike; military expended material strike; aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Parachutes; sonobuoy fragments	
Detailed Military Expended Material Information	Sonobuoys; parachutes; expended countermeasures; sonobuoys fragments	
Assumptions Used for Analysis	While 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.	

A.1.5.9 Submarine Command Course Operations

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Submarine Command Course (SCC)	Train prospective submarine Commanding Officers to operate against surface, air, and subsurface threats.	
Long Description	Train prospective Commanding Officers on submarines to operate against each other to locate and conduct simulated attacks. Submarine Command Course is a Commander, U.S. Submarine Forces requirement to provide training to prospective submarine commanders in rigorous and realistic scenarios. This training assesses prospective commanding officers' abilities to operate in numerous hostile environments, encompassing surface ships, aircraft as well as other submarines. The course incorporates anti-submarine warfare tracking exercise, anti-submarine warfare torpedo exercise.	
Information Typical to the Event	**Platform:** One or more submarines **Systems:** Mid-frequency (primarily passive) and high-frequency sonars **Ordnance/Munitions:** Exercise torpedoes (torpedo exercise only) **Targets:** MK-30 **Duration:** Event duration is from 3-5 days (at-sea portion). **Typical Event Area Dimensions:** 30 x 40 nm	**Location:** Northeast JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency and high-frequency sonar (heavyweight torpedo, hull mounted sonar) **Energy:** None **Physical Disturbance and Strike:** Vessel and in-water device strike; military expended material strike **Entanglement:** Guidance wires **Ingestion:** Torpedo accessories (ballast weights)	
Detailed Military Expended Material Information	Torpedo accessories (guidance wire, ballast weights, flex tubing) Expended countermeasures	
Assumptions used for Analysis	Torpedoes are recovered. Guidance wire is brittle and breaks easily. Weights sink rapidly. For Alternatives 1 and 2, the anti-submarine warfare portion of this event is incorporated in Tracking Exercise/Torpedo Exercise Submarine.	

A.1.5.10 Anti-Submarine Warfare For Composite Training Unit Exercise

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Anti-Submarine Warfare for Composite Training Unit Exercise (COMPTUEX)	Anti-submarine warfare activities conducted during a Composite Training Unit Exercise.	
Long Description	Intermediate level battle group exercise designed to create a cohesive strike group prior to deployment or Joint Task Force Exercise. Typically seven surface ships, helicopters, maritime patrol aircraft, two submarines and various unmanned vehicles. Each strike group performs a rehearsal called Composite Training Unit Exercise before deployment. Prior to the Composite Training Unit Exercise, each ship and aircraft in the strike group trains in their specialty. The Composite Training Unit Exercise is an intermediate-level strike group exercise designed to forge the group into a cohesive fighting team. Composite Training Unit Exercise is normally conducted during a 2 to 3 week period prior to a Joint Task Force Exercise and consists of an 18 day schedule of event driven exercise, and a 3 day Final Battle Problem. The Composite Training Unit Exercise is an integration phase, at-sea, major range event. For the Carrier Strike Group, this exercise integrates the aircraft carrier and carrier air wing with surface and submarine units in a challenging operational environment. For the expeditionary strike group/amphibious readiness group, this exercise integrates amphibious ships with their associated air wing, surface ships, submarines, and the Marine expeditionary unit. Live-fire operations that may take place during composite training unit exercise include long-range air strikes, naval surface fire support, and surface-to-air, surface-to-surface, and air-to-surface missile exercises. The Marine expeditionary unit also conducts realistic training based on anticipated operational requirements and to further develop the required coordination between Navy and Marine Corps forces. Special operations training may also be integrated with the exercise scenario.	
Information Typical to the Event	**Platform**: Surface ships, fixed-wing aircraft, helicopters, submarines, unmanned vehicles **Systems**: All sonars **Ordnance/Munitions:** All ship and aircraft weapons, explosive sonobuoys **Targets:** All surface, air, and anti-submarine warfare targets (Expendable Mobile Anti-submarine Warfare Training Targets) **Duration:** Event duration is 21 days. **Typical event area dimensions:** 60 x 120 nm	**Location:** VACAPES Navy Cherry Point JAX Gulf of Mexico**
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (hull-mounted sonar, dipping sonar, sonobuoys, towed arrays); acoustic countermeasures; vessel noise; aircraft noise; underwater explosives **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike; aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Parachutes; countermeasures; sonobuoy fragments	
Detailed Military Expended Material Information	One MK-39 (expendable target) Each air deployed sonobuoy will have a parachute. Expended countermeasures	

Activity Name	Activity Description
Assumptions Used for Analysis	** Gulf of Mexico refers to the body of water. For Composite Training Unit Exercise only the anti-submarine warfare activities were analyzed as a Composite Training Unit Exercise. Other warfare area training conducted during the Composite Training Unit Exercise was analyzed as unit level training (gunnery exercise, missile exercise, etc.).

A.1.5.11 Anti-Submarine Warfare for Joint Task Force Exercise/Sustainment Exercise

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Anti-Submarine Warfare for Joint Task Force Exercise (JTFEX)/ Sustainment Exercise (SUSTAINEX)	Anti-submarine warfare activities conducted during a Joint Task Force Exercise / Sustainment Exercise	
Long Description	**Joint Task Force Exercise** This is the culmination of training and preparation for deployment. This exercise requires U.S. naval forces to integrate all assets to accomplish missions in a multi-threat, multi-dimensional environment. The exercise serves as the ready-to-deploy certification for the Navy-Marine team, requiring tests of critical plans, synchronized employment of available assets and realistic training with live ordnance. Joint Task Force Exercise is normally 10 days long, not including a 3-day in-port Force Protection Exercise, and is the final at-sea exercise for the Carrier Strike Group or Expeditionary Strike Group prior to deployment. Joint Task Force Exercise occurs three to four times per year. **Sustainment Exercise** The 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 designed to challenge the strike group in all warfare areas. This exercise is similar to a Composite Training Unit Exercise but of shorter duration.	
Information Typical to the Event	**Platform**: Surface ships; fixed-wing aircraft; helicopters; submarines, unmanned vehicles **Systems**: All sonars **Ordnance/Munitions:** All ship and aircraft weapons, explosive sonobuoys may be used **Targets:** All surface, air, and anti-submarine warfare targets (Expendable Mobile Anti-submarine Warfare Training Targets) **Duration:** Event duration is 10 days. **Typical event area dimensions:** Up to 180 x 180 nm	**Location:** VACAPES Navy Cherry Point JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (hull mounted sonar, dipping sonar, towed arrays, sonobuoys); acoustic countermeasures; underwater explosives; vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike**: vessel strike; in-water device strike; military expended material strike; aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Parachutes; countermeasures; sonobuoy fragments	
Detailed Military Expended Material Information	One MK-39 (expendable target) Expended countermeasures	
Assumptions Used for Analysis	Sonobuoys: each air deployed sonobuoy will have a parachute For Joint Task Force Exercise / Sustainment Exercise only the anti-submarine warfare activities were analyzed as a Joint Task Force Exercise / Sustainment Exercise. Other warfare area training conducted during the Joint Task Force Exercise / Sustainment Exercise was analyzed as unit level training (gunnery exercise, missile exercise, etc.).	

A.1.6 ELECTRONIC WARFARE

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

A.1.6.1 Electronic Warfare Operations

Activity Name	Activity Description	
Electronic Warfare (EW)		
Electronic Warfare Operations (EW OPS)	Aircraft and surface ship crews attempt to 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 attempt to control critical portions of the electromagnetic spectrum used by enemy systems to degrade or deny their ability to defend its forces from attack or recognize an emerging threat early enough 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.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft; helicopters; surface ships **Systems:** None **Ordnance/Munitions:** None **Targets:** Land based fixed/mobile threat emitters **Duration:** Event duration is from 1 to 2 hours.	**Location*:** VACAPES: W-386 (Air K), W-72 Navy Cherry Point: W-122 JAX: W-132, W-133, W-134, W-157, W-158
Potential Impact Concerns (Information regarding deconstruct categories and stressors)	**Acoustic:** Vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). All chaff and flares involved in this event are covered under chaff exercises and flare exercises, respectively.	

A.1.6.2 Counter Targeting Flare Exercise

Activity Name	Activity Description	
Electronic Warfare (EW)		
Counter Targeting - Flare Exercise (FLAREX)	Fixed-wing aircraft and helicopters crews defend against an attack by deploying flares to disrupt threat infrared missile guidance systems.	
Long Description	Fixed-wing aircraft and helicopter crews deploy flares to disrupt threat infrared missile guidance systems to defend against an attack. 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 while operating above 3,000 ft. Flare exercises are often conducted with chaff exercises, rather than as a stand-alone exercise.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft; helicopters **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is from 1 to 2 hours.	**Location*:** VACAPES: W-386, W-72 Navy Cherry Point: W-122 (1,8,15,16) JAX: W-157A (Area 3X, 4X) GOMEX: Panama City OPAREA, W-151 A/B Key West: W-174 A/B/C/E/F/G, W-465 A/B, Bonefish ATCAA
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** Expended components of flares (pistons)	
Detailed Military Expended Material Information	Flares	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Approximately 5 flares per aircraft	

A.1.6.3 Counter Targeting Chaff Exercise – Ship

Activity Name	Activity Description	
Electronic Warfare (EW)		
Counter Targeting Chaff Exercise (CHAFFEX) - Ship	Surface ship crews defend against an attack by deploying chaff, a radar reflective material, which disrupt threat targeting and missile guidance radars.	
Long Description	Surface ship crews deploy chaff to disrupt threat targeting and missile guidance radars and 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 event 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 to 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).	
Information Typical to the Event	**Platform:** Surface ships **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 1.5 hours.	**Location*:** VACAPES: W-386, W-72 Navy Cherry Point: W-122 (1, 8, 15, 16) JAX: W-157A (Area 3X, 4X) GOMEX: W-151 A/B, W-155 A/B
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** Expended components of chaff (end caps, pistons, chaff)	
Detailed Military Expended Material Information	Chaff; chaff canisters; end caps; pistons; Mk 53 expendable decoys	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Assume half of the events use expendable decoys	

A.1.6.4 Counter Targeting Chaff Exercise – Aircraft

Activity Name	Activity Description	
Electronic Warfare (EW)		
Counter Targeting Chaff Exercise (CHAFFEX) - Aircraft	Fixed-wing aircraft and helicopter crews defend against an attack by deploying chaff, a radar reflective material, which disrupt threat targeting and missile guidance radars.	
Long Description	Fixed-wing aircraft and helicopter crews deploy chaff to disrupt threat targeting and missile guidance radars and to defend against an attack. Fixed-wing aircraft and helicopter 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 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.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft; helicopters **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 1.5 hours.	**Location*:** VACAPES: W-386, W-72 Navy Cherry Point: W-122 (1, 8, 15, 16) JAX: W-157A (Area 3X, 4X) Gulf of Mexico: W-151 A/B, W-155 A/B Key West: W-174 A/B/C/E/F/G, W-465 A/B
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** Expended components of chaff (end caps, pistons, chaff)	
Detailed Military Expended Material Information	Chaff cartridges; plastic end caps; pistons	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Chaff is usually expended while conducting other training activities, such as air combat maneuvering.	

A.1.7 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 or a contact with 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.1.7.1 Mine Countermeasure Exercise – Ship Sonar

Activity Name	Activity Description	
Mine Warfare (MIW)		
Mine Countermeasures Exercise (MCM) – Ship Sonar	Littoral combat 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. Littoral Combat Ship utilizes unmanned surface vehicles and remotely operated vehicles to tow mine detection (hunting) equipment. Systems will operate from shallow zones of greater than 40 ft. to deep water. Events could be embedded in major training events.	
Information Typical to the Event	**Platform:** Surface ships (Littoral Combat Ships); unmanned vehicles **Systems:** AN/AQS-20, Remote Minehunting System, AN/AQS-24 **Ordnance/Munitions:** None **Targets:** Minefields; temporary mines; or no targets (training to deploy/operate gear). **Duration:** Event duration is from 1.5 to 4 hours.	**Location*:** VACAPES: W-50, surface grid 13, 1A1, 1A2, 6, 7c, 7d, AIR-G, lower Chesapeake Bay JAX: Carrier Strike Group Mine Training Area (surface grids 26 B through D [Warning Areas 158A and 158E] and areas proximate to Charleston underwater detonation boxes) GOMEX: Panama City Mine Warfare Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (mine-hunting sonar); vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; seafloor devices **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	No military expended material use is anticipated. Temporary placed mines will be recovered.	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). No explosives are to be used. Constraints: Assume system will be operated in areas free of obstructions, and will be towed well above the seafloor. Towed system will be operated in a manner to avoid entanglement/damage. Events will take place in water depths of 40 ft. and greater. Existing placed mine shapes to be used. There is the potential for temporary placement of mine shapes.	

A.1.7.2 Mine Neutralization – Explosive Ordnance Disposal

Activity Name	Activity Description	
Mine Warfare (MIW)		
Mine Neutralization/ Explosive Ordnance Disposal (EOD)	Personnel disable threat mines. Explosive charges are used.	
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. 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 10 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 events.	
Information Typical to the Event	**Platform:** Helicopters, small boats **Systems:** None **Ordnance/Munitions:** Underwater detonation charges **Targets:** Minefields **Duration:** Event duration is up to 4 hours.	**Location*:** VACAPES: W-50 and proximate to W-50 Navy Cherry Point: Underwater detonation area JAX: Charleston underwater detonation boxes GOMEX: Panama City OPAREA Key West: Demo Key
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; aircraft strike (birds only); seafloor devices **Entanglement:** None **Ingestion:** Target fragments	
Detailed Military Expended Material Information	Target fragments; mooring blocks	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Time delayed fuses may be used (up to 10 minutes). Charge placed anywhere in water column, including bottom. Mine shapes will be recovered.	

A.1.7.3 Underwater Mine Countermeasure Raise, Tow, Beach and Exploitation Operations

Activity Name	Activity Description	
Mine Warfare (MIW)		
Underwater Mine Countermeasure (UMCM) Raise, Tow, Beach and Exploitation Operations	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 vehicle, marine mammals, or other diver search techniques. Mines are then neutralized, or prevented from working as they are intended to. 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.	
Information Typical to the Event	**Platform:** Helicopters; small boats; unmanned underwater vehicles **Systems:** None **Ordnance/Munitions:** None **Targets:** Minefields **Duration:** Event duration is up to 4 hours.	**Location*:** VACAPES: W-50, R-6606, lower Chesapeake Bay Navy Cherry Point: Amphibious Ready Group Mine Warfare Training Area (seaspace radiating from Onslow Beach, Camp Lejeune) JAX: Carrier Strike Group Mine Training Area (surface grids 26 B through D [Warning Areas 158A and 158E] and areas proximate to Charleston underwater detonations boxes) GOMEX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; aircraft strike (birds only); seafloor device strike (mine placement) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Mooring blocks	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). No underwater detonations are performed. Events primarily conducted in W-50 and beaches at Dam Neck. Mine shapes are recovered as part of the event.	

A.1.7.4 Airborne Mine Countermeasure – Towed Mine Neutralization

Activity Name	Activity Description	
Mine Warfare (MIW)		
Airborne Mine Countermeasures (AMCM) -towed mine neutralization	Ship crews, helicopter aircrews tow systems (e.g., Organic Airborne and Surface Influence Sweep, MK-104/105) through the water which are designed to disable or trigger mines.	
Long Description	Helicopter/ship crews and unmanned surface vehicle/unmanned underwater 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 will be conducted either with non-explosive training mineshapes. Devices used include the following: Organic Airborne and Surface Influence Sweep (OASIS), a towed device that imitates the magnetic and acoustic signatures of naval ships and submarines; 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; AN/SPU-1/W (Magnetic Orange Pipe), a magnetic pipe that is used to trigger magnetically influenced mines.	
Information Typical to the Event	**Platform:** surface vessel (Littoral Combat Ship); unmanned surface vehicle; helicopters **Systems:** None **Ordnance/Munitions:** Cable cutters **Targets:** Existing minefields; temporary placed mines, or no targets (training to deploy/operate gear) **Duration:** Event duration is typically from 1.5 to 4 hours.	**Location*:** VACAPES: W-50, surface grid 13, 1A1, 1A2, 6, 7c, 7d, AIR-G, lower Chesapeake Bay Navy Cherry Point: Amphibious Ready Group Mine Warfare Training Area (seaspace radiating from Onslow Beach, Camp Lejeune) JAX: Carrier Strike Group Mine Training Area (surface grids 26 B through D [Warning Areas 158A and 158E] and areas proximate to Charleston underwater detonation boxes) GOMEX: Panama City Mine Warfare Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise; aircraft noise **Energy:** Electromagnetic **Physical Disturbance and Strike:** Vessel strike; in-water device strike; aircraft strike (birds only); seafloor device strike (bottom placed mine shapes) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Devices are towed from helicopters, ships, unmanned surface vehicles and unmanned underwater vehicles. Mechanical sweeping (cable cutting), acoustic and magnetic influence sweeping 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 will be recovered.	

A.1.7.5 Airborne Mine Countermeasure – Mine Detection

Activity Name	Activity Description	
Mine Warfare (MIW)		
Airborne Mine Countermeasures - Mine Detection	Ship crews or helicopter aircrews detect mines using towed or laser mine detection systems (e.g., AN/AQS-20, Airborne Laser Mine Detection System).	
Long Description	Helicopter crews 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.	
Information Typical to the Event	**Platform:** Helicopters; unmanned surface vehicles; unmanned underwater vehicles **Systems:** Airborne Laser Mine Detection System, AN/AQS-20A, AN/AQS-24A **Ordnance/Munitions:** None **Targets:** Existing minefields; temporary placed mines; or no targets (training to deploy/operate gear) **Duration:** Event duration is typically from 1.5 to 4 hours.	**Location*:** VACAPES: W-50, surface grid 13, 1A1, 1A2, 6, 7c, 7d, AIR-G, lower Chesapeake Bay Navy Cherry Point: Amphibious Ready Group Mine Warfare Training Area (seaspace radiating from Onslow Beach, Camp Lejeune) JAX: Carrier Strike Group Mine Training Area (surface grids 26 B through D [Warning Areas 158A and 158E] and areas proximate to Charleston underwater detonation boxes) GOMEX: Panama City Mine Warfare Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (mine detection systems); vessel noise; aircraft noise **Energy:** In-air low energy laser **Physical Disturbance and Strike:** Vessel strike; in-water device strike; aircraft strike (birds only); seafloor device strike (bottom placed mine shapes) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Sonar mine detection systems towed from helicopters, ships, and unmanned surface vehicles are used. Airborne laser systems are used to detect mine shapes. Laser systems are similar to commercial LIDAR. The in-air low energy laser stressor was used in analysis of potential impacts on human resources. Mine shapes will be recovered.	

A.1.7.6 Mine Countermeasure – Mine Neutralization, Small- and Medium-Caliber

Activity Name	Activity Description	
Mine Warfare (MIW)		
Mine Countermeasures – Mine Neutralization, Small- and Medium-Caliber	Ship crews or helicopter aircrews disable mines by firing small- and medium-caliber projectiles.	
Long Description	Ship and helicopter crews utilize small- and medium-caliber weapons to neutralize potential mines. Weapons may employ laser detection and targeting systems. Small- and medium-caliber projectiles are non-explosive and neutralize mines by breaching casing, causing the mine to flood or detonate.	
Information Typical to the Event	**Platform:** Helicopters; surface vessels **Systems:** None **Ordnance/Munitions:** Small-caliber and medium-caliber (non-explosive) **Targets:** Existing minefields; temporarily placed mines **Duration:** Event duration is typically from 1.5 to 4 hours.	**Location*:** VACAPES: W-50, surface grid 13, 1A1, 1A2, 6, 7c, 7d, AIR-G, lower Chesapeake Bay Navy Cherry Point: Amphibious Ready Group Mine Warfare Training Area (seaspace radiating from Onlsow Beach, Camp Lejeune beach) JAX: Carrier Strike Group Mine Training Area (surface grids 26 B through D [Warning Areas 158A and 158E] and areas proximate to Charleston UNDET boxes)
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, aircraft noise; weapons firing noise **Energy:** In-air low energy laser **Physical Disturbance and Strike:** Vessel strike; in-water device strike; military expended material strike (projectiles); seafloor device strike (bottom placed mine shapes); aircraft strike (birds only) **Entanglement:** None **Ingestion:** Small-caliber projectiles; medium-caliber projectiles; casings	
Detailed Military Expended Material Information	Small-caliber projectiles; medium-caliber projectiles; casings	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.1.7.7 Mine Countermeasure Mine Neutralization – Remotely Operated Vehicle

Activity Name	Activity Description	
Mine Warfare (MIW)		
Mine Countermeasures - Mine Neutralization – Remotely Operated Vehicles	Ship crews or helicopter aircrews disable mines using remotely operated underwater vehicles.	
Long Description	Ship 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 events.	
Information Typical to the Event	**Platform:** Helicopters; ships **Systems:** Acoustic mine targeting system **Ordnance/Munitions:** Neutralizers (explosive and non-explosive) **Targets:** Existing minefields; temporarily placed mines **Duration:** Event duration is from 1.5 to 4 hours.	**Location*:** VACAPES: W-50, surface grid 13, 1A1, 1A2, 6, 7c, 7d, AIR-G, lower Chesapeake Bay Navy Cherry Point: Amphibious Ready Group Mine Warfare Training Area (seaspace radiating from Onslow Beach, Camp Lejeune) JAX: Carrier Strike Group Mine Training Area (surface grids 26 B through D [Warning Areas 158A and 158E] and areas proximate to Charleston underwater detonation boxes) GOMEX: Panama City Mine Warfare Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; vessel noise; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; in-water device strike; sea floor device strike (bottom placed mine shapes); aircraft strike (birds only) **Entanglement:** Fiber optic cable **Ingestion:** Neutralizer fragments	
Detailed Military Expended Material Information	Neutralizer fragments; fiber optic cables	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Acoustic sources associated with remotely operated vehicle mine neutralization systems do not require quantitative analysis. See Section 2.3.7.2 (Source Classes Qualitatively Analyzed).	

A.1.7.8 Mine Laying

Activity Name	Activity Description	
Mine Warfare (MIW)		
Mine Laying	Fixed-wing aircraft and submarine crews drop/launch non-explosive mine shapes.	
Long Description	Fixed-wing aircraft lay offensive or defensive mines for a tactical advantage for friendly forces. Fixed-wing 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 and are recovered when possible.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft (F/A-18, P-3, P-8, F-35) **Systems:** None **Ordnance/Munitions:** Non-explosive mine shapes; "Quickstrike" mines **Targets:** None **Duration:** Event duration is 1 hour.	**Location*:** VACAPES: W-72A (Area 13, Area 20 or W-72A surface grids 1A1 and 1A3) Navy Cherry Point: W-122 Area 15 JAX: W-157A and W-158A
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive mine shapes); aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Non-explosive mine shapes	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives) Mine laying is similar to a non-explosive bombing exercise. These events primarily occur during major training exercises. While mine shapes will be recovered if possible, assume they will not for the analysis. Mine laying will typically take place in waters less than 100 ft. in depth. Assume 12 mine shapes are used per event.	

A.1.7.9 Coordinated Unit Level Helicopter Airborne Mine Countermeasures Exercises

Activity Name	Activity Description	
Mine Warfare (MIW)		
Coordinated Unit Level Helicopter Airborne Mine Countermeasure Exercises	A detachment of helicopters and crews 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.	
Information Typical to the Event	**Platform:** Helicopters **Systems:** Various airborne mine countermeasures **Ordnance/Munitions:** None **Targets:** Permanent and temporary mine shapes **Duration:** Events last multiple days.	**Location*:** VACAPES: W-50, surface grid 13, 1A1, 1A2, 6, 7c, 7d, AIR-G, lower Chesapeake Bay Navy Cherry Point: Amphibious Ready Group Mine Warfare Training Area (seaspace radiating from Onslow Beach, Camp Lejeune) JAX: Carrier Strike Group Mine Training Area (surface grids 26 B through D [Warning Areas 158A and 158E] and areas proximate to Charleston underwater detonation boxes) GOMEX: Panama City Mine Warfare Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (mine hunting); aircraft noise **Energy:** Electromagnetic (magnetic influence mine sweeping) **Physical Disturbance and Strike:** Vessel strike; in-water device strike; seafloor device strike (bottom placed mine shapes); aircraft strike (birds only) **Entanglement:** Fiber optic cable **Ingestion:** None	
Detailed Military Expended Material Information	If used during an event, remotely operated mine neutralizer systems could expend fiber optic cable. Projectiles (medium-caliber) could be used, similar to Mine Countermeasures – Mine Neutralization small- and medium-caliber events.	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). 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 events.	

A.1.7.10 Civilian Port Defense

Activity Name	Activity Description	
Mine Warfare (MIW)		
Civilian Port Defense-MIW	Maritime security operations for military and civilian ports and harbors.	
Long Description	Naval forces provide Mine Warfare capabilities to Department of Homeland Security sponsored events. The three pillars of mine warfare, airborne (helicopter), surface (ships and unmanned vehicles), 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 the exercise. Event locations and scenarios will vary according to Department of Homeland Security strategic goals and evolving world events. Purpose of AFTT analysis is to ensure adequate Marine Mammal Protection Act (MMPA) authorizations are in place to support the use of acoustic mine detection sensors. Additional analysis and regulatory engagement will be conducted as appropriate as planning for the actual events begin.	
Information Typical to the Event	**Platform:** Surface ships, boats, helicopters **Systems:** Unmanned underwater and surface vehicles, various mine detection sensors (AN/AQS-20, AN/AQS-24) **Ordnance/Munitions:** High-explosive charges **Targets:** Temporary mine shapes **Duration:** Events last multiple days.	**Location:** Waters around: Earle, New Jersey; Groton, Connecticut; Hampton Roads, Virginia; Morehead City and Wilmington, North Carolina; Kings Bay, Georgia; Jacksonville, Florida; and Beaumont and Corpus Christi, Texas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (mine hunting); underwater explosives; vessel noise; aircraft noise **Energy:** Electromagnetic (magnetic influence mine sweeping) **Physical Disturbance and Strike:** Vessel strike; in-water device strikes; seafloor device strike (bottom placed mine shapes); aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Explosives may be used if required for scheduled mine neutralization events. This EIS/OEIS provides programmatic analysis for acoustic effects only. Mine shapes will be recovered. While goal is to conduct once per year, alternating east/west coast, assume that an east coast event will occur every other year with a total of three per five year period.	

A.1.8 MAJOR EXERCISES

A major training event is comprised of 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 event, 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 event, however, these disparate training tasks are conducted in concert, rather than in isolation.

Major range events include:

A.1.8.1 Composite Training Unit Exercise

The Composite Training Unit Exercise is an Integration Phase, at-sea, major range event. For the Carrier Strike Group, this exercise integrates the aircraft carrier and carrier air wing with surface and submarine units in a challenging operational environment. For the expeditionary strike group, this exercise integrates amphibious ships with their associated air wing, surface ships, submarines, and Marine expeditionary unit. Live-fire operations that may take place during composite training unit exercise include long-range air strikes, Naval surface fire support, and surface-to-air, surface-to-surface, and air-to-surface missile exercises. The Marine expeditionary unit also conducts realistic training based on anticipated operational requirements and to further develop the required coordination between Navy and Marine Corps forces. Special operations training may also be integrated with the exercise scenario. Marine mammal systems may be used during the exercise. The composite training unit exercise is typically 21 days in length. The exercise is conducted in accordance with a schedule of events, which may include two one-day, scenario-driven, “mini” battle problems, culminating with a scenario-driven three-day Final Battle Problem. Composite training unit exercise occurs three to four times per year.

A.1.8.2 Joint Task Force Exercise

The Joint Task Force Exercise is a dynamic and complex major range event that is the culminating exercise in the Sustainment Phase training for the Carrier Strike Groups and Expeditionary Strike Groups. For an Expeditionary Strike Group, the exercise incorporates an Amphibious Ready Group Certification Exercise for the amphibious ships and a Special Operations Capable Certification for the Marine expeditionary unit. When schedules align, the joint task force exercise may be conducted concurrently for an Expeditionary Strike Group and Carrier Strike Group. Joint task force exercise emphasizes mission planning and effective execution by all primary and support warfare commanders, including command and control, surveillance, intelligence, logistics support, and the integration of tactical fires. Joint task force exercises are complex scenario-driven exercises that evaluate a strike group in all warfare areas. Marine mammal systems may be used during the exercise. Joint task force exercise is normally 10 days long, not including a three-day in-port force protection exercise, and is the final at-sea exercise for the Carrier Strike Group or Expeditionary Strike Group prior to deployment. Joint task force exercise occurs three to four times per year.

A.1.8.3 Sustainment Exercise

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

A.1.9 OTHER TRAINING ACTIVITIES

A.1.9.1 Search and Rescue

Activity Name	Activity Description	
Other Training Exercises		
Search and Rescue (SAR)	Helicopter crews rescue military personnel at sea.	
Long Description	Helicopter crews rescue military personnel at sea. Helicopters fly below 3,000 ft. and locate personnel to be rescued. Chaff and flares are expended (these will be captured under chaff exercises and flare exercises, respectively).	
Information Typical to the Event	**Platform:** Helicopters (H-60); small boats **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is from 2-3 hours.	**Location:** JAX: Proximate to Naval Station Mayport beaches and St. Johns River, Seminole Beach
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Chaff and flares associated with this event are captured under chaff exercises and flare exercises, respectively.	

A.1.9.2 Precision Anchoring

Activity Name	Activity Description	
Other Training Exercises		
Precision Anchoring	Releasing of anchors in designated locations.	
Long Description	Ship crews choose the best available anchoring sites. The ship then 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.	
Information Typical to the Event	**Platform:** All surface ships **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is up to 1 hour.	**Location:** VACAPES: Established anchorages JAX: Established anchorages GOMEX: Established anchorages
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, seafloor device strike (anchor) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions used for Analysis		

A.1.9.3 Elevated Causeway System

Activity Name	Activity Description	
Other Training Exercises		
Elevated Causeway System (ELCAS)	A temporary pier is constructed off of the beach. Piles are driven into the sand and then later removed.	
Long Description	A pier is constructed off of the beach. The pier is designed to allow for offload of materials and equipment from supply ships. Piles are driven into the sand with an impact hammer. Causeway platforms are then hoisted and secured onto the piles with hydraulic jacks and cranes. It is assembled by joining standard causeway sections together and can be assembled in 10 days. The pier, including associated piles, is removed at the conclusion of training.	
Information Typical to the Event	**Platform:** Boats **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Events last multiple days.	**Location:** VACAPES: Joint Expeditionary Base - Little Creek and Joint Expeditionary Base - Fort Story Navy Cherry Point: Camp Lejeune
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Pile driving and removal **Energy:** None **Physical Disturbance and Strike:** None **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	This EIS/OEIS is providing programmatic analysis of acoustic impacts from pile driving only.	

A.1.9.4 Submarine Navigational (SUB NAV)

Activity Name	Activity Description	
Other Training Exercises		
Submarine Navigational (SUB NAV)	Submarine crews operate sonar for navigation and object detection while transiting in/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 object detection while transiting in/out of port during periods of reduced visibility.	
Information Typical to the Event	**Platform:** Submarines **Systems:** High-frequency submarine sonar system **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is up to 2 hours.	**Location:** Northeast: Submarine Base Groton, Portsmouth Naval Shipyard VACAPES: Naval Station Norfolk JAX: Submarine Base Kings Bay, Naval Station Mayport, Port Canaveral
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency sonar (submarine high-frequency system) **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis		

A.1.9.5 Submarine Under Ice Certification

Activity Name	Activity Description	
Other Training Exercises		
Submarine Under Ice Certification	Submarine crews train to operate 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 events. A single exercise is comprised of 36 hours of training, spread out over 5 days in 6-hour training sessions.	
Information Typical to the Event	**Platform:** Submarine **Systems:** Submarine high-frequency sources **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is up to 6 hours.	**Location*:** Northeast: OPAREAs VACAPES: OPAREA Navy Cherry Point: OPAREA JAX: OPAREAs
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency sonar (submarine sources) **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.1.9.6 Surface Ship Object Detection

Activity Name	Activity Description	
Other Training Exercises		
Surface Ship Object Detection	Surface ship crews operate sonar for navigation and object detection while transiting in/out of port during reduced visibility.	
Long Description	Surface ships locate underwater objects that may impede transit in/out of port during periods of reduced visibility. Object detection and navigational training is conduced while transiting in and out of port using either the AN/SQS-53 or AN/SQS-56 in the Kingfisher mode. This training is conducted primarily in the shallow water shipping lanes off the coasts but may be conducted adjacent to any Navy port.	
Information Typical to the Event	**Platform:** Surface ships **Systems:** Hull mounted sonar systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is up to 2 hours.	**Location*:** VACAPES: Naval Station Norfolk JAX: Naval Station Mayport
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (hull mounted sonar), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.1.9.7 Surface Ship Sonar Maintenance

Activity Name	Activity Description	
Other Training Exercises		
Surface Ship Sonar Maintenance (in OPAREAs and Ports)	Pierside and at-sea maintenance of sonar systems	
Long Description	This scenario consists of surface ships performing periodic maintenance to the AN/SQS-53 or AN/SQS-56 sonar 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.	
Information Typical to the Event	**Platform:** Surface ships **Systems:** Hull mounted sonar systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is up to 4 hours.	**Location*:** VACAPES: Naval Station Norfolk, OPAREA Navy Cherry Point: OPAREA JAX: Naval Station Mayport, OPAREAs GOMEX: OPAREAs Other AFTT Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (hull mounted sonar), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Other AFTT Areas refers to areas outside of existing range complexes and testing ranges.	

A.1.9.8 Submarine Sonar Maintenance

Activity Name	Activity Description	
Other Training Exercises		
Submarine Sonar Maintenance (in OPAREAs and Ports)	Pierside and at-sea maintenance of sonar systems.	
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	
Information Typical to the Event	**Platform:** Submarines **Systems:** High-frequency submarine sonar system **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is from 45 minutes to 1 hour.	**Location*:** Northeast: Submarine Base Groton, Portsmouth Naval Shipyard VACAPES: Naval Station Norfolk Navy Cherry Point JAX: Submarine Base Kings Bay, Naval Station Mayport, Port Canaveral Other AFTT Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency sonar (submarine sonars) **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-1 of Chapter 2 (Description of Proposed Action and Alternatives). Other AFTT Areas refers to areas outside of existing range complexes and testing ranges.	

A.1.9.9 Undersea Warfare Training Range

Activity Name	Activity Description	
Specific Training Range		
Undersea Warfare Training Range (USWTR)	Anti-submarine warfare training will occur at the Undersea Warfare Training Range in the JAX OPAREA.	
Long Description	Anti-submarine warfare training will occur at the Undersea Warfare Training Range in the JAX OPAREA. The Undersea Warfare Training Range is an instrumented sea space, equipped with cables and hydrophones. This capability allows for real time tracking of anti-submarine warfare exercise participants, the assessment of tactics employed and crew proficiency. The ability to provide detailed feedback to the trainees greatly improves the training value of the anti-submarine warfare exercise..	
Information Typical to the Event	**Platform:** Fixed-wing aircraft; helicopters; surface ships, submarines **Systems:** Mid-frequency helicopter dipping, hull mounted, towed sonar; sonobuoys; Nixie **Ordnance/Munitions:** Exercise torpedoes (non-explosive) **Targets:** Expendable Mobile Anti-Submarine Warfare Training Target or MK-30 **Duration:** Not Applicable	**Location:** JAX: Undersea Warfare Training Range
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Various sonar systems (sonobuoy, dipping sonar, torpedo guidance, hull mounted and towed); aircraft noise; vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike; aircraft strike (birds only); vessel and in-water device strike **Entanglement:** Parachutes, guidance wires **Ingestion:** Parachutes	
Detailed Military Expended Material Information	MK-39 Expendable Mobile Anti-Submarine Warfare Training Targets Torpedo accessories (ballast weights) from exercise torpedoes, sonobuoys, parachutes	
Assumptions Used for Analysis	Torpedoes are recovered. Guidance wire has a low breaking strength. Weights and flex tubing sink rapidly. Typical USWTR Events: Tracking Exercise/Torpedo Exercise • Helicopter, 214 events • Maritime Patrol Aircraft, 100 events • Maritime Patrol Advanced Extended Echo Ranging Sonobuoys, 43 events • Surface, 102 events • Submarine, 16 events	

A.2 NAVAL AIR SYSTEMS COMMAND TESTING ACTIVITIES

Naval Air Systems Command events will closely follow fleet primary mission areas, such as the testing of airborne mine warfare and anti-submarine warfare weapons and systems. Naval Air Systems Command events include, but are not limited to, the testing of new aircraft platforms, weapons, and systems that have not been integrated into fleet training events, such as directed energy weapons and the Joint Strike Fighter. In addition to testing new platforms, weapons, and systems, Naval Air Systems Command also conducts lot acceptance testing of airborne weapons and sonobuoys in support of the fleet. These types of events do not fall within one of the fleet primary mission areas; however, in general, most Naval Air Systems Command testing events in terms of their potential environmental effects are similar to fleet training events.

While many of these systems will eventually be used by the fleet during normal training and will be addressed in this EIS/OEIS for those fleet activities, testing and development activities involving the same or similar systems as will be used by operational fleet units may be used in different locations and manners than when actually used by operational fleet units. Hence, the analysis for testing events and training of fleet units may differ.

A.2.1 ANTI AIR WARFARE

A.2.1.1 Air Combat Maneuver Test

Activity Name	Activity Description	
Anti-Air Warfare (AAW)		
Air Combat Maneuver	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.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** F-35 (2 flight hours/event at 5 days/week); F/A-18 A-D or E/F variants (1.5 flight hours/event), E/A-18G (2 flight hours/event)	**Location:** VACAPES Navy Cherry Point JAX GOMEX AFTT Study Area
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	2 chaff flares per event (All chaff and flare expenditure is captured under Chaff and Flare tests, respectively)	

A.2.1.2 Air Platform Vehicle Test

Activity Name	Activity Description	
Anti-Air Warfare (AAW)		
Air Platform/Vehicle Test	Testing performed to quantify the flying qualities, handling, airworthiness, stability, controllability, and integrity of an air platform or vehicle. No 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 in-flight 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 would undergo air platform/vehicle testing. No weapons are released during an Air Platform/Vehicle Test. Aircraft may employ laser detection for targeting systems and trailing antenna. Events may involve two or more fighter jet aircrafts and a towed target tractor by a contracted aircraft (e.g., Lear jet).	
Information Typical to the Event	**Platform:** Fixed and rotary-wing aircraft, includes unmanned aerial systems **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** 2-8 flight hours/event	**Location*:** VACAPES: W-386, W-387A, W-72A, W-72B, but could include other Warning/Restricted Areas JAX Key West GOMEX AFTT Study Area
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** In-air low energy laser **Physical Disturbance and Strike:** Military expended material strike (fuel tanks or similar), aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Fuel tanks, carriages, dispensers, or similar types of support systems on aircraft may be jettisoned depending on test	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). It is estimated that 2-4 fuel tanks are expended per event; however this can vary based on requirements. The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.2.1.3 Air Platform Weapons Integration Test

Activity Name	Activity Description	
Anti-Air Warfare (AAW)		
Air Platform Weapons Integration Test	Testing performed to quantify the compatibility of weapons with the aircraft from which they would be launched or released. Mostly 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.	
Information Typical to the Event	**Platform:** Fixed and rotary-wing aircraft **Systems:** Gun Systems Integration, Air Intercept Missile (AIM) Missile Series (e.g., AIM-9x) and Advanced Medium Range Air-to-Air Missile (AMRAAM); AGM-114R, MK46, MK54, 20mm, Rapid Airborne Mine Clearance System (RAMICS) **Ordnance/Munitions:** Missiles, rockets, small- and medium-caliber projectiles, bombs (non-explosive) **Targets:** The use of drones, such as the BQM-74 and 34, may be used as a target for weapon and mission system test events. Surface targets will also be used as needed for proposed test events. **Duration:** F/A-18 A-D or F/A-18 E/F (1.5 flight hours/event), E/A-18G (2 flight hours/event); F35 (1.5 to 2.5 hrs/event), MH-60R (2.5 flight hours/event)	**Location*:** VACAPES: W-386, W-72A, R-6604
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (projectiles, missiles, rockets, bombs); aircraft strike (birds only) **Entanglement:** None **Ingestion:** Small projectiles, medium projectiles, casings	
Detailed Military Expended Material Information	• Small projectiles • Medium-caliber canon rounds • Non-explosive rockets and missiles • Non-explosive bombs • Weapons carriage, suspension, and launch equipment	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). Estimate 2-4 weapons carriages expended per event	

A.2.1.4 Air-to-Air Weapons System Test

Activity Name	Activity Description	
Anti-Air Warfare (AAW)		
Air-to-Air Weapons Systems Test	Test to evaluate the effectiveness of air-launched weapons against designated airborne targets. Fixed-wing, rotary-wing aircraft may be used. No testing of high-explosive weapons is planned.	
Long Description		
Information Typical to the Event	**Platform:** Fixed and rotary-wing aircraft **Systems:** Electronic Combat Systems; Air Intercept Missile, Missile Series (e.g., AIM-9x) and Advanced Medium Range Air-to-Air Missile; Modified aircraft system or aircraft gun that typically fires non-explosive rounds; **Ordnance/Munitions:** Missiles, small- and medium-caliber projectiles (non-explosive) **Targets:** BQM-34, BQM-74, GQM 163 Coyote, Tactical Air-Launched Decoys, and paraflares **Duration:** F/A-18 A-D or F/A-18 E/F (1.5 flight hours/event); E/A-18G (2 hours/event); F-35 (2 flight hours/event); MH-60R/S (2.5 flight hours/event)	**Location*:** VACAPES: W-386, W-72, R-6604
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended materials strike (projectiles, missiles); aircraft strike (birds only) **Entanglement:** None **Ingestion:** Small-caliber projectiles, medium-caliber projectiles, casings	
Detailed Military Expended Material Information	Small-caliber projectiles, medium-caliber projectiles, casings, missiles	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). All chaff and flare expenditure in this event is captured under Chaff and Flare tests, respectively.	

A.2.1.5 Air-to-Air Missile Test

Activity Name	Activity Description	
Anti-Air Warfare (AAW)		
Air-to-Air Missile Test	Test to evaluate the effectiveness of air-launched weapons against designated airborne targets. Fixed-wing, rotary-wing aircraft may be used.	
Long Description	This event is similar to the training event missile exercise (air-to-air). Tests are a type of Air-to-Air Weapons System Test in which air-to-air missiles (non-explosive) are fired from fixed-wing aircraft against unmanned aerial drones such as BQM-34 and BQM-74.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft, includes aerial drones **Systems:** Joint Air-to-Ground missiles, captive air training missiles, Air-to-Ground Missiles-114 Hellfire B/K/M or R; Harpoon or JSOW or other Inert Class Stores (1000 lb.); MTS (44C) FLIR Upgrade **Ordnance/Munitions:** Air Intercept Missile and Advanced Medium Range Air-to-Air Missile (non-explosive) **Targets:** BQM-34, BQM-74, GQM 163 Coyote, Tactical Air-Launched Decoys, and paraflares **Duration:** MH-60R/S (2.5 flight hours/event); P-3 or P-8 (4 flight hours/event); F-35 (2 flight hours/event)	**Location*:** VACAPES: W-386, W-72, R-6604
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended materials strike (missile, parachutes); aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Parachutes; flare pistons	
Detailed Military Expended Material Information	Missiles, flare pistons, parachutes from paraflares	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). All chaff and flare expenditure in this event is captured under Chaff and Flare tests, respectively with the exception of paraflares used as targets. Assume one paraflare per missile	

A.2.1.6 Air-to-Air Gunnery Test – Medium-Caliber

Activity Name	Activity Description	
Anti-Air Warfare (AAW)		
Air-to-Air Gunnery Test – medium-caliber	Test to evaluate the effectiveness of air-to-air guns against designated airborne targets. Fixed-wing, rotary-wing aircraft may be used.	
Long Description	This event is similar to the training event gunnery exercise air-to-air. An Air-to-Air Gunnery Test involves the firing of guns from both fixed-wing and rotary-wing aircraft against a towed aerial banner which serves as the target. Typically non-explosive rounds are fired and the targets fired upon are unmanned aerial drones.	
Information Typical to the Event	**Platform:** Fixed or rotary-wing aircraft (e.g., F/A-18 A-D F/A-18E/F, E/A-18G, MH-60S **Systems:** Gun Systems **Ordnance/Munitions:** Medium-caliber projectiles (non-explosive) **Targets:** BQM-34, BQM-74, GQM 163 Coyote **Duration:** F/A-18 A-D/ or F/A-18E/F (1.5 flight hours/event); E/A-18G (2 flight hours/event), MH-60S (2 flight hours/event)	**Location*:** VACAPES: W-386, W-72, R-6604
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (projectiles); aircraft strike (birds only) **Entanglement:** None **Ingestion:** Medium-caliber projectiles; casings	
Detailed Military Expended Material Information	Medium-caliber projectiles, casings	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.2.1.7 Intelligence, Surveillance, and Reconnaissance Test

Activity Name	Activity Description	
Anti-Air Warfare (AAW)		
Intelligence, Surveillance, and Reconnaissance Test	Aircrews use all available sensors to collect data on threat vessels.	
Long Description	An Anti-Air Warfare intelligence, surveillance, and reconnaissance test involves evaluating communications capabilities of fixed-wing and rotary-wing aircraft, including unmanned 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. Several unmanned aerial systems are planned for testing, including the Broad Area Maritime Surveillance system, Fire Scout vertical take-off and landing tactical unmanned air vehicle, and the Unmanned Combat Air System Aircraft Carrier Demonstration Unmanned Aerial System. Unmanned Aerial Systems are remotely piloted or self-piloted aircraft. Tactical Unmanned Aerial Systems are designed to support tactical commanders with near-real-time imagery intelligence at ranges up to 200 kilometers. Most small to mid-sized unmanned systems, such as Small Tactical Unmanned Aerial System/Tier II, act as eyes in the sky, relaying raw imagery back to military personnel on the ground. The data are then processed, analyzed, and shared up and down the chain of command. New technology systems, such as the MK XII-Mode 5, which provide combat identification Friend or Foe and are used for aircraft and ship-based communications.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft, rotary-wing aircraft, Broad Area Maritime Surveillance system, Fire Scout vertical take-off and landing tactical unmanned air vehicle, and the Unmanned Combat Air System Aircraft Carrier Demonstration; Small Tactical Unmanned Aerial System/Tier II **Systems:** MK XII-Mode 5 **Ordnance/Munitions:** None **Targets:** None **Duration:** 2-20 flight hours/event	**Location:** VACAPES Navy Cherry Point JAX AFTT Study Area
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft Strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.2.2 ANTI 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 various air-to-surface missile, gunnery, and bombing 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 high-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 high-explosive ordnance on a surface target.

A.2.2.1 Air-to-Surface Missile Test

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW)		
Air-to-Surface Missile Test	This event is similar to the training event missile exercise air-to-surface. 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	Similar to a missile exercise air-to-surface, 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. Both stationary and mobile targets would be utilized during testing, and some operational tests would use explosive missiles (i.e., high-explosive warhead). All developmental testing will use non-explosive (i.e., non-explosive warhead) with a live motor. Naval Air Systems Command plans to conduct integration testing of the MH-60R/S helicopters and the joint air to ground missile. Both stationary and mobile targets would be used during testing. Approximately 25 percent of some operational tests could use explosive missiles (i.e. high-explosive warhead). All developmental testing will use non-explosive (i.e., non-explosive warhead). Similar integration tests would be conducted with the MH-60R/S and the Hellfire air to ground missile. Approximately 25 percent of these tests could involve explosive missiles (i.e. high-explosive warhead). P-3 and P-8A fixed-wing aircraft plan to conduct software and weapons verification testing with Harpoon or JSOW (or equivalent) missiles. Some explosive missiles are planned for use.	
Information Typical to the Event	**Platform:** Fixed-wing and rotary-wing aircraft **Systems:** **Ordnance/Munitions:** Joint air to ground missile Hellfire air-to-ground missile (explosive), Harpoon, JSOW (non-explosive), captive air training missile **Targets:** Stationary and mobile surface marine targets **Duration:** P3/P8A (4 flight hours/event); MH-60R/S (2 flight hours/event)	**Location*:** VACAPES: W386 (85 percent), W72 (10 percent), RR6604 (5 percent)] JAX GOMEX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (missiles), aircraft strike (birds only) **Entanglement:** None **Ingestion:** Missile fragments; target fragments	

Activity Name	Activity Description
Detailed Military Expended Material Information	Missiles, missile fragments, target fragments
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives) 2 air-to-surface missiles/event, 25 percent which will be high-explosive

A.2.2.2 Air-to-Surface Gunnery Test – Medium-Caliber

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW)		
Air-to-Surface Gunnery Test – Medium-Caliber	This event is similar to the training event gunnery exercise air-to-surface. Strike fighter and helicopter 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	Strike fighter and helicopter aircrews evaluate new or enhanced aircraft guns against surface maritime targets to test that the gun, gun ammunition, or associated systems meets 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 mm, 20 mm, 30 mm, 0.30 caliber, and 0.50 caliber gun ammunition (see Mine Warfare Section below).	
Information Typical to the Event	**Platform:** Fixed-wing and rotary-wing aircraft **Systems:** MH-60R/S: GAU-17 (7.62 mm), GAU-21 (0.50 cal), M197 (20 mm), M230 (30 mm), M240 (7.62 mm) **Ordnance/Munitions:** Medium-caliber projectiles (e.g., 7.62 mm, 20 mm, 30 mm, 30 mm supercavitating, non-explosive and explosive) **Targets:** Stationary and mobile surface maritime targets may be used **Duration:** F-35 (2 flight hours/event); F/A-18 A-D and F/A-18 E/F (2 hours/event) MH-60R/S (2.5 flight hours/event)	**Location*:** VACAPES: W386 (85 percent), W72 (10 percent), RR6604 (5 percent) JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (projectiles) ; aircraft strike (birds only) **Entanglement:** None **Ingestion:** Medium-caliber projectiles, casings, target fragments, projectile fragments	
Detailed Military Expended Material Information	Projectiles, casings, target fragments, projectile fragments	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). All projectiles under the No Action Alternative are non-explosive. Assume all Alternative 1 and 2 events include the use of some explosive rounds.	

A.2.2.3 Rocket Test

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW)		
Rocket Test	Rocket tests evaluate the integration, accuracy, performance, and safe separation of guided and unguided 2.75-inch rockets fired from a hovering or forward flying helicopter or from a fixed-wing strike aircraft.	
Long Description	Rocket tests are conducted to evaluate the integration, accuracy, performance, and safe separation of laser-guided and unguided 2.75-inch rockets fired from a hovering or forward flying helicopter or from a fixed-wing strike aircraft. Rocket tests would involve the release of primarily live motor/non-explosive warhead rockets. Some high-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. Rocket types may include variations of the Hydra-70 rocket developed under the Advanced Precision Kill Weapons System program or similar munitions developed under Low-cost Guided Imaging Rocket program as well as MEDUSA rockets. All rockets planned for testing are 2.75-inch rockets. Some rocket tests may be conducted in conjunction with upgrades to or integration of the Forward Looking Infrared targeting system.	
Information Typical to the Event	**Platform:** Fixed-wing or rotary-wing (MH-60R/S) aircraft **Systems:** **Ordnance/Munitions:** 2.75 in. Hydra-70 (or similar) (explosive and non-explosive) **Targets:** Stationary and mobile surface maritime targets may be used **Duration:** MH-60R/S (2.5 flight hours/event); F/A-18 variants (1.5 flight hours/event), F-35 (2 flight hours/event)	**Location*:** VACAPES: W386 (Air G & H) JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; aircraft noise **Energy:** In-air low energy laser **Physical Disturbance and Strike:** Military expended material strike (rockets); aircraft strike (birds only) **Entanglement:** None **Ingestion:** Rocket fragments, target fragments	
Detailed Military Expended Material Information	Rockets; rocket fragments, target fragments; rocket launchers	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). Under the No Action Alternative, all rockets are non-explosive. Multiple rockets fired/event, 25 percent of which will be high-explosive. The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.2.2.4 Air-to-Surface Bombing Test

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW)		
Air-to-Surface Bombing Test	This event is similar to the training event bombing exercise air-to-surface. Strike fighter and maritime patrol aircraft test the delivery of bombs (non-explosive) 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	Strike fighter and maritime patrol aircraft test the delivery of bombs (non-explosive) 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. Both high-explosive and non-explosive bombs may be released during this type of test; however, the vast majority of releases will be non-explosive bombs and typically include non explosive general purpose bombs (e.g., MK-82 and MK-83) and guided bomb units (e.g., GBU-12 and GBU-32) of various sizes. Surface targets may also be used.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft **Systems:** None **Ordnance/Munitions:** Bombs (e.g., MK-82, MK-83, GBU-12, GBU-32, non-explosive) **Targets:** Stationary surface maritime targets may be used **Duration:** F-35 (2 flight hours/event); P-8 and P-3 (4 flight hours/event); F/A-18 variants (1.5 flight hours/event); EA-18G (2 flight hours/event)	**Location*:** VACAPES: W386, W72
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive bombs); aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Non-explosive bombs	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.2.2.5 Laser Targeting Test

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW)		
Laser Targeting	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, which are designed to illuminate designated targets for engagement with laser-guided weapons. No weapons are released during a laser targeting test.	
Information Typical to the Event	**Platform:** Rotary-wing aircraft (MH-60R/S); fixed-wing aircraft (P8-A) **Systems:** Laser targeting systems, including the Laser Range Designator on the MH-60R/S helicopters **Ordnance/Munitions:** None **Targets:** None **Duration:** 2.5 flight hours/event	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** In-air low energy laser **Physical Disturbance and Strike:** Aircraft strikes (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.2.2.6 High Energy Laser Weapons Test

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW)		
High Energy Laser Weapon Test	High energy laser weapons 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 weapons 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, small surface vessels. The high energy laser would be employed from a hovering or forward flight helicopter (MH-60R/S) and is designed to disable the surface vessel, rendering it immobile. The high energy laser would have a range of up to six kilometers (km). Small boats or other unmanned surface targets would be used during the high energy laser test.	
Information Typical to the Event	**Platform**: MH-60R/S helicopter **Systems**: High energy laser **Ordnance/Munitions:** None **Targets:** Small Surface Boats **Duration:** MH-60R/S: 2.5 flight hrs/event	**Location:** VACAPES
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise; vessel noise **Energy:** High energy laser **Physical Disturbance and Strike:** Vessel strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** Target fragments	
Detailed Military Expended Material Information	Target fragments	
Assumptions Used for Analysis		

A.2.3 ELECTRONIC WARFARE

A.2.3.1 Electronic System Evaluation

Activity Name	Activity Description	
Electronic Warfare (EW)		
Electronic Systems Evaluation	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 actual Electronic Warfare system. The test results are also used to define performance characteristics and to improve and update existing analytical and predictive models.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft **Systems:** Electronic Warfare systems (Electronic Attack, Electronic Protect, and Electronic Support) **Ordnance/Munitions:** None **Targets:** None **Duration:** 2-6 flight hours/event	**Location*:** VACAPES: W386, W72 GOMEX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). All chaff and flare expenditure is captured under Chaff and Flare tests, respectively.	

A.2.3.2 Chaff Test

Activity Name	Activity Description	
Electronic Warfare (EW)		
Chaff Test	This event is similar to the training event Chaff exercise. Chaff tests evaluate newly developed or enhanced chaff, chaff dispensing equipment, or modified aircraft systems against chaff deployment. Tests may also train pilots and aircrew in the use of new chaff dispensing equipment. Chaff tests are often conducted with flare tests and Air Combat Maneuver events, as well as other test events, 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-winged aircraft and helicopters deploy chaff to disrupt threat targeting and missile guidance radars and to defend against an attack (Electronic Protect deployment). Chaff tests are often conducted with flare tests or Air Combat Maneuver events, as well as other tests, rather than as a standalone test. Weapons are not typically fired during chaff tests. Chaff is employed for a number of different tactical reasons, but the end goal is to create a target that will distract enemy radar and weapon systems away from the friendly platform. Chaff may also be employed offensively (Electronic Attack deployment), such as before a major strike to "hide" inbound striking aircraft. Different chaff types (e.g., RR-129A/AL, RR-144A/AL, and RR-170A/AL) are used by a variety of different Navy aircraft; however all chaff consists of a radar reflector material made of thin, narrow, metallic strips cut in various lengths, and is intended to elicit frequency responses which deceive enemy radars. 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, such as before a major strike to "hide" inbound striking aircraft or ships. 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. Naval Air Systems Command chaff tests are conducted year-round.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft, rotary-wing aircraft **Systems:** Chaff (RR-129A/AL, RR-144A/AL, and RR-170A/AL) **Ordnance/Munitions:** None **Targets:** None **Duration:** F/A-18 A/D or F/A-18 E/F (1.5 flight hours/event); EA-18G (2 flight hrs/event); MH-60R/S (2 flight hrs/event); CH-53K (14 days/year at 2 flight hours/event); P-3 (4 flight hours/event)	**Location:** VACAPES: W386, W72 Navy Cherry Point JAX GOMEX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** Chaff; end caps; pistons	

Activity Name	Activity Description
Detailed Military Expended Material Information	Chaff, end caps, pistons
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). Estimated 60-100 chaff canisters per event All releases from MH60 would be up to 60 canisters per event

A.2.3.3 Flare Test

Activity Name	Activity Description	
Electronic Warfare (EW)		
Flare Test	This event is similar to the training event Flare exercise. 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 events, as well as other test events, 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 events, as well as other test events, 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. Fixed-wing aircraft and helicopters 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. Flare types commonly deployed during Naval Air Systems Command testing activities include but are not limited to: MJU-57, MJU-49, and MJU-38 for high speed aircraft and MJU-32 for low speed aircraft. Both fixed-wing and rotary-wing aircraft would conduct flare tests.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft, rotary-wing aircraft **Systems:** Flares: MJU-57, MJU-49, and MJU-38 for high speed aircraft and MJU-32; Joint Allied Threat Assessment System/Common Infrared Countermeasures **Ordnance/Munitions:** None **Targets:** None **Duration:** MH-60R/S (2.0 flight hrs/event; 30 events/year); CH-53K (14 events/year at 2 flight hours/event); F/A-18 A-D or F/A-18 E/F (1.5 flight hours/event) and EA-18G (2 flight hours/event); P-3/ P-8 (4 flight hours/event)	**Location*:** VACAPES: W386, W72 Navy Cherry Point JAX GOMEX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** End caps	
Detailed Military Expended Material Information	Flares (end caps and pistons)	

Activity Name	Activity Description
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). Flare use from all other events are captured under this activity. Estimated 60-100 flares per event All releases from MH60 would be up to 60 flares per event

A.2.4 ANTI-SUBMARINE WARFARE

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

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

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

The torpedoes released during a torpedo employment exercise are non-explosive. No other weapons are fired during anti-submarine warfare tests. Anti-submarine warfare sonar systems are deployed from certain classes of surface ships, submarines, helicopters, and fixed-wing patrol aircraft (Table 2.3-1). Helicopters equipped with dipping sonar or sonobuoys are utilized to locate suspect submarines or submarine targets within the training 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.

There are three types of active sonar: low-frequency (below 1 kHz), mid-frequency (1 to 10 kHz), and high-frequency (above 10 kHz). Table 2.3-1 (see Chapter 2, Description of Proposed Action and Alternatives) lists the types of sonar and sound sources that Naval Air Systems Command plans to evaluate in the Study Area. There are no plans to test low frequency sound sources.

High-frequency active sonar operates at frequencies greater than 10 kHz. At higher acoustic frequencies, sound rapidly dissipates in the ocean environment, resulting in short detection ranges. High-frequency sonar is used primarily for determining water depth, hunting mines, and guiding torpedoes.

Mid-frequency active sonar operates between 1 and 10 kHz, enabling operators to detect underwater objects at greater distances than with high-frequency active sonar, but at shorter distances than with low-frequency active sonar. Because of this detection ranging capability, mid-frequency active sonar is the Navy's primary tool for conducting anti-submarine warfare. Many anti-submarine warfare experiments and tests have demonstrated that this improved capability for long-range detection of adversary submarines before they are able to conduct an attack is essential to U.S. ship survivability.

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 (tonal) and incoherent (explosive) sonobuoys. The types of testing sound sources employed by Naval Air Systems Command during anti-submarine warfare sonar tests in the Study Area are identified in Table 2.3-1 and descriptions of anti-submarine warfare tests are provided in the sections below.

A.2.4.1 Anti-Submarine Torpedo Test

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Anti-submarine Warfare Torpedo Test	This event is similar to the training event torpedo exercise. 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	Similar to a torpedo exercise, an Anti-submarine Warfare Torpedo Test evaluates ASW systems onboard rotary-wing (i.e., MH-60R helicopter) and fixed-wing (maritime patrol aircraft-P-8) aircraft and the ability to search for, detect, classify, localize, track and attack a submarine or similar target (e.g., MK-39 EMATT or MK-30). The focus of the Anti-submarine Warfare Torpedo test is the torpedo and torpedoes (e.g., MK-46 or MK-54), but other Anti-submarine Warfare systems are often used during the test, such as AN/AQS-22 dipping sonar (MH-60R) and sonobuoys (e.g., AN/SSQ-62). MK-39 or MK-30 targets simulate an actual submarine threat and are deployed at varying depths and speeds. 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). Eighty five percent of non-explosive torpedoes are recovered. A parachute assembly and guidance wire used for aircraft-launched torpedoes is jettisoned and sinks. Ballast (typically lead weights) may be released from the torpedoes to allow for recovery and sink to the bottom.	
Information Typical to the Event	**Platform:** Fixed-wing (MPA-P-8) and rotary-wing (MH-60R helicopter) aircraft **Systems:** Torpedoes that may be evaluated: MK-46, MK-54, MK-50, and MK-56); systems used in conjunction with testing torpedoes: AN/AQS-22 dipping sonar (MH-60R); sonobuoys (e.g., AN/SSQ-62) **Ordnance/Munitions:** Torpedoes (MK-46, MK-54, MK-50, and MK-56) (non-explosive) **Targets:** MK-39 EMATT or MK-30 **Duration:** MH-60R 2 flight hours/event; P-3/P-8 6 flight hours/event	**Location:** VACAPES JAX

Activity Name	Activity Description
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (AN/AQS-22), sonobuoys (DICASS AN/SSQ-62x); torpedoes; aircraft noise **Energy:** None **Physical Disturbance and Strike:** In-water device strike; military expended material strike, aircraft strike (birds only) **Entanglement:** Parachutes, guidance wire **Ingestion:** Parachutes
Detailed Military Expended Material Information	Torpedo accessories (e.g., parachute assembly, guidance wire), sonobuoys, ballast targets
Assumptions Used for Analysis	Assume one torpedo accessory package (parachute, ballast, guidance wire) per torpedo Assume one target per torpedo Assume 12 sonobuoys per event Assume 15 percent of non-explosive torpedoes are not recovered.

A.2.4.2 Kilo Dip

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Kilo dip	Function check of the AN/AQS-22 dipping sonar prior to conduct full test or training event on the dipping sonar.	
Long Description	A kilo dip is the operational term used to describe a functional check of a helicopter deployed dipping sonar system. During a functional check, a single MH-60R helicopter would transit to an area designated for dipping sonar testing (i.e., a dip point usually close to shore) and would deploy the AN/AQS-22 sonar transducer assembly via a reel mechanism to a predetermined depth or series of depths while the helicopter hovers over the dip point. Once at the desired depth, the AN/AQS-22 sonar transducer would be activated and would transmit a pulsed, acoustic signal (i.e., ping) for approximately two to four minutes (enough time to check that all systems are functioning properly). After the check is completed, the AN/AQS-22 sonar transducer assembly would be reeled in, and in some instances the helicopter would transit to a second dip point before the procedure is repeated. A kilo dip is a precursor to more comprehensive testing.	
Information Typical to the Event	**Platform:** MH-60R helicopter **Systems:** AN/AQS-22 **Ordnance/Munitions:** None **Targets:** None **Duration:** 1.5 flight hours/event	**Location*:** Northeast: Narragansett Bay VACAPES: W-386 & W-72 Navy Cherry Point JAX: W-157, W-158, W-159
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (AN/AQS-22), aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.2.4.3 Sonobuoy Lot Acceptance Test

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Sonobuoy Lot Acceptance test	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 the following types of sonobuoys: AN/SSQ-62x DICASS, AN/SSQ-110x IEER, AN/SSQ-125 MAC, MK-61 SUS, MK-64 SUS, MK-82 SUS, MK-84 SUS, and Mini Source. Some sonobuoys are explosive.	
Information Typical to the Event	**Platform:** Surface vessels, fixed-wing aircraft, rotary-wing aircraft **Systems:** Sonobuoys (AN/SSQ-62x DICASS, AN/SSQ-110x IEER, AN/SSQ-125 MAC, MK-61 SUS, MK-64 SUS, MK-82 SUS, MK-84 SUS, and Mini Source) **Ordnance/Munitions:** None **Targets:** None **Duration:** 6 flight hours/event	**Location:** Key West
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Sonar (sonobuoys: AN/SSQ-62x DICASS, AN/SSQ-110x IEER, AN/SSQ-125 MAC, MK-61 SUS, MK-64 SUS, MK-82 SUS, MK-84 SUS, and Mini Source), underwater explosives, vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike, vessel strike, aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Parachutes; target fragments; sonobuoy fragments	
Detailed Military Expended Material Information	Parachutes; target fragments; sonobuoy fragments	
Assumptions Used for Analysis	Assume one parachute per sonobuoy Assume an average of 80 non-explosive sonobuoys per event; however the number of sonobuoys used in each event may vary	

A.2.4.4 Anti-Submarine Warfare Tracking Test – Helicopter

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Anti-Submarine Tracking Test - Helicopter	This event is similar to the training event Anti-Submarine tracking exercise-helicopter. The test evaluates the sensors and systems used to detect and track submarines and to ensure that helicopter systems used to deploy the tracking systems perform to specifications.	
Long Description	Similar to an Anti-Submarine tracking exercise-helicopter, an Anti-Submarine Tracking Test—Helicopter 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. Typically, one MH-60R helicopter conducts ASW testing using the AN/AQS-22 dipping sonar, tonal sonobuoys (e.g., AN/SSQ-62), passive sonobuoys (e.g., AN/SSQ-53D/E), or explosive sonobuoys (e.g., mini sound-source seeker buoys). Targets (e.g., MK-39 EMATT or MK-30) may also be employed during an Anti-Submarine event. This activity would be conducted in shallow or deep waters and could initiate from a land base or from a surface ship. Helicopter Anti-Submarine 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 Helicopter Tracking Test could be conducted as part of an Anti-Submarine Tracking Coordinated Event with fleet training activities.	
Information Typical to the Event	**Platform:** MH-60R **Systems:** AN/AQS-22 dipping sonar, tonal sonobuoys (e.g., AN/SSQ-62), explosive sonobuoys (e.g., mini sound-source seeker buoys), passive sonobuoys (e.g., AN/SSQ-53D/E),and new development mid-frequency active sonar buoys (follow-on to DICASS) **Ordnance/Munitions:** Explosive sonobuoys; mini sound-source seeker buoys (a.k.a., "mini-buoys") **Targets:** MK-39 or MK-30 **Duration:** 2 flight hours/event	**Location*:** Northeast VACAPES: W-386 & W-72 Navy Cherry Point JAX: W-157, W-158, W-159 GOMEX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (AN/AQS-22); sonobuoys (e.g., AN/SSQ-62, new development mid-frequency active buoys); underwater explosives, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike, aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Parachute; explosive sonobuoy fragments	
Detailed Military Expended Material Information	• 1 MK-39 or MK-30 target (MK-30 is recovered and reused, MK-39 is not) • If target air dropped, 1 parachute/target • 0-24 sonobuoys/event (1 parachute/sonobuoy) • Explosive sonobuoy fragments	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.2.4.5 Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft

Activity Name	Activity Description	
Anti-Submarine Warfare (ASW)		
Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft	The test evaluates the sensors and systems used by maritime patrol 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	Similar to an Anti-Submarine Warfare tracking exercise-maritime patrol aircraft, an Anti-Submarine Warfare Tracking Test—Maritime Patrol Aircraft 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. P3 or P8A fixed-wing aircraft conduct Anti-submarine warfare testing using tonal sonobuoys (e.g., AN/SSQ-62 DICASS), explosive sonobuoys (e.g., AN/SSQ-110 IEER), passive sonobuoys (e.g., AN/SSQ 53 DIFAR), torpedoes (e.g., MK-46), smoke devices (e.g., MK-58), SUS devices (e.g., MK-61 SUS), missiles (e.g., harpoons), and chaff. Targets (e.g., MK-39 EMATT) may also be employed during an Anti-Submarine Warfare scenario. This activity would be conducted in deep (typically beyond 100 ft.) waters and weapons testing could be initiated from a land base or a surface ship. Some Anti-Submarine Warfare maritime patrol aircraft Tracking Test could be conducted as part of a Coordinated Event with fleet training activities.	
Information Typical to the Event	**Platform:** P-3 or P-8A fixed-wing aircraft **Systems:** Sonobuoys (e.g., AN/SSQ-62), passive sonobuoys (e.g., AN/SSQ-53D/E) **Ordnance/Munitions:** IEER, SUS, other non-explosive class stores (1,000 lb.) **Targets:** MK-39 or MK-30, smoke device **Duration:** 4 to 6 flight hours /event	**Location:** Northeast VACAPES Navy Cherry Point JAX GOMEX Other AFTT Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (sonobuoys [DICASS AN/SSQ-62x]), underwater explosives (e.g. IEER, Mk-82 SUS; torpedoes [e.g., MK-46, MK-54]), aircraft noise **Energy:** None **Physical Disturbance and Strike: :** Military expended material strike, in-water device strike, aircraft strike (birds only) **Entanglement:** Parachutes, **Ingestion:** Parachutes, sonobuoy fragments	
Detailed Military Expended Material Information	• 1 MK-39 or MK-30 target (MK-30 is recovered and reused, MK-39 is not) • If target air dropped, 1 parachute/target • 20-60 sonobuoys/event (1 parachute/sonobuoy)	
Assumptions Used for Analysis	Torpedo, missile, and chaff use will be captured under Anti-Submarine Warfare Torpedo Test, Anti-Surface Warfare Missile Test, and Chaff Test, respectively. Analysis of these will not be conducted under this activity.	

A.2.5 MINE WARFARE

Mine Warfare involves the detection, avoidance, and neutralization of mines to protect Navy ships and submarines, and offensive mine laying in naval operations. A naval mine is a self-contained, explosive device placed in the water at predetermined depths to destroy ships or submarines. Naval mines are deposited and left in place until triggered by the approach of or contact with an enemy ship, or until removed or otherwise destroyed. Naval mines can be laid by minelayers, other ships, submarines, and aircraft. Naval Air Systems Command Mine Warfare testing events include Airborne Mine Countermeasures events, Mine Laying events (similar to Mine exercises), and mine neutralization events. Sonar systems and sound sources associated with Mine Warfare testing events are listed in Table 2.3-2 (see Chapter 2, Description of Proposed Action and Alternatives). The AN/ASQ-235, an Airborne Projectile-based Mine Clearance System, and AN/ALQ-220 (Organic and Surface Influence Sweep) are mine neutralization systems capable of destroying mines or otherwise rendering them non-functional. The AN/AQS-20A and Airborne Laser Mine Detection System are mine hunting systems used for locating and recording the positions of mines for avoidance or subsequent neutralization.

A.2.5.1 Airborne Mine Neutralization Systems Test – ASQ-235 (Airborne Mine Neutralization System)

Activity Name	Activity Description	
Mine Warfare (MIW)		
Airborne Mine Neutralization Systems (AMNS) Test – AQS-235	Airborne mine neutralization tests of the AN/ASQ-235 evaluate the system's ability detect and destroy mines off of the MH-60 Airborne Mine Countermeasures capable helicopter. The AN/ASQ-235 uses up to four unmanned underwater vehicles equipped with high-frequency sonar, video cameras, and 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 AN/ASQ-235 (source excluded from quantitative analysis) uses up to four unmanned underwater vehicles equipped with high-frequency sonar and video cameras to detect 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 helicopter 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 a high-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 an inert neutralizer against and inert mine shape, or a high-explosive neutralizer against an inert mine shape or a high-explosive neutralizer against an explosive mine.	
Information Typical to the Event	**Platform:** MH-60S helicopter **Systems:** AN/ASQ-235 (Airborne Mine Neutralization System) **Ordnance/Munitions:** Neutralizers (explosive and non-explosive); mines (explosive and non-explosive) **Targets:** Floating/moored/bottom mine or shapes **Duration:** 2.5 flight hours/event	**Location*:** VACAPES: W-50, W-72, W386 SFOMF NSWCPCD

Activity Name	Activity Description
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives, aircraft noise **Energy:** in-air low energy laser **Physical Disturbance and Strike:** Aircraft strike (birds only); military expended material strike; seafloor device strike (mine shapes) **Entanglement:** Fiber optic cable **Ingestion:** Mine fragments, neutralizer fragments, fiber optic cable fragments
Detailed Military Expended Material Information	• Fiber-optic cable, plus additional expended material, such as the can that holds and deploys the cable • 1 – 4 neutralizers deployed per high-explosive event Mine shapes are typically retrieved and reused, if they are not too badly damaged from neutralization attempt.
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). The in-air low energy laser stressor was used in analysis of potential impacts on human resources.

A.2.5.2 Airborne Projectile-based Mine Clearance System

Activity Name	Activity Description	
Mine Warfare (MIW)		
Airborne Projectile-based Mine Clearance System	An MH-60S helicopter uses a laser-based detection system to search for mines and to fix mine locations for neutralization with an airborne projectile-based mine clearance system. The system neutralizes mines by firing a small or medium-caliber non explosive, supercavitating projectile from a hovering helicopter.	
Long Description	During a airborne projectile-based mine clearance system test, a MH-60S helicopter evaluates the search capabilities of a Airborne Projectile-based Mine Clearance System (such as the AN/AWS-2 Rapid Airborne Mine Clearance System] to detect mines and fix mine locations using a laser. The airborne projectile-based mine clearance system can work in tandem with the Airborne Laser Mine Detection System by providing a mine neutralizing (destroying) capability for Airborne Laser Mine Detection System -detected, near-surface mines. The gun (such as the Rapid Airborne Mine Clearance System Bushmaster) fires a small or medium-caliber (such as a 30 mm) non-explosive, supercavitating projectile at the target from a hovering MH-60S. The projectile penetrates the target, rendering it non-functional. Mine shapes (as opposed to high-explosive mines) would almost always be used as the targets during a test. In the event a high-explosive mine is used during the final testing phase an underwater explosion may be generated as the mine is neutralized.	
Information Typical to the Event	**Platform**: MH-60S helicopter **Systems**: Rapid Airborne Mine Clearance System or Rapid Airborne Mine Clearance System-like system **Ordnance/Munitions:** Small or medium-caliber supercavitating projectile (non-explosive), mines (non-explosive and explosive) **Targets:** Floating/moored/bottom /mine or mine shape **Duration:** 2.5 flight hours/event	**Location*:** VACAPES: W-50 NSWCPCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives ; aircraft noise **Energy:** in-air low energy laser **Physical Disturbance and Strike:** Military expended material strike (projectiles), seafloor device strike (mine shapes), aircraft strikes (birds only) **Entanglement:** None **Ingestion:** Projectiles (small- and medium-caliber), target fragments	
Detailed Military Expended Material Information	Projectiles (small- and medium-caliber); target fragments. Mine shapes are typically retrieved and reused, if they are not too badly damaged from neutralization attempt.	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). All mines under the No Action Alternative are non-explosive. The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.2.5.3 Airborne Towed Mine Sweeping Test

Activity Name	Activity Description	
Mine Warfare (MIW)		
Airborne Towed Minesweeping Test	Airborne Towed Minesweeping Test (such as the Organic Airborne and Surface Influence Sweep) would be conducted by a MH-60S helicopter to evaluate the functionality of towed minesweeping devices and the MH-60S at sea. The OASIS is towed from a forward flying helicopter and works by emitting an electromagnetic field and mechanically generated underwater sound to simulate the presence of a ship. The sound and electromagnetic signature cause nearby mines to explode.	
Long Description	Airborne Towed Minesweeping Test (such as the Organic Airborne and Surface Influence Sweep) would be conducted by an Airborne Mine Countermeasures capable MH-60S helicopter to evaluate the functionality of Organic Airborne and Surface Influence Sweep and MH-60S at sea. For most tests, mine sweeping would be simulated using Versatile Exercise Mine System (non-explosive mine shapes that emit a plume of smoke rather than exploding) and high-explosive mines at the culmination of testing, approximately 1 per event. The Organic Airborne and Surface Influence Sweep works by emitting an electromagnetic field and underwater sound generated from a mechanical source to simulate a ship's sound signature. The Organic Airborne and Surface Influence Sweep serves to "sweep" or cause live mines to detonate when exposed to the electromagnetic field and simulated ship sound signature. The sound generated from the Organic Airborne and Surface Influence Sweep is not sonar, but rather a mechanically-generated sound to simulate a ship prop.	
Information Typical to the Event	**Platform:** MH-60S **Systems:** Towed minesweeping systems (e.g., Organic Airborne and Surface Influence Sweep) **Ordnance/Munitions:** Mines (explosive), Versatile Exercise Mine System **Targets:** Floating/moored/bottom mines (non-explosive and explosive) **Duration:** 2.5 flight hours/event	**Location*:** VACAPES: W-50, W-72 NSWCPCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives; aircraft noise **Energy:** Electromagnetic **Physical Disturbance and Strike:** In-water towed device strike, seafloor device strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** Mine fragments	
Detailed Military Expended Material Information	Mine fragments	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). Non-explosive mine shapes will be recovered.	

A.2.5.4 Airborne Towed Mine Hunting Sonar Test

Activity Name	Activity Description	
Mine Warfare (MIW)		
Airborne Towed Minehunting Sonar Test	A mine-hunting system that is towed from an MH-60S helicopter with sonar for detection and classification of bottom and moored mines. An electro-optical sensor allows for identification of bottom mines.	
Long Description	Tests of towed mine-hunting sonar systems (such as the AN/AQS-20A, or "Q20") evaluate the search capabilities of this helicopter-towed, mine hunting, detection, and classification system. The sonar on the Q20 identifies mine-like objects in the deeper parts of the water column, but is not designed to identify near-surface mines.	
Information Typical to the Event	**Platform:** Rotary-wing aircraft (MH-60S) **Systems:** Towed mine-hunting sonar systems (AN/AQS-20A) **Ordnance/Munitions:** None **Targets:** Floating/moored/near surface mine or mine shape **Duration:** 2.5 flight hours/event	**Location*:** VACAPES: W-50, W-72 NSWCPCD SFOMF
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency Sonar (AN/AQS-20A), aircraft noise **Energy:** None **Physical Disturbance and Strike:** In-water towed device strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.2.5.5 Airborne Laser-based Mine Detection System Test

Activity Name	Activity Description	
Mine Warfare (MIW)		
Airborne Laser-Based Mine Detection System Test	An airborne mine hunting test of the AN/AES-1 Airborne Laser Mine Detection System, that is operated from the MH-60S helicopter and evaluates the system's ability to detect, classify, and fix the location of floating and near-surface, moored mines. The system uses a laser to locate mines and may operate in conjunction with an airborne projectile-based mine detection system to neutralize mines.	
Long Description	During an Airborne Mine Countermeasures test, a MH-60S helicopter evaluates the search capabilities of the AN/AES-1 Airborne Laser Mine Detection System. Airborne Laser Mine Detection System is a mine hunting system designed to detect, classify, and localize floating and near-surface, moored sea mines using a laser system. The Airborne Laser Mine Detection System will be integrated into the MH-60S helicopter to provide a rapid wide-area reconnaissance and assessment of mine threats in littoral zones, confined straits, choke points and amphibious objective areas for Carrier and Expeditionary Strike Groups. The Airborne Laser Mine Detection System uses pulsed laser light to image the entire near-surface volume potentially containing mines. Airborne Laser Mine Detection System is capable of day or night operations without stopping to deploy or recover equipment and without towing any equipment in the water. With untethered operations, it can attain high area search rates. This design uses the forward motion of the aircraft to generate image data negating the requirement for complex scanning mechanisms and ensuring high system reliability. Airborne Laser Mine Detection System also provides accurate target geo-location to support follow on neutralization of the detected mines. Airborne Laser Mine Detection System works in conjunction with the mine neutralization system, Rapid Airborne Mine Clearance System.	
Information Typical to the Event	**Platform:** MH-60S helicopter **Systems:** AN/AES-1 Airborne Laser Mine Detection System **Ordnance/Munitions:** None **Targets:** Floating/moored mine shapes **Duration:** 2.5 flight hours/event	**Location*:** VACAPES: W-50, W-72 NSWCPCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** in-air low energy laser **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives). The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.2.5.6 Mine Laying Test

Activity Name	Activity Description	
Mine Warfare (MIW)		
Mine Laying Test	Fixed-winged 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-winged 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 (i.e., MK-76, BDU-45, or BDU-48), making multiple passes in the same flight pattern and dropping one or more shapes each time. The mine shapes are scored for accuracy as they enter the water. The non-explosive mine shapes are expendable and are typically not recovered after the test.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft **Systems:** None **Ordnance/Munitions:** Mine shapes (i.e., MK-62, MK-63. or MK-65 quick-strike; non-explosive) **Targets:** None **Duration:** 2 flight hours/event	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only); seafloor device strike (mine shape) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Mine Shapes 10/event	
Assumptions Used for Analysis		

A.2.6 OTHER TESTING ACTIVITIES

A.2.6.1 Test and Evaluation – Catapult Launch

Activity Name	Activity Description	
Other Testing		
Test and Evaluation Catapult Launch	Tests evaluate the function of aircraft carrier catapults at sea following enhancements, modifications, or repairs to catapult launch systems, including aircraft catapult launch tests. No weapons or other expendable materials would be released.	
Long Description	Aircraft catapults are systems used to assist aircraft take-off in aircraft carriers. Catapults consist of a track built into the flight deck, below which is a large piston or shuttle that is attached through the track to the nose gear of the aircraft. Navy aircraft launch systems are powered by steam or driven by an electromagnetic motor. Steam-powered catapults draw steam from the ship's boilers to the catapult steam receivers or accumulator, where it is stored at the desired pressure. From the receivers/accumulator, steam is directed to the launching valves, and provides the energy to launch aircraft. The most significant differences between the various types of steam catapults are the length and capacity. An electromagnetic launch system provides higher launch energy capability, reduced weight, volume, and maintenance, increased controllability, availability, reliability, and efficiency. The present electromagnetic aircraft launch system design centers around a linear synchronous motor and supplied power from pulsed disk alternators through a cycloconverter. Average power, obtained from an independent source on the host platform, is stored kinetically in the rotors of the disk alternators. It is then released in a 2-3 second pulse during a launch. This high-frequency power is fed to the cycloconverter which acts as a rising voltage, rising frequency source to the launch motor. The linear synchronous motor takes the power from the cycloconverter and accelerates the aircraft down the launch stroke, all the while providing "real time" closed loop control. Catapult launch tests would occur on fleet aircraft carriers during deployment. The specific locations of carriers from 2014-2020 is unknown. No weapons or other expendable materials would be released during catapult tests.	
Information Typical to the Event	**Platform:** CVN 68-78, fixed-wing aircraft **Systems:** Catapult; electromagnetic aircraft launch system **Ordnance/Munitions:** None **Targets:** None **Duration:** Fixed-wing aircraft (2 to 6 flight hours/event)	**Location:** VACAPES Navy Cherry Point JAX AFTT Study Area
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis		

A.2.6.2 Air Platform Shipboard Integrate Test

Activity Name	Activity Description	
Other Testing		
Air Platform Shipboard Integrate Test		
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, Hazards of Electromagnetic Radiation to Ordnance, Hazard of Electromagnetic Radiation to Personnel, and High Energy Radio Frequency.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft **Systems:** Data link and Communication Systems, Hazards of Electromagnetic Radiation to Ordnance, Hazard of Electromagnetic Radiation to Personnel, High Energy Radio Frequency **Ordnance/Munitions:** None **Targets:** None **Duration:** 2-6 flight hours/event	**Location*:** VACAPES: W-386, W-72 Navy Cherry Point JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.2.6.3 Shipboard Electronic Systems Evaluation

Activity Name	Activity Description	
Other Testing		
Shipboard Electronic Systems Evaluation	Tests measure ship antenna radiation patterns and test communication systems with a variety of aircraft.	
Long Description	Shipboard electronic systems evaluation tests measure ship antenna radiation patterns and evaluate communication systems linking ships and aircraft. Naval Air Systems Command aircraft capable of landing on a ship (e.g., aircraft carrier or littoral combat ship) temporarily deploy to a nearshore ship and conduct a variety of tests over a period of days to test newly installed or modified systems onboard the aircraft for compatibility with shipboard electronic systems. Follow-on test and evaluation of unmanned aerial systems would consist of dynamic interface testing, shipboard electromagnetic testing, and envelope expansion tests intended to evaluate capability of the unmanned aerial systems to conduct launch and recovery operations from a ship at sea as well as perform missions in a maritime environment. Altitudes would range from mean seal level to 15,000 feet mean seal level with the majority of flights occurring between mean seal level and 3,000 feet. Unmanned aerial systems would include STUAS/Tier II tactical unmanned aerial systems, BAMS, Fire Scout VTUAV, and UCAS-D testing. Shipboard testing of the Joint Precision Approach and Landing System (test new technology systems to provide precision guidance to aircraft landing on air capable ships. At-sea flight test of the CH-53K would consist of shipboard compatibility (dynamic interface/envelope expansion) and, during Operational Evaluation, amphibious assault scenarios. SESE tests of the V-22 helicopter would involve flight and wind envelope expansion interface testing with LHA, LHD, and LPD class ships.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft, rotary-wing aircraft, unmanned aerial systems **Systems:** Joint Precision Approach and Landing System **Ordnance/Munitions:** None **Targets:** None **Duration:** 2-20 flight hours/event	**Location*:** VACAPES: W-386, W-72 Navy Cherry Point JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.2.6.4 Maritime Security

Activity Name	Activity Description	
Other Testing		
Maritime Security	Maritime patrol aircraft and helicopters participate in maritime security activities and fleet training events. Aircraft and surface ships identify, track, intercept, board, and inspect foreign merchant vessels suspected of not complying with United Nations/allied sanctions or conflict rules of engagement.	
Long Description	Crews from Navy helicopters and surface ships identify, track, intercept, board, and inspect foreign merchant vessels suspected of not complying with United Nations/allied sanctions or conflict rules of engagement. The boarding party will be delivered from a surface ship via rigid-hull inflatable boat or similar small craft if the target vessel is non-hostile or via helicopter if hostile. This training event is non-firing. Naval Air Systems Command maritime patrol aircraft and helicopters may participate in maritime security activities and training events.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft, rotary-wing aircraft **Systems:** None **Ordnance/Munitions:** Paintballs **Targets:** High performance small boats and unmanned vehicles **Duration:** Varies depending on platform, under 12 hours	**Location*:** VACAPES: W-386, W-72 Navy Cherry Point JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise; vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information		
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-2 of Chapter 2 (Description of Proposed Action and Alternatives).	

A.3 NAVAL SEA SYSTEMS COMMAND TESTING ACTIVITIES

Naval Sea Systems Command testing activities are aligned with its mission of new ship construction, life cycle support, and weapon systems development. Each major category of Naval Sea Systems Command activities is described below.

A.3.1 NEW SHIP CONSTRUCTION

Ship construction activities include pierside testing events, a series of sea trials, and developmental and operational test and evaluation programs. Pierside and at-sea testing of systems aboard a ship may include activation of acoustic sources, acoustic countermeasures, radars, and radio equipment. Pierside events also consist of light-off and operational checks of the vessel's propulsion, weapons, and other combat systems prior to at-sea operations. However, for purposes of this EIS/OEIS, pierside testing at Navy contractor shipyards will consist only of tactical sonar systems. At sea, each new ship is operated at full power and subjected to high-speed runs and steering tests. At-sea test firing of shipboard weapons systems, including guns, is also conducted.

A.3.1.1 Surface Combatant Sea Trials – Pierside Sonar Testing

Activity Name	Activity Description	
Ship Construction and Maintenance		
New Ship Construction		
Surface Combatant Sea Trials – Pierside Sonar Testing	Tests ship's sonar systems pierside to ensure proper operation.	
Long Description	Pierside sonar testing is one part of the total surface combatant sea trial activity. Surface combatant sonars are tested pierside to ensure proper operation prior to conducting the at-sea portion of the sea trial. Surface combatants included in this activity are the ARLEIGH BURKE class (DDG 51) and the ZUMWALT class (DDG 1000) destroyers.	
Information Typical to the Event	**Platform:** Surface combatant (e.g., DDG 51 and DDG 1000) **Systems:** Mid-frequency sonars **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 3 weeks, with each source run independently and not continuously during this time.	**Location:** Bath, Maine Norfolk, Virginia Mayport, Florida Pascagoula, Mississippi
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF1, MF1K, MF10), underwater communications (e.g., MF9) **Energy:** None **Physical Disturbance and Strike:** None **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.1.2 Surface Combatant Sea Trials – Propulsion Testing

Activity Name	Activity Description	
New Ship Construction		
Surface Combatant Sea Trials – Propulsion Testing	Ship is run at high speeds in various formations (e.g., straight-line and reciprocal paths).	
Long Description	Propulsion testing is one part of the total surface combatant sea trial activity. Propulsion testing includes ship maneuvering, including full power runs (speeds in excess of 30 knots) and endurance runs.	
Information Typical to the Event	**Platform:** Surface combatant (e.g., DDG 51 and DDG 1000) **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Full power runs are conducted for a total of 4 hours, and endurance runs are conducted for a total of 2 hours.	**Location*:** Northeast: Boston Area Complex Gulf of Mexico:** GOMEX: W155B VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). **Gulf of Mexico refers to the body of water. Ships will not be traveling in a straight line. Ships will operate across the full spectrum of capable speeds. Ships will not be conducting test constantly for the entire duration.	

A.3.1.3 Surface Combatant Sea Trials – Gun Testing – Large-Caliber

Activity Name	Activity Description	
New Ship Construction		
Surface Combatant Sea Trials – Gun Testing – Large-Caliber	**:** Gun systems are tested using non-explosive rounds.	
Long Description	Large-caliber gun testing is one part of the total surface combatant sea trial activity. Tests currently include firing of the 5 inch .62 caliber gun, and will potentially include a 155 mm gun for future DDG 1000 platforms.	
Information Typical to the Event	**Platform:** Surface combatant (e.g., DDG 51 and DDG 1000) **Systems:** Large-caliber guns (5 inch, 155 mm) **Ordnance/Munitions:** Large-caliber projectiles (e.g., 5 inch, 155 mm, 20-mm cannon) (non-explosive) **Targets:** None **Duration:** The entire sea trial duration is 4 days, within which gun testing would occur.	**Location*:** Northeast: CGULL OPAREA Gulf of Mexico:** GOMEX: W151C VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, military expended materials strike (non-explosive projectiles). **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	26 non-explosive practice munitions/event Projectiles, casings	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). **Gulf of Mexico refers to the body of water. Ships will not be conducting test constantly for the entire duration. 26 rounds per event	

A.3.1.4 Surface Combatant Sea Trials – Missile Testing

Activity Name	Activity Description	
New Ship Construction		
Surface Combatant Sea Trials – Missile Testing	Non-explosive missiles are fired at target drones to test the launching system.	
Long Description	Missile testing is one part of the total surface combatant sea trial activity. During the event, support craft launch target drones, upon which two non-explosive missiles are fired.	
Information Typical to the Event	**Platform:** Surface combatant (e.g., DDG 51 and DDG 1000) **Systems:** Missile launch system **Ordnance/Munitions:** Missiles (non-explosive) **Targets:** Retrievable mobile targets (e.g., drones) **Duration:** The entire sea trial duration is 4 days, within which missile testing would occur.	**Location*:** Northeast: CGULL OPAREA Gulf of Mexico:** GOMEX: W151C VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive practice munitions), vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	2 missiles (non-explosive)/event	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). **Gulf of Mexico refers to the body of water. Ships will not be conducting test constantly for the entire duration. Two missiles per event Target drones are recovered by supporting craft.	

A.3.1.5 Surface Combatant Sea Trials – Decoy Testing

Activity Name	Activity Description	
New Ship Construction		
Surface Combatant Sea Trials – Decoy Testing	Includes testing of the MK 36 Decoy Launching system.	
Long Description	Testing of the MK 36 Decoy Launching system is one part of the total surface combatant sea trial activity. During the event, chaff cartridges are launched to ensure proper operation of the system.	
Information Typical to the Event	**Platform:** Surface combatant (e.g., DDG 51 and DDG 1000) **Systems:** MK 36 Decoy Launching system **Ordnance/Munitions:** None **Targets:** None **Duration:** The entire sea trial duration is 4 days, within which decoy launching testing would occur.	**Location*:** Northeast: CGULL OPAREA Gulf of Mexico:** (GOMEX: W151C) VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** End caps, pistons, chaff	
Detailed Military Expended Material Information	36 chaff cartridges/event	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). **Gulf of Mexico refers to the body of water. Ships will not be conducting test constantly for the entire duration. 36 chaff cartridges/event	

A.3.1.6 Surface Combatant Sea Trials – Surface Warfare Testing – Large-Caliber

Activity Name	Activity Description	
New Ship Construction		
Surface Combatant Sea Trials – Surface Warfare Testing – Large-Caliber	Ships defend against surface targets with large-caliber guns.	
Long Description	Surface warfare testing is one part of the total surface combatant sea trial activity. During this event, a high speed maneuverable surface target would run a weaving pattern towards the ship at speeds in excess of 20 knots. The surface combatant would fire non-explosive large-caliber rounds at the incoming target.	
Information Typical to the Event	**Platform:** Surface combatant (e.g., DDG 51 and DDG 1000) **Systems:** .62 caliber gun **Ordnance/Munitions:** Large-caliber projectiles (e.g., 5 inch, 155 mm) (non-explosive) **Targets:** Surface targets (e.g., High Speed Maneuverable Surface Target) **Duration:** The entire sea trial duration is 4 days, within which surface warfare testing would occur.	**Location*:** Northeast: CGULL OPAREA Gulf of Mexico:** (GOMEX: W151C) VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, weapons firing noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike, military expended material strike (non-explosive practice munitions) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Large-caliber projectiles	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). **Gulf of Mexico refers to the body of water. Ships will not be conducting test constantly for the entire duration. 48 rounds per event	

A.3.1.7 Surface Combatant Sea Trials – Anti-Submarine Warfare Testing

Activity Name	Activity Description	
New Ship Construction		
Surface Combatant Sea Trials – Anti-Submarine Warfare Testing	Ships demonstrate capability of countermeasure systems and underwater surveillance and communications systems.	
Long Description	Anti-submarine warfare testing is one part of the total surface combatant sea trial activity. During this event, hull-mounted sonar systems are operated to test the capability of the systems. Mid- and high-frequency acoustic sources are used during this activity.	
Information Typical to the Event	**Platform:** Surface combatant (e.g., DDG 51 and DDG 1000) **Systems:** Surface ship sonars, countermeasure systems, and underwater surveillance and communications systems **Ordnance/Munitions:** None **Targets:** Motorized autonomous targets (e.g., Expendable Mobile Anti-Submarine Warfare Training Target) **Duration:** The entire sea trial duration is 4 days, within which anti-submarine warfare testing would occur.	**Location*:** Northeast: CGULL OPAREA Gulf of Mexico** (GOMEX: W151C) VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonars (e.g., MF1, MF1K, MF10), acoustic countermeasures (e.g., ASW3), underwater communications (e.g., MF9), vessel noise **Energy:** None **Physical Disturbance and Strike**: Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	3 passive sonobuoys/event; expendable targets	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). **Gulf of Mexico refers to the body of water. Ships will not be conducting test constantly for the entire duration.	

A.3.1.8 Aircraft Carrier Sea Trials – Propulsion Testing

Activity Name	Activity Description	
New Ship Construction		
Aircraft Carrier Sea Trial – Propulsion Testing	Ship is run at high speeds in various formations (e.g., straight-line and reciprocal paths).	
Long Description	Propulsion testing is one part of the total aircraft carrier sea trial activity. Propulsion testing includes ship maneuvering, including full power runs (speeds in excess of 30 knots) and endurance runs in both straight line and reciprocal paths.	
Information Typical to the Event	**Platform:** Aircraft carrier **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Propulsion testing is conducted within the 1 to 2 day aircraft carrier sea trial.	**Location:** VACAPES
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike**: Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Ships will not be traveling in a straight line. Ships will operate across the full spectrum of capable speeds. Ships will not be conducting test constantly for the entire duration.	

A.3.1.9 Aircraft Carrier Sea Trials – Gun Testing – Small-Caliber

Activity Name	Activity Description	
New Ship Construction		
Aircraft Carrier Sea Trial – Gun Testing Small-Caliber	Gun systems are tested using non-explosive rounds.	
Long Description	Small-caliber gun testing is included as part of the total aircraft carrier sea trial activity. Small-caliber gun testing includes .50 caliber guns.	
Information Typical to the Event	**Platform:** Aircraft carrier **Systems:** .50 caliber gun **Ordnance/Munitions:** Small-caliber projectiles (e.g., .50 caliber) (non-explosive) **Targets:** None **Duration:** Small-caliber gun testing is conducted within the 1 to 2 day aircraft carrier sea trial.	**Location:** VACAPES Navy Cherry Point JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike**: Military expended material strike (non-explosive projectiles), vessel strike **Entanglement:** None **Ingestion:** Small-caliber projectiles, casings	
Detailed Military Expended Material Information	Casings, projectiles	
Assumptions Used for Analysis	Ships will not be conducting test constantly for the entire duration. Events can occur in any of the range complexes. 100 rounds per event	

A.3.1.10 Aircraft Carrier Sea Trials – Gun Testing – Medium-Caliber

Activity Name	Activity Description	
New Ship Construction		
Aircraft Carrier Sea Trial – Gun Testing Medium-Caliber	Gun systems are tested using non explosive and high-explosive rounds.	
Long Description	Medium-caliber gun testing is included as part of the total aircraft carrier sea trial activity. Medium-caliber gun testing includes 20 mm guns. In addition, fixed-wing aircraft deployed from an aircraft carrier will fire medium-caliber guns.	
Information Typical to the Event	**Platform:** Aircraft carrier, fixed-wing aircraft **Systems:** Medium-caliber gun systems **Ordnance/Munitions:** Medium-caliber projectiles (20 mm) (non-explosive and explosive) **Targets:** None **Duration:** Medium-caliber gun testing is conducted within the 1 to 2 day aircraft carrier sea trial.	**Location:** VACAPES Navy Cherry Point JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise, weapons firing noise, underwater explosives (e.g., E1), vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (projectiles, fragments), aircraft strike (birds only), vessel strike **Entanglement:** None **Ingestion:** Projectiles, casings, fragments	
Detailed Military Expended Material Information	Casings, projectiles, fragments	
Assumptions Used for Analysis	Ships will not be conducting test constantly for the entire duration. Events can occur in any of the range complexes. Approximately one percent of projectiles are high-explosive.	

A.3.1.11 Aircraft Carrier Sea Trials – Missile Testing

Activity Name	Activity Description	
New Ship Construction		
Aircraft Carrier Sea Trial – Missile Testing	Surface-to-air missiles are fired to test the launching system.	
Long Description	Aircraft carrier sea trials include self defense systems such as surface-to-air missiles.	
Information Typical to the Event	**Platform:** Aircraft carrier **Systems:** Missile launching system **Ordnance/Munitions:** Missiles (e.g., Evolved Sea Sparrow Missile or Rolling Airframe Missile) (explosive) **Targets:** Drone **Duration:** Missile testing is conducted within the 1 to 2 day aircraft carrier sea trial.	**Location:** VACAPES
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** In-air explosives, vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (fragments), vessel strike; aircraft strike (birds only) **Entanglement:** None **Ingestion:** Fragments	
Detailed Military Expended Material Information	Fragments	
Assumptions Used for Analysis	Ships will not be conducting test constantly for the entire duration. Missiles explode in the air. One target per event	

A.3.1.12 Aircraft Carrier Sea Trials – Bomb Testing

Activity Name	Activity Description	
New Ship Construction		
Aircraft Carrier Sea Trial – Bomb Testing	Air-to-surface non-explosive bombs are delivered from carrier-launched fixed-wing aircraft.	
Long Description	Fixed-wing aircraft deployed from an aircraft carrier will deliver non-explosive practice bombs.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft, aircraft carrier **Systems:** None **Ordnance/Munitions:** Non-explosive practice bombs **Targets:** Surface target (towed or smoke float) **Duration:** Bomb testing is conducted within the 1 to 2 day aircraft carrier sea trial.	**Location:** JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise, vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive bombs), aircraft strike (birds only), vessel strike, in-water device strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Non-explosive bombs	
Assumptions Used for Analysis	Ships will not be conducting test constantly for the entire duration. Two bombs per event Assume one target per event	

A.3.1.13 Submarine Sea Trials – Pierside Sonar Testing

Activity Name	Activity Description	
New Ship Construction		
Submarine Sea Trial – Pierside Sonar Testing	Tests submarine's sonar systems pierside to ensure proper operation.	
Long Description	Pierside sonar testing is one part of the total submarine sea trial activity. Submarine sonar systems are tested pierside to ensure proper operation prior to conducting the at-sea portion of the sea trial.	
Information Typical to the Event	**Platform:** Submarines **Systems:** Submarine sonars, underwater communications **Ordnance/Munitions:** None **Targets:** None **Duration:** Pierside sonar testing is conducted within a 5 day sea trial.	**Location:** Groton, Connecticut Newport News, Virginia
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF3), high-frequency sonar (e.g., HF1), underwater communication (e.g., M3) **Energy:** None **Physical Disturbance and Strike:** None **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Ships will not be conducting test constantly for the entire duration.	

A.3.1.14 Submarine Sea Trials – Propulsion Testing

Activity Name	Activity Description	
New Ship Construction		
Submarine Sea Trial – Propulsion Testing	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.	
Information Typical to the Event	**Platform:** Submarines **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Propulsion testing sonar testing is conducted within a 5 day sea trial.	**Location:** Northeast VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** None **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Subs will not be conducting test constantly for the entire duration. Subs will not be traveling in a straight line. Subs will operate across the full spectrum of capable speeds.	

A.3.1.15 Submarine Sea Trials – Weapons System Testing

Activity Name	Activity Description	
New Ship Construction		
Submarine Sea Trial – Weapons System Testing	Submarine weapons systems are tested by cycling water through them in lieu of actual weapons firing.	
Long Description	Weapons system testing is one part of the total submarine sea trial activity. During this event, the submarine launches "water slugs" in lieu of actual torpedoes or countermeasures.	
Information Typical to the Event	**Platform:** Submarines **Systems:** Torpedo and countermeasure systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Weapons system testing sonar testing is conducted within a 5 day sea trial.	**Location:** Northeast VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** None **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Subs will not be conducting test constantly for the entire duration.	

A.3.1.16 Submarine Sea Trials – Anti-Submarine Warfare Testing

Activity Name	Activity Description	
New Ship Construction		
Submarine Sea Trial – Anti-Submarine Warfare Testing	Submarines demonstrate capability of underwater surveillance and communications systems.	
Long Description	Anti-submarine warfare testing is one part of the total submarine sea trial activity. During this event, hull-mounted sonar systems and underwater communications are operated to test the capability of the systems. Mid-and high-frequency acoustic sources are used during this activity.	
Information Typical to the Event	**Platform:** Submarines **Systems:** Surveillance and communication systems **Ordnance/Munitions:** None **Targets:** Submarines, motorized autonomous targets (e.g., Expendable Mobile Anti-Submarine Warfare Training Target) **Duration:** Anti-submarine warfare testing is conducted within a 5 day sea trial.	**Location:** Northeast VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF3), high-frequency sonar (e.g., HF1), underwater communication (e.g., M3, MF10) **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Targets	
Assumptions Used for Analysis	Subs will not be conducting test constantly for the entire duration.	

A.3.1.17 Other Class Ship Sea Trials – Propulsion Testing

Activity Name	Activity Description	
New Ship Construction		
Other Class Ship Sea Trial – Propulsion Testing	Ship is run at high speeds in various formations (e.g., straight-line and reciprocal paths).	
Long Description	Propulsion testing is one part of the total sea trial activity. During this event, the ship is tested for maneuverability, including full power and endurance runs.	
Information Typical to the Event	**Platform:** Amphibious warfare ships, surface combatant (e.g., Littoral Combat Ship), support craft/other - specialized high speed , support craft/other **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Propulsion testing occurs during an approximate 4 hour period during the 2-day sea trial.	**Location*:** AFTT Study Area: VACAPES Gulf of Mexico:** GOMEX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). **Gulf of Mexico refers to the body of water. Ships will not be conducting test constantly for the entire duration. Ships will not be traveling in a straight line. Ships will operate across the full spectrum of capable speeds.	

A.3.1.18 Other Class Ship Sea Trials – Gun Testing – Small-Caliber

Activity Name	Activity Description	
New Ship Construction		
Other Class Ship Sea Trial – Gun Testing Small-Caliber	Ships defend against surface targets with small-caliber guns	
Long Description	Small-caliber gun testing is included as part of the total sea trial activity. Small-caliber gun testing includes .50 caliber guns.	
Information Typical to the Event	**Platform:** Amphibious warfare ships, surface combatant (e.g., Littoral Combat Ship), support craft/other - specialized high speed , support craft/other **Systems:** Small-caliber weapon systems **Ordnance/Munitions:** Small-caliber projectiles (non-explosive) **Targets:** None **Duration:** Small-caliber gun testing would occur within the 2-day sea trial.	**Location*:** Gulf of Mexico**: GOMEX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive projectiles), vessel strike **Entanglement:** None **Ingestion:** Small-caliber projectiles, casings	
Detailed Military Expended Material Information	Small-caliber projectiles, casings	
Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). **Gulf of Mexico refers to the body of water. Ships will not be conducting test constantly for the entire duration.	

A.3.1.19 Anti-Submarine Warfare Mission Package Testing

Activity Name	Activity Description	
New Ship Construction		
Anti-Submarine Warfare Mission Package Testing	Ships and their supporting platforms (e.g., helicopters, unmanned aerial systems) detect, localize, and prosecute submarines.	
Long Description	Littoral combat 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.	
Information Typical to the Event	**Platform:** Surface combatant, rotary-wing aircraft **Systems:** Surface ship sonars, helicopter-deployed sonars, active sonobuoys, torpedo sonars **Ordnance/Munitions:** Non-explosive torpedoes **Targets:** Motorized autonomous targets (e.g., Expendable Mobile Anti-Submarine Warfare Training Target) **Duration:** Event duration is approximately 1-2 weeks, with 4-8 hours of active sonar use with intervals of non-activity in between.	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF12), helicopter-deployed sonar (e.g., MF4), active sonobuoys (e.g., MF5), torpedo sonar (e.g., TORP1); vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike; aircraft strike (birds only) **Entanglement:** Parachutes; **Ingestion:** Parachutes	
Detailed Military Expended Material Information	Lightweight torpedo launch accessories Sonobuoys; Parachutes	
Assumptions used for Analysis	One target per event All sonobuoys have parachutes unless otherwise noted. 2 sonobuoys expended per event	

A.3.1.20 Surface Warfare Mission Package Testing– Gun Testing Small-Caliber

Activity Name	Activity Description	
New Ship Construction		
Surface Warfare Mission Package Testing – Gun Testing Small-Caliber	Ships defense against surface targets with small-caliber guns	
Long Description	Littoral combat ships conduct surface warfare by detecting, tracking, and prosecuting small-boat threats. The surface warfare mission package 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.	
Information Typical to the Event	**Platform:** Surface combatant **Systems:** 30 mm gun **Ordnance/Munitions:** Small-caliber projectiles (.50 caliber) (non-exlposive) **Targets:** None **Duration:** Event duration is approximately 1-2 weeks, with intervals of surface warfare mission package use during this time.	**Location:** AFTT Study Area (typically in designated Fleet OPAREAs)*
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive projectiles) **Entanglement:** None **Ingestion:** Small projectile, casings	
Detailed Military Expended Material Information	Casings, small projectiles	
Assumptions used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). 500 rounds per event	

A.3.1.21 Surface Warfare Mission Package Testing – Gun Testing Medium-Caliber

Activity Name	Activity Description	
New Ship Construction		
Surface Warfare Mission Package Testing – Gun Testing Medium-Caliber	Ships defense against surface targets with medium-caliber guns	
Long Description	Littoral combat ships conduct surface warfare by detecting, tracking, and prosecuting small-boat threats. The surface warfare mission package 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.	
Information Typical to the Event	**Platform:** Surface combatant **Systems:** Medium-caliber gun systems **Ordnance/Munitions:** Medium-caliber projectiles (non-explosive) **Targets:** None **Duration:** Event duration is approximately 1-2 weeks, with intervals of surface warfare mission package use during this time.	**Location:** AFTT Study Area (typically in designated fleet OPAREAs)*
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Weapons firing noise; vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive projectiles); vessel strike **Entanglement:** None **Ingestion:** Projectiles, casings	
Detailed Military Expended Material Information	Casings, projectiles	
Assumptions used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). 1,400 rounds per event	

A.3.1.22 Surface Warfare Mission Package Testing – Gun Testing Large-Caliber

Activity Name	Activity Description	
New Ship Construction		
Surface Warfare Mission Package Testing – Gun Testing Large-Caliber	Ships defense against surface targets with Large-Caliber guns	
Long Description	Littroral combat ships conduct surface warfare by detecting, tracking, and prosecuting small-boat threats. The surface warfare mission package provides a layered strike/defensive capability by use of its embarked support aircraft, medium range surface-to-surface missiles, and 57 mm gun weapon system.	
Information Typical to the Event	**Platform:** Surface combatant **Systems:** Gun systems **Ordnance/Munitions:** Large-Caliber projectiles (non-explosive) **Targets:** None **Duration:** Event duration is approximately 1-2 weeks, with intervals of surface warfare mission package use during this time.	**Location:** AFTT Study Area (typically in designated fleet OPAREAs)*
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Weapons firing noise; vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive projectiles); vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Casings, projectiles	
Assumptions used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). 1,400 rounds per event	

A.3.1.23 Surface Warfare Mission Package Testing – Missile/Rocket Testing

Activity Name	Activity Description	
New Ship Construction		
Surface Warfare Mission Package Testing – Missile/Rocket Testing	Ships defense against surface targets with medium range missiles or rockets	
Long Description	Littoral combat ships conduct surface warfare by detecting, tracking, and prosecuting small-boat threats. The surface warfare mission package provides a layered strike/defensive capability by use of its embarked support aircraft, medium range missiles or rockets, and gun weapon system.	
Information Typical to the Event	**Platform:** Surface combatant, rotary-wing aircraft **Systems:** None **Ordnance/Munitions:** Missiles (e.g., anti-surface) (non-explosive and explosive) **Targets:** None **Duration:** Event duration is approximately 1-2 weeks, with intervals of surface warfare mission package use during this time.	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives (e.g., E6), weapons firing noise, aircraft noise; vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike; military expended material strike (non-explosive projectiles and explosive fragments), aircraft strike (birds only) **Entanglement:** None **Ingestion:** Fragments	
Detailed Military Expended Material Information	Missile or rocket fragments	
Assumptions used for Analysis	2 missiles or rockets per event	

A.3.1.24 Mine Countermeasure Mission Package Testing

Activity Name	Activity Description	
New Ship Construction		
Mine Countermeasure Mission Package Testing	Ships conduct mine countermeasure operations.	
Long Description	Littoral combat ships conduct mine detection using unmanned submersible and aerial systems, magnetic and acoustic sensor systems deployed by ship or support helicopters, and laser systems. Mines are then neutralized using magnetic, acoustic, and supercavitating systems.	
Information Typical to the Event	**Platform:** Surface combatant, unmanned underwater vehicles, rotary-wing aircraft **Systems:** Towed sonar system **Ordnance/Munitions:** mine neutralization systems (e.g., Airborne Mine Neutralization System) **Targets:** Floating/moored/bottom non-explosive, mines or passive mine simulation systems **Duration:** Event duration is 1-2 weeks with intervals of mine countermeasure mission package use during this time.	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Towed sonar systems (e.g., HF4), underwater explosives (e.g., E4), aircraft noise, vessel noise **Energy:** in-air low energy laser **Physical Disturbance and Strike:** Vessel strike, in-water device strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** Fragments	
Detailed Military Expended Material Information	Fragments	
Assumptions Used for Analysis	4 charges per event The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.3.1.25 Post-Homeporting Testing

Activity Name	Activity Description	
New Ship Construction		
Post-Homeporting Testing (all classes)	Tests electronic, navigation, and refueling capabilities.	
Long Description	Post-homeporting testing includes Shipboard Electronic Systems Evaluation Facility measurements of antenna radiation patterns, Tactical Air Navigation certification, Identification Friend or Foe Verification, Dynamic Interface test (to validate helicopter operations), and underway replenishments.	
Information Typical to the Event	**Platform:** All classes of surface ships **Systems:** Electronic and navigation systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 1 to 5 days, depending upon the test being conducted (e.g., Shipboard Electronic Systems Evaluation Facility testing is 1 day, dynamic interface testing is 5 days).	**Location:** Northeast VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.2 SHOCK TRIALS

Each new class (or major upgrade) of surface ships constructed for the Navy must 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 four underwater detonations would be conducted at various distances from the ship (charges are set closer to the ship as the trial progressives). Anticipated shock trials prior to 2019 include a CVN 21 Class aircraft carrier, DDG 1000 Zumwalt Class Destroyer, Independence Class Littoral Combat Ship, and Freedom Class Littoral Combat Ship.

A.3.2.1 Aircraft Carrier Full Ship Shock Trial

Activity Name	Activity Description	
Ship Shock Trials		
Aircraft Carrier Full Ship Shock Trial	Underwater detonations against an aircraft carrier.	
Long Description	Each new class (or major upgrade) of surface ships constructed for the Navy must 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 four underwater detonations would be conducted at various distances from the ship (charges are set closer to the ship as the trial progressives).	
Information Typical to the Event	**Platform:** Aircraft carrier, support craft/other **Systems:** None **Ordnance/Munitions:** High-explosive charges **Targets:** None **Duration:** Events typically occur over 4 weeks, with one detonation conducted per week. However, smaller charge sizes may be detonated on consecutive days.	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives (e.g., E17), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** Charge fragments	
Detailed Military Expended Material Information	Charge fragments	
Assumptions Used for Analysis	Four charges per event Only one event will occur per five year period. Event may occur in either JAX or VACAPES. Will occur in waters deeper than 650 ft. *Modeling scenario:* Four 40,000 lb. charges	

A.3.2.2 DDG 1000 Zumwalt Class Destroyer Full Ship Shock Trial

Activity Name	Activity Description	
Shock Trials		
DDG 1000 Zumwalt Class Destroyer Full Ship Shock Trial	Underwater detonations against DDG 1000 Zumwalt Class Destroyer.	
Long Description	Each new class (or major upgrade) of surface ships constructed for the Navy must 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 four underwater detonations would be conducted at various distances from the ship (charges are set closer to the ship as the trial progressives).	
Information Typical to the Event	**Platform:** Surface combatant, support craft/other **Systems:** None **Ordnance/Munitions:** High-explosive charges **Targets:** None **Duration:** Events typically occur over four weeks, with one detonation conducted per week. However, smaller charge sizes may be detonated on consecutive days.	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives (e.g., E16), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** Charge fragments	
Detailed Military Expended Material Information	Charge fragments	
Assumptions Used for Analysis	Four charges per event One event will occur during the five year period. Event may occur in either JAX or VACAPES. Will occur in waters deeper than 650 ft. *Modeling scenario:* Four 10,000 lb. charges	

A.3.2.3 Littoral Combat Ship Full Ship Shock Trial

Activity Name	Activity Description	
Shock Trials		
Littoral Combat Ship Full Ship Shock Trial	Underwater detonations against Littoral Combat Ship.	
Long Description	Each new class (or major upgrade) of surface ships constructed for the Navy must 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 four underwater detonations would be conducted at various distances from the ship (charges are set closer to the ship as the trial progressives).	
Information Typical to the Event	**Platform:** Surface combatant, support craft/other **Systems:** None **Ordnance/Munitions:** High-explosive charges **Targets**: None **Duration:** Events typically occur over four weeks, with one detonation conducted per week. However, smaller charge sizes may be detonated on consecutive days.	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosion (e.g., E16), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** Charge fragments	
Detailed Military Expended Material Information	Charge fragments	
Assumptions Used for Analysis	Four charges per event Two events will occur through five year period. Event may occur in either JAX or VACAPES. Will occur in waters deeper than 650 ft. *Modeling scenario:* Four 10,000 lb. charges	

A.3.3 LIFECYCLE ACTIVITIES

Testing activities are conducted throughout the lifecycle of a Navy ship to verify performance and mission capabilities. Tactical sonar system testing occurs pierside during maintenance, repair and overhaul availabilities, and at sea immediately following most major industrial periods. A Combat System Ship Qualification Trial is conducted for new ships and for ships that have undergone modification or overhaul of their combat systems.

A.3.3.1 Ship Signature Testing

Activity Name	Activity Description	
Lifecycle Activities		
Ship Signature Testing	Tests ship and submarine radar signatures and electromagnetic countermeasures.	
Long Description	Radar cross signature testing of surface ships is accomplished on new vessels and periodically throughout a ship's lifecycle to measure how detectable the ship is to radar. For example, Assessment Identification of Mine Susceptibility measurements are specific electromagnetic and passive acoustical tests performed on mine countermeasure ships and on the Littoral Combat Ship mine countermeasure modules to determine their mine susceptibility. Additionally, measurements of deployed electromagnetic countermeasures are conducted during the new construction, post-delivery, and lifecycle phases of the acquisition process for submarines. 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. Event duration includes all systems checks, including those that do not have active sonar.	
Information Typical to the Event	**Platform:** All surface ship and submarine classes **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is up to 20 days.	**Location:** VACAPES Joint Expeditionary Base Little Creek, Norfolk, Virginia Gulf of Mexico**
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	**Gulf of Mexico refers to the body of water.	

A.3.3.2 Surface Ship Sonar Testing/Maintenance (in OPAREAs and Ports)

Activity Name	Activity Description	
Lifecycle Activities		
Surface Ship Sonar Testing/Maintenance (in OPAREAs and Ports)	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 sonars, navigation systems, fathometers, underwater communications systems, underwater distress beacons, range finders, and other similar systems, would be tested.	
Information Typical to the Event	**Platform:** All surface ship classes **Systems:** Surface ship sonars, fathometers, underwater communications **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration for each test can be up to 3 weeks, with intermittent use of active sonar.	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF1, MF1K), underwater communications (e.g., MF9, MF10), acoustic countermeasures (e.g., ASW3), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Sonar would not be continuously active for the duration of the test.	

A.3.3.3 Submarine Sonar Testing/Maintenance (in OPAREAs and Ports)

Activity Name	Activity Description	
Lifecycle Activities		
Submarine Sonar Testing/Maintenance (in OPAREAs and Ports)	Pierside and at-sea testing of submarine 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 navigation systems, fathometers, underwater communications systems, underwater distress beacons, range finders, and other similar systems, would be tested.	
Information Typical to the Event	**Platform:** Submarine **Systems:** Submarine sonars, fathometers, underwater communications, tracking pingers **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration for each test can be up to three weeks, with intermittent use of active sonar.	**Location:** Northeast VACAPES
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF3, P1), high-frequency sonar (HF1, HF3), underwater communications (e.g., MF3), **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Sonar would not be used continuously throughout duration of test.	

A.3.3.4 Combat System Ship Qualification Trial – In-Port Maintenance Period

Activity Name	Activity Description	
Lifecycle Activities		
Combat System Ship Qualification Trial (CSSQT) - In-Port Maintenance Period	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.	
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.	
Information Typical to the Event	**Platform:** Surface combatant, amphibious warfare ship **Systems:** All combat systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 3 weeks.	**Location:** Norfolk, Virginia Mayport, Florida
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF1) **Energy:** None **Physical Disturbance and Strike:** None **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Sonar would not be continuously active for the duration of the test.	

A.3.3.5 Combat System Ship Qualification Trial – Air Defense

Activity Name	Activity Description	
Lifecycle Activities		
Combat System Ship Qualification Trial (CSSQT) - Air Defense (AD)	Tests the ship's capability to detect, identify, track, and successfully engage live and simulated targets.	
Long Description	Air Defense events 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.	
Information Typical to the Event	**Platform:** Surface combatant, amphibious warfare ship **Systems:** All combat systems **Ordnance/Munitions**: Missiles (e.g., anti-air) (non-explosive and explosive), medium-caliber projectiles (non-explosive), large-caliber projectiles (non-explosive) **Targets:** Retrievable mobile targets (e.g., drones) **Duration:** Event duration is 1 week.	**Location:** VACAPES JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** In-air explosives, weapons firing noise, vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive practice munitions, munition fragments), aircraft strike (birds only), vessel strike **Entanglement:** None **Ingestion:** Chaff, target fragments, medium-caliber projectiles, end caps, pistons, casings	
Detailed Military Expended Material Information	• 2,000 medium-caliber projectiles/event non-explosive • 20 large-caliber projectiles/event non-explosive • Munition fragments • Target fragments • Chaff, end caps, pistons – 60 canisters per event • Targets	
Assumptions Used for Analysis		

A.3.3.6 Combat System Ship Qualification Trial – Surface Warfare

Activity Name	Activity Description	
Lifecycle Activities		
Combat System Ship Qualification Trial (CSSQT) - Surface Warfare (SUW)	Tests shipboard sensors capabilities to detect and track surface targets, relay the data to the gun weapon system, and engage targets.	
Long Description	Surface warfare events are gun weapons system tests conducted in a clear environment to demonstrate shipboard sensors capabilities to detect and track surface targets, relay the data to the gun weapon system, and engage targets. The event qualified 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 targets.	
Information Typical to the Event	**Platform:** Surface combatant, amphibious warfare ship **Systems:** Gun weapons system, missile systems **Ordnance/Munitions:** Large-caliber projectiles (e.g., 155 mm, 5 inch) (non-explosive and explosive), medium-caliber projectiles (non-explosive), missiles (non-explosive) **Targets:** Mobile surface targets (e.g., High-Speed Maneuvering Surface Target), towed surface targets (e.g., Low Cost Modular Target) **Duration:** Event duration is 1 week.	**Location:** VACAPES JAX Key West
Potential Impact Concerns *(Information regarding de-construct categories and stressors)*	**Acoustic:** In-air explosives, weapons firing noise, vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive practice munitions, projectile fragments), vessel strike, in-water device strike **Entanglement:** None **Ingestion:** Medium-caliber projectiles, fragments	
Detailed Military Expended Material Information	• 300 large-caliber gun rounds/event • 1 surface-to-surface missile/event • 2,000 medium-caliber rounds • Munition fragments	
Assumptions used for Analysis	Explosive large-caliber rounds are air-burst.	

A.3.3.7 Combat System Ship Qualification Trial – Undersea Warfare

Activity Name	Activity Description	
Lifecycle Activities		
Combat System Ship Qualification Trial (CSSQT) - Undersea Warfare (USW)	Tests ships ability to track and engage undersea targets.	
Long Description	Undersea Warfare events are comprised of a series of tracking and firing exercises. The events ensure the operability of the Undersea Warfare suite and its interface with the Light Airborne Multi-Purpose System helicopter. Approximately 1 week of in-port training precedes exercises on an instrumented underwater range, where ship's force becomes familiar with operation and maintenance of the Undersea Warfare system. Personnel then demonstrate the capability to establish the datalink between the helicopter and ship's Undersea Warfare system.	
Information Typical to the Event	**Platform:** Surface combatant, rotary-wing aircraft **Systems:** Surface ship sonars, underwater communication systems, sonobuoys **Ordnance/Munitions:** Non-explosive torpedoes **Targets:** Motorized autonomous targets (e.g., Expendable Mobile Anti-Submarine Warfare Training Target) **Duration:** Event duration is 1 week.	**Location:** JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF1, MF2), high-frequency sonar (e.g., HF4), helicopter-deployed dipping sonar (e.g., MF4), active sonobuoys (e.g., MF5), torpedo sonar (e.g., TORP1), vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike, aircraft strike (birds only) **Entanglement:** Parachutes **Ingestion:** Parachutes	
Detailed Military Expended Material Information	• Lightweight torpedo launch accessories (nose cap, suspension bands, air stabilizer, sway brace pad, arming wire, fahnstock clip, parachute) • Sonobuoys – 83 per event • Expendable targets	
Assumptions Used for Analysis	Five targets per event All sonobuoys have parachutes unless otherwise noted. Lightweight torpedoes only; no guidance wires Sonobuoys: 8 DICASS + 75 DIFAR/event	

A.3.4 NAVAL SEA SYSTEM COMMAND RANGE ACTIVITIES NAVAL SURFACE WARFARE CENTER PANAMA CITY DIVISION TESTING RANGE

A.3.4.1 Air Operations

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Air Operations	Various aircraft operations in support of other test activities.	
Long Description	Helicopters support the majority of testing activities at Naval Surface Warfare Center Panama City Division Testing Range. Aircraft ensure that test areas are clear of other air and surface vessels prior to testing and perform post-test surveys following the completion of a test event. Air operations also involve the towing, delivery, and recovery of real and mock operational systems such as mines, rockets, and mine countermeasure systems. Any active acoustic stressors will be analyzed under separate activities. Aircraft are also involved in high-explosive firing exercise, gun firing is included under a separate activity, projectile firing. Naval Surface Warfare Center Panama City Division Testing Range activities are identified as hours of operations per year rather than duration of each individual event.	
Information Typical to the Event	**Platform:** Fixed-wing aircraft, rotary-wing aircraft **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** 1,116 hours/year	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Aircraft noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.4.2 Surface Operations

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Surface Operations	Surface vessel operations for deployment and recovery of mine warfare systems and testing of communication and propulsion systems.	
Long Description	Surface vessels are often used to tow mine warfare systems for testing. Surface crafts are also used to deploy and recover mock mine warfare systems to assess the effectiveness of surface and airborne mine countermeasures systems and other test systems. Developmental and operational testing of communications and propulsion systems on surface vessels are also conducted within the Study Area. Naval Surface Warfare Center Panama City Division Testing Range activities are identified as hours of operations per year rather than duration of each individual event.	
Information Typical to the Event	**Platform:** Surface combatant, support craft/other **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** 7,443 hours/year	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.4.3 Subsurface Operations

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Subsurface Operations	Subsurface operations include testing of underwater vehicles, items placed on the ocean floor, and diving activities.	
Long Description	Subsurface operations include a variety of underwater vehicles, robotic or autonomous systems, and items placed on the sea floor. Diving activities and special operations activities also occur. Other subsurface operations 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. Naval Surface Warfare Center Panama City Division Testing Range activities are identified as hours of operations and items expended per year rather than duration of each individual event.	
Information Typical to the Event	**Platform:** Submarine, unmanned underwater vehicles, support craft/other **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** 1,620 hours/year	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike, seafloor device strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Items (e.g. non-explosive mines) placed on seafloor will be retrieved after a certain amount of time. 966 items per year	
Assumptions Used for Analysis		

A.3.4.4 Sonar Operations

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Sonar Operations	Sonar systems testing determines their capability to detect, localize, and characterize mine-like objects.	
Long Description	Sonar operations involve the testing of various sonar systems in the ocean and laboratory environment to analyze the systems' capability to detect, locate, and characterize mine-like objects under various environmental conditions. Testing activities include sonar operations in the mid- and high-frequency ranges. Low-frequency sonar is not proposed to be used during activities. Naval Surface Warfare Center Panama City Division Testing Range activities are identified as hours of operations per year rather than duration of each individual event.	
Information Typical to the Event	**Platform:** Surface combatant, support craft/other **Systems:** Mid frequency sonar, high-frequency sonar **Ordnance/Munitions:** None **Targets:** None **Duration:** 1,080 hours/year	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF1K, MF2K), high-frequency sonar (e.g., HF4, HF5, SAS2, M3), very high-frequency sonar (e.g., SAS3), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.4.5 Electromagnetic Operations

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Electromagnetic Operations	Electromagnetic operations test an array of magnetic sensors used in mine countermeasure operations.	
Long Description	Electromagnetic operations tests an array of magnetic sensors used in mine countermeasures operations. Aircraft and surface vessels deploy sensors in the territorial and non-territorial waters of the Study Area. Multiple sweeps are then conducted over specified test areas containing tethered and buried mock mines in an effort to demonstrate the systems' effectiveness to influence or trigger magnetic targets. Naval Surface Warfare Center Panama City Division Testing Range activities are identified as hours of operations per year rather than duration of each individual event.	
Information Typical to the Event	**Platform:** Surface combatant, support craft/other, aircraft **Systems:** Electromagnetic system (e.g., Organic Airborne and Surface Influence Sweeps) **Ordnance/Munitions**: None **Targets**: None **Duration:** 735 hours/year	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, aircraft noise **Energy:** Electromagnetic device **Physical Disturbance and Strike:** Vessel strike, in-water device strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.4.6 Laser Operations

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Laser Operations	Laser systems are tested to determine effectiveness as a tool to identify mine like objects.	
Long Description	Laser systems emit a narrow, high-frequency beam, and are often utilized to map underwater habitat and bottom contours. Testing is used to determine this technology's effectiveness as a tool to identify mine-like objects. Systems employed by the Navy include light imaging detection and ranging, laser line scan, and directional systems. These operations occur both below and above the water surface. Naval Surface Warfare Center Panama City Division Testing Range activities are identified as hours of operations per year rather than duration of each individual event.	
Information Typical to the Event	**Platform:** None **Systems:** Lasers (including light imaging detection and ranging, laser line scan, and directional systems) **Ordnance/Munitions**: None **Targets:** None **Duration:** 1,053 hours/year	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** None **Energy:** in-air low energy laser **Physical Disturbance and Strike:** None **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	The in-air low energy laser stressor was used in analysis of potential impacts on human resources.	

A.3.4.7 Ordnance Operations

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Ordnance Operations	Airborne, surface, organic (readily available units in place), and shallow water mine countermeasure systems testing using explosive ordnance.	
Long Description	High-explosive testing is necessary to analyze the effectiveness of naval airborne, surface, organic (readily available units in place), and shallow water mine countermeasure systems. Testing involving detonation of explosives is only conducted after a system has successfully completed non explosive testing and an adequate amount of data has been collected to support the decision for high-explosive testing. Depending on the test scenario, high-explosive testing may occur from the surf zone to the outer perimeter of the study area. Some testing activities may also require the use of line charges or projectile firing.	
Information Typical to the Event	**Platform:** Surface combatant, rotary-wing aircraft, support craft/other **Systems:** None **Ordnance/Munitions:** 51 detonations of 1-10 lb. net explosive weight Three detonations of 11-75 lb. net explosive weight 16 detonations of 76-600 lb. net explosive weight Three line charges **Targets:** None **Duration:** Event duration is 1 day.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives (e.g., E5, E14), vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, military expended materials strike (fragments), aircraft strike (birds only) **Entanglement:** None **Ingestion:** Fragments	
Detailed Military Expended Material Information	Fragments	
Assumptions Used for Analysis	73 items/year	

A.3.4.8 Projectile Firing

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Projectile Firing	Airborne and surface crews defend against surface targets with small, medium, and large-caliber guns.	
Long Description	Projectile firing includes small, medium, and large-caliber projectiles. Projectiles associated with these rounds are mainly armor-piercing projectiles. All projectile firing occurs over non-territorial waters.	
Information Typical to the Event	**Platform:** Surface combatant, support craft/other **Systems:** None **Ordnance/Munitions:** 6,000 small-caliber, 4,572 medium-caliber, and 300 large-caliber rounds (non-explosive) **Targets:** Non-explosive mines **Duration:** Event duration is 1 day.	**Location:** NSWC PCD (past 12 nm)
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Weapons firing noise, vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, military expended material strike (projectiles) **Entanglement:** None **Ingestion:** Small-caliber projectiles, medium-caliber projectiles, casing	
Detailed Military Expended Material Information	Small, medium, and large-caliber projectiles, casings	
Assumptions Used for Analysis	10,872 items/year All projectile firing takes place outside of territorial waters. 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 could use the same shapes without needing to redeploy.	

A.3.4.9 Unmanned Underwater Vehicle Demonstrations

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Unmanned Underwater Vehicle (UUV) Demonstration	Testing and demonstrations of multiple Unmanned Underwater Vehicles and associated acoustic, optical, and magnetic systems.	
Long Description	Includes tests and demonstrations of unmanned underwater vehicles in detecting and classifying mine-like or other buried objects. Vehicles would employ both passive and active acoustic systems. Many vehicles are employed over a 3-week event.	
Information Typical to the Event	**Platform:** Unmanned underwater vehicles, support craft/other **Systems:** Sonar systems (low, mid-, and high-frequency) **Ordnance/Munitions:** None **Targets:** Non-explosive mines and mine-like objects **Duration:** Event duration is 3 weeks.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF5), mid-frequency sonar (e.g., MF9), high-frequency sonar (e.g., HF5, HF6, HF7, FLS2, SAS2), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike, seafloor device strike (bottom crawling unmanned underwater vehicles) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Active acoustic use would not be continuous throughout the duration of the activity. Multiple vehicles operate simultaneously in one or multiple areas.	

A.3.4.10 Mine Detection and Classification Testing

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Mine Detection and Classification Testing	Air, surface, and subsurface vessels detect and classify 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 significant water depths, ranging from the surf zone to deep water. In order to develop better and safer methods of minesweeping, the Navy is currently testing new systems to detect, locate, and identify 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 is currently designed for operation from a manned helicopter; however, the next generation of such equipment is expected to operate from unmanned aerial systems.	
Information Typical to the Event	**Platform:** Rotary-wing aircraft, unmanned aerial system, support craft/other, unmanned underwater vehicles, submarines **Systems:** Mine detection and classification systems **Ordnance/Munitions:** None **Targets:** Floating, moored, or bottom mounted non-explosive mines or mine simulation systems. **Duration:** Event duration is up to 10 days, with up to 12 hours of sound-in-water activity each day.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF1K), high-frequency sonar (e.g., HF1, HF4, SAS2), vessel noise, aircraft noise **Energy:** in-air low energy laser **Physical Disturbance and Strike:** Vessel strike, in-water device strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used 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 could 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.	

A.3.4.11 Mine Countermeasure/Neutralization Testing

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Mine Countermeasure / Neutralization Testing	Air, surface, and subsurface vessels neutralize threat mines and mine-like objects.	
Long Description	Mine countermeasure/neutralization testing is required to ensure systems can effectively neutralize threat mines that would otherwise restrict passage through an area. Countermeasure systems are deployed from surface ships and helicopters to neutralize mines a number of ways: cutting mooring cables of buoyant mines, producing acoustic energy that fires acoustic-influence mines, producing electrical energy to replicate the magnetic signatures of surface ships in order to detonate threat mines, detonation of mines using remotely-operated vehicles such as the Archerfish Common Neutralizer, and using explosive charges or supercavitating projectiles to destroy threat mines.	
Information Typical to the Event	**Platform:** Rotary-wing aircraft, surface combatants, remotely operated vehicles **Systems:** Mid- and high-frequency sources, electrical energy generation, explosive neutralizers **Ordnance/Munitions:** Explosive charges or supercavitating projectiles (small and medium projectiles-non-explosive) **Targets:** Non-explosive mines **Duration:** Event duration ranges from 1 to 10 days, with intermittent use of countermeasure/neutralization systems during this period.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosion (e.g., E4), vessel noise, aircraft noise **Energy:** Electromagnetic systems **Physical Disturbance and Strike:** Aircraft strike (birds only), vessel strike, in-water device strike, military expended material strike **Entanglement:** None **Ingestion:** Fragments; small-caliber projectiles; medium-caliber projectiles	
Detailed Military Expended Material Information	Target fragments, charge fragments; small- and medium-caliber projectiles	
Assumptions Used for Analysis		

A.3.4.12 Stationary Source Testing

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Stationary Source Testing	Stationary equipment (including swimmer defense systems) is tested to determine functionality.	
Long Description	Stationary source 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, which are 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. In addition, swimmer defense testing includes testing of systems to determine if they can effectively detect, characterize, verify, and engage swimmer/diver threats in harbor environments. Swimmer and diver threats are detected with high-frequency sonars. The threats are then warned to exit the water through the use of underwater voice communications. If the threat does not comply, non-lethal diver deterrent air guns are used against the threat. Surface loudhailers are also used during the test.	
Information Typical to the Event	**Platform:** Support craft/other **Systems:** Acoustic countermeasures, high-frequency sonar, airguns, surface loudhailers **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration ranges from 20 minutes to multiple days. (stationary source testing) Event duration is 14 days, with intermittent periods of use for each system during this time. (swimmer defense)	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF4), mid-frequency sonar (e.g., MF8), high-frequency sonar (e.g., SD1), very high-frequency sonar (e.g., SD2), airgun (e.g., AG), vessel noise **Energy:** None **Physical Disturbance and Strike:** Seafloor device strike (swimmer defense tripod), vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Acoustics will not be used continuously throughout the event.	

A.3.4.13 Special Warfare Testing

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Special Warfare Testing	Special warfare includes testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances.	
Long Description	Special warfare includes testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances. Testing could include the use of special operations forces deployed from submerged submarines while at sea.	
Information Typical to the Event	**Platform:** Submarines **Systems:** Acoustic communications **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is up to 5 days with intermittent periods of active acoustics.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Acoustic communications (e.g. MF9) **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.4.14 Unmanned Underwater Vehicle Testing

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range(NSWC PCD)		
Unmanned Underwater Vehicle (UUV) Testing	Unmanned Underwater Vehicles are deployed to evaluate hydrodynamic parameters, to full mission, multiple vehicle functionality assessments.	
Long Description	Unmanned underwater vehicle testing ranges from simple, single-vehicle tests to evaluate hydrodynamic parameters, to full mission, multiple vehicle functionality assessments. Most Unmanned Underwater Vehicle operations include a launch, run, and recovery sequence of events. Unmanned Underwater Vehicles include modular, multi-mission platforms and anti-submarine warfare targets. Unmanned Underwater Vehicles may be launched from aircraft, surface craft, submarines, or land. Once launched, the vehicles are either towed or self-propelled to the test area. Unmanned Underwater Vehicles may also deploy and recover remote sensors and acoustically communicate with them.	
Information Typical to the Event	**Platform:** Unmanned underwater vehicle, support craft/other **Systems:** High-frequency sonar, very high-frequency sonar **Ordnance/Munitions:** None **Targets:** Bottom and moored non-explosive mines **Duration:** Event duration for unmanned underwater vehicles with traditional propulsion typically is up to 40 hours. Some propulsion systems (e.g., gliders) could operate continuously for multiple months.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF5), mid-frequency sonar (e.g., MF9), high-frequency sonar (e.g., HF5, HF6, HF7, FLS2, SAS2), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike, seafloor device strike (bottom-crawling unmanned underwater vehicles) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used 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 could use the same shapes without needing to redeploy.	

A.3.4.15 Ordnance Testing – Line Charge Testing

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Ordnance Testing – Line Charge Testing	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. Naval Surface Warfare Center Panama City Division Testing Range performs testing 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 107 m (350 ft.) detonation cord with explosives lined from one end to the other end in a series of 2 kg (5 lb.) increments.	
Information Typical to the Event	**Platform:** Support craft/other **Systems:** None **Ordnance/Munitions:** Line charges **Targets:** None **Duration:** Event duration is 1 day.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosion (e.g., E14), Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** Charge fragments	
Detailed Military Expended Material Information	Charge fragments	
Assumptions Used for Analysis		

A.3.4.16 Ordnance Testing – Gun Testing- Small-Caliber

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Ordnance Testing – Gun testing-Small-Caliber	Airborne and surface crews defend against surface targets with small-caliber guns	
Long Description	Small-caliber guns are fired from airborne and surface crews.	
Information Typical to the Event	**Platform:** Surface combatants, rotary-wing aircraft **Systems:** None **Ordnance/Munitions:** Small-caliber projectiles (non-explosive) **Targets:** None **Duration:** Event duration is 1 day.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended materials strike (non-explosive projectiles), vessel strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** Small-caliber projectiles, casings	
Detailed Military Expended Material Information	• Small-caliber projectiles, casings • 1,000 rounds per event	
Assumptions Used for Analysis	1,000 rounds per event	

A.3.4.17 Ordnance Testing – Gun Testing- Medium-Caliber

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Ordnance Testing – Gun testing-medium-caliber	Airborne and surface crews defend against surface targets with medium-caliber guns	
Long Description	Medium-caliber guns are fired from airborne and surface crews.	
Information Typical to the Event	**Platform:** Surface combatant, rotary-wing aircraft **Systems:** None **Ordnance/Munitions:** Medium-caliber projectiles (non-explosive) **Targets:** None **Duration:** Event duration is 1 day.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Weapons firing noise, vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, aircraft strike (birds only), military expended material strike (non-explosive projectiles) **Entanglement:** None **Ingestion:** Medium-caliber projectiles, casings	
Detailed Military Expended Material Information	• Medium-caliber projectiles, casings • 50 rounds per event	
Assumptions Used for Analysis	50 rounds per event	

A.3.4.18 Ordnance Testing – Gun Testing- Large-Caliber

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Ordnance Testing – Gun testing-large-caliber	Airborne and surface crews defend against surface targets with large-caliber guns	
Long Description	Large-caliber guns are fired from airborne and surface crews.	
Information Typical to the Event	**Platform:** Surface combatant, rotary-wing aircraft **Systems:** None **Ordnance/Munitions:** Large-caliber projectiles (explosive and non-explosive) **Targets:** None **Duration:** Event duration is 1 day.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Weapons firing noise, underwater explosives (e.g., E5), vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive projectiles), vessel strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** Fragments	
Detailed Military Expended Material Information	Large-caliber projectiles, casings, fragments	
Assumptions Used for Analysis	10 rounds per event.	

A.3.4.19 Countermeasure Testing – Acoustic Systems Testing

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Countermeasure Testing - Acoustic Systems Testing	Towed sonar arrays are employed to detect and neutralize incoming weapons.	
Long Description	Countermeasure testing involves the testing of systems that would detect, localize, and track incoming weapons. Countermeasure systems that could be tested include towed arrays (e.g., NIXIE). Event duration ranges from 4 hours to 10 days, depending on the countermeasure being tested. For example, NIXIE pierside testing occurs in 4 hours	
Information Typical to the Event	**Platform:** None **Systems:** Acoustic countermeasures **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration ranges from 4 hours to 10 days, depending on the countermeasure being tested.	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency sonar (e.g., HF5), acoustic countermeasure (e.g., ASW3) **Energy:** None **Physical Disturbance and Strike:** In-water device strike (towed device) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.4.20 Countermeasure Testing – Anti-Torpedo Torpedo Defense System Testing

Activity Name	Activity Description	
Naval Surface Warfare Center Panama City Division Testing Range (NSWC PCD)		
Countermeasure Testing - Anti-Torpedo Torpedo Defense System Testing	Anti-torpedo torpedo defense systems are employed to detect and neutralize incoming weapons.	
Long Description	Countermeasure testing involves the testing of systems that would detect, localize, and track incoming weapons. Countermeasure systems that could be tested include anti-torpedo torpedo defense systems.	
Information Typical to the Event	**Platform:** Surface combatant **Systems:** Countermeasure systems **Ordnance/Munitions:** Non-explosive torpedoes **Targets:** None **Duration:** Event duration ranges from 4 hours to 10 days, depending on the countermeasure being tested. For example, anti-torpedo torpedo defense systems event duration is 10 days with a maximum of 40 anti-torpedo torpedoes fired (up to 10 shots occurring per day).	**Location:** NSWC PCD
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency sonar (e.g., HF5), acoustic countermeasure (e.g., ASW3), torpedo sonar (TORP1), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike (torpedoes) **Entanglement:** Parachutes **Ingestion:** Parachutes	
Detailed Military Expended Material Information	Torpedo launch accessories (nose covers, parachutes, ram plates)	
Assumptions Used for Analysis	Torpedoes are recovered after use. Assume one parachute per torpedo	

A.3.5 NAVAL UNDERSEA WARFARE CENTER DIVISION, NEWPORT

A.3.5.1 Launcher Testing

Activity Name	Activity Description	
Naval Undersea Warfare Center Division, Newport Testing Range (NUWCDIVNPT)		
Launcher Testing	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, and unmanned underwater 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 recovered after the test and are usually equipped with an acoustic locator to aid in their recovery.	
Information Typical to the Event	**Platform:** Support craft/other, support craft/other-specialized high speed **Systems:** Launcher systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 12 hours with multiple launches conducted during this time.	**Location:** Narragansett Bay and surrounding waters NUWCDIVNPT
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Small metal or plastic items	
Assumptions Used for Analysis	Instrumented operational equipment or mock equipment used will be recovered.	

A.3.5.2 Torpedo Testing

Activity Name	Activity Description	
Naval Undersea Warfare Center Division, Newport Testing Range (NUWCDIVNPT)		
Torpedo Testing	Non-explosive torpedoes are launched to record operational data. All torpedoes are recovered.	
Long Description	Testing of torpedoes consists of a pre-test, launch, run, and recovery sequence of events in Narragansett Bay and surrounding waters. Test launches may be from a permanent launch platform, or from surface or underwater vehicles. After launch, the torpedo typically follows a pre-programmed scenario to reach points of specific depth and location, and data are recorded for post-run performance evaluation. Test torpedoes are outfitted with special transponders that can locate the units at the end of their runs. Occasionally, there may be a test that involves acoustics. Recovery operations are typically conducted from ships that are specifically crewed and outfitted for torpedo recovery.	
Information Typical to the Event	**Platform:** Surface combatant, support craft/other **Systems:** None **Ordnance/Munitions:** Torpedoes (non-explosive) **Targets:** None **Duration:** Event duration ranges from 1 to 12 hours.	**Location:** Narragansett Bay and surrounding waters Narragansett Bay and Rhode Island Sound Restricted Areas
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Torpedo sonar (e.g., TORP1, TORP2), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike (torpedo) **Entanglement:** Guidance wire **Ingestion:** None	
Detailed Military Expended Material Information	Heavyweight torpedo accessories (guidance wire, flex hose)	
Assumptions Used for Analysis	All torpedoes will be recovered. One torpedo per event	

A.3.5.3 Towed Equipment Testing

Activity Name	Activity Description	
Naval Undersea Warfare Center Division, Newport Testing Range (NUWCDIVNPT)		
Towed Equipment Testing	Surface vessel or unmanned surface vehicles deploys equipment to determine functionality of towed systems.	
Long Description	Testing is conducted on equipment to evaluate hydrodynamic characteristics and control of a tow body, to test fully functional items, or to 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. Equipment may be acoustically active or produce radio-frequency transmissions.	
Information Typical to the Event	**Platform:** Support craft/other, unmanned surface vehicle **Systems:** Towed device, low-, mid-, and high-frequency sonars **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration typically ranges from 2 to 8 hours.	**Location:** Narragansett Bay and surrounding waters NUWCDIVNPT
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF4), mid-frequency sonar (e.g., MF9), high-frequency sonar (e.g., SAS1), vessel noise **Energy:** None **Physical Disturbance and Strike:** In-water device strike (towed devices), vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.5.4 Unmanned Underwater Vehicle Testing

Activity Name	Activity Description	
Naval Undersea Warfare Center Division, Newport Testing Range (NUWCDIVNPT)		
Unmanned Underwater Vehicle (UUV) Testing	Unmanned Underwater Vehicles are deployed to evaluate hydrodynamic parameters, to full mission, multiple vehicle functionality assessments.	
Long Description	Unmanned underwater vehicle testing ranges from simple, single-vehicle tests to evaluate hydrodynamic parameters, to full mission, multiple vehicle functionality assessments. Most Unmanned Underwater Vehicle operations include a launch, run, and recovery sequence of events. Unmanned Underwater Vehicles include modular, multi-mission platforms and anti-submarine warfare targets. Unmanned Underwater Vehicles may be launched from aircraft, surface craft, submarines, or land. Once launched, the vehicles are either towed or self-propelled to the test area. Unmanned Underwater Vehicles may also deploy and recover remote sensors and acoustically communicate with them.	
Information Typical to the Event	**Platform:** Unmanned underwater vehicle, support craft/other **Systems:** Low-, mid-, and high- frequency sonars **Ordnance/Munitions:** None **Targets:** None **Duration:** For unmanned underwater vehicles with traditional propulsion duration is typically up to 40 hours. Some propulsion systems (e.g., gliders) could operate continuously for multiple months.	**Location:** Narragansett Bay and surrounding waters NUWCDIVNPT
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF5), high-frequency sonar (e.g., HF6, SAS2). mid-frequency sonar (e.g., MF7, MF10), vessel noise **Energy:** None **Physical Disturbance and Strike:** In-water device strike, vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.5.5 Unmanned Surface Vehicle Testing

Activity Name	Activity Description	
Naval Undersea Warfare Center Division, Newport Testing Range (NUWCDIVNPT)		
Unmanned Surface Vehicle (USV) Testing	Unmanned Surface Vehicles are deployed to verify the functionality of basic capabilities and complex tests that involve multiple participants and missions.	
Long Description	Unmanned Surface Vehicle testing includes simple tests to verify the functionality of basic capabilities and complex tests that involve multiple participants and missions. 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 (e.g., an autonomous kayak), and remote-controlled jet skis.	
Information Typical to the Event	**Platform:** Unmanned surface vehicle, support craft/other **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration ranges from 1 to 12 hours.	**Location:** Narragansett Bay and surrounding waters NUWCDIVNPT
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** In-water device strike, vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.5.6 Unmanned Aerial System Testing

Activity Name	Activity Description	
Naval Undersea Warfare Center Division, Newport Testing Range (NUWCDIVNPT)		
Unmanned Aerial System (UAS) Testing	Unmanned Aerial Systems are launched to test the capability to extend the communications range of unmanned underwater vehicles, unmanned surface vehicles, and submarines.	
Long Description	Unmanned Aerial System testing is a possibility for future testing operations. 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 communications range of unmanned underwater vehicles, unmanned surface vehicles, and submarines. To test unmanned aerial system launcher systems, a subsurface capsule release may be conducted within the Narragansett Bay restricted area. 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.	
Information Typical to the Event	**Platform:** Unmanned aerial system, support craft/other **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration ranges from 1 to 12 hours.	**Location:** NUWCDIVNPT
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Aircraft strike (birds only), vessel strike, in-water device strike (unmanned aerial system launch) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.5.7 Semi-Stationary Equipment Testing

Activity Name	Activity Description	
Naval Undersea Warfare Center Division, Newport Testing Range (NUWCDIVNPT)		
Semi-Stationary Equipment Testing	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, which are 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.	
Information Typical to the Event	**Platform:** Support craft/other **Systems:** Acoustic countermeasures **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration ranges from 20 minutes to multiple days.	**Location:** Narragansett Bay and surrounding waters NUWCDIVNPT
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF4, LF5), mid-frequency sonar (e.g., MF9, MF10), high-frequency sonar (e.g., HF5, HF6), countermeasures, vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.5.8 Unmanned Underwater Vehicles Demonstrations

Activity Name	Activity Description	
Naval Undersea Warfare Center Division, Newport Testing Range (NUWCDIVNPT)		
Unmanned Underwater Vehicle (UUV) Demonstrations	Testing and demonstrations of multiple Unmanned Underwater Vehicles and associated acoustic, optical, and magnetic systems.	
Long Description	Includes tests and demonstrations of autonomous vehicles in detecting and classifying mine-like or other buried objects. Vehicles would employ both passive and active acoustic systems. Many vehicles are employed over a two-week event.	
Information Typical to the Event	**Platform:** Unmanned underwater vehicles, support craft/other **Systems:** Unmanned underwater vehicle sonar systems **Ordnance/Munitions:** None **Targets:** Non-explosive mines and mine-like objects **Duration:** Event duration is 2 weeks.	**Location:** Narragansett Bay and surrounding waters NUWCDIVNPT
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF5), mid-frequency sonar (e.g., MF9), high-frequency sonar (e.g., HF5, HF6, HF7, FLS2, SAS2), vessel noise **Energy:** None **Physical Disturbance and Strike:** In-water device strike, vessel strike, seafloor device strike (bottom crawling unmanned underwater vehicles) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Active acoustic use would not be continuous throughout the duration of the activity. Multiple vehicles operate simultaneously in one or multiple areas. Mine shapes used as targets are in place from previous activities and are not deployed as part of this activity.	

A.3.5.9 Pierside Integrated Swimmer Defense

Activity Name	Activity Description	
Naval Undersea Warfare Center Division, Newport Testing Range (NUWCDIVNPT)		
Pierside Integrated Swimmer Defense Testing	Swimmer defense testing ensures that systems can effectively detect, characterize, verify, and defend against swimmer/diver threats in harbor environments.	
Long Description	Swimmer defense testing includes testing of systems to determine if they can effectively detect, characterize, verify, and engage swimmer/diver threats in harbor environments. Swimmer and diver threats are detected with high-frequency sonars. The threats are then warned to exit the water through the use of underwater voice communications. If the threat does not comply, non-lethal diver deterrent air guns are used against the threat. Surface loudhailers are also used during the test.	
Information Typical to the Event	**Platform:** Support craft/other **Systems:** High-frequency sonar, airguns, surface loudhailers **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 14 days.	**Location:** NUWCDIVNPT Pierside: Newport, Rhode Island
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF4), mid-frequency sonar (e.g., MF8), swimmer defense sonar (e.g., SD1), airgun (e.g., AG), vessel noise **Energy:** None **Physical Disturbance and Strike:** Seafloor device strike (swimmer defense tripod), vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.6 SOUTH FLORIDA OCEAN MANAGEMENT FACILITY

A.3.6.1 Signature Analysis Operations

Signature Analysis operations 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 detection of submarines, acoustic and magnetic signature detection of unmanned underwater vehicles and surface ships, radar, and optical detection of surface ships.

Activity Name	Activity Description	
South Florida Ocean Measurement Facility (SFOMF)		
Signature Analysis (SA) Activities	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 detection of submarines, acoustic and magnetic signature detection of unmanned underwater vehicles and surface ships, radar, and optical detection of surface ships.	
Information Typical to the Event	**Platform:** Surface combatant, amphibious warfare ship, submarines, unmanned underwater vehicles **Systems:** ship and submarine sonars, underwater communications, **Ordnance/Munitions:** None **Targets:** None **Duration:** Events occur periodically over multiple days.	**Location:** SFOMF
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF4), mid-frequency sonar (e.g., MF9), high-frequency sonar (e.g., HF1, HF6), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.6.2 Mine RDT&E Activities

Activity Name	Activity Description	
South Florida Ocean Measurement Facility (SFOMF)		
Mine Testing	Air, surface, and sub-surface systems detect, counter, and neutralize ocean-deployed mines.	
Long Description	Mine testing activities require the placement of underwater temporary minefields (non-explosive). Mine testing encompasses subsurface sensor installation and retrieval; bottom mounted sub-surface targets (mine-like objects and target shapes) and sensor deployment and recovery; and air, surface, and subsurface sensor (acoustic and magnetic) array calibration. Mine testing activities include air, surface, and sub-surface systems which are used to detect, counter, and neutralize ocean-deployed mines. Sensor and target deployment and recovery may be performed utilizing small, large, and autonomous surface vessels; sub-surface autonomous undersea vehicles, unmanned undersea vehicles, and submarines (self-propelled, towed, and autonomous); and aircraft.	
Information Typical to the Event	**Platform:** Unmanned surface vehicles, unmanned undersea vehicles, submarines, fixed-wing aircraft, surface combatants, support craft/other **Systems:** Mine countermeasure systems **Ordnance/Munitions:** None **Targets:** Floating/moored/bottom non-explosive mines or passive mine simulation systems **Duration:** Event duration is 5 days.	**Location:** SFOMF
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mine countermeasure systems (e.g., HF4), aircraft noise, vessel noise **Energy:** Electromagnetic **Physical Disturbance and Strike:** In-water device strike, aircraft strike (birds only), seafloor device strike (non-explosive mine shape), vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Placement of temporary minefields (these will be removed after the test is finished)	

A.3.6.3 Surface Testing Activities

Activity Name	Activity Description	
South Florida Ocean Measurement Facility (SFOMF)		
Surface Testing Activities	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.	
Information Typical to the Event	**Platform:** Unmanned surface vehicles, support craft/other **Systems:** Unmanned vehicle sonar systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 1 day to multiple months.	**Location:** SFOMF
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, low-frequency sonar (e.g., LF5), mid-frequency sonar (e.g., MF9), high-frequency sonar (e.g., FLS2, HF5, HF6, HF7, SAS2), **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.6.4 Subsurface Testing Activities

Activity Name	Activity Description	
South Florida Ocean Measurement Facility (SFOMF)		
Subsurface Testing Activities	Various underwater, bottom crawling, robotic, vehicles 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 sea floor. 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.	
Information Typical to the Event	**Platform:** Manned and unmanned underwater vehicles, support craft/other **Systems:** Unmanned vehicle sonar systems **Ordnance/Munitions:** None **Targets:** Mine shapes (non-explosive) **Duration:** Event duration is 1 day.	**Location:** SFOMF
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, low-frequency sonar (e.g., LF5), mid-frequency sonar (e.g., MF9), high-frequency sonar (e.g., FLS2, HF5, HF6, HF7, SAS2), **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike, seafloor device strike (non-explosive mine shapes) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used 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.	

A.3.6.5 Unmanned Underwater Vehicles Demonstrations

Activity Name	Activity Description	
South Florida Ocean Measurement Facility (SFOMF)		
Unmanned Underwater Vehicles (UUV) Demonstrations	Testing and demonstrations of multiple Unmanned Underwater Vehicles and associated acoustic, optical, and magnetic systems.	
Long Description	Includes tests and demonstrations of unmanned vehicles in detecting and classifying mine-like or other buried objects. Vehicles would employ both passive and active acoustic systems. Many vehicles are employed over a two-week event.	
Information Typical to the Event	**Platform:** Unmanned underwater vehicles, support craft/other **Systems:** Unmanned underwater vehicle sonar systems **Ordnance/Munitions:** None **Targets:** Non-explosive mines and mine-like objects **Duration:** Event duration is two weeks.	**Location:** SFOMF
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF5), mid-frequency sonar (e.g., MF9), high-frequency sonar (e.g., HF5, HF6, HF7, FLS2, SAS2), vessel noise **Energy:** None **Physical Disturbance and Strike:** In-water device strike, vessel strike, seafloor device strike (non-explosive mine shapes, bottom crawling unmanned underwater vehicles) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Use of active acoustics would not be continuous throughout the duration of the activity. Multiple vehicles operate simultaneously in one or multiple areas.	

A.3.7 ADDITIONAL ACTIVITIES AT LOCATIONS OUTSIDE OF NAVAL SEA SYSTEMS COMMAND RANGES – ANTI-SURFACE WARFARE / ANTI-SUBMARINE WARFARE TESTING

A.3.7.1 Missile Testing

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW) / Anti-Submarine Warfare (ASW) Testing		
Missile Testing	Missile testing includes various missiles fired from submarines and surface combatants.	
Long Description	Missile testing includes various missiles (e.g., standard missiles, Water Piercing Missile Launch) fired from submarines and surface combatants.	
Information Typical to the Event	**Platform:** Surface combatant, submarines **Systems:** None **Ordnance/Munitions:** Missiles (e.g. anti-surface, strike) - (non-explosive) **Targets:** Unmanned surface vehicles, drones **Duration:** Event duration is 1 to 2 hours.	**Location:** VACAPES AFTT Study Area
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Weapons firing noise, vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive practice munitions), vessel strike, in-water device strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	One surface-to-surface missile/event	
Assumptions Used for Analysis	All targets will be recovered.	

A.3.7.2 Kinetic Energy Weapon Testing

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW) / Anti-Submarine Warfare (ASW) Testing		
Kinetic Energy Weapon Testing	A kinetic energy weapon uses stored energy released in a burst to accelerate a non-explosive projectile.	
Long Description	A kinetic energy weapon uses stored energy released in a burst to accelerate a non-explosive projectile to more than seven times the speed of sound to a range of up to 200 miles.	
Information Typical to the Event	**Platform:** Surface Combatant **Systems:** Kinetic energy weapon **Ordnance/Munitions:** Large-caliber projectile (non-explosive) **Targets:** Recoverable or expendable floating target **Duration:** Event duration is 1 day.	**Location:** VACAPES AFTT Study Area
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Weapons firing noise, vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive projectile), vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	• 40 large-caliber projectile per event • One event with 5,000 large-caliber projectiles • Expendable target – 1 target per event	
Assumptions Used for Analysis	Assume one target per event One event with 5,000 projectiles would occur only once before 2019.	

A.3.7.3 Electronic Warfare Testing

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW) / Anti-Submarine Warfare (ASW) Testing		
Electronic Warfare Testing	Testing will include radiation of military and commercial radar and communication systems (or simulators).	
Long Description	Testing will include radiation of military and commercial radar and communication systems (or simulators). No subsurface transmission would occur during this testing.	
Information Typical to the Event	**Platform:** Submarines **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 3 hours per day over a 7 day period.	**Location:** Norfolk, Virginia Groton, Connecticut Northeast
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** None **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.7.4 Torpedo (Non-Explosive) Testing

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW) / Anti-Submarine Warfare (ASW) Testing		
Torpedo (Non-explosive) Testing	Air, surface, or submarine crews employ non explosive torpedoes against submarines or surface vessels.	
Long Description	Aerial, surface, and subsurface assets fire exercise torpedoes against surface or subsurface targets. Torpedo testing evaluates the performance and the effectiveness of hardware and software upgrades of heavyweight or lightweight torpedoes. Event duration is dependent on number of torpedoes fired. Events can last up to 2 weeks and use 40 torpedoes. Typically, no more than eight torpedoes are fired per day during daylight hours.	
Information Typical to the Event	**Platform:** Submarines, surface combatant, fixed-wing aircraft, rotary-wing aircraft, support craft/other **Systems:** Surface ship and submarine sonars, sonobuoys, dipping sonars **Ordnance/Munitions:** Lightweight torpedoes, heavyweight torpedoes **Targets:** Submarines, surface ships, motorized autonomous targets (e.g., Expendable Mobile Anti-Submarine Warfare Training Target), stationary artificial targets (e.g., Fleet Training Target) **Duration:** Event duration is up to 2 weeks.	**Location:** Northeast VACAPES Navy Cherry Point JAX Gulf of Mexico** Boston Area Complex: Cape Code TORPEX boxes
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency sonar (e.g., HF1), mid-frequency sonar (e.g., MF1, MF3), helicopter-deployed sonar (e.g., MF4), active sonobuoy (e.g., MF5), torpedo sonar (e.g., TORP1, TORP2), acoustic countermeasure (e.g., ASW3, ASW4), vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike, aircraft strike (birds only) **Entanglement:** Parachutes (sonobuoy and torpedo), guidance wire **Ingestion:** Parachutes (sonobuoy and torpedo), torpedo launch accessories	

Detailed Military Expended Material Information	• Sonobuoys – 384 sonobuoys per year
	• Expendable targets – one target per event
	• Acoustic countermeasures – 356 countermeasures per year
	• Torpedo launch accessories
	  ◦ Lightweight torpedo launch accessories – 136 torpedoes per year (Alternative 2)
	  ○ Nose cap, suspension bands, air stabilizer, sway brace pad, arming wire, fahnstock clip, wing kit, rocket booster, parachute, lead weights
	  ○ Expended material is dependent upon torpedo fired and firing platform.
	  ◦ Heavyweight torpedo launch accessories – 492 torpedoes per year (Alternative 2)
	  ○ Guidance wire, flex hose	

Assumptions Used for Analysis	**Gulf of Mexico refers to the body of water. All torpedoes are recovered. Assume all lightweight torpedo launch accessories have all listed material All sonobuoys have a parachute unless otherwise noted.	

A.3.7.5 Torpedo (Explosive) Testing

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW) / Anti-Submarine Warfare (ASW) Testing		
Torpedo (Explosive) Testing	Air, surface, or submarine crews employ explosive torpedoes against artificial targets.	
Long Description	Non-explosive and explosive torpedoes (carrying a warhead) would be launched at a suspended target by a submarine and fixed- or rotary-winged aircraft or surface combatants. Torpedoes would detonate on an artificial target located at a depth between 200 and 700 ft. below the water's surface. Event duration is 1 to 2 days during daylight hours. Only one heavyweight torpedo test could occur in one day; two heavyweight torpedo tests could occur on consecutive days. Two lightweight torpedo tests could occur in a single day.	
Information Typical to the Event	**Platform:** Submarine, surface combatant, fixed-wing aircraft, rotary-wing aircraft, support craft/other **Systems:** None **Ordnance/Munitions:** Torpedoes (heavyweight and lightweight) (explosive and non-explosive) **Targets:** Stationary artificial targets (e.g., MK 28) **Duration:** Event duration is 1 to 2 days during daylight hours.	**Location*:** Other AFTT Areas: SINKEX box AFTT Study Area
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosion (e.g., E8, E11), torpedo sonar (TORP1, TORP2), vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike, aircraft strike (birds only) **Entanglement:** Parachutes (sonobuoy and torpedo), guidance wire **Ingestion:** Target and torpedo fragments, parachutes (sonobuoy and torpedo	

Detailed Military Expended Material Information	• Eight high-explosive torpedoes per year
	• Torpedo launch accessories
	  ◦ Lightweight torpedo launch accessories – 12 torpedoes per year (Alternatives 1 and 2)
	  ◦ Nose cap, suspension bands, air stabilizer, sway brace pad, arming wire, fahnstock clip, wing kit, rocket booster, parachute, lead weights
	  ◦ Expended material is dependent upon torpedo fired and firing platform.
	  ◦ Heavyweight torpedo launch accessories – 16 torpedoes per year (Alternatives 1 and 2)
	  ◦ Guidance wire, flex hose	

Assumptions Used for Analysis	*The specific areas are where activities typically occur. They can occur throughout the full area listed in Table 2.8-3 of Chapter 2 (Description of Proposed Action and Alternatives). All sonobuoys have parachutes unless otherwise noted. 210 passive sonobuoys per event	

A.3.7.6 Countermeasure Testing – Acoustic System Testing

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW) / Anti-Submarine Warfare (ASW) Testing		
Countermeasure Testing – Acoustic System Testing	Towed arrays are employed to detect, localize, and track in coming weapons	
Long Description	Countermeasure testing involves the testing of systems that would detect, localize, and track incoming weapons. Acoustic system testing includes towed arrays (e.g., NIXIE).	
Information Typical to the Event	**Platform:** Surface combatant, aircraft carrier **Systems:** Countermeasure systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Approximately four hours	**Location:** Norfolk, Virginia Mayport, Florida AFTT Study Area Northeast Navy Cherry Point
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF1), high-frequency sonar (e.g., HF5), acoustic countermeasure (e.g., ASW3), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike (towed devices) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.7.7 Countermeasure Testing – Anti-Torpedo Torpedo Defense System Testing

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW) / Anti-Submarine Warfare (ASW) Testing		
Countermeasure Testing – Anti-Torpedo Defense System Testing	Torpedoes are launched from surface ships to localize and attack incoming weapons.	
Long Description	Countermeasure testing involves the testing of systems that would detect, localize, and track incoming weapons. Anti-torpedo torpedo defense systems testing involves the launch of non-explosive torpedoes at incoming weapons. Event duration is up to 10 days with a maximum of 40 anti-torpedo torpedoes fired (up to 10 shots occurring per day).	
Information Typical to the Event	**Platform:** Surface combatant **Systems:** Countermeasure systems **Ordnance/Munitions:** Lightweight torpedoes (non-explosive) **Targets:** None **Duration:** Event duration is up to 10 days.	**Location:** Boston Area Complex: Cape Cod TORPEX boxes Northeast
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF1), high-frequency sonar (e.g., HF5), acoustic countermeasure (ASW3), torpedo sonar (e.g., TORP1), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike **Entanglement:** Parachute (torpedo) **Ingestion:** Parachutes	
Detailed Military Expended Material Information	Lightweight torpedo launch accessories (nose covers, parachutes, ram plates)	
Assumptions Used for Analysis		

A.3.7.8 Pierside Sonar Testing

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW) / Anti-Submarine Warfare (ASW) Testing		
Pierside Sonar Testing	Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities.	
Long Description	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 events. Event duration is 2 weeks with active sonar used intermittently over 2 days during the total event duration.	
Information Typical to the Event	**Platform:** Submarine **Systems:** Mid- and high-frequency sonars, underwater communications systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 2 weeks.	**Location:** Portsmouth, New Hampshire Groton, Connecticut Norfolk, Virginia Kings Bay, Georgia Port Canaveral, Florida
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF3), high-frequency sonar (e.g., HF1, HF3) **Energy:** None **Physical Disturbance and Strike:** None **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Event duration is 2 weeks with active sonar used intermittently over 2 days during the total event duration.	

A.3.7.9 At-Sea Sonar Testing

Activity Name	Activity Description	
Anti-Surface Warfare (ASUW) / Anti-Submarine Warfare (ASW) Testing		
At-sea Sonar Testing	At-sea testing to ensure systems are fully functional in an open ocean environment.	
Long Description	At-sea sonar testing is required to calibrate sonar systems while the ship or submarine is in an open ocean environment. Tests 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.	
Information Typical to the Event	**Platform:** Surface combatant, submarine **Systems:** Tactical sonar **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is from 4 hours to 11 days,	**Location:** VACAPES Northeast JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF3), high-frequency sonar (e.g., HF1), acoustic countermeasure (e.g., ASW4), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, military expended material strike (acoustic countermeasures) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	Acoustic countermeasures – 10 per event	
Assumptions Used for Analysis	Active sonar use is intermittent throughout the duration of the event.	

A.3.8 MINE WARFARE TESTING

A.3.8.1 Mine Detection and Classification Testing

Activity Name	Activity Description	
Mine Warfare (MIW) Testing		
Mine Detection and Classification	Air, surface, and subsurface vessels detect and classify 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 capable of sweeping a wide range of threat mines at tactically significant water depths, ranging from the surf zone to deep water. In order to develop better and safer methods of minesweeping, the Navy is currently testing new systems to detect, locate, and identify 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 is currently designed for operation from a manned helicopter; however, the next generation of such equipment is expected to operate from unmanned aerial systems.	
Information Typical to the Event	**Platform:** Rotary-wing aircraft, unmanned aerial systems, surface combatant, amphibious warfare ship, remotely operated vehicles **Systems:** Mine detection and classification systems **Ordnance/Munitions:** None **Targets:** Floating/moored/bottom non-explosive mines or passive mine simulation systems **Duration:** Event duration is up to 10 days.	**Location:** VACAPES
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency sonar (e.g., HF4), vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Laser systems also used during testing	

A.3.8.2 Mine Countermeasure/Neutralization Testing

Activity Name	Activity Description	
Mine Warfare (MIW) Testing		
Mine Countermeasure / Neutralization Testing	Air, surface, and subsurface vessels neutralize threat mines that would otherwise restrict passage through an area.	
Long Description	Mine countermeasure/neutralization testing is required to ensure systems can effectively neutralize threat mines that would otherwise restrict passage through an area. Countermeasure systems are deployed from surface ships and helicopters to neutralize mines a number of ways: cutting mooring cables of buoyant mines, producing medium- to high-frequency acoustic energy that fires acoustic-influence mines, producing electrical energy to replicate the magnetic signatures of surface ships in order to detonate threat mines, detonation of mines using remotely-operated vehicles such as the Archerfish Common Neutralizer, and using explosive charges or supercavitating projectiles to destroy threat mines.	
Information Typical to the Event	**Platform:** Surface combatant, amphibious warfare ship, rotary-wing aircraft, remotely operated vehicles **Systems:** Mine neutralization systems **Ordnance/Munitions:** Explosive mines **Targets:** Floating/moored/bottom non-explosive and explosive mines and mine simulation systems, high-explosive mines **Duration:** Event duration is 1 to 10 days.	**Location:** VACAPES Gulf of Mexico**
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency sonar (e.g., HF4), underwater explosives (e.g., E4, E8), vessel noise, aircraft noise **Energy:** Electromagnetic minesweeping systems **Physical Disturbance and Strike:** Vessel strike, in-water device strike, aircraft strike (birds only) **Entanglement:** Fiber-optic cable **Ingestion:** Target fragments	
Detailed Military Expended Material Information	Target fragments, fiber-optic cable	
Assumptions Used for Analysis	**Gulf of Mexico refers to the body of water. **Other Sensors:** Mine countermeasures systems (e.g., AN/AWS-2 Rapid Airborne Mine Clearance System, AN/ALQ-220 Organic Airborne and Surface Influence Sweep)	

A.3.9 SHIPBOARD PROTECTION SYSTEMS AND SWIMMER DEFENSE TESTING

A.3.9.1 Pierside Integrated Swimmer Defense

Activity Name	Activity Description	
Shipboard Protection Systems and Swimmer Defense Testing		
Pierside Integrated Swimmer Defense	Swimmer defense testing ensures that systems can effectively detect, characterize, verify, and engage swimmer/diver threats in harbor environments.	
Long Description	Swimmer defense testing includes testing of systems to determine if they can effectively detect, characterize, verify, and engage swimmer/diver threats in harbor environments. Swimmer and diver threats are detected with high-frequency sonars. The threats are then warned to exit the water through the use of underwater voice communications. If the threat does not comply, non-lethal diver deterrent air guns are used against the threat. Surface loudhailers are also used during the test.	
Information Typical to the Event	**Platform:** Support craft/other **Systems:** High-frequency sonar, airguns, surface loudhailers **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 14 days.	**Location:** Joint Expeditionary Base Little Creek, Norfolk, Virginia
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Low-frequency sonar (e.g., LF4), mid-frequency sonar (e.g., MF8), swimmer defense sonar (e.g., SD1), airgun (e.g., AG), vessel noise **Energy:** None **Physical Disturbance and Strike:** Seafloor device strike (swimmer defense tripod), vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.9.2 Shipboard Protection Systems Testing

Activity Name	Activity Description	
Shipboard Protection Systems and Swimmer Defense Testing		
Shipboard Protection Systems Testing	Various systems are used to protect surface combatants from various threats.	
Long Description	Surface ships engage small boat threats through the use of spotlights and loudhailers (pierside) but can also include the use of .50 caliber guns (at-sea).	
Information Typical to the Event	**Platform:** Surface combatant **Systems:** None **Ordnance/Munitions:** Small-caliber projectiles (e.g., .50 caliber) (non-explosive) **Targets:** Floating target, rigid-hull inflatable boat **Duration:** Event duration is 10 days.	**Location:** VACAPES Norfolk, Virginia
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Military expended material strike (non-explosive projectiles), vessel strike **Entanglement:** None **Ingestion:** Small-caliber projectiles, casings	
Detailed Military Expended Material Information	• Casings, projectiles • Target fragments	
Assumptions Used for Analysis		

A.3.9.3 Chemical/Biological Simulant Testing

Activity Name	Activity Description	
Shipboard Protection Systems and Swimmer Defense Testing		
Chemical/Biological Simulant Testing	Chemical/biological agent simulants are deployed against surface ships.	
Long Description	Chemical or biological agent simulants are deployed against surface ships to verify the integrity of the ship's defense system including installed detection, protection, and decontamination systems. Methods of simulant delivery include aerial dispersal and hand-held spray.	
Information Typical to the Event	**Platform:** Surface combatant, fixed-wing aircraft **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 3 days.	**Location:** VACAPES Northeast
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise, aircraft noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike, aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Examples of chemical simulants: glacial acetic acid, triethyl phosphate	

A.3.10 UNMANNED VEHICLE TESTING

A.3.10.1 Underwater Deployed Unmanned Aerial System Testing

Activity Name	Activity Description	
Unmanned Vehicle Testing		
Underwater Deployed Unmanned Aerial System Testing	Submarines launch unmanned aerial systems while submerged.	
Long Description	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.	
Information Typical to the Event	**Platform:** Submarine **Systems:** Unmanned aerial systems **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 8 hours (4 hours/day over 2 days).	**Location:** VACAPES Northeast
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** None **Energy:** None **Physical Disturbance and Strike:** Vessel strike, in-water device strike (unmanned aerial system launch), aircraft strike (birds only) **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	• Expandable capsule (with flotation collar) • Ballast weights	
Assumptions Used for Analysis		

A.3.10.2 Unmanned Vehicle Development and Payload Testing

Activity Name	Activity Description	
Unmanned Vehicle Testing		
Unmanned Vehicle Development and Payload Testing	Vehicle development involves the production and upgrade of new unmanned platforms on which to attach various payloads used for different purposes.	
Long Description	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, and other missions. Tests 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, surface vessels, and terrestrial commands Event duration for unmanned vehicles with traditional propulsion typically lasts up to 40 hours. Some propulsion systems (e.g., gliders) could operate continuously for multiple months.	
Information Typical to the Event	**Platform:** Unmanned vehicles (underwater, surface, and aerial), support craft/other **Systems:** Unmanned vehicle sonars **Ordnance/Munitions:** None **Targets:** None **Duration:** Events typically last up to 40 hours, although some could operate continuously for multiple months.	**Location:** Northeast VACAPES Navy Cherry Point JAX Gulf of Mexico**
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Mid-frequency sonar (e.g., MF9), high-frequency sonar (e.g., SAS2), vessel noise **Energy:** None **Physical Disturbance and Strike:** In-water device strike, seafloor device (bottom crawling vehicles), vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	** Gulf of Mexico refers to the body of water.	

A.3.11 OTHER TESTING

A.3.11.1 Special Warfare

Activity Name	Activity Description	
Other Testing		
Special Warfare	Special warfare includes testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances.	
Long Description	Special warfare includes testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances. Testing could include the use of special operations forces deployed from submerged submarines while at sea.	
Information Typical to the Event	**Platform:** Surface craft/other, submarines **Systems:** Submarine sonars, Doppler sonar, underwater communications **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is up to 30 days.	**Location:** Key West
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** High-frequency sonar (e.g., HF1), underwater communications (e.g., MF9), vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis	Test will not occur constantly throughout duration	

A.3.11.2 Radio Frequency Communications Testing

Activity Name	Activity Description	
Other Testing		
Radio Frequency Communications Testing	Testing of towed or floating buoys for communications through radio-frequencies.	
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. Communication would occur from sea to shore or shore to sea.	
Information Typical to the Event	**Platform:** Surface combatant, submarines, support craft/other **Systems:** Towed antennas, single-transmit buoy **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 3 days (4 hours/day for 3 days).	**Location:** Northeast
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Vessel noise **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.11.3 Hydrodynamic Testing

Activity Name	Activity Description	
Other Testing		
Hydrodynamic Testing	Submarines maneuver in the submerged operating environment.	
Long Description	Hydrodynamic testing is required to validate the control and maneuverability of a submarine in the submerged operating environment.	
Information Typical to the Event	**Platform:** Submarine **Systems:** None **Ordnance/Munitions:** None **Targets:** None **Duration:** Event duration is 10 days.	**Location:** AFTT Study Area
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** None **Energy:** None **Physical Disturbance and Strike:** Vessel strike **Entanglement:** None **Ingestion:** None	
Detailed Military Expended Material Information	None	
Assumptions Used for Analysis		

A.3.11.4 At-Sea Explosives Testing

Activity Name	Activity Description	
Other Testing		
At-Sea Explosives Testing	Explosives are detonated at sea.	
Long Description	Explosives of various weights could be tested to determine the feasibility of use for different events. Up to 10 charges per event (up to 100 lb. net explosive weight) could be detonated to determine the shock/pressure generated, which could be used for various scenarios at sea.	
Information Typical to the Event	**Platform:** None **Systems:** None **Ordnance/Munitions:** Subscale charges **Targets:** None **Duration:** Event duration is 3 days, with multiple detonations per event.	**Location:** Gulf of Mexico** JAX
Potential Impact Concerns *(Information regarding deconstruct categories and stressors)*	**Acoustic:** Underwater explosives (e.g., E5) **Energy:** None **Physical Disturbance and Strike:** None **Entanglement:** None **Ingestion:** Fragments	
Detailed Military Expended Material Information	Charge fragments	
Assumptions Used for Analysis	**Gulf of Mexico refers to the body of water.	

This Page Intentionally Left Blank

APPENDIX B

NOTICE OF INTENT

This Page Intentionally Left Blank

Federal Register / Vol. 75, No. 135 / Thursday, July 15, 2010 / Notices 41163

92132, or Meghan Byrne, Naval Facilities Engineering Command, Pacific. Attention: HSTT EIS/OEIS, 258 Makalapa Dr, Ste 100, Building 258, Floor 3, Room 258C210, Pearl Harbor, HI 96860–3134.

SUPPLEMENTARY INFORMATION: The DON's proposed action is to conduct training and testing activities that include the use of active sonar and explosives within the at-sea portions of existing DON training range complexes around the Hawaiian Islands and off the coast of Southern California (known as the HSTT study area). While the majority of these training and testing activities take place in operating and warning areas and/or on training and testing ranges, some training activities, such as sonar maintenance and gunnery exercises, are conducted concurrent with normal transits and may occur outside of DON operating and warning areas.

The HSTT study area combines the at-sea portions of the following range complexes: Hawaii Range Complex, Southern California Range Complex, and Silver Strand Training Complex. The existing western boundary of the Hawaii Range Complex is being expanded 60 miles to the west to the International Dateline. The HSTT study area also includes the transit route between Hawaii and Southern California as well as DON and commercial piers at Pearl Harbor, HI and San Diego, CA where sonar may be tested.

The proposed action is to conduct military training and testing activities in the HSTT study area. The purpose of the proposed action is to achieve and maintain Fleet Readiness to meet the requirements of Title 10 of the U.S. Code, which requires DON to "maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas." The proposed action would also allow DON to attain compliance with applicable environmental authorizations, consultations, and other associated environmental requirements, including those associated with new platforms and weapons systems, for example, the Low Frequency Anti-Submarine Warfare capability associated with the Littoral Combat Ship.

The alternatives that will be analyzed in the HSTT EIS and OEIS meet the purpose and need of the proposed action by providing the level of training that meets the requirements of Title 10, thereby ensuring that Sailors and Marines are properly prepared for operational success. Similarly, the level of RDT&E proposed for the HSTT study area is necessary to ensure that Sailors and Marines deployed overseas have the latest proven military equipment. Accordingly, the alternatives to be addressed in the HSTT EIS and OEIS are:

1. No Action—The No Action Alternative continues baseline training and testing activities and force structure requirements as defined by existing DON environmental planning documents. This documentation includes the Records of Decision for the Hawaii and Southern California range complexes and the Preferred Alternative for the Silver Strand Training Complex Draft EIS and OEIS.

2. Alternative 1—This alternative consists of the No Action alternative, plus expansion of the overall study area boundaries, and updates and/or adjustments to locations and tempo of training and testing activities. This alternative also includes changes to training and testing requirements necessary to accommodate force structure changes, and the development and introduction of new vessels, aircraft, and weapons systems.

3. Alternative 2—Alternative 2 consists of Alternative 1 with an increased tempo of training and testing activities. This alternative also allows for additional range enhancements and infrastructure requirements.

Resource areas that will be addressed because of the potential effects from the proposed action include, but are not limited to: Ocean and biological resources (including marine mammals and threatened and endangered species); air quality; airborne soundscape; cultural resources; transportation; regional economy; recreation; and public health and safety.

The scoping process will be used to identify community concerns and local issues to be addressed in the EIS and OEIS. Federal agencies, state agencies, local agencies, Native American Indian Tribes and Nations, the public, and interested persons are encouraged to provide comments to the DON to identify specific issues or topics of environmental concern that the commenter believes the DON should consider. All comments provided orally or in writing at the scoping meetings, will receive the same consideration during EIS and OEIS preparation. Written comments must be postmarked no later than September 14, 2010, and should be mailed to: Naval Facilities Engineering Command, Southwest, 2730 McKean Street, Building 291, San Diego, CA 92136–5198, Attention: Mr. Kent Randall—HSTT EIS/OEIS.

Dated: July 9, 2010.

D.J. Werner

Lieutenant Commander, Office of the Judge Advocate General, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. 2010–17234 Filed 7–14–10; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare an Environmental Impact Statement and Overseas Environmental Impact Statement for Navy Atlantic Fleet Training and Testing and To Announce Public Scoping Meetings

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to section 102 of the National Environmental Policy Act (NEPA) of 1969, as implemented by the Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508), and Executive Order 12114, the Department of the Navy (DON) announces its intent to prepare an Environmental Impact Statement (EIS) and Overseas EIS (OEIS) to evaluate the potential environmental effects associated with military readiness training and research, development, testing, and evaluation (RDT&E) activities (hereinafter referred to as "training and testing" activities) conducted within the Atlantic Fleet Training and Testing (AFTT) study area. The AFTT study area includes the western North Atlantic Ocean along the east coast of North America (including the area where the Undersea Warfare Training Range will be used), the Chesapeake Bay, and the Gulf of Mexico. Also included are select Navy pierside locations and channels. The AFTT study area does not include the Arctic. This EIS and OEIS is being prepared to renew and combine current regulatory permits and authorizations; address current training and testing not covered under existing permits and authorizations; and to obtain those permits and authorizations necessary to support force structure changes and emerging and future training and testing requirements.

The DON will invite the National Marine Fisheries Service to be a cooperating agency in preparation of this EIS and OEIS.

DATES AND ADDRESSES: Five public scoping meetings will be held between 4 p.m. and 8 p.m. on the following dates and at the following locations:

1. Monday, August 23, 2010, Hynes Convention Center, 900 Boylston Street, Boston, MA.

2. Wednesday, August 25, 2010, Virginia Beach Convention Center, 1000 19th Street, Virginia Beach, VA.

3. Thursday, August 26, 2010, Crystal Coast Civic Center, 3505 Arendell Street, Morehead City, NC.

4. Tuesday, August 31, 2010, Prime F. Osborn III Convention Center, 1000 Water Street, Jacksonville, FL.

5. Wednesday, September 1, 2010, Gulf Coast Community College, 5230 West Highway 98, Panama City, FL.

Each of the five scoping meetings will consist of an informal, open house session with informational stations staffed by DON representatives. Meeting details will be announced in local newspapers. Additional information concerning meeting times is available on the EIS and OEIS Web page located at: *http://www.AFTTEIS.com.*

FOR FURTHER INFORMATION CONTACT: Naval Facilities Engineering Command, Code EV22LL (AFTT EIS/OEIS Project Manager), 6506 Hampton Boulevard, Norfolk, VA 23508–1278, telephone number 757–322–4645.

SUPPLEMENTARY INFORMATION: The DON's proposed action is to conduct training and testing activities that include the use of active sonar and explosives within the at-sea portions of existing range complexes and on RDT&E ranges within the AFTT study area (including the area where the Undersea Warfare Training Range will be used). The boundary of the AFTT study area begins seaward from the mean high water line and moves east to the 45 degree west longitude line, generally following the 2nd Fleet area of responsibility (except for the Arctic). The AFTT study area covers approximately 2.6 million square nautical miles of ocean area, which includes Navy operating areas (sea space) and warning areas (airspace). While the majority of Navy training and many testing activities take place within operating and warning areas and/or on RDT&E ranges, some activities, such as sonar maintenance and gunnery exercises, are conducted concurrent with normal transits and occur outside of operating and warning areas.

The following DON training range complexes fall within the AFTT study area: Northeast Range Complex, Virginia Capes (VACAPES) Range Complex, Navy Cherry Point Range Complex, Jacksonville Range Complex, Key West Range Complex, and Gulf of Mexico (GOMEX) Range Complex. The DON RDT&E ranges in the AFTT study area include: Naval Undersea Warfare Center Newport, Newport, RI; Naval Surface Warfare Center (NSWC) Panama City Division, FL; and NSWC Carderock Division South Florida Test Facility, FL. The piers and channels in the AFTT study area are located at the following Navy ports, Naval Shipyards, and Navy contractor shipyards: Bath Iron Works, ME; Portsmouth Naval Shipyard, ME; Electric Boat and Naval Base Groton, CT; Northrop Grumman Shipbuilding—Newport News, VA; Norfolk Naval Base, VA; Norfolk Naval Shipyard, VA; Naval Amphibious Base Little Creek, VA; Naval Base Kings Bay, GA; Naval Base Mayport, FL; Port Canaveral, FL; Northrop Grumman Shipbuilding—Avondale, LA; Northrop Grumman Shipbuilding—Ingalls, MS; and, Halter Moss Point Shipyard, MS.

The proposed action is to conduct military training and testing activities in the AFTT study area. The purpose of the proposed action is to achieve and maintain Fleet Readiness to meet the requirements of Title 10 of the U.S. Code, which requires the DON to "maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas." The proposed action would also allow the DON to attain compliance with applicable environmental authorizations, consultations, and other associated environmental requirements, including those associated with new platforms and weapons systems, for example, the Low Frequency Anti-Submarine Warfare capability associated with the Littoral Combat Ship.

The alternatives that will be analyzed in the AFTT EIS and OEIS meet the purpose and need of the proposed action by providing the level of training that meets the requirements of Title 10, thereby ensuring that Sailors and Marines are properly prepared for operational success. Similarly, the level of RDT&E proposed for the AFTT study area is necessary to ensure that Sailors and Marines deployed overseas have the latest proven military equipment. Accordingly, the alternatives to be addressed in the AFTT EIS and OEIS are:

1. No Action—The No Action Alternative continues baseline training and testing activities and force structure requirements as defined by existing DON environmental planning documents. This documentation includes the Records of Decision for Atlantic Fleet Active Sonar Training (AFAST), VACAPES, Navy Cherry Point, Jacksonville, and NSWC Panama City Division, and the Preferred Alternative for the GOMEX Draft EIS and OEIS.

2. Alternative 1—This alternative consists of the No Action alternative, plus expansion of the overall study area boundaries, and updates and/or adjustments to locations and tempo of training and testing activities. This alternative also includes changes to training and testing requirements necessary to accommodate force structure changes, and the development and introduction of new vessels, aircraft, and weapons systems.

3. Alternative 2—Alternative 2 consists of Alternative 1 with an increased tempo of training and testing activities. This alternative also allows for additional range enhancements and infrastructure requirements.

Resource areas that will be addressed due to the potential effects from the proposed action include, but are not limited to: Ocean and biological resources (including marine mammals and threatened and endangered species); air quality; airborne soundscape; cultural resources; transportation; regional economy; recreation; and public health and safety.

The scoping process will be used to identify community concerns and local issues to be addressed in the EIS and OEIS. Federal agencies, state agencies, local agencies, Native American Indian Tribes and Nations, the public, and interested persons are encouraged to provide comments to the DON to identify specific issues or topics of environmental concern that the commenter believes the DON should consider. All comments provided orally or in writing at the scoping meetings will receive the same consideration during EIS and OEIS preparation. Written comments must be postmarked no later than September 14, 2010, and should be mailed to: Naval Facilities Engineering Command, Atlantic, Code: EV22LL (AFTT EIS/OEIS Project Manager), 6506 Hampton Boulevard, Norfolk, VA, 23508–1278.

Dated: July 9, 2010.

D.J. Werner,

Lieutenant Commander, Office of the Judge Advocate General, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. 2010–17237 Filed 7–14–10; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF EDUCATION

Submission for OMB Review; Comment Request

AGENCY: Department of Education.

SUMMARY: The Director, Information Collection Clearance Division,

APPENDIX C

AGENCY CORRESPONDENCE

This Page Intentionally Left Blank

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO

5090
Ser N456D/10U158199
21 July 2010

Mr. Eric C. Schwaab
Assistant Administrator
National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD 20910

Dear Mr. Schwaab: Eric

In accordance with the National Environmental Policy Act (NEPA), the Department of the Navy (Navy) is initiating the preparation of an Environmental Impact Statement (EIS)/Overseas EIS (OEIS) to evaluate the potential environmental effects associated with military readiness training and research, development, testing, and evaluation (RDT&E) activities conducted within the Atlantic Fleet Training and Testing (AFTT) study area. The AFTT study area includes the Western North Atlantic Ocean along the East Coast of North America, the Chesapeake Bay, and the Gulf of Mexico (including the area where the Undersea Warfare Training Range will be operated). Also included are select Navy pier-side locations and channels. The AFTT study area does not include the Arctic.

The AFTT EIS/OEIS will consolidate five previous EIS/OEISs that cover most of the AFTT study area into a single EIS/OEIS analyses: the Atlantic Fleet Active Sonar Training (AFAST), the Virginia Capes (VACAPES) Range Complex, the Navy Cherry Point Range Complex, the Jacksonville Range Complex and the Naval Surface Warfare Center Panama City Range Complex. In addition, Navy is currently finalizing the Gulf of Mexico (GOMEX) Range Complex EIS/OEIS that is expected to be complete in late 2010.

An important aspect of the AFTT EIS/OEIS will be the anaylsis of the acoustic effects to marine species protected under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). The AFTT EIS/OEIS is also intended to serve as a basis for the renewal of current regulatory permits and authorizations, the earliest expiring in January 2014; address current training and testing not covered under the existing permits and authorizations; and obtain those permits and authorizations necessary to support force structure changes and emerging and future training and testing requirements.

To complete the analysis required by the permitting and consultation processes, the Navy and the National Marine Fisheries Services (NMFS) will need to work together. Therefore, in accordance with the Council on Environmental Quality's (CEQ) NEPA guidelines

(specifically, 40 CFR Part 1501) and CEQ's 2002 guidance on cooperating agencies, Navy requests NMFS serve as a cooperating agency for the development of the AFTT EIS/OEIS.

As the lead agency, the Navy will be responsible for overseeing preparation of the EIS/OEIS that will include, but not be limited to, the following:

- Gathering all necessary background information and preparing all necessary permit applications associated with the proposed action.
- Working with NMFS personnel to determine the method of estimating potential effects to protected marine species, including threatened and endangered species.
- Determining the scope of the EIS/OEIS, including the alternatives evaluated.
- Circulating the appropriate NEPA documentation to the general public and any other interested parties.
- Scheduling and supervising meetings held in support of the NEPA process and compiling any comments received.
- Maintaining an administrative record and responding to any Freedom of Information Act requests relating to the EIS/OEIS.

Navy respectfully requests that NMFS, in its role as a cooperating agency, provide support as follows:

- Providing timely comments after the Agency Information Meeting (which will be held at the onset of the EIS/OEIS process) and on working drafts of the EIS/OEIS documents. The Navy requests that comments on draft EIS/OEIS documents (Version 2) be provided within 30 working days.
- Responding to Navy requests for information, in particular related to review of the acoustic effects analysis and evaluation of the effectiveness of protection and mitigation measures.
- Coordinating, to the maximum extent practicable, any public comment periods required in the MMPA permitting process with the Navy's NEPA public comment periods.
- Participating, as necessary, in meetings hosted by the Navy for discussion of issues related to the EIS/OEIS, including public hearings/meetings.

2

- Adhering to the overall schedule as set forth by the Navy.
- Providing a formal, written response to this request.

The Navy views this agreement as important to the successful completion of the environmental planning process for the AFTT EIS/OEIS. NMFS assistance will be invaluable in this endeavor.

The point of contact for this action is Ms. Dawn Schroeder, (703) 602-4769, email: Dawn.Schroeder@navy.mil.

John Quinn

JOHN P. QUINN
Deputy Director, Energy and Environmental Readiness Division (OPNAV N45)

Copy to:
ASN (EI&E)
DASN (E)
OAGC (EI&E)
Commander, U.S. Fleet Forces Command (N73, N77)
Commander, U.S. Pacific Fleet (N01CE, N7)
Commander, Navy Installations Command (N45)
Commander, Navy Region Southeast (N45)
Commander, Navy Region MIDLANT (N45)

Eric - Thanks in advance for your help as we cooperate to achieve both our missions.

John

3

DEPARTMENT OF THE NAVY
COMMANDER
U.S. FLEET FORCES COMMAND
1562 MITSCHER AVENUE SUITE 250
NORFOLK, VA 23551-2487

5090
Ser N46/014
April 5, 2012

Ms. Helen M. Golde
Acting Director, Office of Protected Resources
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
1315 East-West Highway, SSMC3, Room 13821
Silver Spring, MD 20910-3282

SUBJECT: REQUEST FOR MARINE MAMMAL PROTECTION ACT INCIDENTAL TAKE AUTHORIZATION AND REGULATIONS FOR U.S. NAVY ATLANTIC FLEET TRAINING AND TESTING ACTIVITIES

Dear Ms. Golde:

In accordance with the Marine Mammal Protection Act, as amended, and 50 C.F.R. Part 216, the U.S. Navy requests a five-year incidental take authorization and regulations for the incidental taking of marine mammals associated with Atlantic Fleet Training and Testing (AFTT) activities occurring within the Gulf of Mexico and Atlantic Ocean.

The proposed action may incidentally expose marine mammals that reside within the AFTT study area to sound and other environmental stressors associated with training and testing activities. The enclosed request further describes the AFTT activities and study area, and provides the specific information required by the National Marine Fisheries Service (NMFS) for consideration of an incidental take request.

The U.S. Navy also requests the above regulations authorize, and NMFS issue, two five-year Letters of Authorization; one issued to Commander, United States Fleet Forces Command for training activities, and one issued to Commander, Naval Sea Systems Command for testing activities. Addresses for these commands are provided below:

Commander, U.S. Fleet Forces Command
Attn: Code N46
1562 Mitscher Avenue, Suite 250
Norfolk, Virginia 23551-2487

Commander, Naval Sea Systems Command
Attn: Code SEA 04R
1333 Isaac Hull Avenue, SE
Washington Navy Yard, DC 20376

5090
Ser N46/014
April 5, 2012

We appreciate your continued support in helping the U.S. Navy to meet its environmental responsibilities.

Sincerely,

J. W. MURPHY
Deputy Chief of Staff
for Shore and Environmental
Readiness

Enclosure: Request for Regulations and Letters of Authorization for the Incidental Taking of Marine Mammals Resulting From U.S. NAVY Training and Testing Activities in the AFTT Study Area

Copy to: Ms. Jolie Harrison, NMFS Office of Protected Resources
Ms. Gina Shultz, NMFS Office of Protected Resources

2

This Page Intentionally Left Blank

APPENDIX D

AIR QUALITY EXAMPLE EMISSIONS CALCULATIONS AND EXAMPLE RECORD OF NON-APPLICABILITY

This Page Intentionally Left Blank

TABLE OF CONTENTS

APPENDIX D AIR QUALITY EXAMPLE EMISSIONS CALCULATIONS AND EXAMPLE RECORD OF NON-APPLICABILITY D-1

D.1 AIR QUALITY EXAMPLE CALCULATIONS D-1
D.1.1 SURFACE ACTIVITIES EMISSIONS D-1
D.1.2 AIR ACTIVITIES EMISSIONS D-2
D.1.3 ORDNANCE AND MUNITIONS EMISSIONS D-3
D.1.4 EMISSIONS ESTIMATES SPREADSHEETS D-4
D.2 EXAMPLE RECORD OF NON-APPLICABILITY D-33

LIST OF TABLES

Table D-1: Emission Factors for Two-Stroke Engines D-1
Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative D-5
Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative D-19
Table D-4: Ordnance Emissions Estimates - No Action Alternative D-30

LIST OF FIGURES

Figure D.2-1: Sample Record of Non-Applicability Memorandum for Rhode Island D-33
Figure D.2-2: Sample Record of Non-Applicability Form D-34
Figure D.2-3a: Sample Conformity Analysis for Rhode Island D-35
Figure D.2-3b: Sample Conformity Analysis for Rhode Island D-36

This Page Intentionally Left Blank

D.1 AIR QUALITY EXAMPLE CALCULATIONS

This appendix discusses emission factor development and calculations including assumptions employed in the analyses presented in the Air Quality section of Chapter 3 (Section 3.2). Section D.2 includes an example Record of Non-Applicability developed using the methods described in this Section D.1.

D.1.1 SURFACE ACTIVITIES EMISSIONS

Surface activities consist of activities associated with boat and ship traffic. Fleet training activities incorporate a variety of marine vessels including cruisers, destroyers, frigates, carriers, submarines, amphibious vessels, and rigid hull inflatable boats. Testing activities at the Naval Undersea Warfare Center Newport, Division Testing Range incorporate a variety of marine vessels including the testing support vessel (TWR-81), a work boat (WB-30), various torpedo recovery vessels, unmanned surface vehicles, and rigid hull inflatable boats. Testing activities at Naval Surface Warfare Center, Panama City Division Testing Range incorporate a variety of marine craft including the Athena 1, Athena 2, Research Vessel (R/V) Mr. Offshore, several 13 to 25 feet (ft.) (4.0 to 7.6 meters [m]) outboard motor boats, a 30 ft. (9.1 m) rigid hull inflatable boat, and 32 ft. (9.8 m), 65 ft. (20 m), and 68 ft. (21 m) inboard diesel vessels. Testing at the South Florida Ocean Measurement Facility involves a mix of testing support vessels. Marine vessels participating in sea trials, shock trials, lifecycle activities, and combat system ship qualification trials are similar to those used in fleet training activities. Each of these vessels incorporates different propulsion methods such as marine outboard engines, diesel engines, and gas turbines. Calculations were developed utilizing the propulsion mechanism.

Marine Outboard Engines:

The U.S. Environmental Protection Agency (USEPA) has published emissions factors for air pollutants produced by several types of two-stroke and four-stroke outboard engines. The most conservative emission factors for two-stroke engines of various horsepower are represented in Table D-1.

Table D-1: Emission Factors for Two-Stroke Engines

USEPA Outboard Engine Emissions Factors (grams/hp-hr)			
NOx	**CO**	**VOC**	**SOx**
0.018	0.63	0.25	0.00108

Source: USEPA, 1999, Exhaust Emissions Factors for Non-Road Engine Modeling-Spark Ignition. Report No. NR-010b; Office of Mobile Sources, Assessment and Modeling Division, EPA-R-99-009.

CO: Carbon Monoxide; hp: Horsepower; hr: Hour; NOx: Nitrogen Oxides; Sox: Sulfur Oxides; USEPA: United States Environmental Protection Agency; VOC: Volatile Organic Compound

Emissions estimates for surface craft utilizing outboard engines were calculated using USEPA AP-42 factors and multiplied by the engine horsepower and hours of operation.

$$Emissions = HP \times HR/YR \times EF \times ENG \times CF$$

Where:

Emissions = Surface craft Emissions (lb. per year)
HP = Horsepower (reflective of a particular load factor/engine power setting)
HR/YR = Hours per year
EF = Emission factor for specific engine type
ENG = Number of engines
CF = Conversion Factor for grams to tons

To determine the entire project emissions, a calculation was conducted for each surface vessel type and for each pollutant and converted to tons, then compared to the baseline Study Area emissions. These values were summed according to the appropriate pollutant to provide the cumulative emissions associated with surface vessel emissions activities.

Diesel Engines:

Limited data were available for large marine diesel engines. Therefore, USEPA AP-42 emissions factors for industrial reciprocating engines were used to calculate diesel engine emissions. Another source utilized for vessel emissions factors included data presented in, John J. McMullen Associates as referenced in previous Navy EIS/OEIS documentation. Diesel was assumed to be the primary fuel to ensure an overly conservative approach. A similar calculation methodology to the outboard engines was employed to ascertain emissions from the diesel engines.

$$Emissions = HP \times HR/YR \times EF \times ENG \times CF$$

Where:

Emissions = Surface craft Emissions (lb. per year)
HP = Horsepower (reflective of a particular load factor/engine power setting)
HR/YR = Hours per year
EF = Emission factor for specific engine type (lb. per hour)
ENG = Number of engines
CF = Conversion Factor for pounds to tons

Diesel engine emission factors were multiplied by the engine horsepower and annual hours of operation to calculate the pounds of pollutant emissions per year. This value was then converted to a tons per year value for comparison with the Study Area total summed emissions on an individual pollutant basis.

D.1.2 AIR ACTIVITIES EMISSIONS

Fleet training and Naval Air Systems Command testing consists of various activities associated with airplanes or helicopters including, but not limited to, the F/A-18, P-3, SH-60B, MH-53, MH-60S, and Lear jets. Testing air activities at Naval Surface Warfare Center, Panama City Division Testing Range consist of various activities associated with airplanes or helicopters including the 1UH-1N, SH-60B, MH-53, MH-60S, and Cessna-172. Aircraft activities of concern are those that occur from ground level up to 3,000 feet (ft.) (914 meters [m]) above ground level. The 3,000 ft. (914 m) above ground level ceiling was assumed to be the atmospheric mixing height above which any pollutant generated would not contribute to increased pollutant concentrations at ground level (known as the mixing zone). All pollutant emissions from aircraft generated greater than 3,000 ft. (914 m) above ground level are excluded from this analysis. The pollutant emission rate is a function of the engine's operating mode, the fuel flow rate, and the engine's overall efficiency. Emissions for one complete flight for a particular aircraft are calculated by knowing the specific engine pollutant emission factors for each mode of operation.

For this EIS/OEIS, emission factors for most military engines were obtained from Navy's Aircraft Environmental Support Office (AESO) memoranda and the Federal Aviation Administration's Emissions and Dispersion Modeling System model. For those aircraft for which engine data was unavailable, an applicable surrogate was used. Emissions factors vary depending on engine power mode, time in each

mode, and fuel flow. Using these data, as well as information on activity levels (i.e., number of sorties), pollutant emissions for each aircraft and activity were calculated by applying the equation below.

$$Emissions = TIM \times FF \times EF \times ENG \times CF$$

Where:

Emissions = Aircraft Emissions (lb. per activity) (for EF in lb./1000 gallon fuel)
TIM = Time-in-mode at a specified power setting (hr/activity).
FF = Fuel flow at a specified power setting (gallons/hr/engine)
EF = Emission factor for specific engine type and power setting (lb./1000 gallons of fuel used)
ENG = Number of engines on aircraft
CF = Conversion Factor (0.001)

As the equation indicates, emissions were estimated by first calculating total fuel used in each of the different modes with the appropriate emission factor.

The following is a list of emissions factor sources used in the EIS/OEIS:

- AESO Memorandum Report No. 9961, Revision A, November 2009.
- AESO Memorandum Report No. 9963, Revision B, July 2001.
- AESO Memorandum Report No. 2000-10B, January 2001.
- AESO Memorandum Report No. 9959, Revision B, January 2001.
- AESO Memorandum Report No. 9960B, April 2000.
- AESO Memorandum Report No. 9943B, April 2000.
- AESO Memorandum Report No. 9941, Revision B, December 2009.
- AESO Memorandum Report No. 9933, Revision B, November 2002.
- AESO Memorandum Report No. 9933, Revision D, March 2011.
- AESO Memorandum Report No. 9929, February 1999.
- AESO Memorandum Report No. 9929, Revision A, November 2009.
- AESO Memorandum Report No. 9948, Revision C, March 2010.
- AESO Memorandum Report No. 9915A, March 2000.
- AESO Memorandum Report No. 9824, Revision B, November 2009.
- AESO Memorandum Report No. 9962, Revision A, November 2009.
- FEIS for the Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Navy Fleet, October 2008.
- USAF Institute for Environment, Safety and Occupational Health Risk Analysis, October 2002.
- USEPA 1978 - Air Pollutant Emission Factors for Military and Civil Aircraft.

D.1.3 ORDNANCE AND MUNITIONS EMISSIONS

Available emissions factors (AP-42, Compilation of Air Pollutant Emission Factors) were utilized. These factors were then multiplied by the net weight of the explosive (or a conversion factor for pounds per item) and the number of times that the munition was used during a designated time frame. This calculation provided annual pounds per year of emissions, which was converted to tons per year for comparison purposes.

Emissions = EXP/YR×EF×Net Wt×CF

Where:

Emissions = Ordnance Emissions (lb. per year)
EXP/YR = Explosives, propellants, and pyrotechnics used per year
EF = Emissions factor
Net Wt = Net Weight of explosive
CF = Conversion Factor for pounds to tons

D.1.4 EMISSIONS ESTIMATES SPREADSHEETS

The following spreadsheets (Tables D-2, D-3, and D-4) are the emissions calculations for vessels, aircraft, and munitions, respectively. The examples provided for vessels and aircraft are for baseline training within the Virginia Capes Range Complex. These examples are representative of similar calculation spreadsheets developed for each range complex or testing area. Moreover, they are representative of the calculations developed for each alternative analyzed in this EIS/OEIS. The example included for ordnance emissions is for baseline ordnance emissions for all range complexes and testing areas utilized for training and testing within the AFTT Study Area. The full set of calculation spreadsheets is available upon request.

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS														EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)				State (0-3 nm offshore)					Waters of US (3-12 nm)					Int Waters (> 12 nm)						GHG Emissions				
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore		CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Anti-Air Warfare																																		
Air Combat Maneuver	Northeast				Aircraft emissions																													
	VACAPES	2320																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Air Defense Exercise	Northeast		35.70	CVN	Nuclear Carrier (No emissions)	0.06	1.0	100%	35.70	0%	0%	100%	0.0	0.0	35.7																				
	VACAPES	595	184.45	CG	Cruiser	0.31	1.0	100%	184.45	0%	0%	100%	0.0	0.0	184.5	0	0	0	0	0	0	0	0	0	0	19,880	8,691	1,627	3,877	485	158	29,143	613,579	20	17	620,113
	Cherry Pt		368.90	DDG	Guided Missile Destroyer	0.62	1.0	100%	368.90	0%	0%	100%	0.0	0.0	368.9	0	0	0	0	0	0	0	0	0	0	38,362	18,039	2,962	6,618	907	160	59,024	1,242,691	40	35	1,255,926
	JAX		5.95	FFG	Guided Missile Frigate	0.01	1.0	100%	5.95	0%	0%	100%	0.0	0.0	6.0	0	0	0	0	0	0	0	0	0	0	398	403	46	69	19	68	405	8,518	0	0	8,609
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Gunnery Exercise, Air-to-Air (Medium Caliber)	Northeast				Aircraft emissions																													
	VACAPES	30																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Missile Exercise, Air-to-Air	Northeast				Aircraft emissions																													
	VACAPES	160																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Gunnery Exercise, Surface-to-Air (Large Caliber)	Northeast		0.00	CVN	Nuclear Carrier (No emissions)		2.0	100%	0.00	0%	0%	100%	0.0	0.0	0.0																				
	VACAPES	18	4.50	CG	Cruiser	0.25	3.0	100%	13.50	0%	0%	100%	0.0	0.0	13.5	0	0	0	0	0	0	0	0	0	0	1,455	636	119	284	36	158	2,133	44,908	1	1	45,386
	Cherry Pt		4.50	DDG	Guided Missile Destroyer	0.25	3.0	100%	13.50	0%	0%	100%	0.0	0.0	13.5	0	0	0	0	0	0	0	0	0	0	1,404	660	108	242	33	160	2,160	45,477	1	1	45,961
	JAX		9.00	FFG	Guided Missile Frigate	0.5	3.0	100%	27.00	0%	0%	100%	0.0	0.0	27.0	0	0	0	0	0	0	0	0	0	0	1,804	1,828	211	312	88	68	1,836	38,655	1	1	39,067
	Key West		18.00	AOE	Logistics / Support	1	4.9	100%	88.20	0%	0%	100%	0.0	0.0	88.2	0	0	0	0	0	0	0	0	0	0	329	1,940	246	5,834	1,171	1,599	141,032	2,969,284	96	84	3,000,906
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Gunnery Exercise, Surface-to-Air (Medium Caliber)	Northeast		0.00	CVN	Nuclear Carrier (No emissions)		2.0	100%	0.00	0%	0%	100%	0.0	0.0	0.0																				
	VACAPES	30	7.50	CG	Cruiser	0.25	3.0	100%	22.50	0%	0%	100%	0.0	0.0	22.5	0	0	0	0	0	0	0	0	0	0	2,425	1,060	198	473	59	158	3,555	74,847	2	2	75,644
	Cherry Pt		7.50	DDG	Guided Missile Destroyer	0.25	3.0	100%	22.50	0%	0%	100%	0.0	0.0	22.5	0	0	0	0	0	0	0	0	0	0	2,340	1,100	181	404	55	160	3,600	75,794	2	2	76,602
	JAX		15.00	FFG	Guided Missile Frigate	0.5	3.0	100%	45.00	0%	0%	100%	0.0	0.0	45.0	0	0	0	0	0	0	0	0	0	0	3,007	3,047	351	521	146	68	3,060	64,425	2	2	65,111
	Key West		30.00	AOE	Logistics / Support	1	4.9	100%	147.00	0%	0%	100%	0.0	0.0	147.0	0	0	0	0	0	0	0	0	0	0	548	3,233	410	9,723	1,952	1,599	235,053	4,948,806	161	140	5,001,511
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Missile Exercise, Surface-to-Air	Northeast		0.00	CVN	Nuclear Carrier (No emissions)	0	2.0	100%	0.00	0%	0%	100%	0.0	0.0	0.0																				
	VACAPES	24	6.00	CG	Cruiser	0.25	4.0	100%	24.00	0%	0%	100%	0.0	0.0	24.0	0	0	0	0	0	0	0	0	0	0	2,587	1,131	212	504	63	158	3,792	79,837	3	2	80,687
	Cherry Pt		6.00	DDG	Guided Missile Destroyer	0.25	4.0	100%	24.00	0%	0%	100%	0.0	0.0	24.0	0	0	0	0	0	0	0	0	0	0	2,496	1,174	193	431	59	160	3,840	80,847	3	2	81,708
	JAX		12.00	FFG	Guided Missile Frigate	0.5	4.0	100%	48.00	0%	0%	100%	0.0	0.0	48.0	0	0	0	0	0	0	0	0	0	0	3,207	3,251	375	555	156	68	3,264	68,720	2	2	69,452
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Intelligence, Surveillance, & Reconnaissance Test	Northeast				Aircraft emissions																													
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS													EMISSIONS/YEAR (lb) BY JURISDICTION																			
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions			
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Amphibious Warfare																																		
Naval Surface Fire Support Exercise - Land based target (FIREX-Land)	Northeast		0	CG	Cruiser	1	9.0	100%	0.00	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.42	9.0	100%	0.00	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Naval Surface Fire Support Exercise - at sea (FIREX-at sea)	Northeast		22	CG	Cruiser	1	9.0	100%	198.00	0%	0%	100%	0.0	0.0	198.0	0	0	0	0	0	0	0	0	0	0	21,340	9,330	1,746	4,162	521	158	31,284	658,653	21	19	665,668
	VACAPES	22	9.24	DDG	Guided Missile Destroyer	0.42	9.0	100%	83.16	0%	0%	100%	0.0	0.0	83.2	0	0	0	0	0	0	0	0	0	0	8,648	4,067	668	1,492	205	160	13,306	280,136	9	8	283,120
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
MEU Certification Exercise (CERTEX)	Northeast		0	LHA	Amphib. Assault Ship - Tarawa	1	6.0	100%	0.0	10%	30%	60%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,119	0	0	0	0	0
	VACAPES	0	0	LHD	Large Helicopter-dock Ships	1	2.5	100%	0.0	10%	30%	60%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Cherry Pt		0	LPD	Amphibious Transport Dock Wasp	1	2.5	100%	0.0	10%	30%	60%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	933	0	0	0	0	0
	JAX		0	LCU	Landing Craft Utility	6	3.0	100%	0.0	10%	30%	60%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	0	0	0	0	0
	Key West		0	AAV/EFV	Amphibious Assault Vehicle	14	6.0	100%	0.0	10%	30%	60%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0
	GOMEX		0	LCAC	Landing Craft Air Cushioned	5	3.0	100%	0.0	10%	30%	60%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	523	0	0	0	0	0
	Outside RCs		0	CRRC	Combat Raiding Rubber Craft	0	6.0	100%	0.0	10%	30%	60%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
	Total																																	
Amphibious Assault	Northeast		0	CRRC	Combat Raiding Rubber Craft	13	2.0	100%	0	100%	0%	0%	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
	VACAPES	0	0	LPD	Amphibious Transport Dock Wasp	1	2.0	100%	0	100%	0%	0%	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Cherry Pt		0	LCU	Landing Craft Utility	2	2.0	100%	0	100%	0%	0%	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	0	0	0	0	0
	JAX		0	LCAC	Landing Craft Air Cushioned	2	2.0	100%	0	100%	0%	0%	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	523	0	0	0	0	0
	Key West		0	AAV/EFV	Amphibious Assault Vehicle	6	2.0	100%	0	100%	0%	0%	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Amphibious Raid / Humanitarian Assistance	Northeast		0	LHD	Large Helicopter-dock Ships	2	8.0	100%	0.0	38%	38%	25%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	933	0	0	0	0	0
	VACAPES	0	0	LHA	Amphib. Assault Ship - Tarawa	1	8.0	100%	0.0	38%	38%	25%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,119	0	0	0	0	0
	Cherry Pt		0	LPD	Amphibious Transport Dock Wasp	3	8.0	100%	0.0	38%	38%	25%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	JAX		0	LCAC	Landing Craft Air Cushioned	4	8.0	100%	0.0	38%	38%	25%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	523	0	0	0	0	0
	Key West		0	LCU	Landing Craft Utility	4	8.0	100%	0.0	38%	38%	25%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	0	0	0	0	0
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Strike Warfare																																		
High-speed Anti-Radiation (Air-to-Surface) (HARM/EX [A-S])	Northeast				Aircraft emissions																													
	VACAPES	26																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS														EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions			
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Anti-Surface Warfare																																		
Maritime Security Ops (MSO)	Northeast		34	CG	Cruiser	0.25	4.0	100%	136.0	0%	0%	100%	0.0	0.0	136.0	0	0	0	0	0	0	0	0	0	0	14,658	6,408	1,200	2,859	358	158	21,488	452,408	15	13	457,226
	VACAPES	136	69.36	DDG	Guided Missile Destroyer	0.51	4.0	100%	136.0	0%	0%	100%	0.0	0.0	136.0	0	0	0	0	0	0	0	0	0	0	14,143	6,650	1,092	2,440	335	160	21,760	458,135	15	13	463,014
	Cherry Pt		13.6	FFG	Guided Missile Frigate	0.1	4.0	100%	277.4	0%	0%	100%	0.0	0.0	277.4	0	0	0	0	0	0	0	0	0	0	18,539	18,788	2,167	3,210	902	68	18,866	397,203	13	11	401,433
	JAX		5.44	LPD	Amphibious Transport Dock Wasp	0.04	4.0	100%	54.4	0%	0%	100%	0.0	0.0	54.4	0	0	0	0	0	0	0	0	0	0	100	592	75	1,782	358	320	17,408	366,508	12	10	370,411
	Key West		13.6	LSD	Landing Ship Dock	0.1	4.0	100%	21.8	0%	0%	100%	0.0	0.0	21.8	0	0	0	0	0	0	0	0	0	0	40	237	30	713	143	320	6,963	146,603	5	4	148,165
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Maritime Security Ops - Anti-Swimmer Grenades	Northeast		9	CG	Cruiser	0.25	4.0	100%	36.0	0%	0%	100%	0.0	0.0	36.0	0	0	0	0	0	0	0	0	0	0	3,880	1,696	318	757	95	158	5,688	119,755	4	3	121,031
	VACAPES	36	18.36	DDG	Guided Missile Destroyer	0.51	4.0	100%	36.0	0%	0%	100%	0.0	0.0	36.0	0	0	0	0	0	0	0	0	0	0	3,744	1,760	289	646	89	160	5,760	121,271	4	3	122,563
	Cherry Pt		3.6	FFG	Guided Missile Frigate	0.1	4.0	100%	73.4	0%	0%	100%	0.0	0.0	73.4	0	0	0	0	0	0	0	0	0	0	4,907	4,973	574	850	239	68	4,994	105,142	3	3	106,262
	JAX		1.44	LPD	Amphibious Transport Dock Wasp	0.04	4.0	100%	14.4	0%	0%	100%	0.0	0.0	14.4	0	0	0	0	0	0	0	0	0	0	27	157	20	472	95	320	4,608	97,017	3	3	98,050
	Key West		3.6	LSD	Landing Ship Dock	0.1	4.0	100%	5.8	0%	0%	100%	0.0	0.0	5.8	0	0	0	0	0	0	0	0	0	0	11	63	8	189	38	320	1,843	38,807	1	1	39,220
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Gunnery Exercise, Surface-to-Surface, (Ship) Small Caliber	Northeast		26.4	CG	Cruiser	0.22	2.5	100%	0.0	0%	28%	72%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	120	54.0	DDG	Guided Missile Destroyer	0.45	2.5	100%	66.0	0%	28%	72%	0.0	18.5	47.5	0	0	0	0	0	1,922	904	148	332	45	4,942	2,324	382	853	117	160	10,560	222,330	7	6	224,698
	Cherry Pt		18.0	FFG	Guided Missile Frigate	0.15	2.5	100%	135.0	0%	28%	72%	0.0	37.8	97.2	0	0	0	0	0	2,526	2,560	295	437	123	6,495	6,582	759	1,125	316	68	9,180	193,276	6	5	195,334
	JAX		0.7	LPD	Amphibious Transport Dock Wasp	0.006	2.5	100%	45.0	0%	28%	72%	0.0	12.6	32.4	0	0	0	0	0	23	137	17	413	83	60	353	45	1,061	213	320	14,400	303,178	10	9	306,406
	Key West		0.4	LSD	Landing Ship Dock	0.003	2.5	100%	1.8	0%	28%	72%	0.0	0.5	1.3	0	0	0	0	0	1	5	1	17	3	2	14	2	42	9	320	576	12,127	0	0	12,256
	GOMEX		0.4	LHD	Large Helicopter-dock Ships	0.003	2.5	100%	0.9	0%	28%	72%	0.0	0.3	0.6	0	0	0	0	0	1	9	1	26	5	4	23	3	68	14	320	288	6,064	0	0	6,128
	Outside RCs		14.4	PC	Patrol Coastal	0.12	2.5	100%	0.9	0%	28%	72%	0.0	0.3	0.6	0	0	0	0	0	4	10	1	2	0	11	25	2	5	1	90	81	1,705	0	0	1,724
	Total																																	
Gunnery Exercise, Surface-to-Surface, (Ship) Med Caliber	Northeast		26.4	CG	Cruiser	0.22	2.5	100%	0.0	0%	28%	72%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	120	54.0	DDG	Guided Missile Destroyer	0.45	2.5	100%	66.0	0%	28%	72%	0.0	18.5	47.5	0	0	0	0	0	1,922	904	148	332	45	4,942	2,324	382	853	117	160	10,560	222,330	7	6	224,698
	Cherry Pt		18.0	FFG	Guided Missile Frigate	0.15	2.5	100%	135.0	0%	28%	72%	0.0	37.8	97.2	0	0	0	0	0	2,526	2,560	295	437	123	6,495	6,582	759	1,125	316	68	9,180	193,276	6	5	195,334
	JAX		0.7	LPD	Amphibious Transport Dock Wasp	0.006	2.5	100%	45.0	0%	28%	72%	0.0	12.6	32.4	0	0	0	0	0	23	137	17	413	83	60	353	45	1,061	213	320	14,400	303,178	10	9	306,406
	Key West		0.4	LSD	Landing Ship Dock	0.003	2.5	100%	1.8	0%	28%	72%	0.0	0.5	1.3	0	0	0	0	0	1	5	1	17	3	2	14	2	42	9	320	576	12,127	0	0	12,256
	GOMEX		0.4	LHD	Large Helicopter-dock Ships	0.003	2.5	100%	0.9	0%	28%	72%	0.0	0.3	0.6	0	0	0	0	0	1	9	1	26	5	4	23	3	68	14	320	288	6,064	0	0	6,128
	Outside RCs		14.4	PC	Patrol Coastal	0.12	2.5	100%	0.9	0%	28%	72%	0.0	0.3	0.6	0	0	0	0	0	4	10	1	2	0	11	25	2	5	1	90	81	1,705	0	0	1,724
	Total																																	
Gunnery Exercise, Surface-to-Surface, (Ship) Lrg Caliber	Northeast		30.1	CG	Cruiser	0.22	2.5	100%	0.0	0%	28%	72%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	137	61.7	DDG	Guided Missile Destroyer	0.45	2.5	100%	75.4	0%	28%	72%	0.0	21.1	54.3	0	0	0	0	0	2,194	1,032	169	378	52	5,642	2,653	436	973	133	160	12,056	253,827	8	7	256,530
	Cherry Pt		20.6	FFG	Guided Missile Frigate	0.15	2.5	100%	154.1	0%	28%	72%	0.0	43.2	111.0	0	0	0	0	0	2,884	2,922	337	499	140	7,415	7,515	867	1,284	361	68	10,481	220,656	7	6	223,006
	JAX		0.8	LPD	Amphibious Transport Dock Wasp	0.006	2.5	100%	51.4	0%	28%	72%	0.0	14.4	37.0	0	0	0	0	0	27	157	20	471	95	68	403	51	1,212	243	320	16,440	346,128	11	10	349,814
	Key West		0.4	LSD	Landing Ship Dock	0.003	2.5	100%	2.1	0%	28%	72%	0.0	0.6	1.5	0	0	0	0	0	1	6	1	19	4	3	16	2	48	10	320	658	13,845	0	0	13,993
	GOMEX		0.4	LHD	Large Helicopter-dock Ships	0.003	2.5	100%	1.0	0%	28%	72%	0.0	0.3	0.7	0	0	0	0	0	2	10	1	30	6	4	26	3	77	16	320	329	6,923	0	0	6,996
	Outside RCs		16.4	PC	Patrol Coastal	0.12	2.5	100%	1.0	0%	28%	72%	0.0	0.3	0.7	0	0	0	0	0	5	11	1	2	0	13	28	2	6	1	90	92	1,947	0	0	1,968
	Total																																	
Gunnery Exercise, Surface-to-Surface, (Boat) Small Caliber	Northeast		36	BW	Boston Whaler	1	2.0	100%	0.0	25%	75%	0%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0
	VACAPES	36	36		Bayliner	1	2.0	100%	72.0	25%	75%	0%	18.0	54.0	0.0	0	5	473	0	0	0	14	1,420	0	0	0	0	0	0	0	9	648	13,643	0	0	13,788
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS													EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of US (3-12 nm)					Int Waters (> 12 nm)						GHG Emissions				
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Gunnery Exercise, Surface-to-Surface, (Boat) Med Caliber	Nor theast		36	BW	Boston Whaler	1	2.0	100%	0.0	25%	75%	0%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0
	VACAPES	36	36		Bayliner	1	2.0	100%	72.0	25%	75%	0%	18.0	54.0	0.0	0	5	473	0	0	0	14	1,420	0	0	0	0	0	0	0	9	648	13,643	0	0	13,788
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Missile Exercise, Surface-to-Surface	Nor theast		0	CG	Cruiser	0.5	11.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.5	11.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Gunnery Exercise, Air-to-Surface, Small Caliber	Nor theast				Aircraft emissions																														
	VACAPES	522																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Gunnery Exercise, Air-to-Surface, Medium Caliber	Nor theast				Aircraft emissions																														
	VACAPES	11																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Missile Exercise, Air-to-Surface, Rocket	Nor theast				Aircraft emissions																														
	VACAPES	97																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Missile Exercise, Air-to-Surface	Nor theast				Aircraft emissions																														
	VACAPES	80																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
BOMBEX, Air-to-Surface	Nor theast				Aircraft emissions																														
	VACAPES	266																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Laser Targeting	Nor theast				Aircraft emissions																														
	VACAPES	272																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Sinking Exercise	Nor theast		0	CG	Cruiser	1.00	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	2.00	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	0.00	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	JAX		0	DD	Destroyer	2.00	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	Key West		0	SSN	Submarines (No emissions)	1																													
	GOMEX																																		
	Outside RCs																																		
	Total																																		

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS													EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of US (3-12 nm)					Int Waters (> 12 nm)						GHG Emissions				
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
High Energy Laser Weapons Test	Northeast		0	CG	Cruiser	0.5	11.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.5	11.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Anti-Submarine Warfare																																			
TRACKEX/TORPEX - Submarine	Northeast		10	TRB	Torpedo Retrieval Boats	1	3.6	100%	36.0	1%	10%	89%	0.4	3.6	32.0	2.8	11.9	0.2	1.2	0.4	27.5	119.1	2.1	12.2	4.2	245	1060	19	109	37	51	1,836	38,655	1	1	39,067
	VACAPES	10																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
TRACKEX/TORPEX - Surface	Northeast		14.5	CG	Cruiser	0.210526	3.6	100%	52.3	1%	10%	89%	0.5	5.2	46.5	56.4	24.6	4.6	11.0	1.4	563.6	246.4	46.1	109.9	13.8	5016	2193	411	978	122	158	8,263	173,960	6	5	175,813
	VACAPES	69	21.8	DDG	Guided Missile Destroyer	0.32	2.0	100%	43.6	1%	10%	89%	0.4	4.4	38.8	45.3	21.3	3.5	7.8	1.1	453.2	213.1	35.0	78.2	10.7	4033	1897	311	696	95	160	6,973	146,802	5	4	148,365
	Cherry Pt		10.9	FFG	Guided Missile Frigate	0.16	2.0	100%	21.8	1%	10%	89%	0.2	2.2	19.4	14.6	14.8	1.7	2.5	0.7	145.6	147.6	17.0	25.2	7.1	1296	1313	151	224	63	68	1,482	31,195	1	1	31,528
	JAX		21.8	TRB	Torpedo Retrieval Boats	0.315789	3.6	100%	78.4	1%	10%	89%	0.8	7.8	69.8	6.0	26.0	0.5	2.7	0.9	59.9	259.6	4.6	26.6	9.1	533	2310	41	237	81	51	4,001	84,228	3	2	85,125
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
TRACKEX/TORPEX - Helicopter	Northeast		5	CG	Cruiser	0.2	3.6	100%	18.0	1%	10%	89%	0.2	1.8	16.0	19.4	8.5	1.6	3.8	0.5	194.0	84.8	15.9	37.8	4.7	1727	755	141	337	42	158	2,844	59,878	2	2	60,515
	VACAPES	25	12.5	DDG	Guided Missile Destroyer	0.5	3.6	100%	45.0	1%	10%	89%	0.5	4.5	40.1	46.8	22.0	3.6	8.1	1.1	468.0	220.1	36.1	80.7	11.1	4165	1958	322	718	99	160	7,200	151,589	5	4	153,203
	Cherry Pt		7.5	TRB	Torpedo Retrieval Boats	0.3	3.6	100%	27.0	1%	10%	89%	0.3	2.7	24.0	2.1	8.9	0.2	0.9	0.3	20.6	89.3	1.6	9.2	3.1	184	795	14	81	28	51	1,377	28,991	1	1	29,300
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
TRACKEX-MPA	Northeast		6.9	CG	Cruiser	0.086957	2	100%	13.7	5%	10%	85%	0.7	1.4	11.7	74.0	32.4	6.1	14.4	1.8	148.1	64.7	12.1	28.9	3.6	1259	550	103	245	31	158	2,171	45,704	1	1	46,190
	VACAPES	79	13.7	DDG	Guided Missile Destroyer	0.173913	2	100%	27.5	5%	10%	85%	1.4	2.7	23.4	142.9	67.2	11.0	24.6	3.4	285.7	134.4	22.1	49.3	6.8	2429	1142	188	419	57	160	4,397	92,564	3	3	93,550
	Cherry Pt		10.3	FFG	Guided Missile Frigate	0.130435	2	100%	20.6	5%	10%	85%	1.0	2.1	17.5	68.9	69.8	8.0	11.9	3.3	137.7	139.6	16.1	23.8	6.7	1171	1186	137	203	57	68	1,401	29,505	1	1	29,819
	JAX		48.1	TRB	Torpedo Retrieval Boats	0.608696	2	100%	96.2	5%	10%	85%	4.8	9.6	81.7	36.7	159.1	2.8	16.3	5.6	73.5	318.2	5.7	32.6	11.2	625	2705	48	277	95	51	4,905	103,267	3	3	104,367
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
TRACKEX/ TORPEX - MPA Sonobuoy	Northeast		3.0	CG	Cruiser	0.086957	2	100%	5.9	5%	10%	85%	0.3	0.6	5.0	31.9	13.9	2.6	6.2	0.8	63.7	27.9	5.2	12.4	1.6	542	237	44	106	13	158	934	19,670	1	1	19,879
	VACAPES	34	5.9	DDG	Guided Missile Destroyer	0.173913	2	100%	11.8	5%	10%	85%	0.6	1.2	10.1	61.5	28.9	4.7	10.6	1.5	123.0	57.8	9.5	21.2	2.9	1045	492	81	180	25	160	1,892	39,838	1	1	40,262
	Cherry Pt		4.4	FFG	Guided Missile Frigate	0.130435	2	100%	8.9	5%	10%	85%	0.4	0.9	7.5	29.6	30.0	3.5	5.1	1.4	59.3	60.1	6.9	10.3	2.9	504	511	59	87	25	68	603	12,698	0	0	12,834
	JAX		20.7	TRB	Torpedo Retrieval Boats	0.608696	2	100%	41.4	5%	10%	85%	2.1	4.1	35.2	15.8	68.5	1.2	7.0	2.4	31.6	137.0	2.4	14.0	4.8	269	1164	21	119	41	51	2,111	44,444	1	1	44,917
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
SEASWIT	Northeast		0	CG	Cruiser	1	60	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	1	60	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	1	60	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Integrated Anti-Submarine Warfare Course	Northeast		0.2	CG	Cruiser	1	60	100%	12.0	0%	0%	100%	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1293	565	106	252	32	158	1,896	39,918	1	1	40,344
	VACAPES	0.2	0.2	DDG	Guided Missile Destroyer	1	60	100%	12.0	0%	0%	100%	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1248	587	96	215	30	160	1,920	40,424	1	1	40,854
	Cherry Pt		0.2	FFG	Guided Missile Frigate	1	60	100%	12.0	0%	0%	100%	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	802	813	94	139	39	68	816	17,180	1	0	17,363
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS													EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions			
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Group Sail	Northeast		3	CG	Cruiser	1	60	100%	180.0	0%	0%	100%	0.0	0.0	180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19400	8482	1588	3784	473	158	28,440	598,776	19	17	605,153
	VACAPES	3	3	DDG	Guided Missile Destroyer	1	60	100%	180.0	0%	0%	100%	0.0	0.0	180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18718	8802	1445	3229	443	160	28,800	606,355	20	17	612,813
	Cherry Pt		3	FFG	Guided Missile frigate	1	60	100%	180.0	0%	0%	100%	0.0	0.0	180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12028	12190	1406	2083	585	68	12,240	257,701	8	7	260,445
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Submarine Command Course Operations	Northeast			SSN	No emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
ASW for Composite Training Unit Exercise (COMPTUEX)	Northeast				Conducted during COMPTUEX																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
ASW for Joint Task Force Exercise (JTFEX) Sustainment Exercise (SUSTAINEX)	Northeast				Conducted during JTFEX																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Electronic Warfare																																			
Electronic Warfare	Northeast		60.4	CG	Cruiser	0.2	6.5	100%	392.6	0%	3%	97%	0.0	11.8	380.8	0.0	0.0	0.0	0.0	0.0	1269.4	555.0	103.9	247.6	31.0	41045	17944	3359	8005	1002	158	62,031	1,305,996	42	37	1,319,905
	VACAPES	302	42.28	DDG	Guided Missile Destroyer	0.14	6.5	100%	274.8	0%	3%	97%	0.0	8.2	266.6	0.0	0.0	0.0	0.0	0.0	857.4	403.2	66.2	147.9	20.3	27721	13036	2141	4782	656	160	43,971	925,770	30	26	935,629
	Cherry Pt		36.24	FFG	Guided Missile frigate	0.12	6.5	100%	235.6	0%	3%	97%	0.0	7.1	228.5	0.0	0.0	0.0	0.0	0.0	472.2	478.6	55.2	81.8	23.0	15268	15474	1785	2644	743	68	16,018	337,245	11	10	340,836
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Flare Exercise	Northeast				Aircraft emissions																														
	VACAPES	80																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Chaff Exercise - Ship	Northeast		21	CG	Cruiser	0.75	2.75	100%	57.8	0%	3%	97%	0.0	1.7	56.0	0.0	0.0	0.0	0.0	0.0	186.7	81.6	15.3	36.4	4.6	6038	2640	494	1177	147	158	9,125	192,107	6	5	194,153
	VACAPES	28	7	DDG	Guided Missile Destroyer	0.25	2.75	100%	19.3	0%	3%	97%	0.0	0.6	18.7	0.0	0.0	0.0	0.0	0.0	60.1	28.2	4.6	10.4	1.4	1942	913	150	335	46	160	3,080	64,846	2	2	65,537
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Chaff Exercise - Aircraft	Northeast				Aircraft emissions																														
	VACAPES	1981																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS														EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)				State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions				
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore		CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Mine Warfare																																		
Mine Countermeasure Exercise - Ship Sonar	Northeast		0	CG	Cruiser	0.2	1.5	100%	0.0	0%	62%	38%	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.14	1.5	100%	0.0	0%	62%	38%	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile frigate	0.12	1.5	100%	0.0	0%	62%	38%	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	JAX																																			
	Key West																																			
	GOMEX																																			
	Outside RCs																																			
	Total																																			
Mine Neutralization - EOD	Northeast		72	RHIB	Rigid Hulled Inflatable Boat	3	12	100%	864.0	100%	0%	0%	864.0	0.0	0.0		34.6	1373.8	8.6	146.9	17.3	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	12	10,368	218,288	7	6	220,613
	VACAPES	24																																		
	Cherry Pt																																			
	JAX																																			
	Key West																																			
	GOMEX																																			
	Outside RCs																																			
	Total																																			
Underwater Mine Countermeasure (UMCM) Raise, Tow, Beach, and Exploitation Operations	Northeast		0	RHIB	Rigid Hulled Inflatable Boat	3	12	100%	0.0	100%	0%	0%	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	12	0	0	0	0	0
	VACAPES	0																																		
	Cherry Pt																																			
	JAX																																			
	Key West																																			
	GOMEX																																			
	Outside RCs																																			
	Total																																			
Airborne Mine Countermeasures (AMCM) Towed Mine Neutralization	Northeast				Aircraft emissions																															
	VACAPES	980																																		
	Cherry Pt																																			
	JAX																																			
	Key West																																			
	GOMEX																																			
	Outside RCs																																			
	Total																																			
Airborne Mine Countermeasures (AMCM) - Mine Detection	Northeast				Aircraft emissions																															
	VACAPES	1232																																		
	Cherry Pt																																			
	JAX																																			
	Key West																																			
	GOMEX																																			
	Outside RCs																																			
	Total																																			
Mine Countermeasures (MCM) - Mine Neutralization Small and Medium Caliber	Northeast				Aircraft emissions																															
	VACAPES	110																																		
	Cherry Pt																																			
	JAX																																			
	Key West																																			
	GOMEX																																			
	Outside RCs																																			
	Total																																			
Mine Countermeasures - Mine Neutralization - ROV	Northeast		210	RHIB	Rigid Hulled Inflatable Boat	1	12	100%	2520.0	100%	0%	0%	2520.0	0.0	0.0		100.8	4006.8	25.2	428.4	50.4	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	12	30,240	636,673	21	18	643,454
	VACAPES	210																																		
	Cherry Pt																																			
	JAX																																			
	Key West																																			
	GOMEX																																			
	Outside RCs																																			
	Total																																			
Mine Laying	Northeast				Aircraft emissions																															
	VACAPES	0																																		
	Cherry Pt																																			
	JAX																																			
	Key West																																			
	GOMEX																																			
	Outside RCs																																			
	Total																																			

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS													EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions			
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Coordinated Unit Level Helicopter AMCM Exercises	Northeast				Aircraft emissions																													
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Major Training Events																																		
Composite Training Unit Exercise (COMPTUEX)	Northeast		1.25	CVN	Nuclear Carrier (No emissions)	1	120.0	100%	0.00	0%	0%	100%	0.0	0.0	0.0																			
	VACAPES	1.25	2.50	CG	Cruiser	2	120.0	100%	300.00	0%	0%	100%	0.0	0.0	300.0	0	0	0	0	0	0	0	0	0	0	32,334	14,136	2,646	6,306	789	158	47,400	997,960	32	28	1,008,588
	Cherry Pt		2.50	DDG	Guided Missile Destroyer	2	120.0	100%	300.00	0%	0%	100%	0.0	0.0	300.0	0	0	0	0	0	0	0	0	0	0	31,197	14,670	2,409	5,382	738	160	48,000	1,010,592	33	29	1,021,355
	JAX		1.25	FFG	Guided Missile Frigate	1	120.0	100%	150.00	0%	0%	100%	0.0	0.0	150.0	0	0	0	0	0	0	0	0	0	0	10,023	10,158	1,172	1,736	488	68	10,200	214,751	7	6	217,038
	Key West		1.25	AOE	Logistics/ Support	1	120.0	100%	150.00	0%	0%	100%	0.0	0.0	150.0	0	0	0	0	0	0	0	0	0	0	560	3,299	419	9,921	1,992	1,599	239,850	5,049,802	164	143	5,103,582
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Joint Task Force Exercise (JTFEX) / Sustainment Exercise (SUSTAINEX)	Northeast		0.66	CVN	Nuclear Carrier (No emissions)	1	120.0	100%	0.00	0%	0%	100%	0.0	0.0	0.0																			
	VACAPES	0.66	1.98	CG	Cruiser	3	120.0	100%	237.60	0%	0%	100%	0.0	0.0	237.6	0	0	0	0	0	0	0	0	0	0	25,609	11,196	2,096	4,994	625	158	37,541	790,384	26	22	798,802
	Cherry Pt		1.98	DDG	Guided Missile Destroyer	3	120.0	100%	237.60	0%	0%	100%	0.0	0.0	237.6	0	0	0	0	0	0	0	0	0	0	24,708	11,619	1,908	4,263	584	160	38,016	800,389	26	23	808,913
	JAX		0.66	FFG	Guided Missile Frigate	1	120.0	100%	79.20	0%	0%	100%	0.0	0.0	79.2	0	0	0	0	0	0	0	0	0	0	5,292	5,363	619	916	257	68	5,386	113,388	4	3	114,596
	Key West		0.66	AOE	Logistics/ Support	1	120.0	100%	79.20	0%	0%	100%	0.0	0.0	79.2	0	0	0	0	0	0	0	0	0	0	295	1,742	221	5,238	1,052	1,599	126,641	2,666,295	86	75	2,694,691
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Other Training																																		
Search and Rescue (SAR)	Northeast				Aircraft emissions																													
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Precision Anchoring	Northeast		0	CG	Cruiser	0.33	3	100%	0.0	0%	50%	50%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.33	3	100%	0.0	0%	50%	50%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	0.33	3	100%	0.0	0%	50%	50%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Elevated Causeway System (ELCAS)	Northeast		0	LCU		2	4	100%	0.0	100%	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Submarine Navigational (SUBNAV)	Northeast			SSN	No emissions																													
	VACAPES	78																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Submarine Under Ice Certification	Northeast			SSN	No emissions																													
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS													EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions			
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Surface Ship Object Detection	Northeast		22.44	CG	Cruiser	0.33	4	100%	89.8	0%	50%	50%	0.0	44.9	44.9	0.0	0.0	0.0	0.0	0.0	4837.2	2114.7	395.8	943.4	118.0	4837	2115	396	943	118	158	14,182	298,590	10	8	301,769
	VACAPES	68	22.44	DDG	Guided Missile Destroyer	0.33	4	100%	89.8	0%	50%	50%	0.0	44.9	44.9	0.0	0.0	0.0	0.0	0.0	4667.1	2194.6	360.4	805.1	110.4	4667	2195	360	805	110	160	14,362	302,369	10	9	305,589
	Cherry Pt		22.44	FFG	Guided Missile Frigate	0.33	4	100%	89.8	0%	50%	50%	0.0	44.9	44.9	0.0	0.0	0.0	0.0	0.0	2998.9	3039.3	350.5	519.3	145.9	2999	3039	351	519	146	68	6,104	128,507	4	4	129,875
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Surface Ship Sonar Maintenance (in OPAREAs and Ports)	Northeast		20.13	CG	Cruiser	0.33	4	100%	80.5	0%	50%	50%	0.0	40.3	40.3	0.0	0.0	0.0	0.0	0.0	4339.2	1897.1	355.1	846.3	105.9	4339	1897	355	846	106	158	12,722	267,852	9	8	270,705
	VACAPES	61	20.13	DDG	Guided Missile Destroyer	0.33	4	100%	80.5	0%	50%	50%	0.0	40.3	40.3	0.0	0.0	0.0	0.0	0.0	4186.6	1968.7	323.3	722.3	99.0	4187	1969	323	722	99	160	12,883	271,243	9	8	274,132
	Cherry Pt		20.13	FFG	Guided Missile Frigate	0.33	4	100%	80.5	0%	50%	50%	0.0	40.3	40.3	0.0	0.0	0.0	0.0	0.0	2690.2	2726.4	314.4	465.8	130.8	2690	2726	314	466	131	68	5,475	115,278	4	3	116,506
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Submarine Sonar Maintenance (in OPAREAs and Ports)	Northeast			SSN	No emissions																														
	VACAPES	34																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Civilian Port Defense	Northeast		0	BW	Boston Whaler	1	2.0	100%	0.0	75%	25%	0%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0
	VACAPES	0	0		Bayliner	1	2.0	100%	0.0	75%	25%	0%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Testing - New Ship Construction																																			
Surface Combatant Sea Trials-Propulsion Testing	Northeast		0	CG	Cruiser	0.33	16	100%	0.0	0%	15%	85%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.33	16	100%	0.0	0%	15%	85%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	0.33	16	100%	0.0	0%	15%	85%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Aircraft Carrier Sea Trials	Northeast			CVN	No emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Sea Basing Ship Sea Trial	Northeast		0.00	AOE	Logistics/ Support	1	40.0	100%	0.00	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,599	0	0	0	0	0
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Amphibious Ship Sea Trial	Northeast		0.0	LPD	Amphibious Transport Dock Wasp	0.33	40.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	VACAPES	0	0.0	LSD	Landing Ship Dock	0.33	40.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Cherry Pt		0.0	LHD	Large Helicopter-dock Ships	0.33	40.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS														EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)				State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions				
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore		CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Submarine Sea Trial	Northeast			SSN	No emissions																													
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Other Class Ship Sea Trials	Northeast		0.0	CG	Cruiser	0.1429	16.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0.0	DDG	Guided Missile Destroyer	0.1429	16.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0.0	FFG	Guided Missile Frigate	0.1429	16.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0
	JAX		0.0	LPD	Amphibious Transport Dock Wasp	0.1429	16.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Key West		0.0	LSD	Landing Ship Dock	0.1429	16.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	GOMEX		0.0	LHD	Large Helicopter-dock Ships	0.1429	16.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Outside RCs		0.0	PC	Patrol Coastal	0.1429	16.0	100%	0.0	0%	15%	85%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0
	Total																																	
LCS Sea Trials and Mission Package Testing	Northeast		0	FFG	Guided Missile Frigate	1	40	100%	0.0	0.0	15%	85%	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Post-Homeporting Test (all Classes)	Northeast		0.0	CG	Cruiser	0.1429	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0.0	DDG	Guided Missile Destroyer	0.1429	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0.0	FFG	Guided Missile Frigate	0.1429	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0
	JAX		0.0	LPD	Amphibious Transport Dock Wasp	0.1429	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Key West		0.0	LSD	Landing Ship Dock	0.1429	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	GOMEX		0.0	LHD	Large Helicopter-dock Ships	0.1429	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Outside RCs		0.0	PC	Patrol Coastal	0.1429	16.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0
	Total																																	
Testing - Shock Trials																																		
Aircraft Carrier Full Ship Shock Trial	Northeast			CVN	No emissions																													
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
DDG 1000 Zumwalt Class Destroyer Full Ship Shock Trial	Northeast		0	DDG	Guided Missile Destroyer	1	24	100%	0.0	0%	0%	100%	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Littoral Combat Ship Full Ship Shock Trial	Northeast		0	FFG	Guided Missile Frigate	1	24	100%	0.0	0%	0%	100%	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS													EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions				
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Testing - Lifecycle Activities																																		
Ship Signature Test	Northeast		0	CG	Cruiser	0.33	16	100%	0.0	50%	50%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.33	16	100%	0.0	50%	50%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	0.33	16	100%	0.0	50%	50%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Shipboard Protection Systems and																																		
Shipboard Protection Systems Testing	Northeast		0	CG	Cruiser	0.2	2.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.2	2.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	0.2	2.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0
	JAX		0	LPD	Amphibious Transport Dock Wasp	0.2	2.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Key West		0	LSD	Landing Ship Dock	0.2	2.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Chemical / Biological Simulant Testing	Northeast		0	CG	Cruiser	0.2	4.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.2	4.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	0.2	4.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0
	JAX		0	LPD	Amphibious Transport Dock Wasp	0.2	4.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Key West		0	LSD	Landing Ship Dock	0.2	4.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Unmanned Vehicle Testing																																		
Underwater Deployed UAV Testing	Northeast			SSN	No emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Unmanned Vehicle Development and Payload Testing	Northeast		0.0	TRB	Torpedo Retrieval Boats	1	8	100%	0.0	75%	25%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	51	0	0	0	0	0
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Other Testing																																		
Test and Evaluation Catapult Launch	Northeast			CVN	No emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Air Platform Shipboard Integrate Test	Northeast			CVN	No emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS													EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions				
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Shipboard Electronic Systems Evaluation	Northeast		0	CG	Cruiser	0.2	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.2	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	0.2	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0
	JAX		0	LPD	Amphibious Transport Dock Wasp	0.2	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Key West		0	LSD	Landing Ship Dock	0.2	4.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Maritime Security	Northeast		0	CG	Cruiser	0.25	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.51	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	0.1	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0
	JAX		0	LPD	Amphibious Transport Dock Wasp	0.04	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	Key West		0	LSD	Landing Ship Dock	0.1	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	0	0
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Countermeasure Testing: Acoustic System Testing	Northeast		0	CG	Cruiser	0.33	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
	VACAPES	0	0	DDG	Guided Missile Destroyer	0.33	4.0	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
	Cherry Pt		0	FFG	Guided Missile Frigate	0.33	4.0	100%	0%	0%	0%	100%	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Special Warfare Testing	Northeast		0	RHIB	Rigid Hulled Inflatable Boat	2	6	100%	0%	100%	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	12	0	0	0	0	0
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Radio-Frequency Testing	Northeast		0.0	TRB	Torpedo Retrieval Boats	1	8	100%	0%	75%	25%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	51	0	0	0	0	0
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Hydrodynamic Testing	Northeast			SSN	no emissions																													
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
At-Sea Explosives Testing	Northeast		0.0	TRB	Torpedo Retrieval Boats	1	8	100%	0.0	0%	0%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	51	0	0	0	0	0
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
RANGE COMPLEX TOTAL (lb)																789.91	5,997.73	1,036.51	709.54	94.24	43,486.89	29,222.16	6,880.16	9,251.92	1,711.18	530,729.98	318,031.61	47,512.48	134,045.11	23,045.77		1,677,480.09	35,317,665.89	1,145.72	998.10	35,693,798.86
RANGE COMPLEX TOTAL (TPY)																0.39	3.00	0.52	0.35	0.05	21.74	14.61	3.44	4.63	0.86	265.36	159.02	23.76	67.02	11.52		838.74	17,658.83	0.57	0.50	17,846.90

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS														EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)				State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions				
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore		CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
Testing: NSWC Panama City Division																																		
AUV Demo		0																																
		0																																
Mine Detect		0																																
		0																																
MCM Testing		0																																
		0																																
Stationary Test		0																																
		0																																
Spec War Test		0	0	RHIB	Rigid Hulled Inflatable Boat	0	6	100%	0.0	100%	0%	0%	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	12	0	0	0	0	0
		0		SDV	No emissions																															
UUV Test		0																																
		0																																
Ord Test		0																																
		0																																
CM Test		0																																
		0																																
Total		0																																
Testing: NUWC Division Newport, RI																																		
Launcher Test		0																																
		0																																
Torpedo Test		0																																
		0																																
Towed Equip Test		0																																
		0																																
UUV Test		0																																
		0																																
USV Test		0																																
		0																																
UAV Test		0																																
		0																																
Semi-Stationary Equip Test		0																																
		0																																
AUV Demo		0																																
		0																																
Pierside Int Swimmer Defense		0																																
		0																																
Total	Total	0																																
South Florida Ocean Measurement																																		
Signature Analysis Ops		0																																
		0																																
Mine RDT&E		0																																
		0																																
Surface Testing		0																																
		0																																
Subsurface Testing		0																																
		0																																

Table D-2: Virginia Capes Range Complex - Training Related - Vessel Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	OPERATIONAL INFORMATION - VESSELS													EMISSIONS/YEAR (lb) BY JURISDICTION																	
			Ship / Vessel / Boat				Range Time (hr)			Distribution (%)			Distribution (hr)			State (0-3 nm offshore)					Waters of U S (3-12 nm)					Int Waters (>12 nm)						GHG Emissions			
			Number	Ship Type	Type	Participation	Per Ship	Time at Each Power Level (%)	Total	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	0-3 nm from shore	3-12 nm from shore	>12 nm from shore	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	CO	NO_x	VOC	SO_x	PM	Fuel Flow (GPH)	Annual Fuel Consumption (gal)	CO_2	N_2O	CH_4	CO_{2-e}
UUV Demos		0																																
		0																																
Total		0																																
Pierside Events																																		
Surface Combatant Sea Trials: Pierside Sonar Testing	Pierside, Bath ME	0	0	CG	Cruiser	0.33	4	100%	0.0	100%	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	158	0	0	0	0	0
	Pierside, Groton CT	0	0	DDG	Guided Missile Destroyer	0.33	4	100%	0.0	100%	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	Pierside, RI	0	0	FFG	Guided Missile Frigate	0.33	4	100%	0.0	100%	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	Pierside, Norfolk Little Creek or Newport News	0																																
	Pierside Kings Bay GA	0																																
	Pierside, Mayport FL	0																																
	Pierside, Port Canaveral FL	0																																
	Pierside, Pascagoula MS	0																																
	Total	0																																
Submarine Sea Trials-Pierside Sonar Testing	Pierside, Bath ME	0		SSN	No emissions																													
	Pierside, Groton CT	0																																
	Pierside, RI	0																																
	Pierside, Norfolk Little Creek or Newport News	0																																
	Pierside Kings Bay GA	0																																
	Pierside, Mayport FL	0																																
	Pierside, Port Canaveral FL	0																																
	Pierside, Pascagoula MS	0																																
	Total	0																																
Pierside Integrated Swimmer Defense	Pierside, Bath ME	0	0	CG	Cruiser	0.33	3	100%	0.0	100%	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	158	0	0	0	0	0
	Pierside, Groton CT	0	0	DDG	Guided Missile Destroyer	0.33	3	100%	0.0	100%	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	160	0	0	0	0	0
	Pierside, RI	0	0	FFG	Guided Missile Frigate	0.33	3	100%	0.0	100%	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	68	0	0	0	0	0
	Pierside, Norfolk Little Creek or Newport News	0																																
	Pierside Kings Bay GA	0																																
	Pierside, Mayport FL	0																																
	Pierside, Port Canaveral FL	0																																
	Pierside, Pascagoula MS	0																																
	Total	0																																

AAV: amphibious assault vehicle; AFTT: Atlantic Fleet Training and Testing; AOE: fast combat support ship; ASW: anti-submarine warfare; AUV: autonomous underwater vehicle; BOMBEX: bombing exercise; BW: boston whaler; CG: cruiser; CH4: methane; Cherry Pt: Navy Cherry Point Range Complex; CM: countermeasures; CO: carbon monoxide; CO2: carbon dioxide; CO2e: carbon dioxide equivalent; CVN: aircraft carrier; DDG: destroyer; EFV: expeditionary fighting vehicle; EOD: explosive ordnance disposal; FFG: frigate; gal: gallon; GHG: greenhouse gas; GOMEX: Gulf of Mexico Range Complex; GPH: gallons per hour; hr: hour; JAX: Jacksonville Range Complex; Key West: Key West Range Complex; lb: pound; LCAC: landing craft air cushion; LCU: landing craft utility; LHA: amphibious assault ship; LHD: landing helicopter dock; LPD: landing platform dock; LSD: landing ship dock; MCM: mine countermeasures; MPA: maritime patrol aircraft; N2O: nitrous oxide; nm: nautical mile; Northeast: Northeast Range Complexes; NOx: nitrogen oxides; NSWC: Naval Surface Warfare Center, Panama City Division Testing Range; NUWC: Naval Undersea Warfare Center Division, Newport Testing Range; Ord: ordnance; Outside RCs: Other AFTT Areas; PC: patrol coastal; PM: particulate matter; RDT&E: research, development, test, and evaluation; RHIB: rigid hull inflatable boat; ROV: remotely operated vehicle; SDV: SEAL delivery vehicle; SEASWITI: southeast anti-submarine warfare integration training initiative; SFOMF: South Florida Ocean Measurement Facility; SOx: sulfur oxides; SSN: nuclear powered fast attack submarine; TORPEX: torpedo exercise; TRACKEX: tracking exercise; TRB: torpedo retrieval boat; UAV: unmanned aerial vehicle; USV: unmanned surface vehicle; UUV: unmanned undersea vehicle; VACAPES: Virginia Capes Range Complex; VOC: volatile organic compounds

NOTES: A standardized calculation worksheet was developed for all training and testing locations; for each alternative; and for each training and testing activity listed in Chapter 2 (Description of the Proposed Action and Alternatives). Emissions estimates for the VACAPES Range Complex example are based on the VACAPES Range Complex activities (Annual Operations #) presented in Column C. Applied emission factors not shown.

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT												EMISSIONS (lb/yr)																		
				Aircraft		Time		Attitude		Distribution (%)			Distribution (hr)			State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				A/C Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft. (%)	Time < 3,000 ft. (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2e}
Anti-Air Warfare																																		
Air Combat Maneuver	Northeast		1.75	406.0	FA-18E/F	1.0	406.0.0	0%	0.0	4%	11%	85%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41,972,280	5996040	126240626	4095	3568	127,585,088
	VACAPES	2320	0.25	580	AV-8B	1.0	580.0	0%	0.0	4%	11%	85%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,480,000	497143	1046 6846	340	296	10,578,318
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Air Defense Exercise	Northeast		0.14	83	E-2	1.0	83.3	50%	41.7	0%	0%	100%	0.00	0.00	4165	0	0	0	0	0	0	0	0	0	0	198	739	45	37	364	183,260	26180	551194	18	16	557,064
	VACAPES	595	0.86	512	FA-18E/F	1.0	511.7	50%	255.9	0%	0%	100%	0.00	0.00	255.85	0	0	0	0	0	0	0	0	0	0	1904	10013	317	1058	17351	5,289,955	755708	15910672	516	450	16,080,121
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Gunnery Exercise, Air-to-Air (Medium Caliber)	Northeast		1.75	53	FA-18E/F	1.0	52.5	0%	0.0	4%	11%	85%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	542,745	77535	1632422	53	46	1,649,807
	VACAPES	30	0.25	8	AV-8B	1.0	7.5	0%	0.0	4%	11%	85%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45,000	6429	135347	4	4	136,789
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Missile Exercise, Air-to-Air	Northeast		0.33	53	FA-18A/C	2.0	105.6	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	700,762	100109	2107691	68	60	2,130,138
	VACAPES	160	0.5	80	FA-18E/F	2.0	160.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,654,080	236297	4975000	161	141	5,027,984
	Cherry Pt		0.09	14	E-2C	4.0	57.6	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126,720	18103	381138	12	11	385,197
	JAX		0	0	EA-18G	2.0	0.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West		0.08	13	DC-130	4.0	51.2	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	230,400	32914	692977	22	20	700,358
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Gunnery Exercise, Surface-to-Air (Large Caliber)	Northeast		0.58	10	Learjet	3.0	31.3	50%	15.7	0%	0%	100%	0.00	0.00	15.66	0	0	0	0	0	0	0	0	0	0	373	98	71	7	21	33,324	4761	100231	3	3	101,298
	VACAPES	18																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Gunnery Exercise, Surface-to-Air (Medium Caliber)	Northeast		0.58	17	Learjet	3.0	52.2	50%	26.1	0%	0%	100%	0.00	0.00	26.10	0	0	0	0	0	0	0	0	0	0	622	164	118	11	35	55,541	7934	167051	5	5	168830
	VACAPES	30																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Missile Exercise, Surface-to-Air	Northeast		0.33	8	SH-60B	3.0	23.8	100%	23.8	0%	0%	100%	0.00	0.00	23.76	0	0	0	0	0	0	0	0	0	0	178	182	16	11	120	28,512	4073	85756	3	2	86,669
	VACAPES	24	0.33	8	P-3	3.0	23.8	67%	15.8	0%	0%	100%	0.00	0.00	15.85	0	0	0	0	0	0	0	0	0	0	138	641	31	30	302	114,048	16293	343024	11	10	346,677
	Cherry Pt		0.33	8	Learjet	3.0	23.8	67%	15.8	0%	0%	100%	0.00	0.00	15.85	0	0	0	0	0	0	0	0	0	0	377	99	72	7	21	25,281	3612	76037	2	2	76,847
	JAX		0	0	C-130	3.0	0.0	67%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West																												37	323		19,904	419,061			
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Intelligence, Surveillance, & Reconnaissance Test	Northeast		1	0	P-3c	6.0	6.0	60%		0%	0%	100%	0.00	0.00	3.60	0	0	0	0	0	0	0	0	0	0	31	146	7	7	69	28,800	4114	86622	3	2	87,545
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Amphibious Warfare																																		
Naval Surface Fire Support Exercise - Land based target (FIREX-Land)	Northeast				Vessel emissions																													
	VACAPES	0																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	
Naval Surface Fire Support Exercise - at sea (FIREX-at sea)	Northeast				Vessel emissions																													
	VACAPES	22																																
	Cherry Pt																																	
	JAX																																	
	Key West																																	
	GOMEX																																	
	Outside RCs																																	
	Total																																	

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT												EMISSIONS (lb/yr)																	
				Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)			State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				AIC Series (#)	Type	Ave. Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2e}
MEU Certification Exercise (CERTEX)	Northeast		0.34	0.0	FA-18A/C	0.5	0.0	15%	0.0	20%	50%	30%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0	0.0	FA-18E/F	0.5	0.0	15%	0.0	20%	50%	30%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt		0.13	0.0	AV-8B	0.5	0.0	25%	0.0	90%	5%	5%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		0.09	0.0	AH-1	1.0	0.0	100%	0.0	90%	5%	5%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West		0.04	0.0	C-130	1.4	0.0	0%	0.0	20%	50%	30%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GOMEX		0.09	0.0	H-53	1.5	0.0	100%	0.0	90%	5%	5%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Outside RCs		0.26	0.0	H-46	1.5	0.0	100%	0.0	90%	5%	5%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total		0.06	0.0	UH-1	1.0	0.0	100%	0.0	90%	5%	5%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphibious Assault	Northeast		0.33	0	AH-1	3.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0.22	0	CH-46	3.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt		0.12	0	CH-53	3.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		0.14	0	AV-8B	3.0	0.0	100%	0.0	0%	100%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West		0.19	0	UH-1	3.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Amphibious Raid / Humanitarian Assistance	Northeast		0.33	0	AH-1	3.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0.22	0	CH-46	3.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt		0.12	0	CH-53	3.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		0.14	0	AV-8B	3.0	0.0	100%	0.0	0%	100%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West		0.19	0	UH-1	3.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Strike Warfare																																			
High-speed Anti-Radiation (Air-to-Surface) (HARM)(AGM-88)	Northeast		1	26	FA-18E/F	6.6	171.6	50%	85.8	0%	0%	100%	0.00	0.00	85.80	0	0	0	0	0	0	0	0	0	0	639	1308.3	106	355	58.19	1,774,001	253429	5335.688	17.3	15.1	5,392.513
	VACAPES	26																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Anti-Surface Warfare																																			
Maritime Security Ops (MSO)	Northeast		0.74	101	SH-60B	4.0	402.6	100%	402.6	0%	0%	100%	0.00	0.00	402.56	0	0	0	0	0	0	0	0	0	0	3019	3092	266	193	2029	483,072	69010	1452.943	47	41	1,468,416
	VACAPES	136	0.25	34	SH-60F	4.0	136.0	100%	136.0	0%	0%	100%	0.00	0.00	136.00	0	0	0	0	0	0	0	0	0	0	1020	1044	90	65	685	163,200	23314	490.859	16	14	496,087
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Maritime Security Ops - Anti-Swimmer Grenades	Northeast		0.74	27	SH-60B	4.0	106.6	100%	106.6	0%	0%	100%	0.00	0.00	106.56	0	0	0	0	0	0	0	0	0	0	799	818	70	51	537	127,872	18267	384.602	12	11	388,698
	VACAPES	36	0.25	9	SH-60F	4.0	36.0	100%	36.0	0%	0%	100%	0.00	0.00	36.00	0	0	0	0	0	0	0	0	0	0	270	276	24	17	181	43,200	6171	129.933	4	4	131,317
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Gunnery Exercise, Surface-to-Surface, (Ship) Small Caliber	Northeast				vessel emissions																														
	VACAPES	120																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Gunnery Exercise, Surface-to-Surface, (Ship) Med Caliber	Northeast				vessel emissions																														
	VACAPES	120																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Gunnery Exercise, Surface-to-Surface, (Ship) Lrg Caliber	Northeast				vessel emissions																														
	VACAPES	137																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Gunnery Exercise, Surface-to-Surface, (Boat) Small Caliber	Northeast				vessel emissions																														
	VACAPES	36																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT											EMISSIONS (lb/yr)																
				Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)			State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				ACC Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2-e}
Gunnery Exercise, Surface-to-Surface, (Boat) Med Caliber	Northeast			vessel emissions																											
	VACAPES	36																													
	Cherry Pt																														
	JAX																														
	Key West																														
	GOMEX																														
	Outside RCs																														
	Total																														
Missile Exercise, Surface-to-Surface	Northeast			vessel emissions																											
	VACAPES	0																													
	Cherry Pt																														
	JAX																														
	Key West																														
	GOMEX																														
	Outside RCs																														
	Total																														
Gunnery Exercise, Air-to-Surface, Small Caliber	Northeast		0.74	386	SH-60B	1.0	386.3	100%	386.3	0%	50%	50%	0.00	193.14	193.14	0	0	0	0	0	1207	1236	106	77	811	1449	1483	127	93	973	463,536	66219	1394184	45	39	1,409,032
	VACAPES	522	0.25	131	SH-60F	1.0	130.5	100%	130.5	0%	50%	50%	0.00	65.25	65.25	0	0	0	0	0	408	418	36	26	274	489	501	43	31	329	156,600	22371	471008	15	13	476,024
	Cherry Pt		0.01	5	MH-60R/S	1.0	5.2	100%	5.2	0%	50%	50%	0.00	2.61	2.61	0	0	0	0	0	16	17	1	1	11	20	20	2	1	13	6,264	895	18840	1	1	19,041
	JAX																														
	Key West																														
	GOMEX																														
	Outside RCs																														
	Total																														
Gunnery Exercise, Air-to-Surface, Medium Caliber	Northeast		0.74	8.1	SH-60B	1.0	8.1	100%	8.1	0%	25%	75%	0.00	2.04	6.11	0	0	0	0	0	13	13	1	1	9	46	47	4	3	31	9,768	1395	29379	1	1	29,692
	VACAPES	11	0.25	2.8	SH-60F	1.0	2.8	100%	2.8	0%	25%	75%	0.00	0.69	2.06	0	0	0	0	0	4	4	0	0	3	15	16	1	1	10	3,300	471	9925	0	0	10,031
	Cherry Pt		0.01	0.1	MH-60R/S	1.0	0.1	100%	0.1	0%	25%	75%	0.00	0.03	0.08	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	132	19	397	0	0	401
	JAX																														
	Key West																														
	GOMEX																														
	Outside RCs																														
	Total																														
Missile Exercise, Air-to-Surface, Rocket	Northeast		0.33	32.0	SH-60B	3.0	96.0	100%	96.0	0%	25%	75%	0.00	24.01	72.02	0	0	0	0	0	150	154	13	10	101	540	553	48	35	363	115,236	16462	346597	11	10	350,288
	VACAPES	97	0.17	16.5	SH-60F	3.0	49.5	100%	49.5	0%	25%	75%	0.00	12.37	37.10	0	0	0	0	0	77	79	7	5	52	278	285	24	18	187	59,364	8481	178550	6	5	180,452
	Cherry Pt		0.18	17.5	FA-18A/C	2.0	34.9	10%	3.5	0%	25%	75%	0.00	0.87	2.62	0	0	0	0	0	2	6	0	0	6	42	117	8	7	111	231,729	33104	696975	23	20	704,398
	JAX		0.18	17.5	FA-18E/F	2.0	34.9	10%	3.5	0%	25%	75%	0.00	0.87	2.62	0	0	0	0	0	1	13	0	0	6	19	399	3	11	178	361,003	51572	1085794	35	31	1,097,357
	Key West		0.14	13.6	S-3B	3.0	40.7	10%	4.1	0%	25%	75%	0.00	1.02	3.06	0	0	0	0	0	14	4	2	0	4	99	28	13	3	25	93,295	13328	280604	9	8	283,592
	GOMEX																														
	Outside RCs																														
	Total																														
Missile Exercise, Air-to-Surface	Northeast		0.33	26.4	SH-60B	3.0	79.2	100%	79.2	0%	0%	100%	0.00	0.00	79.20	0	0	0	0	0	0	0	0	0	0	594	608	52	38	399	95,040	13577	285853	9	8	288,898
	VACAPES	80	0.17	13.6	SH-60F	3.0	40.8	100%	40.8	0%	0%	100%	0.00	0.00	40.80	0	0	0	0	0	0	0	0	0	0	306	313	27	20	206	48,960	6994	147258	5	4	148,826
	Cherry Pt		0.18	14.4	FA-18A/C	2.0	28.8	10%	2.9	0%	0%	100%	0.00	0.00	2.88	0	0	0	0	0	0	0	0	0	0	47	129	8	8	122	191,117	27302	574825	19	16	580,947
	JAX		0.18	14.4	FA-18E/F	2.0	28.8	10%	2.9	0%	0%	100%	0.00	0.00	2.88	0	0	0	0	0	0	0	0	0	0	21	439	4	12	195	297,734	42533	895500	29	25	905,037
	Key West		0.14	11.2	S-3B	3.0	33.6	10%	3.4	0%	0%	100%	0.00	0.00	3.36	0	0	0	0	0	0	0	0	0	0	108	31	14	3	28	76,944	10992	231426	8	7	233,890
	GOMEX																														
	Outside RCs																														
	Total																														
BOMBEX, Air-to-Surface	Northeast		0	0	SH-60B	1.0	0.0	100%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	266	0.2	53	F-15	1.0	53.2	10%	5.3	0%	0%	100%	0.00	0.00	5.32	0	0	0	0	0	0	0	0	0	0	119	1540	21	13	269	329,627	47090	991424	32	28	1,001,983
	Cherry Pt		0	0	FA-18A/C	1.0	0.0	10%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		0.7	186	FA-18E/F	1.0	186.2	10%	18.6	0%	0%	100%	0.00	0.00	18.62	0	0	0	0	0	0	0	0	0	0	139	2839	23	77	1263	1,924,936	274991	5789656	188	164	5,851,316
	Key West		0.1	27	S-3B	1.0	26.6	10%	2.7	0%	0%	100%	0.00	0.00	2.66	0	0	0	0	0	0	0	0	0	0	86	25	11	2	22	60,914	8702	183212	6	5	185,163
	GOMEX																														
	Outside RCs																														
	Total																														
Laser Targeting	Northeast		0	0	SH-60B	1.0	0.0	100%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	272	0.2	54	F-15	1.0	54.4	10%	5.4	0%	0%	100%	0.00	0.00	5.44	0	0	0	0	0	0	0	0	0	0	122	1575	22	13	275	337,062	48152	1013787	33	29	1,024,584
	Cherry Pt		0	0	FA-18A/C	1.0	0.0	10%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		0.7	190	FA-18E/F	1.0	190.4	10%	19.0	0%	0%	100%	0.00	0.00	19.04	0	0	0	0	0	0	0	0	0	0	142	2903	24	79	1291	1,968,355	281194	5920250	192	167	5,983,301
	Key West		0.1	27	S-3B	1.0	27.2	10%	2.7	0%	0%	100%	0.00	0.00	2.72	0	0	0	0	0	0	0	0	0	0	88	25	12	2	23	62,288	8898	187345	6	5	189,340
	GOMEX																														
	Outside RCs																														
	Total																														
Sinking Exercise	Northeast		0.15	0	E-2	16.0	0.0	10%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0.62	0	FA-18E/F	16.0	0.0	10%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt		0.08	0	P-3	16.0	0.0	10%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		0.15	0	SH-60B	16.0	0.0	100%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West																														
	GOMEX																														
	Outside RCs																														
	Total																														
High Energy Laser Weapons Test	Northeast		0.33	0	SH-60B	1.0	0.0	100%	0.0	0%	50%	50%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0.17	0	SH-60F	1.0	0.0	100%	0.0	0%	50%	50%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt		0.18	0	FA-18A/C	1.0	0.0	10%	0.0	0%	50%	50%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		0.18	0	FA-18E/F	1.0	0.0	10%	0.0	0%	50%	50%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West		0.14	0	S-3B	1.0	0.0	10%	0.0	0%	50%	50%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GOMEX																														
	Outside RCs																														
	Total																														

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT												EMISSIONS (lb/yr)																	
				Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)			State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				AIC Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft. (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2e}
Anti-Submarine Warfare																																	
TRACKEX/TORPEX-Submarine	Northeast			SSN-no emissions																													
	VACAPES	10																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
TRACKEX/TORPEX-Surface	Northeast			vessel emissions																													
	VACAPES	69																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
TRACKEX/TORPEX-Helicopter	Northeast		0.17	4	SH-60B	3.6	15.3	100%	15.3	0%	24%	76%	0.00	3.61	11.69	0	0	0	0	0	23	23	2	1	15	88	90	8	6	59	18,360	2623	55 222	2	2	55 810
	VACAPES	25	0.83	21	SH-60F	3.6	74.7	100%	74.7	0%	24%	76%	0.00	17.63	57.07	0	0	0	0	0	110	113	10	7	74	428	438	38	27	288	89,640	12806	269612	9	8	272,483
	Cherry Pt				MH-60R	3.6	0.0	100%	0.0	0%	24%	76%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
TRACKEX-MPA	Northeast		1	79	P-3	6.0	474.0	25%	118.5	5%	10%	85%	5.93	11.85	100.73	52	240	12	11	113	22	100	5	5	47	880	4076	198	193	1919	2,275,200	325029	6843152	222	193	6,916,031
	VACAPES	79	0	0	P8-MMA	6.0	0.0	25%	0.0	5%	10%	85%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
TRACKEX/TORPEX-MPA-Sonobuoy	Northeast		1	34	P-3	6.0	204.0	25%	51.0	5%	10%	85%	2.55	5.10	43.35	22	103	5	5	49	9	43	2	2	20	379	1754	85	83	826	979,200	139886	2945154	96	83	2,976,520
	VACAPES	34	0	0	P8-MMA	6.0	0.0	25%	0.0	5%	10%	85%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
SEASWITI	Northeast		1	0	P-3	16.0	0.0	10%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	2	0	SH-60B	16.0	0.0	100%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Integrated Anti-Submarine Warfare Course	Northeast		1	0	P-3	16.0	3.2	10%	0.3	0%	0%	100%	0.00	0.00	0.32	0	0	0	0	0	0	0	0	0	0	3	13	1	1	6	15,360	2194	46198	1	1	46691
	VACAPES	0.2	2	0	SH-60B	16.0	6.4	100%	6.4	0%	0%	100%	0.00	0.00	6.40	0	0	0	0	0	0	0	0	0	0	48	49	4	3	32	7,680	1097	23099	1	1	23,345
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Group Sail	Northeast		1	3	P-3	16.0	48.0	10%	4.8	0%	0%	100%	0.00	0.00	4.80	0	0	0	0	0	0	0	0	0	0	42	194	9	9	91	230,400	32914	692977	22	20	700,358
	VACAPES	3	4	12	SH-60B	16.0	192.0	100%	192.0	0%	0%	100%	0.00	0.00	192.00	0	0	0	0	0	0	0	0	0	0	1440	1475	127	92	968	230,400	32914	692977	22	20	700,358
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Submarine Command Course Operations	Northeast			SSN	No emissions																												
	VACAPES	0																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
ASW for Composite Training Unit Exercise (COMPTUEX)	Northeast				Conducted during COMPTUEX																												
	VACAPES	0																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT												EMISSIONS (lb/yr)																	
				Aircraft		Time		Altitude	Distribution (%)			Distribution (hr)				State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				AC Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2e}
ASW for Joint Task Force Exercise (JTFEX) Sustainment Exercise (SUSTAINEX)	Northeast			Conducted during JTFEX																													
	VACAPES	0																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Electronic Warfare																																	
Electronic Warfare	Northeast		0.05	15	SH-60B/F	2.1	31.7	100%	31.7	0%	0%	100%	0.00	0.00	31.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	237.83	243.53	20.93	15.22	159.82	38,052	5436	114450	4	3	115,668
	VACAPES	302	0.004	1	HH-60	2.1	2.5	100%	2.5	0%	0%	100%	0.00	0.00	2.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.03	19.48	1.67	1.22	11.79	3,044	435	9156	0	0	9,253
	Cherry Pt		0.04	12	P-3	2.0	24.2	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	115,968	16567	348799	11	10	352,513
	JAX		0.29	88	FA-18A/C	2.0	175.2	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,162,362	166052	3496052	113	99	3,533,285
	Key West		0.29	88	FA-18E/F	2.0	175.2	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,810,804	258686	5446381	177	154	5,504,385
	GOMEX		0.02	6	E-2C	2.0	12.1	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26,576	3797	79933	3	2	80,784
	Outside RCs		0.11	33	EA-6B	2.0	66.4	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	424,552	60650	1276930	41	36	1,290,529
	Total		0.2	60	Learjet	2.0	120.8	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	128,531	18362	386585	13	11	390,702
Flare Exercise	Northeast		0.25	20	FA-18E/F	2.8	55.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	568,590	81227	1710156	55	48	1,728,369
	VACAPES	80	0.25	20	EA-18G	2.8	55.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	568,590	81227	1710156	55	48	1,728,369
	Cherry Pt		0.25	20	EP-3	2.8	55.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	231,660	33094	696767	23	20	704,188
	JAX		0	0	EA-6B	2.8	0.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0
	Key West		0	0	P-3	2.8	0.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0
	GOMEX		0.25	20	Learjet	2.0	40.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42,560	6080	128008	4	4	129,372
	Outside RCs		0.25	20	SH-60B/F	2.8	55.0	100%	55.0	0%	0%	100%	0.00	0.00	55.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	412.50	422.40	36.30	26.40	277.20	66,000	9429	198509	6	6	200,623
	Total																																		
Chaff Exercise - Ship	Northeast																																		
	VACAPES	28																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Chaff Exercise - Aircraft	Northeast		0.25	495.25	FA-18E/F	2.8	1361.9	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14,079,710	2011387	42347745	1374	1197	42,798,748
	VACAPES	1981	0.25	495.25	EA-18G	2.8	1361.9	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14,079,710	2011387	42347745	1374	1197	42,798,748
	Cherry Pt		0.25	495.25	EP-3	2.8	1361.9	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5,736,481	819497	17253695	560	488	17,437,447
	JAX		0	0	EA-6B	2.8	0.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0
	Key West		0	0	P-3	2.8	0.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0
	GOMEX		0.25	495.25	Learjet	2.0	990.5	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,053,892	150556	3169806	103	90	3,203,564
	Outside RCs		0.25	495.25	SH-60B/F	2.8	1361.9	100%	1361.9	0%	0%	100%	0.00	0.00	1361.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1021453	10459.68	893.88	653.73	6864.17	1,634,325	233475	4915583	159	139	4,967,934
	Total																																		
Mine Warfare																																			
Mine Countermeasure Exercise - Ship Sonar	Northeast				vessel emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Mine Neutralization - EOD	Northeast				vessel emissions																														
	VACAPES	24																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Underwater Mine Countermeasure (UMCM) Raise, Tow, Beach, and Exploitation Operations	Northeast				vessel emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Airborne Mine Countermeasures (AMCM) Towed Mine Neutralization	Northeast		1	980	SH-60B	2.1	2058.0	100%	2058.0	100%	0%	0%	2058.00	0.00	0.00	15435.00	15805.44	1358.28	987.84	10372.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,469,600	352800	7427851	241	210	7,506,958
	VACAPES	980																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Airborne Mine Countermeasures (AMCM) - Mine Detection	Northeast		1	1232	SH-60B	2.1	2587.2	100%	2587.2	100%	0%	0%	2587.20	0.00	0.00	19404.00	19869.70	1707.55	1241.86	13039.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,104,640	443520	9337870	303	264	9,437,318
	VACAPES	1232																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT												EMISSIONS (lb/yr)																	
				Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)			State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				A/C Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2e}
Mine Countermeasures (MCM) - Mine Neutralization Small and Medium Caliber	Northeast		1	110	SH-60B	2.1	231.0	100%	231.0	25%	75%	0%	57.75	173.25	0.00	433.13	443.52	38.12	27.72	291.06	1299.38	1330.56	114.35	83.16	873.18	0.00	0.00	0.00	0.00	0.00	277,200	39600	833738	27	24	842,618
	VACAPES	110																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Mine Countermeasures - Mine Neutralization - ROV	Northeast		1	210	SH-60B	2.1	441.0	100%	441.0	100%	0%	0%	441.00	0.00	0.00	3307.50	3386.88	291.06	211.68	2222.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	529,200	75600	1591682	52	45	1,608,634
	VACAPES	210																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Mine Laying	Northeast		0.19	0	P-3	0.9	0.0	67%	0.0	50%	40%	10%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0
	VACAPES	0	0.42	0	FA-18A/C	0.5	0.0	7%	0.0	50%	40%	10%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0
	Cherry Pt		0.39	0	FA-18E/F	0.5	0.0	7%	0.0	50%	40%	10%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Coordinated Unit Level Helicopter AMCM Exercises	Northeast		4	0	SH-60B	4.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0
	VACAPES	0																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Major Training Events																																	
Composite Training Unit Exercise (COMPTUEX)	Northeast		3	4	SH-60B/F	36.0	135.0	100%	135.0	0%	0%	100%	0.00	0.00	135.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1012.50	1036.80	89.10	64.80	680.40	162,000	23143	487250	16	14	492,439
	VACAPES	1.25	3	4	HH-60	36.0	135.0	100%	135.0	0%	0%	100%	0.00	0.00	135.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1012.50	1036.80	89.10	64.80	680.40	162,000	23143	487250	16	14	492,439
	Cherry Pt		2	3	P-3	36.0	90.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	432,000	61714	1293933	42	37	1,313,170
	JAX		20	25	FA-18A/C	36.0	900.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5,972,400	853200	17963273	583	508	18,154,582
	Key West		20	25	FA-18E/F	36.0	900.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9,304,200	1329171	27984375	908	791	28,282,409
	GOMEX		6	8	E-2C	36.0	270.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	594,000	84857	1786582	58	50	1,805,609
	Outside RCs																																		
	Total																																		
Joint Task Force Exercise (JTFEX) / Sustainment Exercise (SUSTAINEX)	Northeast		3	2	SH-60B/F	36.0	71.3	100%	71.3	0%	0%	100%	0.00	0.00	71.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	534.60	547.43	47.04	34.21	359.25	85,536	12219	257268	8	7	260,008
	VACAPES	0.66	3	2	HH-60	36.0	71.3	100%	71.3	0%	0%	100%	0.00	0.00	71.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	534.60	547.43	47.04	34.21	359.25	85,536	12219	257268	8	7	260,008
	Cherry Pt		2	1	P-3	36.0	47.5	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	228,096	32585	686048	22	19	693,354
	JAX		20	13	FA-18A/C	36.0	475.2	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,153,427	450490	9484608	308	268	9,585,619
	Key West		20	13	FA-18E/F	36.0	475.2	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,912,618	701803	14775750	479	418	14,933,112
	GOMEX		6	4	E-2C	36.0	142.6	0%	0.0	0%	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	313,632	44805	943315	31	27	953,362
	Outside RCs																																		
	Total																																		
Other Training																																	
Search and Rescue (SAR)	Northeast		1	0	SH-60B	2.0	0.0	100%	0.0	100%	0%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0
	VACAPES	0																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Precision Anchoring	Northeast				vessel emissions																												
	VACAPES	0																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Elevated Causeway System (ELCAS)	Northeast				vessel emissions																												
	VACAPES	0																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
Submarine Navigational (SUBNAV)	Northeast			SSN	No emissions																												
	VACAPES	78																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT												EMISSIONS (lb/yr)																
				Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)			State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				AIC Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft. (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_2e
Submarine Underice Certification	Northeast			SSN	No emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Surface Ship Object Detection	Northeast				vessel emissions																											
	VACAPES	68																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Surface Ship Sonar Maintenance (in OPAREAs and Ports)	Northeast				vessel emissions																											
	VACAPES	61																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Submarine Sonar Maintenance (in OPAREAs and Ports)	Northeast			SSN	No emissions																											
	VACAPES	34																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Civilian Port Defense	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Testing - New Ship Construction																																
Surface Combatant Sea Trials - Propulsion Testing	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Aircraft Carrier Sea Trials	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Sea Basing Ship Sea Trial	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Amphibious Ship Sea Trial	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Submarine Sea Trial	Northeast				SSN-no emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT												EMISSIONS (lb/yr)																
				Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)			State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				A/C Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2e}
Other Class Ship Sea Trials	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
LCS Sea Trials and Mission Package Testing	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Post-Homeporting Test (all Classes)	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Testing - Shock Trials																																
Aircraft Carrier Full Ship Shock Trial	Northeast				CVN-no emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
DDG 1000 Zumwalt Class Destroyer Full Ship Shock Trial	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Littoral Combat Ship Full Ship Shock Trial	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Testing - Lifecycle Activities																																
Ship Signature Test	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Shipboard Protection Systems and																																
Shipboard Protection Systems Testing	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															
Chemical / Biological Simulant Testing	Northeast				vessel emissions																											
	VACAPES	0																														
	Cherry Pt																															
	JAX																															
	Key West																															
	GOMEX																															
	Outside RCs																															
	Total																															

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT													EMISSIONS (lb/yr)																			
				Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)				State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				AC Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2e}
Unmanned Vehicle Testing																																			
Underwater Deployed UAV Testing	Northeast			SSN	No emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Unmanned Vehicle Development and Payload Testing	Northeast				vessel emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Other Testing																																			
Test and Evaluation Catapult Launch	Northeast			CVN	no emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Air Platform Shipboard Integrate Test	Northeast			CVN	no emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Shipboard Electronic Systems Evaluation	Northeast				vessel emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Maritime Security	Northeast		0.74	0	SH-60B	4.0	0.0	100%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0.25	0	SH-60F	4.0	0.0	100%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Countermeasure Testing: Acoustic System Testing	Northeast				vessel emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Special Warfare Testing	Northeast				vessel emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Radio-Frequency Testing	Northeast				vessel emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		
Hydrodynamic Testing	Northeast			SSN	no emissions																														
	VACAPES	0																																	
	Cherry Pt																																		
	JAX																																		
	Key West																																		
	GOMEX																																		
	Outside RCs																																		
	Total																																		

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT												EMISSIONS (lb/yr)																	
				Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)			State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				A/C Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2e}
At-Sea Explosives Testing	Northeast			vessel emissions																													
	VACAPES	0																															
	Cherry Pt																																
	JAX																																
	Key West																																
	GOMEX																																
	Outside RCs																																
	Total																																
RANGE COMPLEX TOTAL (lb)																38,653.66	39,848.47	3,411.69	2,485.37	26,087.01	3,355.87	3,553.09	300.43	219.59	2,305.17	31,624.68	95,678.94	3,425.46	3,665.86	47,752.77	141,398,987.30	20,219,759.42	425,706,814.83	13,796.50	12,018.91	429,817,066.65
RANGE COMPLEX TOTAL (TPY)																19.33	19.92	1.71	1.24	13.04	1.68	1.78	0.15	0.11	1.15	15.81	47.84	1.71	1.83	23.88	70,699.49	10,109.88	212,853.41	6.90	6.01	214,908.53
Testing: NSWC Panama City																																	
AUV Demo		0			vessel emissions																												
		0																															
Mine Detect		0	0	0	SH-60B	1.6	0.0	100%	0.0	25%	50%	25%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0																															
MCM Testing		0	0	0	SH-60B	1.6	0.0	100%	0.0	25%	50%	25%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0																															
Stationary Test		0			No emissions																												
		0																															
Spec War Test		0			SDV no emissions																												
		0																															
UUV Test		0			vessel emissions																												
		0																															
Ord Test		0	0	0	SH-60B	1.0	0.0	100%	0.0	0%	0%	100%	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0																															
CM Test		0			vessel emissions																												
		0																															
Total		0																															
Testing: NUWC Division Newport,																																	
Launcher Test		0																															
		0																															
Torpedo Test		0																															
		0																															
Towed Equip Test		0																															
		0																															
UUV Test		0																															
		0																															
USV Test		0																															
		0																															
UAV Test		0																															
		0																															
Semi-Stationary Equip Test		0																															
		0																															
AUV Demo		0																															
		0																															
Pierside Int Swimmer Defense		0																															
		0																															
Total	Total	0																															
South Florida Ocean																																	
Signature Analysis Ops		0																															
		0																															
Mine RDT&E		0																															
		0																															

Table D-3: Virginia Capes Range Complex - Training Related - Aircraft Air Emissions—No-Action Alternative (Continued)

Training or Testing Event	Location	Annual Operations (#)	Distribution	TRAINING OPS INFORMATION - AIRCRAFT												EMISSIONS (lb/yr)																	
				Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)			State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use (total)		GHG Emissions (lb)			
				A/C Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO_2	N_2O	CH_4	CO_{2-e}
Surface Testing		0																															
		0																															
Subsurface Testing		0																															
		0																															
UUV Demos		0																															
		0																															
Total		0																															
Pierside Events																																	
Surface Combatant Sea Trials: Pierside Sonar Testing	Pierside, Bath ME	0																															
	Pierside, Groton CT	0																															
	Pierside , RI	0																															
	Pierside, Norfolk Little Creek or Newport News	0																															
	Pierside Kings Bay GA	0																															
	Pierside, Mayport FL	0																															
	Pierside, Port Canaveral FL	0																															
	Pierside, Pascagoula MS	0																															
	Total	0																															
Submarine Sea Trials - Pierside Sonar Testing	Pierside, Bath ME	0																															
	Pierside, Groton CT	0																															
	Pierside , RI	0																															
	Pierside, Norfolk Little Creek or Newport News	0																															
	Pierside Kings Bay GA	0																															
	Pierside, Mayport FL	0																															
	Pierside, Port Canaveral FL	0																															
	Pierside, Pascagoula MS	0																															
	Total	0																															
Pierside Integrated Swimmer Defense	Pierside, Bath ME	0																															
	Pierside, Groton CT	0																															
	Pierside , RI	0																															
	Pierside, Norfolk Little Creek or Newport News	0																															
	Pierside Kings Bay GA	0																															
	Pierside, Mayport FL	0																															
	Pierside, Port Canaveral FL	0																															
	Pierside, Pascagoula MS	0																															
	Total	0																															

A/C: aircraft; AFTT: Atlantic Fleet Training and Testing; ASW: anti-submarine warfare; AUV: autonomous underwater vehicle; BOMBEX: bombing exercise; CH4: methane; Cherry Pt: Navy Cherry Point Range Complex; CM: countermeasures; CO: carbon monoxide; CO2: carbon dioxide; CO2e: carbon dioxide equivalent; EOD: explosive ordnance disposal; gal: gallon; GHG: greenhouse gas; GOMEX: Gulf of Mexico Range Complex; GPH: gallons per hour; hr: hour; JAX: Jacksonville Range Complex; Key West: Key West Range Complex; lb: pound; MCM: mine countermeasures; MPA: maritime patrol aircraft; N2O: nitrous oxide; nm: nautical mile; Northeast: Northeast Range Complexes; NOx: nitrogen oxides; NSWC: Naval Surface Warfare Center, Panama City Division Testing Range; NUWC: Naval Undersea Warfare Center Division, Newport Testing Range; Ord: ordnance; Outside RCs: Other AFTT Areas; PM: particulate matter; RDT&E: research, development, test, and evaluation; ROV: remotely operated vehicle; SEASWITI: southeast anti-submarine warfare integration training initiative; SFOMF: South Florida Ocean Measurement Facility; SOx: sulfur oxides; TORPEX: torpedo exercise; TRACKEX: tracking exercise; UAV: unmanned aerial vehicle; USV: unmanned surface vehicle; UUV: unmanned undersea vehicle; VACAPES: Virginia Capes Range Complex; VOC: volatile organic compounds

NOTE: A standardized calculation worksheet was developed for all training and testing locations; for each alternative; and for each training and testing activity listed in Chapter 2 (Description of the Proposed Action and Alternatives). Emissions estimates for the VACAPES Range Complex example are based on the VACAPES Range Complex activities (Annual Operations #) presented in Column C. Applied emission factors not shown.

Table D-4: Ordnance Emissions Estimates - No Action Alternative

MEM Category	Location – Range Complex	Number of MEM Items (Annual) for Training Activities	Number of MEM Items (Annual) for Testing Activities	Emission Factors (lb/item)						Emissions (lb/year) Training						Emissions (TPY) Training						Emissions (lb/year) Testing						Emissions (TPY) Testing					
		No Action Alternative	No Action Alternative	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Bombs																																	
Bombs (High Explosive)	Northeast / NUWC Newport	0	0	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Virginia Capes	**20**	**0**	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1220.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Cherry Point	0	0	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Jacksonville	0	0	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Key West	0	0	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / NSWC Panama City	4	0	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	244.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1220	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Other AFTT	0	0	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Total	24	0																														
Bombs (Non-Explosive Practice Munition)	Northeast / NUWC Newport	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Virginia Capes	**555**	**355**	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Cherry Point	811	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Jacksonville	696	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Key West	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / NSWC Panama City	292	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Other AFTT	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Total	2354	355																														
Projectiles																																	
Small Caliber	Northeast / NUWC Newport	0	0	0.0023	0.0001	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Virginia Capes	**1301800**	**800**	0.0023	0.0001	0.0000	0.0000	0.0001	0.0000	2994.1400	126.2746	0.0000	0.0000	66.3918	49.4684	1.4971	0.0631	0.0000	0.0000	0.0332	0.0247	1.8400	0.0776	0.0000	0.0000	0.0408	0.0304	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000
	Cherry Point	187645	0	0.0023	0.0001	0.0000	0.0000	0.0001	0.0000	431.5835	18.2016	0.0000	0.0000	9.5699	7.1305	0.2158	0.0091	0.0000	0.0000	0.0048	0.0036	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Jacksonville	502140	0	0.0023	0.0001	0.0000	0.0000	0.0001	0.0000	1154.9220	48.7076	0.0000	0.0000	25.6091	19.0813	0.5775	0.0244	0.0000	0.0000	0.0128	0.0095	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Key West	0	0	0.0023	0.0001	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / NSWC Panama City	39600	8000	0.0023	0.0001	0.0000	0.0000	0.0001	0.0000	91.0800	3.8412	0.0000	0.0000	2.0196	1.5048	0.0455	0.0019	0.0000	0.0000	0.0010	0.0008	18.4000	0.7760	0.0000	0.0000	0.4080	0.3040	0.0092	0.0004	0.0000	0.0000	0.0002	0.0002
	Other AFTT	0	0	0.0023	0.0001	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Total	2031185	8800																														
Medium Caliber (High Explosive)	Northeast / NUWC Newport	0	0	0.033	0.00043	0.0000	0.0000	0.00066	0.00046	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Virginia Capes	**0**	**15210**	0.033	0.00043	0.0000	0.0000	0.00066	0.00046	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	501.9300	6.5403	0.0000	0.0000	10.0386	6.9966	0.2510	0.0033	0.0000	0.0000	0.0050	0.0035
	Cherry Point	0	0	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Jacksonville	0	6000	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	198.0000	2.5800	0.0000	0.0000	3.9600	2.7600	0.0990	0.0013	0.0000	0.0000	0.0020	0.0014
	Key West	0	0	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / NSWC Panama City	0	0	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Any OPAREA	0	0	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Other AFTT	0	0	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Total	0	21210																														
Medium Caliber (Non-Explosive Practice Munitions)	Northeast / NUWC Newport	0	0	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Virginia Capes	**22400**	**21210**	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	739.2000	9.6320	0.0000	0.0000	14.7840	10.3040	0.3696	0.0048	0.0000	0.0000	0.0074	0.0052	699.9300	9.1203	0.0000	0.0000	13.9986	9.7566	0.3500	0.0046	0.0000	0.0000	0.0070	0.0049
	Cherry Point	38400	0	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	1267.2000	16.5120	0.0000	0.0000	25.3440	17.6640	0.6336	0.0083	0.0000	0.0000	0.0127	0.0088	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Jacksonville	55540	16000	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	1832.8200	23.8822	0.0000	0.0000	36.6564	25.5484	0.9164	0.0119	0.0000	0.0000	0.0183	0.0128	528.0000	6.8800	0.0000	0.0000	10.5600	7.3600	0.2640	0.0034	0.0000	0.0000	0.0053	0.0037
	Key West	36000	0	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	1188.0000	15.4800	0.0000	0.0000	23.7600	16.5600	0.5940	0.0077	0.0000	0.0000	0.0119	0.0083	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / NSWC Panama City	25600	5272	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	844.8000	11.0080	0.0000	0.0000	16.8960	11.7760	0.4224	0.0055	0.0000	0.0000	0.0084	0.0059	173.9760	2.2670	0.0000	0.0000	3.4795	2.4251	0.0870	0.0011	0.0000	0.0000	0.0017	0.0012
	Any OPAREA	0	0	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Other AFTT	0	4572	0.0330	0.0004	0.0000	0.0000	0.0007	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	150.8760	1.9660	0.0000	0.0000	3.0175	2.1031	0.0754	0.0010	0.0000	0.0000	0.0015	0.0011
	Total	177940	47054																														
Large Caliber (High Explosive)	Northeast / NUWC Newport	0	0	0.1280	0.1600	0.0000	0.0000	0.0096	0.0074	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Virginia Capes	**858**	**0**	0.1280	0.1600	0.0000	0.0000	0.0096	0.0074	109.8240	137.2800	0.0000	0.0000	8.2368	6.3835	0.0549	0.0686	0.0000	0.0000	0.0041	0.0032	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Cherry Point	78	0	0.1280	0.1600	0.0000	0.0000	0.0096	0.0074	9.9840	12.4800	0.0000	0.0000	0.7488	0.5803	0.0050	0.0062	0.0000	0.0000	0.0004	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Jacksonville	390	0	0.1280	0.1600	0.0000	0.0000	0.0096	0.0074	49.9200	62.4000	0.0000	0.0000	3.7440	2.9016	0.0250	0.0312	0.0000	0.0000	0.0019	0.0015	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Key West	0	0	0.1280	0.1600	0.0000	0.0000	0.0096	0.0074	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / NSWC Panama City	0	0	0.1280	0.1600	0.0000	0.0000	0.0096	0.0074	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Other AFTT	0	0	0.1280	0.1600	0.0000	0.0000	0.0096	0.0074	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Total	1326	0																														

Table D-4: Ordnance Emissions Estimates - No Action Alternative (Continued)

MEM Category	Location – Range Complex	Number of MEM Items (Annual) for Training Activities	Number of MEM Items (Annual) for Testing Activities	Emission Factors (lb/item)						Emissions (lb/year) Training						Emissions (TPY) Training						Emissions (lb/year) Testing						Emissions (TPY) Testing					
		No Action Alternative	No Action Alternative	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Large Caliber (Non-Explosive Practice Munition)	Northeast / NUWC Newport	0	148	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Virginia Capes	**3844**	**0**	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Cherry Point	1392	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Jacksonville	2372	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Key West	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / NSWC Panama City	1240	448	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Other AFTT	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Total	8848	596																														
Missiles (High Explosive)	Northeast / NUWC Newport	0	0																														
	Virginia Capes	**178**	**5**																														
	Cherry Point	42	0																														
	Jacksonville	88	5																														
	Key West	0	0																														
	GOMEX / NSWC Panama City	0	0																														
	Other AFTT	0	0																														
	Total	308	10																														
Missiles (Non-Explosive Practice Munition)	Northeast / NUWC Newport	0	4																														
	Virginia Capes	**112**	**36**																														
	Cherry Point	10	0																														
	Jacksonville	15	5																														
	Key West	0	0																														
	GOMEX / NSWC Panama City	0	4																														
	Any AFTT	0	0																														
	Total	137	49																														
Rockets (High Explosive)	Northeast / NUWC Newport	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Virginia Capes	**0**	**150**	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	139.5000	0.8400	0.0000	0.0000	60.0000	43.5000	0.0698	0.0004	0.0000	0.0000	0.0300	0.0218
	Cherry Point	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Jacksonville	0	110	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	102.3000	0.6160	0.0000	0.0000	44.0000	31.9000	0.0512	0.0003	0.0000	0.0000	0.0220	0.0160
	Key West	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / Panama City	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Other AFTT	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Total	0	260																														
Rockets (Non-Explosive)	Northeast / NUWC Newport	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Virginia Capes	**3700**	**0**	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	3441.0000	20.7200	0.0000	0.0000	1480.0000	1073.0000	1.7205	0.0104	0.0000	0.0000	0.7400	0.5365	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Cherry Point	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Jacksonville	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Key West	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / Panama City	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Other AFTT	0	0	0.9300	0.0056	0.0000	0.0000	0.4000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Total	3700	0																														
Pyrotechnic Buoys (e.g. MK-58 Marine Marker)	Northeast / NUWC Newport	0	23	0.0460	0.0010	0.0000	0.0001	0.6800	0.1100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0580	0.0230	0.0000	0.0028	15.6400	2.5300	0.0005	0.0000	0.0000	0.0000	0.0078	0.0013
	Virginia Capes	**261**	**29**	0.0460	0.0010	0.0000	0.0001	0.6800	0.1100	12.0060	0.2610	0.0000	0.0313	177.4800	28.7100	0.0060	0.0001	0.0000	0.0000	0.0887	0.0144	1.3340	0.0290	0.0000	0.0035	19.7200	3.1900	0.0007	0.0000	0.0000	0.0000	0.0099	0.0016
	Cherry Point	98	11	0.0460	0.0010	0.0000	0.0001	0.6800	0.1100	4.5080	0.0980	0.0000	0.0118	66.6400	10.7800	0.0023	0.0000	0.0000	0.0000	0.0333	0.0054	0.5060	0.0110	0.0000	0.0013	7.4800	1.2100	0.0003	0.0000	0.0000	0.0000	0.0037	0.0006
	Jacksonville	271	26	0.0460	0.0010	0.0000	0.0001	0.6800	0.1100	12.4660	0.2710	0.0000	0.0325	184.2800	29.8100	0.0062	0.0001	0.0000	0.0000	0.0921	0.0149	1.1960	0.0260	0.0000	0.0031	17.6800	2.8600	0.0006	0.0000	0.0000	0.0000	0.0088	0.0014
	Key West	0	0	0.0460	0.0010	0.0000	0.0001	0.6800	0.1100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	GOMEX / Panama City	66	11	0.0460	0.0010	0.0000	0.0001	0.6800	0.1100	3.0360	0.0660	0.0000	0.0079	44.8800	7.2600	0.0015	0.0000	0.0000	0.0000	0.0224	0.0036	0.5060	0.0110	0.0000	0.0013	7.4800	1.2100	0.0003	0.0000	0.0000	0.0000	0.0037	0.0006
	Other AFTT	0	5	0.0460	0.0010	0.0000	0.0001	0.6800	0.1100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2300	0.0050	0.0000	0.0006	3.4000	0.5500	0.0001	0.0000	0.0000	0.0000	0.0017	0.0003
	Total	696	105																														

Table D-4: Ordnance Emissions Estimates - No Action Alternative (Continued)

MEM Category	Location – Range Complex	Number of MEM Items (Annual) for Training Activities	Number of MEM Items (Annual) for Testing Activities	Emission Factors (lb/item)						Emissions (lb/year) Training						Emissions (TPY) Training						Emissions (lb/year) Testing						Emissions (TPY) Testing					
		No Action Alternative	No Action Alternative	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
																CO	NOx	VOC	SOx	PM10	PM2.5							CO	NOx	VOC	SOx	PM10	PM2.5
													TOTALS BY COMPLEX (TPY)		Northeast / NUWC Newport	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000							TOTALS BY COMPLEX (TPY)		Northeast / NUWC Newport	0.0005	0.0000	0.0000	0.0000	0.0078	0.0013
															Virginia Capes	4.2581	0.1471	0.0000	0.0000	0.8734	0.5839									**Virginia Capes**	0.6723	0.0083	0.0000	0.0000	0.0519	0.0317
															Cherry Point	0.8566	0.0236	0.0000	0.0000	0.0512	0.0181									Cherry Point	0.0003	0.0000	0.0000	0.0000	0.0037	0.0008
															Jacksonville	1.5251	0.0676	0.0000	0.0000	0.1251	0.0387									Jacksonville	0.4147	0.0051	0.0000	0.0000	0.0381	0.0224
															Key West	0.5940	0.0077	0.0000	0.0000	0.0119	0.0083									Key West	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
															GOMEX / NSWC Panama City	0.5915	0.0075	0.0000	0.0000	0.0319	0.0103									GOMEX / NSWC Panama City	0.0964	0.0015	0.0000	0.0000	0.0057	0.0020
															Other AFTT	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000									Other AFTT	0.0756	0.0010	0.0000	0.0000	0.0032	0.0013
															Study Area Training Total	**7.8252**	**0.2536**	**0.0000**	**0.0000**	**1.0935**	**0.6592**									**Study Area Testing Total**	**1.2598**	**0.0159**	**0.0000**	**0.0000**	**0.1105**	**0.0593**
																CO	NOx	VOC	SOx	PM10	PM2.5												
													TOTALS BY COMPLEX for Training and Testing Combined (TPY)		Northeast / NUWC Newport	0.0005	0.0000	0.0000	0.0000	0.0078	0.0013												
															Virginia Capes	4.9304	0.1554	0.0000	0.0000	0.9253	0.6157												
															Cherry Point	0.8569	0.0237	0.0000	0.0000	0.0549	0.0187												
															Jacksonville	1.9398	0.0727	0.0000	0.0000	0.1632	0.0611												
															Key West	0.5940	0.0077	0.0000	0.0000	0.0119	0.0083												
															GOMEX / NSWC Panama City	0.6879	0.0090	0.0000	0.0000	0.0376	0.0122												
															Other AFTT	0.0756	0.0010	0.0000	0.0000	0.0032	0.0013												
															Grand Total for NAA	**9.0850**	**0.2694**	**0.0000**	**0.0000**	**1.2040**	**0.7186**												

AFTT: Atlantic Fleet Training and Testing; Cherry Point: Navy Cherry Point Range Complex; CO: carbon monoxide; GOMEX: Gulf of Mexico Range Complex; Jacksonville: Jacksonville Range Complex; Key West: Key West Range Complex; lb: pound; MEM: military expended material; Northeast: Northeast Range Complexes; NOx: nitrogen oxides; NSWC Panama City: Naval Surface Warfare Center, Panama City Division Testing Range; NUWC Newport: Naval Undersea Warfare Center Division, Newport Testing Range; Other AFTT: Other AFTT Areas PM10: particulate matter less than less than 10 micrometers in diameter; PM2.5: particulate matter less than 2.5 micrometers in diameter; SFOMF: South Florida Ocean Measurement Facility; SOx: sulfur oxides; TPY: tons per year; Virginia Capes: Virginia Capes Range Complex; VOC: volatile organic compounds

NOTE: The VACAPES Range Complex example is shown in bold in comparison to other range complex data.

D.2 EXAMPLE RECORD OF NON-APPLICABILITY

This appendix shows an example of the documentation that will be prepared for each air quality control region in nonattainment or maintenance of the National Ambient Air Quality Standards potentially impacted by the Proposed Action. The example documentation (shown for Rhode Island) includes: a record of non-applicability memorandum (Figure D.2-1), a standard example form to show Clean Air Act conformity (Figure D.2-2), and sample conformity analyses (Figure D.2-3 a and b).

MEMORANDUM FOR THE RECORD

From: _____

Subj: Conformity Analyses for Atlantic Fleet Training and Testing (AFTT) Environmental Impact Statement/Overseas Environmental Impact Statement – Activities in Rhode Island Waters

Ref: 40 CFR, 51.853(b)

Encl: (1) Record of Non-Applicability for Atlantic Fleet Training and Testing in Rhode Island State Waters;

(2) Conformity Analyses for Preferred Alternative Operating Scenario in Rhode Island State Waters

1. Enclosure (1) is a Record of Non-Applicability for those activities associated with Atlantic Fleet Training and Testing activities which are expected to occur in Rhode Island waters annually. The total NOx and VOC emissions for the Preferred Alternative are included in enclosure (2). Comparison of the calculated values in enclosure (2) with those in reference (b) show this project is significantly below the *de minimis* levels.

2. If there are any questions or if additional information is needed, please call _____ at _____.

_____

Name

Title

Figure D.2-1: Sample Record of Non-Applicability Memorandum for Rhode Island

NAVY RECORD OF NON-APPLICABILITY FOR CLEAN AIR ACT CONFORMITY

The Proposed Action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

Proposed Action:

Action Proponents: United States Fleet Forces Command

Naval Sea Systems Command

Naval Air Systems Command

Office of Naval Research

Proposed Action Name: Atlantic Fleet Training and Testing (AFTT) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS)

Proposed Action and Emissions Summary:

Affected Air Basin: Metropolitan Providence Air Quality Control Region

Date RONA prepared: _____

RONA prepared by: Naval Facilities Engineering Command, Atlantic

Attainment Area Status and Emissions Evaluation Conclusion:

To the best of my knowledge and belief, the information contained within this General Conformity Applicability Analysis is correct and accurate. By signing this statement, I am in agreement with the finding that the total of all reasonably foreseeable direct and indirect emissions that will result from this action is below the *de minimis* threshold set forth in 40 CFR 51.853(b). Accordingly, it is my determination that this action conforms to the applicable State Implementation Plan (SIP).

RONA Approval:

Signature: _____

Name/Rank: _____ Date: _____

Position: _____Commanding Officer: _____ Activity: _____

Figure D.2-2: Sample Record of Non-Applicability Form

Subject: Conformity Analysis for Navy Training and Testing in Rhode Island Waters

The AFTT EIS/OEIS has been prepared to assess current and future activities in the AFTT EIS/OEIS Study Area. The Study Area includes the state waters of Rhode Island wherein Naval Undersea Warfare Center Division, Newport Testing Range conducts testing activities. These training and testing activities generally involve a variety of boats and other watercraft which are used to support and also perform on-water testing activities. Portions of other Navy training and testing events are also conducted within and above Rhode Island waters. Aircraft overflights and vessel activities during portions of anti-submarine warfare and anti-surface warfare training and testing events would occur above Rhode Island waters.

Table 1 contains the list of on-water sources, engines, and their fuels, with the exception of the TWR-841 which also includes diesel-electric generators which can operate independently of the boat engines. This and other engine information was needed to calculate the potential emissions of nitrogen oxides (NOx) and volatile organic compounds (VOCs) resulting from testing activities conducted at the Naval Undersea Warfare Center Division, Newport Testing Range.

Table 1: List of On-Water Sources, Engines and Fuels

Boat or Source	Fuel	Number of Engines and Engine Size
WB825 (small boat)	Gasoline	One - 225 hp
UB-8906 (small boat)	Gasoline	One - 130 hp
RHIB 54 Boat (small boat)	Gasoline	Two - 40 hp
RHIB 687 Boat (small boat)	Gasoline	One – 90 hp
RHIB 85 Boat (small boat)	Gasoline	One -25 hp
WB-30	Diesel fuel oil	Two – 225 hp
TWR-841	Diesel fuel oil	Two – 2350 hp
Spartan 1 (Unmanned Surface Vehicle)	Diesel fuel oil	Two – 315 hp
Spartan 2 (Unmanned Surface Vehicle)	Diesel fuel oil	Two – 400 hp
Spartan 3 (Unmanned Surface Vehicle)	Diesel fuel oil	Two -440 hp
Spartan 4 (Unmanned Surface Vehicle)	Diesel fuel oil	Two – 500 hp
High Speed Ferry	Diesel fuel oil	Four – 1300 hp
Electric Generator Set 841	Diesel fuel oil	Two – 200 hp

Figure D.2-3a: Sample Conformity Analysis for Rhode Island

In addition to the engine information for each boat, the annual hours of operation for each boat was needed to estimate the emissions of NOx and VOCs. Using the engine and fuel information and proposed boat activities, the appropriate emission factors were identified from various Environmental Protection Agency documents for marine engines. These documents included, but were not limited to:

1. Draft Regulatory Impact Analysis: Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression-Ignition Engines Less than 30 Liters per Cylinder, EPA420-D-007-001, March 2007.
2. USEPA Memorandum, "Emission Factors for Recreational Marine Diesel Engines," EPA Doc No. EPA420-F-02-044, dated 09 September 2002.
3. Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression-Ignition EPA 420-P-04-009. April 2004.
4. "Conversion Factors for Hydrocarbon Emission Components" EPA420-R-05-015. December 2005, NR-002c.

For each source, the appropriate emission factor is multiplied by the time of use and engine size to estimate emissions. A similar methodology was applied to calculate aircraft emissions. The emissions of criteria air pollutants from all sources were added and converted to tons per year. Appendix D of the EIS/OEIS contains all the information from which these emissions estimates were calculated. The emissions estimates for CO, NOx, and VOC for each alternative are given in Table 2 below.

Table 2: Rhode Island Emissions Estimates for the Preferred Alternative

Estimated Annual Air Pollutant Emissions in Rhode Island State Waters (within 3 nautical miles), Alternative 2			
Emissions by Air Pollutant (TPY)			
	CO	**NOx**	**VOC**
No Action Alternative	**43.50**	**39.01**	**2.09**
Alternative 2			
Aircraft	0.04	0.21	0.01
Vessels	65.79	61.15	3.21
Alternative 2 Total	**65.84**	**61.36**	**3.22**
Change	**22.34**	**22.35**	**1.13**
de Minimis Threshold	100	100	50
Exceeds Threshold	NO	NO	NO

TPY=tons per year; CO = carbon monoxide; NOx = nitrogen oxides; VOC = volatile organic compounds

Figure D.2-3b: Sample Conformity Analysis for Rhode Island

REFERENCES

Aircraft Environmental Support Office. (1999). AESO memoradum report no. 9929. Aircraft emission estimates: H-60 landing and takeoff cycle and in-frame, maintenance testing using JP-5. Draft.

Aircraft Environmental Support Office. (2000a). AESO memoradum report No. 9915, revision A. Aircraft emission estimates: S-3 landing and takeoff cycle and in-frame, maintenance testing using JP-5.

Aircraft Environmental Support Office. (2000b). AESO memorandum report no. 9943, revision B. Aircraft emission estimates: E-2 mission operations using JP-5.

Aircraft Environmental Support Office. (2000c). AESO memorandum report no. 9960, revision B. Aircraft emission estimates: H-53 mission operations using JP-5.

Aircraft Environmental Support Office. (2001a). AESO memoradum report no. 9963, revision B. Aircraft emission estimates: AV-8B mission operations using JP-5 fuel.

Aircraft Environmental Support Office. (2001b). AESO memorandum report no. 2000-10, revision B. Aircraft emission estimates: C-130 mission operations using JP-5.

Aircraft Environmental Support Office. (2001c). AESO memorandum report no. 9959, revision B. Aircraft emission estimates: H-46 mission operations using JP-5.

Aircraft Environmental Support Office. (2002). AESO memoradum report no. 9933, revision B. Aircraft emission estimates: F/A-18 mission operations using JP-5.

Aircraft Environmental Support Office. (2009a). AESO memoraddum report no. 9824, revision B. Aircraft emission estimates:AH-1W landing and takeoff cycleand maintenance testing using JP-5.

Aircraft Environmental Support Office. (2009b). AESO memoradum report no. 9962, revision A. Aircraft emission estimates: UH-1 and HH-1 mission operations using JP-5. .

Aircraft Environmental Support Office. (2009c). AESO memorandum report no. 9929, revision A. Aircraft emission estimates: H-60 landing and takeoff cycle and in-frame, maintenance testing using JP-5.

Aircraft Environmental Support Office. (2009d). AESO memorandum report no. 9941, revision B. Aircraft emission estimates: EA-6B mission operations using JP-5.

Aircraft Environmental Support Office. (2009e). AESO memorandum report no. 9961, revision A. Aircraft emission estimates: AH-1 mission operations using JP-5.

Aircraft Environmental Support Office. (2010). AESO memoradum report no. 9948, revision C. Aircraft emission estimates: P-3 mission operations using JP-5.

Aircraft Environmental Support Office. (2011). AESO memorandum report no. 9933, revision D. Aircraft emission estimates: F/A-18 mission operations using JP-5. Revision D.

John J. McMullen Associates. (2001). Emission factors for Navy ships.

U.S. Air Force. (2002). Air Force Institute for Environment: Safety and occupational health risk analysis. Aircraft/auxiliary power units/aerospace ground support equipment emission factors.

U.S. Department of the Navy. (2008). Final environmental impact statement for the introduction of the P-8A multi-mission maritime aircraft into the U.S. Navy Fleet.

U.S. Environmental Protection Agency. (1978). Air pollutant emission factors for military and civil aircraft.

U.S. Environmental Protection Agency. (1999). Exhaust emission factors for nonroad engine modeling - spark ignition.

APPENDIX E

PUBLIC PARTICIPATION

This Page Intentionally Left Blank

TABLE OF CONTENTS

APPENDIX E PUBLIC PARTICIPATION E-3

E.1 PROJECT WEBSITE E-3
E.2 GENERAL SUMMARY OF THE SCOPING PERIOD E-3
E.2.1 PUBLIC SCOPING NOTIFICATION E-3
E.2.2 SCOPING MEETINGS E-12
E.2.3 PUBLIC SCOPING COMMENTS E-12

LIST OF TABLES

Table E-1: Newspaper Announcements of Scoping Meetings E-11

LIST OF FIGURES

There are no figures in this section.

This Page Intentionally Left Blank

APPENDIX E PUBLIC PARTICIPATION

This appendix includes information about the public's participation in the development of the Atlantic Fleet Training and Testing (AFTT) Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS).

E.1 PROJECT WEBSITE

A public website was established for this project, www.AFTTEIS.com. This website address was published in the Notice of Intent to Prepare an Environmental Impact Statement and Overseas Impact Statement and was subsequently reprinted in all newspaper advertisements, agency letters, and public postcards for the Notice of Intent. The scoping meeting fact sheets and various other materials are available on the project website and will be made available throughout the course of the project.

E.2 GENERAL SUMMARY OF THE SCOPING PERIOD

The public scoping period began with the issuance of the Notice of Intent in the *Federal Register* on 15 July 2010. This notice included a project description and scoping meeting dates and locations. The scoping period lasted 60 days, concluding on 14 September 2010. The scoping period allowed a variety of opportunities for the public to comment on the scope of the EIS/OEIS.

E.2.1 PUBLIC SCOPING NOTIFICATION

The Navy made significant efforts to notify the public to ensure maximum public participation during the scoping process. A summary of these efforts follows.

E.2.1.1 Scoping Notification Letters

Notice of Intent/Notice of Scoping Meeting letters were distributed on 15 July 2010 to 214 federally recognized tribes, state elected officials, and federal, regional, and state agencies.

E.2.1.1.1 Federally Recognized Tribes

Alabama-Coushatta Tribes of Texas
Aroostook Band of Micmac Indians of Maine
Catawba Indian Nation
Cayuga Nation of New York
Chitimacha Tribe of Louisiana
Coushatta Tribe of Louisiana
Eastern Band of Cherokee Indians of North Carolina
Houlton Band of Maliseet Indians of Maine
Jena Band of Choctaw Indians
Kickapoo Traditional Tribe of Texas
Mashantucket Pequot Tribe of Connecticut
Mashpee Wampanoag Tribe, Massachusetts
Miccosukee Tribe of Indians of Florida
Mississippi Band of Choctaw Indians, Mississippi
Mohegan Indian Tribe of Connecticut
Narragansett Indian Tribe of Rhode Island
Oneida Nation of New York
Onondaga Nation of New York
Passamaquoddy Tribe – Indian Township Reservation

Passamaquoddy Tribe – Pleasant Point Reservation
Penobscot Tribe of Maine
Poarch Band of Creek Indians of Alabama
Saint Regis Mohawk Tribe, New York
Seminole Tribe of Florida
Seneca Nation of New York
Tonawanda Band of Seneca Indians of New York
Tunica-Biloxi Indian Tribe of Louisiana
Tuscarora Nation of New York
Wampanoag Tribe of Gay Head of Massachusetts
Ysleta del Sur Pueblo of Texas

E.2.1.1.2 Alabama

E.2.1.1.2.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.2.2 State Agencies

Alabama Department of Agriculture and Industries
Alabama Department of Conservation and Natural Resources
Alabama Department of Economic and Community Affairs
Alabama Department of Environmental Management
Alabama Development Office
Alabama Historical Commission

E.2.1.1.3 Connecticut

E.2.1.1.3.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.3.2 State Agencies

Connecticut Council on Environmental Quality
Connecticut Department of Economic and Community Development
Connecticut Department of Environmental Protection
Connecticut Department of Public Health

E.2.1.1.4 Delaware

E.2.1.1.4.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.4.2 State Agencies

Delaware Division of Historical and Cultural Affairs
Delaware Economic Development Office
Delaware Heritage Commission
Delaware River Basin Commission

Delaware Office of Management and Budget: Budget Development, Planning, and Administration
Department of Natural Resources and Environmental Control

E.2.1.1.5 Florida

E.2.1.1.5.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.5.2 State Agencies

Florida Department of Environmental Protection
Florida Fish and Wildlife Conservation Commission
Florida Fish and Wildlife Conservation Commission: Office of Environmental Services
Florida State Clearinghouse

E.2.1.1.6 Georgia

E.2.1.1.6.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.6.2 State Agencies

Georgia Department of Economic Development
Georgia Department of Natural Resources
Georgia Environmental Facilities Authority
Georgia Forestry Commission
Georgia State Clearinghouse

E.2.1.1.7 Louisiana

E.2.1.1.7.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.7.2 State Agencies

Louisiana Department of Culture, Recreation, and Tourism
Louisiana Department of Economic Development
Louisiana Department of Environmental Quality
Louisiana Department of Natural Resources
Louisiana State Military Department

E.2.1.1.8 Maine

E.2.1.1.8.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.8.2 State Agencies

Historic Preservation Commission
Maine Department of Conservation
Maine Department of Environmental Protection
Maine Department of Inland Fisheries and Wildlife
Maine State Planning Office

E.2.1.1.9 Maryland

E.2.1.1.9.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.9.2 State Agencies

Maryland Department of Environment
Maryland Department of Natural Resources
Maryland Department of Agriculture
Maryland Department of Business and Economic Development
Maryland Economic Development Corporation
Maryland State Clearinghouse for Intergovernmental Assistance

E.2.1.1.10 Massachusetts

E.2.1.1.10.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.10.2 State Agencies

Cape Cod Commission
Central Massachusetts Regional Planning Commission
Franklin Regional Council of Governments
Massachusetts Department of Conservation and Recreation
Massachusetts Department of Environmental Protection
Massachusetts Department of Public Health
Massachusetts Executive Office of Health and Human Services
Massachusetts Port Authority (Massport)
Massachusetts Regional Planning Commission
Massachusetts Water Resources Authority
Merrimack Valley Planning Commission

E.2.1.1.11 Mississippi

E.2.1.1.11.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.11.2 State Agencies

Mississippi Department of Environmental Quality

Mississippi Department of Finance and Administration
Mississippi Department of Marine Resources, Coastal Management and Planning
Mississippi Soil and Water Conservation Commission
Mississippi State Port Authority

E.2.1.1.12 New Hampshire

E.2.1.1.12.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.12.2 State Agencies

New Hampshire Department of Cultural Resources
New Hampshire Department of Environmental Services
New Hampshire Department of Resources and Economic Development
New Hampshire Department of Safety
New Hampshire Division of Forests and Lands
New Hampshire Fish and Game Department
New Hampshire Office of Energy and Planning
State of New Hampshire Economic Development

E.2.1.1.13 New Jersey

E.2.1.1.13.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.13.2 State Agencies

Garden State Preservation Trust
New Jersey Department of Agriculture
New Jersey Department of Environmental Protection
New Jersey Department of Environmental Protection: Office of Permit Coordination and Environmental Review
New Jersey Economic Development Authority
New Jersey Historic Trust

E.2.1.1.14 New York

E.2.1.1.14.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.14.2 State Agencies

New York State Department of Environmental Conservation

E.2.1.1.15 North Carolina

E.2.1.1.15.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.15.2 State Agencies

North Carolina Department of Administration
North Carolina Department of Administration: State Environmental Review Clearinghouse
North Carolina Department of Cultural Resources
North Carolina Department of Environment and Natural Resources
North Carolina Division of Parks and Recreation
North Carolina Division of Water Quality
North Carolina Economic Developers Association
North Carolina State Ports Authority
North Carolina Wildlife Resources Commission
North Carolina's Southeast Economic Development Organization

E.2.1.1.16 Rhode Island

E.2.1.1.16.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.16.2 State Agencies

Rhode Island Coastal Resources Management Council
Rhode Island Department of Administration
Rhode Island Department of Environmental Management
Rhode Island Department of Health
Rhode Island Division of Planning

E.2.1.1.17 South Carolina

E.2.1.1.17.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.17.2 State Agencies

Department of Natural Resources
Office of State Budget
South Carolina Department of Agriculture
South Carolina Department of Health and Environmental Control
South Carolina Department of Parks, Recreation, and Tourism
South Carolina Sea Grant Consortium

E.2.1.1.18 Texas

E.2.1.1.18.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.18.2 State Agencies

Texas Bureau of Economic Geology
Texas Commission on Environmental Quality
Texas General Land Office
Texas Parks and Wildlife Department
Texas State Grants Team

E.2.1.1.19 Virginia

E.2.1.1.19.1 State Elected Officials

Office of the Governor
Congressional Delegates

E.2.1.1.19.2 State Agencies

Chesapeake Bay Commission
Virginia Department of Conservation and Recreation
Virginia Department of Environmental Quality
Virginia Department of Forestry
Virginia Department of Game and Inland Fisheries
Virginia Department of Historic Resources
Virginia Department of Natural Resources
Virginia Department of Planning and Budget
Virginia Department of Transportation
Virginia Marine Resources Commission
Virginia Port Authority
Virginia Resources Authority

E.2.1.1.20 Regional

E.2.1.1.20.1 Federal Agencies

Federal Aviation Administration, Eastern Region
Federal Aviation Administration, Southern Region
Federal Aviation Administration, Southwest Region
Fishery Management Council, Caribbean
Fishery Management Council, Gulf of Mexico
Fishery Management Council, Mid-Atlantic
Fishery Management Council, New England
Fishery Management Council, South Atlantic
Gulf State Marine Fisheries Commission
National Marine Fisheries Service, West Palm Beach Field Office
U.S. Army Corps of Engineers, Baltimore District
U.S. Army Corps of Engineers, Galveston District
U.S. Army Corps of Engineers, Jacksonville District

U.S. Army Corps of Engineers, Jacksonville District, West Palm Beach Office
U.S. Army Corps of Engineers, Mobile District
U.S. Army Corps of Engineers, New England District
U.S. Army Corps of Engineers, New Orleans District
U.S. Army Corps of Engineers, New York District
U.S. Army Corps of Engineers, Norfolk District
U.S. Army Corps of Engineers, Philadelphia District
U.S. Army Corps of Engineers, Wilmington District
U.S. Coast Guard, District 1
U.S. Coast Guard, District 5
U.S. Coast Guard, District 7
U.S. Coast Guard, District 8
U.S. Coast Guard, District 9
U.S. Environmental Protection Agency, Region 1
U.S. Environmental Protection Agency, Region 2
U.S. Environmental Protection Agency, Region 3
U.S. Environmental Protection Agency, Region 4
U.S. Environmental Protection Agency, Region 5
U.S. Fish and Wildlife Service, Southeast Regional Office
U.S. Geological Survey, Northeast Regional Office
U.S. Geological Survey, South Central Regional Office
U.S. Geological Survey, Southeast Regional Office

E.2.1.1.21 United States of America

E.2.1.1.21.1 Federal Agencies

Bureau of Ocean Energy, Management, Regulation, and Enforcement
Marine Mammal Commission
National Marine Fisheries Service, Headquarters
National Marine Fisheries Service, Office of Protected Resources
National Park Service
U.S. Army Corps of Engineers, Headquarters
U.S. Coast Guard, Office of Operating and Environmental Standards Division, Headquarters
U.S. Department of Agriculture
U.S. Department of Agriculture, Forest Service
U.S. Department of Transportation, Maritime Administration, Office of Deepwater Ports and Offshore Activities
U.S. Environmental Protection Agency
U.S. Environmental Protection Agency, Office of Federal Activities
U.S. Fish and Wildlife Service, Headquarters
U.S. Geological Survey, Headquarters

E.2.1.2 Postcard Mailers

On 12 July 2010, postcards were mailed to 1,173 recipients on the project mailing list, including individuals, nonprofit organizations, and for-profit organizations. The postcards included the dates, locations, and times for the scoping meetings as well as the website for more information.

E.2.1.3 Press Releases

Press releases to announce the Notice of Intent were distributed on 15 July 2010.

E.2.1.4 Newspaper Display Advertisements

To announce the scoping meetings, advertisements were placed in the listed newspapers in the following cities on the dates indicated below:

Table E-1: Newspaper Announcements of Scoping Meetings

Portland, Maine	New Bedford, Massachusetts	Boston, Massachusetts
The Portland Press Herald	*The Standard Times*	*Boston Herald*
Friday, 16 July 2010 Monday, 16 August 2010 Friday, 20 August 2010 Saturday, 21 August 2010 Sunday, 22 August 2010	Friday, 16 July 2010 Friday, 13 August 2010 Friday, 20 August 2010 Saturday, 21 August 2010 Sunday, 22 August 2010	Friday, 16 July 2010 Friday, 13 August 2010 Friday, 20 August 2010 Saturday, 21 August 2010 Sunday, 22 August 2010
Newport, Rhode Island	Salisbury, Maryland	Outer Banks, North Carolina
Newport Daily News	*The Daily Times*	*Outer Banks Sentinel*
Friday, 16 July 2010 Monday, 16 August 2010 Thursday, 19 August 2010 Friday, 20 August 2010 Saturday, 21 August 2010	Friday, 16 July 2010 Monday, 16 August 2010 Sunday, 22 August 2010 Monday, 23 August 2010 Tuesday, 24 August 2010	Wednesday, 14 July 2010 Wednesday, 18 August 2010 Wednesday, 25 August 2010
Norfolk, Virginia	Newport News, Virginia	Jacksonville, North Carolina
The Virginian-Pilot	*The Daily Press*	*Jacksonville Daily News*
Friday, 16 July 2010 Wednesday, 18 August 2010 Sunday, 22 August 2010 Monday, 23 August 2010 Tuesday, 24 August 2010	Friday, 16 July 2010 Wednesday, 18 August 2010 Sunday, 22 August 2010 Monday, 23 August 2010 Tuesday, 24 August 2010	Friday, 16 July 2010 Sunday, 22 August 2010 Saturday, 28 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010
Wilmington, North Carolina	Charleston, South Carolina	Savannah, Georgia
Wilmington Star News	*Charleston Post and Courier*	*Savannah Morning News*
Friday, 16 July 2010 Thursday, 19 August 2010 Monday, 23 August 2010 Tuesday, 24 August 2010 Wednesday, 25 August 2010	Friday, 16 July 2010 Thursday, 19 August 2010 Monday, 23 August 2010 Tuesday, 24 August 2010 Wednesday, 25 August 2010	Friday, 16 July 2010 Tuesday, 24 August 2010 Saturday, 28 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010
Jacksonville, Florida	Fort Lauderdale, Florida	Brevard, Florida
Florida Times Union	*Florida Sun Sentinel*	*Florida Today*
Friday, 16 July 2010 Tuesday, 24 August 2010 Saturday, 28 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010	Friday, 16 July 2010 Monday, 23 August 2010 Saturday, 28 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010	Friday, 16 July 2010 Tuesday, 24 August 2010 Saturday, 28 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010

Table E-1: Newspaper Announcements of Scoping Meetings (Continued)

Panama City, Florida	Pensacola, Florida	New Orleans, Louisiana
Panama City News Herald	*Pensacola News Journal*	*Times-Picayune*
Friday, 16 July 2010 Tuesday, 24 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010 Tuesday, 31 August 2010	Friday, 16 July 2010 Sunday, 22 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010 Tuesday, 31 August 2010	Friday, 16 July 2010 Monday, 23 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010 Tuesday, 31 August 2010
Galveston, Texas	Corpus Christi, Texas	
Galveston Daily News	*Corpus Christi Caller Times*	
Friday, 16 July 2010 Sunday, 22 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010 Tuesday, 31 August 2010	Friday, 16 July 2010 Monday, 23 August 2010 Sunday, 29 August 2010 Monday, 30 August 2010 Tuesday, 31 August 2010	

E.2.2 SCOPING MEETINGS

Scoping meetings were held on 23, 25, 26, and 31 August and on 1 September in the cities of Boston, Massachusetts; Virginia Beach, Virginia; Morehead City, North Carolina; Jacksonville, Florida; and Panama City, Florida respectively. The meetings were structured in an open-house format, presenting informational posters and written information, with Navy staff and project experts available to answer participants' questions.

What is a scoping meeting?

Scoping meetings allow the face-to-face exchange of information and ideas to ensure that relevant topics are identified and properly studied and that the EIS is thorough and balanced. The scoping determines the extent of the EIS in terms of significant issues.

E.2.3 PUBLIC SCOPING COMMENTS

Scoping participants submitted comments in three ways:

- Written comments at the public meetings
- Written letters (received any time during the public comment period)
- Comments submitted through the project website (received any time during the public comment period)

The Navy received comments from 69 individuals and groups. Because many of the comments addressed more than one issue, 107 total comments resulted. The following provides a synopsis of the comments received.

E.2.3.1 Biological Resources–Marine Mammals

A significant number of participants expressed concern about impacts on marine mammals, in particular the North Atlantic right whale. Concerns were associated with use of Navy sonar; ship strikes; impacts of training on habitat, breeding grounds, and migration corridors; and the efficacy of mitigation measures.

E.2.3.2 Sonar and Underwater Detonations

Many comments mentioned concerns about the effect of Navy sonar on marine life, such as marine mammals, fish, sea turtles, and sea invertebrates. Some comments requested that the EIS/OEIS consider alternative technologies to mid-frequency active sonar.

E.2.3.3 Threatened and Endangered Species

Numerous comments discussed potential impacts on the North Atlantic right whale habitat and migration routes and on sea turtle nesting areas, nesting seasons, and habitat. Safety issues associated with ship strikes and entanglement were also raised, as were requests for identification of additional mitigation measures.

E.2.3.4 Water Quality

Water quality comments included general concerns about the potential contaminants in the water, potential water quality impacts to fisheries and habitat associated with Navy training, and adherence to federal and state regulations, including state coastal management programs.

E.2.3.5 Other

This category includes a range of comments with numerous submissions discussing the importance of offshore alternative energy interests and the need for Navy coordination with those interests and activities, including interaction with federal, regional, and state agencies. Related to that topic was a comment requesting review of wind turbine encroachment on Navy training areas. Other comments stated that new or broadened activities should be performed elsewhere, that previous Navy EIS documents have been inadequate, and that existing National Marine Fisheries Service and other regulatory permits should not be reissued. A comment related to potential effects on cultural and historical resources associated with the Alabama-Coushatta Tribe of Texas in the Gulf of Mexico was also submitted.

E.2.3.6 Biological Resources—Fish and Marine Habitat

A significant number of participants expressed concerns about impacts on fish and marine habitat, with specific mention of the red drum, striped bass, and effects on bottom habitat supporting snapper and grouper. Two commenters also requested evaluation of Navy activities on potential oil spill residue remaining in the Gulf of Mexico and associated impacts on habitat.

E.2.3.7 Meetings/National Environmental Policy Act Process

Comments on the National Environmental Policy Act (NEPA) process and scoping meetings included support of the scoping meetings held, the request for a public forum to be held in Texas, and a question about whether the Navy coordinates with local environmental groups as part of the NEPA process. Other comments stated that the EIS process under NEPA was Navy-driven and should include more independent, third-party review and involvement.

E.2.3.8 Public Health and Safety

Comments were submitted regarding the perceived safety challenges posed to people and the environment from military training and activities. Other comments discussed the importance of Navy training to U.S. defense.

E.2.3.9 Alternatives

A range of comments discussed alternatives, with some stating that alternatives were inadequate and lacked specificity, others providing suggested modifications to the list of alternatives, and others supporting the alternatives provided and the evaluation of adjoining and overlapping range complexes within one EIS document. Specific comments were submitted regarding the need for additional study of the Outer Continental Shelf resources and a request that the EIS include individual planning areas such as were included in the Atlantic Fleet Active Sonar Testing EIS.

E.2.3.10 Recreation

Requests were made that the EIS analyze the effects of training and testing on the nearshore environment and recreational resources.

E.2.3.11 Air Quality

Commenters requested complete characterizations and descriptions of the environmental resources and physical conditions in the area of potential impact, including air quality.

E.2.3.12 Terrestrial/Birds

In addition to comments about impacts on wildlife and birds in general, a specific request was made for the EIS to consider the impact of Navy training and testing on nesting waterbirds, including those found in the southern Chesapeake Bay.

E.2.3.13 Depleted Uranium

The concern with depleted uranium involved its effect on U.S. military personnel specifically and on people and the environment in general.

E.2.3.14 Noise

It was specifically requested that the EIS identify and evaluate potential noise impacts and disturbances from training and testing activities.

E.2.3.15 Proposed Action

The comment pertaining to the Proposed Action supported the proposal and alternatives.

E.2.3.16 Regional Economy

One comment noted the importance of the growing offshore alternative energy industry to the state economy and requested consideration of the impact of training and testing sites and activities on potential alternative energy interests.

APPENDIX F

TRAINING AND TESTING ACTIVITIES MATRICES

This Page Intentionally Left Blank

TABLE OF CONTENTS

F. TRAINING AND TESTING ACTIVITIES MATRICES F-1

F.1 STRESSORS ASSOCIATED WITH NAVY ACTIVITIES BY TRAINING ACTIVITY F-1
F.2 STRESSORS ASSOCIATED WITH NAVY ACTIVITIES BY TESTING ACTIVITY F-6
F.3 STRESSORS ASSOCIATED WITH NAVY ACTIVITIES BY RESOURCE F-15

LIST OF TABLES

Table F-1: Stressors by Training Activity F-1
Table F-2: Stressors by Testing Activity F-6
Table F-3: Stressors by Resource F-15

LIST OF FIGURES

There are no figures in this section.

This Page Intentionally Left Blank

F. TRAINING AND TESTING ACTIVITIES MATRICES

F.1 STRESSORS ASSOCIATED WITH NAVY ACTIVITIES BY TRAINING ACTIVITY

Table F-1: Stressors by Training Activity

Atlantic Fleet Training Activity	Biological Resources																Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
ANTI-AIR WARFARE (AAW)																														
Air Combat Maneuver (ACM)						✓				✓							✓	✓					✓			✓	✓			
Air Defense Exercise (ADEX)						✓	✓			✓	✓						✓	✓								✓	✓			
Gunnery Exercise (Air-to-Air) – Medium-Caliber						✓				✓		✓				✓	✓	✓		✓				✓	✓	✓	✓			✓
Missile Exercise (Air-to-Air)				✓		✓				✓		✓			✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓			✓
Gunnery Exercise (Surface-to-Air) – Large-Caliber				✓	✓	✓	✓			✓	✓	✓				✓	✓	✓	✓	✓				✓	✓	✓	✓			✓
Gunnery Exercise (Surface-to-Air) – Medium-Caliber				✓	✓	✓	✓			✓	✓	✓				✓	✓	✓		✓				✓	✓	✓	✓			✓
Missile Exercise (Surface-to-Air)				✓	✓		✓			✓	✓	✓				✓	✓	✓	✓	✓	✓			✓	✓	✓	✓			✓
AMPHIBIOUS WARFARE (AMW)																														
Fire Support Exercise – Land-Based Target					✓		✓				✓						✓	✓							✓	✓				✓
Fire Support Exercise – At Sea			✓		✓		✓				✓	✓				✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓
Marine Expeditionary Unit (MEU) Certification Exercise (CERTEX)**						✓	✓			✓	✓						✓	✓							✓		✓			✓
Amphibious Assault						✓	✓			✓	✓						✓	✓						✓	✓		✓			✓
Amphibious Raid/Humanitarian Assistance Operations							✓			✓	✓						✓	✓						✓	✓		✓			✓
STRIKE WARFARE (STW)																														
High-Speed Anti-Radiation Missile Exercise (Air-to-Surface) (HARMEX [A-S])				✓		✓	✓			✓	✓	✓				✓	✓	✓		✓	✓			✓	✓	✓	✓		✓	✓

Note: A check indicates events that take place for all alternatives; ** Alternative 1 and Alternative 2 only. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-1: Stressors by Training Activity (Continued)

Atlantic Fleet Training Activity	Biological Resources																Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
ANTI-SURFACE WARFARE (ASUW)																														
Maritime Security Operations						✓	✓			✓	✓	✓				✓	✓	✓							✓	✓	✓			✓
Maritime Security Operations – Anti-Swimmer Grenades			✓				✓				✓	✓				✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓		✓
Gunnery Exercise (Surface-to-Surface) Ship – Small-Caliber							✓				✓	✓				✓	✓	✓		✓					✓	✓	✓			✓
Gunnery Exercise (Surface-to-Surface) Ship – Medium-Caliber			✓		✓		✓				✓	✓				✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓
Gunnery Exercise (Surface-to-Surface) Ship – Large-Caliber			✓		✓		✓				✓	✓				✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓
Gunnery Exercise (Surface-to-Surface) Boat – Small-Caliber							✓				✓	✓				✓	✓	✓		✓				✓	✓	✓	✓			✓
Gunnery Exercise (Surface-to-Surface) Boat – Medium-Caliber			✓		✓		✓				✓	✓				✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓
Missile Exercise (Surface-to-Surface)			✓		✓		✓				✓	✓				✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓
Gunnery Exercise (Air-to-Surface) – Small-Caliber						✓				✓		✓				✓	✓	✓		✓				✓	✓	✓	✓			✓
Gunnery Exercise (Air-to-Surface) – Medium-Caliber			✓			✓				✓	✓	✓				✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓
Missile Exercise (Air-to-Surface) Rocket			✓			✓				✓	✓	✓				✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Missile Exercise (Air-to-Surface)			✓			✓				✓	✓	✓		✓		✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Bombing Exercise (Air-to-Surface)			✓			✓				✓		✓				✓	✓	✓	✓	✓			✓	✓	✓		✓	✓	✓	✓
Laser Targeting						✓	✓			✓	✓						✓	✓							✓		✓		✓	✓
Sinking Exercise (SINKEX)			✓		✓	✓	✓			✓	✓	✓		✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓
ANTI-SUBMARINE WARFARE (ASW)																														
Tracking Exercise/Torpedo Exercise – Submarine	✓					✓	✓			✓	✓	✓		✓						✓				✓			✓	✓		✓
Tracking Exercise/Torpedo Exercise – Surface	✓						✓				✓	✓					✓	✓						✓	✓		✓	✓		✓

Note: A check indicates events that take place for all alternatives. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-1: Stressors by Training Activity (Continued)

Atlantic Fleet Training Activity	Biological Resources																Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
ANTI-SUBMARINE WARFARE (ASW) (Continued)																														
Tracking Exercise/Torpedo Exercise – Helicopter	✓					✓	✓			✓	✓	✓			✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓		✓
Tracking Exercise/Torpedo Exercise – Maritime Patrol Aircraft	✓					✓	✓			✓	✓	✓			✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓		✓
Tracking Exercise/Torpedo Exercise – Maritime Patrol Aircraft Extended Echo Ranging Sonobuoys	✓		✓			✓				✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Anti-Submarine Warfare Tactical Development	✓	✓				✓	✓			✓	✓	✓			✓	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓		✓
Integrated Anti-Submarine Warfare Course (IAC)	✓	✓				✓	✓			✓	✓	✓			✓	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓		✓
Group Sail	✓	✓	✓			✓	✓			✓	✓	✓			✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓
Submarine Command Course (SCC) Operations	✓										✓	✓		✓		✓								✓	✓		✓	✓		✓
ASW for Composite Training Unit Exercise (COMPTUEX)	✓	✓	✓			✓	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓
ASW for Joint Task Force Exercise (JTFEX)/Sustainment Exercise (SUSTAINEX)	✓	✓	✓			✓	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓
ELECTRONIC WARFARE (EW)																														
Electronic Warfare Operations (EW Ops)						✓	✓			✓	✓						✓	✓							✓	✓	✓			✓
Counter Targeting Flare Exercise						✓				✓						✓	✓	✓		✓		✓		✓	✓	✓	✓			✓
Counter Targeting Chaff Exercise – Ship							✓				✓					✓	✓	✓				✓			✓					✓
Counter Targeting Chaff Exercise – Aircraft						✓				✓						✓	✓	✓				✓				✓				✓
MINE WARFARE (MIW)																														
Mine Countermeasures Exercise (MCM) – Ship Sonar	✓						✓				✓		✓				✓	✓							✓			✓		✓
Mine Neutralization – Explosive Ordnance Disposal (EOD)			✓			✓	✓			✓	✓	✓	✓			✓	✓	✓	✓				✓	✓	✓	✓	✓	✓		✓

Note: A check indicates events that take place for all alternatives; ** Alternative 1 and Alternative 2 only. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-1: Stressors by Training Activity (Continued)

Atlantic Fleet Training Activity	Biological Resources																	Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors		Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials		Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
MINE WARFARE (MIW) (Continued)																															
Underwater Mine Countermeasures (UMCM) Raise, Tow, Beach, and Exploitation Operations**						✓	✓			✓	✓		✓					✓	✓						✓	✓	✓	✓			✓
Airborne Mine Countermeasures (AMCM) – Towed Mine Neutralization						✓	✓	✓		✓	✓		✓					✓	✓						✓	✓	✓	✓	✓		✓
Airborne Mine Countermeasures (AMCM) – Mine Detection	✓					✓	✓			✓	✓		✓					✓	✓						✓	✓	✓	✓	✓	✓	✓
Mine Countermeasures (MCM) – Mine Neutralization – Small and Medium-Caliber					✓	✓	✓			✓	✓	✓	✓			✓		✓	✓		✓				✓	✓	✓	✓		✓	✓
Mine Countermeasures (MCM) – Mine Neutralization – Remotely Operated Vehicle			✓			✓	✓			✓	✓	✓	✓	✓		✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓
Mine Laying**						✓				✓		✓						✓	✓		✓				✓	✓	✓	✓			✓
Coordinated Unit Level Helicopter Airborne Mine Countermesure Exercises**	✓					✓		✓		✓	✓		✓	✓				✓	✓						✓	✓	✓	✓	✓		✓
Civilian Port Defense**	✓		✓			✓	✓	✓		✓	✓		✓					✓	✓	✓				✓	✓	✓	✓	✓	✓		✓
OTHER TRAINING EXERCISES																															
Search and Rescue (SAR)						✓	✓			✓	✓							✓	✓						✓	✓	✓	✓			✓
Precision Anchoring							✓				✓		✓					✓	✓			✓	✓		✓	✓		✓			✓
Elevated Causeway System (ELCAS)**		✓																								✓			✓		
Submarine Navigation	✓										✓																	✓	✓		✓
Submarine Under Ice Certification**	✓										✓														✓			✓	✓		✓

Note: A check indicates events that take place for all alternatives; ** Alternative 1 and Alternative 2 only. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-1: Stressors by Training Activity (Continued)

Atlantic Fleet Training Activity	Biological Resources															Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
OTHER TRAINING EXERCISES (Continued)																													
Surface Ship Object Detection	✓						✓				✓													✓	✓		✓	✓		✓
Surface Ship Sonar Maintenance (in OPAREAs and Ports)	✓						✓				✓													✓	✓		✓	✓		✓
Submarine Sonar Maintenance (in OPAREAs and Ports)	✓										✓													✓			✓	✓		✓

Note: A check indicates events that take place for all alternatives; ** Alternative 1 and Alternative 2 only. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

F.2 STRESSORS ASSOCIATED WITH NAVY ACTIVITIES BY TESTING ACTIVITY

Table F-2: Stressors by Testing Activity

Research, Development, Test, and Evaluation Activity	Biological Resources																Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
Naval Air Systems Command																														
ANTI-AIR WARFARE (AAW)																														
Air Combat Maneuver (ACM)						✓				✓							✓	✓								✓	✓			✓
Air Platform/Vehicle Test						✓				✓		✓					✓	✓		✓						✓	✓		✓	✓
Air Platform Weapons Integration Test						✓				✓		✓				✓	✓	✓	✓	✓					✓	✓	✓			✓
Air-to-Air Weapons System Test						✓				✓		✓				✓	✓	✓		✓				✓		✓	✓			✓
Air-to-Air Missile Test						✓				✓		✓			✓	✓	✓	✓		✓				✓	✓	✓	✓			✓
Air-to-Air-Gunnery Test						✓				✓		✓				✓	✓	✓		✓				✓	✓	✓	✓			✓
Intelligence, Surveillance, and Reconnaissance Test						✓				✓							✓	✓								✓	✓			✓
ANTI-SURFACE WARFARE (ASUW)																														
Air-to-Surface Missile Test			✓			✓				✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Air-to-Surface Gunnery Test – Medium-Caliber			✓			✓				✓		✓				✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓
Rocket Test			✓			✓				✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Air-to-Surface Bombing Test						✓				✓		✓					✓	✓		✓	✓			✓	✓	✓	✓			✓
Laser Targeting Test						✓				✓							✓	✓								✓	✓		✓	✓
High Energy Laser Weapons Test						✓			✓	✓	✓					✓	✓	✓				✓		✓	✓	✓	✓		✓	✓
ELECTRONIC WARFARE (EW)																														
Electronic System Evaluation						✓				✓							✓	✓								✓	✓			✓
Chaff Test						✓				✓						✓	✓	✓								✓	✓			✓
Flare Test						✓				✓						✓	✓	✓								✓	✓			✓

Note: A check indicates events that take place for all alternatives; 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-2: Stressors by Testing Activity (Continued)

Research, Development, Test, and Evaluation Activity	Biological Resources																Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires,	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
ANTI-SUBMARINE WARFARE (ASW)																														
ASW Torpedo Test	✓					✓				✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓		✓
Kilo Dip	✓					✓				✓							✓	✓							✓	✓	✓	✓		✓
Sonobuoy Lot Acceptance Test**	✓		✓			✓	✓			✓	✓	✓			✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓		✓
ASW Tracking Test – Helicopter	✓		✓			✓				✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
ASW Tracking Test – Maritime Patrol Aircraft	✓		✓			✓				✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
MINE WARFARE (MIW)																														
Airborne Mine Neutralization Systems (AMNS)Test – ASQ-235			✓			✓				✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Airborne Projectile-Based Mine Clearance System			✓			✓				✓		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Airborne Towed Minesweeping Test			✓			✓		✓		✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Airborne Towed Minehunting Sonar Test	✓					✓				✓	✓						✓	✓							✓	✓	✓	✓		✓
Airborne Laser-based Mine Detection System Test						✓				✓							✓	✓							✓	✓	✓		✓	✓
Mine Laying Test						✓				✓			✓				✓	✓		✓	✓	✓		✓	✓	✓	✓			✓
OTHER TESTING ACTIVITIES																														
Test and Evaluation (T&E) Catapult Launch						✓	✓			✓	✓						✓	✓							✓	✓	✓			✓
Air Platform Shipboard IntegrationTest						✓				✓							✓	✓							✓	✓	✓			✓
Shipboard Electronic Systems Evaluation						✓				✓							✓	✓								✓	✓			✓
Maritime Security						✓	✓			✓	✓						✓	✓								✓	✓			✓

Note: A check indicates events that take place for all alternatives; ** Alternative 1 and Alternative 2 only. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-2: Stressors by Testing Activity (Continued)

Research, Development, Test, and Evaluation Activity	Biological Resources																Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
Naval Sea Systems Command																														
SHIP CONSTRUCTION AND MAINTENANCE																														
NEW SHIP CONSTRUCTION																														
Surface Combatant Sea Trials – Pierside Sonar Testing**	✓	✓																										✓		
Surface Combatant Sea Trials – Propulsion Testing							✓				✓						✓	✓							✓		✓			✓
Surface Combatant Sea Trials – Gun Testing, Large-Caliber					✓		✓				✓	✓					✓	✓		✓				✓	✓	✓	✓			✓
Surface Combatant Sea Trials – Missile Testing					✓		✓			✓	✓	✓					✓	✓		✓				✓	✓		✓			✓
Surface Combatant Sea Trials – Decoy Testing							✓				✓					✓	✓	✓				✓			✓		✓			✓
Surface Combatant Sea Trials – Surface Warfare Testing- Large-Caliber					✓		✓				✓	✓					✓	✓		✓				✓	✓	✓	✓			✓
Surface Combatant Sea Trials – Anti-Submarine Warfare Testing	✓	✓					✓				✓						✓	✓		✓	✓	✓			✓		✓	✓		✓
Aircraft Carrier Sea Trials – Propulsion Testing**							✓				✓						✓	✓							✓		✓			✓
Aircraft Carrier Sea Trials – Gun Testing – Small-Caliber**							✓				✓	✓				✓								✓	✓		✓			✓
Aircraft Carrier Sea Trials – Gun Testing – Medium-Caliber**			✓		✓	✓	✓			✓	✓	✓				✓			✓	✓			✓	✓	✓	✓	✓	✓		✓
Aircraft Carrier Sea Trials – Missile Testing**				✓		✓	✓				✓	✓				✓				✓			✓	✓	✓	✓	✓	✓		✓
Aircraft Carrier Sea Trials – Bomb Testing**						✓	✓			✓	✓	✓								✓				✓	✓		✓			
Submarine Sea Trials – Pierside Sonar Testing**	✓	✓																										✓		
Submarine Sea Trials – Propulsion Testing**											✓																✓			✓

Note: A check indicates events that take place for all alternatives; 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-2: Stressors by Testing Activity (Continued)

Research, Development, Test, and Evaluation Activity	Biological Resources															Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
Naval Sea Systems Command (Continued)																													
SHIP CONSTRUCTION AND MAINTENANCE (Continued)																													
NEW SHIP CONSTRUCTION (Continued)																													
Submarine Sea Trials – Weapons System Testing**											✓																✓			✓
Submarine Sea Trials – Anti-Submarine Warfare Testing**	✓	✓									✓																✓	✓		✓
Other Class Ship Sea Trials – Propulsion Testing							✓				✓						✓	✓							✓		✓			✓
Other Class Ship Sea Trials – Gun Testing – Small-Caliber							✓				✓	✓				✓	✓	✓							✓	✓	✓			✓
ASW Mission Package Testing**	✓					✓	✓			✓	✓	✓			✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓		✓
ASW Mission Package Testing – Airborne**	✓					✓				✓							✓	✓								✓	✓	✓		✓
SUW Mission Package Testing – Gun Testing – Small-Caliber**							✓				✓	✓				✓	✓	✓		✓					✓	✓	✓			✓
SUW Mission Package Testing – Gun Testing – Medium-Caliber**					✓		✓				✓	✓				✓	✓	✓		✓				✓	✓	✓	✓			✓
SUW Mission Package Testing – Gun Testing – Large-Caliber**					✓		✓				✓	✓					✓	✓		✓				✓	✓	✓	✓			✓
SUW Mission Package Testing – Missile/Rocket Testing**			✓		✓	✓	✓			✓	✓	✓				✓	✓	✓					✓	✓	✓	✓	✓	✓		✓
MCM Mission Package Testing**	✓		✓			✓	✓			✓	✓					✓	✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓
Post-Homeporting Testing (All Classes)**							✓				✓						✓	✓							✓		✓			✓
SHOCK TRIALS																													
Aircraft Carrier Full Ship Shock Trial**			✓				✓				✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
DDG 1000 Zumwalt Class Destroyer Full Ship Shock Trial**			✓				✓				✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Littoral Combat Ship Full Ship Shock Trial**			✓				✓				✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

Note: A check indicates events that take place for all alternatives; ** Alternative 1 and Alternative 2 only. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-2: Stressors by Testing Activity (Continued)

Research, Development, Test, and Evaluation Activity	Biological Resources																Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
Naval Sea Systems Command (Continued)																														
SHIP CONSTRUCTION AND MAINTENANCE (Continued)																														
LIFECYCLE ACTIVITIES																														
Ship Signature Testing**							✓				✓						✓	✓									✓	✓		✓
Surface Ship Sonar Testing/Maintenance (in OPAREAs and Ports)**	✓	✓					✓				✓						✓	✓									✓	✓		✓
Submarine Sonar Testing/Maintenance (in OPAREAs and Ports)**	✓	✓									✓																✓	✓		✓
Combat System Ship Qualification Trial (CSSQT) – In-port Maintenance Period**	✓																											✓		
Combat System Ship Qualification Trial (CSSQT) – Air Defense (AD)**				✓	✓		✓			✓	✓	✓				✓	✓	✓		✓		✓		✓		✓	✓			✓
Combat System Ship Qualification Trial (CSSQT) – Surface Warfare (SUW)**				✓	✓		✓				✓	✓				✓	✓	✓		✓		✓		✓		✓	✓			✓
Combat System Ship Qualification Trial (CSSQT) – Undersea Warfare (USW)**	✓					✓	✓			✓	✓	✓			✓	✓	✓	✓		✓		✓		✓		✓	✓	✓		✓
NAVSEA RANGE ACTIVITIES																														
Naval Surface Warfare Center Panama City Division																														
Air Operations*						✓				✓							✓	✓							✓	✓	✓			✓
Surface Operations*							✓				✓						✓	✓							✓		✓			✓
Subsurface Operations*							✓				✓		✓											✓			✓			✓
Sonar Operations*	✓						✓				✓						✓	✓									✓	✓		✓
Electromagnetic Operations*						✓	✓	✓		✓	✓						✓	✓								✓	✓			✓
Laser Operations*																													✓	
Ordnance Operations*			✓			✓	✓			✓	✓	✓				✓	✓	✓	✓	✓			✓	✓	✓	✓				✓

Note: A check indicates events that take place for all alternatives; ** Alternative 1 and Alternative 2 only. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-2: Stressors by Testing Activity (Continued)

Research, Development, Test, and Evaluation Activity	Biological Resources															Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors										
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
NAVSEA RANGE ACTIVITIES (Continued)																													
Naval Surface Warfare Center Panama City Division (Continued)																													
Projectile Firing*					✓		✓				✓	✓				✓	✓	✓		✓				✓	✓	✓	✓			✓
Unmanned Underwater Vehicles Demonstrations	✓						✓				✓	✓	✓				✓	✓						✓	✓		✓	✓		✓
Mine Detection and Classification Testing**	✓					✓	✓			✓	✓						✓	✓						✓	✓		✓	✓	✓	✓
Mine Countermeasure/Neutralization Testing**			✓			✓	✓	✓		✓	✓	✓				✓	✓	✓		✓			✓	✓	✓	✓	✓	✓		✓
Stationary Source Testing**	✓	✓					✓				✓		✓				✓	✓						✓			✓	✓		✓
Special Warfare Testing**		✓									✓						✓	✓									✓	✓		✓
Unmanned Underwater Vehicle (UUV) Testing**	✓						✓				✓		✓				✓	✓						✓	✓		✓	✓		✓
Ordnance Testing – Line Charge Testing**			✓				✓				✓					✓			✓				✓	✓	✓		✓	✓		✓
Ordnance Testing – Gun Testing – Small-Caliber**						✓	✓			✓	✓	✓				✓	✓	✓		✓				✓	✓	✓	✓			✓
Ordnance Testing – Gun Testing – Medium-Caliber**					✓	✓	✓			✓	✓	✓				✓	✓	✓						✓	✓	✓	✓			✓
Ordnance Testing – Gun Testing – Large-Caliber**			✓		✓	✓	✓			✓	✓	✓				✓	✓	✓					✓	✓	✓	✓	✓	✓		✓
Countermeasure Testing – Acoustic Systems Testing**	✓	✓									✓						✓	✓						✓	✓		✓	✓		✓
Countermeasure Testing – Anti-Torpedo Torpedo Defense System Testing**	✓	✓					✓				✓	✓			✓	✓								✓	✓		✓	✓		✓
Naval Undersea Warfare Center Division, Newport																													
Launcher Testing							✓				✓					✓	✓	✓						✓	✓		✓			✓
Torpedo Testing	✓						✓				✓			✓			✓	✓							✓		✓	✓		✓
Towed Equipment Testing	✓						✓				✓						✓	✓							✓		✓	✓		✓

Note: A check indicates events that take place for all alternatives; * No Action Alternative only. ** Alternative 1 and Alternative 2 only. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-2: Stressors by Testing Activity (Continued)

Research, Development, Test, and Evaluation Activity	Biological Resources																Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
NAVSEA RANGE ACTIVITIES (Continued)																														
Naval Undersea Warfare Center Division, Newport (Continued)																														
Unmanned Underwater Vehicle (UUV) Testing	✓						✓				✓						✓	✓							✓		✓	✓		✓
Unmanned Surface Vehicle (USV) Testing							✓				✓						✓	✓							✓		✓			✓
Unmanned Aerial System Testing							✓			✓	✓														✓		✓			✓
Semi-Stationary Equipment Testing	✓	✓					✓				✓						✓	✓							✓		✓	✓		✓
Unmanned Underwater Vehicles Demonstrations	✓						✓				✓		✓				✓	✓						✓	✓		✓	✓		✓
Pierside Integrated Swimmer Defense	✓	✓					✓				✓		✓											✓	✓		✓	✓		✓
South Florida Ocean Measurement Facility																														
Signature Analysis Operations**	✓						✓				✓						✓	✓									✓	✓		✓
Mine Testing Activities**	✓					✓	✓	✓		✓	✓		✓				✓	✓						✓	✓	✓	✓	✓		✓
Surface Testing Activities**	✓						✓				✓														✓		✓	✓		✓
Subsurface Testing Activities**	✓						✓				✓		✓											✓			✓	✓		✓
Unmanned Underwater Vehicles Demonstrations**	✓						✓				✓		✓											✓	✓		✓	✓		✓
ACTIVITIES AT LOCATIONS OUTSIDE OF NAVSEA RANGES																														
ANTI-SURFACE WARFARE/ANTI-SUBMARINE WARFARE TESTING																														
Missile Testing**					✓		✓			✓	✓	✓					✓	✓	✓	✓	✓			✓	✓	✓	✓			✓
Kinetic Energy Weapon Testing**					✓		✓				✓	✓					✓	✓	✓	✓	✓			✓	✓	✓	✓			✓
Electronic Warfare Testing**											✓																✓			✓
Torpedo (Non-Explosive) Testing	✓	✓				✓	✓			✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓

Note: A check indicates events that take place for all alternatives; 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-2: Stressors by Testing Activity (Continued)

Research, Development, Test, and Evaluation Activity	Biological Resources																	Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors		Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials		Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
ACTIVITIES AT LOCATIONS OUTSIDE OF NAVSEA RANGES (Continued)																															
ANTI-SURFACE WARFARE/ANTI-SUBMARINE WARFARE TESTING (Continued)																															
Torpedo (Explosive) Testing	✓		✓			✓	✓			✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Countermeasure Testing – Acoustic System Testing**	✓	✓					✓				✓							✓	✓						✓			✓	✓		✓
Countermeasure Testing – Anti-Torpedo Torpedo Defense System Testing**	✓						✓				✓				✓	✓		✓	✓							✓		✓	✓		✓
Pierside Sonar Testing	✓																												✓		
At-sea Sonar Testing	✓	✓					✓				✓	✓						✓	✓									✓	✓		✓
MINE WARFARE TESTING																															
Mine Detection and Classification Testing**	✓					✓	✓			✓	✓							✓	✓							✓	✓	✓	✓		✓
Mine Countermeasure/Neutralization Testing**	✓		✓			✓	✓	✓		✓	✓			✓		✓		✓	✓	✓	✓		✓	✓		✓	✓	✓	✓		✓
SHIPBOARD PROTECTION SYSTEMS AND SWIMMER DEFENSE TESTING																															
Pierside Integrated Swimmer Defense	✓	✓				✓					✓		✓												✓			✓	✓		✓
Shipboard Protection Systems Testing							✓				✓	✓				✓		✓	✓		✓						✓	✓	✓		✓
Chemical/Biological Simulant Testing						✓	✓			✓	✓							✓	✓			✓	✓			✓	✓	✓			✓
UNMANNED VEHICLE TESTING																															
Underwater Deployed Unmanned Aerial System Testing**										✓	✓	✓									✓				✓	✓		✓			✓
Unmanned Vehicle Development and Payload Testing**	✓						✓				✓		✓												✓	✓		✓	✓		✓

Note: A check indicates events that take place for all alternatives; ** Alternative 1 and Alternative 2 only. 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

Table F-2: Stressors by Testing Activity (Continued)

Research, Development, Test, and Evaluation Activity	Biological Resources																	Physical Resources						Human Resources							
	Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors		Air Quality Stressors		Sediment and Water Quality Stressors											
	Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials		Criteria Air Pollutants	Hazardous Air Pollutants	Explosives	Metals	Chemicals	Other Materials	Acoustics [1]	Physical Disturbance [1]	Accessibility [2]	Airborne Acoustics [2]	Physical Disturbance and Strikes [2]	Underwater Energy [3]	In-Air Energy [3]	Physical Interactions [3]
ACTIVITIES AT LOCATIONS OUTSIDE OF NAVSEA RANGES (Continued)																															
OTHER TESTING (Continued)																															
Special Warfare	✓	✓					✓				✓																✓	✓		✓
Radio-Frequency Communications Testing**							✓				✓																✓			✓
Hydrodynamic Testing**											✓																✓			✓
At-Sea Explosive Testing**			✓													✓				✓				✓		✓				

Note: A check indicates events that take place for all alternatives; ** Alternative 1 and Alternative 2 only; 1: cultural resources stressor; 2: socioeconomics stressor; 3: public health and safety stressor

F.3 STRESSORS ASSOCIATED WITH NAVY ACTIVITIES BY RESOURCE

Table F-3: Stressors by Resource

		Biological Resources																Physical Resources						Human Resources							
		Acoustic Stressors							Energy Stressors		Physical Stressors				Entanglement Stressors		Ingestion Stressors	Air Quality Stressors		Sediment and Water Quality Stressors											
Stressors vs. Resources		Tactical Acoustic Sonar	Other Acoustic Devices	Underwater Explosions	In-air Explosions	Weapons Firing Noise	Aircraft Noise	Vessel and Simulated Vessel Noise	Electromagnetic	Lasers	Aircraft and Aerial Target Strikes	Vessel and In-water Device Strikes	Military Expended Materials	Seafloor Devices	Cables and Wires	Parachutes	Military Expended Materials	Criteria Air Pollutants	Hazardous Air Pollutants	Explosives and Explosive Hyproducts	Metals	Chemicals Other than Explosives	Other Materials	Acoustics	Physical Disturbance	Accessibility	Airborne Acoustics	Physical Disturbance and Strikes	Underwater Energy	In-Air Energy	Physical Interactions
Physical	Sediments and Water Quality																			✓	✓	✓	✓								
	Air Quality																	✓	✓												
Biological	Marine Habitats			✓								✓	✓	✓																	
	Marine Mammals	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓								
	Sea Turtles and Other Marine Reptiles	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓								
	Birds	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓				✓	✓	✓												
	Marine Vegetation			✓								✓	✓	✓						✓	✓	✓	✓								
	Marine Invertebrates	✓	✓	✓					✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓								
	Fish	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓								
Human	Cultural Resources			✓			✓						✓	✓										✓	✓						
	Socioeconomic Resources		✓	✓	✓	✓	✓	✓				✓	✓		✓	✓				✓	✓	✓	✓			✓	✓	✓			
	Public Health and Safety	✓	✓	✓	✓	✓				✓	✓	✓	✓																✓	✓	✓

This Page Intentionally Left Blank

APPENDIX G

STATISTICAL PROBABILITY ANALYSIS FOR ESTIMATING DIRECT STRIKE IMPACT AND NUMBER OF POTENTIAL EXPOSURES

This Page Intentionally Left Blank

TABLE OF CONTENTS

APPENDIX G . STATISTICAL PROBABILITY ANALYSIS FOR ESTIMATING DIRECT STRIKE IMPACT AND NUMBER OF POTENTIAL EXPOSURES G-1

G-1 DIRECT IMPACT ANALYSIS G-1
G-2 PARAMETERS FOR ANALYSIS G-3
G-3 INPUT DATA G-4
G-4 OUTPUT DATA G-4

LIST OF TABLES

Table G-1: Probability of a High Energy Laser Strike for Representative Marine Mammal Species by Alternative G-5
Table G-2: Probability of a High Energy Laser Strike for a Representative Sea Turtle Species by Alternative G-5
Table G-3: Probability of a Military Expended Material Strike for Representative Marine Mammal Species and Areas by Alternative G-6
Table G-4: Probability of a Military Expended Material Strike for a Representative Sea Turtle Species by Area and Alternative G-6

This Page Intentionally Left Blank

APPENDIX G. STATISTICAL PROBABILITY ANALYSIS FOR ESTIMATING DIRECT STRIKE IMPACT AND NUMBER OF POTENTIAL EXPOSURES

This appendix discusses the methods and results for calculating the probability of a direct strike of an animal from any military items from the proposed training and testing activities falling toward (or directed at) the sea surface. For the purposes of this appendix, military items include non-explosive practice munitions, sonobuoys, acoustic countermeasures, targets, and high-energy lasers. Only marine mammals and sea turtles will be analyzed using these methods because animal densities are necessary to complete the calculations, and density estimates are currently only available for marine mammals and sea turtles within the Study Area. Furthermore, the analysis conducted here does not account for explosive munitions because impacts from explosives are analyzed within the Navy Acoustic Effects Model.

G-1 DIRECT IMPACT ANALYSIS

A statistical probability was calculated to estimate the impact probability (P) and number of exposures (T) associated with direct impact of military items on marine animals on the sea surface within the specified training or testing area (R) in which the activities are occurring. The statistical probability analysis is based on probability theory and modified Venn diagrams with rectangular "footprint" areas for the individual animal (A) and total impact (I) inscribed inside the training or testing area (R). The analysis assumes: (1) that all animals would be at or near the surface 100 percent of the time, when in fact, marine mammals spend the majority of their time underwater, and (2) that the animals are stationary, which does not account for any movement or any potential avoidance of the training or testing activity.

1. A = length*width, where the individual animal's width (breadth) is assumed to be 20 percent of its length for marine mammals and 112 percent of its length for sea turtles. This product for A is multiplied by the number of animals N_a in the specified training or testing area (i.e., product of the highest average seasonal animal density [D] and training or testing area [R]: $N_a = D*R$) to obtain the total animal footprint area ($A*N_a = A*D*R$) in the training or testing area. As a worst case scenario, the total animal footprint area is calculated for the species with the highest average seasonal density in the training or testing area with the highest use of military items within the entire Study Area.

2. $I = N_{mun}$*length*diameter, where N_{mun} = total annual number of military items for each type, and "length" and "diameter" refer to the individual military equipment dimensions. For each type, the individual impact footprint area is multiplied by the total annual number of military items to obtain the type-specific impact footprint area ($I = N_{mun}$*length*diameter). Each training or testing activity uses one or more different types of military items, each with a specific number and dimensions, and several training and testing activities occur in a given year. When integrating over the number of military items types for the given activity (and then over the number of activities in a year), these calculations are repeated (accounting for differences in dimensions and numbers) for all military items types used, to obtain the type-specific impact footprint area (I). These impact footprint areas are summed over all military items types for the given activity, and then summed (integrated) over all activities to obtain the total impact footprint area resulting from all activities occurring in the training or testing area in a given year. As a worst case scenario, the total impact footprint area is calculated for the training or testing area with the highest use of military items within the entire Study Area.

Though marine mammals and sea turtles are not randomly distributed in the environment, a random point calculation was chosen due to the intensive data needs that would be required for a calculation that incorporated more detailed information on an animal's or military item's spatial occurrence.

The analysis is expected to provide an overestimation of the probability of a strike for the following reasons: (1) it calculates the probability of a single military item (of all the items expended over the course of the year) hitting a single animal at its species' highest seasonal density, (2) it does not take into account the possibility that an animal may avoid military activities, (3) it does not take into account the possibility that an animal may not be at the water surface, (4) it does not take into account that most projectiles fired during training and testing activities are fired at targets, and so only a very small portion of those projectiles that miss the target would hit the water with their maximum velocity and force, and (5) it does not quantitatively take into account the Navy avoiding animals that are sighted through the implementation of mitigation measures.

The likelihood of an impact is calculated as the probability (P) that the animal footprint (A) and the impact footprint (I) will intersect within the training or testing area (R). This is calculated as the area ratio A/R or I/R, respectively. Note that A (referring to an **individual** animal footprint) and I (referring to the impact footprint resulting from the **total** number of military items N_{mun}) are the relevant quantities used in the following calculations of single-animal impact probability [P], which is then multiplied by the number of animals to obtain the number of exposures (T). The probability that the random point in the training or testing area is within both types of footprints (i.e., A and I) depends on the degree of overlap of A and I. The probability that I overlaps A is calculated by adding a buffer distance around A based on one-half of the impact area (i.e., 0.5*I), such that an impact (center) occurring anywhere within the combined (overlapping) area would impact the animal. Thus, if L_i and W_i are the length and width of the impact footprint such that $L_i*W_i = 0.5*I$ and $W_i/L_i = L_a/W_a$ (i.e., similar geometry between the animal footprint and impact footprint), and if L_a and W_a are the length and width (breadth) of the individual animal such that $L_a*W_a = A$ (= individual animal footprint area), then, assuming a purely static, rectangular scenario (Scenario 1), the total area $A_{tot} = (L_a + 2*L_i)*(W_a + 2*W_i)$, and the buffer area $A_{buffer} = A_{tot} – L_a*W_a$.

Four scenarios were examined with respect to defining and setting up the overlapping combined areas of A and I:

1. **Scenario 1**: Purely static, rectangular scenario. Impact is assumed to be static (i.e., direct impact effects only; non-dynamic; no explosions or scattering of military items after the initial impact). Hence the impact footprint area (I) is assumed to be rectangular and given by the product of military items length and width (multiplied by the number of military items).
   $A_{tot} = (L_a + 2*L_i)*(W_a + 2*W_i)$ and $A_{buffer} = A_{tot} – L_a*W_a$.

2. **Scenario2**: Dynamic scenario with end-on collision, in which the length of the impact footprint (Li) is enhanced by Rn = 5 military items lengths to reflect forward momentum.
   $A_{tot} = (L_a + (1 + R_n)*L_i)*(W_a + 2*W_i)$ and $A_{buffer} = A_{tot} – L_a*W_a$.

3. **Scenario 3**: Dynamic scenario with broadside collision, in which the width of the impact footprint (W_i) is enhanced by R_n = 5 military items lengths to reflect forward momentum.
   Atot = $(L_a + 2*W_i)*(W_a + (1 + R_n)*L_i)$ and $A_{buffer} = A_{tot} – L_a*W_a$.

4. **Scenario 4**: Purely static, radial scenario, in which the rectangular animal and impact footprints are replaced with circular footprints while conserving area. Define the radius (R_a) of the circular

individual animal footprint such that $\pi*R_a^2 = L_a*W_a$, and define the radius (R_i) of the circular impact footprint such that $\pi *R_i^2 = 0.5*L_i*W_i = 0.5*I$. Then $A_{tot} = \pi *(R_a + R_i)^2$ and $A_{buffer} = A_{tot} - \pi *R_a^2$ (where $\pi = 3.1415927$).

Static impacts (Scenarios 1 and 4) assume no additional areal coverage effects of scattered military items beyond the initial impact. For dynamic impacts (Scenarios 2 and 3), the distance of any scattered military items must be considered by increasing the length (Scenario 2) or width (Scenario 3), depending on orientation (broadside versus end-on collision), of the impact footprint to account for the forward horizontal momentum of the falling object. Forward momentum typically accounts for five object lengths, resulting in a corresponding increase in impact area. Significantly different values may result from these two types of orientation. Both of these types of collision conditions can be calculated each with 50 percent likelihood (i.e., equal weighting between Scenarios 2 and 3, to average these potentially different values).

Impact probability P is the probability of impacting one animal with the given number, type, and dimensions of all military items used in training or testing activities occurring in the area per year, and is given by the ratio of total area (A_{tot}) to training or testing area (R): $P = A_{tot}/R$. Number of exposures is $T = N*P = N*A_{tot}/R$, where N = number of animals in the training or testing area per year (given as the product of the animal density [D] and range size [R]). Thus, $N = D*R$ and hence $T = N*P = N*A_{tot}/R = D*A_{tot}$. Using this procedure, P and T were calculated for each of the four scenarios, for Endangered Species Act (ESA)-listed marine mammals and the marine mammal and sea turtle species with the highest average seasonal density (used as the annual density value) and for each military item type. The scenario -specific P and T values were averaged over the four scenarios (using equal weighting) to obtain a single scenario -averaged annual estimate of P and T.

G-2 PARAMETERS FOR ANALYSIS

Impact probabilities (P) and number of exposures (T) were estimated by the analysis for the following parameters:

1. **Three proposed alternatives**: No Action Alternative, Alternative 1, and Alternative 2. Animal densities, animal dimensions, and military item dimensions are the same for the three alternatives.

2. **Two Training or Testing Areas**: Virginia Capes (VACAPES) and Jacksonville (JAX) Range Complexes. Areas are 94,875 kilometers $(km)^2$ and 171,804 km^2, respectively. These two training areas were chosen because they constitute the areas with the highest estimated numbers and concentrations of military expended materials for each alternative, and would, thus, provide a reasonable comparison for all other areas with fewer expended materials.

3. **The following types of munitions or other items**:

    a) **Small-caliber projectiles:** up to and including 0.50 caliber rounds
    b) **Medium-caliber projectiles:** larger than 0.50 caliber rounds but smaller than 57 millimeters (mm) projectiles
    c) **Large-caliber projectiles:** includes projectiles greater than or equal to a 57 mm projectile
    d) **Missiles:** includes rockets and jet-propelled munitions
    e) **Bombs:** Non-explosive practice bombs and mine shapes, ranging from 10 to 2000 lbs
    f) **Torpedoes:** includes aircraft deployed torpedoes

g) **Sonobuoys:** includes aircraft deployed sonobuoys
h) **Targets:** includes airborne, surface, and subsurface targets, as well as mine shapes
i) **Lightweight torpedo accessories:** includes all accessories that are dropped along with the torpedo (nose cap, air stabilizer, etc.)
j) **Anchor blocks:** includes blocks used to anchor mine shapes to the seafloor
k) **Acoustic countermeasures:** includes aircraft deployed acoustic countermeasures
l) **High Energy Lasers:** includes high energy laser weapons that are directed at a surface target

4. **Animal species of interest:** the six species of Endangered Species Act (ESA)-listed marine mammals and the non-ESA listed marine mammal species with the highest average seasonal density in the training and testing areas of interest. The sea turtle species with the highest average seasonal density in the training and testing areas of interest.

G-3 INPUT DATA

Input data for the direct strike analysis include animal species likely to be in the area and military items proposed for use under each of the three alternatives. Animal species data include: (1) species ID and status (i.e., threatened, endangered, or neither), (2) highest average seasonal density estimate for the species of interest, and (3) adult animal dimensions (length and width) for the species with the highest density. The animal's dimensions are used to calculate individual animal footprint areas (A = length*width), and animal densities are used to calculate the number of exposures (T) from the impact probability (P): T = N*P. Military items data include: (1) military items category (e.g., projectile, bomb, rocket, target), (2) military items dimensions (length and width), and (3) total number of military items used annually.

Military items input data, specifically the quantity (e.g., numbers of guns, bombs, and rockets), are different in magnitude among the three proposed alternatives (No Action Alternative, Alternative 1, and Alternative 2). All animal species input data, the military items identification and category, and military items dimensions, are the same for the three alternatives, only the quantities (i.e., total number of military items) are different.

G-4 OUTPUT DATA

Estimates of impact probability (P) and number of exposures (T) for a given species of interest, were made for the specified training or testing area with the highest annual number of military items used for each of the three alternatives. The calculations derived P and T from the highest annual number of military items used in the Study Area for the given alternative. Differences in P and T among the alternatives arise from different numbers of events (and therefore military items) for the three alternatives.

Results for marine mammals and sea turtles are presented in Tables G-1 through G-4.

Table G-1: Probability of a High Energy Laser Strike for Representative Marine Mammal Species by Alternative

Northeast United States Continental Shelf Large Marine Ecosystem and Gulf Stream Open Ocean Area			
VACAPES Range Complex			
Species	**Testing**		
	No Action	**Alternative 1**	**Alternative 2**
North Atlantic Right Whale	0.00%	0.00%	0.00%
Humpback Whale	0.00%	0.00%	0.00%
Sei Whale	0.00%	0.00%	0.00%
Fin Whale	0.00%	0.00%	0.00%
Blue Whale	0.00%	0.00%	0.00%
Sperm Whale	0.00%	0.00%	0.00%
Atlantic Spotted Dolphin	0.00%	0.00%	0.00%

VACAPES: Virginia Capes Range Complex

Table G-2: Probability of a High Energy Laser Strike for a Representative Sea Turtle Species by Alternative

Northeast United States Continental Shelf Large Marine Ecosystem and Gulf Stream Open Ocean Area			
VACAPES Range Complex			
Species	**Testing**		
	No Action	**Alternative 1**	**Alternative 2**
Loggerhead Sea Turtle	0.0000	0.0001	0.0001

VACAPES: Virginia Capes Range Complex

Table G-3: Probability of a Military Expended Material Strike for Representative Marine Mammal Species and Areas by Alternative

Northeast United States Continental Shelf Large Marine Ecosystem and Gulf Stream Open Ocean Area						
VACAPES Range Complex						
Species	**Training**			**Testing**		
	No Action	**Alternative 1**	**Alternative 2**	**No Action**	**Alternative 1**	**Alternative 2**
North Atlantic Right Whale	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Humpback Whale	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
Sei Whale	0.02%	0.05%	0.05%	0.04%	0.06%	0.06%
Fin Whale	0.01%	0.03%	0.03%	0.03%	0.04%	0.04%
Blue Whale	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sperm Whale	0.08%	0.18%	0.18%	0.16%	0.23%	0.25%
Atlantic Spotted Dolphin	1.84%	4.43%	4.43%	3.76%	5.67%	5.98%
Southeast United States Continental Shelf Large Marine Ecosystem and Gulf Stream Open Ocean Area						
JAX Range Complex						
Species	**Training**			**Testing**		
	No Action	**Alternative 1**	**Alternative 2**	**No Action**	**Alternative 1**	**Alternative 2**
North Atlantic Right Whale	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Humpback Whale	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sei Whale	0.01%	0.02%	0.02%	0.00%	0.00%	0.00%
Fin Whale	0.00%	0.01%	0.01%	0.00%	0.00%	0.00%
Blue Whale	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sperm Whale	0.01%	0.02%	0.02%	0.00%	0.01%	0.01%
Atlantic Spotted Dolphin	0.46%	0.95%	0.95%	0.15%	0.22%	0.24%

JAX: Jacksonville Range Complex; VACAPES: Virginia Capes Range Complex

Table G-4: Probability of a Military Expended Material Strike for a Representative Sea Turtle Species by Area and Alternative

Northeast United States Continental Shelf Large Marine Ecosystem and Gulf Stream Open Ocean Area						
VACAPES Range Complex						
Species	**Training**			**Testing**		
	No Action	**Alternative 1**	**Alternative 2**	**No Action**	**Alternative 1**	**Alternative 2**
Loggerhead Sea Turtle	0.74%	1.78%	1.78%	1.51%	2.28%	2.40%
Southeast United States Continental Shelf Large Marine Ecosystem and Gulf Stream Open Ocean Area						
JAX Range Complex						
Species	**Training**			**Testing**		
	No Action	**Alternative 1**	**Alternative 2**	**No Action**	**Alternative 1**	**Alternative 2**
Loggerhead Sea Turtle	0.0196	0.0403	0.0402	0.0012	0.0045	0.0046

JAX: Jacksonville Range Complex; VACAPES: Virginia Capes Range Complex