
Appendix A Navy Activities Descriptions

Supplemental Environmental Impact Statement/ Overseas Environmental Impact Statement Northwest Training and Testing

TABLE OF CONTENTS

APPENDIX A	NAVY ACTIVITIES DESCRIPTIONS.....	A-1
A.1	Training Activities.....	A-1
A.1.1	Air Warfare Training	A-1
A.1.1.1	Air Combat Maneuver	A-2
A.1.1.2	Gunnery Exercise Surface-to-Air	A-3
A.1.1.3	Missile Exercise Air-to-Air.....	A-5
A.1.1.4	Missile Exercise Surface-to-Air	A-7
A.1.2	Anti-Submarine Warfare Training.....	A-9
A.1.2.1	Anti-Submarine Warfare Torpedo Exercise – Submarine	A-10
A.1.2.2	Anti-Submarine Warfare Tracking Exercise – Helicopter	A-12
A.1.2.3	Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft	A-14
A.1.2.4	Anti-Submarine Warfare Tracking Exercise – Ship	A-16
A.1.2.5	Anti-Submarine Warfare Tracking Exercise – Submarine	A-18
A.1.3	Electronic Warfare Training.....	A-19
A.1.3.1	Electronic Warfare Training.....	A-19
A.1.4	Mine Warfare Training.....	A-21
A.1.4.1	Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises.....	A-21
A.1.4.2	Mine Neutralization – Explosive Ordnance Disposal Training.....	A-23
A.1.5	Surface Warfare Training.....	A-25
A.1.5.1	Bombing Exercise Air-to-Surface	A-25
A.1.5.2	Gunnery Exercise Surface-to-Surface – Ship	A-27
A.1.5.3	Missile Exercise Air-to-Surface	A-29
A.1.6	Other Training.....	A-31
A.1.6.1	Intelligence, Surveillance, Reconnaissance	A-31
A.1.6.2	Maritime Security Operations	A-33
A.1.6.3	Personnel Insertion/Extraction – Non-Submersible.....	A-36
A.1.6.4	Precision Anchoring.....	A-38

A.1.6.5	Search and Rescue.....	A-39
A.1.6.6	Small Boat Attack Exercise	A-40
A.1.6.7	Submarine Sonar Maintenance	A-42
A.1.6.8	Surface Ship Sonar Maintenance	A-43
A.1.6.9	Unmanned Underwater Vehicle Training.....	A-44
A.2	Naval Sea Systems Command Testing Activities.....	A-46
A.2.1	Anti-Submarine Warfare.....	A-46
A.2.1.1	Anti-Submarine Warfare Testing.....	A-46
A.2.1.2	At-Sea Sonar Testing	A-48
A.2.1.3	Countermeasure Testing	A-50
A.2.1.4	Pierside Sonar Testing	A-52
A.2.1.5	Submarine Sonar Testing/Maintenance.....	A-53
A.2.1.6	Torpedo (Explosive) Testing	A-54
A.2.1.7	Torpedo (Non-Explosive) Testing	A-56
A.2.2	Mine Warfare.....	A-58
A.2.2.1	Mine Countermeasure and Neutralization Testing.....	A-58
A.2.2.2	Mine Detection and Classification Testing	A-60
A.2.3	Surface Warfare.....	A-62
A.2.3.1	Kinetic Energy Weapon Testing.....	A-62
A.2.4	Unmanned Systems	A-64
A.2.4.1	Unmanned Aerial System Testing	A-64
A.2.4.2	Unmanned Surface Vehicle System Testing	A-66
A.2.4.3	Unmanned Underwater Vehicle Testing	A-68
A.2.5	Vessel Evaluation	A-70
A.2.5.1	Propulsion Testing	A-70
A.2.5.2	Undersea Warfare Testing	A-71
A.2.5.3	Vessel Signature Evaluation	A-73
A.2.6	Other Testing	A-75
A.2.6.1	Acoustic and Oceanographic Research	A-75
A.2.6.2	Acoustic Component Testing.....	A-77
A.2.6.3	Cold Water Support.....	A-79
A.2.6.4	Hydrodynamic and Maneuverability Testing	A-80
A.2.6.5	Non-Acoustic Component Testing.....	A-81

A.2.6.6	Post Refit Sea Trial.....	A-83
A.2.6.7	Radar and Other System Testing.....	A-84
A.2.6.8	Semi-Stationary Equipment Testing.....	A-86
A.2.6.9	Simulant Testing.....	A-88
A.3	Naval Air Systems Command Testing Activities.....	A-90
A.3.1	Anti-Submarine Warfare.....	A-90
A.3.1.1	Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft.....	A-90
A.3.1.2	Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft (SUS).....	A-92
A.3.2	Other Testing.....	A-94
A.3.2.1	Intelligence, Surveillance, Reconnaissance/Electronic Warfare Triton Testing.....	A-94

List of Figures

There are no figures in this appendix.

List of Tables

There are no tables in this appendix.

This page intentionally left blank.

APPENDIX A NAVY ACTIVITIES DESCRIPTIONS

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.

Descriptions of sonar, ordnance/munitions, targets, and other systems were provided in the 2015 Northwest Training and Testing (NWTT) Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) (Section 2.3, Description of Sonar, Ordnance/Munitions, Targets, and Other Systems Employed in Northwest Training and Testing Activities).

A.1.1 AIR WARFARE TRAINING

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

A.1.1.1 Air Combat Maneuver

Air Warfare			
Air Combat Maneuver			
Short Description	Fixed-wing aircrews aggressively maneuver against threat aircraft to gain tactical advantage.	Typical Duration 1–2 hours	
Long Description	Basic flight maneuvers in which fixed-wing aircrew engage in offensive and defensive maneuvering against each other. During air combat maneuver engagements, no ordnance is fired, but countermeasures such as chaff and flares may be used. These events typically involve two aircraft; however, based upon the training requirement, events may involve multiple aircraft. Occurs year round, day and night. Primarily a day activity with only about 4 percent occurring at night.		
Typical Components	Platforms: Fixed-wing aircraft Targets: Air targets Systems being Trained/Tested: None		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Aircraft safety	Typical Locations	
		Offshore Area W-237 Olympic Military Operations Area (MOA)	
Stressors to Biological Resources	Acoustic: Aircraft noise Explosive: None	Physical Disturbance and Strike: Aircraft and aerial targets Ingestion: Military expended materials – other than munitions	Energy: In-air electromagnetic devices Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Airborne acoustics Physical disturbance and strike	Public Health and Safety: None
Military Expended Material	Ingestible Material: Compression pad or plastic piston, endcap – chaff and flare, flare O-ring Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	None		
Assumptions Used for Analysis	No munitions fired. Flare and chaff may be used. For air quality analysis: <ul style="list-style-type: none"> - Average 2 fixed-wing fighter aircraft per event - Average 1 hr. per event 		

A.1.1.2 Gunnery Exercise Surface-to-Air

Air Warfare			
Gunnery Exercise Surface-to-Air			
Short Description	Surface ship crews fire medium- and large-caliber guns at air targets.	Typical Duration 1–2 hours	
Long Description	Surface ship crews defend against threat aircraft or missiles with large- and medium-caliber 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- or medium-caliber guns fire non-explosive projectiles to disable or destroy the threat before it reaches the ship. The target is towed by a contract air services jet. Occurs year round, daytime only.		
Typical Components	Platforms: Aircraft carrier, amphibious warfare ship, fixed-wing aircraft, surface combatants Targets: Air targets Systems being Trained/Tested: None		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Aircraft safety Weapons firing safety	Typical Locations	
		Offshore Area W-237	
Stressors to Biological Resources	Acoustic: Aircraft noise Vessel noise Weapons noise Explosive: None	Physical Disturbance and Strike: Aircraft and aerial targets Vessels and in-water devices Military expended materials Ingestion: Military expended materials – munitions	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: Metals	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions
Military Expended Material	Ingestible Material: Large- and medium-caliber projectile fragments Non-Ingestible Material: Large- and medium-caliber casings, large-caliber projectiles	Military Recoverable Material	Air targets
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		

Air Warfare	
Gunnery Exercise Surface-to-Air	
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Weapons Firing Noise Physical Disturbance and Strike: (Section 5.3.4) Vessel movement
Assumptions Used for Analysis	All large-caliber non-explosive events occur greater than 20 NM from shore, and all other non-explosive rounds are used 12 NM or greater from shore. The target is a fiberglass finned target that is towed approximately 3 NM behind the towing aircraft, at an altitude of 1,000 ft. or greater.

A.1.1.3 Missile Exercise Air-to-Air

Air Warfare			
Missile Exercise Air-to-Air			
Short Description	Fixed-wing aircrews fire air-to-air missiles at air targets.	Typical Duration 1–2 hours	
Long Description	An event involves two or more fixed-wing aircraft and a target. Missiles are either high-explosive warheads or non-explosive practice munitions. The target is an unmanned aerial target drone, a tactical air-launched decoy, or a parachute suspended illumination flare. Target drones deploy parachutes and are recovered by small boat or rotary-wing aircraft; tactical air-launched decoys and illumination flares are expended and not recovered. These events typically occur at high altitudes. Occurs year round, daytime only.		
Typical Components	Platforms: Fixed-wing aircraft; rotary-wing aircraft; small boat Targets: Air targets, flares Systems being Trained/Tested: None		
Standard Operating Procedures (Section 2.3.3)	Vessel safety	Typical Locations	
	Aircraft safety Weapons firing safety Target deployment and retrieval safety	Offshore Area W-237	
Stressors to Biological Resources	Acoustic: Aircraft noise Vessel noise Weapons noise Explosive: In-air explosions	Physical Disturbance and Strike: Aircraft and aerial targets Vessels and in-water devices Military expended materials Ingestion: Military expended materials – munitions Military expended materials – other than munitions	Energy: In-air electromagnetic devices Entanglement: Decelerators/parachutes
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: Explosives Metals Chemicals	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions
Military Expended Material	Ingestible Material: Target and missile (explosive) fragments, casing Non-Ingestible Material: Large parachutes, medium parachutes, illumination flares, missile (non-explosive)	Military Recoverable Material	Targets
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		

Air Warfare	
Missile Exercise Air-to-Air	
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Assumptions Used for Analysis	4 Training events per year with 4 high explosive (HE) warheads, 4 non-explosive practice munitions (NEPM) warheads. Assume 1 flare per Missile Exercise event. All events occur greater than 50 NM from shore and above 15,000 ft. altitude. All propellant and explosives are consumed.

A.1.1.4 Missile Exercise Surface-to-Air

Air Warfare			
Missile Exercise Surface-to-Air			
Short Description	Surface ship crews fire surface-to-air missiles at air targets.	Typical Duration 1–2 hours	
Long Description	Surface ship crews defend against threat missiles and aircraft with ship-launched surface-to-air missiles. The event involves a simulated threat aircraft or anti-ship missile that is detected by the ship’s radar. Ship-launched surface-to-air missiles are fired (high-explosive) to disable or destroy the threat. The target typically is a remote-controlled drone. Surface-to-air missiles may also be used to train against land attack missiles. Occurs year round, daytime only.		
Typical Components	Platforms: Aircraft carrier, amphibious warfare ships, surface combatants Targets: Air targets Systems being Trained/Tested: None		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Aircraft safety Weapons firing safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area W-237	
Stressors to Biological Resources	Acoustic: Aircraft noise Vessel noise Weapons noise Explosive: In-air explosions	Physical Disturbance and Strike: Aircraft and aerial targets Vessels and in-water devices Military expended materials Ingestion: Military expended materials – munitions Military expended materials – other than munitions	Energy: None Entanglement: Decelerators/parachutes
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: Explosives Metals Chemicals	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions
Military Expended Material	Ingestible Material: Target and missile (explosive) fragments Non-Ingestible Material: Large parachutes	Military Recoverable Material	Undamaged targets
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		

Air Warfare	
Missile Exercise Surface-to-Air	
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Assumptions Used for Analysis	Assumes that all surface-to-air missiles are high explosive. All events occur greater than 50 NM from shore and missile explosions occur above 500 ft. altitude. All explosive and propellant are consumed.

A.1.2 ANTI-SUBMARINE WARFARE TRAINING

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

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

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

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.1.2.1 Anti-Submarine Warfare Torpedo Exercise – Submarine

Anti-Submarine Warfare			
Anti-Submarine Warfare Torpedo Exercise—Submarine			
Short Description	Submarine crews search for, track, and detect submarines. Event would include one non-explosive MK-48 torpedo.	Typical Duration	
		8 hours	
Long Description	<p>Submarine crews search for, detect, and track a surface vessel or 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 surface vessel or threat submarine. Passive sonar is used almost exclusively. Explosive (only for Alternative 2) or non-explosive exercise torpedoes can be fired and active sonar can be used during this training event.</p> <p>This exercise may involve a single submarine, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft, ships, and submarines. The preferred range for this exercise is an instrumented underwater range, but it may be conducted in other range complexes depending on training requirements and available assets. Occurs year round, day and night.</p>		
Typical Components	<p>Platforms: Fixed-wing aircraft, small boats, submarines Targets: Sub-surface targets Systems being Trained/Tested: Mid-frequency and high-frequency sonar, torpedoes</p>		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety Towed in-water device safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise	Physical Disturbance and Strike: Vessels and in-water devices Military expended materials	Energy: None
	Explosive: In-water explosions (Alternative 2 only)	Ingestion: None	Entanglement: Wires and cables
Stressors to Physical Resources	Air Quality: None	Sediments and Water Quality: Metals	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Physical disturbance and strike	Public Health and Safety: In-water energy Physical interactions
Military Expended Material	Ingestible Material: For Alternative 2 only: heavyweight torpedo (explosive) – fragments, target fragments	Military Recoverable Material	Anti-Submarine Warfare Training Targets, Exercise Torpedoes
	Non-Ingestible Material: Guidance wires, heavyweight torpedo accessories		
Sonar and Other Transducer Bins	Mid-Frequency: MF3	Torpedoes: TORP2	
	High-Frequency: HF1		

Anti-Submarine Warfare					
Anti-Submarine Warfare Torpedo Exercise—Submarine					
In-Water Explosive Bins	E11 (Alternative 2 only)				
Procedural Mitigation Measures	<table border="0"> <tr> <td>Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar</td> <td>Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Towed in-water devices</td> </tr> <tr> <td>Explosive Stressors: <i>(Section 5.3.3)</i> Explosive torpedoes (Alternative 2 only)</td> <td></td> </tr> </table>	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Towed in-water devices	Explosive Stressors: <i>(Section 5.3.3)</i> Explosive torpedoes (Alternative 2 only)	
Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Towed in-water devices				
Explosive Stressors: <i>(Section 5.3.3)</i> Explosive torpedoes (Alternative 2 only)					
Assumptions Used for Analysis	<p>Exercise non-explosive practice torpedoes are recovered.</p> <p>Guidance wire has a low breaking strength and breaks easily. Weights and flex tubing sink rapidly.</p> <p>All explosive events would occur 50 NM or more from shoreline; non-explosive events would occur at least 12 NM from shore. All events occur in water depth of 600 ft. or greater.</p>				

A.1.2.2 Anti-Submarine Warfare Tracking Exercise – Helicopter

Anti-Submarine Warfare			
Anti-Submarine Warfare Tracking Exercise - Helicopter			
Short Description	Helicopter crews search for, track, and detect submarines.	Typical Duration 2–4 hours	
Long Description	<p>Helicopters using sonobuoys and dipping sonar search to 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.</p> <p>Sonobuoys (both passive and active) are typically employed by a helicopter operating at altitudes below 3,000 ft. Dipping sonar (both passive and active) is employed from an altitude of about 50 ft. after the search area has been narrowed based on the sonobuoy search.</p> <p>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. Unmanned aerial systems, such as the MQ-8 Fire Scout, may also be used. The preferred range for this exercise is an instrumented range, but it may be conducted in other range complexes depending on training requirements and available assets. Occurs year round, day and night.</p>		
Typical Components	<p>Platforms: Rotary-wing aircraft, small boats, unmanned aerial systems</p> <p>Targets: Sub-surface targets</p> <p>Systems being Trained/Tested: Dipping sonar systems, sonobuoys</p>		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Aircraft safety Unmanned aircraft system procedures Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	<p>Acoustic: Sonar and other transducers Aircraft noise Vessel noise</p> <p>Explosive: None</p>	<p>Physical Disturbance and Strike: Aircraft and aerial target Vessels and in-water devices Military expended materials</p> <p>Ingestion: Military expended materials – other than munitions</p>	<p>Energy: In-air electromagnetic devices</p> <p>Entanglement: Decelerators/parachutes Wires and cables</p>
Stressors to Physical Resources	<p>Air Quality: Criteria air pollutants</p>	<p>Sediments and Water Quality: Chemicals Metals Other materials</p>	
Stressors to Human Resources	<p>Cultural Resources: Physical disturbance and strike</p>	<p>Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike</p>	<p>Public Health and Safety: In-water energy Physical interactions</p>
Military Expended Material	<p>Ingestible Material: Small decelerators/parachutes</p> <p>Non-Ingestible Material: Sonobuoys, ASW Training Targets, sonobuoy wires</p>	Military Recoverable Material	ASW Training Targets
Sonar and Other Transducer Bins	<p>Mid-Frequency: MF4 MF5</p>		

Anti-Submarine Warfare			
Anti-Submarine Warfare Tracking Exercise - Helicopter			
In-Water Explosive Bins	None		
Procedural Mitigation Measures	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar</td> <td style="width: 50%;">Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement</td> </tr> </table>	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	<p>Submarines may provide service as the target. All events are conducted in water greater than 600 ft. in depth and further than 12 NM from shore. For air quality analysis:</p> <ul style="list-style-type: none"> - 1 rotary-wing aircraft per event - Average 2 hours per event 		

A.1.2.3 Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft

Anti-Submarine Warfare			
Anti-Submarine Warfare Tracking Exercise—Maritime Patrol Aircraft			
Short Description	Maritime patrol aircraft crews search for, track, and detect submarines.	Typical Duration 2–8 hours	
Long Description	Fixed-wing maritime patrol aircraft employ sonobuoys to search for, detect, classify, localize, and track a simulated threat submarine with the goal of determining a firing solution that could be used to launch a torpedo and destroy the submarine. Sonobuoys are deployed in specific patterns based on the expected threat submarine and specific water conditions. Depending on these two factors, these patterns will cover many different size areas. For certain sonobuoys, tactical parameters of use may be classified. The anti-submarine warfare target used for this exercise may be a MK-39 Expendable Mobile Anti-Submarine Warfare (ASW) Training Target, a MK-30 target, or a live submarine. Occurs year round, day and night.		
Typical Components	Platforms: Fixed-wing aircraft Targets: Sub-surface targets, submarines Systems being Trained/Tested: Mid-frequency sonar		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Aircraft safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Aircraft noise Vessel noise Explosive: None	Physical Disturbance and Strike: Aircraft and aerial target Vessels and in-water devices Military expended materials Ingestion: Military expended materials – other than munitions	Energy: In-air electromagnetic devices Entanglement: Decelerators/parachutes Wires and cables
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: Chemicals Metals Other materials	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: In-water energy Physical interactions
Military Expended Material	Ingestible Material: Small decelerators/parachutes Non-Ingestible Material: Sonobuoys, ASW training targets, sonobuoy wires	Military Recoverable Material	ASW training targets, lightweight (non-explosive) torpedo
Sonar and Other Transducer Bins	Mid-Frequency: MF5	Anti-Submarine Warfare: ASW2 ASW5	Torpedoes: TORP1
In-Water Explosive Bins	None		

Anti-Submarine Warfare	
Anti-Submarine Warfare Tracking Exercise—Maritime Patrol Aircraft	
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar
Assumptions Used for Analysis	Submarine may provide service as the target. If target is air dropped, one parachute per target. Exercise non-explosive practice torpedoes are recovered. All events are conducted in water greater than 600 ft. in depth and further than 12 NM from shore. For air quality analysis: <ul style="list-style-type: none"> - 1 fixed-wing patrol aircraft per event - Average 6 hours per event

A.1.2.4 Anti-Submarine Warfare Tracking Exercise – Ship

Anti-Submarine Warfare			
Anti-Submarine Warfare Tracking Exercise—Ship			
Short Description	Surface ship crews search for, track, and detect submarines.	Typical Duration	
		2–4 hours	
Long Description	<p>Surface ships search for, detect, and track threat submarines to determine a firing position to launch a torpedo and attack the submarine.</p> <p>A surface ship operates at slow speeds while employing sonobuoys, hull-mounted sonar, or towed array sonar. Passive or active sonar is employed depending on the type of threat submarine, the tactical situation, and environmental conditions. The target for this exercise is either a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target or live submarine.</p> <p>This exercise may involve a single ship, or involve multiple aircraft, ships, and submarines. Occurs year round, day and night.</p>		
Typical Components	<p>Platforms: Surface combatants</p> <p>Targets: Sub-surface targets</p> <p>Systems being Trained/Tested: Mid-frequency sonar</p>		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Towed in-water device safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	<p>Acoustic: Sonar and other transducers Vessel noise</p> <p>Explosive: None</p>	<p>Physical Disturbance and Strike: Vessels and in-water devices Military expended materials</p> <p>Ingestion: None</p>	<p>Energy: In-air electromagnetic devices</p> <p>Entanglement: Wires and cables</p>
Stressors to Physical Resources	<p>Air Quality: Criteria air pollutants</p>	<p>Sediments and Water Quality: None</p>	
Stressors to Human Resources	<p>Cultural Resources: Physical disturbance and strike</p>	<p>Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike</p>	<p>Public Health and Safety: In-water energy Physical interactions</p>
Military Expended Material	<p>Ingestible Material: None</p> <p>Non-Ingestible Material: ASW training targets, expendable bathythermograph</p>	Military Recoverable Material	ASW training targets
Sonar and Other Transducer Bins	<p>Mid-Frequency: MF1 MF11</p>	<p>Anti-Submarine Warfare: ASW3</p>	
In-Water Explosive Bins	None		

Anti-Submarine Warfare	
Anti-Submarine Warfare Tracking Exercise—Ship	
Procedural Mitigation Measures	<p>Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar</p> <p>Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Towed in-water devices</p>
Assumptions Used for Analysis	<p>A submarine may provide service as the target. All events are conducted in water greater than 600 ft. in depth and further than 12 NM from shore.</p>

A.1.2.5 Anti-Submarine Warfare Tracking Exercise – Submarine

Anti-Submarine Warfare			
Anti-Submarine Warfare Tracking Exercise—Submarine			
Short Description	Submarine crews search for, track, and detect submarines.	Typical Duration 8 hours	
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. 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. Occurs year round, day and night.		
Typical Components	Platforms: Submarines Targets: Sub-surface targets Systems being Trained/Tested: Mid-frequency and high-frequency sonar		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Towed in-water device safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosive: None	Physical Disturbance and Strike: Vessels and in-water devices Military expended materials Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: None	Sediments and Water Quality: Metals	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Physical disturbance and strike	Public Health and Safety: In-water energy Physical interactions
Military Expended Material	Ingestible Material: None Non-Ingestible Material: ASW Training Targets	Military Recoverable Material	None
Sonar and Other Transducer Bins	Mid-Frequency: MF3	High-Frequency: HF1	
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar	Physical Disturbance and Strike: (Section 5.3.4) Towed in-water devices Vessel movement	
Assumptions Used for Analysis	All events are conducted in water greater than 600 ft. in depth and further than 12 NM from shore.		

A.1.3 ELECTRONIC WARFARE TRAINING

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.1.3.1 Electronic Warfare Training

Electronic Warfare			
Electronic Warfare Training			
Short Description	Aircraft and ship crews control portions of the electromagnetic spectrum used by enemy systems to degrade or deny the enemy's ability to take defensive actions.	Typical Duration	
		1–2 hours	
Long Description	Aircraft and ship crews control the electromagnetic spectrum used by enemy systems to degrade or deny the enemy's ability to take defensive actions. Electronic Warfare Operations can be active or passive, offensive or defensive. Fixed-wing aircraft employ active jamming and deception against enemy search radars to mask the friendly inbound strike aircraft mission. Surface ships detect and evaluate enemy electronic signals from enemy aircraft or missile radars; evaluate courses of action concerning the use of passive or active countermeasures; and then use ship maneuvers and either chaff, flares, active electronic countermeasures, or a combination of them to defeat the threat. Occurs year round, day and night.		
Typical Components	Platforms: Fixed-wing aircraft, surface combatants Targets: Air targets, electronic warfare targets Systems being Trained/Tested: None		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety	Typical Locations	
		Offshore Area W-237 Olympic MOA	Inland Waters Inland Waters
Stressors to Biological Resources	Acoustic: Aircraft noise Vessel noise	Physical Disturbance and Strike: Aircraft and aerial target Vessels and in-water devices	Energy: In-air electromagnetic devices
	Explosive: None	Ingestion: Military expended materials – other than munitions	Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions

Electronic Warfare			
Electronic Warfare Training			
Military Expended Material	Ingestible Material: Chaff (Offshore Area only) – air fibers, compression pad or plastic piston, endcap – chaff Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	For air quality analysis: <ul style="list-style-type: none"> - 1 contract air services aircraft - 1 fixed-wing electronic warfare aircraft - 1 fixed-wing strike aircraft - Average 2 hours per event 		

A.1.4 MINE WARFARE TRAINING

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 they are triggered by the approach of an enemy ship, or are destroyed or removed. Naval mines can be laid by purpose-built minelayers, other ships, submarines, or airplanes. Mine warfare training includes mine countermeasures exercises and mine laying exercises.

A.1.4.1 Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises

Mine Warfare			
Civilian Port Defense—Homeland Security Anti-Terrorism/Force Protection Exercises			
Short Description	Maritime security personnel train to protect civilian ports and harbors against enemy efforts to interfere with access to those ports.	Typical Duration	
		Multiple days	
Long Description	Naval forces conduct mine warfare training in conjunction with Department of Homeland Security units. The three pillars of mine warfare, airborne (helicopter), surface (surface ships), and undersea (divers, marine mammals, and unmanned vehicles) mine countermeasures will be brought to bear in order to ensure strategic U.S. ports remain free of mine threats. Various mine warfare sensors, which utilize active acoustics, will be employed in the detection, classification, and neutralization of mines. Along with traditional mine warfare techniques, such as helicopter towed mine countermeasures, new technologies (unmanned vehicles) will be utilized. Marine mammal systems may be used during this exercise. Event locations and scenarios will vary according to Department of Homeland Security and Department of Defense strategic goals and evolving world events. Occurs year round, day and night.		
Typical Components	Platforms: Moored platform, rotary-wing aircraft, support craft, surface combatants, unmanned underwater vehicles Targets: Sub-surface targets (mine shapes) Systems being Trained/Tested: Mine detection systems, towed mine neutralization systems, airborne mine neutralization system		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Aircraft safety Unmanned surface vehicle and unmanned underwater vehicle procedures Towed in-water device procedures	Typical Locations	
		Inland Waters Naval Magazine Indian Island NS Everett Naval Base Kitsap (NBK) Bangor NBK Bremerton Manchester Fuel Pier Port Angeles Port of Seattle	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Aircraft noise Vessel noise	Physical Disturbance and Strike: Aircraft and aerial target Vessels and in-water devices Seafloor devices	Energy: In-water electromagnetic devices In-air electromagnetic devices
	Explosive: None	Ingestion: None	Entanglement: None

Mine Warfare			
Civilian Port Defense—Homeland Security Anti-Terrorism/Force Protection Exercises			
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality:	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: In-water energy In-air energy Physical interactions
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	Mine shapes
Sonar and Other Transducer Bins	High-Frequency: HF4	Synthetic Aperture Sonars: SAS2	
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement Towed in-water devices	
Assumptions Used for Analysis	<p>Non-permanent mine shapes will be laid in various places on the bottom and will be retrieved. Shapes are varied, from about 1 m circular to about 2.5 m long by 1 m wide. They will be recovered using normal assets, with diver involvement.</p> <p>While goal is to conduct once per year, alternating East/West Coast, assume that a West Coast event will occur every other year with a total of three per 5-year period.</p> <p>For air quality analysis:</p> <ul style="list-style-type: none"> - 1 rotary-wing aircraft (12 hours) - 1 Mine Countermeasures-class ship (24 hours) - 1 Rigid Hull Inflatable Boat (24 hours) 		

A.1.4.2 Mine Neutralization – Explosive Ordnance Disposal Training

Mine Warfare			
Mine Neutralization – Explosive Ordnance Disposal Training			
Short Description	Personnel disable threat mines using explosive charges.	Typical Duration	
		Up to 4 hours	
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 non-explosive practice mines in the water with an explosive device and may involve detonation of one or more explosive charges per training event. At each of the two training locations, up to three events per year may occur using < 0.1-pound (E0) explosive charges (Limpet Mine Neutralization Tool), and three events per year with up to 2.5-pound (E3) charges. For each event using 0.1-pound charges, a total of up to six charges may be used. For events using charges of 2.5 pounds or less, one charge will be used. Events may also include recovery of the neutralized non-explosive mine to the surface and towing it to shore by small boat. These training events are normally conducted during daylight hours for safety reasons. Occurs year round, daytime only.		
Typical Components	Platforms: Small boat Targets: Sub-surface targets (mine shapes) Systems being Trained/Tested: None		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Underwater detonation safety	Typical Locations	
		Inland Waters Crescent Harbor EOD training Range Hood Canal EOD Training Range	
Stressors to Biological Resources	Acoustic: Vessel Noise Explosive: In-water explosions	Physical Disturbance and Strike: Vessels and in-water devices Military expended materials Seafloor devices Ingestion: Military expended materials – munitions Military expended materials – other than munitions	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: Explosives Chemicals Metals Other materials	
Stressors to Human Resources	Cultural Resources: Explosives Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: In-water energy Physical interactions
Military Expended Material	Ingestible Material: Target fragments, small-caliber projectile casings Non-Ingestible Material: Mine-shape (explosive) fragments	Military Recoverable Material	Training targets (mine shapes)

Mine Warfare			
Mine Neutralization – Explosive Ordnance Disposal Training			
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	Up to E3		
Procedural Mitigation Measures	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">Explosive Stressors: <i>(Section 5.3.3)</i> Explosive mine neutralization activities involving Navy divers</td> <td style="width: 50%; border: none;">Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement</td> </tr> </table>	Explosive Stressors: <i>(Section 5.3.3)</i> Explosive mine neutralization activities involving Navy divers	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Explosive Stressors: <i>(Section 5.3.3)</i> Explosive mine neutralization activities involving Navy divers	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	Mine shapes will be recovered. For air quality analysis: <ul style="list-style-type: none"> - 3 small boats - Average 2 hours per event 		

A.1.5 SURFACE WARFARE TRAINING

Surface warfare is a type of naval warfare in which aircraft and surface ships employ weapons and sensors in operations directed against enemy surface ships or small boats. Aircraft-to-surface Surface Warfare is conducted by using precision guided munitions. Surface warfare also is conducted by warships employing naval guns. Training in surface warfare includes surface-to-surface gunnery, air-to-surface gunnery, and bombing exercises. Gunnery and missile training may involve expenditure of ordnance against a towed target.

A.1.5.1 Bombing Exercise Air-to-Surface

Surface Warfare			
Bombing Exercise Air-to-Surface			
Short Description	Fixed-wing aircrews deliver bombs against surface targets.	Typical Duration	
		1 hour	
Long Description	<p>Fixed-wing aircraft conduct bombing exercises against stationary floating targets (e.g., MK-58 smoke buoy), towed targets, or maneuvering targets. An aircraft clears the area, deploys a smoke buoy, and then delivers high-explosive or non-explosive practice munitions bombs on the target. A range boat may be used to deploy towed or maneuvering targets for an aircraft to attack.</p> <p>Exercises for strike fighters typically involve a flight of two aircraft delivering unguided or guided munitions that may be either high-explosive or non-explosive. The following munitions may be employed by strike fighter aircraft in the course of bombing exercise: Unguided munitions include non-explosive subscale 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). Occurs year round, daytime only.</p>		
Typical Components	<p>Platforms: Fixed-wing aircraft, support craft Targets: Surface targets Systems being Trained/Tested: Aircraft platforms, bombs, non-explosive practice munitions</p>		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Aircraft safety Laser procedures Weapons firing safety Target deployment and retrieval safety	Typical Locations	
		<p>Offshore Area W-237 (Excluding Olympic MOA and Olympic Coast National Marine Sanctuary)</p>	
Stressors to Biological Resources	<p>Acoustic: Aircraft noise Vessel noise</p>	<p>Physical Disturbance and Strike: Aircraft and aerial target Vessels and in-water devices Military expended materials</p>	<p>Energy: In-air electromagnetic devices</p>
	<p>Explosive: In-water explosions</p>	<p>Ingestion: Military expended materials – munitions Military expended materials – other than munitions</p>	<p>Entanglement: Decelerators/parachutes</p>
Stressors to Physical Resources	<p>Air Quality: Criteria air pollutants</p>	<p>Sediments and Water Quality: Explosives Metals</p>	

Surface Warfare			
Bombing Exercise Air-to-Surface			
Stressors to Human Resources	Cultural Resources: Explosives Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: In-water energy Physical interactions
Military Expended Material	Ingestible Material: Small decelerators/parachutes, target fragments, bomb fragments Non-Ingestible Material: Mark 58 marine marker, bomb (non-explosive)	Military Recoverable Material	Recoverable surface targets
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	E10		
Procedural Mitigation Measures	Explosive Stressors: <i>(Section 5.3.3)</i> Explosive bombs	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Non-explosive bombs and mine shapes	
Assumptions Used for Analysis	Approximately 90 percent of non-explosive bombs are the sub-scale bombs such as the MK-76 and BDU-48. 110 NEPM and 10 HE bombs annually. All explosive bombing events occur greater than 50 NM from shore. Non-explosive bombing events occur greater than 20 NM from shore. Air-to-surface bombing is not authorized in the Olympic Coast National Marine Sanctuary. For air quality analysis: - 2 fixed-wing strike aircraft (1 hour)		

A.1.5.2 Gunnery Exercise Surface-to-Surface – Ship

Surface Warfare			
Gunnery Exercise Surface-to-Surface – Ship			
Short Description	Surface ship crews fire large-, medium-, and small-caliber guns at surface targets.	Typical Duration	
		Up to 3 hours	
Long Description	<p>This exercise involves ships’ gun crews engaging surface targets at sea with their main battery large-caliber (typically 57 millimeter [mm], 76 mm, and 5-inch), medium-caliber (20 mm, 25 mm, and 40 mm), and small-caliber (.50-caliber and smaller) 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.</p> <p>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.</p> <p>Large-caliber guns will also be fired during weapon certification events and in conjunction with weapon maintenance.</p> <p>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).</p> <p>Shipboard protection systems utilizing small-caliber projectiles will train against high-speed mobile targets. Occurs year round, daytime only.</p>		
Typical Components	<p>Platforms: Surface combatants</p> <p>Targets: Recoverable or expendable floating target (stationary or towed), remote controlled high speed targets</p> <p>Systems being Trained/Tested: Large-, medium-, and small-caliber gun systems</p>		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Weapons firing safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Vessel noise Weapons noise	Physical Disturbance and Strike: Vessels and in-water devices Military expended materials	Energy: In-air electromagnetic devices
	Explosive: In-water explosions In-air explosions	Ingestion: Military expended materials – munitions Military expended materials – other than munitions	Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: Explosives Metals	
Stressors to Human Resources	Cultural Resources: Explosives Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: In-water energy Physical interactions

Surface Warfare			
Gunnery Exercise Surface-to-Surface – Ship			
Military Expended Material	<p>Ingestible Material: Target fragments, projectile fragments, small- and medium-caliber casings, small- and medium-caliber (non-explosive) projectiles</p> <p>Non-Ingestible Material: Large-caliber projectiles (non-explosive), large-caliber casings, marine marker, canister</p>	Military Recoverable Material	Recoverable surface targets
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	E1	E2	E5
Procedural Mitigation Measures	<p>Acoustic Stressors: <i>(Section 5.3.2)</i> Weapons firing noise</p> <p>Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Small-, medium-, and large-caliber non-explosive practice munitions</p>	<p>Explosive Stressors: <i>(Section 5.3.3)</i> Explosive medium-caliber and large-caliber projectiles</p>	
Assumptions Used for Analysis	<p>Small- and medium-caliber NEPM activity always occurs 12 NM or more from the shoreline. Large-caliber NEPM activity always occurs 20 NM or more from shoreline. Medium- and large-caliber explosive munitions activity always occur 50 NM or more from shore.</p> <p>For analytical purposes assume all high explosive rounds are fused to detonate upon impact with water surface or target.</p> <p>After impacting the water, the high explosive rounds are expected to detonate within three feet of the surface. Non-explosive rounds and fragments from the high explosive rounds will sink to the bottom of the ocean.</p>		

A.1.5.3 Missile Exercise Air-to-Surface

Surface Warfare			
Missile Exercise Air-to-Surface			
Short Description	Fixed-wing aircrews simulate firing precision-guided missiles, using captive air training missiles (CATMs) against surface targets. Some activities include firing a missile with a high-explosive (HE) warhead.	Typical Duration	
		2 hours	
Long Description	Fighter, Electronic Attack, maritime patrol aircraft aircrews fire precision-guided missiles against surface targets. Aircraft involved may be unmanned. Fixed-wing aircraft (fighters, Electronic Attack, or maritime patrol aircraft) approach an at-sea surface target from high altitude and launch high-explosive precision guided missiles. Occurs year round, daytime only.		
Typical Components	Platforms: Fixed-wing aircraft, surface combatants Targets: Recoverable floating target (stationary or towed), remotely operated target Systems being Trained/Tested: Air-to-surface missile systems		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Aircraft safety Laser procedures Weapons firing safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area W-237	
Stressors to Biological Resources	Acoustic: Aircraft noise Vessel noise Weapons noise Explosive: In-water explosions	Physical Disturbance and Strike: Aircraft and aerial target strike Military expended materials Vessel and in-water devices Ingestion: Military expended materials – munitions Military expended materials – other than munitions	Energy: In-air electromagnetic devices Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria Air Pollutants Hazardous Air Pollutants	Sediment and Water Quality: Explosives Chemicals Metals	
Stressors to Human Resources	Cultural Resources: Acoustics Explosives Physical disturbance	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: In-water energy In-air energy Physical interactions
Military Expended Material	Ingestible Material: Missile fragments, target fragments Non-Ingestible Material: Missiles (non-explosive)	Military Recoverable Material	Recoverable surface targets
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	E10		

Surface Warfare	
Missile Exercise Air-to-Surface	
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Non-Explosive Missiles
	Explosive Stressors: <i>(Section 5.3.3)</i> Explosive Missiles
Assumptions Used for Analysis	Assume one target per event. Most missiles are non-firing. Some missiles are live missiles with HE warhead (2 HE missiles per year). All events occur greater than 50 NM from shore.

A.1.6 OTHER TRAINING

A.1.6.1 Intelligence, Surveillance, Reconnaissance

Other Training			
Intelligence, Surveillance, Reconnaissance			
Short Description	Aircraft, unmanned aerial systems, ships, and submarines use all available sensors to collect data on threat vessels.	Typical Duration 2–8 hours	
Long Description	Aircraft, unmanned aerial systems operators, ships, and submarines use all available sensors to collect data on threat vessels. Passive sonobuoys are used to collect and analyze acoustic data, and photographic equipment is used to document the vessel with visual information. Occurs year round, daytime only.		
Typical Components	Platforms: Aircraft, unmanned aerial system, ships, submarines Targets: None Systems being Trained/Tested: None		
Standard Operating Procedures (Section 2.3.3)	Aircraft safety Unmanned aircraft system procedures Vessel safety	Typical Locations	
		Offshore Area Offshore Area	Inland Waters Restricted Area 6701 NAVY 7 OPAREA
Stressors to Biological Resources	Acoustic: Aircraft noise Vessel noise Explosive: None	Physical Disturbance and Strike: Aircraft and aerial target Military expended materials Vessel and in-water devices Ingestion: Military expended materials – other than munitions	Energy: In-air electromagnetic devices Entanglement: Wires and cables
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: None	Public Health and Safety: None
Military Expended Material	Ingestible Material: Small decelerators/parachutes Non-Ingestible Material: Sonobuoys, sonobuoy wires	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	None		

Other Training	
Intelligence, Surveillance, Reconnaissance	
Assumptions Used for Analysis	ISR training is conducted by Maritime Patrol Aircraft and unmanned aerial systems in W-237 and the Pacific Northwest Operating Area. Activities typically last 6 hours. P-8A aircrews use a variety of intelligence gathering and surveillance methods, including visual, infrared, electronic, radar, and acoustic. EP-3 and EA-18G crews conduct ISR training as well, but to a lesser extent than P-8A crews.

A.1.6.2 Maritime Security Operations

Other Training			
Maritime Security Operations			
Short Description	Aircraft, surface ship, and small boat crews conduct a suite of maritime security operations events, including maritime security escorts for Navy vessels such as submarines and aircraft carriers; Visit, Board, Search, and Seizure; Maritime Interdiction Operations; Force Protection; and Anti-Piracy Operations.	Typical Duration	
		TPP, averaging 10 hours, up to approximately 12–18 hours; 2 hours for other MSO activities	
Long Description	<p>Maritime security operations in the NWTT study area are predominantly maritime security escort events, including the Transit Protection Program (TPP) and training of other escort units. The TPP includes up to 9 security vessels that protect SSBNs while moving within Puget Sound and the Strait of Juan de Fuca. U.S. Coast Guard (USCG) personnel and their ancillary equipment and weapons systems are involved in these events. Generally, the escorts establish a moving 1000-yard perimeter (security zone) around the vessel to prevent non-participants from entering that security zone. Non-participant vessels might be ordered to move. Every 2 years, a training event occurs which involves up to 16 vessels, transiting from Hood Canal to Admiralty Inlet. During this biennial event, boat crews train to engage surface targets by firing small-caliber (blank) weapons.</p> <p>Similar maritime security escort training occurs with Coastal Riverine Group (CRG) boats that conduct force protection for designated vessels and movements. These CRG boat crews train to protect ships while entering and leaving ports. Other missions include ensuring compliance with vessel security zones for ships in port and at anchor, conducting patrols to counter waterborne threats, and conducting harbor approach defense.</p> <p>The vessels used by TPP and CRG include small unit riverine craft, combat rubber raiding craft, rigid-hull inflatable boats, patrol craft, reaction vessels, blocking vessels, 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. Boat crews may use high or low speeds to approach and engage targets simulating other boats, swimmers, floating mines, or nearshore land targets with small-caliber (blank) weapons. Occurs year round, daytime only.</p>		
Typical Components	<p>Platforms: Small boats, reaction vessels, blocking vessels, aircraft, and patrol boats Targets: High-performance small boats, recoverable or expendable floating target Systems being Trained/Tested: None</p>		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety Weapons firing safety Target deployment and retrieval safety	Typical Locations	
		<p>Inland Waters NBK Bremerton Hood Canal Dabob Bay TPS Route (169) NS Everett Puget Sound Strait of Juan de Fuca</p>	
Stressors to Biological Resources	Acoustic: Vessel noise Weapons noise Aircraft noise	Physical Disturbance and Strike: Aircraft and aerial target Vessels and in-water devices Military expended materials	Energy: In-air electromagnetic devices
	Explosive: None		Entanglement: None

Other Training			
Maritime Security Operations			
	Ingestion: Military expended materials – munitions		
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: Metals	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions
Military Expended Material	Ingestible Material: Shell casings Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	<p>Maritime security training events conducted in inland waters do not involve live fire of weapons. All maritime security events involve vessel movement, sometimes at speeds necessary to overtake suspect vessel or small boats (targets). Maritime security training events, particularly maritime security escorts, are conducted proximate to Naval Bases (NAVBASEs) Kitsap Bangor, Bremerton, and Everett, and within the Hood Canal, Dabob Bay, Puget Sound, and Strait of Juan de Fuca.</p> <p>Maritime Security Escort (SSBN Transit Protection): The Transit Protection Program (TPP) utilizes a mixture of 16 security vessels, up to 9 of which can be utilized at any time for escorting SSBNs transiting between the SSBN homeport of NAVBASE Bangor and the dive/surface point in the Strait of Juan de Fuca or Dabob Bay. TPP vessels include 16 escort security boats home ported at NAVBASE Kitsap Bangor, consisting of 2 Blocking Vessels (250 ft.), 2 Reaction Vessels (87 ft.), and 12 Screening Vessels (small boats and patrol boats – 16–85 ft.).</p> <p>Depending on the type of vessel escort being conducted and other conditions, the security zone could be from a 100-yard to a 1,000-yard radius around the escorted vessel. Recreational and commercial vessels might be ordered to move.</p> <p>To the extent practicable, all use of blank ammunition would be near the center of the waterway and no closer than 500 yards to the shoreline.</p> <p>All shell casings associated with use of blank ammunition shall be captured, to the greatest extent feasible, using either cofferdams around guns, capture bins, or capture on the deck of vessels. Radio broadcasts to mariners will be conducted during exercises to ensure the public is aware and clear of the area.</p>		

Other Training	
Maritime Security Operations	
	<p>Maritime Security Escort (Coastal Riverine Group): Naval Coastal Riverine Units train to provide escort and force protection security to naval vessels. These training events will be conducted within inland waterways in and around Naval Homeports such as Naval Base Kitsap Bangor, Naval Base Kitsap Bremerton, and Naval Station Everett, and within the Hood Canal, Dabob Bay, Puget Sound, and Strait of Juan de Fuca WA.</p> <p>These training events would occur approximately 51 times per year, approximately 60–70 percent originating proximate to Bangor, 20–30 percent proximate to Bremerton, and the remainder (less than 10 percent) proximate to Everett. The average total transit distance associated with maritime security escort training events (Other) can vary between 50 and 180 NM.</p> <p>Maritime Security Escort (Other) is supported with 6 total vessels (i.e., 34' Sea Ark Patrol Craft and 85' Mk VI Riverine Craft), of which 2–4 vessels would be used for a single escort mission. Naval Coastal Riverine Forces would also conduct certification maritime security escort training events once every 6–9 months. These certification events would include 8–10 days underway, operating in common escort areas (with 1–2 days of no-fire events/7 days of blank fire events in the vicinity of Whidbey Island). The typical training day would consist of two shifts, approximately 5 hours each. Nighttime training is not anticipated. Certification training would utilize up to 5 boats (3 as escorts, 1 simulating a Navy vessel to be protected, and 1 simulating Opposition Force [OPFOR]).</p> <p>Expended Brass: Efforts will be made by crews to collect all expended brass (shell casings) captured on the deck; however, brass ejection may result in loss over the side. Use of Pyrotechnics limited to flash, flare, and sound devices, may be utilized. Noise Levels: Loud hailers will be used for hailing contacts if no radio communication can be established. Use of sirens in support of mission or training will be minimized and period of use limited to late-morning through early evening.</p> <p>Water Depth: Patrol boats will not typically be operating in shoal water. Unless in an emergency and during launch and recovery, patrol boats will only operate in waters in which the charted depth is greater than 6 ft. Speed: Patrol boats are not expected to exceed 15 knots unless involved in a drill that requires them to quickly move from one zone to another to provide force protection.</p> <p>For air quality analysis:</p> <ul style="list-style-type: none"> - 1 fixed-wing strike aircraft - 1 rotary-wing aircraft - 3–9 small boats - Average 2 hours per event

A.1.6.3 Personnel Insertion/Extraction – Non-Submersible

Other Training			
Personnel Insertion/Extraction Training—Non-Submersible			
Short Description	Military personnel train for insertion and extraction into target areas using rotary wing aircraft, fixed-wing aircraft (insertion only), or small boats.	Typical Duration	
		Up to 12 hours	
Long Description	Personnel train to approach or depart an objective area using various transportation methods and tactics. These operations train forces to insert and extract personnel and equipment day or night. Tactics and techniques employed include insertion from aircraft by parachute, by rope, or from low, slow-flying helicopters from which personnel jump into the water. Parachute training is required to be conducted on surveyed drop zones to enhance safety. Insertion and extraction methods also employ small inflatable boats. Activity may include Navy personnel learning advanced self-contained underwater breathing apparatus (SCUBA) diving, to include tactics, techniques, and procedures and emergency procedures. Small boats are used for safety. Occurs year round, day and night.		
Typical Components	Platforms: Small boats, rotary-wing aircraft, fixed-wing aircraft Targets: None Systems being Trained/Tested: None		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety	Typical Locations	
		Inland Waters Crescent Harbor EOD Range NAVY 7 OPAREA	
Stressors to Biological Resources	Acoustic: Vessel noise Aircraft noise Explosive: None	Physical Disturbance and Strike: Vessels and in-water devices Aircraft and aerial target Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: None	Public Health and Safety: None
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		

Other Training	
Personnel Insertion/Extraction Training—Non-Submersible	
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Assumptions Used for Analysis	For air quality analysis: - 1 small boat - Average 8 hours per event

A.1.6.4 Precision Anchoring

Other Training			
Precision Anchoring			
Short Description	Surface ship crews release and retrieve anchors in designated locations.	Typical Duration	
		Up to 1 hour	
Long Description	Ship crews choose the best available anchoring sites. The ship uses all means available to determine its position when anchor is dropped to demonstrate calculating and plotting the anchor's position within 100 yards of center of planned anchorage. Occurs year round, day and night.		
Typical Components	Platforms: Navy ships Targets: None Systems being Trained/Tested: None		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety	Typical Locations	
		Inland Waters Naval Magazine Indian Island Naval Station Everett NAVY 3 OPAREA Eastern Banks Area	
Stressors to Biological Resources	Acoustic: Vessel noise	Physical Disturbance and Strike: Vessels and in-water devices Seafloor devices	Energy: In-air electromagnetic devices
	Explosive: None	Ingestion: None	Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions
Military Expended Material	Ingestible Material: None	Military Recoverable Material	None
	Non-Ingestible Material: None		
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	None		

A.1.6.5 Search and Rescue

Other Training			
Search and Rescue			
Short Description	Helicopter crews train to rescue military personnel at sea.	Typical Duration 2–3 hours	
Long Description	Helicopter crews rescue military personnel at sea. Helicopters fly below 3,000 ft. and locate personnel to be rescued. Flares are expended during training. Occurs year round, day and night.		
Typical Components	Platforms: Rotary-wing aircraft, small boats Targets: None Systems being Trained/Tested: None		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety	Typical Locations	
		Inland Waters Crescent Harbor EOD Range Restricted Area 6701	
Stressors to Biological Resources	Acoustic: Aircraft noise Vessel noise	Physical Disturbance and Strike: Aircraft and aerial target Vessels and in-water devices	Energy: In-air electromagnetic devices
	Explosive: None	Ingestion: None	Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions
Military Expended Material	Ingestible Material: Flares Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	This activity involves a helicopter landing and simulated extraction of a survivor (typically one of the helicopter crewmembers). The search and rescue helicopter, an H-60, approaches the survivor, hovers, recovers the survivor, and then departs the area with the survivor onboard.		

A.1.6.6 Small Boat Attack Exercise

Other Training			
Small Boat Attack Exercise			
Short Description	Small boat crews engage pierside surface targets with small-caliber weapons. Only blank rounds are fired.	Typical Duration	
		4 hours over 3 days	
Long Description	<p>A single activity consists of multiple days of training. For analysis in this Supplemental, a 3-day scenario is assumed. On the first day, blanks will be fired from a small-caliber machine gun, mounted on a high-speed boat used by Navy security forces. The second day will consist of test firing multiple crew-serve and hand-held small-caliber weapons, all with blank ammunition. Some rounds will be fired from both the high-speed boat and from a Navy surface ship moored at a Navy pier. The third day will be the full training exercise. This consists of a high-speed attack vessel running directly at the Navy pier where the simulated target surface ship is moored.</p> <p>Duration of firing will be approximately 2 hours with a total of 1,000 rounds fired the first day, and a duration of 1.5 hours with a total of 1,000 rounds fired the second day. The final day will have a duration of approximately 30 minutes, with 1,000 rounds fired. Typical firing patterns are 3–30 round bursts, assess target, and then fire again. Multiple crew members will be given a chance to fire the weapons. Occurs year round, daytime only.</p>		
Typical Components	<p>Platforms: Small boats or watercraft Targets: High-performance small boats Systems being Trained/Tested: None</p>		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Weapons firing procedures	Typical Locations	
		<p>Inland Waters Naval Station Everett NBK Bangor NBK Bremerton</p>	
Stressors to Biological Resources	<p>Acoustic: Vessel noise Weapons noise</p>	<p>Physical Disturbance and Strike: Vessels and in-water devices Military expended materials</p>	<p>Energy: None</p>
	<p>Explosive: None</p>	<p>Ingestion: Military expended materials – munitions</p>	<p>Entanglement: None</p>
Stressors to Physical Resources	<p>Air Quality: Criteria air pollutants</p>	<p>Sediments and Water Quality: Metals</p>	
Stressors to Human Resources	<p>Cultural Resources: Physical disturbance and strike</p>	<p>Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike</p>	<p>Public Health and Safety: Physical interactions</p>
Military Expended Material	<p>Ingestible Material: Small-caliber casings</p> <p>Non-Ingestible Material: None</p>	<p>Military Recoverable Material</p>	<p>None</p>

Other Training	
Small Boat Attack Exercise	
Sonar and Other Transducer Bins	None
In-Water Explosive Bins	None
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Assumptions Used for Analysis	At locations where a security barrier is present, and sea lions may be hauled out on the barrier, the security barrier will be pulled fully open to remove haul out opportunities. During Day 1 training, all firing will occur at least 250 ft. away from the security barrier.

A.1.6.7 Submarine Sonar Maintenance

Other Training			
Submarine Sonar Maintenance			
Short Description	Maintenance of submarine sonar and other system checks are conducted pierside or at sea.	Typical Duration Up to 1 hour	
Long Description	A submarine performs periodic maintenance on the AN/BQQ-10 (low-, mid-, and high-frequency) sonar system while in port or at sea. Submarines conduct maintenance to their sonar systems in shallow water near their homeport; however, sonar maintenance could occur at sea as the system's performance may warrant. Occurs year round, day and night.		
Typical Components	Platforms: Submarines Targets: None Systems being Trained/Tested: Low-, mid-, and high-frequency hull mounted sonar		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Pierside testing safety	Typical Locations	
		Offshore Area Offshore Area	Inland Waters NBK Bremerton NBK Bangor
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise	Physical Disturbance and Strike: Vessels and in-water devices	Energy: None
	Explosive: None	Ingestion: None	Entanglement: None
Stressors to Physical Resources	Air Quality: None	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: None	Public Health and Safety: In-water energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	Low-Frequency: LF5 Mid-Frequency: MF3	High-Frequency: HF1	
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement	
Assumptions Used for Analysis	For biological resources analysis, vessel noise and vessel strike are only analyzed for the periods while the submarines are surfaced, typically brief in nature. Mitigation measures related to vessel movement are also only considered during the period of surfacing. For human resources stressor analysis, physical disturbance and strike and physical interactions are only analyzed for the periods while the submarines are surfaced, typically brief in nature.		

A.1.6.8 Surface Ship Sonar Maintenance

Other Training			
Surface Ship Sonar Maintenance			
Short Description	Maintenance of surface ship sonar and other system checks are conducted pierside or at sea.	Typical Duration Up to 4 hours	
Long Description	This scenario consists of surface ships performing periodic maintenance to the AN/SQS-53 sonar and other ship systems while in port or at sea. This maintenance takes up to 4 hours. Surface ships operate active sonar systems for maintenance while in shallow water near their homeport; however, sonar maintenance could occur anywhere as the system's performance may warrant. Occurs year round, day and night.		
Typical Components	Platforms: Surface combatants Targets: None Systems being Trained/Tested: Mid-frequency hull mounted sonar		
Standard Operating Procedures (Section 2.3.3)	Vessel safety	Typical Locations	
		Offshore Area Offshore Area	Inland Waters Naval Station Everett NBK Bremerton
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosive: None	Physical Disturbance and Strike: Vessels and in-water devices Ingestion: None	Energy: In-air electromagnetic devices Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: None	Public Health and Safety: In-water energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	Mid-Frequency: MF1		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement	
Assumptions Used for Analysis	None		

A.1.6.9 Unmanned Underwater Vehicle Training

Other Training			
Unmanned Underwater Vehicle Training			
Short Description	Unmanned underwater vehicle certification involves training with unmanned platforms to ensure submarine crew proficiency. Tactical development involves training with various payloads for multiple purposes to ensure that the systems can be employed effectively in an operational environment.	Typical Duration	
		Up to 24 hours	
Long Description	Unmanned underwater vehicle certification and tactical development involves training with unmanned platforms on which various payloads are attached and used for different purposes. Payload certification and development training assesses various systems that can be incorporated onto unmanned platforms for mine warfare, bottom mapping, and other missions. Training can range from basic remote control and autonomous navigation tests to deployment and activation of onboard systems that may include hydrodynamic instruments, launchers, and recovery capabilities. These vehicles are capable of expanding the communication and surveillance capabilities of submarines, and terrestrial commands. Occurs year round, day and night.		
Typical Components	Platforms: Support craft, unmanned underwater vehicle Targets: None Systems being Trained/Tested: Acoustic modem, high-frequency sonar, synthetic aperture sonar		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Unmanned surface vehicle and unmanned underwater vehicle procedures	Typical Locations	
		Offshore Area Quinalt Range Site W-237A	Inland Waters Crescent Harbor EOD Range, Dabob Bay Range Complex, NBK Bangor, NBK Bremerton, Keyport Range Site, Manchester Fuel Pier, NAVY 3 OPAREA, NAVY 7 OPAREA
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosive: None	Physical Disturbance and Strike: Vessels and in-water devices Military expended materials Ingestion: None	Energy: None Entanglement: None
	Air Quality: None	Sediments and Water Quality: None	
Stressors to Physical Resources			
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: None	Public Health and Safety: None
	Military Expended Material Ingestible Material: None Non-Ingestible Material: Anchor blocks	Military Recoverable Material	None

Other Training			
Unmanned Underwater Vehicle Training			
Sonar and Other Transducer Bins	<table border="0"> <tr> <td>Forward-Looking Sonar: FLS2</td> <td>Acoustic Modems: M3</td> </tr> </table>	Forward-Looking Sonar: FLS2	Acoustic Modems: M3
Forward-Looking Sonar: FLS2	Acoustic Modems: M3		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	Potential specific locations for this activity include Northwest Training Range Complex Dabob Bay, Hood Canal Sinclair Inlet, NBK Bangor, NBK Keyport, Manchester Fuel Pier. For air quality analysis: <ul style="list-style-type: none"> - 1 support craft - Average 8 hours per event 		

A.2 NAVAL SEA SYSTEMS COMMAND TESTING ACTIVITIES

A.2.1 ANTI-SUBMARINE WARFARE

A.2.1.1 Anti-Submarine Warfare Testing

Anti-Submarine Warfare			
Anti-Submarine Warfare Testing			
Short Description	Ships and their supporting platforms (rotary-wing aircraft and unmanned aerial systems) detect, localize, and prosecute submarines.	Typical Duration 1–2 weeks, with 4–8 hours of active sonar use with intervals of non-activity in between.	
Long Description	Ships conduct detect-to-engage operations against modern diesel-electric and nuclear submarines using airborne and surface assets (both manned and unmanned). Active and passive acoustic systems are used to detect and track submarine targets, culminating in the deployment of lightweight torpedoes to engage the threat. Occurs year round, daytime only.		
Typical Components	Platforms: Rotary-wing aircraft, submarine, surface combatant Targets: Sub-surface targets System being Trained/Tested: Acoustic countermeasures, navigation sonar, sonar systems, sonobuoys, torpedo systems, underwater communications		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Aircraft safety Towed in-water device safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area Quinault Range Site	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Aircraft noise Vessel noise Explosives: None	Physical Disturbance and Strike: Aircraft and aerial targets Military expended material Vessels and in-water devices Ingestion: Military expended materials – other than munitions	Energy: None Entanglement: Decelerators/parachutes Wires and cables
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – military expended material	Sediments and Water Quality: Chemicals Metals Other materials	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy In-water energy	
Military Expended Material	Ingestible Material: Small decelerator/parachute Non-Ingestible Material: Acoustic countermeasures, lightweight torpedo accessories, mobile subsurface target, sonobuoy (non-explosive), sonobuoy wires	Military Recoverable Material	Lightweight (non-explosive) torpedo, mobile subsurface target

Anti-Submarine Warfare			
Anti-Submarine Warfare Testing			
Sonar and Other Transducer Bins	Mid-Frequency: MF1K MF4 MF10 MF11 MF 5 MF12	Anti-Submarine Warfare: ASW1 ASW2 ASW3 ASW5	Torpedoes: TORP1
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement Towed in-water devices	
Assumptions Used for Analysis	All sonobuoys have parachutes unless otherwise noted.		

A.2.1.2 At-Sea Sonar Testing

Anti-Submarine Warfare					
At-Sea Sonar Testing					
Short Description	At-sea testing to ensure systems are fully functional in an open ocean environment.			Typical Duration From 4 hours to 11 days	
Long Description	At-sea sonar testing is required to calibrate or document the functionality of sonar systems while the ship or submarine is in an ocean environment. At-sea sonar testing is conducted to verify the vessel meets design acoustic specifications, define the underwater characteristics of the vessel, determine effects of systems and equipment on ship's acoustic characteristics, and provide technical background necessary to initiate development of design improvements to reduce noise. Tests also consist of electronic support measurement, photonics, and sonar sensor accuracy testing. In some instances, a submarine's passive detection capability is tested when a second submarine utilizes its active sonar or is equipped with a noise augmentation system in order to replicate acoustic or electromagnetic signatures of other vessel types or classes. Occurs year round, day and night.				
Typical Components	Platforms: Aircraft carrier, submarines, support craft Targets: Sub-surface targets System being Trained/Tested: Acoustic countermeasures, acoustic modems, sonar systems, underwater communication systems, torpedo systems				
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety		Typical Locations		
	Towed in-water device safety Target deployment and retrieval safety		Offshore Area Offshore Area	Inland Waters Dabob Bay Range Complex	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosives: None	Physical Disturbance and Strike: Military expended materials Vessels and in-water devices Ingestion: Military expended materials – other than munitions	Energy: In-air electromagnetic devices Entanglement: Decelerator/parachutes		
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – military expended material	Sediments and Water Quality: Metals Chemicals Other materials			
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Accessibility	Public Health and Safety: Physical interactions In-air energy In-water energy		
Military Expended Material	Ingestible Material: Small decelerator/parachute Non-Ingestible Material: Anti-torpedo torpedo accessories, motorized sub-surface target	Military Recoverable Material	Anti-torpedo torpedo, mobile subsurface target		
Sonar and Other Transducer Bins	Mid-Frequency: MF3	High-Frequency HF1 HF5	Anti-Submarine Warfare ASW3	Torpedoes TORP1	Acoustic Modems M3

Anti-Submarine Warfare							
At-Sea Sonar Testing							
In-Water Explosive Bins	None						
Procedural Mitigation Measures	<table border="0"> <tr> <td>Acoustic Stressors: <i>(Section 5.3.2)</i></td> <td>Physical Disturbance and Strike: <i>(Section 5.3.4)</i></td> </tr> <tr> <td>Active sonar</td> <td>Vessel movement</td> </tr> <tr> <td></td> <td>Towed in-water devices</td> </tr> </table>	Acoustic Stressors: <i>(Section 5.3.2)</i>	Physical Disturbance and Strike: <i>(Section 5.3.4)</i>	Active sonar	Vessel movement		Towed in-water devices
Acoustic Stressors: <i>(Section 5.3.2)</i>	Physical Disturbance and Strike: <i>(Section 5.3.4)</i>						
Active sonar	Vessel movement						
	Towed in-water devices						
Assumptions Used for Analysis	Active sonar use is intermittent throughout the duration of the event.						

A.2.1.3 Countermeasure Testing

Anti-Submarine Warfare			
Countermeasure Testing			
Short Description	Countermeasure testing involves the testing of systems that will detect, localize, and track incoming weapons, including marine vessel targets. Countermeasures may be systems to obscure the vessel's location or systems to rapidly detect, track, and counter incoming threats. Testing includes surface ship torpedo defense systems and marine vessel stopping payloads.	Typical Duration	
		From 4 hours to 6 days, depending on the countermeasure being tested	
Long Description	<p>Countermeasure testing evaluates the deployment, operation, and effectiveness of components or fully integrated systems used to defend a vessel from an incoming threat. Countermeasures may be mechanical, chemical, or electronic devices that are released from a vessel to obscure the vessel's location or provide a false target. Countermeasures may also be threat-intervention systems operated from within the vessel to detect, localize, track, and respond to incoming threats. Threat detection range may be extended by towing a sensor array. Test scenarios vary widely, ranging from measuring the operation of a deployment mechanism to validating the ability of an integrated system to detect, track, localize, and destroy an incoming torpedo.</p> <p>Torpedo defense systems are an array of integrated systems that detect, localize, track, and respond to incoming weapons. At-sea testing of torpedo defense systems addresses all components, including towed acoustic systems, torpedo warning systems, and countermeasure anti-torpedo subsystems. Some torpedo defense system scenarios employ non-explosive torpedoes against targets released by secondary platforms (e.g., submarine). While surface vessels are in transit, countermeasure systems may be used to identify false alert rates.</p> <p>Marine vessel stopping payloads are systems designed to deliver the appropriate measure(s) to affect a vessel's propulsion and associated control surfaces to significantly slow and potentially stop the advance of the vessel. Marine vessel-stopping proposed activities include the use of biodegradable polymers. The biodegradable polymers that the Navy uses are designed to temporarily interact with the propeller(s) of a target craft, rendering the craft ineffective. Occurs year round. Offshore Area: Up to 50% of testing could occur at night. Inland waters: Daytime testing only.</p>		
Typical Components	<p>Platforms: All Navy ships and boats, moored platforms, support craft Targets: Mine warfare targets, sub-surface targets, surface targets System being Trained/Tested: Acoustic countermeasures, sonar systems, underwater communications, torpedo systems</p>		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Towed in-water device safety Weapons firing safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Quinault Range Site Western Behm Canal SEAFAC	Inland Waters Dabob Bay Range Complex Keyport Range Site
Stressors to Biological Resources	<p>Acoustic: Sonar and other transducers Vessel noise</p> <p>Explosives: None</p>	<p>Physical Disturbance and Strike: Military expended material Vessels and in-water devices</p> <p>Ingestion: Military expended materials – other than munitions</p>	<p>Energy: In-air electromagnetic devices</p> <p>Entanglement: Biodegradable polymer Wires and cables</p>

Anti-Submarine Warfare				
Countermeasure Testing				
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – military expended material		Sediments and Water Quality: Metals Chemicals Other materials	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy In-water energy	
Military Expended Material	Ingestible Material: Biodegradable polymer Non-Ingestible Material: Acoustic countermeasures, guidance wire, heavyweight torpedo accessories, mobile subsurface target	Military Recoverable Material	Mine shape (non-explosive), heavyweight (non-explosive) torpedo, acoustic countermeasures, mobile subsurface target	
Sonar and Other Transducer Bins	Mid-Frequency: MF1	High-Frequency: HF8	Anti-Submarine Warfare: ASW3 ASW4	Torpedoes: TORP2
In-Water Explosive Bins	None			
Procedural Mitigation Measures	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar		Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Towed in-water devices	
Assumptions Used for Analysis	Not all events will include the use of sonar and other transducers. Use of expendable materials is minimized in Inland Waters, and most components of countermeasures are recovered (some components are consumed in use and dissipate in the environment). Obscuring devices deployed in the water may have a self-inflating balloon and tether that helps them to operate at the ideal depth. The balloon allows test units to be recovered in calm conditions, but has a slow leak enabling the empty container to sink to the floor. The tether is a very thin wire or monofilament type material and is an entanglement hazard. No marine vessel stopping testing will occur at Southeast Alaska Acoustic Measurement Facility (SEAFAC). All materials used at SEAFAC would be recovered.			

A.2.1.4 Pierside Sonar Testing

Anti-Submarine Warfare			
Pierside Sonar Testing			
Short Description	Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities.	Typical Duration	
		Up to 3 weeks total per ship, with each source run independently and not continuously during this time	
Long Description	Ships and submarines will 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. Testing may also include the firing of inert torpedo shapes. Event duration varies, with average durations of 3 weeks with active sonar used intermittently over 2 days during the total event duration. This also includes pierside sonar testing during surface combatant sea trials. Occurs year round, day and night.		
Typical Components	Platforms: Submarines, surface combatants Targets: None System being Trained/Tested: Sonar systems, underwater communications		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Pierside testing safety	Typical Locations	
		Inland Waters NBK Bangor NBK Bremerton Naval Station Everett	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Explosives: None	Physical Disturbance and Strike: None Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: None Habitats: None	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: None	Public Health and Safety: In-water energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	Mid-Frequency: MF1 MF2 MF3 MF9 MF10 MF12	High-Frequency: HF3	Anti-Submarine Warfare: ASW3
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar		
Assumptions Used for Analysis	None		

A.2.1.5 Submarine Sonar Testing/Maintenance

Anti-Submarine Warfare			
Submarine Sonar Testing/Maintenance			
Short Description	Pierside, moored, and underway testing of submarine systems occurs periodically following major maintenance periods and for routine maintenance.	Typical Duration	
		Up to 3 weeks, with intermittent use of active sonar	
Long Description	Following major and routine maintenance periods, system operations are evaluated in both stationary and underway tests. 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, will be tested. Occurs year round, day and night.		
Typical Components	Platforms: Moored platform, submarines, surface ships Targets: None System being Trained/Tested: Sonar systems, underwater communications		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Pierside testing safety	Typical Locations	
		Western Behm Canal SEAFAC	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosives: None	Physical Disturbance and Strike: Vessels and in-water devices Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: None Habitats: None	Sediment and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Physical disturbance and strike	Public Health and Safety: Physical interactions In-water energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	Mid-Frequency: MF9	High Frequency: HF6	
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement	
Assumptions Used for Analysis	None		

A.2.1.6 Torpedo (Explosive) Testing

Anti-Submarine Warfare			
Torpedo (Explosive) Testing			
Short Description	Air, surface, or submarine crews employ explosive and non-explosive torpedoes against artificial targets.	Typical Duration	
		1–2 days during daylight hours	
Long Description	Non-explosive and explosive torpedoes (carrying a warhead) will be launched at a suspended target by a submarine and fixed- or rotary-wing aircraft or surface combatants. Occurs year round.		
Typical Components	Platforms: Fixed-wing aircraft, moored platform, rotary-wing aircraft, submarines, support craft, surface combatant Targets: Sub-surface targets, surface targets System being Trained/Tested: Acoustic countermeasures, sonar systems, sonobuoys, underwater communications, torpedo systems		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety Towed in-water device safety Weapons firing safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Aircraft noise Vessel noise Explosives: In-water explosions	Physical Disturbance and Strike: Aircraft and aerial targets Military expended materials Vessels and in-water devices Ingestion: Military expended materials – munitions Military expended materials – other than munitions	Energy: In-air electromagnetic devices Entanglement: Decelerator/Parachutes Wires and cables
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – military expended material In-water explosions	Sediment and Water Quality: Explosives Chemicals Metals Other materials	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy In-water energy

Anti-Submarine Warfare			
Torpedo (Explosive) Testing			
Military Expended Material	Ingestible Material: Lightweight torpedo (explosive) - fragments, heavyweight torpedo (explosive) – fragments, small decelerator/parachute, target fragments Non-Ingestible Material: Buoy (non-explosive), guidance wire, heavyweight torpedo accessories, lightweight torpedo accessories, sonobuoy (non-explosive), sonobuoy wires, stationary surface target		Military Recoverable Material Heavyweight (non-explosive) torpedo, lightweight (non-explosive) torpedo
Sonar and Other Transducer Bins	Mid-Frequency: MF1 MF3 MF4 MF5 MF6	High-Frequency: HF1 HF6	Anti-Submarine Warfare: ASW3 Torpedoes: TORP1 TORP2
In-Water Explosive Bins	E8 E11		
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar Explosive Stressors: (Section 5.3.3) Explosive torpedoes		Physical Disturbance and Strike: (Section 5.3.4) Vessel movement Towed in-water devices
Assumptions Used for Analysis	All sonobuoys have parachutes unless otherwise noted. Only one heavyweight torpedo test could occur in 1 day; two heavyweight torpedo tests could occur on consecutive days. Two lightweight torpedo tests could occur in a single day. All non-explosive torpedoes are recovered. Explosive torpedo testing occurs at least 50 NM from shore and does not occur within the boundaries of the Olympic Coast National Marine Sanctuary.		

A.2.1.7 Torpedo (Non-Explosive) Testing

Anti-Submarine Warfare			
Torpedo (Non-Explosive) Testing			
Short Description	Air, surface, or submarine crews employ non-explosive torpedoes against targets, submarines, or surface vessels.	Typical Duration Up to 2 weeks	
Long Description	Aerial, surface, and subsurface assets fire exercise torpedoes against surface or subsurface targets, or at no target and programmed with a particular run geometry. Torpedo testing evaluates the performance and the effectiveness of hardware and software upgrades of heavyweight or lightweight torpedoes. It also includes testing of experimental torpedoes. Not all torpedo tests involve acoustics. Exercise torpedoes are recovered, typically from surface ships and helicopters that are specifically crewed and outfitted for torpedo recovery. Event duration is dependent on number of torpedoes fired. Offshore Area: A few events within this activity may have nighttime testing up to 50%. Inland Waters: Daytime testing only.		
Typical Components	Platforms: Aircraft carrier, autonomous underwater vehicle, fixed-wing aircraft, moored platform, rotary-wing aircraft, remotely operated vehicle, submarines, support craft, surface combatant, unmanned underwater vehicle Targets: Sub-surface targets, surface targets System being Trained/Tested: Acoustic countermeasures, sonar systems, sonobuoys, underwater communications, torpedo systems		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety Towed in-water device safety Unmanned surface vehicle and unmanned underwater vehicle procedures Weapons firing safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	Inland Waters Dabob Bay Range Complex
Stressors to Biological Resources	Acoustic: Sonar and other transducers Aircraft noise Vessel noise Explosives: None	Physical Disturbance and Strike: Aircraft and aerial targets Military expended materials Vessels and in-water devices Ingestion: Military expended materials – other than munitions	Energy: In-air electromagnetic devices Entanglement: Decelerators/Parachutes, Wires and cables
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – military expended materials	Sediment and Water Quality: Metals Chemicals Other materials	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy In-water energy

Anti-Submarine Warfare					
Torpedo (Non-Explosive) Testing					
Military Expended Material	Ingestible Material: Small decelerator/parachute Non-Ingestible Material: Acoustic countermeasures, buoy (non-explosive), heavyweight torpedo accessories, lightweight torpedo accessories, mobile sub-surface target, sonobuoy (non-explosive), sonobuoy wires, fiber optic cable, guidance wire, anti-torpedo torpedo accessories			Military Recoverable Material	Anchors, heavyweight (non-explosive) torpedo, lightweight (non-explosive) torpedo, anti-torpedo torpedo, stationary sub-surface target, mobile subsurface target
Sonar and Other Transducer Bins	Low-Frequency: LF4	Mid-Frequency: MF1 MF3 MF4 MF5 MF6 MF9 MF10	High-Frequency: HF1 HF5 HF6	Anti-Submarine Warfare: ASW3 ASW4	Torpedoes: TORP1 TORP2 TORP3
In-Water Explosive Bins	None				
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar			Physical Disturbance and Strike: (Section 5.3.4) Vessel movement	
Assumptions Used for Analysis	All exercise torpedoes are recovered. Typically, no more than 8 torpedoes are fired per day during daylight hours.				

A.2.2 MINE WARFARE

A.2.2.1 Mine Countermeasure and Neutralization Testing

Mine Warfare			
Mine Countermeasure and Neutralization Testing			
Short Description	Air, surface, and subsurface vessels neutralize threat mines and mine-like objects.	Typical Duration	
		1–10 days, with intermittent use of countermeasure/neutralization systems during this period	
Long Description	Mine countermeasure-neutralization and mine system testing is required to ensure systems can effectively neutralize threat (live or inert) mines that will otherwise restrict passage through an area and to ensure U.S. Navy mines remain effective against enemy ships. These systems may be deployed with a variety of ships, aircraft, submarines, or unmanned autonomous vehicles and operate in water depths up to 6,000 ft. Mines are neutralized by cutting mooring cables of buoyant mines, producing acoustic energy that fires acoustic-influence mines, by employing radar or laser fields, detonating mines using remotely operated vehicles, or using explosive charges to destroy threat mines. There will be no explosive testing in the Inland Waters. Testing in Inland Waters would involve non-explosive aspects of mine countermeasure and neutralization testing, including the placement of non-explosive targets, the operation of unmanned underwater vehicles and associated sensors, and the operation of laser systems. Occurs year round, primarily daytime, though some events may extend into night. Inland Waters testing is daylight hours only.		
Typical Components	Platforms: Amphibious warfare ship, mine warfare ship, rotary-wing aircraft, rotary-wing unmanned aerial system, surface combatant, unmanned underwater vehicle Targets: Mine shapes System being Trained/Tested: Electromagnetic devices, minehunting sonar, low powered lasers, radar		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety Laser procedures Unmanned aircraft system procedures Unmanned surface vehicle and unmanned underwater vehicle procedures Towed in-water device safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	Inland Waters Only non-explosive aspects of this testing activity would occur at the following areas: NBK Bremerton Carr Inlet Operations Area Crescent Harbor EOD Range Dabob Bay Range Complex Hood Canal EOD Range Naval Station Everett Keyport Range Site Naval Magazine Indian Island NAVY 3 OPAREA
Stressors to Biological Resources	Acoustic: Sonar and other transducers Aircraft noise Vessel noise Explosives: In-water explosions (Offshore Area only)	Physical Disturbance and Strike: Aircraft and aerial targets Military expended materials Vessels and in-water devices Seafloor devices Ingestion: Military expended materials - munitions	Energy: In-air electromagnetic devices Entanglement: Wires and cables

Mine Warfare			
Mine Countermeasure and Neutralization Testing			
Stressors to Physical Resources	Air Quality: Criteria air pollutants		Sediment and Water Quality: Explosives Metals Other materials
	Habitats: Physical disturbance and strike – military expended material Physical disturbance and strike – seafloor devices In-water explosions (Offshore Area only)		
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy In-water energy
Military Expended Material	Ingestible Material: Neutralizer (explosive) – fragments, mine (explosive) – fragments Non-Ingestible Material: Fiber optic cable, fiber optic can, anchors	Military Recoverable Material	Mine shape (non-explosive)
Sonar and Other Transducer Bins	High-Frequency: HF4		
In-Water Explosive Bins	E4 E7		
Procedural Mitigation Measures	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement Towed in-water devices	Explosive Stressors: (Section 5.3.3) Explosive mine countermeasure and neutralization activities Acoustic Stressors (Section 5.3.2) Active sonar	
Assumptions Used for Analysis	Explosives are not used in the Inland Waters or in the Olympic Coast National Marine Sanctuary. Manned aircraft are not used in the Inland Waters except within the area above Navy 3 OPAREA, and operate per FAA regulations.		

A.2.2.2 Mine Detection and Classification Testing

Mine Warfare			
Mine Detection and Classification Testing			
Short Description	Air, surface, and subsurface vessels and systems detect and classify mines and mine-like objects. Vessels also assess their potential susceptibility to mines and mine-like objects.	Typical Duration	
		Up to 24 days, with up to 12 hours of acoustic activity each day	
Long Description	Mine detection and classification systems require testing to evaluate the capability of generating underwater magnetic and acoustic signature fields as well as sonar systems that can detect and classify a wide range of threat mines at tactically different water depths. Surface craft may deploy an underwater sensor system that uses ship signature to develop a susceptibility profile against mine-like objects. This testing encompasses evaluating the operation and effectiveness of the components and integrated systems for mine detection and classification, as well as assessing vessel vulnerability to mines and development of new mine-like targets. Detection systems may use acoustic, electro-optic, or laser sensors, and may be deployed from surface or subsurface vessels, or unmanned platforms. Mine detection and classification sonar may also be used for mapping, as well as detection, classification, and localization of items on the seafloor. In order to develop better and safer methods of minesweeping, the Navy is currently testing new systems to detect locate, identify, and avoid mines including a laser airborne mine detection system that uses laser illumination coupled with sensitive electro-optic receivers to find mines in the upper part of the water column. Occurs year round, daytime only.		
Typical Components	Platforms: Moored platforms, support craft, surface combatants, remotely operated vehicles, unmanned aerial vehicles, unmanned underwater vehicles Targets: Mine shapes System being Trained/Tested: Minehunting sonar, electro-magnetic or laser sensors		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Laser procedures Unmanned aircraft system procedures Unmanned surface vehicle and unmanned underwater vehicle procedures Towed in-water device safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Quinault Range Site	Inland Waters Dabob Bay Range Complex Keyport Range Site
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosives: None	Physical Disturbance and Strike: Aircraft and aerial targets Vessels and in-water devices Seafloor devices Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – seafloor devices	Sediments and Water Quality: Metals	

Mine Warfare			
Mine Detection and Classification Testing			
Stressors to Human Resources	Cultural resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics	Public Health and Safety: Physical interactions In-air energy In-water energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	Anchors, mine shape (non-explosive)
Sonar and Other Transducer Bins	Low-Frequency: LF4	High-Frequency: HF4	Broadband BB1 BB2
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement Towed in-water devices	
Assumptions Used for Analysis	Mine-like targets and temporary anchored devices may be deployed for the duration of a single test event or may be left in place for up to 12 months to support multiple events; all devices and their anchors are recovered. Bottom anchors are not deployed in known sensitive shallow water benthic habitats such as eelgrass beds.		

A.2.3 SURFACE WARFARE

A.2.3.1 Kinetic Energy Weapon Testing

Surface Warfare			
Kinetic Energy Weapon Testing			
Short Description	A kinetic energy weapon uses stored energy released in a burst to accelerate a projectile.	Typical Duration	
		1 day	
Long Description	A kinetic energy weapon uses stored energy released in a burst to accelerate a projectile to more than 7 times the speed of sound to a range of up to 200 miles. Occurs year round, up to 25% of this testing could occur at night.		
Typical Components	Platforms: Surface combatants Targets: Air targets, surface targets System being Trained/Tested: Kinetic energy weapon		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Weapons firing safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Weapons noise Vessel noise Aircraft noise Explosives: In-air explosions	Physical Disturbance and Strike: Aircraft and aerial targets Military expended materials Vessels and in-water devices Ingestion: Military expended materials – munitions Military expended materials – other than munitions	Energy: In-air electromagnetic devices Entanglement: Decelerators/Parachutes
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – military expended material	Sediments and Water Quality: Metals	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy
Military Expended Material	Ingestible Material: Large-caliber (explosive) projectile fragments, target fragments Non-Ingestible Material: Expendable aerial drone, kinetic energy round, large-caliber projectile (non-explosive), large-caliber projectile casings, sabot - kinetic energy round, stationary surface target	Military Recoverable Material	None

Surface Warfare	
Kinetic Energy Weapon Testing	
Sonar and Other Transducer Bins	None
In-Water Explosive Bins	None
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Small-, medium-, and large-caliber non-explosive practice munitions
Assumptions Used for Analysis	Assume one target is expended per event. Explosive rounds are designed to detonate above the surface target. Activity takes place at least 50 NM from shore.

A.2.4 UNMANNED SYSTEMS

A.2.4.1 Unmanned Aerial System Testing

Unmanned Systems			
Unmanned Aerial System Testing			
Short Description	Unmanned aerial systems (UASs) are remotely piloted or self-piloted (i.e., preprogrammed flight pattern) aircraft that include fixed-wing, rotary-wing, and other vertical takeoff vehicles. They can carry cameras, sensors, communications equipment, or other payloads.	Typical Duration	
		1–12 hours	
Long Description	UASs are remotely piloted or self-piloted (i.e., preprogrammed flight pattern) aircraft that include fixed-wing, rotary-wing, and other vertical takeoff vehicles. They can carry cameras, sensors, communications equipment, or other payloads. UASs can vary in size up to approximately 10 ft. in length, with gross vehicle weights of a couple hundred pounds. Propulsion types can range from traditional turboprops, turboprops, and piston engine-driven propellers, to electric motor-driven propellers powered by rechargeable batteries (lead-acid, nickel-cadmium, and lithium ion), photovoltaic cells, or hydrogen fuel cells. Occurs year round, daytime only.		
Typical Components	Platforms: Fixed-wing unmanned aerial system, rotary-wing unmanned aerial system, support craft Targets: None System being Trained/Tested: Unmanned aerial vehicle		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Unmanned aircraft system procedures	Typical Locations	
		Offshore Area Quinalt Range Site	Inland Waters Dabob Bay Range Complex Keyport Range Site Restricted Area 6701
Stressors to Biological Resources	Acoustic: Vessel noise Explosives: None	Physical Disturbance and Strike: Aircraft and aerial targets Vessels and in-water devices Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: None	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		

Unmanned Systems	
Unmanned Aerial System Testing	
In-Water Explosive Bins	None
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Assumptions Used for Analysis	UASs work in compliance with the Federal Aviation Administration (FAA) regulations UASs can vary in size up to approximately 10 ft. in length, with gross vehicle weights of a couple hundred pounds.

A.2.4.2 Unmanned Surface Vehicle System Testing

Unmanned Systems			
Unmanned Surface Vehicle System Testing			
Short Description	Unmanned surface vehicles are primarily autonomous systems designed to augment current and future platforms to help deter maritime threats. They employ a variety of sensors designed to extend the reach of manned ships.	Typical Duration	
		Up to 10 days. Some propulsion systems (gliders) could operate continuously for multiple months.	
Long Description	Unmanned surface vehicles (USV) can include remotely operated craft (semisubmersible, plane hull, semi-plane hull, etc.) and test vehicles. During testing, they can operate autonomously, semi-autonomously, or non-autonomously. Non-autonomous or remotely controlled vehicles may be tethered like remotely operated vehicles (ROVs) or remotely controlled via radio link. USVs may have multiple test objectives or payloads (such as cameras and sonar) onboard so that numerous tests can be executed during a single testing activity. USVs may be used in conjunction with unmanned underwater vehicles and unmanned aerial systems to meet test objectives. USV launch and retrieval methods are highly variable because of the differences in vehicle type and size. USV test vehicle launch methods include lowering onto the water from a support craft or pier, deploying from another craft, or launching from a boat ramp. The vehicle will propel itself through the water to complete the test objectives, which could include deployment or recovery of a payload, sonar or other sensor use, or completion of a propulsion test. Occurs year round, daytime only.		
Typical Components	Platforms: Unmanned surface vehicle; support craft Targets: Surface targets System being Trained/Tested: Unmanned surface vehicle		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Unmanned surface vehicle and unmanned underwater vehicle procedures Target deployment and retrieval safety	Typical Locations	
		Offshore Area Quinault Range Site	Inland Waters Dabob Bay Range Complex Keyport Range Site
Stressors to Biological Resources	Acoustic: Vessel noise Explosives: None	Physical Disturbance and Strike: Vessels and in-water devices Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: None	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	Stationary Surface Targets, anchors

Unmanned Systems	
Unmanned Surface Vehicle System Testing	
Sonar and Other Transducer Bins	None
In-Water Explosive Bins	None
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Assumptions Used for Analysis	None

A.2.4.3 Unmanned Underwater Vehicle Testing

Unmanned Systems			
Unmanned Underwater Vehicle Testing			
Short Description	Testing involves the production or upgrade of unmanned underwater vehicles. This may include testing of mission capabilities (e.g., mine detection), evaluating the basic functions of individual platforms, or conducting complex events with multiple vehicles.	Typical Duration	
		Typically 1–2 days, but endurance testing may last up to 35 days. Some propulsion systems (e.g., gliders) could operate continuously for multiple months.	
Long Description	Unmanned underwater vehicle (UUV) testing covers a broad range of activity in support of the development of UUV performance capabilities (propulsion, navigation, control, durability, and reliability) and mission capabilities (launch and recovery systems, development of various payloads and the capability to deliver the payload as needed, data collection and communication). UUVs may operate singly, in groups, or in coordination with unmanned aircraft or unmanned surface vehicles. Most UUV operations include a launch, transit, mission profile execution, and recovery operations. UUVs may be developed to carry out warfare missions (e.g., mine detection) or scientific missions (e.g., bottom mapping), while others are developed to support other testing objectives (e.g., performing as a target for anti-submarine warfare). UUVs may be launched from unmanned aerial vehicles, surface craft, submarines, piers, or land. Once launched, the vehicles are either towed or self-propelled to the test area. Unmanned underwater vehicles may also deploy, tow, operate, or recover remote sensors and payload systems. Systems on or towed by the UUV may be acoustically active, produce radio-frequency transmissions, or use lasers. Occurs year round, day and night.		
Typical Components	<p>Platforms: Fixed-wing unmanned aerial systems, patrol boats, remotely operated vehicles, shore-based facilities, small boats, special mission ships, submarines, support craft, surface combatants, unmanned surface vehicles, unmanned underwater vehicles</p> <p>Targets: Mine warfare targets, sub-surface targets, surface targets</p> <p>System being Trained/Tested: Sonar systems, acoustic modem, underwater communications systems, torpedo systems, unmanned underwater vehicle</p>		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Towed in-water device safety Unmanned aircraft system procedures Unmanned surface vehicle and unmanned underwater vehicle procedures Target deployment and retrieval safety	Typical Locations	
		Offshore Area Quinault Range Site	Inland Waters Carr Inlet Operations Area Dabob Bay Range Complex Keyport Range Site
Stressors to Biological Resources	<p>Acoustic: Sonar and other transducers Vessel noise</p> <p>Explosives: None</p>	<p>Physical Disturbance and Strike: Aircraft and aerial targets Military expended materials Vessels and in-water devices Seafloor devices</p> <p>Ingestion: Military Expended Materials – Other Than Munitions</p>	<p>Energy: In-air electromagnetic devices</p> <p>Entanglement: Decelerators/parachutes Wires and cables</p>

Unmanned Systems						
Unmanned Underwater Vehicle Testing						
Stressors to Physical Resources	Air Quality: Criteria air pollutants			Sediments and Water Quality: Chemical Other materials		
	Habitats: Physical disturbance and strike – military expended material Physical disturbance and strike – seafloor devices					
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike		Socioeconomic Resources: Accessibility Physical disturbance and strike		Public Health and Safety: Physical interactions In-air energy In-water energy	
Military Expended Material	Ingestible Material: Small decelerators/parachutes		Military Recoverable Material	Anchor, mine shape (non-explosive), lightweight (non-explosive) torpedo, anti-torpedo torpedo, stationary surface target, stationary sub-surface target, mobile subsurface target		
	Non-Ingestible Material: Lightweight torpedo accessories, anti-torpedo torpedo accessories, fiber optic cable, mobile subsurface target					
Sonar and Other Transducer Bins	High-Frequency: HF5 HF9	Very High Frequency: VHF1	Torpedoes: TORP1	Forward-Looking Sonar: FLS2	Acoustic Modems: M3	Synthetic Aperture Sonars: SAS2
In-Water Explosive Bins	None					
Procedural Mitigation Measures	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar			Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Towed in-water devices		
Assumptions Used for Analysis	Mine shapes and other temporary anchored targets may be deployed for the duration of a single test event or may be left in place for up to 12 months to support multiple events; all devices and their anchors are recovered. Bottom anchors are not deployed in known sensitive shallow water benthic habitats such as eelgrass beds. Multiple vehicles may operate simultaneously in one or multiple areas.					

A.2.5 VESSEL EVALUATION

A.2.5.1 Propulsion Testing

Vessel Evaluation			
Propulsion Testing			
Short Description	Ship is run at high speeds in various formations and at various depths.	Typical Duration	
		Up to 5 days	
Long Description	Propulsion testing is one part of the total sea trial activity. During this activity, the ship is tested for maneuverability, including full power and endurance runs. Occurs year round, day and night.		
Typical Components	Platforms: Surface ships Targets: None System being Trained/Tested: None		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Vessel noise Explosives: None	Physical Disturbance and Strike: Vessels and in-water devices Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria Air Pollutants Habitats: None	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	Surface ships will not be conducting test constantly for the entire duration. Surface ships may not be traveling in a straight line. Surface ships will operate at least 10 NM from shore, across the full spectrum of capable speeds.		

A.2.5.2 Undersea Warfare Testing

Vessel Evaluation			
Undersea Warfare Testing			
Short Description	Ships demonstrate capability of countermeasure systems and underwater surveillance, weapons engagement, and communications systems. This tests ships' ability to detect, track, and engage undersea targets.	Typical Duration	
		Up to 10 days	
Long Description	Undersea warfare events may be comprised of tracking and firing events or tests of hull-mounted sonar system capabilities to detect and avoid torpedo type targets. Tracking and firing events ensure the operability of the undersea warfare suite and its interface with the rotary-wing helicopter. Tests include demonstrating the ability of the ship to search, detect, and track a target and conduct attacks with exercise torpedoes. Detection and avoidance events may use surface craft and underwater platforms to test the capability of mid- and high-frequency acoustic sources. Subsurface moving targets, rocket and air-dropped weapons, sonobuoys, towed arrays, and sub-surface torpedo-like devices may be used. Approximately 1 week of in-port training may precede the event. Occurs year round, day and night.		
Typical Components	Platforms: Rotary-wing aircraft, submarines, support craft, surface combatant Targets: Sub-surface targets System being Trained/Tested: Acoustic countermeasures, underwater communications systems, sonar systems, sonobuoys, torpedo systems		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Aircraft noise Vessel noise Explosives: None	Physical Disturbance and Strike: Aircraft and aerial targets Military expended materials Vessels and in-water devices Ingestion: Military expended materials – other than munitions	Energy: None Entanglement: Decelerator/Parachute, Wires and cables
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – military expended material	Sediments and Water Quality: Metals Chemicals Other materials	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy In-water energy

Vessel Evaluation					
Undersea Warfare Testing					
Military Expended Material	Ingestible Material: Small decelerator/parachute Non-Ingestible Material: Acoustic countermeasures, buoy (non-explosive), expended bathythermograph, expended bathythermograph wire, heavyweight torpedo accessories, lightweight torpedo accessories, mobile subsurface target, sonobuoy (non-explosive), sonobuoy wires, guidance wire			Military Recoverable Material	Lightweight (non-explosive) torpedo, heavyweight (non-explosive) torpedo, mobile subsurface target
Sonar and Other Transducer Bins	Mid-Frequency: MF1 MF4 MF5 MF6 MF9	High-Frequency: HF4	Anti-Submarine Warfare: ASW3 ASW4	Torpedoes: TORP1 TORP2	
In-Water Explosive Bins	None				
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active sonar		Physical Disturbance and Strike (Section 5.3.4) Vessel movement		
Assumptions Used for Analysis	Not all sonobuoys used in this activity would include a decelerator/parachute. Ships will not be conducting test constantly during the duration of the allotted time.				

A.2.5.3 Vessel Signature Evaluation

Vessel Evaluation			
Vessel Signature Evaluation			
Short Description	Surface ship, submarine, and auxiliary system signature assessments. This may include electronic, radar, acoustic, infrared and magnetic signatures.	Typical Duration	
		Typically 1–5 days, up to 20 days depending on the test being conducted	
Long Description	Signature testing is passive monitoring of surface ships and submarines, conducted on new ships and periodically throughout a vessel’s life cycle, to assess the vessel’s vulnerability to various types of detection systems when operating in different profiles (e.g., with or without a communication buoy deployed). Signature testing may include the subject vessel’s own safety and navigation systems, tracking devices and range safety systems, radar systems, and underwater or in-air communications equipment. Submarines move through the test site, but in-water devices may be towed. Data may be collected by passive acoustic hydrophones, by passive electro-magnetic or infrared sensors, or by radar. Also included in this activity is the Shipboard Electronic Systems Evaluation Facility, which conducts measurements of antenna emission patterns, Federal Aviation Administration identification of Friend or Foe systems, and Tactical Air Navigation Systems. Occurs year round, day and night.		
Typical Components	Platforms: Moored platforms, submarines, support craft, surface combatant Targets: None System being Trained/Tested: None		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety	Typical Locations	
		Western Behm Canal SEAFAC	Inland Waters Dabob Bay Range Complex
Stressors to Biological Resources	Acoustic: Vessel noise Explosives: None	Physical Disturbance and Strike: Vessels and in-water devices Ingestion: None	Energy: In-air electromagnetic devices Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: None	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike <i>(Section 5.3.4)</i> Vessel movement		

Vessel Evaluation	
Vessel Signature Evaluation	
Assumptions Used for Analysis	None

A.2.6 OTHER TESTING

A.2.6.1 Acoustic and Oceanographic Research

Acoustic and Oceanographic Science and Technology			
Acoustic and Oceanographic Research			
Short Description	Research using active transmissions from sources deployed from ships, aircraft, and unmanned underwater vehicles. Research sources can be used as proxies for current and future Navy systems.		Typical Duration
			Up to 14 days
Long Description	Active acoustic transmissions used for engineering tests of acoustic sources, validation of ocean acoustic models, tests of signal processing algorithms, and characterization of acoustic interactions with the ocean bottom, fish and ocean surface. Standard oceanographic research sensing (acoustic Doppler current profiler, fathometer-like systems) also to be employed. Occurs year round, daytime only.		
Typical Components	Platforms: Support craft, unmanned underwater vehicle Targets: None System being Trained/Tested: Sonar systems		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Unmanned surface vehicle and unmanned underwater vehicle procedures	Typical Locations	
		Offshore Area Quinault Range Site	Inland Waters Dabob Bay Range Complex Keyport Range Site
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosives: None	Physical Disturbance and Strike: Vessels and in-water devices Seafloor devices Ingestion: None	Energy: In-air electromagnetic devices Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – seafloor devices	Sediments and Water Quality: Other materials	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy In-water energy	
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	Anchors
Sonar and Other Transducer Bins	Low Frequency: LF4	Mid Frequency: MF9	
In-Water Explosive Bins	None		

Acoustic and Oceanographic Science and Technology		
Acoustic and Oceanographic Research		
Procedural Mitigation Measures	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Assumptions Used for Analysis	None	

A.2.6.2 Acoustic Component Testing

Other Testing			
Acoustic Component Testing			
Short Description	Various surface vessels, moored equipment, and materials are tested to evaluate performance in the marine environment.		Typical Duration 1 day to multiple months
Long Description	Acoustic component testing includes various activities utilizing the marine environment for testing and evaluation, including troubleshooting components of all installed systems, including acoustic systems. Components may be tested in-situ or removed and tested independently. Test may involve radar, environmental sensors, magnetic, passive acoustic, optical, or 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, and subsurface. Occurs year round, day and night.		
Typical Components	Platforms: Moored platforms, submarines, support craft, surface combatants, unmanned underwater vehicles, unmanned aerial vehicles, unmanned surface vessels Targets: None System being Trained/Tested: Acoustic modems, sonar systems, underwater communication systems		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Unmanned aircraft system procedures Unmanned surface vehicle and unmanned underwater vehicle procedures		Typical Locations
			Western Behm Canal SEAFAC Inland Waters NBK Bangor NBK Bremerton Naval Station Everett Naval Magazine Indian Island
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosives: None	Physical Disturbance and Strike: Aircraft and aerial targets Vessels and in-water devices Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: None	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions In-water energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	Low Frequency: LF5	Mid Frequency: MF9	High Frequency: HF3 HF6
In-Water Explosive Bins	None		

Other Testing		
Acoustic Component Testing		
Procedural Mitigation Measures	Acoustic Stressors (<i>Section 5.3.2</i>) Active sonar	Physical Disturbance and Strike: (<i>Section 5.3.4</i>) Vessel movement
Assumptions Used for Analysis	Subject vessel being tested is moored at the Navy piers in Washington, but may be moving or static if the test is conducted at SEAFAC. ROVs may be used to deploy sensors below the water line at the Washington piers, but are unlikely to be used at SEAFAC.	

A.2.6.3 Cold Water Support

Other Testing			
Cold Water Support			
Short Description	Fleet training for divers in a cold-water environment, and other diver training related to Navy divers supporting range/test site operations and maintenance.	Typical Duration	
		Assume 8 hours for all events, though they may continue for up to 40 hours, and infrequently some may operate intermittently for multiple consecutive months	
Long Description	Fleet training for divers in a cold-water environment, and other diver training related to Navy divers supporting range/test facility operations and maintenance. Hand-held acoustic systems and underwater communication devices may be used in diver training, as well as a variety of in-water devices for transporting divers or cargo, and various dive targets such as mine-like shapes. Occurs year round, day and night.		
Typical Components	Platforms: Moored platform, submarines, surface combatant Targets: Mine warfare targets System being Trained/Tested: Sonar systems, underwater communications		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Target deployment and retrieval safety	Typical Locations	
		Western Behm Canal SEAFAC	Inland Waters Carr Inlet Operations Area Dabob Bay Range Complex Keyport Range Site
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosives: None	Physical Disturbance and Strike: Vessels and in-water devices Seafloor devices Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – seafloor devices	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility	Public Health and Safety: Physical interactions In-water energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	Mine shape (non-explosive), anchors
Sonar and Other Transducer Bins	High-Frequency HF6		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement	
Assumptions Used for Analysis	If a submarine is used as part of the event (SEAFAC, Carr Inlet), submarine acoustic systems may be activated.		

A.2.6.4 Hydrodynamic and Maneuverability Testing

Other Testing			
Hydrodynamic and Maneuverability Testing			
Short Description	Submarines maneuver in the submerged operating environment.	Typical Duration 10 days	
Long Description	Hydrodynamic testing is required to validate the control and maneuverability of a submarine in a submerged testing environment. Occurs year round, day and night.		
Typical Components	Platforms: Moored platform, submarines, support craft Targets: None System being Trained/Tested: None		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety	Typical Locations	
		Western Behm Canal SEAFAC	
Stressors to Biological Resources	Acoustic: Vessel noise Explosives: None	Physical Disturbance and Strike: Vessels and in-water devices Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: None Habitats: None	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural resources: None	Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	For biological resource analysis, vessel noise and vessel strike are only analyzed for the periods while the submarines are surfaced, typically brief in nature. Mitigation measures related to vessel movement are only considered using the period of surfacing as well. For human resource stressor analysis, physical disturbance and strike and physical interactions are only analyzed for the periods (typically brief in nature) while the submarine is surfaced. Underwater communications are used for range and vessel safety purposes.		

A.2.6.5 Non-Acoustic Component Testing

Other Testing			
Non-Acoustic Component Testing			
Short Description	These tests involve non-acoustic sensors and communication systems. Non-acoustic sensors may also gather other forms of environmental data.	Typical Duration	
		3 days (4 hours per day for 3 days)	
Long Description	Radio communication with submarines typically includes systems using tethered, untethered, or towed buoyant in-water devices to raise an antenna package to the surface to broadcast the signal. Some communication buoys are intended for single-use applications while the rest are multi-use packages. The component hardware of these systems needs to be tested to ensure that it will reliably support communication without interfering with non-communication vessel operations. Components may be tested while integrated with the platform or removed and tested independently. Test may involve radar, environmental sensors, magnetic, passive acoustic, or optical instrumentation to measure, record, and analyze component effectiveness, dependability, operational parameters, and durability. Optical communications tests may include communication between helicopter or fixed-wing aircraft and manned or unmanned underwater systems, and may also include ground truth sensors mounted on surface craft. Occurs year round, day and night.		
Typical Components	Platforms: All Navy ships and boats, in-water structures, moored platforms, remotely operated vehicles, support craft, unmanned aerial vehicles, unmanned underwater vehicles Targets: None System being Trained/Tested: Communications systems		
Standard Operating Procedures (Section 2.3.3)	Vessel safety Unmanned aircraft system procedures Unmanned surface vehicle and unmanned underwater vehicle procedures	Typical Locations	
		Offshore Area Offshore Area	Inland Waters Dabob Bay Range Complex Keyport Range Site Keyport Pier NBK Bangor Zelatched Point Pier
Stressors to Biological Resources	Acoustic: Vessel noise Explosives: None	Physical Disturbance and Strike: Aircraft and aerial targets Vessels and in-water devices Seafloor devices Ingestion: None	Energy: In-air electromagnetic devices Entanglement: Wires and cables
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: Physical disturbance and strike – seafloor devices	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: Physical interactions In-air energy

Other Testing			
Non-Acoustic Component Testing			
Military Expended Material	Ingestible Material: None Non-Ingestible Material: Fiber optic cable	Military Recoverable Material	Bottom placed instruments
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel Movement		
Assumptions Used for Analysis	Manned aircraft are not used in Dabob Bay Range Complex or Keyport Range Site. Underwater communications are used for range and vessel safety purposes. Unmanned aerial vehicles used in the inland waters areas would be small (e.g., Phantom quadcopter).		

A.2.6.6 Post Refit Sea Trial

Other Testing			
Post Refit Sea Trial			
Short Description	Following periodic maintenance periods or repairs, sea trials are conducted to evaluate submarine propulsion, sonar systems, and other mechanical tests.		Typical Duration
			Typically 8 hours
Long Description	Testing activities are conducted throughout the life of a Navy submarine to verify performance and mission capabilities. Sea trials are conducted following periodic maintenance or repairs. A typical test may include a submarine operating at full power and subjected to high-speed runs, steering tests, and other mechanical tests. Occurs year round, day and night.		
Typical Components	Platforms: Fixed facility, submarines Targets: None System being Trained/Tested: Acoustic modem, underwater communications		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety	Typical Locations	
		Inland Waters Dabob Bay Range Complex	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Explosives: None	Physical Disturbance and Strike: None Ingestion: None	Energy: None Entanglement: None
Stressors to Physical Resources	Air Quality: None Habitats: None	Sediments and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions In-water energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	Mid-Frequency: MF10	High-Frequency: HF9	Acoustic Modems: M3
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar		Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Assumptions Used for Analysis	None		

A.2.6.7 Radar and Other System Testing

Other Testing			
Radar and Other System Testing			
Short Description	Testing may include use of military or commercial radar, communication systems (or simulators), or high-energy lasers. Testing may occur aboard a ship, helicopter, manned or unmanned underwater vehicle against drones, small boats, or other targets.	Typical Duration	
		12 hours per day over a 7-day period	
Long Description	At-sea testing may include use of military or commercial radar, communication systems (including laser-based optical communication systems), or high-energy laser weapons. Air and surface targets used in testing may include unmanned aerial vehicles, small craft (e.g., floating cardboard triwalls, towed, anchored, or self-propelled vessels) or shore-based platforms. Testing of laser-based optical communication systems may include air and subsurface transmissions with targets that include stationary/moored platforms, manned or unmanned underwater vehicles, and unmanned aerial vehicles. High-energy laser weapons testing may include tracking, scoring, and neutralization runs with single or multiple targets. No subsurface transmission will occur during high-energy laser weapons testing. Occurs year round, day and night.		
Typical Components	<p>Platforms: Surface ships, rotary-wing aircraft, unmanned aerial vehicles, manned and unmanned underwater vehicles, submerged vehicles, stationary/moored platforms, support craft, shore-based facility</p> <p>Targets: Aerial targets, surface targets, sub-surface targets</p> <p>System being Trained/Tested: Radar, high-energy laser weapons, laser-based optical communication systems</p>		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety High-energy laser safety Unmanned aircraft system procedures Unmanned surface vehicle and unmanned underwater vehicle Procedures Towed in-water device safety Target deployment and retrieval safety	Typical Locations	
		Offshore Area Offshore Area	Inland Waters/Pierside Dabob Bay Range Complex NBK Bremerton
Stressors to Biological Resources	<p>Acoustic: Aircraft noise Vessel noise</p> <p>Explosives: None</p>	<p>Physical Disturbance and Strike: Aircraft and aerial targets Military expended materials Vessels and in-water devices</p> <p>Ingestion: None</p>	<p>Energy: In-air electromagnetic devices High-energy lasers</p> <p>Entanglement: Decelerators/parachutes</p>
Stressors to Physical Resources	<p>Air Quality: Criteria air pollutants</p> <p>Habitats: Physical disturbance and strike – military expended material</p>	<p>Sediments and Water Quality: Metals Other materials</p>	

Other Testing			
Radar and Other System Testing			
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Accessibility Airborne acoustics	Public Health and Safety: Physical interactions In-air energy In-water energy
Military Expended Material	Ingestible Material: None Non-Ingestible Material: Air targets – expended drone, large parachutes mobile surface target	Military Recoverable Material	Stationary surface target
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement Towed in-water devices		
Assumptions Used for Analysis	High-energy laser weapons would be tested only in the Offshore Area. Laser-based optical communication systems would be tested in the Dabob Bay Range Complex or the Offshore Area (including the Quinault Range Site).		

A.2.6.8 Semi-Stationary Equipment Testing

Other Testing				
Semi-Stationary Equipment Testing				
Short Description	Semi-stationary equipment (e.g., hydrophones) is deployed to determine functionality.		Typical Duration	
			From 10 minutes to multiple days	
Long Description	Semi-stationary equipment calibration and 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, sonobuoys, and transducers. Some units produce sound in the water (e.g., acoustic countermeasures), while others only listen (e.g., passive sonobuoys, vector sensors that measure particle motion). Some tests could require deployment in an area that provides opportunistic data collection (e.g., placing a hydrophone near a shipping lane to collect shipping noise data), or with specific geographic or oceanographic requirements. Occurs year round, day and night.			
Typical Components	Platforms: Moored platform, shore-based facility, submarines, support craft Targets: None System being Trained/Tested: Acoustic modems, sonar systems, underwater communications systems			
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety	Typical Locations		
		Western Behm Canal SEAFAC	Inland Waters Dabob Bay Range Complex Keyport Range Site	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Vessel noise Explosives: None	Physical Disturbance and Strike: Vessels and in-water devices Ingestion: None	Energy: None Entanglement: Wires and cables	
Stressors to Physical Resources	Air Quality: Criteria air pollutants Habitats: None	Sediments and Water Quality: Metals Other materials		
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: Accessibility Physical disturbance and strike	Public Health and Safety: Physical interactions In-water energy	
Military Expended Material	Ingestible Material: None Non-Ingestible Material: Fiber optic cable	Military Recoverable Material	Anchors, canister	
Sonar and Other Transducer Bins	Low-Frequency: LF4	Mid-Frequency: MF9	High-Frequency: HF6 HF9	Very High Frequency: VHF2
In-Water Explosive Bins	None			

Other Testing			
Semi-Stationary Equipment Testing			
Procedural Mitigation Measures	<table border="0"> <tr> <td>Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar</td> <td>Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement</td> </tr> </table>	Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement
Acoustic Stressors: <i>(Section 5.3.2)</i> Active sonar	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	<p>Anchored equipment and temporary mooring buoys may be deployed for the duration of a single test event or may be left in place for up to 12 months to support multiple events; all devices and their anchors are recovered. Bottom anchors are not deployed in known sensitive shallow water benthic habitats such as eelgrass beds.</p> <p>Acoustic test facility testing would occur at the Keyport Pier.</p>		

A.2.6.9 Simulant Testing

Other Testing			
Simulant Testing			
Short Description	The capability of surface ship defense systems to detect and protect against chemical and biological attacks are tested.	Typical Duration	
		3 days	
Long Description	<p>The capabilities of surface ship defense systems to detect and protect in the event of chemical and biological attacks are tested. Testing involves the deployment of harmless compounds (i.e., simulants) as substitutes for chemical and biological warfare agents. Because chemical and biological warfare agents remain a security threat, the Department of Defense uses relatively harmless compounds (simulants) as substitutes for chemical and biological warfare agents to test equipment intended to detect their presence. Chemical and biological agent detectors monitor for the presence of chemical and biological warfare agents and protect military personnel and civilians from the threat of exposure to these agents. The simulants trigger a response by sensors in the detection equipment without irritating or injuring personnel involved in testing detectors. Navy Chemical Agent Simulant 82 (commonly referred to as NCAS-82), glacial acetic acid, triethyl phosphate, sulfur hexafluoride, 1,1,1,2 tetrafluoroethane (a refrigerant commonly known as R134), and 1,1-difluoroethane (a refrigerant commonly known as R-152a) are also referred to as gaseous simulants and can be released in smaller quantities in conjunction with glacial acetic acid or triethyl phosphate releases. The types of biological simulants that may be used include spore-forming bacteria, non-spore-forming bacteria, ovalbumin, bacteriophage MS2, and Aspergillus niger. The simulants are generally dispersed by hand at the detector or by aircraft as a fine mist or aerosol. Occurs year round, daytime only.</p>		
Typical Components	<p>Platforms: Fixed-wing aircraft, rotary-wing aircraft, surface combatant Targets: None System being Trained/Tested: None</p>		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	<p>Acoustic: Aircraft noise Vessel noise Explosives: None</p>	<p>Physical Disturbance and Strike: Aircraft and aerial targets Vessels and in-water devices Ingestion: None</p>	<p>Energy: In-air electromagnetic devices Entanglement: None</p>
Stressors to Physical Resources	<p>Air Quality: Criteria air pollutants Habitats: None</p>	<p>Sediments and Water Quality: Chemicals Other materials</p>	
Stressors to Human Resources	<p>Cultural Resources: None</p>	<p>Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike</p>	<p>Public Health and Safety: Physical interactions In-air energy</p>

Other Testing			
Simulant Testing			
Military Expended Material	Ingestible Material: None Non-Ingestible Material: None	Military Recoverable Material	None
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Physical Disturbance and Strike: <i>(Section 5.3.4)</i> Vessel movement		
Assumptions Used for Analysis	All chemical simulants have low toxicity to humans and the environment. Examples of chemical simulants include glacial acetic acid and triethyl phosphate. All biological simulants are considered to be Biosafety Level 1 organisms. Examples of biological simulants are spore-forming bacteria, non-spore-forming bacteria, the protein ovalbumin, MS2 bacteriophages, and the fungus <i>Aspergillus niger</i> . Simulant testing will occur at least 3 NM from shore.		

A.3 NAVAL AIR SYSTEMS COMMAND TESTING ACTIVITIES

A.3.1 ANTI-SUBMARINE WARFARE

A.3.1.1 Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft

Anti-Submarine Warfare			
Anti-Submarine Warfare Tracking Test—Maritime Patrol Aircraft			
Short Description	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.	Typical Duration	
		4–8 flight hours per event	
Long Description	Similar to an anti-submarine warfare (ASW) 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. P-3 or P-8 fixed-wing aircraft conduct anti-submarine warfare testing using non-impulsive sonobuoys (e.g., AN/SSQ-62 DICASS, AN/AQS-125 MAC, AN/AQS-125 HDC, MK-84 ESUS) and passive sonobuoys (e.g., AN/SSQ-53 DIFAR). If available, tests may be conducted using an actual submarine as the target. This activity would be conducted in deep (typically beyond 100 ft.) waters. Some anti-submarine warfare maritime patrol aircraft tracking tests could be conducted as part of a coordinated event with fleet training activities. Occurs year round, day and night.		
Typical Components	Platforms: Fixed-wing aircraft Targets: Submarines Systems being Trained/Tested: Sonobuoys/sonobuoy launching systems, data transmission systems		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Sonar and other transducers Aircraft noise	Physical Disturbance and Strike: Aircraft and aerial targets Military expended materials	Energy: In-air electromagnetic devices
	Explosives: None	Ingestion: Military expended materials – other than munitions	Entanglement: Wires and cables Decelerators/parachutes
Stressors to Physical Resources	Habitats: Physical disturbance and strike – military expended material	Air Quality: Criteria Air Pollutants	Sediment and Water Quality: Metals Other Materials
Stressors to Human Resources	Cultural Resources: Physical disturbance and strike	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: In-water energy Physical interactions

Anti-Submarine Warfare			
Anti-Submarine Warfare Tracking Test—Maritime Patrol Aircraft			
Military Expended Material	Ingestible Material: Small decelerators/parachutes Non-Ingestible Material: Sonobuoys, sonobuoy wires	Military Recoverable Material	None
Sonar and Other Transducer Bins	Mid-Frequency: MF5 MF6	Anti-Submarine Warfare: ASW2 ASW5	
In-Water Explosive Bins	None		
Procedural Mitigation Measures	Acoustic Stressors: (Section 5.3.2) Active Sonar	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement	
Assumptions Used for Analysis	Assume one decelerator/parachute per sonobuoy For air quality analysis: <ul style="list-style-type: none"> - 1 fixed-wing patrol aircraft - Average 8 hours per event 		

A.3.1.2 Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft (SUS)

Anti-Submarine Warfare			
Anti-Submarine Warfare Tracking Test—Maritime Patrol Aircraft (SUS)			
Short Description	This test evaluates the sensors and systems used by maritime patrol aircraft to communicate with submarines using any of the family of signal underwater sound (SUS) sonobuoy systems.	Typical Duration	
		8 flight hours per event	
Long Description	Similar to an ASW tracking exercise-maritime patrol aircraft, an anti-submarine warfare tracking test—maritime patrol aircraft (SUS) 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. P-3 or P-8 fixed-wing aircraft conduct anti-submarine warfare testing using explosive (SUS) sonobuoys (i.e., MK-61 SUS, MK-64 SUS, and MK-82 SUS) and passive sonobuoys (e.g., AN/SSQ-53 DIFAR). If available, tests may be conducted using an actual submarine as the target. This activity would be conducted in deep (typically beyond 100 ft.) waters. Some anti-submarine warfare maritime patrol aircraft tracking tests could be conducted as part of a coordinated event with fleet training activities. Occurs year round, day and night.		
Typical Components	Platforms: Fixed-wing aircraft Targets: Submarines Systems being Trained/Tested: Sonobuoys/sonobuoy launching systems, data transmission systems		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Vessel safety Aircraft safety	Typical Locations	
		Offshore Area Offshore Area	
Stressors to Biological Resources	Acoustic: Aircraft noise	Physical Disturbance and Strike: Aircraft and aerial targets Military expended materials	Energy: In-air electromagnetic devices
	Explosive: In-water explosions	Ingestion: Military expended materials – other than munitions	Entanglement: Wires and cables Decelerators/parachutes
Stressors to Physical Resources	Air Quality: Criteria Air Pollutants	Sediment and Water Quality: Explosives Chemicals Metals Other Materials	
	Cultural Resources: Explosives Physical disturbance	Socioeconomic Resources: Accessibility Airborne acoustics Physical disturbance and strike	Public Health and Safety: In-water energy Physical Interactions
Military Expended Material	Ingestible Material: Small decelerators/parachutes, sonobuoy fragments Non-Ingestible Material: Sonobuoys, sonobuoy wires	Military Recoverable Material	None

Anti-Submarine Warfare			
Anti-Submarine Warfare Tracking Test—Maritime Patrol Aircraft (SUS)			
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	E1 E3		
Procedural Mitigation Measures	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Explosive Stressors: (Section 5.3.3) Explosive Sonobuoys </td> <td style="width: 50%; vertical-align: top;"> Physical Disturbance and Strike: (Section 5.3.4) Vessel movement </td> </tr> </table>	Explosive Stressors: (Section 5.3.3) Explosive Sonobuoys	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement
Explosive Stressors: (Section 5.3.3) Explosive Sonobuoys	Physical Disturbance and Strike: (Section 5.3.4) Vessel movement		
Assumptions Used for Analysis	Assume one decelerator/parachute per sonobuoy Explosive sonobuoy testing occurs at least 50 NM from shore and does not occur within the boundaries of the Olympic Coast National Marine Sanctuary. For air quality analysis: <ul style="list-style-type: none"> - 1 fixed-wing patrol aircraft - Average 8 hours per event 		

A.3.2 OTHER TESTING

A.3.2.1 Intelligence, Surveillance, Reconnaissance/Electronic Warfare Triton Testing

Electronic Warfare (EW)			
ISR/EW Triton Testing			
Short Description	ISR/EW Triton Testing will evaluate the sensors and communication systems on board the MQ-4C Triton unmanned aerial system.	Typical Duration	
		Up to 30 flight hours per event	
Long Description	The MQ-4C Triton unmanned aerial system will fill a complementary role to the P-8A fixed-wing aircraft, providing maritime intelligence, surveillance and reconnaissance (ISR) and Electronic Warfare (EW) support to the Navy. This MQ-4C Triton will be equipped with electro-optical and infrared sensors that allow it to conduct high-altitude surveillance operations. ISR/EW Triton Testing will evaluate the sensors and communication systems on board the MQ-4C Triton unmanned aerial system at a high altitude (50,000 feet above sea level) within the NWT Study Area. Occurs year round, day and night.		
Typical Components	Platforms: Fixed-wing aircraft Targets: None Systems being Trained/Tested: Unmanned aerial systems, data transmission systems		
Standard Operating Procedures <i>(Section 2.3.3)</i>	Aircraft safety Unmanned aircraft system procedures	Typical Locations	
		Offshore Area Offshore Area	Inland Waters EW Range
Stressors to Biological Resources	Acoustic/Explosive: Aircraft noise	Physical Disturbance and Strike: Aircraft and aerial targets	Energy: In-air electromagnetic devices
		Ingestion: None	Entanglement: None
Stressors to Physical Resources	Air Quality: None	Sediment and Water Quality: None	
Stressors to Human Resources	Cultural Resources: None	Socioeconomic Resources: None	Public Health and Safety: None
Military Expended Material	Ingestible Material: None	Military Recoverable Material	None
	Non-Ingestible Material: None		
Sonar and Other Transducer Bins	None		
In-Water Explosive Bins	None		
Procedural Mitigation Measures	None		

Electronic Warfare (EW)	
ISR/EW Triton Testing	
Assumptions Used for Analysis	None

This page intentionally left blank.