Appendix A Activity Descriptions

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APPENDIX A Activity Descriptions

A.1 Training Activities

The proposed training activities would be conducted by the U.S. Navy (Navy), U.S. Marine Corps (USMC), U.S. Coast Guard (USCG), U.S. Army (Army), and U.S. Air Force (USAF). The Navy as the lead agency, jointly with the USCG, Army, and USAF, are action proponents for the training activities described in this appendix. The 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 military training.

Descriptions of training and testing activities are included in Data Sheets, beginning on p. A-3. Location information provided on the Data Sheets indicate where activities would occur within the broad HCTT Study Area. Specific locations which are typically scheduled for the activity are included within parentheticals and are not intended to restrict activity to only those locations.

The tempo of activities, i.e., the number of events per year, are found in Chapter 2, Tables 2-11 through 2-19.

In addition, because the military 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. These exercises frequently include multiple services (Navy, USMC, USCG, Army, USAF) and could include foreign participants from time to time. Foreign participation is episodic to location and time (by year). Data collected to make assumptions about events has factored a certain number of participants which could include foreign participants.

New technologies and tactics require forces to be distributed over increasingly larger areas to conduct realistic training and testing.

A.1.1 Major Anti-Submarine Warfare (ASW) Training Exercises

A major training exercise is comprised of multiple “unit level” activities conducted by several units operating together while commanded and controlled by a single commander. These ASW exercises typically employ an exercise scenario developed to train and evaluate the larger integrated force in naval tactical tasks. In a major training exercise, most of the operations and activities being directed and coordinated by the strike group commander are identical in nature to the operations conducted during individual, crew, and smaller-unit training events. In a major training exercise, however, these disparate training tasks are conducted in concert, rather than by an individual smaller unit. Table A-1 describes the differences between major training exercises and smaller integrated/coordinated anti-submarine warfare exercises based on scale, duration, and sonar hours.

Table A-1: Major Anti-Submarine Warfare Training Exercises and Integrated/Coordinated Anti-Submarine Warfare Training

	Exercise Group	Description	Scale	Duration	Location	Exercise Examples	Modeled Hull-mounted Sonar per Exercise
Major Training Exercises	Large Integrated ASW	Larger-scale, longer duration integrated ASW exercises	Greater than 6 surface ASW units (up to 30 with the largest exercises), 2 or more submarines, multiple ASW aircraft	Generally >10 days	CA HI	Strike Group COMPTUEX, RIMPAC	>500 hours
	Medium Integrated ASW	Medium-scale, medium duration integrated ASW exercises	Approximately 3–8 surface ASW units, at least 1 submarine, multiple ASW aircraft	Generally 4–10 days	CA HI	Task Force/ Sustainment Exercise, Multi-Warfare Exercise	100–500 hours
Integrated/Coordinated Training	Small Integrated ASW	Small-scale, short duration integrated ASW exercises	Approximately 3–6 surface ASW units, 2 dedicated submarines, 2–6 ASW aircraft	Generally <5 days	CA HI	SWATT, NUWTAC	50–100 hours
	Medium Coordinated ASW	Medium-scale, medium duration, coordinated ASW exercises	Approximately 2–4 surface ASW units, possibly a submarine, 2–5 ASW aircraft	Generally 3–10 days	CA HI	SCC, Fleet Battle Problem, TACDEVEX	<100 hours
	Small Coordinated ASW	Small-scale, short duration, coordinated ASW exercises	Approximately 2–4 surface ASW units, possibly a submarine, 1–2 ASW aircraft	Generally 2–4 days	CA HI	ARG/MEU COMPTUEX, ID CERTEX	<50 hours

Notes: ASW = Anti-Submarine Warfare, CA = California Study Area, HI = Hawaii Study Area, SOCAL = Southern California Range Complex, PMSR = Point Mugu Sea Range, HRC = Hawaii Range Complex, RIMPAC = Rim of the Pacific, COMPTUEX = Composite Training Unit Exercise, SWATT = Surface Warfare Advanced Tactical Training, NUWTAC = Naval Undersea Warfare Training Assessment Course, SCC = Submarine Command Course, ARG/MEU CERTEX = Amphibious Ready Group/Marine Expeditionary Unit Certification Exercise, TACDEVEX = Tactical Development Exercise, ID CERTEX/ASW = Independent Deployer Certification Exercise/Tailored Anti-submarine Warfare Training, “>” = greater than, “<” = less than

Major ASW training exercises are listed below.

A.1.1.1 Composite Training Unit Exercise (Strike Group)

Major Training Exercise – Large Integrated Anti-Submarine Warfare	
Composite Training Unit Exercise (Strike Group)	
Short Description	Aircraft carrier and carrier air wing integrate with surface and submarine units in a challenging multi-threat operational environment that certifies them ready to deploy.
Long Description	The Composite Training Unit Exercise is an integration phase, at-sea, major training exercise, designed to forge the aircraft carrier strike group into a cohesive fighting team before deployment. The Composite Training Unit Exercise normally consists of a four-week schedule of event-driven scenarios. An exercise typically consists of seven surface ships, multiple fixed-wing and rotary-wing aircraft, up to two submarines, and various unmanned vehicles. The exercise integrates the aircraft carrier and carrier air wing with surface and submarine units to achieve certification prior to deployment. Coast Guard and Air Force assets may participate in this activity.
Typical Components	**Platforms:** Aircraft Carrier, Fleet Support Vessel, Fixed Wing – Patrol Aircraft, Fixed-Wing – Strike Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle – Fixed Wing **Targets:** Sub-surface Targets – Maneuvering, Surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed, Sonobuoys **Munitions:** See notes in parameters for analysis
Active Sonar	LFH, MF1, MF1C, MFM, MFH, Broadband (MF to HF)
In-Water Explosives	See notes in parameters for analysis
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles
Parameters for Analysis	Only the anti-submarine warfare activities were analyzed as a Composite Training Unit Exercise. Other warfare area training conducted during the Composite Training Unit Exercise is analyzed elsewhere as unit-level training (e.g., gunnery exercise, missile exercise, etc.).
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.1.2 Rim of the Pacific Exercise

Major Training Exercise - Large Integrated Anti-Submarine Warfare	
Rim of the Pacific Exercise	
Short Description	A biennial multinational training exercise in which navies from Pacific Rim nations and other allies assemble in Pearl Harbor, Hawaii, to conduct training throughout the Hawaiian Islands in a number of warfare areas. Components of a Rim of the Pacific exercise may be conducted in the California Study Area.
Long Description	Rim of the Pacific is the world's largest multinational maritime exercise, typically lasting four to five weeks. Hosted by Commander, Pacific Fleet, the exercise is scheduled in the summer on even years. Rim of the Pacific includes participation by multiple nations (in 2024 included 30 nations, 40 surface ships, 4 submarines, 14 national land forces, approximately 171 aircraft, and more than 25,000 personnel). The exercise typically consists of three major phases. Phase I, the Harbor Phase, will consist of operational planning meetings, safety briefings, and sporting events. This phase is designed to make final preparations for the at-sea phases of the exercises, as well as build on professional and personal relationships between the participating countries. Phase II, the Force Integration Training (FIT) Phase, is driven by a structured schedule of events. This portion may include live-fire gunnery and missile exercises, maritime interdiction and vessel boarding, surface warfare, undersea warfare, naval maneuvers, air defense exercises, as well as explosive ordnance disposal, diving and salvage operations, mine clearance operations, and an amphibious landing. This phase exercises the ability of each nation to conduct robust command and control operations with multinational players and enhances each unit's operational capabilities. Phase III, the Tactical Phase of the exercise, is scenario-driven. The intense training during this phase allows participating nations to further strengthen their maritime skills and capabilities and improve their ability to communicate and operate in simulated hostile scenarios. This phase concludes with the ships' return to Pearl Harbor, where participating nations will reconvene to discuss the exercise and overall accomplishments. Multiple ships and aircraft search for, locate, and track submarines under an integrated command structure. Marine mammal systems may be used during this exercise. Coast Guard cutters and aircraft may participate in this activity.
Typical Components	**Platforms:** Aircraft Carrier, Amphibious Warfare Vessel, Fixed Wing - Other, Fixed Wing – Patrol Aircraft, Fixed Wing - Strike Aircraft, Fleet Support Vessel, Patrol Combatant, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle – Fixed Wing **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Mine Warfare, Sonar Systems - Towed, Sonobuoys **Munitions:** Torpedoes – Exercise, see notes in parameters for analysis
Active Sonar	MF1, MF1C, MFM, MFH, HFH, Broadband (MF to HF)
In-Water Explosives	See notes in parameters for analysis
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigations):**

	Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles
Parameters for Analysis	Only the anti-submarine warfare activities were analyzed as a Rim of the Pacific Exercise. Other warfare area training conducted during the Rim of the Pacific Exercise is analyzed elsewhere as unit-level training (e.g., gunnery exercise, missile exercise, etc.). All acoustic sources which may be used during training and testing activities by U.S. and foreign forces have been accounted for in the modeling and analysis presented in this major training exercise.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.1.3 Task Force/Sustainment Exercise

Major Training Exercise - Medium Integrated Anti-Submarine Warfare	
Task Force/Sustainment Exercise	
Short Description	Aircraft carrier and carrier air wing integrates with surface and submarine units in a challenging multi-threat operational environment to maintain ability to deploy.
Long Description	Sustainment Exercises are similar in scope to Composite Training Unit Exercises but shorter in duration and therefore fewer active sonar hours. Sustainment Exercises are conducted to ensure that a Carrier Strike Group maintains an acceptable level of readiness after returning from deployment in order to maintain a surge capability.
Typical Components	**Platforms:** Aircraft Carrier, Fleet Support Vessel, Fixed Wing – Patrol Aircraft, Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle – Fixed Wing **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed, Sonobuoys **Munitions:** See notes in parameters for analysis
Active Sonar	LFH, MF1, MF1C, MFM, MFH, Broadband (MF to HF)
In-Water Explosives	See notes in parameters for analysis
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigations):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles
Parameters for Analysis	Only the anti-submarine warfare activities were analyzed as a Task Force/Sustainment Exercise. Other warfare area training conducted during the Task Force/Sustainment Exercise is analyzed elsewhere as unit-level training (e.g., gunnery exercise, missile exercise, etc.).
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.2 Integrated/Coordinated Training Anti-Submarine Warfare

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

A.1.2.1 Independent Deployer Certification Exercise/Tailored Surface Warfare Training

Integrated/Coordinated Anti-Submarine Warfare Training	
Independent Deployer Certification Exercise/Tailored Surface Warfare Training	
Short Description	Multiple ships, aircraft, and submarines conduct integrated multi-warfare training with a surface warfare emphasis. Serves as a ready-to-deploy certification for individual surface ships tasked with surface warfare missions.
Long Description	This event stresses planning, coordination, and communications during multiple warfare training scenarios. Two or more ships and two to six helicopters searching for, locating, and attacking one submarine. Typically, one ship and helicopter are actively prosecuting while the other ship and helicopter are repositioning. Simultaneously, the submarine may practice simulated attacks against the ships. Example exercises include: Naval Undersea Warfare Training Assessment Course and Surface Warfare Advanced Tactical Training. Multiple acoustic sources may be active at one time.
Typical Components	**Platforms:** Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Aerial Vehicle - Fixed Wing, Unmanned Aerial Vehicle - Rotary Wing, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Surface Targets **Systems being Trained/Tested:** None **Munitions:** See notes in parameters for analysis
Active Sonar	See notes in parameters for analysis
In-Water Explosives	See notes in parameters for analysis
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigations):** Active acoustic sources Manned surface vessels Unmanned Vehicles
Parameters for Analysis	All anti-submarine acoustic sources which may be used during Independent Deployer Certification Exercise/Tailored Surface Warfare Training have been accounted for in the modeling and analysis of anti-submarine unit-level training events presented in this EIS/OEIS. Additionally, other warfare area training conducted during the Deployer Certification Exercise/Tailored Surface Warfare Training is analyzed elsewhere as unit-level training (e.g., gunnery exercise, missile exercise, etc.).

Location (typical specific location where applicable)	Phase IV Requirement 2025-2032
	NOCAL
	PMSR
	SOCAL

A.1.2.2 Medium Coordinated Anti-Submarine Warfare

Integrated/Coordinated Anti-Submarine Warfare Training	
Medium Coordinated Anti-Submarine Warfare	
Short Description	Typically, a 3–10-day exercise with multiple ships, ASW aircraft, and submarines integrating the use of their sensors, including sonobuoys, to search, detect, and track threat submarines.
Long Description	Medium coordinated ASW exercises are tailored events designed to train submarines and surface combatants and develop warfighting tactics, techniques and procedures, and may include torpedo firing. These exercises generally consist of a coordinated training scenario that typically involves two to four surface ships, embarked helicopters, two to three submarines, unmanned vehicles, and maritime patrol aircraft. These exercises may be stand-alone ASW events, such as a Tactical Development Exercise (TACDEVEX) or a Fleet Battle Problem event, generally lasting 3-10 days, or they may be included as part of the "mini-war" phase of the Submarine Commanders Course (SCC), during which torpedoes may be fired.
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle - Fixed Wing **Targets:** Sub-surface Targets - Maneuvering, Surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed, Sonobuoys **Munitions:** Torpedoes – Exercise, see notes in parameters for analysis
Active Sonar	MF1, MF1C, MFM, MFH, HFH, Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	See notes in parameters for analysis
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigations):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned Vehicles
Parameters for Analysis	While preference will be to train against an actual submarine or MK 30 recoverable target, assume only MK 39 expendable targets will be used. One MK 39 Expendable Mobile Anti-Submarine Warfare Training Target may be used in place of an actual submarine target. Only the anti-submarine warfare activities were analyzed as a medium coordinated ASW exercise. All other warfare area training conducted during the larger exercise was analyzed as unit-level training (e.g., bombing, gunnery, missile exercise, etc.).

	Phase IV Requirement 2025-2032
Location (typical specific location where applicable)	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.2.3 Small Coordinated Anti-Submarine Warfare

Integrated/Coordinated Anti-Submarine Warfare Training	
Small Coordinated Anti-Submarine Warfare Exercise	
Short Description	Typically, a 2 to 5-day exercise with multiple ships, aircraft and submarines integrating the use of their sensors, including sonobuoys, to search, detect, and track threat submarines.
Long Description	This is an Anti-Submarine Warfare (ASW) exercise conducted in the HCTT Study Area by forward deployed Navy Strike Groups to sustain and assess their ASW proficiency. The exercise is designed to assess the Strike Groups' ability to conduct ASW in the most realistic environment, against the level of threat expected, in order to effect changes to both training and capabilities (e.g., equipment, tactics, and changes to size and composition) of U.S. Navy Strike Groups. The Strike Group receives significant training value in ASW and other warfare areas, as training is inherent in all at-sea exercises. Additional unit-level activities, such as MISSILEX may be conducted during these events.
Typical Components	**Platforms:** Aircraft Carrier, Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle - Fixed Wing **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed, Sonobuoys **Munitions:** See notes in parameters for analysis
Active Sonar	LFH, MF1, MF1C, MFM, MFH, Broadband (MF to HF)
In-Water Explosives	See notes in parameters for analysis
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned Vehicles
Parameters for Analysis	Only the anti-submarine warfare activities were analyzed as a Small Coordinated Anti-Submarine Warfare Exercise. All other warfare area training conducted during the exercise was analyzed as unit-level training (e.g., bombing exercises, gunnery exercises, missile exercises, etc.).
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.3 Integrated/Coordinated Training – Other

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

A.1.3.1 Composite Training Unit Exercise (Amphibious Ready Group/Marine Expeditionary Unit)

Integrated/Coordinated Training – Other	
Composite Training Unit Exercise (Amphibious Ready Group/Marine Expeditionary Unit)	
Short Description	The amphibious ready group and the Marine expeditionary unit integrate with surface and submarine units in a challenging multi-threat operational environment that certifies them ready to deploy.
Long Description	The Composite Training Unit Exercise is an integration phase, at-sea, major training exercise, designed to forge the amphibious ready group and the Marine expeditionary unit into a cohesive fighting team before deployment. The Composite Training Unit Exercise normally consists of a four-week schedule of event-driven scenarios. An exercise typically consists of surface ships, multiple fixed-wing and rotary-wing aircraft, up to two submarines, and various unmanned vehicles. The exercise integrates the amphibious ready group and the Marine expeditionary unit to achieve certification prior to deployment. Coast Guard and Air Force assets may participate in this activity.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Aerial Vehicle - Rotary Wing, Unmanned Surface Vehicle, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle – Fixed Wing **Targets:** Sub-surface Targets – Maneuvering, Surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed, Sonobuoys **Munitions:** See notes in parameters for analysis
Active Sonar	LFH, MF1, MFM, MFH, Broadband (MF to HF)
In-Water Explosives	See notes in parameters for analysis
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles
Parameters for Analysis	Only the anti-submarine warfare activities were analyzed as a Composite Training Unit Exercise. Other warfare area training conducted during the Composite Training Unit Exercise is analyzed elsewhere as unit-level training (e.g., gunnery exercise, missile exercise, etc.).

	Phase IV Requirement 2025-2032
Location (typical specific location where applicable)	NOCAL
	PMSR
	SOCAL (Del Mar Boat Basin, Camp Pendleton Amphibious Assault Area, Camp Pendleton Amphibious Vehicle Training Area)
	Amphibious Corridors 1-4
	Hawaii Range Complex

A.1.3.2 Innovation and Demonstration Exercise

Integrated/Coordinated Training - Other	
Innovation and Demonstration Exercise	
Short Description	These exercises are conducted to demonstrate or test new capabilities, tactics, techniques, and procedures, and generate standardized, actionable data for evaluation.
Long Description	Innovation and Demonstration Exercises give the Navy and Marine Corps the opportunity to test potential initiatives that address capability gaps and provide inventive solutions in an operational environment. These exercises are conducted to demonstrate or evaluate new capabilities, tactics, techniques and procedures, and generate standardized, actionable data for evaluation. Innovation and Demonstration exercises could include Carrier Strike Groups (CSGs), Expeditionary Strike Groups (ESGs), and joint or coalition forces, and involve Air Warfare, Amphibious Warfare, Anti-Submarine Warfare, Electronic Warfare, Expeditionary Warfare, Mine Warfare, Seabed Warfare, Surface Warfare, and C4I (Command, Control, Communications, Computer, and Intelligence). Unmanned systems may be used. Specific exercises included in this category include certain Fleet Battle Problem, Tactical Development Exercises, Large At-Sea Field Experiment, Project Convergence, and Unmanned Systems Integrated Battle Problem.
Typical Components	**Platforms:** Extra Large Unmanned Underwater Vehicle, Fixed Wing – Patrol Aircraft, Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Aerial Vehicle - Fixed Wing, Unmanned Aerial Vehicle - Rotary Wing, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Air Targets - Drone, Mine Targets, Sub-surface Targets - Maneuvering, Surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Signal, Underwater sound Devices, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed, Sonobuoys **Munitions:** Projectile - Large Caliber, Projectile - Medium Caliber, Projectile - Small Caliber, Surface-to-Air Missiles, Aerial Loitering Munitions, Torpedoes - Exercise
Active Sonar	LFH, MF1, MF1C, MFM, MFH, HFH, Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	E5
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Active acoustic sources Explosive gunnery Non-explosive gunnery Towed in-water devices Unmanned vehicles Weapon firing noise
Parameters for Analysis	None

	Phase IV Requirement 2025-2032
Location (typical specific location where applicable)	NOCAL
	PMSR
	SOCAL (Del Mar Boat Basin)
	Amphibious Corridors 1-4
	Hawaii Range Complex
	Transit Corridor

A.1.3.3 Integrated Air Missile Defense Exercise

Integrated/Coordinated Training - Other	
Integrated Air Missile Defense Exercise	
Short Description	Missiles are launched from a ship against airborne targets, including Ballistic Missiles, simulating an airborne threat to ships.
Long Description	The purpose of Integrated Air Missile Defense (IAMD) Exercises is to deepen relationships and enhance interoperability between United States and allies. Missiles are launched from a ship against a dynamic test target. Platforms could include F/A-18, ships (allied navies), aerial targets (BQM, Aegis Readiness Assessment Vehicle (ARAV)), unmanned aerial systems (e.g., MQ-9) RF. Ship on-board systems track and engage the target in the open ocean. Fixed-wing aircraft could simultaneously make runs against Advanced Radar Detection Laboratory. Another scenario for this type of activity is the Pacific Dragon IAMD Exercise, in which the allied forces involved typically include the Japan Maritime Self Defense Force (JMSDF), Republic of Korea Navy (ROKN), Royal Australian Navy (RAN), and Royal Canadian Navy (RCN). Test target missiles are launched from the Kauai Test Facility at Pacific Missile Range Facility (PMRF) over the open ocean portion of the Hawaii Study Area.
Typical Components	**Platforms:** Fixed-Wing – Strike Aircraft, Surface Combatant, Unmanned Aerial Vehicles – Fixed-Wing **Targets:** Air Targets - Drone, Air Targets - Other **Systems being Trained/Tested:** None **Munitions:** Surface-to-Air Missiles
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Includes explosive bins at medium altitudes. Establishment of and impacts from land based firing points covered in separate NEPA.
Location	**Phase IV Requirement 2025-2032**
	Hawaii Range Complex
	Temporary Operating Area

A.1.3.4 Large Scale Amphibious Exercise

Integrated/Coordinated Training - Other	
Large Scale Amphibious Exercise	
Short Description	The Large Scale Amphibious Exercise utilizes all elements of the Marine Air Ground Task Force (Amphibious) to secure the battlespace (air, land, and sea), maneuver to and seize the objective, and conduct self-sustaining operations ashore with logistic support of the Expeditionary Strike Group. This exercise could include activities in multiple warfare areas in support of at-sea operations such as in the littorals or during straits transits.
Long Description	The Large Scale Amphibious Exercise utilizes all elements of the Marine Air Ground Task Force (Amphibious) to secure the battlespace (air, land, and sea), maneuver to and seize the objective, and conduct self-sustaining operations ashore with logistic support of the Expeditionary Strike Group. This exercise could include activities in multiple warfare areas in support of at-sea operations such as in the littorals or during straits transits. Amphibious ships, Marine aircraft, and ground units are all integrated to complete the objective. Large Scale Amphibious Exercises could include named events such as ARG-MEU Exercise, Amphibious Squadron MEU Integrated Training (PMINT), Dawn Blitz, Steel Knight, Winter Fury, or Summer Fury. Shore activities could include establishment and use of an Expeditionary Advanced Base (EAB). At-sea activities could include integration of Marine Corps MCM capabilities with MIW, combating mines in surf zone/landing craft zone, amphibious operations (logistics across the shore), and long-range, inland air assaults. Some training scenarios include small boat raids; visit, board, search, and seizure training; helicopter and mechanized amphibious raids; and non-combatant evacuation operations. Unmanned systems and lasers could be employed. This exercise could last up to 1 week and involve the use of various weapons, weapon systems, and ordnance. These exercises typically employ widely distributed elements over an extended area for training to replicate real-world missions and assignment areas.
Typical Components	**Platforms:** Amphibious Vehicles, Amphibious Warfare Vessel, Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft, Small Boat, Surface Combatant, Tiltrotor Aircraft, Unmanned Surface Vehicle, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle - Fixed Wing **Targets:** Air Targets - Drone, Mine Targets, Sub-surface Targets - Maneuvering, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** See notes in parameters for analysis
Active Sonar	No
In-Water Explosives	See notes in parameters for analysis
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Unmanned vehicles
Parameters for Analysis	Potential acoustic and explosive use during this activity are accounted for under appropriate individual unit-level activities.

	Phase IV Requirement 2025-2032
Location	NOCAL
	PMSR
	SOCAL (Del Mar Boat Basin)
	Amphibious Corridors 1–4
	Hawaii Range Complex

A.1.3.5 Multi-Warfare Exercise

Integrated/Coordinated Training - Other	
Multi-Warfare Exercise	
Short Description	Multi-Warfare Exercises are integrated events that include training in multiple warfare areas.
Long Description	Multi-Warfare Exercises are integrated events that include training in multiple warfare areas. Some events may involve only Navy surface ships firing missiles and guns in Air Warfare and Surface Warfare scenarios. Other events, such as the Large Scale Exercise could involve ships, aircraft, submarines, amphibious forces, and joint and coalition participants engaged in all warfare areas. These exercises could include air-to-surface missiles, air-to-air missiles, surface-to-air missiles and guns, surface-to-air lasers, surface-to-surface missiles and guns, torpedoes, shore-based gunnery and missiles such as HIMARS and Aerial Loitering Munitions, and ASW sonar.
Typical Components	**Platforms:** Aircraft Carrier, Amphibious Warfare Vessel, Fixed Wing – Patrol Aircraft, Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft, Submarine, Surface Combatant, Unmanned Surface Vehicles **Targets:** Air Targets - Drone, Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed, Sonobuoys **Munitions:** Torpedoes - Exercise, See notes in parameters for analysis
Active Sonar	LFH, MF1, MF1C, MFM, MFH, HFH, Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	See notes in parameters for analysis
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles
Parameters for Analysis	All other warfare area training conducted during Multi-Warfare Exercise were analyzed as unit-level training (gunnery, missile exercise, etc.). All military expended materials, munitions, explosives and sonar use is included in individual unit-level events. Additional activities utilizing sources not listed in the Sonar and Other Transducer Bins section above may occur during this exercise. All acoustic sources which may be used during training and testing activities have been accounted for in the modeling and analysis presented in this EIS/OEIS.
Location	**Phase IV Requirement 2025-2032** NOCAL PMSR SOCAL Hawaii Range Complex

A.1.4 Air Warfare Training

The mission of air warfare is to destroy or reduce enemy air and missile threats (including unmanned airborne threats) and serves two purposes: to protect U.S. forces from attacks from the air and to gain air superiority. Air warfare provides U.S. forces with adequate attack warnings, while denying hostile forces the ability to gather intelligence about U.S. forces.

Aircraft conduct air warfare through radar search, detection, identification, and engagement of airborne threats. Surface ships conduct air warfare through an array of modern anti-aircraft weapon systems such as aircraft detecting radar, naval guns linked to radar-directed fire-control systems, surface-to-air missile systems, and radar-controlled guns for close-in point defense.

A.1.4.1 Air Combat Maneuvers

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

A.1.4.2 Air Defense Exercise

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

A.1.4.3 Gunnery Exercise Air-to-Air – Medium Caliber

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

A.1.4.4 Gunnery Exercise Air-to-Air – Small Caliber

Air Warfare	
Gunnery Exercise Air-to-Air Small Caliber	
Short Description	Rotary-wing aircrews fire small-caliber guns at air targets.
Long Description	Helicopter aircrews maneuver aircraft to engage a small airborne threat with crew served weapons. Typically involves one helicopter and an airborne UAV or drone target.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Air Targets - Drone **Systems being Trained/Tested:** None **Munitions:** Projectile - Small Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Typically involves two or more rotary-wing aircraft and aerial drones. The drone is not recovered after the exercise.
Location	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.4.5 Gunnery Exercise Surface-to-Air – Large Caliber

Air Warfare	
Gunnery Exercise Surface-to-Air Large Caliber	
Short Description	Surface ship crews fire large-caliber guns at air targets.
Long Description	Navy and Coast Guard surface ship crews defend against threat aircraft or missiles with large-caliber guns to disable or destroy the threat. An exercise involves one ship and a simulated threat aircraft or missile that is detected by the ship's radar. Large-caliber guns fire non-explosive projectiles at the threat before it reaches the ship. The target is towed by a contract air services jet or is an expendable unmanned aerial vehicle.
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Other **Systems being Trained/Tested:** None **Munitions:** Projectile - Large Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Weapon firing noise
Parameters for Analysis	The towed target is a fiberglass finned target that is towed approximately 3 nautical miles behind the towing aircraft. All projectiles are assumed to be non-explosive.
Location	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.4.6 Gunnery Exercise Surface-to-Air – Medium Caliber

Air Warfare	
Gunnery Exercise Surface-to-Air Medium Caliber	
Short Description	Surface ship crews fire medium-caliber guns at air targets.
Long Description	Navy and Coast Guard surface ship crews defend against threat aircraft or missiles with medium-caliber guns to disable or destroy the threat. An exercise involves one ship and a simulated threat aircraft or anti-ship missile that is detected by the ship's radar. Medium-caliber guns fire non-explosive projectiles to disable or destroy the threat before it reaches the ship. The target is towed by a contract air services jet or is an expendable unmanned aerial vehicle.
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Other **Systems being Trained/Tested:** None **Munitions:** Projectile - Medium Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	The target is a fiberglass finned target that is towed approximately 3 nautical miles behind the towing aircraft.
Location	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.4.7 High-Energy Laser Exercise Surface-to-Air

Air Warfare	
High-Energy Laser Exercise Surface-to-Air	
Short Description	Surface ship crews disable or destroy air targets with high-energy laser systems.
Long Description	Ship crews employ high-power energy laser systems that are used to create critical failures in airborne targets. System directs a directed energy beam that can penetrate thin layers of metal at short distances that can render air targets inoperative. Laser systems can also be used in a low power setting as non-lethal deterrent during maritime security operations (force protection). The low power capability would not be used against manned platforms during training.
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Drone **Systems being Trained/Tested:** High-Energy Laser Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 20252032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.4.8 Medium Range Interceptor Capability

Air Warfare	
Medium Range Interceptor Capability	
Short Description	Ground personnel defend against threat missiles and aircraft with vehicle-launched ground-to-air missile systems.
Long Description	Ground personnel defend against threat missiles and aircraft with vehicle-launched ground-to-air missile systems. The event involves an aerial target simulating a threat aircraft, anti-ship missile, or land attack missile, which is detected by the air defense systems radar or other sensors. Vehicle-launched ground-to-air missiles are fired to disable or destroy the threat. Missiles are either explosive warheads or non-explosive practice munitions. The target typically is a remote controlled drone.
Typical Components	**Platforms:** Wheeled or tracked vehicle **Targets:** Air Targets - Drone **Systems being Trained/Tested:** None **Munitions:** Land-Based Surface-to-Air Missiles
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Includes explosive bins at medium altitudes. Establishment of and impacts from land based firing points covered in separate NEPA.
Location	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex (PMRF [land area])

A.1.4.9 Missile Exercise Air-to-Air

Air Warfare	
Missile Exercise Air-to-Air	
Short Description	Fixed-wing aircrews fire air-to-air missiles at air targets.
Long Description	An exercise involves two or more fixed-wing aircraft and a target. Missiles are either explosive warheads or non-explosive practice munitions. The target is an unmanned aerial target drone, 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 exercises typically occur at high altitudes.
Typical Components	**Platforms:** Fixed Wing - Strike Aircraft **Targets:** Air Targets - Decoy, Air Targets - Flare **Systems being Trained/Tested:** None **Munitions:** Air-to-Air Missiles
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Assumes that all missiles are explosive, although non-explosive practice munitions may be used. All missiles explode at high altitude. All propellant and explosives are consumed. Assume 1.5 flares per Missile Exercise event.
Location	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.4.10 Missile Exercise – Man-Portable Air Defense System

Air Warfare	
Missile Exercise - Man-Portable Air Defense System	
Short Description	Personnel employ a shoulder fired surface-to-air missile at air targets.
Long Description	Personnel employ the Man-Portable Air Defense Systems, a shoulder fired surface to air missile, against threat missiles or aircraft. An exercise involves personnel firing the Man-Portable Air Defense System at remote piloted or other aerial targets. Activity is conducted by combat forces firing from shore or shipboard at targets over the water. Small boats are used to ensure range safety.
Typical Components	**Platforms:** Amphibious Vehicles **Targets:** Air Targets - Drone **Systems being Trained/Tested:** None **Munitions:** Land-Based Surface-to-Air Missiles
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Includes explosive bins at medium altitudes. For analysis, all missiles are assumed to be explosive, although non-explosive practice munitions may be used. All propellant and explosives are consumed. Establishment of, and impacts from land based firing points covered in separate NEPA.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	Hawaii Range Complex (PMRF[land area])
	SOCAL (SCI)

A.1.4.11 Missile Exercise Surface-to-Air

Air Warfare	
Missile Exercise Surface-to-Air	
Short Description	Surface ship crews defend against threat missiles and aircraft with missiles.
Long Description	Surface ship crews defend against threat missiles and aircraft with ship-launched surface-to-air missiles. The exercise involves an aerial target that simulates a threat aircraft, anti-ship missile, or land attack missile, which is detected by the ship's radar. Ship-launched surface-to-air missiles are fired to disable or destroy the threat. The target typically is either a sub-sonic remote-controlled drone or a supersonic target. Target drones deploy parachutes and are recovered by small boat or rotary-wing aircraft; when used, tactical air-launched decoys are not recovered. Supersonic targets are not recovered.
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Drone **Systems being Trained/Tested:** None **Munitions:** Surface-to-Air Missiles
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Assumes that all surface-to-air missiles are high-explosive. Missile explodes well above surface at medium and high altitudes. All explosive and propellant are consumed.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.5 Amphibious Warfare Training

The mission of amphibious warfare is to project military power from the sea to the shore (i.e., attack a threat on land by a military force embarked on ships) through the use of naval firepower and expeditionary landing forces. Amphibious warfare operations include small unit reconnaissance or raid missions to large-scale amphibious exercises involving multiple ships and aircraft combined into a strike group.

Amphibious warfare training ranges from individual, crew, and small unit events to large task force exercises. Individual and crew training include amphibious vehicles and naval gunfire support training. Such training includes shore assaults, boat raids, airfield or port seizures, and reconnaissance. Large scale amphibious exercises involve ship-to-shore maneuver, naval fire support, such as shore bombardment, and air strike and attacks on targets that are in close proximity to friendly forces.

A.1.5.1 Amphibious Assault

Amphibious Warfare	
Amphibious Assault	
Short Description	Large unit forces move ashore from amphibious ships at sea for the immediate execution of inland objectives.
Long Description	Large unit forces move ashore from amphibious ships at sea for the immediate execution of inland objectives. Amphibious assault is conducted for the purposes of prosecuting further combat operations, obtaining a site for an Expeditionary Advanced Base, or denying the enemy use of an area. Unit-level training exercises involve one or more amphibious ships, and their associated watercraft and aircraft, to move personnel and equipment from ship to shore without the command and control and supporting elements involved in a full scale exercise. The goal is to practice loading, unloading, and movement and to develop the timing required for a full-scale exercise.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Fixed Wing - Strike Aircraft, Fleet Support Vessel, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Typical event: 1–3 amphibious ships (e.g., LHA or LHD, LPD, LSD); 2-8 landing craft (landing craft, air cushioned; landing craft, utility); 4–14 amphibious assault vehicles; up to 22 aircraft (e.g., HMH-53, H-46/MV-22, AH-1, UH-1, AV-8); a Marine Expeditionary Unit (2,200 Marines).
Location (typical location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL (Camp Pendleton Amphibious Assault Area [CPAAA], Del Mar Boat Basin, Camp Pendleton Amphibious Vehicle Training Area, San Clemente Island, Pyramid Cove, Horse Beach Cove, West Cove, Wilson Cove)
	Amphibious Corridors 1-4
	Hawaii Range Complex (Marine Corps Training Area Bellows, Kaneohe Bay, Marine Corps Base Hawaii, PMRF [land area])

A.1.5.2 Amphibious Operations in a Contested Environment

Amphibious Warfare	
Amphibious Operations in a Contested Environment	
Short Description	Navy and Marine Corps forces conduct operations in coastal and offshore waterways against air, surface, and subsurface threats.
Long Description	USMC forces establish Expeditionary Advanced Bases on land and protect against air, surface, and subsurface attacks. Systems employed include but are not limited to Marine Air Defense Integrated System (MADIS), Navy Marine Expeditionary Ship Interdiction System (NMESIS), Long Range Unmanned Surface Vehicle (LRUSV) employing unmanned aerial systems, high-energy laser systems, 155 mm Howitzer artillery, and High Mobility Artillery Rocket Systems.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Fixed Range, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** Air Targets - Drone, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Medium Caliber, Land-Based Surface-to-Air Missiles, Land-Based Surface-to-Surface Missiles
Active Sonar	No
In-Water Explosives	See notes in parameters for analysis.
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive missiles and rockets
Parameters for Analysis	In-water explosives used during this activity are addressed in other Unit-Level activities such as Shore-to-Surface Artillery Exercise and Shore-to-Surface Missile Exercise. Includes explosive bins at medium and high altitudes. Impacts on land from firing points is covered in separate NEPA.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (CPAAA, San Clemente Island, SHOBA, Camp Pendleton Amphibious Vehicle Training Area, Del Mar Boat Basin)
	PMSR
	Amphibious Corridor 1-4
	Hawaii Range Complex (Marine Corps Training Area Bellows, Kaneohe Bay, Marine Corps Base Hawaii, PMRF [land area])

A.1.5.3 Amphibious Raid

Amphibious Warfare	
Amphibious Raid	
Short Description	Small unit forces move from amphibious ships at sea for a specific short-term mission. These are quick operations with as few personnel as possible.
Long Description	Small unit forces swiftly move from amphibious vessels at sea into hostile territory for a specific mission, including a planned withdrawal. Raids are conducted to inflict loss or damage, secure information, create a diversion, confuse the enemy, or capture or evacuate individuals or material. Amphibious raid forces are kept as small as possible to maximize stealth and speed of the operation. An event may employ assault amphibian vehicle units, small boats, small unit live-fire and non-live-fire operations. Surveillance or reconnaissance unmanned surface and aerial vehicles may be used during this event.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Small Boat, Unmanned Aerial Vehicle – Rotary Wing, Unmanned Surface Vehicles **Targets:** Land Targets **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Unmanned vehicles
Parameters for Analysis	Weapons firing during this event is discussed in appropriate activity descriptions (e.g., surface-to-surface and air-to-surface small-caliber gunnery exercises).
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SSTC
	PMSR
	SOCAL (CPAAA, SHOBA, West Cove)
	Amphibious Corridors 1-4
	Hawaii Range Complex (Marine Corps Training Area Bellows, Kaneohe Bay, Marine Corps Base Hawaii, PMRF [land area])

A.1.5.4 Amphibious Vehicle Maneuvers

Amphibious Warfare	
Amphibious Vehicle Maneuvers	
Short Description	Crews practice the employment of amphibious craft, amphibious vehicles, and small boats.
Long Description	Navy and Marine Corps personnel train to learn handling characteristics of a variety of amphibious craft, to include the Landing Craft Air Cushion (LCAC), the Landing Craft Utility (LCU), the Amphibious Combat Vehicle (ACV), the Amphibious Assault Recovery Vehicle (AAV-R), and the Lighter Amphibious Resupply Cargo (LARC) vehicle. Small boats include the use of the Landing Craft Personnel Light (LCPL), the Improved Navy Lighterage System (INLS), the Rigid Hull Inflatable Boats (RHIBs), and the Combat Rubber Raiding Craft (CRRCs). Training includes the use of amphibious craft to and from the shore as well as driving amphibious vehicles into and out of the water from ship or shore and launching and recovering small boats into the water for operations between ship and shore.
Typical Components	**Platforms:** Amphibious Vehicles, Amphibious Vessels, Small Boats **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL (CPAAA, Del Mar Boat Basin, San Clemente Island, SHOBA)
	Amphibious Corridors 1-4
	Hawaii Range Complex (Marine Corps Training Area Bellows, Marine Corps Base Hawaii, Kaneohe Bay, PMRF [land area])

A.1.5.5 Expeditionary Fires Exercise/Supporting Arms Coordination Exercise

Amphibious Warfare	
Expeditionary Fires Exercise/Supporting Arms Coordination Exercise	
Short Description	Military units provide integrated and effective close air support, Naval Surface Fire Support fire, and Marine Corps artillery fire in support of amphibious operations.
Long Description	Military units provide integrated and effective close air support, Naval Surface Fire Support, and Marine Corps artillery fire in support of amphibious operations. The mission of the exercises is to achieve effective integration of Naval gunfire, close air support, and Marine Corps artillery fire support.
Typical Components	**Platforms:** Amphibious Warfare Vessels, Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft, Surface Combatant **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Impacts from land based firing points and targets are not analyzed in this EIS/OEIS. Only the at-sea components of this activity (naval gunfire from surface ships) are analyzed in this document.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SHOBA)

A.1.5.6 Naval Surface Fire Support Exercise – At Sea

Amphibious Warfare	
Naval Surface Fire Support Exercise – At Sea	
Short Description	Surface ship crews fire large caliber guns at a passive acoustic hydrophone scoring system.
Long Description	Surface ship crews use large caliber guns to support forces ashore; however, the land target is simulated at sea. Rounds are scored by passive acoustic buoys located at or near the target area. The portable scoring system is composed of buoys set in a predesigned pattern at specific intervals, which are retrieved after the exercise. A scoring system provides a realistic presentation, such as a land mass with topography, to the vessels combat system. This virtual land target area overlays the hydrophone array. The vessel fires its munitions into the target area and the acoustic noise resulting from the impact of the round landing in the water is detected by the hydrophones. The scoring system triangulates the exact point of impact of the round, allowing the exercise to be conducted as if the vessel were firing at an actual land target. Surface ship crews use large caliber main battery guns to support forces ashore.
Typical Components	**Platforms:** Surface Combatant **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Projectile - Large Caliber
Active Sonar	No
In-Water Explosives	E5
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive gunnery Weapons firing noise Non-explosive gunnery
Parameters for Analysis	Events occur greater than 12 nautical miles from shore. Non-explosive practice munitions may be used when acoustic sensors can detect projectile splash. High explosives may be used during all other events. Assume all explosive projectiles detonate on impact with water surface.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032** Hawaii Range Complex (BARSTUR, BSURE)

A.1.5.7 Naval Surface Fire Support Exercise – Land-Based Target

Amphibious Warfare	
Naval Surface Fire Support Exercise – Land-Based Target	
Short Description	Surface ship crews fire large-caliber guns at land-based targets in support of forces ashore.
Long Description	Surface ship crews use large-caliber guns to support forces ashore. One or more ships position themselves from three to six NM from the target area and a land-based spotter relays type and exact location of the target. After observing the fall of the shot, the spotter relays any adjustments needed to reach the target. Once the projectiles are on target, the spotter requests a sufficient number to effectively destroy the target. This exercise occurs on land ranges where explosive and non-explosive practice munitions are authorized and is often supported by target shapes such as tanks, trucks, trains, or aircraft on the ground.
Typical Components	**Platforms:** Surface Combatant **Targets:** Land Targets **Systems being Trained/Tested:** None **Munitions:** Projectile - Large Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Weapons firing noise
Parameters for Analysis	Impacts on land-based targets is covered in separate NEPA.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SHOBA)

A.1.5.8 Non-Combat Amphibious Operation

Amphibious Warfare	
Non-Combat Amphibious Operations	
Short Description	Amphibious vehicles move personnel and equipment from ships to shore and back.
Long Description	Navy and Marine Corps forces train to move personnel and equipment from ship-to-shore and from shore-to-ship to facilitate non-combat military operations. These training events include Non-Combatant Evacuation Operation, Humanitarian Assistance Operations, and Disaster Relief Operations. Noncombatants are evacuated when their lives are endangered by war, civil unrest, or natural disaster. Helicopters, landing crafts, amphibious ships, and other forces could be expected to participate in this operation during day or night.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (CPAAA, San Clemente Island, SHOBA)
	PMSR
	Amphibious Corridors 1-4
	Hawaii Range Complex (Marine Corps Training Area Bellows, Marine Corps Base Hawaii, PMRF [land area])

A.1.5.9 Shore-to-Surface Artillery Exercise

Expeditionary Warfare	
Shore-to-Surface Artillery Exercise	
Short Description	Army and Marine Corps crews engaging surface targets at sea with their main battery cannons (typically 105mm and 155mm) and mortars (typically 120mm).
Long Description	This exercise involves Army or Marine Corps artillery gun crews engaging surface targets at sea with their main battery cannons (typically 105mm and 155mm) and mortars (typically 120mm). Targets are typically stationary such as killer tomatoes. Some targets are expended during the exercise and are not recovered. This exercise may involve a single-firing artillery battery, or be undertaken in the context of a coordinated larger exercise involving multiple batteries. During all exercises, either high-explosive or non-explosive projectiles may be used. High-explosive projectiles can either be fused for detonation on impact (with water surface or targets), or for proximity to the target (in air detonation).
Typical Components	**Platforms:** Amphibious Vehicles **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** None **Munitions:** Projectile - Large Caliber
Active Sonar	No
In-Water Explosives	E6
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive gunnery
Parameters for Analysis	In water impacts are similar to those analyzed under Gunnery Exercise Surface-to-Surface Ship Large-Caliber. Shore based firing point impacts are addressed in other NEPA documentation. All projectiles will impact beyond 3 NM from shore.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SCI)
	Hawaii Range Complex (PMRF Training Area)

A.1.5.10 Shore-to-Surface Missile Exercise

Expeditionary Warfare	
Missile Exercise Shore-to-Surface	
Short Description	Army and Marine Corps units launch missiles from shore at surface maritime targets.
Long Description	Army and Marine Corps units launch missiles from shore at surface maritime targets with the goal of destroying or disabling enemy ships or boats. Weapon systems include the HIMARS and NMESIS.
Typical Components	**Platforms:** Vehicle Launch Platform **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Air-to-Surface Missiles, Rockets
Active Sonar	No
In-Water Explosives	E9
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	In-water impacts are similar to those analyzed under Missile Exercise Surface-to-Surface. Shore based firing point impacts are addressed in other NEPA documentation.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032** PMSR SOCAL Hawaii Range Complex (PMRF Training Area)

A.1.6 Anti-Submarine Warfare Training

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

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

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

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

A.1.6.1 Torpedo Exercise – Helicopter

Anti-Submarine Warfare	
Anti-Submarine Warfare Torpedo Exercise – Helicopter	
Short Description	Helicopter crews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.
Long Description	Helicopters using sonobuoys and dipping sonar search for, detect, classify, localize, and track a simulated threat submarine with the goal of determining a firing solution that could be used to launch a torpedo and destroy the submarine. Sonobuoys (both passive and active) are typically employed by a helicopter operating at low altitude. Dipping sonar (both passive and active) is employed after the search area has been narrowed based on the sonobuoy search. The anti-submarine warfare target used for this exercise may be expendable or non-expendable mobile targets, or a live submarine. This exercise may involve a single aircraft or occur during a coordinated larger exercise involving multiple aircraft and ships, including a major range event. Unmanned aerial systems, such as the MQ-8 Fire Scout, may also be used. The exercise torpedo is recovered by a special recovery helicopter or small craft. The preferred range for this exercise is an instrumented underwater range, but it may be conducted in other parts of the Study Area depending on training requirements and available assets.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Unmanned Surface Vehicle, Unmanned Aerial Vehicle – Rotary-Wing, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Dipping, Sonobuoys **Munitions:** Torpedoes - Exercise
Active Sonar	MFM, MFH, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SOAR, Tanner Bank SWTR, San Clemente Island SWTR)
	PMSR
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.6.2 Torpedo Exercise – Maritime Patrol Aircraft

Anti-Submarine Warfare	
Anti-Submarine Warfare Torpedo Exercise – Maritime Patrol Aircraft	
Short Description	Maritime patrol aircraft crews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.
Long Description	Fixed-wing maritime patrol aircraft employ sonobuoys to search for, detect, classify, localize, and track a simulated threat submarine with the goal of determining a firing solution that could be used to launch a torpedo and destroy the submarine. Both sonobuoys and torpedoes (using the High Altitude Anti-Submarine Warfare Weapon Capability kit) may be delivered at high altitudes to remain clear of high threat areas. Sonobuoys are deployed in specific patterns based on the expected threat submarine and specific water conditions. Depending on these two factors, these patterns will cover many different size areas. For certain sonobuoys, tactical parameters of use may be classified. The anti-submarine warfare target used for this exercise may be expendable or non-expendable mobile targets, or a live submarine. This exercise may involve a single aircraft, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft and vessels, including a major range event. The exercise torpedo is recovered by helicopter or small boat. The preferred range for this exercise is an instrumented underwater range, but it may be conducted in other parts of the Study Area depending on training requirements and available assets.
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonobuoys **Munitions:** Torpedoes - Exercise
Active Sonar	MFM, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	Submarine may provide service as the target. If target is air-dropped, one parachute per target. Torpedoes are recovered.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SOAR, Tanner Bank SWTR, San Clemente Island SWTR)
	PMSR
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.6.3 Torpedo Exercise – Ship

Anti-Submarine Warfare	
Anti-Submarine Warfare Torpedo Exercise – Ship	
Short Description	Surface ship crews search for, track, and detect submarines. Exercise torpedoes are used during this exercise.
Long Description	Surface ships search for, detect, and track threat submarines to determine a firing position to launch a torpedo and attack the submarine. A surface ship operates at slow speeds while employing hull-mounted or towed array sonar. Passive or active sonar is employed depending on the type of threat submarine, the tactical situation, and environmental conditions. The anti-submarine warfare target used for this exercise is a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, MK-30 Target, or live submarine. This exercise may involve a single ship, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft, ships, and submarines, including a major range event.
Typical Components	**Platforms:** Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Hull Mounted **Munitions:** Torpedoes - Exercise
Active Sonar	MF1, MF1C, HFH, Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices
Parameters for Analysis	Submarines may provide service as the target. Torpedoes are recovered.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SOAR, Tanner Banks SWTR, San Clemente Island SWTR)
	PMSR
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.6.4 Torpedo Exercise – Submarine

Anti-Submarine Warfare	
Anti-Submarine Warfare Torpedo Exercise – Submarine	
Short Description	Submarine crews search for, track, and detect submarines. Exercise torpedoes are used during this exercise.
Long Description	Submarine crews search for, detect and track a threat submarine to develop firing position to launch a torpedo. A single submerged submarine operates at slow speeds and various depths while using its hull mounted or towed array sonar to track a threat submarine. Passive sonar is used almost exclusively. Non-explosive exercise torpedoes can be fired, and active sonar can be used during this training exercise. This exercise may involve a single submarine, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft, ships, and submarines, including a major range event. The exercise torpedo is recovered by helicopter or small craft. The preferred range for this exercise is an instrumented underwater range, but it may be conducted in other range complexes depending on training requirements and available assets.
Typical Components	**Platforms:** Submarine, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Hull Mounted **Munitions:** Torpedoes - Exercise
Active Sonar	MFH, HFH, Broadband (LF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices
Parameters for Analysis	Specific modeling areas for this activity include: BARSTUR, SOAR. Torpedoes are recovered. Guidance wire has a low breaking strength and breaks easily. Weights and flex tubing sink rapidly.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SOAR, Tanner Banks SWTR, San Clemente Island SWTR)
	PMSR
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.6.5 Tracking Exercise – Helicopter

Anti-Submarine Warfare	
Anti-Submarine Warfare Tracking Exercise – Helicopter	
Short Description	Helicopter crews search for, track, and detect submarines.
Long Description	Helicopters using sonobuoys and dipping sonar search for, detect, classify, localize, and track a simulated threat submarine with the goal of determining a firing solution that could be used to launch a torpedo and destroy the submarine. The anti-submarine warfare target used for this exercise may be a MK-39 Expendable Mobile Anti-submarine Warfare Training Target, a MK-30 target, or a live submarine. This exercise may involve a single aircraft, or occur during a coordinated larger exercise involving multiple aircraft and ships, including a major range event. Unmanned aerial systems, such as the MQ-8 Fire Scout, may also be used. The preferred range for this exercise is an instrumented range, but it may be conducted in other range complexes depending on training requirements and available assets.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Unmanned Aerial Vehicle – Rotary-Wing, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Dipping, Sonobuoys **Munitions:** None
Active Sonar	MFM, MFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	Submarines may provide service as the target.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL (SOAR, Tanner Banks SWTR, San Clemente Island SWTR)
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.6.6 Tracking Exercise –Unmanned Surface Vessel

Anti-Submarine Warfare	
Anti-Submarine Warfare Tracking Exercise – Unmanned Surface Vessel	
Short Description	USVs search for, detect, and track a sub-surface target simulating a threat submarine with the goal of determining a firing solution that could be used to launch a torpedo.
Long Description	USVs search for, detect, and track a sub-surface target simulating a threat submarine with the goal of determining a firing solution that could be used to launch a torpedo. A USV 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 scenario is either a MK39 EMATT, MK30 recoverable target, or live sub. This exercise may involve a single USV or be undertaken in the context of a coordinated larger exercise involving multiple aircraft, ships, and submarines, including a major range event.
Typical Components	**Platforms:** Fleet Support, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonobuoys **Munitions:** Projectile – Medium Caliber
Active Sonar	MFM
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL (SOAR, Tanner Bank SWTR, San Clemente Island SWTR)
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.6.7 Tracking Exercise – Maritime Patrol Aircraft

Anti-Submarine Warfare	
Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft	
Short Description	Maritime patrol aircraft crews search for, track, and detect submarines.
Long Description	Fixed-wing maritime patrol aircraft employ sonobuoys to search for, detect, classify, localize, and track a simulated threat submarine with the goal of determining a firing solution that could be used to launch a torpedo and destroy the submarine. Sonobuoys may be released at higher altitudes. Sonobuoys are deployed in specific patterns based on the expected threat submarine and specific water conditions. The anti-submarine warfare target used for this exercise may be a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, a MK-30 target, or a live submarine. This exercise may involve a single aircraft, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft and vessels, including a major range event.
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonobuoys **Munitions:** None
Active Sonar	LFM, LFH, MFM
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	Submarine may provide service as the target. If target is air-dropped, one parachute per target.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL (SOAR, Tanner Bank SWTR, San Clemente Island SWTR)
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.6.8 Tracking Exercise – Ship

Anti-Submarine Warfare	
Anti-Submarine Warfare Tracking Exercise – Ship	
Short Description	Surface ship crews search for, track, and detect submarines.
Long Description	Surface ships search for, detect, and track threat submarines to determine a firing position to launch a torpedo and attack the submarine. A surface ship operates at slow speeds while employing sonobuoys, hull-mounted sonars, or towed array sonar. Passive or active sonar is employed depending on the type of threat submarine, the tactical situation, and environmental conditions. The target for this exercise is either a MK-39 Expendable Mobile Anti-Submarine Warfare Training Target, MK-30 Recoverable Training Target, or live submarine. This exercise may involve a single ship, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft, ships, and submarines, including a major range event.
Typical Components	**Platforms:** Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Countermeasures, Sonar Systems - Hull Mounted, Sonar Systems - Towed **Munitions:** None
Active Sonar	MF1, MF1C, MFH, Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices
Parameters for Analysis	A Submarine may provide service as the target.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL (SOAR, Tanner Bank SWTR, San Clemente Island SWTR)
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.6.9 Tracking Exercise – Submarine

Anti-Submarine Warfare	
Anti-Submarine Warfare Tracking Exercise – Submarine	
Short Description	Submarine crews search for, track, and detect submarines.
Long Description	Submarine crews search for, detect, and track a threat submarine to develop firing position to launch a torpedo. A single submerged submarine operates at slow speeds and various depths while using its hull mounted sonar to track a threat submarine. Passive sonar is used almost exclusively. The target for this exercise is either an MK 39 expendable mobile anti-submarine warfare training target, MK 30 recoverable training target, or live submarine. This exercise may involve a single submarine, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft, ships, and submarines, including a major range event.
Typical Components	**Platforms:** Submarine, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None
Active Sonar	MFH, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL (SOAR, Tanner Bank SWTR, San Clemente Island SWTR)
	Hawaii Range Complex (BARSTUR, BSURE)
	Transit Corridor

A.1.6.10 Training and End-to-End Mission Capability Verification – Torpedo

Anti-Submarine Warfare	
Training and End-to-End Mission Capability Verification – Torpedo	
Short Description	Air, surface, or submarine crews employ explosive torpedoes against virtual targets.
Long Description	Non-explosive and explosive torpedoes (carrying a warhead) would be launched at a suspended target by a submarine and fixed- or rotary-wing aircraft or surface combatants. Torpedoes would detonate on an artificial target below the water's surface. Event duration is 1-2 days during daylight hours. 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.
Typical Components	**Platforms:** Submarine, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Stationary **Systems being Trained/Tested:** Signal, Underwater sound Devices, Sonar Systems - Hull Mounted **Munitions:** Torpedoes - Exercise, Torpedoes - HE
Active Sonar	MFH, HFM, HFH
In-Water Explosives	E11
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Explosive torpedoes
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SOAR, Tanner Bank SWTR, San Clemente Island SWTR)
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.7 Electronic Warfare

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

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

A.1.7.1 Counter Targeting Chaff Exercise – Aircraft

Electronic Warfare	
Counter Targeting Chaff Exercise – Aircraft	
Short Description	Fixed-winged aircraft and helicopter aircrews deploy chaff to disrupt threat targeting and missile guidance radars.
Long Description	Fixed-winged aircraft and helicopter aircrews deploy chaff to disrupt threat targeting and missile guidance radars. Fixed-winged aircraft and helicopter aircrews detect electronic targeting signals from threat radars or missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud deceives the inbound missile, and the aircraft clears away from the threat. Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to elicit frequency responses, which deceive enemy radars. Chaff is employed to create a target that will lure enemy radar and weapons system away from the actual friendly platform.
Typical Components	**Platforms:** Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Chaff is usually expended while conducting other training activities, such as air combat maneuvering.

	Phase IV Requirement 2025-2032
Location (typical specific location where applicable)	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.7.2 Counter Targeting Chaff Exercise – Ship

Electronic Warfare	
Counter Targeting Chaff Exercise – Ship	
Short Description	Surface ship crews deploy chaff to disrupt threat targeting and missile guidance radars.
Long Description	Navy surface ship and Coast Guard cutter crews deploy chaff to disrupt threat targeting and missile guidance radars to defend against an attack. Surface ship crews detect electronic targeting signals from threat radars or missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud deceives the inbound missile, and the vessel clears away from the threat. The typical exercise duration is approximately 1.5 hours. Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to elicit frequency responses, which deceive enemy radars. Chaff is employed create a target that will lure enemy radar and weapons system away from the actual friendly platform. Ships may also train with advanced countermeasure systems, such as the MK 53 Decoy Launching System (Nulka).
Typical Components	**Platforms:** Surface Combatant **Targets:** None **Systems being Trained/Tested:** Chaff Launchers **Munitions:** MK 53 Nulka
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Stressors to human resources were not analyzed for this activity since it occurs greater than 12 nautical miles from shore.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.7.3 Counter Targeting Flare Exercise

Electronic Warfare	
Counter Targeting Flare Exercise	
Short Description	Fixed-winged aircraft and helicopter aircrews deploy flares to disrupt threat infrared missile guidance systems.
Long Description	Navy, Marine Corps, and Coast Guard fixed-winged aircraft and helicopter aircrews deploy flares to disrupt threat infrared missile guidance systems. Aircraft detect electronic targeting signals from threat radars or missiles or a threat missile plume when launched and dispense flares and immediately maneuver to defeat the threat. This exercise trains aircraft personnel in the use of defensive flares designed to confuse infrared sensors or infrared homing missiles, thereby causing the sensor or missile to lock onto the flares instead of the real aircraft. Typically, an aircraft will expend five flares in an exercise while operating above 3,000 ft. Flare exercises are often conducted with chaff exercises, rather than as a stand-alone exercise.
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Approximately five flares per aircraft while operating above 3,000 ft.
Location (typical applicable location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.7.4 Electronic Warfare Operations

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

A.1.8 Expeditionary Warfare

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

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

A.1.8.1 Dive and Salvage Operations

Expeditionary Warfare	
Dive and Salvage Operations	
Short Description	Navy divers perform dive operations and salvage training.
Long Description	Navy divers will conduct a variety of salvage training to include refloating grounded vessels, underwater repairs to ships, facilities, underwater survey operations, and other underwater training as required.
Typical Components	**Platforms:** Support Craft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	The practice salvage platform can be sunk and then refloated and removed.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Port Hueneme Harbor
	Hawaii Range Complex (Naval Defense Sea Area, Puuloa Underwater Range, Kaneohe Bay)

A.1.8.2 Gunnery Exercise Ship-to-Shore

Expeditionary Warfare	
Gunnery Exercise Ship-to-Shore	
Short Description	Small boat crews fire small- and medium-caliber guns at land-based targets.
Long Description	Personnel conduct training in open ocean and littoral operations, including in the vicinity of SCI. Training events include firing of crew-served machine guns and hand held weapons into land impact areas of SHOBA. The boats used by these units include small unit river craft, combat rubber raiding craft, rigid hull inflatable boats, patrol craft, and many other versions of these types of boats.
Typical Components	**Platforms:** Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Projectile - Small Caliber, Projectile - Medium Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Impacts on land-based targets is covered in separate NEPA.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SHOBA)

A.1.8.3 Obstacle Loading

Expeditionary Warfare	
Obstacle Loading	
Short Description	Military personnel use explosive charges to destroy barriers or obstacles to amphibious vehicle access to beach areas.
Long Description	Navy personnel train to construct, place, and safely detonate multiple charges laid in a pattern for underwater obstacle clearance. Explosive Ordnance Disposal and other expeditionary personnel locate barriers or obstacles designed to block amphibious vehicle access to beach areas, then use explosive charges to destroy them. Obstacle Clearance and Mat Weave may use between 350-500 lb. charges. Time delay fuses may be used for these events.
Typical Components	**Platforms:** Small Boat **Targets:** Metal Plates, Sub-surface Targets – Stationary, Bottom-Placed Targets **Systems being Trained/Tested:** None **Munitions:** Demolition Devices
Active Sonar	No
In-Water Explosives	E2, E6, E10
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Explosive underwater demolition multiple charge – mat weave and obstacle loading
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (TAR2, TAR3)
	Hawaii Range Complex (Barbers Point Underwater Range, Ewa Training Minefield, Puuloa Underwater Range, Lima Landing Pearl Peninsula [Victor One])

A.1.8.4 Personnel Insertion/Extraction – Air

Expeditionary Warfare	
Personnel Insertion/Extraction – Air	
Short Description	Personnel are inserted into and extracted from an objective area by fixed-wing aircraft or helicopters.
Long Description	Personnel are inserted into a water objective via fixed-wing aircraft using parachutes or by helicopters via ropes or jumping into the water. They will conduct an infiltration to an objective (harbor, beach, moored vessel, etc.) and conduct a variety of tasks. The insertion/extraction activities are confined to in-water training. Upon completion of training objectives, personnel are extracted by helicopters or small boats. Small scale explosive charges may be utilized.
Typical Components	**Platforms:** Fixed Wing - Cargo and Transport Aircraft, Rotary-Wing Aircraft, Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Small scale munitions
Active Sonar	No
In-Water Explosives	E1
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	SSTC (Boat Lanes – North and South)
	Hawaii Range Complex

A.1.8.5 Personnel Insertion/Extraction – Surface and Subsurface

Expeditionary Warfare	
Personnel Insertion/Extraction – Surface and Subsurface	
Short Description	Personnel are inserted into and extracted from an objective area by small boats or subsurface platforms.
Long Description	Utilizing both surface and subsurface platforms, personnel are inserted in the water. They will conduct an infiltration to an objective (harbor, beach, moored vessel, etc.) and conduct a variety of tasks. Underwater platforms and small, manned submersibles are used to simulate deploying from and recovering to a submarine. The insertion/extraction activities are confined to in-water training.
Typical Components	**Platforms:** Small Boat **Targets:** Air Targets - Drone, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Small-scale munitions
Active Sonar	No
In-Water Explosives	E1
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Events are typically conducted in waters near land.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SSTC (Boat Lanes – North and South)
	SOCAL
	Hawaii Range Complex

A.1.8.6 Personnel Insertion/Extraction – Swimmer/Diver

Expeditionary Warfare	
Personnel Insertion/Extraction – Swimmer/Diver	
Short Description	Divers and swimmer infiltrate harbors, beaches, or moored vessels and conduct a variety of tasks.
Long Description	Divers and swimmer infiltrate harbors, beaches, or moored vessels and conduct a variety of tasks. Activity may include Navy personnel learning advanced self-contained underwater breathing apparatus (SCUBA) diving to include tactics, techniques, and procedures and emergency procedures. Small boats are used for safety.
Typical Components	**Platforms:** Small Boat **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Grenades
Active Sonar	No
In-Water Explosives	E1
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SSTC (Boat Lanes – North and South)
	SOCAL (Del Mar Boat Basin)
	Hawaii Range Complex

A.1.8.7 Port Damage Repair

Other Training Activities	
Port Damage Repair	
Short Description	Navy Expeditionary forces train to repair critical port facilities.
Long Description	Navy Expeditionary Forces support Fleet mission through expedient repair of critical port facilities. Training includes diving operations, pile driving and removal, salvage operations, and repairs to piers, quay walls, and other waterfront infrastructure. Training events normally last up to 30 days.
Typical Components	**Platforms:** Structure **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Pile driving and pile removal
Parameters for Analysis	Port Damage Repair training activities could occur up to 12 times per year. Each training event is comprised of up to seven separate modules, each which could occur up to three iterations during a single event (for a maximum of 21 modules). Training events would last a total of 30 days, of which pile driving is only anticipated to occur for a maximum of 14 days. Per training event, piles of various shapes, sizes and materials would be installed using impact or vibratory methods. Crews could work 24 hours a day for each event. All piles or sheets would be removed after the training event using vibratory or dead pull methods. During pile driving events, the Action Proponent performs soft starts during impact installation of each pile to ensure proper operation of the diesel impact hammer. During a soft start, the Action Proponent performs an initial set of strikes from the impact hammer at reduced energy before it can be operated at full power and speed. The energy reduction of an individual hammer cannot be quantified because it varies by individual driver.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	Port Hueneme Harbor

A.1.8.8 Small Boat Attack

Expeditionary Warfare	
Small Boat Attack	
Short Description	Afloat units defend against small boat or personal water craft attack.
Long Description	For this activity, one or two small boats or personal watercraft conduct attack activities on units afloat, training ship crews how to respond to small boat attack in harbors, restricted channels, and nearshore areas using non-lethal means or armament appropriate to the threat and location.
Typical Components	**Platforms:** All Navy Ships and Boats, Small Boat, Unmanned Surface Vehicle **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Small Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Non-explosive gunnery
Parameters for Analysis	Non-explosive practice munitions only
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.8.9 Underwater Construction Team Training

Expeditionary Warfare	
Underwater Construction Team Training	
Short Description	Navy and Coast Guard divers conduct underwater repair and construction.
Long Description	Navy and Coast Guard divers will perform cutting, welding, assembly, and installation of deep-water structures, mooring systems, underwater instrumentation, and other systems as needed.
Typical Components	**Platforms:** Small Boat, Unmanned Bottom Crawler **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	Port Hueneme Harbor
	Naval Base San Diego
	Hawaii Range Complex (Naval Defense Sea Area, Puuloa Underwater Range, Kaneohe Bay, Pearl Harbor)

A.1.9 Mine Warfare

The mission of mine warfare is to detect, classify, and avoid or neutralize (disable) mines to protect Navy ships and submarines and to maintain free access to ports and shipping lanes. Mine warfare also includes offensive mine laying to gain control of or deny the enemy access to sea space. Naval mines can be laid by ships, submarines, or aircraft.

Mine warfare neutralization training includes exercises in which ships, aircraft, submarines, underwater vehicles, unmanned vehicles, or marine mammal detection systems search for mine shapes. Personnel train to destroy or disable mines by attaching underwater explosives to or near the mine or using remotely operated vehicles to destroy the mine.

A.1.9.1 Airborne Mine Countermeasure – Mine Detection

Mine Warfare	
Airborne Mine Countermeasure - Mine Detection	
Short Description	Helicopter aircrews detect mines using laser mine detection systems.
Long Description	Helicopter aircrews use airborne devices to detect, locate, and classify potential mines. Airborne devices utilize laser systems to locate mines located below the surface. Devices used include the Airborne Laser Mine Detection System (ALMDS), developed to detect and classify floating and near-surface, moored mines.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Laser Detection Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Airborne laser systems used to detect mine shapes. Laser systems are similar to commercial Light Detection And Ranging systems. The in-air low energy laser stressor was used in analysis of potential impacts on human resources. Mine shapes may be deployed via ship and will be recovered.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (, Tanner/Cortes Training Minefield, Pyramid Cove Mine Training Range,)
	SSTC (Airborne Mine Countermeasure [AMCM] Training Range, Imperial Beach Mine Training Range)
	Hawaii Range Complex (Barbers Point Underwater Range, Barbers Point Harbor to Lighthouse, , , Waiapuaa Bay PMRF Training Area)

A.1.9.2 Airborne Mine Laying

Mine Warfare	
Airborne Mine Laying	
Short Description	Fixed-wing aircraft drop non-explosive mine shapes.
Long Description	Fixed-winged aircraft lay offensive or defensive mines for a tactical advantage for friendly forces. Fixed-winged aircraft lay a precise minefield pattern for specific tactical situations. Training shapes are non-explosive.
Typical Components	**Platforms:** Fixed Wing - Other, Fixed Wing - Strike Aircraft, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Mine Warfare Devices **Munitions:** Mines
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Non-explosive aerial-deployed mines and bombs
Parameters for Analysis	Mine laying is similar to a non-explosive bombing exercise. These events primarily occur during major training exercises. Mine laying will typically take place in waters less than 100 feet in depth. Assume 12 mine shapes are used per event.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.1.9.3 Amphibious Breaching Operations

Mine Warfare	
Amphibious Breaching Operations	
Short Description	Amphibious forces use explosive clearing systems to clear simulated mines on beaches, shallow water, and surf zones for potential landing of personnel and vehicles.
Long Description	Trains amphibious forces to create lanes in simulated enemy obstacle systems to allow maneuver forces freedom of movement. Includes use of explosive clearing systems to breach simulated minefields on beaches, shallow water, and surf zones for potential landing of personnel and vehicles. Systems include, but are not limited to, Mine Line Clearing Charges (MICLIC) and similar. Anticipated tempo similar to Amphibious Assault-Battalion Landing activity.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Small Boat, Unmanned Bottom Crawler, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Stationary **Systems being Trained/Tested:** None **Munitions:** Demolition Devices
Active Sonar	No
In-Water Explosives	E4, E5, E6
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive mine countermeasure and neutralization (no divers)
Parameters for Analysis	MICLIC and other breaching activities conducted at Pyramid Cove and Horse Beach Cove may rely on multiple charges during an event.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (CPAAA, Pyramid Cove, Horse Beach Cove, SHOBA, TAR 2, TAR 3)
	SSTC (Boat Lanes – North and South)
	Hawaii Range Complex (Barbers Point Underwater Range, Ewa Training Minefield, Puuloa Underwater Range, Lima Landing, Pearl Peninsula [Victor One])

A.1.9.4 Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercise

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.
Long Description	Naval forces provide mine warfare capabilities to support Department of Homeland Security sponsored exercises. The three pillars of mine warfare, airborne (helicopter), surface (surface ships and unmanned surface vehicles), and undersea (divers, marine mammals, and unmanned vehicles) mine countermeasures will be brought to bear in order to ensure strategic U.S. ports remain free of mine threats. Various mine warfare sensors, which utilize active acoustics, will be employed in the detection, classification, and neutralization of mines. Along with traditional mine warfare techniques, such as helicopter towed mine countermeasures, new technologies (unmanned vehicles) will be utilized. Marine mammal systems may be used during this exercise. Exercise locations and scenarios will vary according to Department of Homeland Security strategic goals and evolving world events. Coast Guard cutters, small boats, and aircraft may participate in this activity.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Small Boat, Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Acoustic Communications, Electromagnetic Systems, Sonar Systems - Mine Warfare, Unmanned Vehicle Systems **Munitions:** Mine Warfare Devices
Active Sonar	MFH, HFM, HFH
In-Water Explosives	E4
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles Explosive mine neutralization (with divers) Explosive mine countermeasure and neutralization (no divers)
Parameters for Analysis	Non-permanent bottom or in-volume mine shapes will be placed and then recovered at the completion of the training. They will be recovered using normal assets, with diver involvement. In addition to mine shapes detection using lasers, mine neutralization or mine countermeasures may be employed. Explosives may be used if required for scheduled mine neutralization events and will be limited to areas authorized for underwater detonations.

	Phase IV Requirement 2025-2032
Location (typical specific location where applicable)	Port Hueneme Harbor, Los Angeles, Long Beach
	San Diego Harbor (Naval Base San Diego, Naval Base Coronado, Naval Base Point Loma)
	Seal Beach
	Hawaii Range Complex (Naval Defense Sea Area, Kaneohe Bay, Honolulu Harbor, Pearl Harbor)

A.1.9.5 Mine Countermeasure Exercise – Ship Sonar

Mine Warfare	
Mine Countermeasures – Ship Sonar	
Short Description	Ship crews detect and avoid mines while navigating restricted areas or channels using remotely operated active sonar systems.
Long Description	Ship crews use unmanned surface vehicles and remotely operated vehicles to tow mine detection (hunting) equipment to detect and avoid mines while navigating restricted areas or channels. These active sonar systems will operate from a shallow zone to deep water. Exercises could be embedded within major training exercises.
Typical Components	**Platforms:** Surface Combatant, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted, Sonar Systems - Mine Warfare **Munitions:** None
Active Sonar	MF1K, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles Towed in-water devices
Parameters for Analysis	Assume system will be operated in areas free of obstructions, and will be towed well above the seafloor. Towed system will be operated in a manner to avoid entanglement and damage. Events will take place in water depths 40 ft. and greater. Existing placed mine shapes to be used. There is the potential for temporary placement of mine shapes.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (Tanner/Cortes Training Minefield, Pyramid Cove Mine Training Range, AMCM Training Range)
	SSTC (Imperial Beach Mine Training Range)
	Hawaii Range Complex (Naval Defense Sea Area, Barbers Point Underwater Range, Ewa Training Minefield, Puuloa Underwater Range, Kingfisher, Kalohi Channel, Pailolo Channel, Maui Basin, Alalakeiki Channel)

A.1.9.6 Mine Countermeasures – Mine Neutralization – Remotely Operated Vehicle Operations

Mine Warfare	
Mine Countermeasures – Mine Neutralization – Remotely Operated Vehicle Operations	
Short Description	Ship, small boat, and helicopter crews locate and disable mines using remotely operated underwater vehicles.
Long Description	Ship, small boat, and helicopter crews utilize remotely operated vehicles to neutralize potential mines. Remotely operated vehicles will use sonar and optical systems to locate and target mine shapes. Explosive mine neutralizers may be used during live fire events.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Sonar Systems - Mine Warfare **Munitions:** Mine Warfare Devices
Active Sonar	HFM
In-Water Explosives	E4
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Explosive mine countermeasure and neutralization (no divers) Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Tanner/Cortes Training Minefield, Pyramid Cove Mine Training Range, Mine Training Range – 1 and 2)
	SSTC (Boat Lanes – North and South, AMCM Training Range, Imperial Beach Mine Training Range, Echo)
	Hawaii Range Complex (Kalohi Channel, Pailolo Channel, Maui Basin, Alalakeiki Channel, Kahoolawe Sub Training Minefield, Barbers Point Underwater Range, Barbers Point Harbor to Lighthouse, Marine Corps Training Area Bellows, Ewa Training Minefield, Naval Defense Sea Area, Puuloa Underwater Range, Kaneohe Bay, Kingfisher, Waiapuaa Bay, PMRF Training Area)

A.1.9.7 Mine Neutralization Explosive Ordnance Disposal

Mine Warfare	
Mine Neutralization Explosive Ordnance Disposal	
Short Description	Personnel disable threat mines using explosive charges.
Long Description	Navy divers, typically explosive ordnance disposal personnel, disable threat mines with explosive charges to create a safe channel for friendly vessels to transit or placing or detonating limpet mines on steel structures. Time-delay fuses may be used for these exercises. These operations are normally conducted during daylight hours for safety reasons. Personnel detect, identify, evaluate, and neutralize mines in the water with an explosive device and may involve detonation of one or more explosive charges up to 20 pounds NEW. Personnel may also identify and place limpet charges on a steel structure in the water and detonate an explosive charge of up to 2.2 pounds NEW.
Typical Components	**Platforms:** Small Boat, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** None **Munitions:** Demolition Devices
Active Sonar	No
In-Water Explosives	E6
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive mine neutralization (with divers)
Parameters for Analysis	Time delayed fuses may be used (up to 10 minutes) for charges up to 20 lb. net explosive weight in some locations. Charge placed anywhere in water column, including bottom. Some mine shapes will be recovered.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Pyramid Cove Mine Training Range, TAR 2, TAR 3)
	SSTC (Boat Lanes – North and South, Echo, AMCM Training Range, Imperial Beach Mine Training Range)
	Hawaii Range Complex (Barbers Point Underwater Range, Ewa Training Minefield, Puuloa Underwater Range, Lima Landing, Pearl Peninsula [Victor One])

A.1.9.8 Submarine Mine Avoidance Exercise

Mine Warfare	
Submarine Mine Avoidance Exercise	
Short Description	Submarine crews practice detecting mines in a designated area.
Long Description	Submarine crews use active sonar to detect and avoid mines or other underwater hazardous objects, while navigating restricted areas or channels, such as while entering or leaving port. This event trains submarine crews to detect and avoid mines. Training utilizes simulated minefields constructed of moored or bottom mines, or instrumented mines that can record effectiveness of mine detection efforts. In a typical training exercise, submarine crews will use high-frequency sonar to locate and avoid the mine shapes. Each mine avoidance exercise involves one submarine operating the high-frequency sonar for 6 hours to navigate through the training minefield.
Typical Components	**Platforms:** Submarine, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Sonar Systems - Hull Mounted, Sonobuoys, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	HFH, VHFH, Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Tanner/Cortes Training Minefield, Pyramid Cove Mine Training Range)
	Hawaii Range Complex (Kalohi Channel, Pailolo Channel, Maui Basin, Alalakeiki Channel, Kahoolawe Sub Training Minefield)

A.1.9.9 Submarine Mobile Mine and Mine Laying Exercise

Mine Warfare	
Submarine Mobile Mine and Mine Laying Exercise	
Short Description	Submarine crews practice deploying submarine launched mines.
Long Description	The submarine launched mine exercise submarine involves a submarine deploying mines. During this event, passive sonar is used almost exclusively, active sonar use is restricted because it would reveal the submarines presence. This exercise typically involves only a single submarine. Mine laying exercises may have a range support craft or a support helicopter to recover mines.
Typical Components	**Platforms:** Extra Large Unmanned Underwater Vehicle, Submarine, Unmanned Surface Vehicle **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Unmanned Vehicle Systems **Munitions:** Mines (Non-Explosive)
Active Sonar	MFM, HFL, HFM, VHFL
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL (Tanner/Cortes Training Minefield, Pyramid Cove Mine Training Range, Mine Training Range – 1 and 2)
	Hawaii Range Complex (Kalohi Channel, Pailolo Channel, Maui Basin, Alalakeiki Channel, Kahoolawe Sub Training Minefield)

A.1.9.10 Surface Ship Object Detection

Mine Warfare	
Surface Ship Object Detection	
Short Description	Cruiser and Destroyer crews detect and avoid mines while navigating restricted areas or channels using hull-mounted active sonar.
Long Description	Cruiser and Destroyer crews use the ship's hull-mounted sonar to detect and avoid mines or other underwater hazardous objects while navigating restricted areas or channels. These systems will operate from a shallow zone greater than 40 ft. to deep water. Exercises could be embedded within major training exercises.
Typical Components	**Platforms:** Surface Combatant **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None
Active Sonar	MF1K
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	Events will take place in water depths 40 ft. and greater. Existing placed mine shapes to be used. There is the potential for temporary placement of mine shapes.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (Tanner/Cortes Training Minefield, Pyramid Cove Mine Training Range)
	SSTC (Imperial Beach Mine Training Range)
	Hawaii Range Complex (Naval Defense Sea Area, Pearl Harbor)

A.1.9.11 Training and End-to-End Mission Capability Verification – Mobile Mine and Mine Laying Exercise

Mine Warfare	
Training and End-to-End Mission Capability Verification – Mobile Mine and Mine Laying Exercise	
Short Description	Submarine crew launches mobile mine(s) to a planned location.
Long Description	Submarine crew launches mobile mine(s) to a planned location. The mine(s) are subsequently recovered by an external source. Active sonar is used periodically. This exercise typically would involve only a single submarine, UUV, or surface craft.
Typical Components	**Platforms:** Submarine, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL (Tanner/Cortes Training Minefield, Pyramid Cove Mine Training Range, Mine Training Range – 1 and 2)
	Hawaii Range Complex (Kalohi Channel, Pailolo Channel, Maui Basin, Alalakeiki Channel, Kahoolawe Sub Training Minefield)

A.1.9.12 Underwater Demolition Qualification and Certification

Mine Warfare	
Underwater Demolition Qualification and Certification	
Short Description	Navy divers conduct various levels of training and certification in placing underwater demolition charges.
Long Description	Demolition requalification and training provides teams with experience in underwater detonations by conducting detonations on metal plates near the shoreline. At water depths less than 100 ft, single or sequential charges (less than 25 lb.) are placed on, or near the seafloor.
Typical Components	**Platforms:** Small Boat, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Metal Plates **Systems being Trained/Tested:** None **Munitions:** Demolition Devices
Active Sonar	No
In-Water Explosives	E5, E6
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive mine neutralization (with divers)
Parameters for Analysis	Only small charges are used within the Bayside area of SSTC.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Pyramid Cove Mine Training Range, TAR 2, TAR 3)
	SSTC (Boat Lanes – North and South, AMCM Training Range, Imperial Beach Mine Training Range)
	Hawaii Range Complex (Barbers Point Underwater Range, Ewa Training Minefield, Puuloa Underwater Range, Lima Landing, Pearl Peninsula [Victor One])

A.1.9.13 Underwater Demolition Multiple Charge – Large Area Clearance

Mine Warfare	
Underwater Demolitions Multiple Charge – Large Area Clearance	
Short Description	Military personnel use explosive charges to destroy barriers or obstacles to amphibious vehicle access to beach areas.
Long Description	Navy personnel train to construct, place, and safely detonate multiple charges laid in a pattern for underwater obstacle clearance. Navy divers locate barriers or obstacles designed to block amphibious vehicle access to beach areas, then use explosive charges to destroy them. Pattern charges (mat weaves) may use as much as 650 pounds of high explosive. Time delay fuses are used for these events.
Typical Components	**Platforms:** Small Boat, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Demolition Devices
Active Sonar	No
In-Water Explosives	E13
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive underwater demolition multiple charge – mat weave and obstacle loading
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (SCI)

A.1.9.14 Underwater Mine Countermeasure Raise, Tow, Beach, and Exploitation

Mine Warfare	
Underwater Mine Countermeasure Raise, Tow, and Beach, and Exploitation	
Short Description	Personnel locate mines, perform mine neutralization, raise and tow mines to the beach, and conduct exploitation operations for intelligence gathering.
Long Description	Navy divers, typically explosive ordnance disposal personnel, locate mines using unmanned underwater vehicle, marine mammals, or other diver search techniques. Mines are then neutralized, or prevented from working as they are intended. A lift balloon is attached to the line and slowly tows the shape to the beach. The final step, exploitation, is intelligence gathering, identifying the mine and how it works, and then disassembling it or disposing of it.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Small Boat, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SSTC (Boat Lanes – North and South)
	SOCAL (ARPA Training Minefield, SCI)
	Hawaii Range Complex (Barbers Point Underwater Range, Marine Corps Training Area Bellows, Ewa Training Minefield, Naval Defense Sea Area, Puuloa Underwater Range, Kaneohe Bay, PMRF Training Area, Waiapuaa Bay and Beach)

A.1.10 Surface Warfare Training

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

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

A.1.10.1 Bombing Exercise Air-to-Surface

Surface Warfare	
Bombing Exercise Air-to- Surface	
Short Description	Fixed-wing aircrews and UASs deliver bombs against surface targets.
Long Description	Fixed-wing aircraft conduct bombing exercises against stationary floating targets (e.g., MK-58 smoke buoy), towed targets, or maneuvering targets. An aircraft clears the area, deploys a smoke buoy, and then delivers high-explosive or non-explosive practice bombs on the target. Exercises for strike fighters typically involve a flight of two aircraft delivering unguided or guided munitions that may be either high-explosive or non-explosive. The following munitions may be employed by strike fighter aircraft in the course of bombing exercise: Unguided munitions including non-explosive subscale bombs (MK-76 and BDU-45) and explosive and non-explosive general purpose bombs (MK-80 series). Precision-guided munitions include laser-guided bombs (explosive, non-explosive), laser-guided training projectiles (non-explosive), Joint Direct Attack Munitions (explosive, non-explosive).
Typical Components	**Platforms:** Fixed Wing - Strike Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Bombs
Active Sonar	No
In-Water Explosives	E9, E10, E12
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Non-explosive aerial-deployed mines and bombs Explosive bombs
Parameters for Analysis	Approximately 90 percent of non-explosive bombs are the sub-scale bombs such as the MK-76 and BDU-48. Approximately 155 explosive bombs used per year throughout HCTT Study Area. Approximately half of the explosive bombs (80) would be 500-lb. bombs, 60 would be 1,000-lb. bombs, and 15 would be 2,000-lb. bombs. Live bombs will not be used in NOCAL.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.10.2 Gunnery Exercise Air-to-Surface – Medium Caliber

Surface Warfare	
Gunnery Exercise Air-to-Surface Medium Caliber	
Short Description	Fixed-wing and helicopter aircrews fire medium-caliber guns at surface targets.
Long Description	Navy, Marine Corps, and Coast Guard fixed-wing and helicopter aircrews engage surface targets with medium-caliber guns. Targets simulate enemy ships, boats, and floating/near- surface mines. Fighter aircraft descend on a target firing high-explosive or non-explosive practice munitions medium-caliber projectiles. Helicopters will fly a racetrack pattern around an at-sea target. Aircrew will engage the target with medium-caliber weapons. Targets range from a smoke float, or an empty steel drum, to high speed remote controlled boats and jet-skis.
Typical Components	**Platforms:** Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Medium Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Non-explosive gunnery Unmanned vehicles
Parameters for Analysis	Most medium-caliber air-to-surface gunnery exercises will be with non-explosive projectiles. High-explosive projectiles will supplement when non-explosive projectiles are not available. Fixed-wing casings remain with aircraft, and helicopter shell casings are expended into the water. Two fixed-wing aircraft (400 projectiles each) or one helicopter (400 projectiles) per activity. One target used per event: expendable smoke float (50 percent), stationary target (45 percent), or remote-controlled target (5 percent). High-explosive projectiles used during this activity would be de minimis.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.10.3 Gunnery Exercise Air-to-Surface – Small Caliber

Surface Warfare	
Gunnery Exercise Air-to-Surface Small Caliber	
Short Description	Helicopter and tiltrotor aircrews, use small-caliber guns to engage surface targets.
Long Description	Helicopters and tiltrotor aircraft, fly a racetrack pattern around an at-sea target. Targets simulate enemy ships, boats, and floating/near-surface mines. Each gunner will engage the target with small-caliber weapons. Targets range from a smoke float, an empty steel drum, to high speed remote controlled boats and jet-skis.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Small Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Non-explosive gunnery
Parameters for Analysis	Most events will occur proximate to naval stations where MH-60 helicopters are home based and target services are available.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.10.4 Gunnery Exercise Surface-to-Surface Boat – Medium Caliber

Surface Warfare	
Gunnery Exercise Surface-to-Surface Boat Medium Caliber	
Short Description	Small boat crews fire medium-caliber guns at surface targets.
Long Description	Army, Navy, and Coast Guard small boat crews fire medium-caliber guns at surface targets. Boat crews may use high or low speeds to approach and engage targets simulating other boats, floating mines, or nearshore land targets with medium-caliber (up to and including 40 mm) weapons. A commonly used target is an empty steel drum. A number of different types of boats are used depending on the unit using the boat and their mission. The boats used by these units include small unit river craft, combat rubber raiding craft, rigid-hull inflatable boats, patrol craft, and many other versions of these types of boats.
Typical Components	**Platforms:** Small Boat **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Grenades, Projectile - Medium Caliber
Active Sonar	No
In-Water Explosives	E1
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive gunnery Non-explosive gunnery Towed in-water devices
Parameters for Analysis	Assume all events include the use of some explosive projectiles. Most events will involve boat crews training with MK 203 40 mm grenade launcher. Most events will occur proximate to naval stations. One target used per event, typically a stationary target such as a 50-liter steel drum. The boats used in this activity have inboard or outboard diesel or gasoline engines with either propeller or water jet propulsion.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.10.5 Gunnery Exercise Surface-to-Surface Boat – Small Caliber

Surface Warfare	
Gunnery Exercise Surface-to-Surface Boat Small Caliber	
Short Description	Small boat crews fire small-caliber guns at surface targets.
Long Description	Army, Navy, and Coast Guard small boat crews fire small-caliber guns at surface targets. Boat crews may use high or low speeds to approach and engage targets simulating other boats, swimmers, floating mines, or nearshore land targets with small-caliber (up to and including 0.50 caliber) weapons. A commonly used target is an empty steel drum.
Typical Components	**Platforms:** Small Boat **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Small Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Non-explosive gunnery Towed in-water devices
Parameters for Analysis	The majority of events will occur proximate to naval stations. Events will occur relatively nearshore due to short range of boats and safety concerns. Events mostly occur within 3 nautical miles of the shoreline, but can occur further from shore.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	SSTC (Boat Lanes – North and South)
	Hawaii Range Complex

A.1.10.6 Gunnery Exercise Surface-to-Surface Ship – Large Caliber

Surface Warfare	
Gunnery Exercise Surface-to-Surface Ship Large Caliber	
Short Description	Surface ship crews fire large-caliber guns at surface targets.
Long Description	Navy and Coast Guard gun crews engage surface targets at sea with their main battery large-caliber (typically 57 mm, 76 mm, and 5-inch) guns. Targets include the QST-35 seaborne powered target, high speed maneuverable surface target, or a specially configured remote controlled watercraft. Some targets are expended during the exercise and are not recovered. The exercise proceeds with the target boat approaching from about 10-NM distance. The target is tracked by radar and when within a predetermined range, it is engaged first with large-caliber "warning shots." As threats get closer all weapons may be used to disable the threat. This exercise may involve a single firing ship, or be undertaken in the context of a coordinated larger exercise involving multiple ships, including a major training exercise. Large-caliber guns will also be fired during weapon certification events and in conjunction with weapon maintenance. During all exercises, either high-explosive or non-explosive projectiles may be used. High-explosive projectiles can either be fused for detonation on impact (with water surface or targets), or for proximity to the target (in air detonation).
Typical Components	**Platforms:** Surface Combatant, Cutter **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Large Caliber
Active Sonar	No
In-Water Explosives	E3, E5
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive gunnery Non-explosive gunnery Towed in-water devices Weapon firing noise
Parameters for Analysis	Activity always occurs beyond 3 nautical miles of the shoreline. For analytical purposes assume all high explosive projectiles are fused to detonate upon impact with water surface or target. After impacting the water, the high explosive projectiles are expected to detonate within three feet of the surface.

	Phase IV Requirement 2025-2032
Location (typical specific location where applicable)	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex
	Transit Corridor

A.1.10.7 Gunnery Exercise Surface-to-Surface Ship – Medium Caliber

Surface Warfare	
Gunnery Exercise Surface-to-Surface Ship Medium Caliber	
Short Description	Surface ship crews fire medium-caliber guns at surface targets.
Long Description	Navy and Coast Guard crews fire medium-caliber guns at surface targets. Ships use medium-caliber weapons to practice defensive marksmanship, typically against a stationary floating target (a 10 ft. diameter red balloon [Killer Tomato]) and high-speed mobile targets. Some targets are expended during the exercise and are not recovered. Shipboard protection systems (Close-In Weapon System) utilizing medium-caliber projectiles would train against high speed mobile targets.
Typical Components	**Platforms:** Surface Combatant, Cutter **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Medium Caliber
Active Sonar	No
In-Water Explosives	E1
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Non-explosive gunnery Explosive gunnery Towed in-water devices
Parameters for Analysis	One target used per event. Approximately 50 percent of targets are “Killer Tomatoes”. Approximately 35 percent are high-speed maneuvering targets, which are recovered. Approximately 15 percent of targets are other stationary targets such as a steel drum.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	PMSR
	NOCAL
	Hawaii Range Complex
	Transit Corridor

A.1.10.8 Gunnery Exercise Surface-to-Surface Ship – Small Caliber

Surface Warfare	
Gunnery Exercise Surface-to-Surface Ship Small Caliber	
Short Description	Surface ship crews fire small-caliber guns at surface targets.
Long Description	Navy and Coast Guard ship crews fire small-caliber guns at surface targets. Ships use small-caliber weapons to practice defensive marksmanship, typically against stationary floating targets. The target may be a 10 ft. diameter red balloon (Killer Tomato, see Figure A.2 4), a 50 gallon steel drum, or other available target, such as a cardboard box. Some targets are expended during the exercise and are not recovered. Ship crew qualifications conducted at sea employ stationary targets on deck. Small-caliber projectiles fired during these exercises will be expended in the water. Shipboard protection systems utilizing small-caliber projectiles will train against high speed mobile targets.
Typical Components	**Platforms:** Surface Combatant, Cutter **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** None **Munitions:** Projectile - Small Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Non-explosive gunnery Towed in-water devices
Parameters for Analysis	Small-caliber gun projectiles per event: 1,000 to 3,000 non-explosive practice munitions.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	PMSR
	NOCAL
	Hawaii Range Complex
	Transit Corridor

A.1.10.9 Laser Targeting – Aircraft

Surface Warfare	
Laser Targeting – Aircraft	
Short Description	Fixed-wing and helicopter aircrews illuminate enemy targets with lasers.
Long Description	Fixed-winged and helicopter aircrew illuminate enemy targets with lasers for engagement by aircraft with laser guided bombs or missiles. This exercise may be conducted alone or in conjunction with other exercises utilizing precision guided munitions, such as surface missiles and guided rockets. Exercises where weapons are fired are addressed in the appropriate activity (e.g., air-to-surface missile exercise). Lower powered lasers may also be used as non-lethal deterrents during maritime security operations (force protection).
Typical Components	**Platforms:** Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft **Targets:** Surface Targets - Towed **Systems being Trained/Tested:** Aircraft Laser Illuminator **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Towed in-water devices
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.10.10 High-Energy Laser Exercise Surface-to-Surface

Surface Warfare	
High-Energy Laser Exercise Surface-to-Surface	
Short Description	Surface ship crews disable or destroy surface targets with high-energy laser systems.
Long Description	Ship crews employ high-power energy laser systems that are used to create critical failures in surface targets. System directs a directed energy beam that can penetrate thin layers of metal at short distances that can render surface targets inoperative. Laser systems can also be used in a low power setting as non-lethal deterrent during maritime security operations (force protection). The low power capability would not be used against manned platforms during training.
Typical Components	**Platforms:** Surface Combatant **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** High-Energy Laser Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Towed in-water devices
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.10.11 Maritime Security Operations

Surface Warfare	
Maritime Security Operations	
Short Description	Helicopter, surface ship, and small boat crews conduct a suite of maritime security operations at sea, to include visit, board, search and seizure; maritime interdiction operations; force protection; and anti-piracy operations.
Long Description	Navy and Coast Guard helicopter and surface ship crews conduct a suite of maritime security operations (e.g., visit, board, search and seizure, maritime interdiction operations, force protection, and anti-piracy operations). These activities involve training of boarding parties delivered by helicopters and surface ships to surface vessels for the purpose of simulating vessel search and seizure operations. Various training scenarios are employed and may include small arms with non-explosive blanks and surveillance or reconnaissance unmanned surface and aerial vehicles. The entire exercise may last two to three hours. Vessel Visit, Board, Search, and Seizure: Military personnel from ships and aircraft board suspect vessels, potentially under hostile conditions. Maritime Interdiction Operations: Ships and aircraft train in pursuing, intercepting, and ultimately detaining suspect vessels. Maritime Infrastructure Protection and Harbor Defense: Naval personnel train to defend oil platforms, similar at sea structures, harbors, piers, and other infrastructure. Warning Shot/Disabling Fire: Naval personnel train in the use of weapons to force fleeing or threatening small boats (typically operating at high speeds) to come to a stop. Ship Force Protection: Ship crews train in tracking multiple approaching, circling small craft, assessing threat potential, and communicating amongst crewmates and other vessels to ensure ships are protected against attack. Anti-Piracy Training: Naval personnel train in deterring and interrupting piracy activity. Training includes large vessels (pirate “mother ships”), and multiple small, maneuverable, and fast craft.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Rotary-Wing Aircraft, Small Boat, Surface Combatant, Cutter **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels

	Non-explosive gunnery Unmanned vehicles
Parameters for Analysis	Maritime Security Operations is a broad term used to describe activities intended train naval forces in the skills necessary to protect naval vessels from small boat attack, counter piracy and drug operations (maritime interdiction operations and visit, board, search, and seizure), and protect key infrastructure (e.g., oil platforms). Maritime security operations need to remain broad as naval forces need to be able to tailor training events to respond to emergent threats. Maritime Security Operations events typically do not involve live fire of weapons. All maritime security operations events involve vessel movement, sometimes at high rates of speed (naval vessels maneuvering to overtake suspect vessel or small boats (targets) closing in and maneuvering around naval vessels), and some events involve helicopters and boarding parties. Maritime security operations training events are conducted proximate to homeports (e.g., San Diego, California and Honolulu, Hawaii) including during times of transit in and out of port, as well as during major training exercises.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.10.12 Missile Exercise Air-to-Surface

Surface Warfare	
Missile Exercise Air-to-Surface	
Short Description	Fixed-wing and helicopter aircrews and UASs fire air-to-surface missiles at surface targets.
Long Description	Fighter, maritime patrol aircraft, and helicopter aircrews fire precision-guided missiles against surface targets. Aircraft involved may be unmanned. Fixed-wing aircraft (fighters or maritime patrol aircraft) approach an at-sea surface target from high altitude, and launch high-explosive precision guided missiles. Helicopters designate at-sea surface targets with a laser or optics for a precision guided high-explosive or non-explosive practice munitions missile. Helicopter launched missiles typically pass through the target's "sail," and, if explosive, detonate at or just below, the water's surface.
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Fixed Wing - Strike Aircraft, Rotary-Wing Aircraft, Unmanned Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Towed **Systems being Trained/Tested:** None **Munitions:** Air-to-Surface Missiles
Active Sonar	No
In-Water Explosives	E6, E7, E8, E9
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Explosive missiles and rockets Non-explosive missiles and rocket Towed in-water devices
Parameters for Analysis	Assume one missile and one target per event. While missiles could explode above the water's surface after contacting targets, analysis assumes all warheads explode at or just below the water's surface.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	PMSR
	Hawaii Range Complex

A.1.10.13 Missile Exercise Air-to-Surface Rocket

Surface Warfare	
Missile Exercise Air-to-Surface Rocket	
Short Description	Helicopter aircrews fire both precision-guided and unguided rockets at surface targets.
Long Description	Helicopters designate an at-sea surface target with a laser or optics for precision-guided high explosive or non-explosive practice munitions rockets.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Rockets
Active Sonar	No
In-Water Explosives	E3
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Explosive missiles and rockets Non-explosive missiles and rockets
Parameters for Analysis	Assume all explosive rockets detonate in water. Rockets may be used in conjunction with force protection events.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	PMSR
	Hawaii Range Complex

A.1.10.14 Missile Exercise Surface-to-Surface

Surface Warfare	
Missile Exercise Surface-to-Surface	
Short Description	Surface ship crews defend against surface threats (ships or small boats) and engage them with missiles.
Long Description	Surface ships launch missiles at surface maritime targets with the goal of destroying or disabling enemy ships or boats. After detecting and confirming a surface threat, the ship will fire a precision guided surface missile. Events with destroyers and cruisers will involve long range (over the horizon) Harpoon (or similar) surface missiles. Events with littoral combat certify ship's crew to defend against "close-in" surface threats and will use shorter range surface missiles such as Griffin or Hellfire. These exercises are live fire, meaning that a missile is fired down range. Surface missiles could be equipped with either high-explosive or non-explosive warheads.
Typical Components	**Platforms:** Surface Combatant **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Surface-to-Surface Missiles
Active Sonar	No
In-Water Explosives	E9
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Assume one missile and one target used per event. While missile could explode above water's surface after contacting target, analysis assumes all warheads explode at or just below surface.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	PMSR
	Hawaii Range Complex

A.1.10.15 Sinking Exercise

Surface Warfare	
Sinking Exercise	
Short Description	Aircraft, ship, and submarine crews deliberately sink a seaborne target, usually a decommissioned ship made environmentally safe for sinking according to U.S. Environmental Protection Agency standards, with a variety of ordnance.
Long Description	Ship personnel and aircrew deliver high-explosive ordnance on a seaborne target (large deactivated vessel), which is deliberately sunk using multiple weapon systems. A sinking exercise is typically conducted by aircraft, surface vessels, and submarines to train in live ordnance delivery on a full size ship target. The target is typically a decommissioned ship made environmentally safe for sinking according to U.S. Environmental Protection Agency standards. The location is greater than 50 nautical miles from shore and in water depths greater than 6,000 feet (ft.). Ship, aircraft, and submarine crews attack with coordinated tactics and deliver a variety of inert and high-explosive ordnance. Coast Guard cutters and aircraft may participate in this activity. Typically, the exercise lasts for 4 to 8 hours and possibly over 1 to 2 days, however it is unpredictable and ultimately ends when the target ship sinks.
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft, Submarine, Surface Combatant **Targets:** Surface Target - Stationary **Systems being Trained/Tested:** None **Munitions:** Air-to-Surface Missiles, Bombs, Projectile - Large Caliber, Projectile - Medium Caliber, Torpedoes - HE
Active Sonar	HFH
In-Water Explosives	E5, E8, E9, E11, E12
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles SINKEX
Parameters for Analysis	The participants and assets typically include: • 1 full-size target ship hulk • 1-5 CG, DDG, or LCS ships • 1-10 F/A-18, or maritime patrol aircraft • 1 or 2 MH-60 helicopters • 1 E-2 aircraft for Command and Control • 1 submarine • 1-3 range clearance aircraft • 1-2 Harpoon surface-to-surface or air-to-surface missiles • 2-4 Maverick or Hellfire air-to-surface missiles • 2-12 MK-80 series general purpose bombs • 200 large-caliber projectiles • 1-2 MK-48 heavyweight submarine-launched torpedo

	• 2,000-10,000 projectiles .50-caliber and 7.62 millimeter • Assume 2 guidance wires expended per event Acoustic effects modeling assumed only a percentage of munitions missed target and exploded in water. Precision guided munitions are assumed to impact target well above waterline and are not modeled (or reported) as in water explosions.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.1.10.16 Surface Warfare Torpedo Exercise – Submarine

Surface Warfare	
Surface Warfare Torpedo Exercise – Submarine	
Short Description	Submarine crews search for, detect, and track a surface ship simulating a threat surface ship with the goal of determining a firing solution that could be used to launch a torpedo with the intent to simulate destroying the targets.
Long Description	Submarine crews search for, detect and track a surface ship(s) simulating threat surface ship(s) with the goal of determining a firing solution that could be used to launch a torpedoes with the intent to simulate destroying the targets. A single submerged submarine operates at various speeds and depths while using its hull mounted and towed array passive and active sonars and potentially UAVs to track the threat target. Passive sonar is used extensively with active sonar used less frequently. Submarine launched exercise torpedoes are fired at the target surface ship(s) and surface ship targets and/or threat supporting fixed and/or rotary wind aircraft may fire light weight torpedoes at the submarine. All exercise participants may employ countermeasures and decoys. This exercise may involve a single submarine, or be undertaken in the context of a coordinated larger exercise involving multiple aircraft, ships, and submarines, including a major range event. The exercise torpedoes are recovered by helicopter or small craft. The preferred range for this exercise is an instrumented underwater range, but it may be conducted off an instrumented range.
Typical Components	**Platforms:** Submarine, Unmanned Aircraft **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Torpedoes - Exercise
Active Sonar	HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL (SOAR, Tanner Bank SWTR, San Clemente Island SWTR)
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.10.17 Training and End-to-End Mission Capability Verification – Submarine Missile Maritime

Surface Warfare	
Training and End-to-End Mission Capability Verification – Submarine Missile Maritime	
Short Description	Submarine crews launch missile(s) which may have an explosive warhead at a maritime target simulating an adversary surface ship with the goal of destroying or disabling adversary surface ship.
Long Description	Submarines launch missiles at surface maritime targets with the goal of destroying or disabling enemy ships or boats. After detecting and confirming a surface threat, the submarine will fire a precision guided surface missile.
Typical Components	**Platforms:** Submarine **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Subsurface-to-Surface Missiles
Active Sonar	No
In-Water Explosives	E9, E10
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.11 Other Training Activities

Other training activities includes training that falls outside the Primary Mission Areas.

A.1.11.1 Aerial Firefighting

Other Training Activities	
Aerial Firefighting	
Short Description	Helicopter aircrews conduct proficiency training in the use of airborne firefighting water baskets, dropping seawater on terrestrial targets on SCI or the Hawaii Range Complex.
Long Description	Helicopters connect to water baskets that are suspended beneath the aircraft. The helicopter and water basket fly to a point over the ocean, descend, and fill the basket with seawater. The helicopter then flies to a predesignated target where the aircrew releases the water. The aircrew gains proficiency in both filling the water basket and in hitting the desired target with the water.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (San Clemente Island)
	Hawaii Range Complex

A.1.11.2 At-Sea Vessel Refueling Training

Other Training Activities	
At-sea Vessel Refueling Training	
Short Description	Crews would practice transferring fuel onto small vessels.
Long Description	Navy and USMC personnel would practice boat handling skills to maneuver the small vessels alongside a larger vessel. Fuel lines would connect to a fuel bladder or a tank on the larger vessel to a refueling point on a smaller vessel. Fuel would then be transferred through the fuel lines to the small vessel.
Typical Components	**Platforms:** Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.1.11.3 Combat Swimmer/Diver Training and Certification

Other Training Activities	
Combat Swimmer/Diver Training and Certification	
Short Description	Navy and Marine Corps personnel conduct combat swimming conditioning swims and surf passage to execute a variety of tasks in the open water and littoral waterways.
Long Description	Navy and Marine Corps personnel conduct combat swimming conditioning swims and surf passage to execute a variety of tasks in the open water and littoral waterways. Personnel will conduct dive training in open and closed circuit self-contained underwater breathing apparatus (SCUBA). Divers practice underwater navigation in harbors, along beaches, or moored vessels and conduct a variety of tasks. Activity may include personnel learning advanced SCUBA diving, to include tactics, techniques, and procedures and emergency procedures. Small boats and jet skis are used for safety.
Typical Components	**Platforms:** Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SSTC (Boat Lanes – North and South, Echo)
	SOCAL (Del Mar Boat Basin, Camp Pendleton Amphibious Assault Area, Camp Pendleton Amphibious Vehicle Training Area)
	Hawaii Range Complex

A.1.11.4 Kilo Dip

Other Training Activities	
Kilo Dip	
Short Description	Functional check of the dipping sonar prior to conducting a full test or training event on the dipping sonar.
Long Description	A kilo dip is the operational term used to describe a functional check of a helicopter deployed dipping sonar system. During a functional check, a single MH-60 helicopter would transit to an area designated for dipping sonar testing (i.e., a dip point usually close to shore) and would deploy the sonar transducer assembly via a reel mechanism to a predetermined depth or series of depths while the helicopter hovers over the dip point. After the check is completed, the sonar transducer assembly would be reeled in, and in some instances the helicopter would transit to a second dip point before the procedure is repeated. A kilo dip is the precursor to more comprehensive testing or training.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** None **Systems being Trained/Tested:** Dipping Sonar **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SSTC (AMCM Training Range, Imperial Beach Mine Training Range)
	SOCAL
	Hawaii Range Complex (BARSTUR, BSURE)

A.1.11.5 Multi-Domain Unmanned Systems

Other Training Activities	
Multi-Domain Unmanned Systems	
Short Description	Multi-domain (surface, subsurface, and airborne) unmanned systems are launched from land, ships, and boats, in support of intelligence, surveillance, and reconnaissance operations, when necessary, employ weapon systems or electronic warfare systems to support intelligence or warfare objectives.
Long Description	Multi-domain unmanned systems (UxS) are launched from land, ships and boats, utilizing various sensors attached to the system to support intelligence, surveillance, and reconnaissance (ISR) operations and when necessary, employ weapon systems or electronic warfare systems to support intelligence or warfare objectives. UxS include unmanned aerial vehicles (UAV), unmanned surface vessels (USV) and unmanned underwater vehicles (UUV).
Typical Components	**Platforms:** Unmanned Aircraft System, Small Boat, Unmanned Aerial Vehicle - Rotary Wing, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Stationary, Surface Targets - Floating **Systems being Trained/Tested:** Unmanned Vehicle Systems **Munitions:** Demolition Devices
Active Sonar	VHFH, Broadband (MF to HF)
In-Water Explosives	E5, E7
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Unmanned vehicles Active acoustic sources Explosive missiles and rockets
Parameters for Analysis	In California, this activity to be conducted within San Diego harbor, as well as in coastal waters and beaches around San Diego and San Clemente Island, using air, surface, and subsurface transit corridors. Unmanned systems maneuvering and intelligence and effects training would occur around San Clemente Island with access to dry and underwater demolition ranges.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.1.11.6 Precision Anchoring

Other Training Activities	
Precision Anchoring	
Short Description	Releasing of anchors in designated locations.
Long Description	Navy and Coast Guard ship crews choose the best available anchoring sites. The ship uses all means available to determine its position when anchor is dropped to demonstrate calculating and plotting the anchor's position within 100 yards of center of planned anchorage.
Typical Components	**Platforms:** All Navy and USCG Ships and Boats **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SSTC (SSTC Anchorages)
	Hawaii Range Complex (Naval Defense Sea Area)

A.1.11.7 Search and Rescue

Other Training Activities	
Search and Rescue	
Short Description	Navy and Coast Guard helicopter, ship, and submarine crews practice the skills required to recover personnel lost at sea.
Long Description	Navy and Coast Guard helicopter, ship, and submarine crews practice the skills required to recover personnel lost at sea. Helicopters locate survivors and deploy rescue swimmer and rescue basket. Survivors are winched up to the hovering helicopter. Surface ships would conduct man overboard drills and deploy a dummy figure in the water. Ship crews would launch a small boat, direct the recovery of the dummy, and recover the small boat. Submarine crews would maneuver submarine to effect recovery of personnel.
Typical Components	**Platforms:** Aircraft Carrier, Amphibious Warfare Vessels, Fleet Support Craft, Patrol Combatant, Surface Combatant, Cutter Rotary-Wing Aircraft, Submarine **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.11.8 Ship-to-Shore Fuel Transfer Training

Other Training Activities	
Ship-to-Shore Fuel Transfer Training	
Short Description	This activity trains personnel in the transfer of petroleum (though only sea water is used during training) from ship to shore.
Long Description	Offshore petroleum discharge system training consists of five training subcomponents including the beach termination unit, operation utility boat technicians, boat coxswain, dive boat operation technician, and single anchor leg moor training. This activity trains personnel in the transfer of petroleum (though only sea water is used during training) from ship to shore. From approximately one mile offshore, technicians and underwater construction team divers roll out conduit from a ship offshore, deploy the single anchor leg mooring which sinks to and settles on the ocean floor, and use anchors at various points along the conduit to secure it to the seafloor. The conduit terminates at the shore location of the termination unit manifold. The current training at Silver Strand Training Complex consists of rolling out a four mile fluid-transfer conduit from the beach out to approximately one mile offshore and anchoring it to the seafloor with a Single Anchor Leg Moor. The improved offshore petroleum discharge system would have a self-sinking hose that could extend up to eight miles offshore, but like the current system, would still be rolled out to approximately one mile offshore during training activities at Silver Strand Training Complex.
Typical Components	**Platforms:** Fleet Support **Targets:** None **Systems being Trained/Tested:** Offshore petroleum discharge system **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL (San Clemente Island, CPAAA)
	SSTC (Boat Lanes – North and South)
	Hawaii Range Complex (Waiapuaa Bay and Beach)

A.1.11.9 Submarine Navigation Exercise

Other Training Activities	
Submarine Navigation	
Short Description	Submarine crews operate sonar for navigation and detection while transiting into and out of port during reduced visibility.
Long Description	Submarine crews train to operate sonar for navigation. The ability to navigate using sonar is critical for detection while transiting into and out of port during periods of reduced visibility. During this activity the submarine will be surfaced.
Typical Components	**Platforms:** Submarine **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None
Active Sonar	MFH, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex (Naval Defense Sea Area, Pearl Harbor)

A.1.11.10 Submarine Sonar Maintenance and Systems Checks

Other Training Activities	
Submarine Sonar Maintenance and Systems Checks	
Short Description	Maintenance of submarine sonar and other system checks are conducted pierside or at sea.
Long Description	A submarine performs periodic maintenance on the AN/BQQ-10 sonar systems while in port or at sea. Submarines conduct maintenance to their sonar systems in shallow water near their homeport, however, sonar maintenance could occur anywhere as the system's performance may warrant.
Typical Components	**Platforms:** Submarine **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted, Sonar Systems - Other **Munitions:** None
Active Sonar	MFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Hawaii Range Complex (Pearl Harbor)
	Transit Corridor

A.1.11.11 Submarine Under Ice Training and Certification

Other Training Activities	
Submarine Under Ice Training and Certification	
Short Description	Submarine crews operate sonar while transiting under ice. Ice conditions are simulated during training and certification events.
Long Description	Submarine crews train to operate under ice. Ice conditions are simulated during training and certification exercises. A single exercise is comprised of 30 hours of training, spread out over 5 days in 6-hour training sessions.
Typical Components	**Platforms:** Submarine **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None
Active Sonar	HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.1.11.12 Submarine and UUV Subsea and Seabed Warfare Exercise

Other Training Activities	
Submarine and UUV Subsea and Seabed Warfare Exercise	
Short Description	Submarine crews and shore-based operators train to launch or recover and operate all classes of UUVs in the subsea and seabed environment in order to defend deep ocean and seabed infrastructure or take offensive action against a simulated adversary's subsea and seabed infrastructure.
Long Description	Submarine crews and shore-based operators train to launch and/or recover and operate all classes of UUVs in the subsea and seabed environment in order to defend deep ocean and seabed infrastructure or take offensive action against a simulated adversary's subsea and seabed infrastructure. The UUV using on board sensors locates the targets and potentially employs non-kinetic effectors against the targets and/or deploys acoustic and non-acoustic sensors. ROV may be employed. XL, L, M and some SUUVs will be recovered during or post exercise. Some deployable non-kinetic effectors and acoustic and non-acoustic sensors may be recovered post exercise.
Typical Components	**Platforms:** Submarine, Unmanned Underwater Vehicle **Targets:** Seabed Targets **Systems being Trained/Tested:** Unmanned Vehicle Systems **Munitions:** Demolition Devices, Projectile - Medium Caliber
Active Sonar	VHFH
In-Water Explosives	E3
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive gunnery
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.11.13 Surface Ship Sonar Maintenance and Systems Checks

Other Training Activities	
Surface Ship Sonar Maintenance and Systems Checks	
Short Description	Maintenance of surface ship sonar and other system checks are conducted pierside or at sea.
Long Description	This scenario consists of surface ships performing periodic maintenance to sonar and other ship systems while in port or at sea. This maintenance takes up to 4 hours. Surface ships operate active sonar systems for maintenance while in shallow water near their homeport, however, sonar maintenance could occur anywhere as the system's performance may warrant.
Typical Components	**Platforms:** Surface Combatant **Targets:** None **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None
Active Sonar	MF1K, MF1, MFH, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Naval Base San Diego
	Hawaii Range Complex (Pearl Harbor)
	Transit Corridor

A.1.11.14 Training and End-to-End Mission Capability Verification – Subsea and Seabed Warfare Kinetic Effectors

Other Training Activities	
Training and End-to-End Mission Capability Verification – Subsea and Seabed Warfare Kinetic Effectors	
Short Description	Submarine crews or shore-based operators employ UUV with munitions or non-munition systems on the sea floor or in the water column.
Long Description	Submarine crews and shore-based operators train to launch and/or recover and operate all classes of UUVs in the subsea and seabed environment in order to take offensive action against a simulated adversary's subsea and seabed infrastructure. Submarine crews or shore-based operators employ UUVs kinetic effectors on the sea floor or in the water column. The kinetic effector is subsequently detonated. ROVs may be employed.
Typical Components	**Platforms:** Unmanned Underwater Vehicle, Remotely Operated Vehicles **Targets:** Seabed Targets **Systems being Trained/Tested:** None **Munitions:** Projectile - Large Caliber
Active Sonar	No
In-Water Explosives	E3
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Explosive gunnery Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.11.15 Training and End-to-End Mission Capability Verification – UAV

Other Training Activities	
Training and End-to-End Mission Capability Verification – UAV	
Short Description	Submarine crews or shore-based personnel controlling a UUV launch a capsule containing a UAV. The canister is deployed underwater and ascends to a programmed depth. The canister subsequently launches a UAV, and the canister sinks.
Long Description	Submarine crews or shore-based personnel controlling a UUV launch a negatively buoyant capsule containing a UAV. The canister is deployed underwater and subsequently launches a UAV and the canister sinks. Radio frequency communications are used to control and communicate with the UAV. The UAV's explosive charge would be remotely actuated or on impact with the target. During an exercise the submarine or UUV launches 2 to 4 UAVs.
Typical Components	**Platforms:** Submarine, Unmanned Aircraft System, Unmanned Underwater Vehicle **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** None **Munitions:** Projectile – Large Caliber
Active Sonar	No
In-Water Explosives	E3
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Explosive missiles and rockets Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.1.11.16 Underwater Survey

Other Training Activities	
Underwater Survey	
Short Description	Navy divers train in survey of underwater conditions and features in preparation for insertion, extraction, or intelligence, surveillance, and reconnaissance activities.
Long Description	A survey of underwater terrain conditions nearshore and a report of findings to provide precise analysis for amphibious landings. Personnel perform methodical reconnoitering of beaches and surf conditions during the day and night to find and clear underwater obstacles and determine the feasibility of landing an amphibious force on a particular beach.
Typical Components	**Platforms:** Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SSTC (Boat Lanes – North and South)
	SOCAL (TAR 2, Del Mar Boat Basin)
	Amphibious Corridors 1-4
	Hawaii Range Complex (Marine Corps Training Area Bellows, Waiapuaa Bay and Beach)

A.1.11.17 Unmanned Aerial System Training

Other Training Activities	
Unmanned Aerial System Training	
Short Description	Surface ships and submarines launch unmanned aerial systems to conduct intelligence, surveillance, and reconnaissance (ISR) missions.
Long Description	Navy, Marine Corps, and Coast Guard forces deploy unmanned aerial vehicles (UAVs) from surface ships, submarines, and ashore locations to conduct ISR. These UAVs are typically recovered, with flight times lasting from 1-8 hours. Personnel use radio frequency communications to control and communicate with the unmanned aerial system during its flight. For submarine launched UAVs, a negatively buoyant capsule is deployed underwater and descends to a programmed depth. The capsule then drops a weight, inflates a flotation collar, rises to the surface, and launches an unmanned aerial system. Submarine launched UAVs are not typically recovered.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Cutter, Submarine, Surface Combatant, Unmanned Aerial Vehicle - Fixed Wing **Targets:** None **Systems being Trained/Tested:** Unmanned Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	PMSR
	NOCAL
	Hawaii Range Complex
	Transit Corridor

A.1.11.18 Unmanned Underwater Vehicle Training – Certification and Development Exercises

Other Training Activities	
Unmanned Underwater Vehicle Training – Certification and Development Exercises	
Short Description	Unmanned underwater vehicle certification involves training with unmanned platforms to ensure submarine crew proficiency. Tactical development involves training with various payloads, for multiple purposes to ensure that the systems can be employed effectively in an operational environment.
Long Description	Unmanned underwater vehicle certification and tactical development involves the training with unmanned platforms on which various payloads are attached and used for different purposes. Unmanned underwater vehicles may be deployed by surface ships and Coast Guard cutters, small boats, submarines, aircraft, and target support vessels. Payload certification and development training assesses various systems that can be incorporated onto unmanned platforms for mine warfare, bottom mapping, and other missions. Training can range from basic remote control and autonomous navigation tests to deployment and activation of onboard systems which may include hydrodynamic instruments, launchers, and recovery capabilities. These vehicles are capable of expanding the communication and surveillance capabilities of submarines, and terrestrial commands.
Typical Components	**Platforms:** Small Boat, Cutter, Submarine, Rotary-Wing Aircraft, Fixed-Wing Aircraft, Unmanned Underwater Vehicle **Targets:** Mine Targets, Sub-surface Targets - Stationary **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems - Other, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	HFM, VHFH, Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	SSTC (Boat Lanes – North and South)
	SOCAL (San Clemente Island)
	PMSR
	Hawaii Range Complex

A.1.11.19 Waterborne Training

Other Training Activities	
Waterborne Training	
Short Description	Small boat crews conduct a variety of training, including boat launch and recovery, operation of crew-served unmanned vehicles, mooring to buoys, anchoring, and maneuvering. Small boats include rigid hull inflatable boats, and riverine patrol, assault, and command boats up to approximately 50 feet in length.
Long Description	Waterborne Training includes qualification and certification as safety observer, safety swimmer, coxswain, and crewman utilizing a variety of Navy and Coast Guard small crafts. These craft include, but are not limited, to rigid hull inflatables, aluminum chambered boats, patrol boats, stand-up paddleboards, kayaks, and jet skis. Small boat crews train to launch and recover, moor to buoys, anchor, and operate a variety of missions in shallow waters.
Typical Components	**Platforms:** Small Boat **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032** SOCAL NOCAL PMSR SSTC (Boat Lanes – North and South) Hawaii Range Complex (Pearl Harbor)

A.2 Testing Activities

A.2.1 Naval Air Systems Command Testing Activities

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

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

A.2.1.1 Air Warfare

Testing of air warfare systems is required to ensure the equipment is fully functional under the conditions in which it will be used. Tests may be conducted on radar and other early-warning detection and tracking systems, new guns or gun projectiles, and missiles. Testing of these systems may be conducted on new ships and aircraft, and on existing ships and aircraft following maintenance, repair, or modification. For some systems, tests are conducted periodically to assess operability. Additionally, tests may be conducted in support of scientific research to assess new and emerging technologies.

A.2.1.1.1 Large Force Test Event

Air Warfare	
Large Force Test Event	
Short Description	U.S. Navy led Large Force Test Event focused on Interoperability Testing and Tactics of Near-Future capabilities in a Maritime environment across the DoD's Air, Sea, and Space domains.
Long Description	U.S. Navy led Large Force Test Event focused on Interoperability Testing and Tactics of Near-Future capabilities in a Maritime environment across the DoD's Air, Sea, and Space domains. Large Force Test Events provide cross service participants with fleet-aligned mission scenarios, robust Blue Air tactics, and Red Air presentations that allow for data driven assessment at the engineering, tactical and operational level.
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Support Craft **Targets:** Surface Targets **Systems being Trained/Tested:** Electronic Warfare Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032** California Study Area

A.2.1.1.2 Air Combat Maneuvers Test

Air Warfare	
Air Combat Maneuvers Test	
Short Description	Aircrews engage in flight maneuvers designed to gain a tactical advantage during combat. Fixed-wing aircrews aggressively maneuver against threat aircraft to gain tactical advantage.
Long Description	Air combat maneuver is the general term used to describe an air-to-air test event involving two or more aircraft, each engaged in continuous proactive and reactive changes in aircraft attitude, altitude, and airspeed.
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Fixed Wing – Strike Aircraft **Targets:** Air Targets - Decoy, Air Targets - Drone **Systems being Trained/Tested:** None **Munitions:** Projectile - Medium Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Includes explosive bins at medium altitudes. Chaff and flare expenditures are captured under Chaff Test and Flare Test, respectively.
Location (typical specific areas where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.1.3 Air Platform Vehicle Test

Air Warfare	
Air Platform Vehicle Test	
Short Description	Testing performed to quantify the flying qualities, handling, airworthiness, stability, controllability, and integrity of an air platform or vehicle. No explosive weapons are released during an air platform/vehicle test.
Long Description	The air platform/vehicle test describes the testing performed to quantify the flying qualities, handling, airworthiness, stability, controllability, and integrity of an air platform/vehicle. Integration of non-weapons system including aerial refueling tests are also conducted as part of an air platform/vehicle test. Test results are compared against design and performance specifications for compliance. The test results are also used to define stability and controllability characteristics and limitations and to improve and update existing analytical and predictive models. A wide variety of fixed-wing and rotary-wing aircraft, including unmanned aerial systems could undergo air platform/vehicle testing. No weapons are released during an Air Platform/Vehicle Test. Aircraft may employ laser detection for targeting systems and trailing antenna. Events may involve two or more fighter jet aircraft and a towed target tractor by a contracted aircraft (e.g., Learjet for laser targeting tests).
Typical Components	**Platforms:** Fixed Wing - Command and Control Aircraft **Targets:** None **Systems being Trained/Tested:** Aircraft Platform/Vehicle **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.1.4 Air Platform Weapons Integration Test

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

A.2.1.1.5 Air-to-Air Missile Test

Air Warfare	
Air-to-Air Missile Test	
Short Description	Test is performed to evaluate the effectiveness of air-launched missiles against designated airborne targets. Fixed-wing aircraft will be used.
Long Description	These tests are a type of air-to-air weapons system test in which air-to-air missiles (non-explosive or in-air explosive) are fired from fixed-wing aircraft against unmanned aerial drones.
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft **Targets:** Air Targets – Drone, Surface Targets - Maneuvering **Systems being Trained/Tested:** Missile Delivery Systems **Munitions:** Air-to-Air Missiles
Active Sonar	No
In-Water Explosives	E7
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Includes explosive bins at medium altitudes. This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.1.6 Surface-to-Air Gunnery Test – Large Caliber

Air Warfare	
Surface-to-Air Gunnery Test – Large Caliber	
Short Description	Surface ship crews fire large-caliber guns at air targets.
Long Description	Surface ship crews defend against threat aircraft or missiles with large-caliber guns to disable or destroy the threat. An exercise involves one ship and a simulated threat aircraft or missile that is detected by the ship's radar. Large-caliber guns fire projectiles at the threat before it reaches the ship. The target is towed by a contract air services jet.
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Decoy, Air Targets - Drone **Systems being Trained/Tested:** Weapons Systems **Munitions:** Projectile - Large Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Includes explosive bins at medium altitudes. This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.1.7 Surface-to-Air Gunnery Test – Medium Caliber

Air Warfare	
Surface-to-Air Gunnery Test - Medium Caliber	
Short Description	Surface ship crews fire medium-caliber guns at air targets.
Long Description	Surface ship crews defend against threat aircraft or missiles with medium-caliber guns to disable or destroy the threat. An exercise involves one ship and a simulated threat aircraft or anti-ship missile that is detected by the ship's radar. Medium-caliber guns fire projectiles to disable or destroy the threat before it reaches the ship. The target is towed by a contract air services jet.
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Decoy, Air Targets - Drone **Systems being Trained/Tested:** Weapons Systems **Munitions:** Projectile - Medium Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Includes explosive bins at medium altitudes. This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.1.8 Intelligence, Surveillance, and Reconnaissance Test

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

A.2.1.1.9 Surface-to-Air Missile Test

Air Warfare	
Surface-to-Air Missile Test	
Short Description	Surface ship crews defend against threat missiles and aircraft with missiles.
Long Description	Surface ship crews defend against threat missiles and aircraft with ship-launched surface-to-air missiles. The exercise involves an aerial target that simulates a threat aircraft, anti-ship missile, or land attack missile, which is detected by the ship's radar. Ship-launched surface-to-air missiles are fired to disable or destroy the threat. The target typically is either a sub-sonic remote-controlled drone or a supersonic target. Target drones deploy parachutes and are recovered by small boat or rotary-wing aircraft. Supersonic targets are not recovered.
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Drone, Surface Targets - Maneuvering **Systems being Trained/Tested:** Weapons Systems **Munitions:** Surface-to-Air Missiles
Active Sonar	No
In-Water Explosives	E8
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive missiles and rockets Non-explosive missiles and rockets
Parameters for Analysis	Includes explosive bins at high, medium altitudes. This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.1.10 Surface-to-Air High-Energy Laser Test

Air Warfare	
Surface-to-Air High-Energy Laser Test	
Short Description	High-energy laser tests would evaluate the specifications, integration, and performance of an aircraft mounted, approximately 25-kilowatt high-energy laser. The laser is intended to be used as a weapon to disable small surface vessels.
Long Description	During a Surface-to-Air High-Energy Laser Test, aircrew evaluate the specifications, integration, and performance of an aircraft mounted, approximately 25 kilowatt high-energy laser that is intended to be used as a weapon against stationary and mobile, unmanned surface targets. The high-energy laser would be employed from a rotary-wing aircraft and is designed to disable the surface vessel, rendering it immobile. The high-energy laser would have a range of up to six kilometers. Unmanned surface targets would be used during the high-energy laser test.
Typical Components	**Platforms:** Fixed Structure, Surface Combatant **Targets:** Air Targets - Drone, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** High-Energy Laser System **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.1.11 Surface-to-Air High-Power Microwave Test

Air Warfare	
Surface-to-Air High-Power Microwave Test	
Short Description	During a High-Power Microwave Test, energy is directed from a ship or land-based system to engage air targets.
Long Description	Pulsed-wave high-power microwave systems convert electrical or chemical energy into radiated energy and deliver high-power, short bursts of radiofrequency energy to neutralize a target. High-power microwave systems operate within a wide range of frequencies, from 1 megahertz to 100 gigahertz, and transmit energy to a target to degrade or destroy electrical components in the target. During a Surface-to-Air High-Power Microwave Test energy is directed from a ship or land-based system to engage air targets. Initial land-based tests in the maritime environment will yield decisive experience before installation of high-power microwave systems on a ships.
Typical Components	**Platforms:** Surface Combatant **Targets:** Air Targets - Drone **Systems being Trained/Tested:** High-Power Microwave System **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.2 Anti-Submarine Warfare

Testing of anti-submarine warfare systems is conducted to develop new technologies and assess weapon performance and operability with new systems and platforms, such as unmanned systems. Testing uses ships, submarines, and aircraft to demonstrate capabilities of torpedoes, missiles, countermeasure systems, and underwater surveillance and communications systems. Tests may be conducted as part of a large-scale fleet training event involving submarines, ships, fixed-wing aircraft, and helicopters. These integrated training events offer opportunities to conduct research and acquisition activities and to train aircrew in the use of new or newly enhanced systems during a large-scale, complex exercise.

A.2.1.2.1 Anti-Submarine Warfare Torpedo Test (Aircraft)

Anti-Submarine Warfare	
Anti-Submarine Warfare Torpedo Test (Aircraft)	
Short Description	Test evaluates anti-submarine warfare systems onboard rotary-wing and fixed-wing aircraft and the ability to search for, detect, classify, localize, track, and attack a submarine or similar target.
Long Description	An anti-submarine warfare torpedo test evaluates anti-submarine warfare systems onboard rotary-wing and fixed-wing aircraft and the ability to search for, detect, classify, localize, track, and attack a submarine or similar target. Both sonobuoys and torpedoes (using the High Altitude Anti-Submarine Warfare Weapon Capability kit) may be delivered at high altitudes to remain clear of high threat areas. The focus of the anti-submarine warfare torpedo test is the operation of non-explosive torpedoes, but other anti-submarine warfare systems are often used during the test. Targets simulate a submarine threat and are deployed at varying depths and speeds. If available, tests may be conducted using an actual submarine as the target. This activity can be conducted in shallow or deep waters and aircraft can originate from a land base or from a surface ship. The torpedo test culminates with the release of an exercise torpedo against the target and is intended to evaluate the targeting, release, and tracking process of deploying torpedoes from aircraft. All exercise torpedoes used in testing are either running (EXTORP) or non-running (REXTORP) and are non-explosive. Eighty-five percent of torpedoes are recovered. A parachute assembly used for aircraft-launched torpedoes is jettisoned and sinks. Ballast (typically lead weights) may be released from the torpedoes to allow for recovery, leaving the ballast to sink to the bottom.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Fixed Wing – Patrol Aircraft **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Dipping, Sonobuoys **Munitions:** Torpedoes - Exercise
Active Sonar	MFM, MFH, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources
Parameters for Analysis	Assume one torpedo accessory package (parachute, ballast) per torpedo. Assume one target per torpedo.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.2.2 Anti-Submarine Warfare Tracking Test – Rotary-Wing

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

A.2.1.2.3 Anti-Submarine Warfare Tracking Test – Fixed-Wing

Anti-Submarine Warfare	
Anti-Submarine Warfare Tracking Test - Fixed-Wing	
Short Description	The test evaluates the sensors and systems used by fixed-wing aircraft to detect and track submarines and to ensure that aircraft systems used to deploy the tracking systems perform to specifications and meet operational requirements.
Long Description	An anti-submarine warfare tracking test—Fixed-Wing evaluates the sensors and systems used to detect and track submarines and to ensure that platform systems used to deploy the tracking systems perform to specifications and meet operational requirements. Targets may also be employed during an anti-submarine warfare scenario. If available, tests may be conducted using an actual submarine deploy the tracking systems perform to specifications and meet operational requirements. Targets may also be employed during an anti-submarine warfare scenario. If available, tests may be conducted using an actual submarine as the target. This activity would be conducted in deep (typically beyond 100 feet) waters. Some anti-submarine warfare fixed-wing aircraft tracking tests could be conducted as part of a coordinated event with fleet training activities.
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonobuoys **Munitions:** None
Active Sonar	LFM, LFH, MFM, HFM
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.2.4 Kilo Dip Test

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

A.2.1.2.5 Sonobuoy Lot Acceptance Test

Anti-Submarine Warfare	
Sonobuoy Lot Acceptance Test	
Short Description	Sonobuoys are deployed from surface vessels and aircraft to verify the integrity and performance of a lot or group of sonobuoys in advance of delivery to the fleet for operational use.
Long Description	Sonobuoys are deployed from surface vessels and aircraft to verify the integrity and performance of a lot or group of sonobuoys in advance of delivery to the fleet for operational use. Lot acceptance testing would occur for multiple types of sonobuoys which may include non-impulsive or explosive.
Typical Components	**Platforms:** Support Vessels, Fixed Wing – Other Aircraft **Targets:** None **Systems being Trained/Tested:** Sonobuoys **Munitions:** None
Active Sonar	LFM, LFH, MFM, HFM
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	Assume one parachute per sonobuoy
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.3 Electronic Warfare

Testing of electronic warfare systems is conducted to improve the capabilities of systems and ensure compatibility with new systems. Testing involves the use of aircraft, surface ships, and submarine crews to evaluate the effectiveness of electronic systems. Similar to training activities, typical electronic warfare testing activities include the use of airborne and surface electronic jamming devices (including testing chaff and flares) to defeat tracking and communications systems. Chaff tests evaluate newly developed or enhanced chaff, chaff dispensing equipment, or modified aircraft systems' use against chaff deployment. Flare tests evaluate deployment performance and crew competency with newly developed or enhanced flares, flare dispensing equipment, or modified aircraft systems' use against flare deployment.

A.2.1.3.1 Chaff Test

Electronic Warfare	
Chaff Test	
Short Description	Chaff tests evaluate newly developed or enhanced chaff, chaff dispensing equipment, or modified aircraft systems against chaff deployment. Tests may also train pilots and aircrews in the use of new chaff dispensing equipment. Chaff tests are often conducted with flare tests and air combat maneuver events, as well as other test events, and are not typically conducted as standalone tests.
Long Description	Chaff tests are conducted to evaluate newly developed or enhanced chaff dispensing equipment, to ensure other newly developed or modified aircraft systems are compatible with chaff deployment, and to train pilots and aircrew in the use of new chaff dispensing equipment. Fixed-wing, rotary-wing, and tiltrotor aircraft deploy chaff to disrupt threat targeting and missile guidance radars and to defend against an attack (Electronic Protect deployment). Chaff tests are often conducted with flare tests or air combat maneuver events, as well as other tests, rather than as a standalone test. Weapons are not typically fired during chaff tests. Chaff is employed for a number of different tactical reasons, but the end goal is to create a target that will distract enemy radar and weapon systems away from the friendly platform. Chaff may also be employed offensively (Electronic Attack deployment), such as before a major strike to "hide" inbound striking aircraft. Different chaff types are used by a variety of different Navy aircraft; however, all chaff consists of a radar reflector material made of thin, narrow, metallic strips cut in various lengths, and is intended to elicit frequency responses which deceive enemy radars. Defensive chaff tests are the most common type of chaff test. In most cases, the chaff test is conducted to evaluate systems on the aircraft deploying the chaff, but it is also critical to view the effect of the chaff from the "enemy" perspective so that radar system operators may practice corrective procedures to overcome the chaff jamming effect. Chaff tests are often designed to gain experience and data from both perspectives. Chaff is typically deployed from an aircraft as the aircraft makes evasive maneuvers to defeat a simulated threat missile or threat aircraft. The chaff deploys in a cloud of the highly reflective filaments and deceives the guidance system of an inbound missile, allowing the aircraft to escape the threat.
Typical Components	**Platforms:** Fixed Wing - Electronic Warfare Aircraft, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** Chaff systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Chaff emissions during testing primarily occur 3 NM or more from shore and are only released when wind conditions will carry the emissions away from shore.

Location (typical specific location where applicable)	Phase IV Requirement 2025-2032
	California Study Area
	Hawaii Study Area

A.2.1.3.2 Electronic Systems Test

Electronic Warfare	
Electronic Systems Test	
Short Description	Test that evaluates the effectiveness of electronic systems to control, deny, or monitor critical portions of the electromagnetic spectrum. In general, electronic warfare testing will assess the performance of three types of electronic warfare systems: electronic attack, electronic protect, and electronic support.
Long Description	Electronic systems evaluations are performed to determine the effectiveness of designated electronic warfare systems to control, deny, or monitor critical portions of the electromagnetic spectrum. In general, electronic warfare testing will assess the performance of three types of electronic warfare systems; specifically, electronic attack, electronic protect, and electronic support. Aircraft electronic attack systems are designed to confuse the enemy or deny the enemy the use of its electronically-targeted weapons systems. The suppression of enemy air defenses and active jamming against hostile aircraft and surface combatant radars are examples of the application of electronic attack. Aircraft electronic protect systems are designed to intercept, identify, categorize, and defeat threat weapons systems that are already targeting that or other friendly aircraft. Aircraft electronic support systems employ passive tactics to intercept, exploit, locate (target), collect, collate, and decipher information from the radio frequency spectrum for the purpose of determining the intentions of the radiating source. Test results are compared against design specifications to evaluate the performance of the actually electronic warfare system. The test results are also used to define performance characteristics and to improve and update existing analytical and predictive models.
Typical Components	**Platforms:** Fixed Wing - Command and Control Aircraft **Targets:** Air Targets - Drone **Systems being Trained/Tested:** Electronic systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	All chaff and flare expenditure is captured under Chaff Test and Flare Test, respectively
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.3.3 Flare Test

Electronic Warfare	
Flare Test	
Short Description	Flare tests evaluate newly developed or enhanced flares, flare dispensing equipment, or modified aircraft systems against flare deployment. Tests may also train pilots and aircrew in the use of newly developed or modified flare deployment systems. Flare tests are often conducted with chaff tests and air combat maneuver events, as well as other test events, and are not typically conducted as standalone tests.
Long Description	Flare tests are conducted to evaluate new flares, newly developed or modified flare deployment systems, to ensure that other newly enhanced aircraft systems are compatible with flare deployment, and to train pilots and aircrew in the use of newly developed or modified flare deployment systems. Flare tests are often conducted with chaff tests and air combat maneuver events, as well as other test events, and are not typically conducted as stand-alone tests. During a flare test, flares (and in some cases chaff) are deployed, but no weapons are typically fired. Flare dispensers may also be jettisoned during a flare test intended to assess the safe release of the dispenser in the event of an emergency. Rotary-wing and tiltrotor aircraft deploy flares as a defensive tactic (electronic protect deployment) to disrupt the infrared missile guidance systems used by heat-seeking missiles, thereby causing the missile to lock onto the flare instead of onto the aircraft and enabling the aircraft to avoid the threat. In a typical scenario, an aircraft may detect the electronic targeting signals emitted from threat radars or missiles, or aircrew may visually identify a threat missile plume when a missile is launched. At a strategically appropriate time, the pilot dispenses flares and immediately maneuvers the aircraft to distract and defeat the threat. During a typical flare test, an aircraft will dispense flares 3,000 ft. above mean sea level and flares are completely consumed while in the air. Aircraft flares use a magnesium extruded flare grain.
Typical Components	**Platforms:** Fixed Wing - Electronic Warfare Aircraft, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** None **Systems being Trained/Tested:** Flare systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Flare use from all other events are captured under this activity.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.4 Mine Warfare

Testing and development of mine warfare systems is conducted to improve sonar, laser, and magnetic detectors intended to hunt, locate, and record the positions of mines for avoidance or subsequent neutralization. Mine warfare testing and development falls into two primary categories: mine detection and classification, and mine countermeasure and neutralization. Mine detection and classification testing involves the use of air, surface, and subsurface vessels and uses sonar, including towed and side-scan sonar, and unmanned vehicles to locate and identify objects underwater. Mine detection and classification systems are sometimes used in conjunction with a mine neutralization system. Mine countermeasure and neutralization testing includes the use of air, surface, and subsurface units to evaluate the effectiveness of tracking devices and countermeasure and neutralization systems to neutralize mine threats. Most neutralization tests use mine shapes, or non-explosive practice mines, to evaluate a new or enhanced capability. For example, during a mine neutralization test, a previously located mine is destroyed or rendered nonfunctional using a helicopter or manned/unmanned surface vehicle based system that may involve the deployment of a towed neutralization system.

A small percentage of mine warfare tests require the use of high-explosive mines to evaluate and confirm the ability of the system to neutralize a high-explosive mine under operational conditions. The majority of mine warfare systems are deployed by ships, helicopters, and unmanned vehicles. Tests may also be conducted in support of scientific research to support these new technologies.

A.2.1.4.1 Airborne Dipping Sonar Minehunting Test

Mine Warfare	
Airborne Dipping Sonar Minehunting Test	
Short Description	A mine-hunting dipping sonar system that is deployed from a rotary-wing aircraft and uses high frequency sonar for the detection and classification of bottom and moored mines.
Long Description	Tests of a mine-hunting dipping sonar system to evaluate the search capabilities of this rotary-wing aircraft-deployed, mine hunting, detection, and classification system. The sonar identifies mine-like objects.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Mine Targets **Systems being Trained/Tested:** Sonar Systems - Mine Warfare **Munitions:** None
Active Sonar	HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.4.2 Airborne Laser Mine Detection System Test

Mine Warfare	
Airborne Laser Mine Detection System Test	
Short Description	An airborne mine hunting test of a laser-based mine detection system, that is operated from a rotary-wing aircraft and evaluates the system's ability to detect, classify, and fix the location of floating and near-surface, moored mines. The system uses a low-energy laser to locate mines.
Long Description	During an airborne mine detection system test, a rotary-wing aircraft evaluates the search capabilities of the AN/AES-1 Airborne Laser Mine Detection System. The Airborne Laser Mine Detection System is a mine hunting system designed to detect, classify, and localize floating and near-surface, moored sea mines using a laser system. The Airborne Laser Mine Detection System will be integrated into the rotary-wing aircraft to provide a rapid wide-area reconnaissance and assessment of mine threats in littoral zones, confined straits, choke points, and amphibious objective areas for Carrier and Expeditionary Strike Groups. The Airborne Laser Mine Detection System uses pulsed laser light to image the entire near-surface volume potentially containing mines. Airborne Laser Mine Detection System is capable of day or night operations without stopping to deploy or recover equipment and without towing any equipment in the water. With untethered operations, it can attain high area search rates. Airborne Laser Mine Detection System also provides accurate target geo-location to support follow on neutralization of the detected mines.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Mine Targets **Systems being Trained/Tested:** Airborne Laser Mine Detection System **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Mine shapes are on an established mine warfare training range
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.4.3 Airborne Mine Neutralization System Test

Mine Warfare	
Airborne Mine Neutralization System Test	
Short Description	A test of the airborne mine neutralization system evaluates the system's ability to detect and destroy mines from an airborne mine countermeasures capable rotary-wing aircraft. The airborne mine neutralization system uses up to four unmanned underwater vehicles equipped with high-frequency sonar, video cameras, and explosive and non-explosive neutralizers.
Long Description	Mine neutralization tests evaluate aircraft and aircraft systems intended to neutralize or otherwise destroy mines through the use of explosives or other munitions. For most neutralization tests, mine shapes or non-explosive mines are used to evaluate new or enhanced mine neutralization systems. The airborne mine neutralization system uses up to four unmanned underwater vehicles equipped with high-frequency sonar and video cameras to relocate previously detected submerged mines. The unmanned underwater vehicles are also equipped with explosives to neutralize the mines after they are located. Data from unmanned underwater vehicles are relayed to the operator in the rotary-wing aircraft through a fiber optic cable enabling the operator to position the neutralizing charge onto the most vulnerable area of the mine. The explosive charge is then detonated to neutralize the mine. For most tests, recoverable non-explosive neutralizers are used. A mine shape, rather than an explosive mine, serves as the target and a range support vessel recovers the non-explosive neutralizer and the mine shape following the test. Testing scenarios include a non-explosive neutralizer against an inert mine shape, or an explosive neutralizer against an explosive mine.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Mine Targets **Systems being Trained/Tested:** None **Munitions:** Mine Warfare Devices
Active Sonar	No
In-Water Explosives	E4
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Explosive mine countermeasure and neutralization (no divers)
Parameters for Analysis	No explosive mines (E11) would be used under the preferred alternative. Explosive mines are proposed and analyzed under the non-preferred alternative.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.4.4 Airborne Minehunting Test – Sonobuoy

Mine Warfare	
Airborne Minehunting Test – Sonobuoy	
Short Description	A mine-hunting system made up of sonobuoys is deployed from a rotary-wing aircraft. A field of sonobuoys, using high-frequency sonar, is used for detection and classification of bottom and moored mines.
Long Description	Tests of mine-hunting sonobuoys to evaluate the search capabilities of this rotary-wing aircraft-deployed, mine hunting, detection, and classification system. The sonar identifies mine-like objects.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Mine Targets **Systems being Trained/Tested:** Sonobuoys **Munitions:** None
Active Sonar	MFM
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.4.5 Mine Laying Test

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

A.2.1.5 Surface Warfare

Testing of weapons used in surface warfare is conducted to develop new technologies and to assess weapon performance and operability with new systems and platforms, such as unmanned systems. Tests include various air-to-surface guns and missiles, surface-to-surface guns and missiles, and bombing tests. Testing events may be integrated into training activities to test aircraft or aircraft systems in the delivery of munitions on a surface target. In most cases the tested systems are used in the same manner in which they are used for fleet training activities.

Training may occur in conjunction with weapons testing to provide Fleet operators unique opportunities to train with combat weapon systems and personnel in scripted warfare environments. For example, Fleet training could occur while testing a weapon system, in which Sailors would experience (be trained in) the use of the system being tested.

A.2.1.5.1 Air-to-Surface Bombing Test

Surface Warfare	
Air-to-Surface Bombing Test	
Short Description	Fixed-wing aircraft test the delivery of bombs against surface maritime targets with the goal of evaluating the bomb, the bomb carry and delivery system, and any associated systems that may have been newly developed or enhanced.
Long Description	Fixed-wing aircraft test the delivery of bombs against surface maritime targets with the goal of evaluating the bomb, the bomb carry and delivery system, and any associated systems that may have been newly developed or enhanced. Both explosive and non-explosive bombs will be released during this type of test; however, the vast majority of releases will be non-explosive bombs and typically include non-explosive general purpose bombs and guided bomb units of various sizes. Surface targets may also be used.
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft **Targets:** Land Targets, Surface Targets - Maneuvering **Systems being Trained/Tested:** Bomb delivery system **Munitions:** Bombs
Active Sonar	No
In-Water Explosives	E7, E9
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Non-explosive aerial-deployed mines and bombs Explosive bombs
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.5.2 Air-to-Surface Gunnery Test

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

A.2.1.5.3 Air-to-Surface High-Energy Laser Test

Surface Warfare	
Air-to-Surface High-Energy Laser Test	
Short Description	High-energy laser tests would evaluate the specifications, integration, and performance of an aircraft mounted, approximately 25 kilowatt high-energy laser. The laser is intended to be used as a weapon to disable small surface vessels.
Long Description	During a high energy laser test, aircrew evaluate the specifications, integration, and performance of an aircraft mounted, approximately 25 kilowatt high energy laser that is intended to be used as a weapon against stationary and mobile, unmanned surface targets. The high energy laser would be employed from a rotary-wing aircraft and is designed to disable the surface vessel, rendering it immobile. The high energy laser would have a range of up to six kilometers. Unmanned surface targets would be used during the high energy laser test.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** High Energy Laser System **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.5.4 Air-to-Surface High-Power Microwave Test

Surface Warfare	
Air-to-Surface High-Power Microwave Test	
Short Description	A High-Power Microwave Test is where energy is directed from a ship or land-based system to engage a surface target, or energy is directed from a system mounted on an aircraft platform onto a surface target.
Long Description	Pulsed-wave high-power microwave systems convert electrical or chemical energy into radiated energy and deliver high-power, short bursts of radiofrequency energy to neutralize a target. High-power microwave systems operate within a wide range of frequencies, from 1 megahertz to 100 gigahertz, and transmit energy to a target to degrade or destroy electrical components in the target. High-power microwave systems can be based on ships and aircraft and directed to engage land and surface targets. Initial land-based tests in a maritime environment will yield decisive experience before installation of high-power microwave weapons on a ships or aircraft.
Typical Components	**Platforms:** Rotary-Wing Aircraft **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** High-Power Microwave System **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.5.5 Air-to-Surface Laser Targeting Test

Surface Warfare	
Air-to-Surface Laser Targeting Test	
Short Description	Aircrews illuminate enemy targets with lasers.
Long Description	During a laser targeting test, aircrew use laser targeting devices integrated into aircraft or weapons systems to evaluate targeting accuracy and precision and to train aircrew in the use of newly developed or enhanced laser targeting devices designed to illuminate designated targets for engagement with laser-guided weapons. No explosive munitions are released during a laser targeting test.
Typical Components	**Platforms:** Unmanned Aerial Vehicle - Fixed Wing Aircraft **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** Targeting Lasers **Munitions:** Bombs
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Non-explosive aerial-deployed mines and bombs
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.5.6 Air-to-Surface Missile Test

Surface Warfare	
Air-to-Surface Missile Test	
Short Description	Test may involve both fixed-wing and rotary-wing aircraft launching missiles at surface maritime targets to evaluate the weapons system or as part of another systems integration test.
Long Description	An air-to-surface missile test may involve both fixed-wing and rotary-wing aircraft launching missiles at surface maritime targets to evaluate the weapons system or as part of another systems integration test. Air-to-surface missile tests can include high explosive, non-explosive, or non-firing (captive air training missile) weapons. Laser targeting systems may also be used. Both stationary and mobile targets would be utilized during testing.
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Tiltrotor Aircraft **Targets:** Air Targets - Decoy, Air Targets - Drone, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Missile Delivery Systems **Munitions:** Air-to-Surface Missiles
Active Sonar	No
In-Water Explosives	E6, E7, E8, E9
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Non-explosive aerial-deployed mines and bombs Manned surface vessels Explosive missiles and rockets Non-explosive missiles and rockets
Parameters for Analysis	
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032** California Study Area Hawaii Study Area

A.2.1.5.7 Long-Range Weapons Delivery System/Hypersonic Vehicle Test

Surface Warfare	
Long-Range Weapons Delivery Systems (OTH)/Hypersonic Vehicle Test	
Short Description	The objective of the Hypersonic Vehicle Program is to develop and demonstrate key technologies to enable an air- or land-launched tactical range hypersonic vehicle for rapid response capabilities.
Long Description	Precision long range standoff weapons are missiles or bombs that may be launched from a distance sufficient to allow attacking personnel to evade defensive fire from the target area. Typically, they are used against land- and sea-based targets in an offensive operation. These weapon systems provide the ability to engage the target while standing off outside the range at which the defenders are likely to engage the attacker. Typical standoff weapons include cruise missiles, glide bombs, and ballistic missiles. The objective of the Hypersonic Vehicle Program is to develop and demonstrate key technologies to enable an air- or land-launched tactical range hypersonic vehicle for rapid response capabilities. Data collected during these events are utilized to predict the performance of future, mature vehicle delivery systems. F-15, B-52, or similar aircraft serve as the primary platform for hypersonic vehicle launches. Flights are typically conducted at altitudes of up to 80,000 feet and can travel 450–2,000 miles, at hypersonic speeds (over Mach 5). The flight vehicle is released and air-launched where its solid rocket motor booster will ignite. The spent booster or boosters and protective shroud then separate from the vehicle which will continue to travel towards a pre-determined impact site in the open ocean.
Typical Components	**Platforms:** Fixed Wing – Strike Aircraft **Targets:** None **Systems being Trained/Tested:** Weapons Systems **Munitions:** Air-to-Surface Missiles, Surface-to-Surface Missiles
Active Sonar	No
In-Water Explosives	E9
Mitigation Involving Visual Observations for Marine Species	None
Parameters for Analysis	Testing at PMSR would occur within the extended special use airspace.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area

A.2.1.5.8 Rocket Test

Surface Warfare	
Rocket Test	
Short Description	Rocket tests are conducted to evaluate the integration, accuracy, performance, and safe separation of guided and unguided rockets fired from a hovering or forward flying rotary-wing aircraft or tilt rotor aircraft.
Long Description	Rocket tests are conducted to evaluate the integration, accuracy, performance, and safe separation of laser-guided and unguided rockets fired from a hovering or forward flying rotary-wing aircraft. Rocket tests would involve the release of primarily live motor/non-explosive warhead rockets. Some explosive warhead rockets would be tested, and during a jettison test, rockets with a non-explosive motor and non-explosive warhead would be jettisoned along with the rocket launcher. Rocket tests are also conducted to train aircrew on the use of new or enhanced weapons systems. Non-explosive warhead rocket types also include flechette rockets. Some rocket tests may be conducted in conjunction with upgrades to or integration of the Forward Looking Infrared targeting system.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Surface Combatant, Tiltrotor Aircraft, Vehicle Launch Platform **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Rocket Delivery Systems **Munitions:** Air-to-Air Missiles, Rockets
Active Sonar	No
In-Water Explosives	E3, E9
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive missiles and rockets Non-explosive missiles and rockets
Parameters for Analysis	
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.5.9 Subsurface-to-Surface Missile Test

Surface Warfare	
Subsurface-to-Surface Missile Test	
Short Description	Submarines launch missiles at surface maritime targets with the goal of destroying or disabling enemy ships or boats.
Long Description	Submarines launch missiles at surface maritime targets with the goal of destroying or disabling enemy ships or boats. After detecting and confirming a surface threat, the submarine will fire a precision guided surface missile.
Typical Components	**Platforms:** Submarine **Targets:** Surface Targets **Systems being Trained/Tested:** Weapons Systems **Munitions:** Subsurface-to-Surface Missiles, Surface-to-Surface Missiles
Active Sonar	No
In-Water Explosives	E10
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.5.10 Surface-to-Surface Gunnery Test – Large Caliber

Surface Warfare	
Surface-to-Surface Gunnery Test - Large Caliber	
Short Description	Surface ship crews fire large-caliber guns at surface targets.
Long Description	This exercise involves ships gun crews engaging surface targets at sea with their main battery large-caliber (typically 57 mm and 5-inch) guns. Targets include the QST-35 seaborne powered target, high speed maneuverable surface target, or a specially configured remote controlled watercraft. Some targets are expended during the exercise and are not recovered. The exercise proceeds with the target boat approaching from about 10-NM distance. The target is tracked by radar and when within a predetermined range, it is engaged first with large-caliber warning shots. As threats get closer all weapons may be used to disable the threat. This exercise may involve a single firing ship, or be undertaken in the context of a coordinated larger exercise involving multiple ships, including a major training exercise. Large-caliber guns will also be fired during weapon certification events and in conjunction with weapon maintenance. During all exercises, either high-explosive or non-explosive projectiles may be used. High-explosive projectiles can either be fused for detonation on impact (with water surface or targets), or for proximity to the target (in air detonation).
Typical Components	**Platforms:** Surface Combatant **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Weapons Systems **Munitions:** Projectile - Large Caliber
Active Sonar	No
In-Water Explosives	E3, E5
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive gunnery Non-explosive gunnery Weapons firing noise
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.5.11 Surface-to-Surface Gunnery Test – Medium Caliber

Surface Warfare	
Surface-to-Surface Gunnery Test – Medium Caliber	
Short Description	Surface ship crews fire medium-caliber guns at surface targets.
Long Description	Surface ship crews fire medium-caliber guns at surface targets. Ships use medium-caliber weapons to practice defensive marksmanship, typically against a stationary floating target (a 10 ft. diameter red balloon (Killer Tomato)) and high-speed mobile targets. Some targets are expended during the exercise and are not recovered. Shipboard protection systems (Close-In Weapon System) utilizing medium-caliber projectiles would train against high speed mobile targets.
Typical Components	**Platforms:** Fleet Support Vessel, Support Craft, Surface Combatant **Targets:** Air Targets - Drone, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Weapons Systems **Munitions:** Projectile - Medium Caliber
Active Sonar	No
In-Water Explosives	E1, E3
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive gunnery Non-explosive gunnery
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.5.12 Surface-to-Surface Gunnery Test – Small Caliber

Surface Warfare	
Surface-to-Surface Gunnery Test – Small Caliber	
Short Description	Surface ship crews fire small-caliber guns at surface targets.
Long Description	Surface ship crews fire small-caliber guns at surface targets. Ships use small-caliber weapons to practice defensive marksmanship, typically against a stationary floating target (a 10 ft. diameter red balloon (Killer Tomato)) and high-speed mobile targets. Some targets are expended during the exercise and are not recovered.
Typical Components	**Platforms:** Support Craft, Surface Combatant **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** Weapons Systems **Munitions:** Projectile - Small Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Non-explosive gunnery
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.5.13 Surface-to-Surface High-Energy Laser Test

Surface Warfare	
Surface-to-Surface High-Energy Laser Test	
Short Description	High-energy laser weapons tests would evaluate the specifications, integration, and performance of a ship-mounted, approximately 25 kilowatt high-energy laser. The laser is intended to be used as a weapon to disable small surface vessels.
Long Description	During a high energy laser weapons test, ship crews evaluate the specifications, integration, and performance of a ship-mounted, approximately 25 kilowatt high energy laser that is intended to be used as a weapon against stationary and mobile, unmanned surface targets. The high energy laser would be employed from a ship and is designed to disable the surface vessel, rendering it immobile. The high energy laser would have a range of up to six kilometers. Unmanned surface targets would be used during the high energy laser test.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Surface Combatant **Targets:** Air Targets - Drone, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** High-Energy Laser System **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.5.14 Surface-to-Surface High-Power Microwave Test

Surface Warfare	
Surface-to-Surface High-Power Microwave Test	
Short Description	A High-Power Microwave Test where energy is directed from a ship or land-based system to engage a surface target, or energy is directed from a system mounted on an aircraft platform onto a surface target.
Long Description	Pulsed-wave high-power microwave systems convert electrical or chemical energy into radiated energy and deliver high-power, short bursts of radiofrequency energy to neutralize a target. High-power microwave systems operate within a wide range of frequencies, from 1 megahertz to 100 gigahertz, and transmit energy to a target to degrade or destroy electrical components in the target. High power microwave systems can be based on ships and aircraft and directed to engage land and surface targets. Initial land-based tests in a maritime environment will yield decisive experience before installation of high-power microwave weapons on a ships or aircraft.
Typical Components	**Platforms:** Surface Combatant **Targets:** Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** High-Power Microwave Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.5.15 Surface-to-Surface Missile Test

Surface Warfare	
Surface-to-Surface Missile Test	
Short Description	Surface ship crews defend against surface threats (ships or small boats) and engage them with missiles.
Long Description	Surface ships launch missiles at surface maritime targets with the goal of destroying or disabling enemy ships or boats. After detecting and confirming a surface threat, the ship will fire a precision guided surface missile. Events with littoral combat and patrol combatant ships would be to certify ship's crew to defend against close-in (less than 10 miles) surface threats. These exercises are live fire, meaning that a missile is fired down range. Surface missiles could be equipped with either high-explosive or non-explosive warheads.
Typical Components	**Platforms:** Surface Combatant, Vehicle Launch Platform **Targets:** Land Targets, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Surface-to-Surface Missiles
Active Sonar	No
In-Water Explosives	E9, E10
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive missiles and rockets Non-explosive missiles and rockets
Parameters for Analysis	This activity may occur anywhere within the California Study Area, but is also known to occur within PMSR.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area (PMSR)

A.2.1.6 Other Testing Activities

A.2.1.6.1 Acoustic and Oceanographic Research

Other Testing Activities	
Acoustic and Oceanographic Research	
Short Description	Active transmissions within the band 10 hertz (Hz)-100 kilohertz (kHz) from sources deployed from ships and aircraft.
Long Description	Active acoustic transmissions within the band 10 Hz-100 kHz used for engineering tests of acoustic sources, validation of ocean acoustic models, characterization of acoustic interactions with the ocean bottom and ocean surface.
Typical Components	**Platforms:** Fixed Wing – Patrol Aircraft, Small Boat **Targets:** Surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Transmission Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.6.2 Air Platform Shipboard Integration Test

Other Testing Activities	
Air Platform Shipboard Integration Test	
Short Description	Aircraft are tested to determine operability from shipboard platforms, performance of shipboard physical operations, and to verify and evaluate communications and tactical data links.
Long Description	The air platform shipboard integration test is performed to evaluate the compatibility of an aircraft to operate from designated shipboard platforms, perform shipboard physical operations, and to verify and evaluate communications and tactical data links. This test function also includes an assessment of carrier-shipboard suitability, such as hazards of electromagnetic radiation to ordnance, hazard of electromagnetic radiation to personnel, and high energy radio frequency.
Typical Components	**Platforms:** Fixed Wing - Command and Control Aircraft, Rotary-Wing Aircraft, Surface Combatant, Tiltrotor Aircraft, Unmanned Aerial Vehicle - Fixed Wing, Unmanned Aerial Vehicle - Rotary Wing **Targets:** None **Systems being Trained/Tested:** Communications Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	California Study Area
	Hawaii Study Area

A.2.1.6.3 Undersea Range System Test

Other Testing Activities	
Undersea Range System Test	
Short Description	Following installation of a Navy underwater warfare training and testing range, tests of the nodes (components of the range) will be conducted to include node surveys and testing of node transmission functionality.
Long Description	The bottom-mounted bi-directional nodes are surveyed post-installation utilizing a range pinger and tested to establish system parameters and baseline hearing ranges. Each acoustic projector is activated at full power while listening is occurring on adjacent hydrophones. The nodes may also be activated during periodic operational and maintenance checks and following significant weather events to confirm that nodes are located correctly and functioning properly prior to ongoing training or testing.
Typical Components	**Platforms:** Range , Small Boat, Support Craft, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems - Other **Munitions:** None
Active Sonar	MFM
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032** California Study Area Hawaii Study Area

A.2.2 Naval Facilities Engineering and Expeditionary Warfare Center

EXWC provides research, development, testing, and evaluation and in-service engineering and lifecycle management for the shore, oceans, and expeditionary domains. EXWC's proposed activities include ocean energy and cable systems research; undersea range system testing; and underwater search, deployment, and recovery.

A.2.2.1 Other Testing

A.2.2.1.1 Ocean Energy and Cable Systems Research

Other Testing Activities	
Ocean Energy and Cable Systems Research	
Short Description	Testing of ocean and marine energy harvesting/producing systems, energy storage and distribution, subsea power systems and associated infrastructure, and temporary subsea cable network deployment and interoperability.
Long Description	Testing of marine energy harvesting/producing systems, energy storage systems, and infrastructure that supports distribution of power to naval research applications and systems in littoral and deep-sea locations. This may include diverse payloads and other packages associated with ocean energy. Activities also include temporary subsea cable network deployments. Standard oceanographic research sensing (acoustic Doppler current profiler, fathometer like systems) also to be employed. Routine maintenance of systems under test may occur to ensure they are located correctly and functioning properly, especially for long duration tests and if there has been a significant weather event. Maintenance may involve repairing or replacing equipment such as batteries and cables.
Typical Components	**Platforms:** Structure, Support Craft, Unmanned Bottom Crawler, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Wave Energy Converters, Marine Energy Converters, Power Storage and Distribution Systems, Fiber Optic Cables **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex (Navy Wave Energy Test Site)

	PMSR

A.2.2.1.2 Undersea Range System Testing

Other Testing Activities	
Undersea Range System Testing	
Short Description	This activity supports advanced ocean technology development for fixed ocean and seafloor systems, including deployment of free-fall penetrometers and gravity deployed anchors used to determine seafloor characteristics and seafloor interaction testing of anchors, small foundations and packages. Advanced ocean technology development for fixed and seafloor systems.
Long Description	This activity supports advanced ocean technology development for fixed ocean and seafloor systems, including deployment of free-fall penetrometers and gravity deployed anchors used to determine seafloor characteristics and seafloor interaction testing of anchors, small foundations and packages. Also includes surveying of the seafloor to determine geophysical characteristics prior to testing.
Typical Components	**Platforms:** All Navy Ships and Boats, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** *De minimis* sources, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL

A.2.2.2 Unmanned Systems

A.2.2.2.1 Underwater Search, Deployment, and Recovery

Unmanned Systems	
Underwater Search, Deployment, and Recovery	
Short Description	Tests various systems associated with Remotely Operated Vehicles and Unmanned Underwater Vehicles to include seafloor sampling, surveying, seafloor excavating, and subsea cable deployment.
Long Description	Subsurface activities include a variety of underwater vehicles, robotic or autonomous systems, and items placed on the seafloor. Diving activities and special operations training also occur to iteratively test engineering solutions for hardening and mitigating seafloor infrastructure vulnerabilities. Other subsurface activities involve manned and unmanned underwater vehicles. All subsurface vehicles are retrieved after use, while most objects (e.g., non-explosive mines) remain for a period of time to be used as testing fixtures. Personnel install, remove for maintenance, or move seabed infrastructure to include cables of varying diameters and lengths and equipment tethered to the bottom that is floating in the water column. Repositioning may be conducted on a routine basis to ensure equipment is functioning properly and seafloor conditions are consistent.
Typical Components	**Platforms:** All Navy Ships and Boats, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems - Hull Mounted, Sonar Systems - Other, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Unmanned vehicles Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL

A.2.3 Naval Sea Systems Command Testing Activities

A.2.3.1 Anti-Submarine Warfare

Testing of anti-submarine warfare systems is conducted to develop new technologies and assess weapon performance and operability with new systems and platforms, such as unmanned systems. Testing uses ships, submarines, and aircraft to demonstrate capabilities of torpedoes, missiles, countermeasure systems, and underwater surveillance and communications systems. Tests may be conducted as part of a large-scale fleet training event involving submarines, ships, fixed-wing aircraft, and helicopters. These integrated training events offer opportunities to conduct research and acquisition activities and to train aircrew in the use of new or newly enhanced systems during a large-scale, complex exercise.

A.2.3.1.1 Anti-Submarine Warfare Mission Package Testing

Anti-Submarine Warfare	
Anti-Submarine Warfare Mission Package Testing	
Short Description	Ships and their supporting platforms (rotary-wing aircraft and unmanned aerial systems) detect, localize, and prosecute submarines.
Long Description	Ships conduct detect-to-engage operations against modern diesel-electric and nuclear submarines using airborne and surface assets (both manned and unmanned). Active and passive acoustic systems are used to detect and track submarine targets, culminating in the deployment of lightweight torpedoes to engage the threat.
Typical Components	**Platforms:** Rotary-Wing Aircraft, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems - Towed, Sonobuoys **Munitions:** Torpedoes - Exercise
Active Sonar	LFM, LFH, MF1, MFM, MFH, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices
Parameters for Analysis	None
Location (typical location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.2.3.1.2 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.
Long Description	At-sea sonar testing is required to calibrate or document the functionality of sonar and torpedo systems while the ship or submarine is in an open ocean environment. At-sea sonar testing is conducted to verify the ship meets design acoustic specifications, define the underwater characteristics of the ship, determine effects of systems and equipment on ships acoustic characteristics, and provide technical background necessary to initiate development of design improvements to reduce noise. Tests also consist of electronic support measurement, photonics, and sonar sensor accuracy testing. In some instances, a submarine's passive detection capability is tested when a second submarine utilizes its active sonar or is equipped with a noise augmentation system in order to replicate acoustic or electromagnetic signatures of other vessel types or classes.
Typical Components	**Platforms:** Fleet Support, Range, Submarine, Support Craft, Surface Combatant **Targets:** Sub-surface Targets - Maneuvering, Surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Countermeasures, Sonar Systems - Hull Mounted, Sonar Systems - Other, Sonar Systems - Towed, Sonobuoys, Underwater Range Systems **Munitions:** Torpedoes - Exercise
Active Sonar	LFM, LFH, MF1K, MF1, MF1C, MFL, MFM, MFH, HFL, HFM, HFH, Broadband (LF to MF), Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices
Parameters for Analysis	Active sonar is intermittent throughout the duration of this event.
Location	**Phase IV Requirement 2025-2032** SOCAL (SOAR) Hawaii Range Complex (PMRF Training Area)

A.2.3.1.3 Pierside Sonar Testing

Anti-Submarine Warfare	
Pierside Sonar Testing	
Short Description	Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities.
Long Description	Ships and submarines would activate mid- and high-frequency tactical sonars, underwater communications systems, and navigational devices to ensure they are fully functional prior to at-sea test events. Testing may also include the firing of inert torpedo shapes. Event duration varies; with average durations of three weeks with active sonar used intermittently over two days during the total event duration. This also includes pierside sonar testing during surface combatant sea trials.
Typical Components	**Platforms:** Submarine, Surface Combatant **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Countermeasures, Sonar Systems - Hull Mounted, Sonar Systems - Other **Munitions:** None
Active Sonar	MFM, MFH, HFM, HFH, Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources
Parameters for Analysis	Event duration is three weeks with active sonar used intermittently.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	Port Hueneme
	Naval Base San Diego
	Hawaii Range Complex (Pearl Harbor)

A.2.3.1.4 Surface Ship Sonar Testing/Maintenance

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

A.2.3.1.5 Torpedo (Explosive) Testing

Anti-Submarine Warfare	
Torpedo (Explosive) Testing	
Short Description	Air, surface, or submarine crews employ explosive and non-explosive torpedoes against virtual targets.
Long Description	Non-explosive and explosive torpedoes (carrying a warhead) will be launched at a suspended target by a submarine and fixed- or rotary-wing aircraft or surface combatants.
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Fixed Wing – Patrol Aircraft, Rotary-Wing Aircraft, Submarine, Support Craft, Surface Combatant **Targets:** Mine Targets, Sub-surface Targets - Stationary, Surface Targets - Floating **Systems being Trained/Tested:** Countermeasures, Signal, Underwater sound Devices, Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonobuoys **Munitions:** Torpedoes - Exercise, Torpedoes - HE
Active Sonar	MF1, MFM, MFH, HFH, Broadband (MF to HF)
In-Water Explosives	E8, E11
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Explosive torpedoes
Parameters for Analysis	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.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Hawaii Range Complex

A.2.3.1.6 Torpedo (Non-Explosive) Testing

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

A.2.3.2 Electronic Warfare

Testing of electronic warfare systems is conducted to improve the capabilities of systems and ensure compatibility with new systems. Testing involves the use of aircraft, surface ships, and submarine crews to evaluate the effectiveness of electronic systems. Similar to training activities, typical electronic warfare testing activities include the use of airborne and surface electronic jamming devices (including testing chaff and flares) to defeat tracking and communications systems. Chaff tests evaluate newly developed or enhanced chaff, chaff dispensing equipment, or modified aircraft systems' use against chaff deployment.

A.2.3.2.1 Radar and Other Systems Testing

Electronic Warfare	
Radar and Other Systems Testing	
Short Description	Test may include use of military or commercial radar, communication systems (or simulators), or high energy lasers. Testing may occur aboard a ship against drones, small boats, rockets, missiles, or other targets
Long Description	At-sea and docked testing may use military or commercial radar, communication systems (or simulators), or high-energy lasers. No subsurface transmission will occur during this testing. Testing of various air and surface targets may include unmanned aerial systems, small boats (floating cardboard tri-walls, towed, anchored, or self-propelled vessels).
Typical Components	**Platforms:** Aircraft Carrier, Amphibious Warfare Vessel, Fixed Wing – Adversary Aircraft, Fixed Wing – Patrol Aircraft, Fixed Wing – Strike Aircraft, Fleet Support, Patrol Combatant, Rotary-Wing Aircraft, Structure, Submarine, Support Craft, Surface Combatant, Unmanned Aerial Vehicle - Fixed Wing Aircraft, Unmanned Bottom Crawler **Targets:** Air Targets - Drone, Air Targets - Other, Mine Targets, Sub-surface Targets - Maneuvering, Sub-surface Targets - Stationary, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems – Other, High-Energy Laser System **Munitions:** Projectile - Large Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Non-explosive gunnery Non-explosive missiles and rockets Towed in-water devices Unmanned vehicles Weapon firing noise
Parameters for Analysis	HE lasers will not be tested pierside.

	Phase IV Requirement 2025-2032
Location (typical specific location where applicable)	PMSR
	SOCAL
	Hawaii Range Complex (PMRF Training Area)

A.2.3.3 Mine Warfare

Testing and development of mine warfare systems is conducted to improve sonar, laser, and magnetic detectors intended to hunt, locate, and record the positions of mines for avoidance or subsequent neutralization. Mine warfare testing and development falls into two primary categories: mine detection and classification, and mine countermeasure and neutralization. Mine detection and classification testing involves the use of air, surface, and subsurface vessels and uses sonar, including towed and side-scan sonar, and unmanned vehicles to locate and identify objects underwater. Mine detection and classification systems are sometimes used in conjunction with a mine neutralization system. Mine countermeasure and neutralization testing includes the use of air, surface, and subsurface units to evaluate the effectiveness of tracking devices and countermeasure and neutralization systems to neutralize mine threats. Most neutralization tests use mine shapes, or non-explosive practice mines, to evaluate a new or enhanced capability. For example, during a mine neutralization test, a previously located mine is destroyed or rendered nonfunctional using a helicopter or manned/unmanned surface vehicle based system that may involve the deployment of a towed neutralization system.

A small percentage of mine warfare tests require the use of high-explosive mines to evaluate and confirm the ability of the system to neutralize a high-explosive mine under operational conditions. The majority of mine warfare systems are deployed by ships, helicopters, and unmanned vehicles. Tests may also be conducted in support of scientific research to support these new technologies.

A.2.3.3.1 Mine Countermeasure and Neutralization Testing

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

A.2.3.3.2 Mine Countermeasure Mission Package Testing

Mine Warfare	
Mine Countermeasure Mission Package Testing	
Short Description	Vessels and associated aircraft conduct mine countermeasure operations.
Long Description	Ships conduct mine detection using unmanned submersible and aerial vehicles, magnetic and acoustic sensor systems deployed by vessel or support helicopters, and high-energy laser systems. Mines are then neutralized using magnetic, acoustic, explosive, and supercavitating systems.
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Rotary-Wing Aircraft, Surface Combatant, Unmanned Aerial Vehicle - Rotary Wing Aircraft, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Electromagnetic Systems, Sonar Systems – Other, Unmanned Vehicle Systems **Munitions:** Bombs, Mine Warfare Devices
Active Sonar	MFH, HFM
In-Water Explosives	E4
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Aerial deployed mines and non-explosive bombs Explosive mine countermeasure and neutralization (no divers) Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL (CPAAA, Tanner/Cortes Training Minefield)
	SSTC (Imperial Beach Minefield)
	Hawaii Range Complex (Kahoolawe Sub Training Minefield, PMRF Training Area)

A.2.3.3.3 Mine Detection and Classification Testing

Mine Warfare	
Mine Detection and Classification Testing	
Short Description	Air, surface, and subsurface vessels and systems detect and classify mines and mine-like objects. Vessels also assess their potential susceptibility to mines and mine-like objects.
Long Description	Mine detection and classification systems require testing to evaluate the capability of generating underwater magnetic and acoustic signature fields as well as sonar systems that can detect, and classify a wide range of threat mines at tactically different water depths. Surface craft may deploy an underwater sensor system that uses ship signature to develop a susceptibility profile against mine-like objects. In order to develop better and safer methods of minesweeping, the Navy is currently testing new systems to detect locate, identify, and avoid mines including a laser airborne mine detection system that uses laser illumination coupled with sensitive electro-optic receivers to find mines in the upper part of the water column. These systems allow for identification of threat materials in an undersea environment without opening or touching the objects. This type of equipment has traditionally been designed for operation from a manned helicopter; however, the Navy is developing the capability to operate from unmanned aerial systems. The Navy is also developing new threat detection electromagnetic (X-ray) systems that allow for identification of threat materials in an undersea environment without opening or touching the objects. Testing will involve placing targets on the seabed or water column and employing the use of detection systems deployed from a Remotely Operated Vehicle to inspect the objects.
Typical Components	**Platforms:** Fleet Support Vessel, Moored Platform, Range, Submarine, Support Craft, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Sonar Systems - Hull Mounted **Munitions:** None
Active Sonar	HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Non-explosive aerial-deployed mines and bombs Unmanned vehicles
Parameters for Analysis	Some mine shapes could be deployed for a specific event, and then retrieved afterwards. However, some mine shapes are left in place so that multiple events could use the same shapes without needing to redeploy. The in-air low energy laser stressor was used in analysis of potential impacts on human resources.

Location (typical specific location where applicable)	Phase IV Requirement 2025-2032
	PMSR
	SOCAL
	SSTC (Imperial Beach Minefield, Tanner/Cortes Training Minefield)
	Hawaii Range Complex (Kahoolawe Sub Training Minefield)

A.2.3.4 Surface Warfare

Testing of weapons used in surface warfare is conducted to develop new technologies and to assess weapon performance and operability with new systems and platforms, such as unmanned systems. Tests include various surface-to-surface guns and missiles. Testing events may be integrated into training activities. In most cases the tested systems are used in the same manner in which they are used for fleet training activities.

A.2.3.4.1 Gun Testing – Large Caliber

Surface Warfare	
Gun Testing – Large Caliber	
Short Description	Surface crews test large-caliber guns to defend against surface targets.
Long Description	Surface combatants conduct surface warfare by detecting, tracking, and prosecuting small-boat threats. Gun testing may also include the surface warfare mission package for the Littoral Combat Ship, which provides a layered strike-defensive capability by use of its embarked support aircraft, medium range surface-to-surface missiles, and 57 millimeter gun weapon system.
Typical Components	**Platforms:** Fleet Support Vessel, Rotary-Wing Aircraft, Surface Combatant **Targets:** Air Targets - Drone, Air Targets - Other, Surface Targets - Floating, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Projectile - Large Caliber, Projectile – Medium Caliber, Projectile – Small Caliber, Torpedoes – Exercise
Active Sonar	HFH
In-Water Explosives	E3, E5
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive gunnery Non-explosive gunnery Towed in-water devices Weapon firing noise
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL

A.2.3.4.2 Gun Testing – Medium Caliber

Surface Warfare	
Gun Testing – Medium Caliber	
Short Description	Surface crews test medium-caliber guns to defend against surface targets.
Long Description	Surface combatants conduct surface warfare by detecting, tracking, and prosecuting small-boat threats. Gun testing may also include the surface warfare mission package on the Littoral Combat Ship, which provides a layered strike-defensive capability by use of its embarked support aircraft, medium range surface-to-surface missiles, and 30 mm gun weapon system.
Typical Components	**Platforms:** Contracted Aircraft, Fleet Support, Surface Combatant **Targets:** Air Targets - Other, Surface Targets - Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** None **Munitions:** Projectile - Large Caliber, Projectile - Medium Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Explosive gunnery Non-explosive gunnery Towed in-water devices Weapon firing noise
Parameters for Analysis	This activity includes in-air explosive gunnery at low altitudes.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL

A.2.3.4.3 Gun Testing – Small Caliber

Surface Warfare	
Gun Testing – Small Caliber	
Short Description	Surface crews test small-caliber guns to defend against surface targets.
Long Description	Small-caliber guns are fired from surface vessels. This testing also includes anti-terrorism/force protection. During this event, surface craft surface targets will make threat profile approaches to the ship. Ship will demonstrate small-caliber gun testing with non-explosive projectiles against the threat target. Small-caliber gun testing includes other class ship sea trials and surface warfare mission package testing.
Typical Components	**Platforms:** Fleet Support Vessel **Targets:** None **Systems being Trained/Tested:** None **Munitions:** Projectile - Small Caliber
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Non-explosive gunnery Towed in-water devices
Parameters for Analysis	400–2,000 projectiles per event. Ships may not be conducting tests consistently for the entire duration.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL

A.2.3.4.4 Missile and Rocket Testing

Surface Warfare	
Missile and Rocket Testing	
Short Description	Missile and rocket testing includes various missiles or rockets fired from submarines and surface combatants. Testing of the launching system and ship defense is performed.
Long Description	Missile and rocket testing includes various missiles or rockets (standard missiles, Water Piercing Missile Launch) fired from submarines and surface combatants. Testing may occur during surface combatant sea trials and surface warfare mission package testing. This activity includes both air warfare and surface warfare events.
Typical Components	**Platforms:** Fleet Support Vessel, Submarine, Surface Combatant **Targets:** Air Targets - Drone, Land Targets, Surface Targets - Maneuvering **Systems being Trained/Tested:** None **Munitions:** Subsurface-to-Surface Missiles, Surface-to-Air Missiles
Active Sonar	No
In-Water Explosives	E6, E7, E8, E10
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Includes explosive bins at low and medium altitudes. Targets used during non-explosive tests will be recovered. Explosive missiles will detonate either in the air or at the water's surface. Ships will not be conducting test constantly for the entire duration.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Hawaii Range Complex (PMRF Training Area)

A.2.3.5 Unmanned Systems

A.2.3.5.1 Underwater Search, Deployment, and Recovery

Unmanned Systems	
Underwater Search, Deployment, and Recovery	
Short Description	Various underwater, bottom crawling, robotic, vehicles are utilized in underwater search, recovery, installation, and scanning activities.
Long Description	Subsurface activities include a variety of underwater vehicles, robotic or autonomous systems, and items placed on the seafloor. This activity will include demonstration and testing of new technologies using low power magnetic resonance for point-to-point diver communications. Diving activities and special operations training also occur. Other subsurface activities involve manned and unmanned underwater vehicles. All subsurface vehicles are retrieved after use, while most objects (e.g., non-explosive mines) remain for a period of time to be used as testing fixtures. The Navy is developing new technologies using low power magnetic resonance for point-to-point diver communications. Testing will involve the use of surface vessels and divers in the water testing the effectiveness of communication.
Typical Components	**Platforms:** All Navy Ships and Boats, Rotary-Wing Aircraft, Small Boat, Unmanned Aerial Vehicle - Fixed Wing, Unmanned Aerial Vehicle - Rotary Wing, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Unmanned vehicles Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	Port Hueneme Harbor
	Naval Base San Diego
	PMSR
	SOCAL
	SSTC (Imperial Beach Minefield)

A.2.3.5.2 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.
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:** Support Craft, Unmanned Surface Vehicle, Unmanned Underwater Vehicles **Targets:** Sub-surface Targets - Stationary **Systems being Trained/Tested:** Oceanographic - Other, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Port Hueneme Harbor

A.2.3.5.3 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.
Long Description	Unmanned underwater vehicle testing ranges from single-vehicle tests to evaluate hydrodynamic parameters, to full mission, multiple vehicle functionality assessments. Most unmanned underwater vehicle operations include a launch, transit, mission profile execution, and recovery operations. Unmanned underwater vehicles include modular, multi-mission platforms and their payloads, and anti-submarine warfare targets. Nets could be used during some extra-large UUV testing activities to test subsurface obstacle avoidance. These tests would occur only during daylight hours. All nets and other obstacle avoidance "targets" would be recovered at the end of each exercise. Placement of submerged nets and other obstacles would avoid sensitive habitats and high-traffic areas.
Typical Components	**Platforms:** Extra Large Unmanned Underwater Vehicle, Support Craft, Unmanned Underwater Vehicle **Targets:** Mine Targets, Sub-surface Targets - Stationary **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems - Other, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	MFM, HFL, HFM, VHFL, VHFH, Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles Towed in-water devices
Parameters for Analysis	Some mine shapes could be deployed for a specific event, and then retrieved afterwards. However, some mine shapes are left in place so that multiple events could use the same shapes without needing to redeploy. Multiple vehicles may operate simultaneously in one or multiple areas.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	Port Hueneme Harbor
	SOCAL
	Hawaii Range Complex (Pearl Harbor)

A.2.3.6 Vessel Evaluation

A.2.3.6.1 Air Defense Testing

Vessel Evaluation	
Air Defense Testing	
Short Description	Tests the ship's capability to detect, identify, track, and successfully engage live and simulated targets. Gun systems are tested using explosive and non-explosive projectiles.
Long Description	Air Defense tests are conducted in clear and varied electronic attack environments, using a mix of missile firings to verify the ship's capability to detect, identify, track, and successfully engage live and simulated targets. The tests include testing the radar's track load in the presence of debris, long range engagement processing, low-elevation detection and tracking, track load in the presence of electronic attack and chaff, and missile performance. Tests currently include firing of the 5 inch .62-caliber gun, and will potentially include a 155 millimeter gun.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Contracted Aircraft, Fixed Wing – Adversary Aircraft, Fixed Wing - Electronic Warfare Aircraft, Fixed Wing – Strike Aircraft, Fleet Support Vessel, Surface Combatant **Targets:** Air Targets - Drone, Air Targets - Other **Systems being Trained/Tested:** None **Munitions:** Projectile - Large Caliber, Projectile - Medium Caliber, Rockets, Surface-to-Air Missiles
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels Weapon firing noise
Parameters for Analysis	Includes in-air explosive bins at low and medium altitudes.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Hawaii Range Complex (PMRF Training Area))

A.2.3.6.2 In-Port Maintenance Testing

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

A.2.3.6.3 Propulsion Testing

Vessel Evaluation	
Propulsion Testing	
Short Description	Ship is run at high speeds in various formations and at various depths.
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.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Fleet Support Vessel **Targets:** Surface Targets - Floating **Systems being Trained/Tested:** Propulsion Systems **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Ships will not be conducting test constantly for the entire duration. Ships may not be traveling in a straight line. Ships will operate across the full spectrum of capable speeds. During surface combatant sea trials full-power runs are conducted for a total of 4 hours, and endurance runs are conducted for a total of 2 hours.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.2.3.6.4 Signature Analysis Operations

Vessel Evaluation	
Signature Analysis Operations	
Short Description	Surface ship and submarine testing of electromagnetic, acoustic, optical, and radar signature measurements.
Long Description	Signature analysis activities include electromagnetic, acoustic, optical, and radar signature measurements, recording, and post-run analyses of data of Navy surface and subsurface vessels. These activities include electromagnetic signature measurement, calibration, and detection of submarines, acoustic and magnetic signature detection of unmanned underwater vehicles and surface ships, radar, and optical detection of surface ships. Testing includes intelligence, surveillance, reconnaissance missions.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Moored Platform, Submarine, Support Craft **Targets:** None **Systems being Trained/Tested:** Acoustic Communications **Munitions:** None
Active Sonar	MFM, HFM
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	Naval Base San Diego
	Hawaii Range Complex

A.2.3.6.5 Small Ship Shock Trial

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

A.2.3.6.6 Submarine Sea Trials – Weapons System Testing

Vessel Evaluation	
Submarine Sea Trials – Weapons System Testing	
Short Description	Submarine weapons and sonar systems are tested at-sea to meet the integrated combat system certification requirements.
Long Description	Submarine weapons and sonar systems are tested at-sea to meet the integrated combat system certification requirements. This test involves subjecting the integrated combat system through rigorous testing which consists of passive and active sonar activities, launching 'water slugs' and exercise torpedoes.
Typical Components	**Platforms:** Moored Platform, Submarine, Support Craft **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems - Hull Mounted, Sonar Systems - Other, Underwater Range Systems **Munitions:** Torpedoes - Exercise
Active Sonar	MFL, MFH, HFM, HFH, Broadband (LF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.2.3.6.7 Surface Warfare Testing

Vessel Evaluation	
Surface Warfare Testing	
Short Description	Tests the capabilities of shipboard sensors to detect, track, and engage surface targets. Testing may include ships defending against surface targets using explosive and non-explosive projectiles, gun system structural test firing and demonstration of the response to Call for Fire against land based targets (simulated by sea-based locations).
Long Description	Surface warfare events are gun weapons system tests conducted in a clear environment to demonstrate the capability of shipboard and remote (helicopter) sensors to detect and track surface or land based (simulated by sea based locations) targets and engage targets with simulated and live gun and missile firings. Testing can also include structural test firing.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Fixed Wing – Adversary Aircraft, Fixed Wing - Electronic Warfare Aircraft, Fixed Wing – Other Aircraft, Fixed Wing – Patrol Aircraft, Fixed Wing – Strike Aircraft, Rotary-Wing Aircraft, Submarine, Support Craft, Surface Combatant **Targets:** Air Targets - Drone, Air Targets - Other, Sub-surface Targets - Maneuvering, Surface Targets - Floating, Surface Targets - Maneuvering, Surface Targets - Towed **Systems being Trained/Tested:** Sonobuoys **Munitions:** Projectile - Large Caliber, Projectile - Medium Caliber, Projectile - Small Caliber, Rockets, Surface-to-Air Missiles, Surface-to-Surface Missiles, Torpedoes - Exercise
Active Sonar	MFM, HFH
In-Water Explosives	E3, E5, E6, E7, E8, E9
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Explosive gunnery Explosive missiles and rockets Non-explosive gunnery Non-explosive missiles and rockets Towed in-water devices Weapon firing noise
Parameters for Analysis	Specific modeling areas for this activity include SOAR. Includes explosive bins at high altitudes. Ships will not be conducting tests constantly for the entire duration.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Hawaii Range Complex (PMRF Training Area)

A.2.3.6.8 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 ship's ability to detect, track, and engage undersea targets.
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.
Typical Components	**Platforms:** Fleet Support Vessel, Rotary-Wing Aircraft, Submarine, Support Craft, Surface Combatant, Unmanned Surface Vehicle **Targets:** Sub-surface Targets - Maneuvering **Systems being Trained/Tested:** Sonar Systems - Dipping, Sonar Systems - Hull Mounted, Sonar Systems – Mine Warfare, Sonobuoys **Munitions:** Air-to-Surface Missiles, Torpedoes - Exercise
Active Sonar	MF1, MFM, MFH, HFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Non-explosive missiles and rockets Towed in-water devices
Parameters for Analysis	Five targets per event. All sonobuoys have a parachute unless otherwise noted. Ships will not be conducting test constantly during the entire duration.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex (PMRF Training Area)

A.2.3.6.9 Vessel Signature Evaluation

Vessel Evaluation	
Vessel Signature Evaluation	
Short Description	Surface ship, submarine, and auxiliary system signature assessments. This may include electronic, radar, acoustic, infrared and magnetic signatures.
Long Description	Radar cross signature testing of surface ships and submarines is accomplished on new ships and periodically throughout a ship's life cycle to measure how detectable the ship is to radar. For example, Assessment Identification of Mine Susceptibility assessments are passive electromagnetic and acoustic measurements performed on mine countermeasure ships and on the Littoral Combat Ship mine countermeasure modules (i.e., auxiliary systems) to determine their mine susceptibility using seafloor deployed magnetometers and hydrophones, and a ship-board global positioning sensor tracking system. Signature testing of all surface ships and submarines verifies that each vessel's signature is within specifications, and may include the use of helicopter-deployed instrumentation, ship-mounted safety and navigation systems, fathometers, tracking devices, radar systems, and underwater communications equipment. Also included in this activity is the Shipboard Electronic Systems Evaluation Facility which conducts measurements of antenna radiation patterns, Federal Aviation Administration identification of Friend or Foe systems, and Tactical Air Navigation Systems.
Typical Components	**Platforms:** Amphibious Warfare Vessel, Surface Combatant **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL (San Clemente Island)

A.2.3.7 Other Testing

A.2.3.7.1 Acoustic and Oceanographic Research

Other Testing Activities	
Acoustic and Oceanographic Research	
Short Description	Research using active transmissions from sources deployed from ships, aircraft, and unmanned underwater vehicles. Research sources can be used as proxies for current and future Navy systems.
Long Description	Active acoustic transmissions used for engineering tests of acoustic sources, validation of ocean acoustic models, tests of signal processing algorithms, characterization of acoustic interactions with the ocean bottom, fish, and ocean surface. Standard oceanographic research testing (acoustic Doppler current profiler, fathometer-like systems) also to be employed.
Typical Components	**Platforms:** Moored Platform, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems – Other, Sonar Systems – Towed, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	LFM, MFM, MFH, HFM, Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	Hawaii Range Complex (PMRF Training Area)

A.2.3.7.2 Countermeasure Testing

Other Testing Activities	
Countermeasure Testing	
Short Description	Countermeasure testing involves the testing of systems that will detect, localize, and track incoming weapons, including marine vessel targets. Testing includes surface ship torpedo defense systems and marine vessel stopping payloads.
Long Description	Countermeasure testing involves the testing of systems that will detect, localize, and track incoming weapons, including marine vessel targets. At-sea testing of the Surface Ship Torpedo Defense systems includes towed acoustic systems, torpedo warning systems, and countermeasure anti-torpedo subsystems. Some countermeasure scenarios would employ non-explosive torpedoes against targets released by secondary platforms (helicopter or submarine). While surface vessels are in transit, countermeasure systems may be used to identify false alert rates. Testing of the maritime vessel stopping payloads will deliver the appropriate measure(s) to affect a target vessel's propulsion and associated control surfaces to significantly slow and potentially stop the advance of the vessel.
Typical Components	**Platforms:** Aircraft Carrier, Rotary-Wing Aircraft, Surface Combatant **Targets:** Air Targets - Other, Sub-surface Targets - Maneuvering, Surface Targets - Floating **Systems being Trained/Tested:** Countermeasures **Munitions:** Rockets, Torpedoes - Exercise
Active Sonar	MFM, MFH, HFH, VHFH, Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles
Parameters for Analysis	Not all events will include the use of acoustics.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032** SOCAL Hawaii Range Complex (Kalohi Channel, Pailolo Channel, Maui Basin, Alalakeiki Channel, PMRF Training Area)

A.2.3.7.3 Insertion/Extraction

Other Testing Activities	
Insertion/Extraction	
Short Description	Testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances.
Long Description	Testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances. Testing could include the use of forces deployed from submerged submarines while at sea.
Typical Components	**Platforms:** Fleet Support Vessel, Submarine **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Sonobuoys **Munitions:** None
Active Sonar	LFH, HFM, Broadband (LF to MF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels
Parameters for Analysis	Test will not occur constantly throughout duration. For biological resource analysis, vessel noise and vessel strike are only analyzed for the periods while the submarines are surfaced, typically brief in nature. Mitigation measures related to vessel movement are only considered during the period of surfacing as well. For human resource stressor analysis, physical disturbance and strike and physical interactions are only analyzed for the periods while the submarine are surfaced, typically brief in nature.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.2.3.7.4 Non-Acoustic Component Testing

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

A.2.3.7.5 Semi-Stationary Equipment Testing

Other Testing Activities	
Semi-Stationary Equipment Testing	
Short Description	Semi-stationary equipment (e.g., hydrophones) is deployed to determine functionality.
Long Description	Semi-stationary equipment testing is performed from a fixed site, suspended over the side of a boat, moored to the bottom, suspended in the water column, or on the surface. Examples of semi-stationary equipment include moored hydrophones (i.e., devices to listen to underwater sound), line arrays (i.e., multiple hydrophones) deployed on the ocean bottom, acoustic countermeasures, a moored oceanographic sensor that moves vertically through the water column, and sonobuoys (i.e., expendable sonar systems). Some units produce sound in the water (e.g., acoustic countermeasures), while others only listen (e.g., passive sonobuoys, vector sensors that measure particle motion). Some tests could require deployment in an area that provides opportunistic data collection (e.g., placing a hydrophone near a shipping lane to collect shipping noise data), or with specific geographic or oceanographic requirements.
Typical Components	**Platforms:** Moored Platform, Structure **Targets:** None **Systems being Trained/Tested:** Distributed Systems **Munitions:** Demolition Devices
Active Sonar	HFH
In-Water Explosives	E4
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Explosive mine countermeasure and neutralization (no divers)
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032** Naval Base San Diego Hawaii Range Complex (Pearl Harbor)

A.2.3.7.6 Simulant Testing

Other Testing Activities	
Simulant Testing	
Short Description	The capability of surface ship and aircraft defense systems to detect and protect against chemical and biological attacks are tested.
Long Description	The capabilities of surface ship defense systems to detect and protect in the event of chemical and biological attacks are tested. Testing involves the deployment of harmless compounds (i.e., simulants) as substitutes for chemical and biological warfare agents. Because chemical and biological warfare agents remain a security threat, the Department of Defense uses relatively harmless compounds (simulants) as substitutes for chemical and biological warfare agents to test equipment intended to detect their presence. Chemical and biological agent detectors monitor for the presence of chemical and biological warfare agents and protect military personnel and civilians from the threat of exposure to these agents. The simulants trigger a response by sensors in the detection equipment without irritating or injuring personnel involved in testing detectors.
Typical Components	**Platforms:** Fixed Wing – Other Aircraft, Surface Combatant **Targets:** None **Systems being Trained/Tested:** None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vessels
Parameters for Analysis	Examples of Chemical Simulants: glacial acetic acid, triethyl phosphate Examples of Biological Simulants: spore-forming bacteria, non-spore-forming bacteria, the protein ovalbumin, MS2 bacteriophages, and the fungus *Aspergillus niger*
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL

A.2.4 Naval Information Warfare Systems Command

A.2.4.1 Acoustic and Oceanographic Science and Technology

A.2.4.1.1 Acoustic, Oceanographic, and Energy Research

Acoustic and Oceanographic Science and Technology	
Acoustic, Oceanographic, and Energy Research	
Short Description	Research and testing utilizing the marine environment for acoustics, oceanographic research, novel techniques for energy generation, and research in support of marine mammal sciences.
Long Description	Testing includes activities utilizing the marine environment for research, development, test, and evaluation of activity-related systems. Tests may involve radar, environmental sensors, magnetic sensors, passive and active acoustic sensors, optical sensors, and lasers. Instrumentation would be temporarily placed in the water column, seafloor, and recovered upon completion of testing. Surface operations would utilize a variety of vessels including unmanned surface and subsurface vehicles, and temporary moorings and buoys for deployment, operation, and testing. Energy research would include the development and testing of energy harvesting and storage technologies, maritime charging stations, remote communications, and associated infrastructure. This testing would also include bioacoustics research in support of marine mammal science.
Typical Components	**Platforms:** Moored Platform, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems - Other, Sonar Systems - Towed, Unmanned Vehicle Systems, Laser, Radar, Energy Harvesting and Charging **Munitions:** None
Active Sonar	LFM, MFM, MFH, HFM, Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL
	SOCAL Nearshore (San Diego Bay)
	Hawaii Range Complex (Pearl Harbor)

A.2.4.2 Other Testing Activities

A.2.4.2.1 Communications

Other Testing Activities	
Communications	
Short Description	Testing communications and networks.
Long Description	Communications testing may include following activities: • Develop and test real-time command-and-control communication networks that function above, on, and under the ocean. • Testing underwater network systems that may include fiber-optic cables, laser communications, and acoustic modem networks. Testing would include the temporary placement of fiber-optic cable, communication nodes, and other instrumentation on the seafloor. Underwater fiber-optic nodes (or endpoints) may also be connected via cable to temporary surface communications buoys. Testing would include air to water communications, such as radio frequency and laser.
Typical Components	**Platforms:** Aerostat, Fixed Wing Aircraft, Moored Platform, Remotely Operated Underwater Vehicle, Support Craft, Unmanned Aerial Vehicle, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** None **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems - Other **Munitions:** None
Active Sonar	Broadband (LF to MF)
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles
Parameters for Analysis	None
Location	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.2.4.2.2 Intelligence, Surveillance, Reconnaissance

Other Testing Activities	
Intelligence, Surveillance, Reconnaissance	
Short Description	Testing ISR technologies may include mine detection and classification; detection and classification of targets of interest; devices under test on submarine cables; systems to detect mine shapes on ship hulls and pier structures; sensors for swimmer interdiction and other threats; and instrumentation that can detect explosive, radioactive, and other signatures.
Long Description	Intelligence, Surveillance, and Reconnaissance systems testing may include the following activities: • Testing undersea technologies that improve the Navy's capability to conduct effective anti-submarine warfare operations in littoral waters. Such tests would measure undersea surveillance performance using electromagnetic or passive acoustic sensors and active transducers. Acoustic modems/communications transducers would be used to send messages. Systems may also employ towed devices, remotely operated vehicles, or unmanned underwater vehicles. Acoustic releases would be used for the recovery of seafloor-mounted or water column-suspended hardware. • Semi-stationary equipment testing is performed from a fixed site, suspended over the side of a boat, moored to the bottom, suspended in the water column, or on the surface. Semi-stationary equipment may include moored hydrophones (i.e., devices to listen to underwater sound), line arrays (i.e., multiple hydrophones) deployed on the ocean bottom, acoustic countermeasures, a moored oceanographic sensor that moves vertically through the water column, and transducers. • Mine detection and classification testing to evaluate the capability of generating underwater magnetic and acoustic signature fields, andsonar systems that can detect and classify a wide range of threat mines at various water depths. • Devices at test on submarine cables • Testing sensor systems to detect mine shapes on ship hulls and pier structures. • Testing of sensors for swimmer interdiction and other threats. • Testing of instrumentation that can detect explosive and radioactive signatures of concern.
Typical Components	**Platforms:** Moored Platform, Small Boat, Support Craft, Remotely Operated Vehicle, Unmanned Aerial Vehicle - Fixed Wing Aircraft, Unmanned Aerial Vehicle - Rotary Wing Aircraft, Unmanned Bottom Crawler, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Acoustic Communications, Air Gun, Sonar Systems - Other, Sonar Systems - Towed, Unmanned Vehicle Systems **Munitions:** Demolition Devices
Active Sonar	LFH, MFL, MFM, MFH, HFL, HFM, VHFH, Broadband (LF), Broadband (LF to HF), Broadband (MF to HF)
In-Water Explosives	No

Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles
Parameters for Analysis	Multiple areas modeled in SOCAL for this activity along with HRC.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	PMSR
	SOCAL (CPAAA, San Clemente Island)
	Naval Base San Diego
	SSTC (Boat Lanes – North and South)
	Hawaii Range Complex (Pearl Harbor)

A.2.4.2.3 Vehicle Testing

Other Testing Activities	
Vehicle Testing	
Short Description	Testing of surface and subsurface vehicles and sensor systems, which may involve Unmanned Underwater Vehicles, gliders, and Unmanned Surface Vehicles.
Long Description	The vehicle testing and sensor systems may include the following: • General testing of the navigational and tracking systems for Unmanned Underwater Vehicles and Unmanned Surface Vehicles of all sizes. Testing could include autonomous transit of up to 60 days for certain vehicles. • Testing of unmanned vehicles with mine-hunting sensors and magnetic mine countermeasure systems in shallow water environments and in and around rocky outcroppings. This type of testing supports inert mine-hunting systems and provides training to Navy personnel on approaches to deploy, detect, and defend against mine systems using unmanned undersea vehicles. • Testing of underwater surveillance systems and anti-submarine warfare systems to detect and track surface and subsurface targets in support of classification, assessment, and response scenarios. This testing may involve multiple small unmanned underwater vehicles working collectively. Testing of passive arrays for conducting submarine detection and tracking experiments and demonstrations. The arrays are composed of hydrophones to receive acoustic energy radiated by targets of interest. • Testing of autonomous vehicles and sensors for oceanographic research and meteorology. Testing would include the use of oceanography sensors to sample and characterize the ocean water column properties at spatial and temporal resolutions to measure and capturebathymetry, imagery data, conductivity, temperature and depth data, and optical data. • Testing the deployment of communication payloads and non-explosive objects from temporarily-placed seafloor devices, surface and subsurface vessels/vehicles and unmanned systems.
Typical Components	**Platforms:** Glider, Moored Platform, Remotely Operated Vehicle, Small Boat, Unmanned Aerial Vehicles, Unmanned Bottom Crawler, Unmanned Surface Vehicle, Unmanned Underwater Vehicle **Targets:** Mine Targets **Systems being Trained/Tested:** Acoustic Communications, Electromagnetic Systems, Sonar Systems - Other, Unmanned Vehicle Systems **Munitions:** None
Active Sonar	LFH, MFL, MFH, HFL, HFM, VHFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Towed in-water devices Unmanned vehicles

Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex
	Transit Corridor

A.2.5 Office of Naval Research Testing Activities

A.2.5.1 Acoustic and Oceanographic Science and Technology

A.2.5.1.1 Acoustic and Oceanographic Research

Acoustic and Oceanographic Science and Technology	
Acoustic and Oceanographic Research	
Short Description	Research involving passive acoustic and oceanographic sensing, as well as active transmissions from sources deployed from ships, aircraft, and unmanned underwater vehicles. Research sources serve as proxies for current and future Navy systems.
Long Description	Active acoustic transmissions used for engineering tests of acoustic sources, validation of ocean acoustic models, tests of signal processing algorithms, and characterization of acoustic interactions with the ocean bottom, fish and ocean surface. Standard oceanographic research sensing (acoustic Doppler current profiler, fathometer-like systems) also to be employed.
Typical Components	**Platforms:** Moored Platform, Small Boat, Support Craft, Unmanned Underwater Vehicle, Unmanned Aerial Vehicle, Unmanned Surface Vehicle, Ocean Bottom Lander **Targets:** Sub-surface Targets – Stationary, Anti-Submarine Warfare Targets – Expended **Systems being Trained/Tested:** Air Gun, Oceanographic - Other, Sonar Systems - Other **Munitions:** Signal Underwater Sound Devices,
Active Sonar	LFM, LFH, MFM, MFH, HFM, HFH, VHFM
In-Water Explosives	E1, E3
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Active acoustic sources Manned surface vessels Unmanned vehicles Explosive sonobuoys and research-based sub-surface explosives
Parameters for Analysis	Research activities may take place anywhere in the Study Area. Air guns not to be used within 3 nm of land. Explosives not to be used within 12 nm of land. Activity in marine sanctuaries limited to de minimis acoustic sources only.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	PMSR
	SOCAL
	Hawaii Range Complex

A.2.5.1.2 Large Displacement Unmanned Underwater Vehicle Testing

Acoustic and Oceanographic Science and Technology	
Large Displacement Unmanned Undersea Vehicle Testing	
Short Description	Autonomy testing and environmental data collection with Large Displacement Unmanned Undersea Vehicles.
Long Description	Large Displacement Unmanned Undersea Vehicle (LDUUV)testing includes launch, autonomous transit (up to 60 days), environmental data collection (e.g., bathymetry, water column properties, ocean surface properties) and retrieval. LDUUV testing throughout the study area will include de minimis acoustic sources (modems, imaging sonars, and fathometers) for safe navigation and data collection.
Typical Components	**Platforms:** Large Displacement Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Stationary **Systems being Trained/Tested:** –None **Munitions:** None
Active Sonar	No
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Unmanned vehicles
Parameters for Analysis	Any acoustic sources used during this activity would be de minimis and not quantitatively analyzed and therefore are not included under systems.
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	NOCAL
	SOCAL
	Hawaii Range Complex

A.2.5.1.3 Long Range Acoustic Communications

Acoustic and Oceanographic Science and Technology	
Long Range Acoustic Communications	
Short Description	Bottom mounted acoustic source will transmit a variety of acoustic communications sequences.
Long Description	Bottom mounted acoustic source will transmit a variety of acoustic communications sequences that will be recorded by a variety of fixed and mobile platforms at ranges from the 100s to the 1,000s of kilometers.
Typical Components	**Platforms:** Moored Platform, Small Boat **Targets:** None **Systems being Trained/Tested:** Oceanographic - Other **Munitions:** None
Active Sonar	LFM
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Manned surface vehicles
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	Hawaii Range Complex

A.2.5.1.4 Mine Countermeasure Technology Research

Acoustic and Oceanographic Science and Technology	
Mine Countermeasure Technology Research	
Short Description	Test involves the use of broadband acoustic sources on unmanned underwater vehicles.
Long Description	Mine countermeasure system testing on unmanned underwater vehicles to take place offshore and in coastal waters. Broadband acoustic sources on unmanned underwater vehicles will use downward directed acoustic transmissions to characterize the ocean bottom. Inert objects will be placed on the bottom to test system performance.
Typical Components	**Platforms:** Unmanned Underwater Vehicle **Targets:** Sub-surface Targets - Maneuvering, Surface Targets - Maneuvering **Systems being Trained/Tested:** Acoustic Communications, Sonar Systems - Other **Munitions:** None
Active Sonar	MFH
In-Water Explosives	No
Mitigation Involving Visual Observations for Marine Species	**Mitigation is required for the following stressors as described in Section 5.6 (Activity-based Mitigation):** Unmanned vehicles Active acoustic sources
Parameters for Analysis	None
Location (typical specific location where applicable)	**Phase IV Requirement 2025-2032**
	SOCAL
	Hawaii Range Complex

A.3 Modernization and Sustainment of Ranges

This section provides additional information about Modernization and Sustainment activities proposed in this EIS/OEIS. Examples of Modernization (upgrading or expanding) range and testing/training areas, systems, and associated components include expanding special use airspace and installing permanent in-water structures, such as cables and platforms. Sustainment activities include maintenance and repair of and around existing and upgraded structures within the Study Area.

A.3.1 Special Use Airspace Modification

The Navy proposes to expand the Study Area in the SOCAL Range Complex with a corresponding increase in special use airspace proximate to the current Warning Area 291 (W-291). The Navy is coordinating with the FAA in its non-rulemaking action for establishing the two new airspace areas.

A.3.1.1 Proposed Area Description

The new proposed airspace is described below and depicted in Figure A-1.

1. W-293. This 48,078.5 NM^2 area would include the airspace from the ocean surface to 17,000 ft. at the western end of Control 1177.

   Beginning at lat. 32°12'04"N, long. 119°42'03"W.
   to lat. 31°50'00"N, long. 119°42'03"W,
   to lat. 30°40'00"N, long. 120°50'03"W,
   to lat. 27°30'00"N, long. 127°10'04"W,
   to lat. 30°23'30"N, long. 127°48'50"W,
   to lat. 31°54'18"N, long. 121°33'12"W,
   to lat. 31°18'54"N, long. 121°10'59"W,
   to lat. 31°41'00"N, long. 120°15'03"W
   to the point of beginning.

2. W-294. This 33,878 NM^2 area would include the airspace from the ocean surface to 80,000 ft.

   Beginning at lat. 28°09'13"N, long. 120°00'00"W,
   to lat. 24°00'01"N, long. 120°00'00"W,
   to lat. 24°00'01"N, long. 125°00'03"W,
   to lat. 27°18’30"N, long. 121°00’00"W
   to the point of beginning.

The new airspace would be used intermittently when announced by Notice to Air Mission.

A.3.1.2 Need for New Airspace

The need for the additional special use airspace stems from three factors:

Tactics, Techniques, and Procedures. Additional airspace contiguous with W-291 and W-289 (PMSR) is needed to train personnel in the realistic employment of new aircraft and aerial weapon systems, unmanned aerial systems, and Tactics, Techniques and Procedures associated with Distributed Maritime

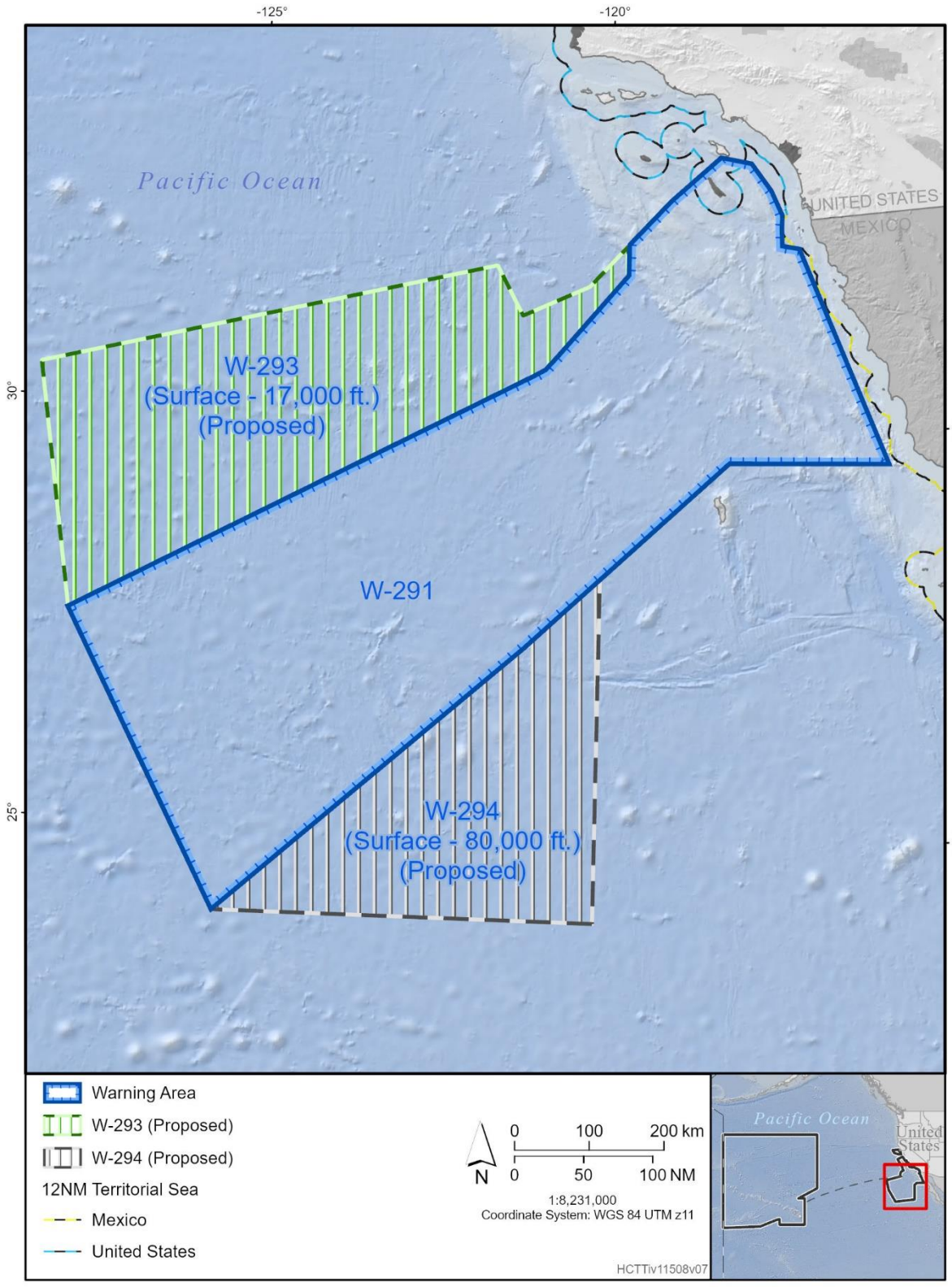

Figure A-1: Proposed Special Use Airspace

Operations. The Navy's foundation concept is built on six imperatives, including increasing distribution of the force across expanding distances. U.S. military advantages are eroding as our adversaries invest in significant technological developments, aggressive military modernization, and growing military capacity and capabilities. Proliferation of long-range precision missiles with their enhanced capabilities for extensive space denial means the United States can no longer presume security when positioning near shore operations. The air space in W-291 was originally developed to support a previous generation of aircraft, weapons, and tactics. Today, W-291 is still used as the tactical cornerstone for training and certifying all deploying Strike Groups in the Pacific. However, due to current airspace configuration constraints, W-291 no longer meets naval aviation training requirements conducted off the coast of Southern California.

Fifth Generation Aircraft. Integration of the F-35 Joint Strike Fighter (JSF) fifth generation aircraft has dramatically extended the battlefield. The F-35 is designed to replace aging fighter inventories including U.S. Air Force F-16s and A-10s, U.S. Navy F/A-18s, and U.S. Marine Corps AV-8B Harriers and F/A-18s. Traveling at Mach 1.6, the F-35 JSF is a long-range, supersonic fighter designed to gather, fuse, and distribute information far beyond ranges of current fourth generation aircraft. Onboard targeting systems provide extended range detection and precision targeting against ground targets and long-range detection of air-to-air threats. Increased range, speed and mobility, extended weapon systems, and expanded sensor capabilities of the F-35 extend hundreds of miles beyond the current size of W-291.

Consequently, the current size of W-291 restricts employment of the F-35 JSF to its full range and sensor capability and results in negative training, whereby creating habit patterns inconsistent with the full spectrum of tactical capabilities of fifth generation aircraft.

Unmanned Aerial Vehicles. Rapidly developing abilities of near-peer competitors drive the need for increased naval capability dispersed over wider areas. Unmanned Aerial Vehicles (UAVs) extend long-range warfighting capability to augment traditional combatant force, whereby providing the option for Combatant Commanders to assume greater operational risk while maintaining tactical and strategic advantage. The Navy is developing and integrating new unmanned technology to build a more lethal and distributed force. UAVs support the naval mission with enhanced technologies for maritime domain awareness with extended range and persistent Intelligence, Surveillance, Reconnaissance and Targeting capabilities.

Large UAVs are capable of significantly greater ranges than the smaller systems, so leveraging this technology with dispersed Command and Control (C2) forces requires expanding existing Special Use Airspace (SUA) in the SOCAL Range Complex. These systems provide assets capable of supporting long-range ordnance delivery. The use of ordnance poses a hazard to non-participating aircraft, so special use airspace is required to alert non-participants of potential dangers.

The Navy is expanding the Study Area to include PMSR and NOCAL Warning Areas W-283, W-285, W-260 and W-513 (Figure A-2). The expansion will support Distributed Maritime Operations via a continuous, inter-connected network of SUA and surface OPAREA from San Diego to Fort Bragg area. Establishing low level SUA between W-291 and W-289 (PMSR) establishes an UAV corridor aligning Fleet operations in W-291 to expanding Fleet operations on PMSR and north to the Central California Warning Areas.

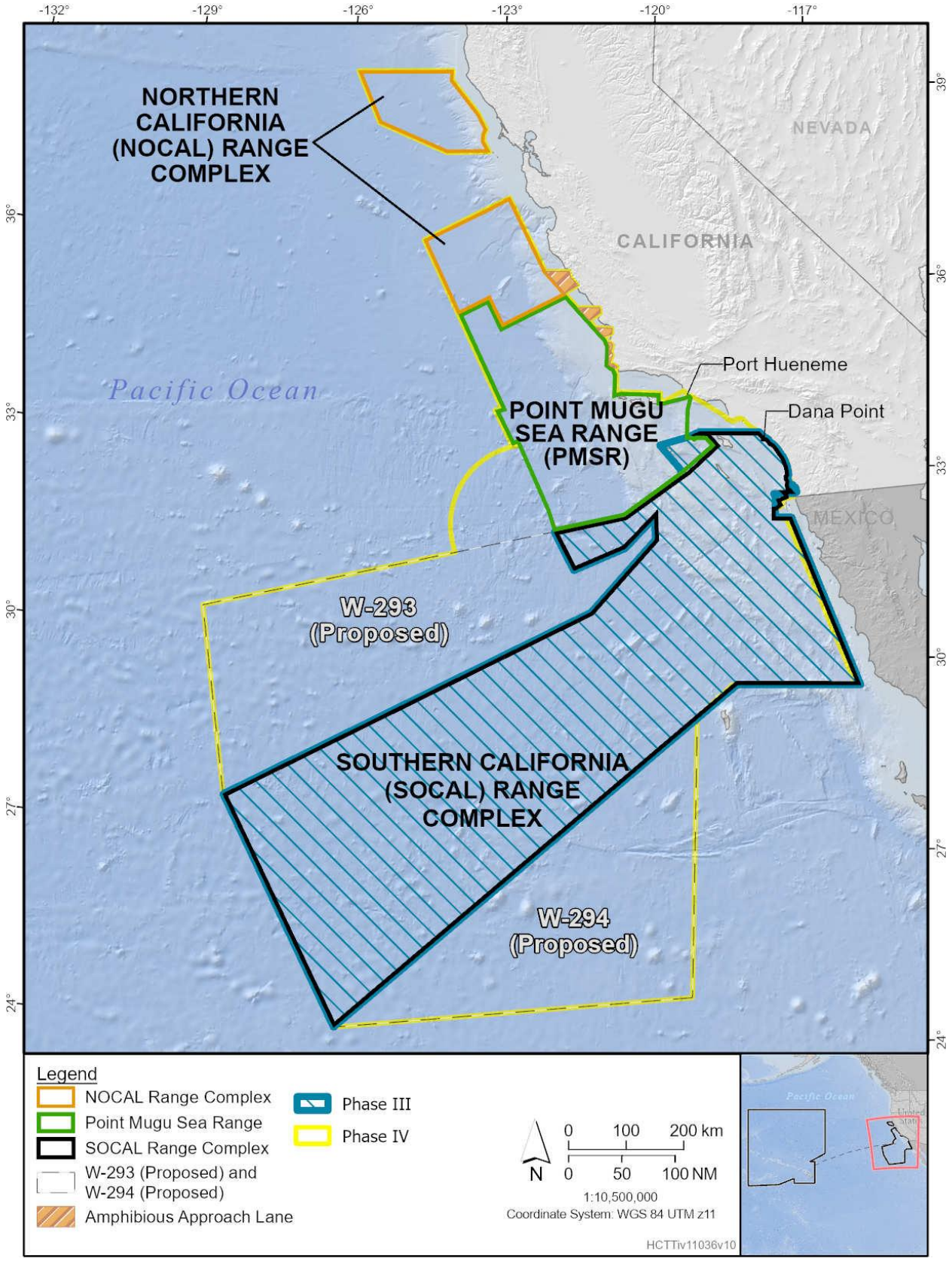

Figure A-2: California Study Area

A.3.2 Southern California Offshore Anti-Submarine Warfare Range Modernization

The Navy proposes to upgrade the existing, deep-water SOAR, located west of SCI, by installing new hydrophones and undersea cables. Maintenance of the deep-water SOAR is needed to sustain the SOAR capabilities.

The SOAR provides tactical range training and testing services to U.S. Navy units of the Pacific Fleet. Fleet readiness is a direct function of quality training, and the SOAR was designed to provide Fleet operators with this essential training. Anti-submarine warfare training is accomplished utilizing a mix of in-air and underwater instrumentation. The SOAR encompasses approximately 670 NM^2 of three-dimensional underwater tracking areas, located just west of SCI (Figure A-4). The underwater tracking range (UTR) routinely supports air, surface, and subsurface unit-level torpedo firing exercises as well as strike group training.

A.3.2.1 Proposed In-Water System Design

There are two types of sensors that will be installed during this modernization: hydrophones and underwater telephones (UWTs). Hydrophones are used to convert acoustic energy into electrical energy, and are used to receive and record sounds on the range. UWTs are used for two-way underwater communications. A node is defined as the electronic package that is deployed on the sea floor and contains one or two sensors. A node containing a single hydrophone sensor is referred to as uni-directional. A node containing two sensors (hydrophone and UWT) is referred to as bi-directional. Several nodes and the associated cabling form an array. A junction box (J-box) is the terminus of the arrays, providing the mechanical and signal interface between the internode cables for the sensor arrays and the trunk cable. The trunk cable is the section of cable from the J-box to the onshore cable termination facility at SCI.

The SOAR Refurbishment would consist of installing new arrays and leaving the old arrays in place. The exact configuration would be determined following underwater surveys of the SOAR, but would be similar to the existing SOAR layout.

All arrays will connect to the existing near-shore junction box and no additional on-shore construction is anticipated. From the underwater junction box, the existing single trunk cable will connect to the onshore cable termination shelter via Sea Shore Interface (SSI) components including four horizontal directionally drilled conduits and their underwater exit points (Figure A-3). Only one of the four conduits is used for SOAR cables, the other three are unused, containing only a corrosion inhibitor solution. These existing components (junction box, trunk cable, and cable termination shelter) will remain in use and will not be replaced. Only the arrays, nodes, and hydrophones will be replaced.

The new nodes would be overlayed approximately within the existing node locations on the seafloor. Due to the configuration of nodes on an array (some of the existing nodes are individually cabled), the cable routes in water depths greater than about 4,000 ft. (deep water) would not be exactly the same as the existing arrays. Previous installation planning and successful historical cable deployments indicates that the seafloor within SOAR is mostly flat and of constant depth with little if any underwater obstructions or seafloor anomalies. The majority of the deep water cable and node deployment would be in the overseas environment, beyond 12 NM from shore.

The array cables would follow the same general path of the existing range, avoiding steep terrains. The spreading out or turning of cables is planned to occur at a constant depth, thus avoiding placing any cables at angles to the downward slope. Historically, there have been no cable failures or installation

impediments along the existing mid-water cable route. Given proven success and existing oceanographic data, following the existing cable routes would yield successful results for the new arrays. A second reason for following the existing cables is that this route proceeds shoreward within the West Cove Restricted Area (no anchorage) where anchoring is prohibited (33 CFR 334.921).

The underwater J-box is equivalent to a distribution panel, connecting the trunk cable to the arrays. It would contain pressure housings and a bottom-mounted structure to enclose the transition between the trunk cable and the internode cables. The J-box would contain pre-terminated internode cable "pigtails" or "branching units." These pigtails shall be coiled in the box and individually raised to the surface for connecting to an individual array.

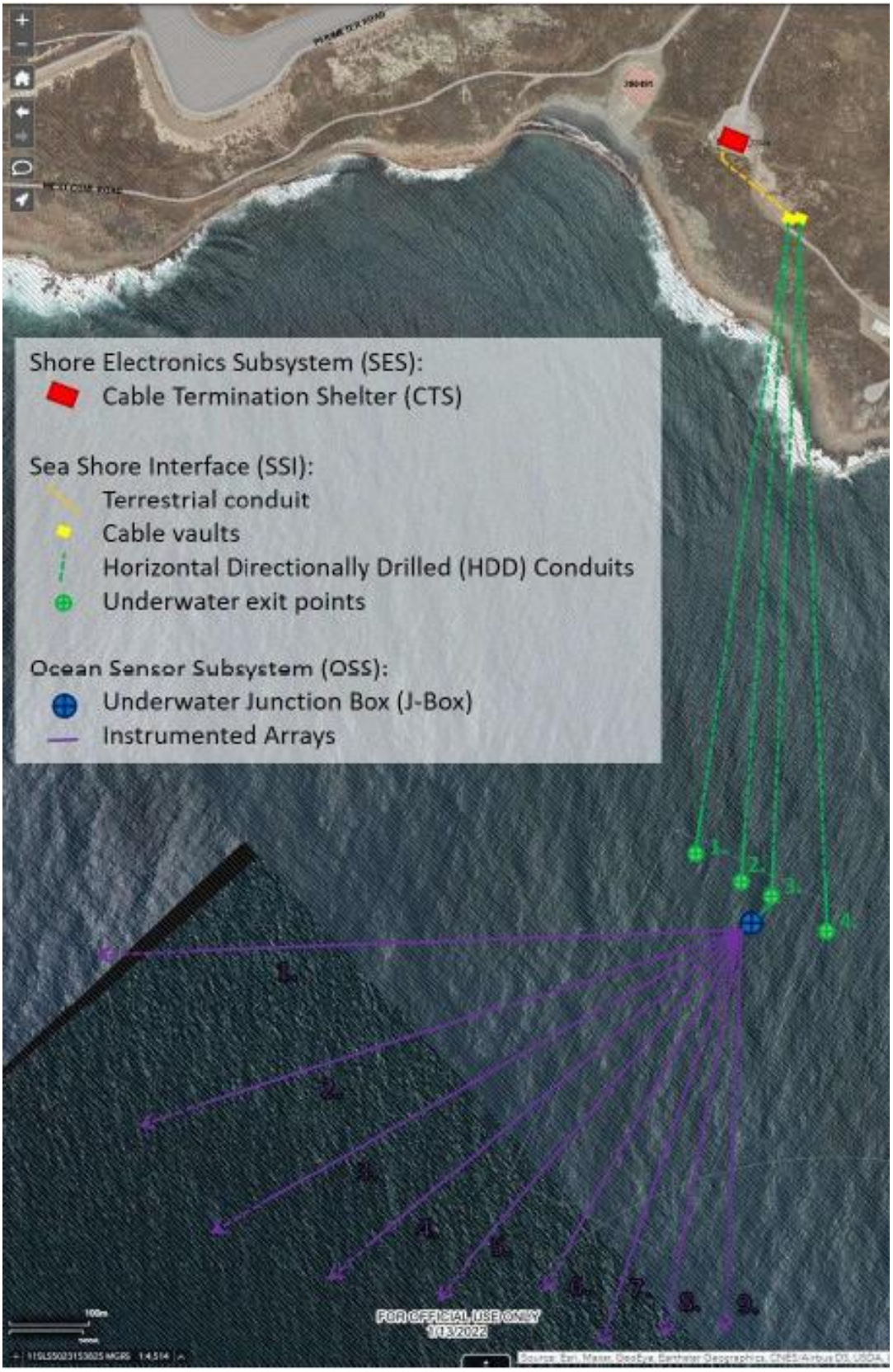

Figure A-3: SOAR Sea Shore Interface (SSI)

A.3.2.2 Cable Characteristics

Internode cable is defined as the cable sections from the J-box to the first node and all subsequent sections between nodes. The design of the internode cable would be similar to that of standard submarine telecommunication cables, including up to 6 fibers encased in multiple layers of protective sheathing steel, nylon, and/or HDPE, and waterblocking material, plus a copper conductor.

A.3.2.3 Description of the Installation

The deployment of the cables would utilize conventional cable laying machinery including a linear cable engine (LCE) and cable pans. The cable from the J-box to the first node would be double-armored and approximately 2 in. in diameter. The new SOAR cables may follow the existing cable routes as the sensors are deployed. The intent is to laterally adjust the sensor positions slightly for the new hydrophones. It is expected that the new cables would lie across existing cables as they are deployed. This is not a concern because the undersea cables for the original SOAR sensors would continue to be used to allow continuous range operations during installation and verification activities and would provide redundancy as long as the cables are operational.

During the offshore deployment of the arrays, the bi-directional and uni-directional nodes would be tested to ensure that the sensors are functional. After the installation is complete, a positional survey would be performed to locate the exact geodetic locations of the sensors on the range. The verification equipment used for the deployment verification and for the survey would use existing SOAR resources that are routinely used during normal range maintenance activities.

A.3.2.4 Maintenance

During SOAR refurbishment and recurring maintenance, divers will replace old zinc anodes from the four existing electrical seafloor cable conduits and replace corrosion inhibitor solutions in the three unused conduits (Figure A-3).

To replace the zinc anodes, divers will remove a bolt, clean the area with a wire brush, to ensure electrical connectivity, and then place a new zinc anode on the conduit. There are two zinc anodes on each conduit; all eight will be replaced. The life expectancy of the anode is typically 24-months.

There is a valve on the underwater termination point of each conduit at approximately 90 ft. depth underwater. To replace corrosion inhibitor solutions, divers will open up the valve to drain the existing corrosion inhibitor solution (0.95 percent CORTEC Vapor Phase Corrosion Inhibitor [VpCl] S-69; 99.05 percent potable water, or similar makeup) from the three unused conduits. After a majority of the conduit is drained, the divers will close the valve and the new corrosion inhibitor solution (1.5 percent CORTEC VpCl-649 BD; 98.5 percent potable water, or similar) will be pumped into the conduits from the onshore cable vaults (Figure A-3). The solution is in a concentrated liquid form and will be mixed with potable water to achieve the desired percent solution. Solutions are effective for approximately 24 months and need to be replaced on a recurring basis. For the three conduits, there is approximately 6,160 gallons of solution that will be replaced every 2 years. For each event, it is estimated this work can be completed in approximately one week during daytime hours.

The corrosion inhibitor products selected for the proposed action are routinely used for this type of application in offshore areas because of its environmentally friendly properties. Manufacturer hydrotests of the product as depicted in Holden et al. (2010) have yielded low toxicity levels and waters containing the product remain safe for many species, allowing the product to be discharged according to local specifications.

A.3.2.5 Special Conservation Measures

The following special conservation measures would be implemented to reduce potential environmental impacts during the refurbishment activities:

1. All activities would occur at sea; no on-land construction is required. SCI may be used to stage equipment and materials.
2. The Navy would maintain oversight of all contractor activities in the offshore waters throughout the installation. The Navy would conduct a safety and environmental briefing for all contractor personnel prior to installation activities. The briefing would explain existing policies regarding the sensitive biological and cultural resources at SCI and illustrate the need to minimize disturbance to cultural sites and native plants, wildlife, and marine habitats.
3. Prior to in-water construction, the Navy would issue a Notice to Mariners alerting boaters to avoid areas of installation activity. As needed, the Navy may also identify portions of the offshore work areas as exclusive use areas on its website (www.scisland.org) to avoid conflicts.
4. Vessels engaged in installation would contain sorbent booms and pads for use in the unlikely event of a fuel spill, and would adhere to all Navy and Coast Guard requirements regarding the containment, cleanup, and reporting of spills.
5. To prevent any potential impacts to abalone during cable anchoring activities, divers would not place an anchor or the cable between the anchors within 3 ft. of any abalone species.
6. Any lighting associated with the Proposed Action would be directed downward to minimize the illumination of surrounding areas.

A.3.3 Shallow Water Training Ranges Installation

The proposed action would include the installation of underwater hydrophone instrumentation systems that would establish two Shallow Water Training Ranges (SWTRs) to enhance training in conjunction with the SOAR shown in Figure A-4. The proposed instrumentation would be in the form of undersea cables and sensor nodes, similar to instrumentation currently in place in SOAR. The cables and sensors would be similar to those that instrument the current deep water SOAR. The new areas would form an integral SWTR capability for SOAR. The combination of deep water and shallow water instrumentation would support a seamless tracking interface from deep to shallow water, which is an essential element of effective ASW training. The instrumented area would be connected to shore via multiple trunk cables.

The SWTR instrumentation would be an undersea cables system integrated with hydrophone and underwater telephone sensors, called nodes, connected to each other and then connected by up to eight trunk cables to a land-based facility where the collected range data would be used to evaluate the performance of participants in shallow water training exercises. The proposed range dimensions are shown in Figure A-4 and the basic proposed features of the instrumentation and construction follow.

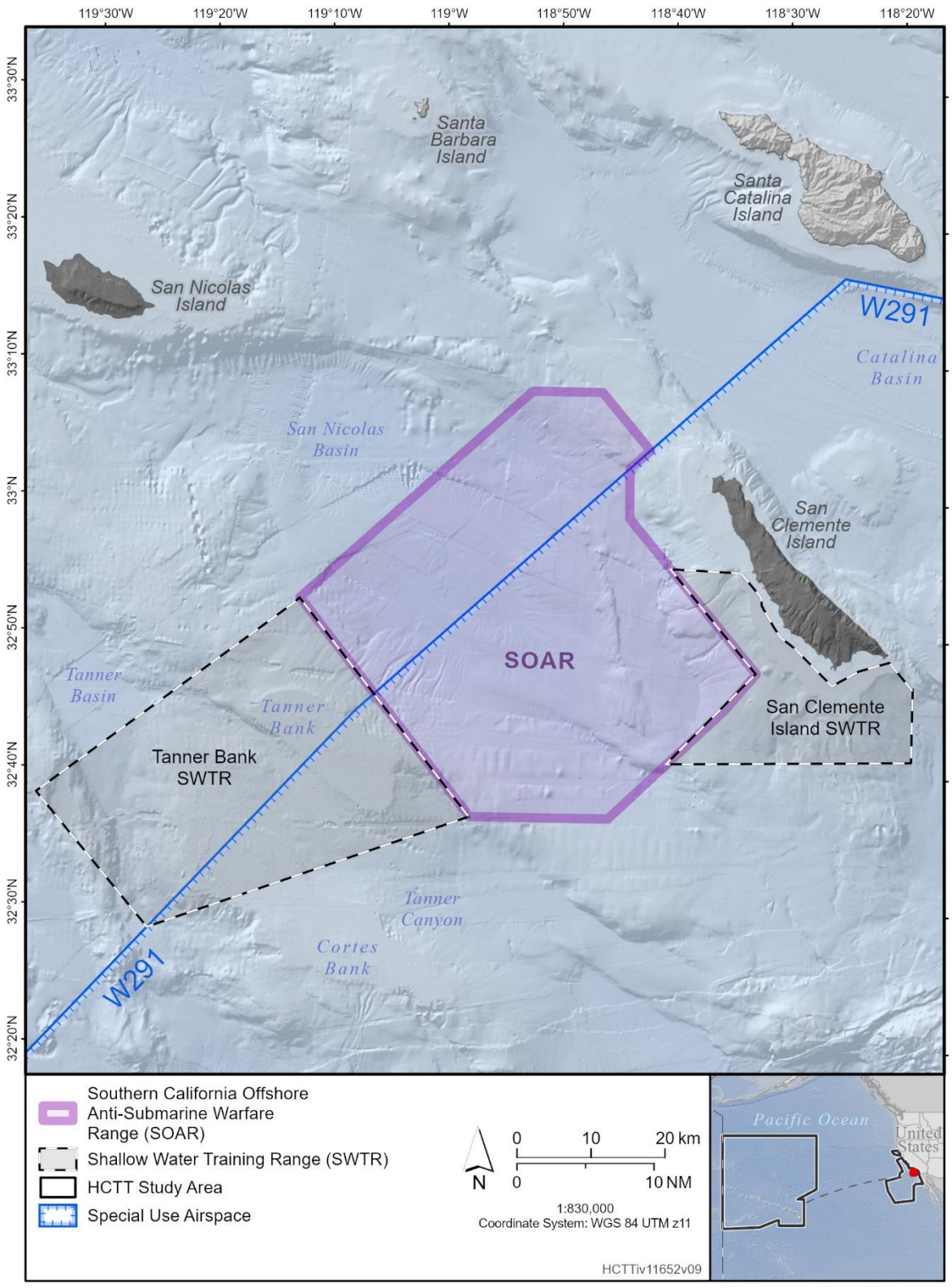

Figure A-4: Shallow Water Training Range

A.3.3.1 Background

In 1999, the Navy formally identified the requirement for a SWTR on the West Coast of the United States to improve the U.S. Navy's shallow water ASW capabilities through more effective training on an instrumented range in shallow water. The Navy completed an analysis of impacts for the construction and use of the SWTR in the 2008 SOCAL EIS/OEIS (U.S. Department of the Navy, 2008). The Record of Decision for the 2008 SOCAL EIS/OEIS (U.S. Department of the Navy, 2009) included the installation of the SWTR but the installation of the underwater hydrophone array was delayed. In 2019, the proposed SWTR boundaries were re-evaluated and slightly modified from the 2008 boundaries. Though the boundaries are slightly revised, the original requirement for deep-to-shallow water tracking and communication is still valid.

The SWTR would provide underwater instrumentation for two shallow water extensions of the current deep water SOAR. Tanner Bank SWTR would encompass an area of 388 NM^2 and SCI SWTR would encompass an area of 129 NM^2. When installed, the underwater instrumentation would increase the use of these areas for ASW training involving mid-frequency active sonar.

A.3.3.2 Installation

The SWTR instrumentation would consist of a system of undersea telecommunication cables, referred to as array cables, arranged on the seafloor and connecting a series of nodes. Each node may contain one or more transducers, which enable the transmission of sound; or a hydrophone, which receives sound and converts it into an electrical signal. The array cables would be connected to an existing underwater junction box close to shore and pulled through existing bores on the western side of SCI. The cables would terminate in the cable termination shelter where data would be transmitted to the range and used to evaluate participant performance in shallow water training exercises. Each range would require a new trunk cable and a new junction box, thus the installation of three trunk cables and three junction boxes would be a part of the Proposed Action. The basic features of the proposed instrumentation and construction are described in this appendix.

The transducer nodes are capable of both transmitting and receiving acoustic signals from ships operating within the instrumented areas of SOAR (a transducer is an instrument that converts one form of energy into another, in this case, underwater sound into an electrical signal or vice-versa). Some nodes are configured to only support receiving signals, some can both transmit and receive, and others are transmit-only versions.

The acoustic signals that are sent from the exercise participants (e.g., submarines, torpedoes, ships) to the receive-capable range nodes allow the position of the participants to be determined and stored electronically for both real-time and future evaluation. The transmit-capable nodes allow communication from the range to ships or other devices that are being tracked. More specific information is described below:

- The SWTR extension would consist of sensor nodes spread on the ocean floor over a 500-NM^2 area. The distance between nodes would vary between 0.5 NM and 3 NM, depending on water depth. Each sensor node would be similar in construction to the existing SOAR instrumentation. The sensor nodes are small spherical shapes of less than 6 inches in diameter. The sensors would be either suspended up to 15 ft. in the water column or lie flat on the seafloor. Sensor nodes located in shallow water with a presence of commercial fishing activity would have an additional protective device surrounding or overlaying a sensor. These mechanical protective devices would be 3 to 4 ft., round or rectangular, with a

shallow height. The final physical characteristics of the sensor nodes would be determined based upon local geographic conditions and to accommodate man-made threats such as fishing activity. Sensor nodes would be connected to each other by an interconnect cable (standard submarine telecommunications cable with diameters less than 1 inch).

- A series of sensor nodes would be connected via the interconnect cable to underwater junction boxes located in diver-accessible water depths. A junction box is rectangular in shape with dimensions of 10 to 15 ft. on each side. The junction boxes would connect to a shore-based facility via trunk cables (submarine cables up to 2-inch diameter with additional data capacity). The trunk cables eliminate the need to have numerous interconnect cables running to shore. Up to eight trunk cables with a combined length of 375 NM would be employed. Trunk cables would be protected in the seashore area by horizontal directionally drilled pipes running beneath the shoreline.
- The interconnecting cables and trunk cables would be deployed from a ship. The trunk cable paths would be routed through the deep water as much as is possible. The trunk cable, which passes through the seashore area, would terminate in SCORE's current cable termination facility at West Cove. From there, information gathered on the SWTR would be transmitted to the SCORE Range Operations Center. The adjacent SOAR has a single junction box located outside the nearshore area and places the trunk cable in a horizontal directionally drilled conduit that terminates onshore.
- The in-water instrumentation system would be structured to achieve a long operating life, with a goal of 20 years and minimum maintenance and repair throughout the life cycle. This is due to the high cost of performing at-sea repairs on transducer nodes and cables, the inherently long lead time to plan, permit, fund, and conduct such repairs (6 to 18 months) and the loss of range capability while awaiting completion. The long life performance would be achieved by using high-quality components, proven designs, and multiple levels of redundancy in the system design. This includes backup capacity for key electronic components and fault tolerance to the loss of individual sensors or even an entire sensor string. The use of materials capable of withstanding long-term exposure to high water pressure and salt water-induced corrosion is also important. Periodic inspection and maintenance in accessible areas also extends system life.

The Navy would submit cable area coordinates to the National Geospatial Intelligence Agency and request that the combined SWTR/SOAR area be noted on charts within the appropriate warning area. This area would be noted in the U.S. Coast Pilot as a Military Operating Area, as are other areas on the West Coast. The Navy may promulgate a Notice to Mariners and a Notice to Air Missions within 72 hours of the training activities, as appropriate.

A.3.3.3 Maintenance

Because the SWTRs would use the existing SOAR conduits described in Section A.3.2.4, and no maintenance activities would be required on the undersea cables or instrumentation, no additional maintenance activity would be required of either the Tanner Bank SWTR or SCI SWTR.

A.3.4 Sustainment of Undersea Ranges

Undersea ranges provide essential mission readiness capabilities. Range sustainment includes maintenance of systems and associated components. Maintenance may include, but is not limited to

inspections, system replacement to extend service life (e.g., anodes and clamps), replacement of corrosion inhibitor solutions, and catastrophic repairs. Sustainment activities at undersea training ranges may require the use of divers, vessels, and unmanned underwater vehicles. Vessels may be required to anchor to the seafloor. Activities may take up to several weeks at a time.

A.3.5 Deployment of Seafloor Cables and Instrumentation

The Navy proposes to deploy fiber-optic cables along the seafloor in three locations in the HCTT Study Area: south and west of SCI in the California OPAREA, to the north east of Oahu and to the west of Kauai in the Hawaii Study Area.

A.3.5.1 California Study Area Cable Expansion

In the California Study Area, an existing trunk cable (submarine fiber-optic cable) system would be expanded, involving approximately 600 kilometers (km) of fiber-optic cable with several junction boxes installed along the cable for devices under test. A submarine fiber-optic cable currently extends from SCI west into deep water (typically greater than 1,500 ft. deep). None of the installation would take place in shallow water, with the new cable starting approximately 100 NM from SCI and going further west from there (Figure A-5).

The cable allows for data transmission and would be used for a variety of tests described previously in Section A.2 (Testing Activities).

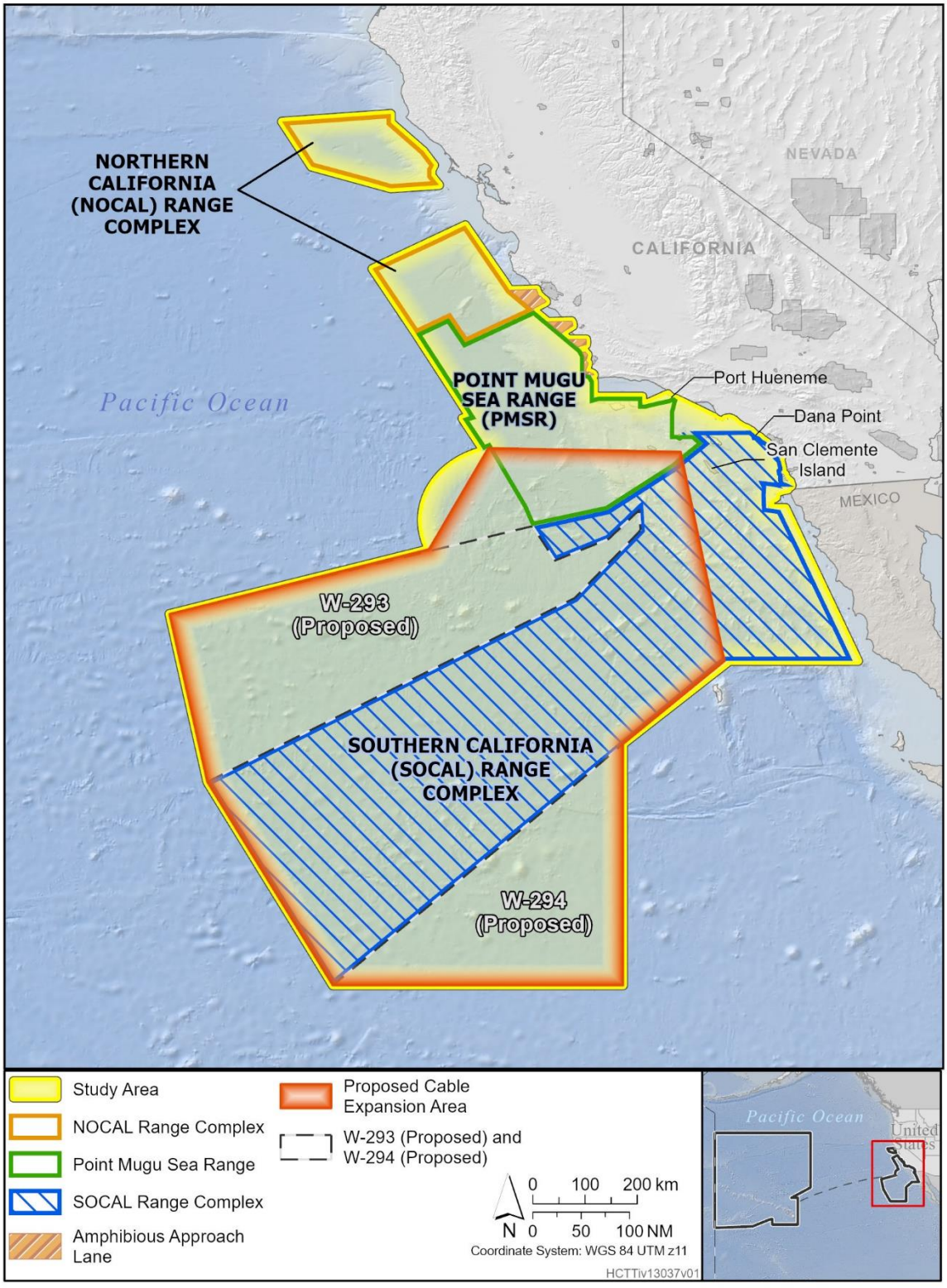

Figure A-5: California Study Area Cable Expansion (Approximate Location)

A.3.5.2 Hawaii Cable Project

A.3.5.2.1 Phase I

In the Hawaii Study Area, the Proposed Action includes maintenance and/or repair of the existing 60-70 km of undersea fiber-optic cable and communication units connected to the existing Wave Energy Test Site (WETS) off the coast of Marine Corps Base Kaneohe Bay (Figure A-6). Repair could include the replacement of the cable and communication units along with small extension of approximately 30 km at the communication node located at a depth of 4000 meters. The cable would be routed to avoid hard bottom occurring near land.

A.3.5.2.2 Phase II

In the Hawaii Study Area, the Proposed Action includes the installation of undersea fiber-optic cable and communication units to an existing undersea cable within PMRF located to the west of Kauai. The installation of the cable and communication units would be analogous to the type, length, and depth of the cable and units used in Phase I of the Hawaii Cable Project. Cable would be routed to avoid hard bottom occurring near land.

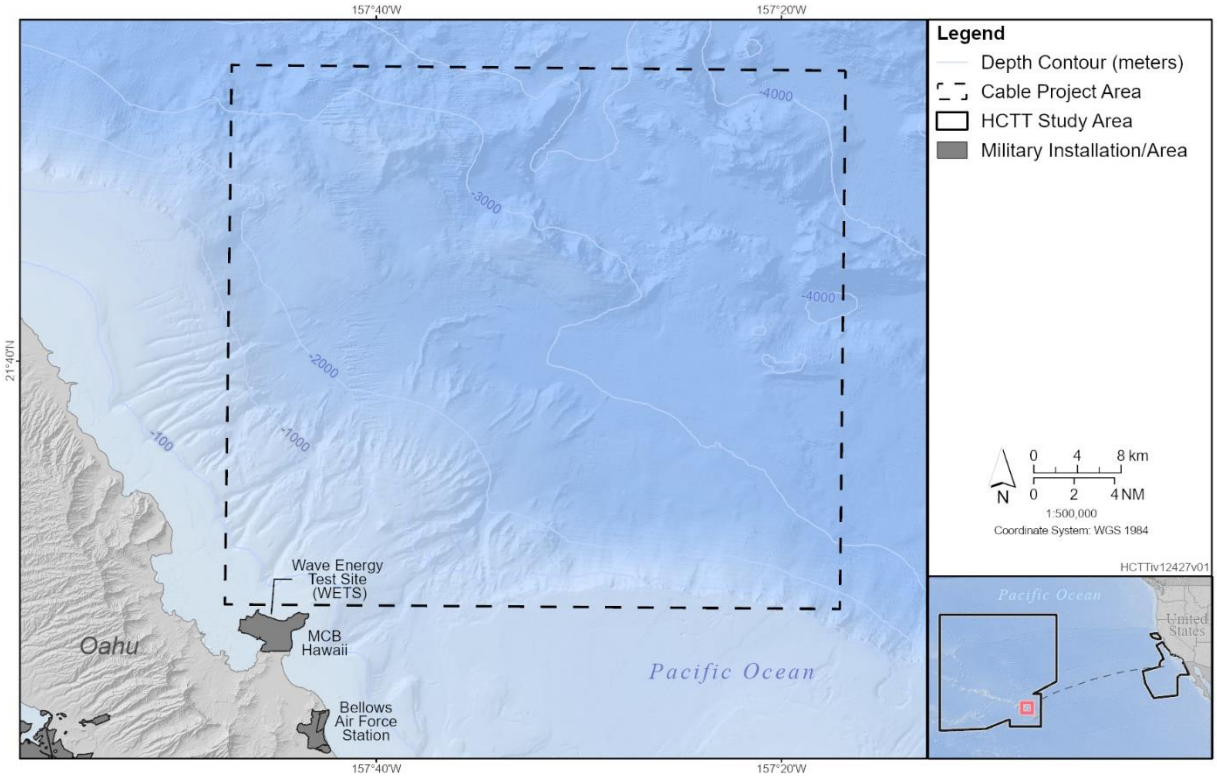

Figure A-6: Proposed Hawaii Cable Project (Phase I)

A.3.6 Installation and Maintenance of Mine Warfare and Other Training Areas

Support crews deploy, move, and retrieve mine countermeasure (MCM) targets or targets simulating adversary subsea and seabed infrastructure to include cables of varying diameters and lengths, bottom equipment, and equipment tethered to the bottom that is floating in the water column. MCM targets could be inserted on the seafloor (bottom targets) or tethered to anchors that are on the seafloor

(moored). MCM targets are non-explosive and emulate real world threats with a variety of sizes and shapes including spheres, cylinders, clamshells, and truncated cones as shown in Figure A-7. Minefields and mine training areas occur from the very shallow water (0-40 ft.) to deep water (>500 ft.). MCM targets need to be replaced every 1-2 years.

The shape and mooring line would be retrieved for refurbishment and redeployed with a new anchor nominally once per year. The concrete anchors would typically be abandoned in place on the bottom after each installation.

To seed a training minefield, MCM target shapes would be deployed from a stationary ship using precision GPS for positioning. Moored shapes are typically deployed in two stages. The shape (with attached mooring tether) is first lowered into the water and released to float on the surface. The vessel then positions over the installation site and releases the anchor to settle to the bottom. As the anchor falls, it pulls any slack out of the mooring line and then pulls the shape under. Bottom shapes are initially lowered into the water by crane, then released to settle to the bottom. Accounting for variables such as wind and current, the actual location is expected to be within approximately 100 yards of the drop point.

For underwater detonation training, individual target mines are inserted either by small boat, by diver, or both, depending on the training scenario.

Depending on the training scenario, a mine installation could consist of one or two mines or involve an entire minefield including a mix of 30 or more bottom and tethered mine shapes.

Existing and proposed minefield locations include:

- Southern California (Figure A-8, Figure A-9, and Figure A-10)
    - Point Mugu Sea Range
    - Tanner Bank Mine Training Range (includes the Tanner/Cortes Banks outside the Mine Training Range)
    - Pyramid Cove Mine Training Range
    - Training Area (TA)-Kilo
    - SSTC-North and South Boat Lanes
    - Imperial Beach Minefield
    - Ocean Beach Mine Training Area
    - Camp Pendleton Amphibious Assault Area
    - Advance Research Projects Agency Training Minefield
- Oahu, Hawaii (Figure A-11)
    - Naval Defense Sea Area
    - Puuloa Underwater Range
    - Ewa Beach Training Minefield
    - Barbers Point Underwater Range
    - Barbers Point Harbor to Lighthouse Training Area (potential)
    - Kaneohe Bay (potential)
    - Bellows Beach (potential)
- Maui, Hawaii (Figure A-12)
    - Kahoolawe Sub Training Minefield
    - Penguin Bank
    - Kalohi Channel

  - Pailolo Channel
  - Maui Basin
  - Alalakeiki Channel
- Kauai, Hawaii (Figure A-13)
  - PMRF Training Area (potential)
  - Waiapuaa Beach (potential)
  - Niihau Kingfisher Range

Other temporary training areas can be established by installing devices that could include hydrophones anchored to the seafloor similarly to anchored mine training shapes or other subsea/seabed targets. When training or testing is completed in the temporary range, or when onboard batteries run out, the instrumentation is recovered and where feasible, anchors are removed along with the mine shape.

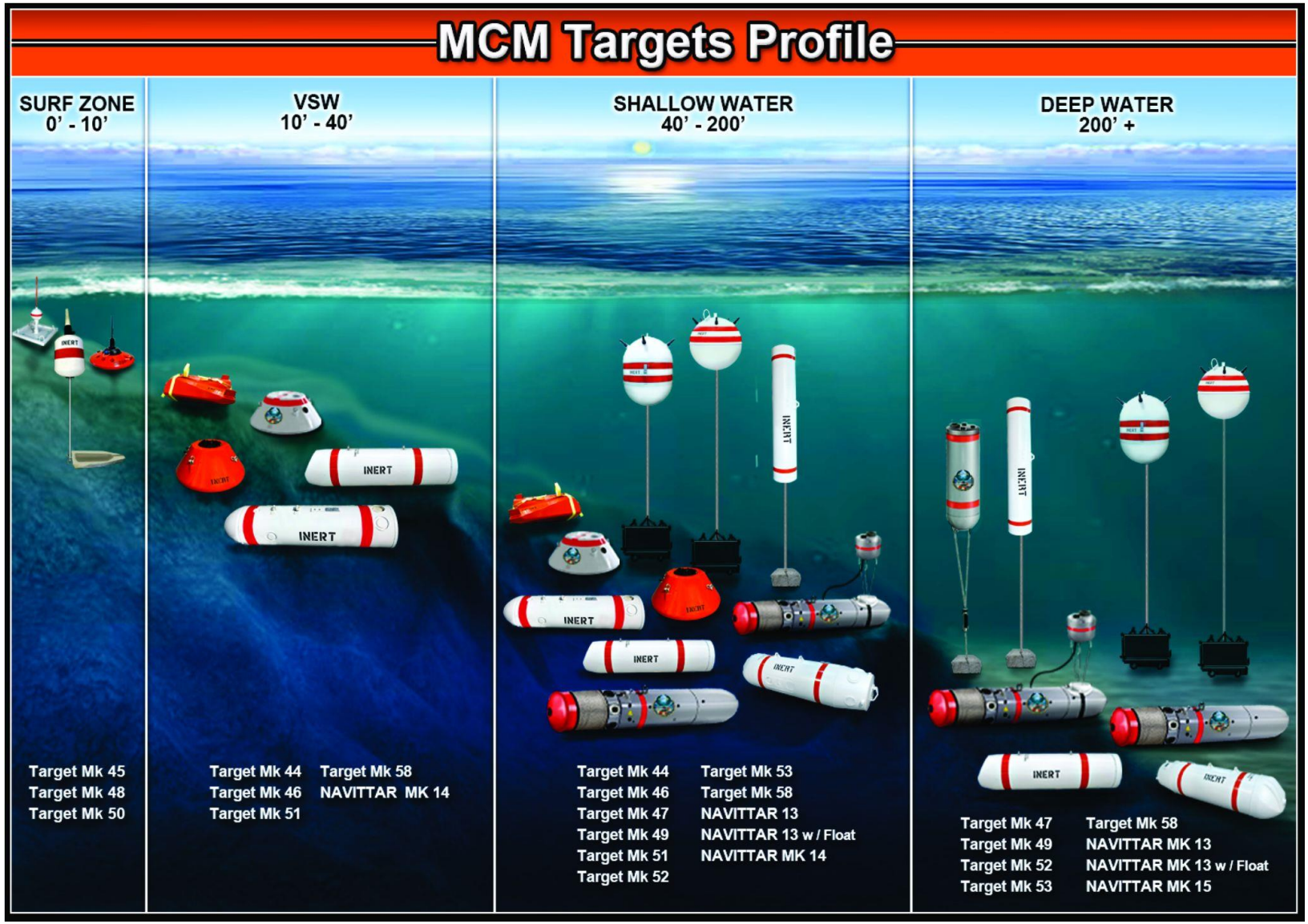

Figure A-7: Mine Countermeasure Targets

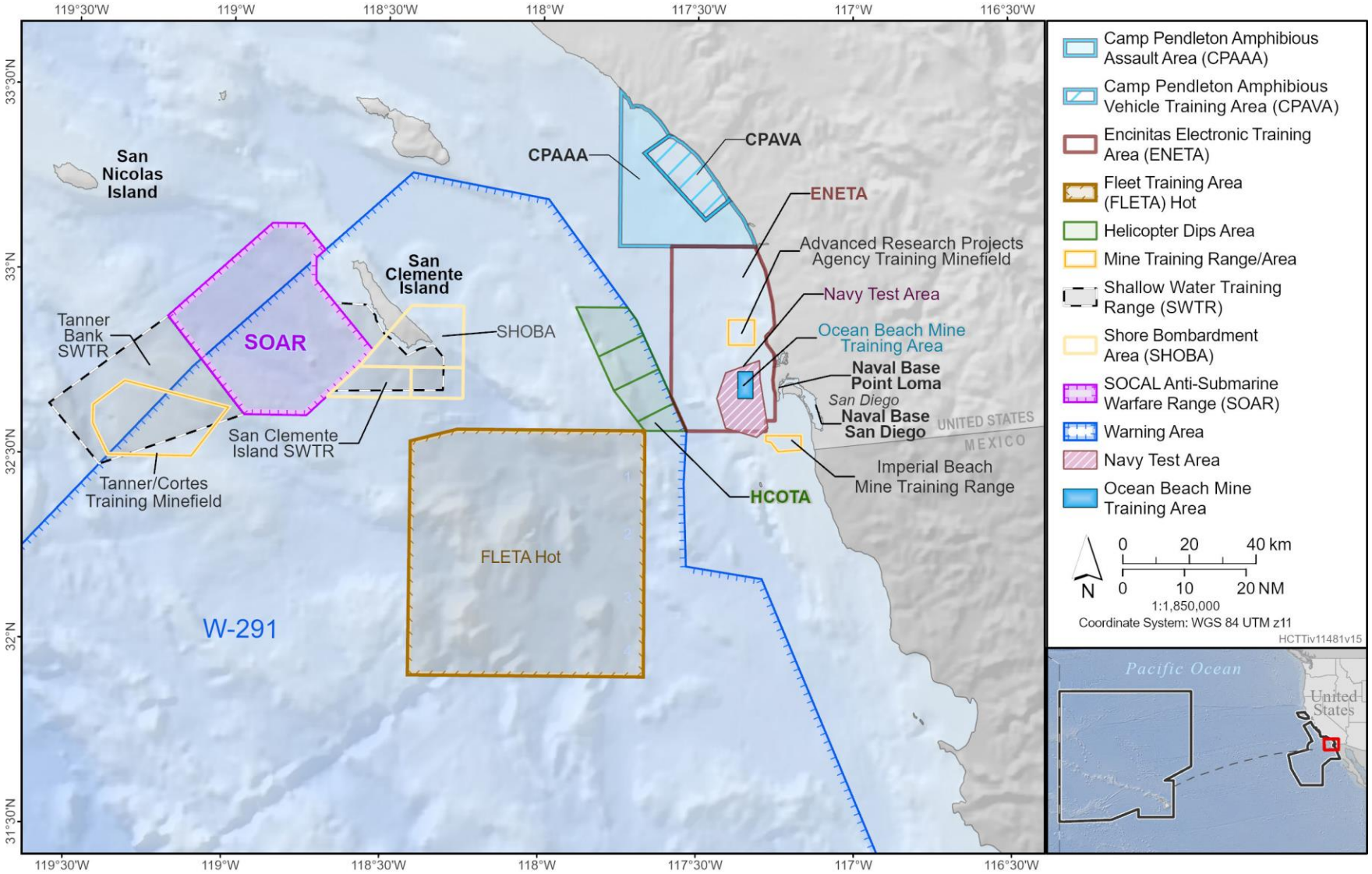

Figure A-8: Southern California Range Complex

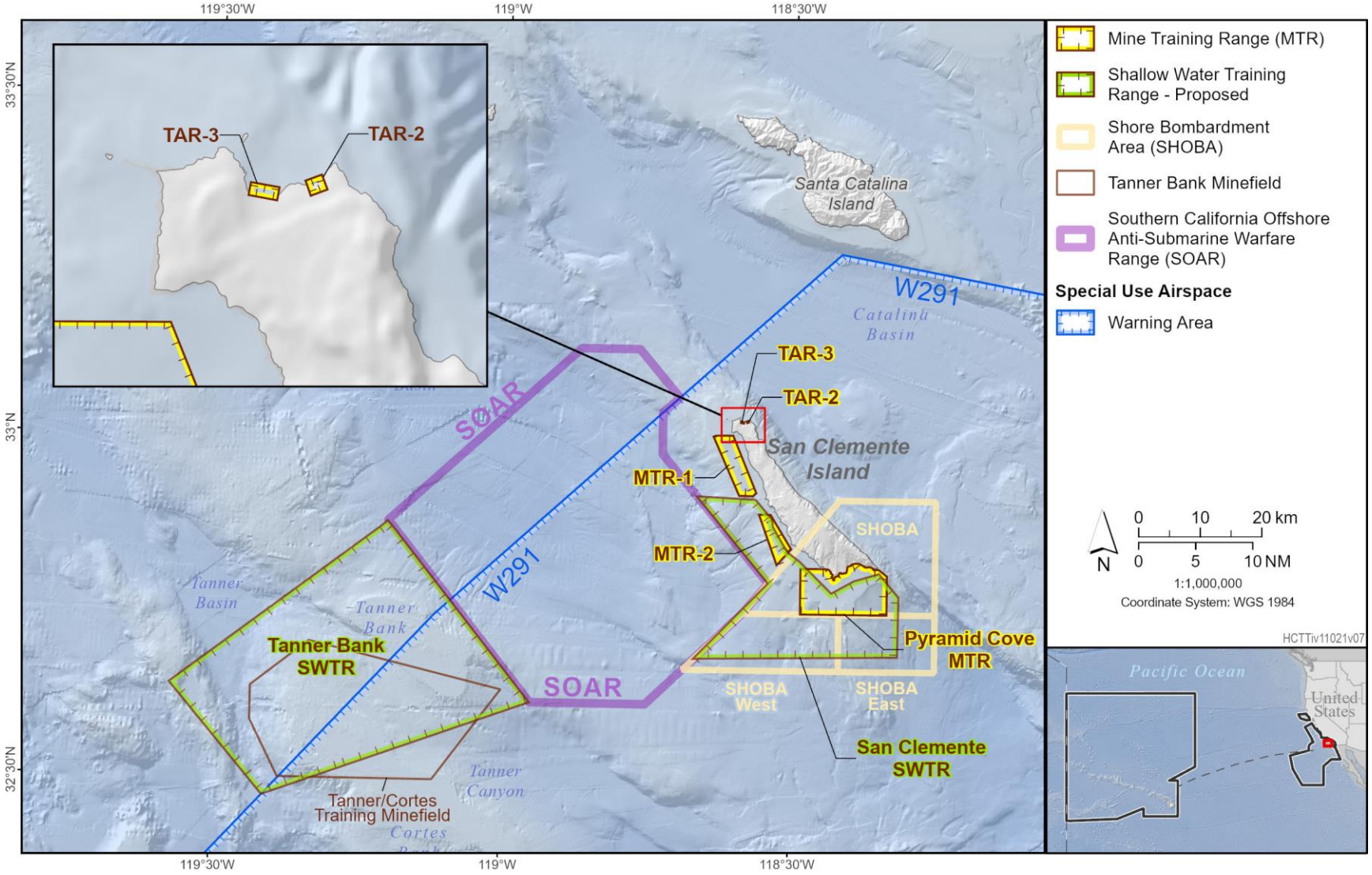

Figure A-9: San Clemente Island Training Areas

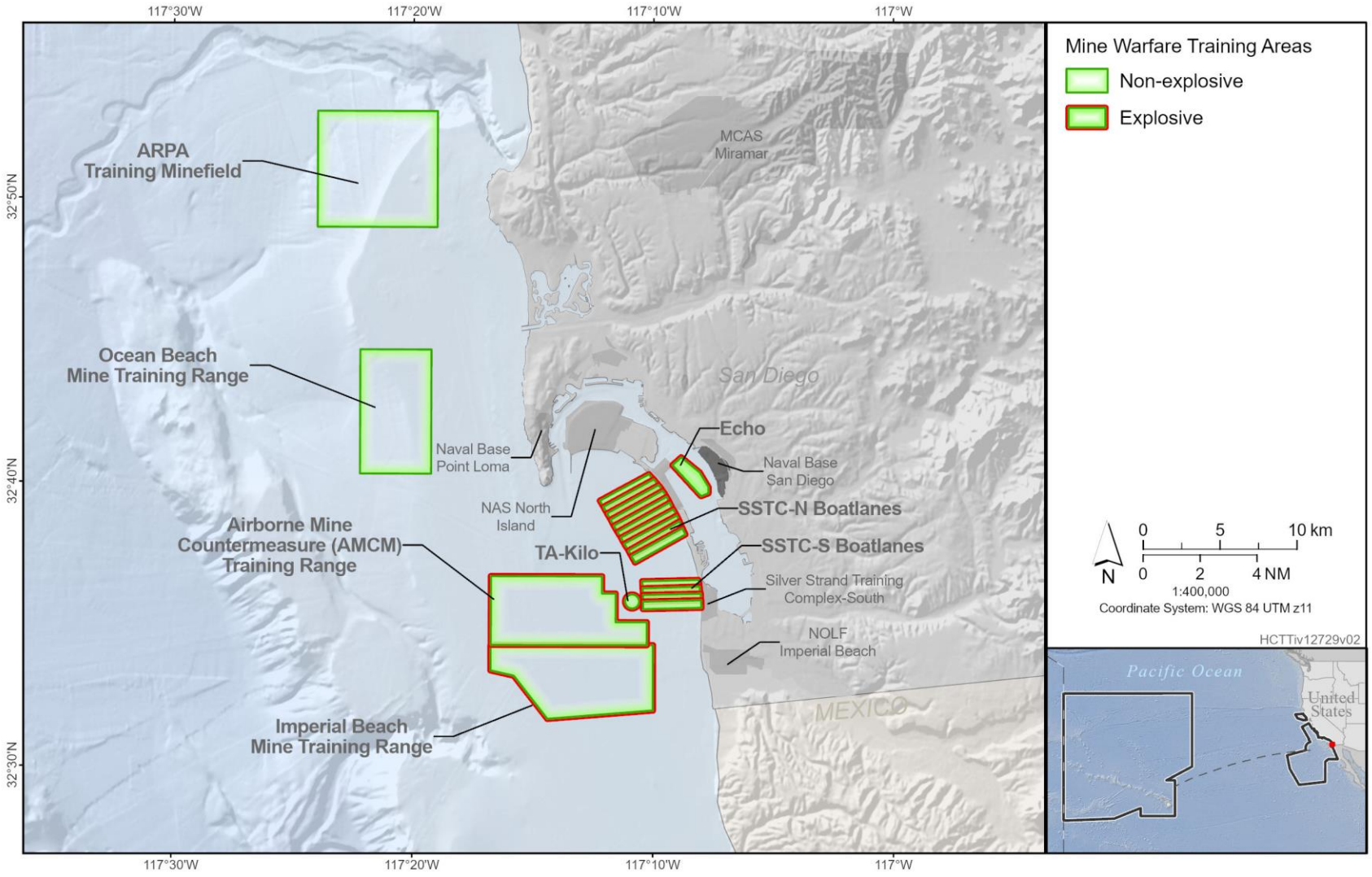

Figure A-10: San Diego Mine Warfare Training Areas

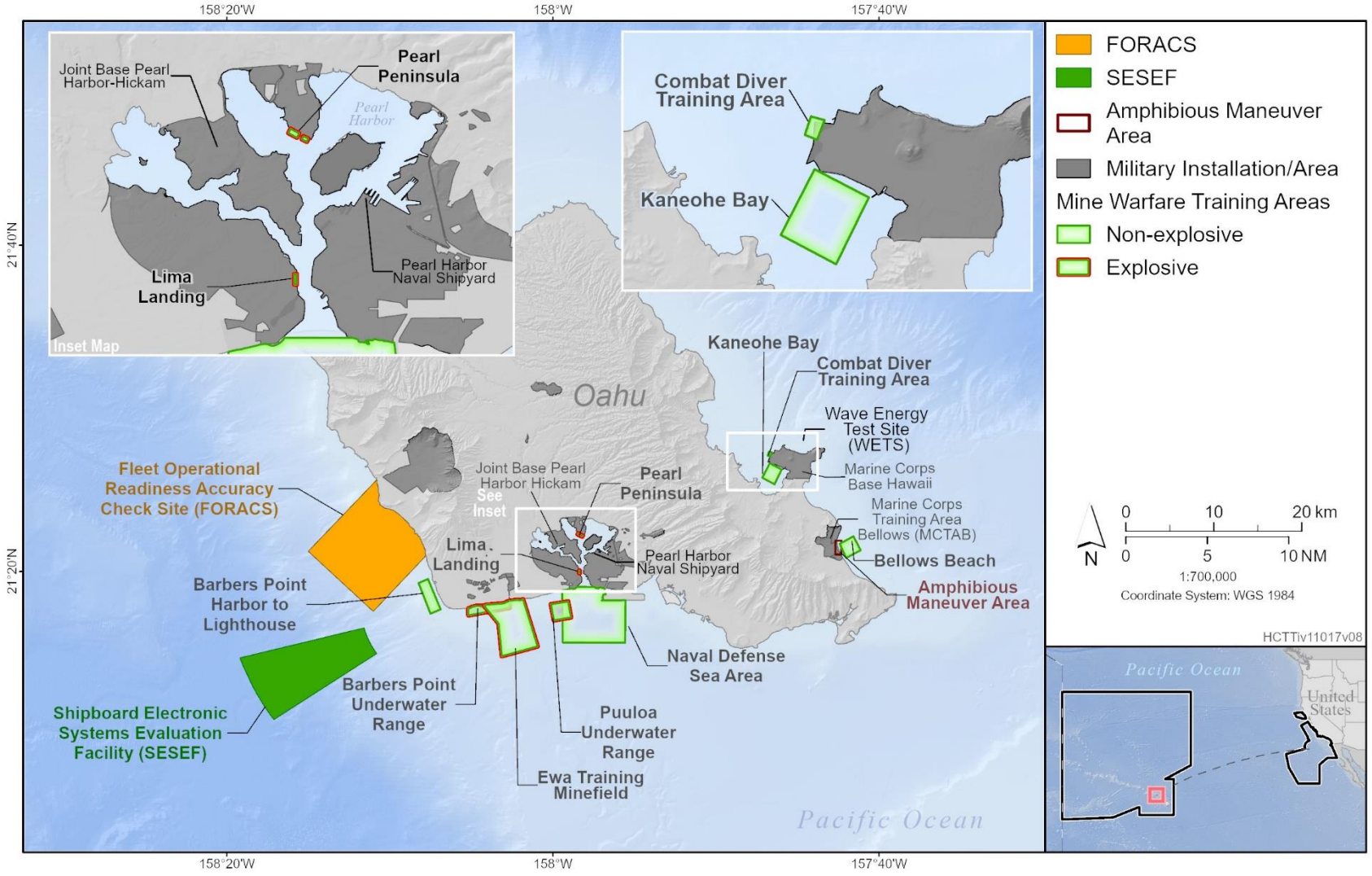

Figure A-11: Oahu Training Areas

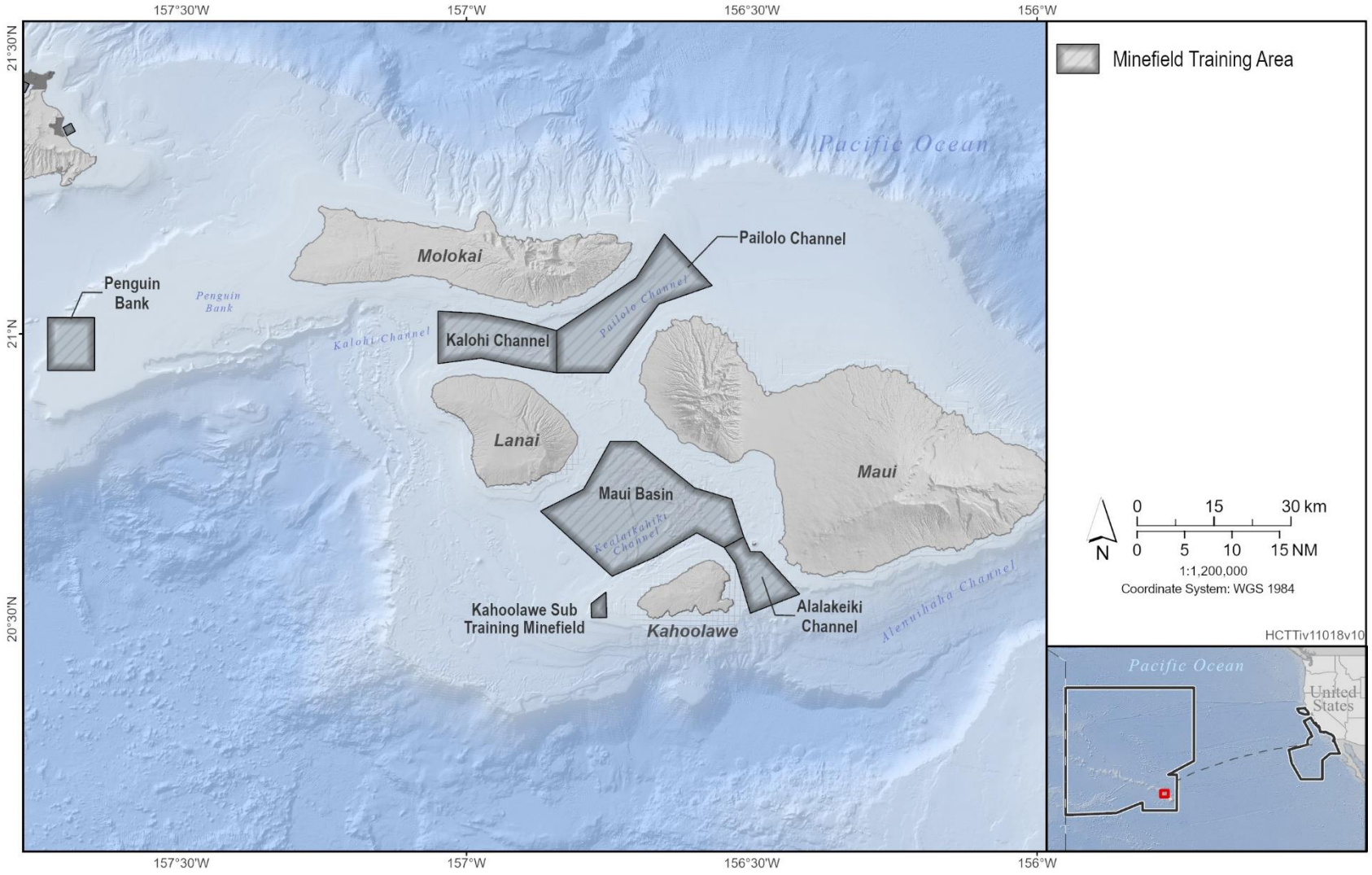

Figure A-12: Maui Mine Training Areas

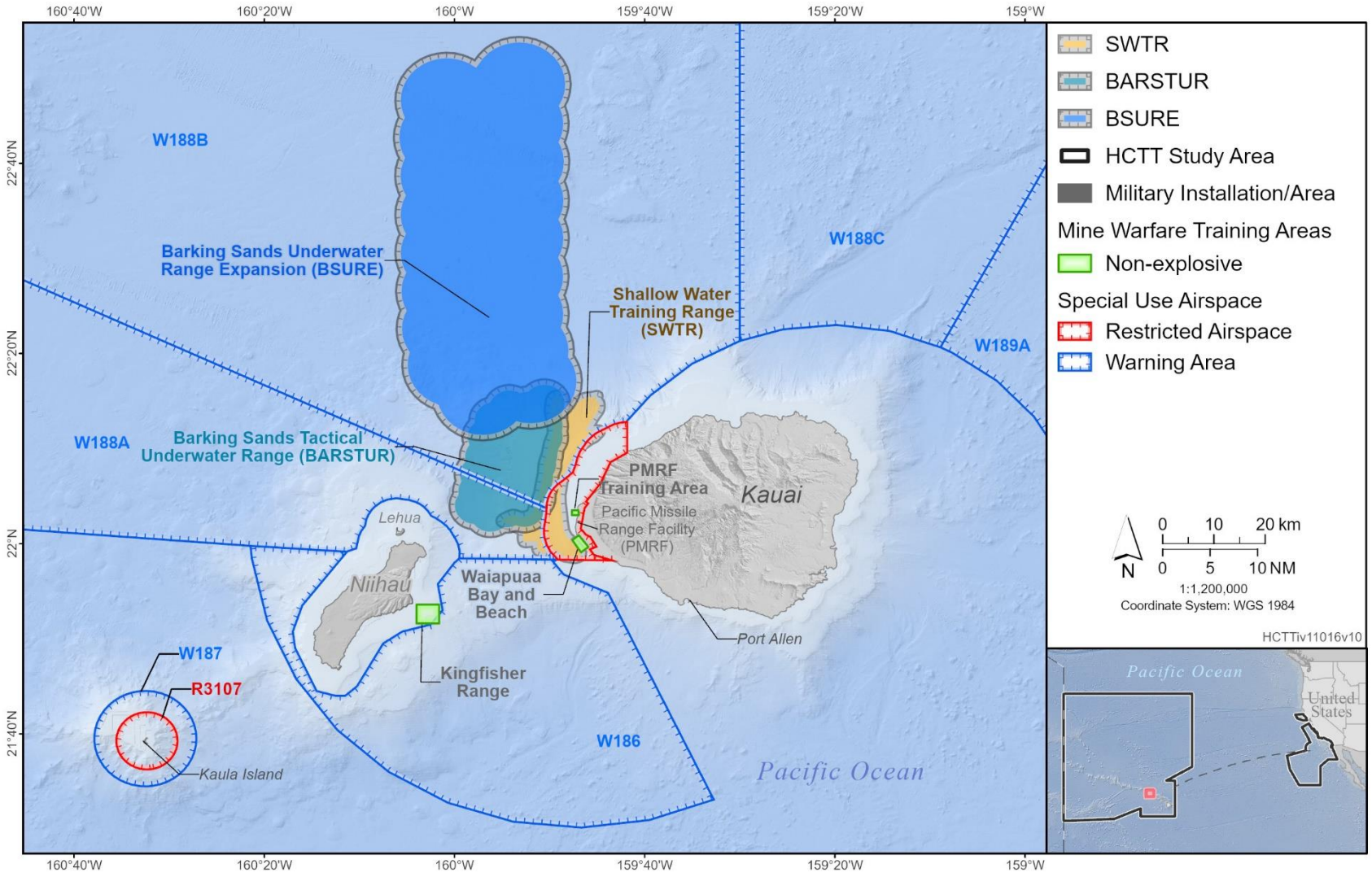

Figure A-13: Kauai and Niihau Mine Training Areas

A.3.7 Installation and Maintenance of Underwater Platforms

An underwater landing platform is required to facilitate underwater vehicle pilot proficiency training in the SOCAL and Hawaii range complexes. The platform to be installed in SOCAL is new, but the platform to be installed in Hawaii was previously approved in 1999, installed in 2001, and removed in 2009. The 2001 installation approval included a Categorical Exclusion, informal consultation with NMFS Pacific Islands Area Office, and approval by the Army pursuant to Section 10 of the Rivers and Harbors Act. The intent is to reinstall a newly designed platform in the previously approved location.

Situated in the non-restrictive, flat, sandy seafloor training areas, the platforms would be permanently mounted, but removable for maintenance. The landing platforms would be approximately 40 ft. by 20 ft. and stand 15 ft. high, with a weight of approximately 16 tons, situated at a depth between 60–100 ft. (Figure A-14). Prior to the installation, numerous pre-poured concrete blocks would be installed in a pre-surveyed area to create a positive anchor point to keep the platforms stationary.

To support navigation to the training platforms, two high-frequency transponders are required to affixed to each platform. The transponders are only designed to be used during training evolutions and would be installed and removed within 24 hours prior to and after each series of scheduled training evolutions. The transponders would only be turned on during active training periods of approximately 4–6 hours.

The platform in SOCAL would be located just west of the Silver Strand Training Complex (SSTC) boat lanes (Figure A-10), and the Hawaii installation would be south of the entrance to Pearl Harbor (Figure A-11).

The underwater vehicles would deploy from their basing location and begin navigation to each respective geographic training platform location. Small surface craft would typically accompany and loiter the training area for safety. Pilots would follow their flight plans until they are within transponder range to which they would then train their equipment for precision navigation. Upon arrival at the training platform, pilots would accomplish repeated take-off and landing evolutions. Once landed, personnel may also practice a variety of insertion or extraction exercises, which may include using nearby training boat lanes for Over-the-Beach activities.

The landing platform would require routine inspections which would be accomplished by divers prior to each training evolution, during transponder installations. Each platform would be preserved in an anti-fouling coating that is similar to the bottom of a surface ship. Furthermore, a floating crane would be used approximately every five years to remove each platform from the ocean floor and then be taken to a ship repair facility to accomplish in-depth structural inspections, repairs, and preservation. Upon completion the platform would be returned and installed to their approved locations.

Figure A-14: Depiction of a Notional Underwater Platform

REFERENCES

Holden, J., A. Hansen, A. Furman, R. Kharshan, and E. Austin. (2010). *Vapor Corrosion Inhibitors in Hydro-Testing and Long Term Storage Applications*. Presented at the NACE International Corrosion 2010 Conference & Expo. San Antonio, TX.

U.S. Department of the Navy. (2008). *Southern California Range Complex Environmental Impact Statement/Overseas Environmental Impact Statement*. San Diego, CA: Naval Facilities Engineering Command Southwest.

U.S. Department of the Navy. (2009). *Record of Decision for the Southern California Range Complex*. Washington, DC: U.S. Department of Defense.