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3.12 Public Health and Safety

PUBLIC HEALTH AND SAFETY SYNOPSIS

Stressors to public health and safety that could result from the Proposed Action within the Study Area were considered, and the following conclusions have been reached for the Preferred Alternative (Alternative 1):

- Underwater Energy: Because of the military's SOPs, activities that involve underwater energy would not have reasonably foreseeable adverse effects on public health and safety.
- In-Air Energy: Because of the military's SOPs, activities that involve in-air energy would not have reasonably foreseeable adverse effects on public health and safety.
- Physical Interaction: Because of the military's SOPs, activities that involve potential physical interactions would not have reasonably foreseeable adverse effects on public health and safety.

3.12.1 Introduction

This section provides the analysis of potential effects on public health and safety within the HCTT Study Area. Generally, the greatest potential for a proposed activity to affect the public is in nearshore areas because that is where public activities are most concentrated. Proposed military readiness activities in nearshore areas could be close to dive sites and other recreational areas where the collective health and safety of groups of individuals would be of concern. Most commercial and recreational marine activities (with the exception of commercial shipping) occur close to the shore, usually limited by the capabilities of the vessel or equipment used.

The military employs SOPs to provide for the safety of personnel and equipment as well as the success of the military readiness activities. SOPs designed to prevent public health and safety effects are discussed in detail in Section 3.0.4. The following subsections generally discuss established safety protocols and SOPs associated with the sea space and airspace environment, as well as specific procedures associated with aviation safety, submarine navigation safety, surface vessel navigation safety, sonar safety, electromagnetic energy and laser safety, and munitions safety.

Methods

The requirements for public health and safety were derived from federal regulations, DoD directives, and military service instructions for military readiness activities. The directives and instructions provide specifications for mission planning and execution, including criteria for public health and safety considerations.

The alternatives were evaluated based on two factors: the potential for specific military readiness activities to affect public health and safety, and the degree to which those activities could have an effect. The likelihood that members of the public would be near a training or testing activity determined the potential for exposure to the activity. If the potential for exposure existed, the degree of the potential effects on public health and safety, including increased risk for injury or loss of life, was determined. If the potential for exposure did not exist, it was determined that there would be no effects on public health and safety.

3.12.2 Affected Environment

The affected environment provides the context for evaluating the effects of the proposed military readiness activities on public health and safety.

3.12.2.1 General Background

The area of interest for assessing potential effects on public health and safety is the Study Area as defined in Chapter 2. As noted there, the HCTT Study Area differs from the HSTT Study Area in that HCTT includes the following:

- an expanded SOCAL Range Complex (W-293 and W-294 and the sea space beneath)
- new testing sea space between W-293 and PMSR
- the inclusion of two existing training and testing at-sea ranges (PMSR and the NOCAL Range Complex)
- inclusion of areas along the Southern California coastline from approximately Dana Point to Port Hueneme
- four amphibious approach lanes providing California land access from NOCAL and PMSR (Figure 2-2)
- nearshore areas within the Hawaii Study Area, such as Kaneohe Bay, MCTAB, or the Naval Defense Sea Area southwest of the entrance to Pearl Harbor (may be used more frequently or for new military readiness activities)

Military, commercial, institutional, and recreational activities have taken place simultaneously in the HSTT Study Area and have coexisted safely for decades. Implementation of the same or similar rules and practices implemented under HSTT, activities which have coexisted safely because of these established rules and practices, would lead to safe use of the waterway and airspace throughout the larger HCTT Study Area. The following paragraphs briefly discuss the rules and practices for recreational, commercial, and military use in sea surface areas and airspace.

3.12.2.1.1 Sea Space

Most of the sea space in the Study Area is accessible for recreational and commercial activities; however, some activities are prohibited or restricted in certain areas (e.g., danger zones and restricted areas).

In accordance with Title 33 CFR part 165 (Regulated Navigation Areas and Limited Access Areas) and Title 33 CFR part 334 (Danger Zone and Restricted Area Regulations), these restrictions can be permanent or temporary. Nautical charts issued by the National Oceanic and Atmospheric Administration include these federally designated zones and areas. Operators of recreational and commercial vessels have a duty to abide by maritime regulations administered by the USCG.

In accordance with Title 33 CFR part 72 (Aids to Navigation), the USCG informs private and commercial vessels about temporary closures via LNM. These notices provide information about durations and locations of closures because of activities that are potentially hazardous to surface vessels. Broadcast notices on maritime frequency radio, weekly publications by the appropriate USCG Navigation Center, and global positioning system navigation charts disseminate these navigational warnings.

3.12.2.1.2 Airspace

Most of the airspace in the Study Area is accessible to general aviation (recreational, private, corporate) and commercial aircraft; however, some airspace, as with waterways, are temporarily off-limits to civilian and commercial use. The FAA has established special use airspace, which is airspace of defined

dimensions wherein activities must be confined because of their nature or wherein limitations may be imposed upon aircraft operations that are not part of those activities (Federal Aviation Administration, 2023). SUA in the Study Area includes the following:

- Restricted airspace: Areas where aircraft are subject to restriction due to the existence of unusual (often invisible) hazards to aircraft (e.g., release of munitions). Some areas are under strict control of the DoD, and some are shared with nonmilitary agencies (FAA Order 7400.2P, Chapter 23).
- Warning areas: Areas of defined dimensions, extending from 3 NM outward from the coast of the United States, that serve to warn non-participating aircraft of potential danger (FAA Order 7400.2P, Chapter 24).

Additionally, Air Traffic Control Assigned Airspace is airspace of defined vertical/lateral limits, implemented by Letter of Agreement between the user and the concerned Air Route Traffic Control Center, and assigned by Air Traffic Control for the purpose of providing air traffic segregation between the specified activity being conducted within the assigned airspace and other instrument flight rules traffic.

NOTAMs are created and transmitted by government agencies and airport operators to alert aircrews of any hazards en route to or at a specific location. The FAA issues NOTAMs to disseminate information on upcoming or ongoing military exercises with resulting airspace restrictions. Civilian aircraft operators are responsible for being aware of restricted areas in airspace and any NOTAMs in effect. Pilots have a duty to abide by aviation rules as administered by the FAA.

3.12.2.2 Safety and Inspection Procedures

In accordance with military instructions presented in this chapter, safety and inspection procedures discussed in this section are designed to ensure public health and safety. The military services promote proactive and comprehensive safety programs designed to reduce to the greatest extent possible any potential adverse effects on public health and safety from military readiness activities.

As previously stated, the greatest potential for military readiness activities to affect the public is in nearshore areas, because public activities are concentrated in those areas. When planning a training or testing activity, the military considers proximity of the activity to public areas in choosing a location. Important factors considered include the ability to control access to an area; schedule (time of day, day of week); frequency, duration, and intensity of activities; range safety procedures; operational control of activities or events; and safety history.

The Navy's Fleet Area Control and Surveillance Facilities provide support and training resources for DoD, Department of Homeland Security, and foreign military units by coordinating, scheduling, and monitoring activities in the U.S. Pacific Fleet operating areas and SUA, except the PMSR, which has been delegated management of the SUA within the PMSR complex, as well as PMRF. At each range, Range Control is responsible for hazard area surveillance and clearance and the control of all range operational areas. Range Control coordinates the real-time control of ranges with the FAA and other military users and communicates with the operations conductors and all participants entering and leaving the range areas. The FAA and the USCG issue NOTAMs and LNMs, respectively.

During military readiness activities in the Study Area, the military ensures that the appropriate safety zone is clear of non-participants before engaging in certain activities, such as firing weapons. Inability to obtain a "clear range" could result in the delay, cancellation, or relocation of an event. This approach

ensures public safety during military readiness activities that otherwise could harm non-participants. Current practices employ the use of sensors and other devices (e.g., radar and big-eye binoculars) to ensure public health and safety while conducting military readiness activities. The following subsections outline the current requirements and practices for human safety as they pertain to range safety procedures, range inspection procedures, exercise planning, and scheduling and coordinating procedures.

Training and testing activities must comply with Fleet Area Control and Surveillance Facility, PMRF, or PMSR procedures, depending on the activity's location. Fleet Area Control and Surveillance Facilities San Diego and Hawaii have published safety procedures for activities conducted both nearshore and offshore, to include the NOCAL Range Complex (U.S. Department of the Navy, 2020a, 2022a, 2022b). These guidelines (and others) apply to range users as noted in Table 3.12-1.

Table 3.12-1: Range Users General Guidelines

HCTT Range Users General Guidelines	
Activity Type	**Guideline Description**
Hazardous (All Munitions Delivery)	The command conducting the exercise is responsible for ensuring that impact areas and targets are clear before commencing hazardous activities.
In-water Munitions Delivery	The use of in-water munitions must be coordinated with submarine operational authorities. The coordination also applies to towed sonar arrays and torpedo countermeasures.
Hazardous (Munitions Delivery)	Aircraft or vessels expending munitions shall not commence firing without the permission of the Range Safety Officer for their specific range area.
Hazardous (Munitions Delivery)	Firing units and targets must remain in their assigned areas, and units must fire in accordance with current safety instructions.
Hazardous (Munitions Transport)	Aircraft carrying munitions to or from ranges shall avoid populated areas to the maximum extent possible.
Hazardous (All Munitions Delivery)	Strict on-scene procedures include the use of ship sensors, visual surveillance of the range from aircraft and range safety boats, and radar and acoustic data to confirm the firing range and target area are clear of civilian vessels, aircraft, or other non-participants.

Comprehensive safety planning instructions exist for specific testing activities, such as laser and electromagnetic energy testing (U.S. Department of the Navy, 2008); (U.S. Department of Defense, 2009). These instructions provide guidance on how to identify the hazards, assess the potential risk, analyze risk control measures, implement risk controls, and review safety procedures. They apply to all testing activities including ground, waterborne, and airborne testing activities involving personnel, aircraft, inert minefields, equipment, and airspace. The guidance applies to system program managers, program engineers, test engineers, test directors, and aircrews that are responsible for incorporating safety planning and review when conducting test programs.

3.12.2.2.1 Aviation Safety

The Navy procedures regarding planning and management of SUA are provided in the Chief of Naval Operations Instruction 3770.2L, Airspace Procedures and Planning Manual (U.S. Department of the Navy, 2017). Scheduling and planning procedures for air operations on range complexes are issued through the Navy's Fleet Area Control and Surveillance Facilities San Diego (U.S. Department of the Navy, 2020a, 2022a, 2022b) for their assigned areas, and PMSR for their assigned areas.

Testing activities have their own procedures that require that safety be considered in any testing event. For example, the Navy's Operational Test and Evaluation Manual prescribes policies and procedures for the planning, conducting, and reporting of Operational Test and Evaluation of new and improved naval weapons and warfare support systems (U.S. Department of the Navy, 2021).

Aircrews involved in training or testing activities must be aware that non-participating aircraft and ships may or may not be precluded from entering the area (based on current regulations) and may not comply with NOTAMS or LNMs. Aircrews are required to maintain a continuous lookout for non-participating aircraft while operating in warning areas under Visual Flight Rules. In general, aircraft carrying munitions are not allowed to fly over public or commercial boats or ships.

3.12.2.2.2 Submarine Navigation Safety

Submarine crews use various methods to avoid collisions while they are surfaced, including visual and radar scanning, acoustic depth finders, and state-of-the-art satellite navigational systems. During submerged transit, submarines use all available ocean navigation tools, including inertial navigation charts that calculate position based on the submerged movements of the submarine. Submarines use these systems to avoid surface vessels as well as all other hazards to navigation.

3.12.2.2.3 Surface Vessel Navigation Safety

The Navy and USCG practice the fundamentals of safe navigation. As specified in Section 3.0.4, ships operated by or for the Navy or USCG have personnel assigned to stand watch at all times, day and night, when underway. Watch personnel undertake extensive training in accordance with the Navy Lookout Training Handbook or civilian equivalent, including on-the-job instruction and a formal Personal Qualification Standard program (or equivalent program for supporting contractors or civilians), to certify that they have demonstrated all necessary skills (such as detection and reporting of floating or partially submerged objects). While on watch, personnel employ visual search techniques, including the use of binoculars and scanning techniques in accordance with the Navy Lookout Training Handbook or civilian equivalent. After sunset and prior to sunrise, watch personnel employ night visual search techniques, which could include the use of night vision devices. Watch personnel are primarily posted for safety of navigation, range clearance, and man-overboard precautions. For some specific testing activities, such as unmanned surface vehicle testing, a support boat would be used in the vicinity of the testing and operation to ensure safe navigation. Before firing or launching a weapon or radiating a non-eye-safe laser, naval surface vessels are required to determine that all safety criteria have been satisfied. When applicable, the surface vessel would use aircraft and other boats to aid in navigation.

3.12.2.2.4 Sonar Safety

Surface vessels and submarines may use active sonar in the pierside locations listed in Chapter 2 and during transit to training or testing exercise locations. To ensure safe and effective sonar use, the Navy applies the same safety procedures for pierside sonar use as described in Section 3.12.2.2.

The U.S. Navy Diving Manual, Appendix 1A, *Safe Diving Distances from Transmitting Sonar*, is the Navy's governing document for protecting divers during active sonar use (U.S. Department of the Navy, 2016). The manual provides procedures for calculating safe distances from active sonar. These procedures are derived from experimental and theoretical research conducted at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit. Safety distances vary based on conditions that include diver dress, type of sonar, and duration of time in the water. These safety distances would also be applicable to recreational swimmers and divers. Some safety procedures include measurements

to be taken during testing activities to identify an exclusion area for non-participating swimmers and divers.

3.12.2.2.5 Electromagnetic Energy Safety

This section discusses electromagnetic energy transmitted through the air as a result of proposed activities. All frequencies (or wavelengths) of electromagnetic energy are referred to as the electromagnetic spectrum and include electromagnetic energy and radio frequency radiation. Communications and electronic devices such as radar, electronic warfare devices, navigational aids, two-way radios, cell phones, and other radio transmitters produce electromagnetic radiation. While such equipment emits electromagnetic energy, some of these systems are the same as, or similar to, civilian navigational aids and radars at local airports and television weather stations. Radio waves and microwaves emitted by transmitting antennas are another form of electromagnetic energy, collectively referred to as radio frequency radiation. Radio frequency energy includes frequencies ranging from 0 to 3,000 gigahertz. Exposure to radio frequency energy of sufficient intensity at frequencies between 3 kilohertz and 300 gigahertz can adversely affect people, munitions, and fuel.

To avoid excessive exposures to electromagnetic energy, military aircraft are operated in accordance with SOPs that establish minimum separation distances between electromagnetic energy emitters and people, munitions, and fuels (U.S. Department of Defense, 2009). Thresholds for determining hazardous levels of electromagnetic energy to humans, munitions, and fuel have been determined for electromagnetic energy sources based on frequency and power output, and practices are in place to protect the public from electromagnetic radiation hazards (U.S. Department of Defense, 2002), (U.S. Department of Defense, 2021). These procedures include setting the heights and angles of electromagnetic energy transmissions to avoid direct exposure, posting warning signs, establishing safe operating levels, activating warning lights when radar systems are operational, and not operating some platforms that emit electromagnetic energy within 15 NM of shore. Safety instructions provide clearance procedures for non-participants in operational areas before conducting military readiness activities that involve in-water electromagnetic energy (e.g., mine warfare) (U.S. Department of Defense, 2021; U.S. Department of the Navy, 2008).

3.12.2.2.6 Laser Safety

Lasers produce a coherent beam of light energy. The military uses lasers for precision range finding, as target designation/illumination devices for engagement with laser-guided weapons, and for mine detection and mine countermeasures, as well as for non-lethal deterrent. High-energy lasers would be used as a weapon to disable small aircraft and surface vessels. The Office of the Chief of Naval Operations Instruction 5100.27B/Marine Corps Order 5104.1C, Navy Laser Hazards Control Program, prescribes Navy and USMC policy and guidance in the identification and control of laser hazards. The Navy observes strict precautions and has written instructions in place for laser users to ensure that non-participants are not exposed to intense light energy. Laser safety procedures for aircraft require an initial pass over the target before laser activation to ensure that target areas are clear. During actual laser use, aircraft run-in headings are also restricted to avoid unintentional contact with personnel or non-participants. Additionally, laser devices switch off automatically when a lock on a target is lost. Personnel participating in laser training activities are required to complete a laser safety course (U.S. Department of the Navy, 2008).

3.12.2.2.7 Explosive Munitions Detonation Safety

Pressure waves from in-water detonations can pose a physical hazard in surrounding waters. Before conducting an in-water explosive training or testing activity, Navy personnel establish an appropriately sized exclusion zone to avoid exposing non-participants to the harmful intensities of pressure waves. The U.S. Navy Diving Manual, Section 2.7.3, *Underwater Explosions*, provides procedures for determining safe distances from in-water explosions (U.S. Department of the Navy, 2016). In accordance with training and testing procedures for safety planning related to detonations, the Navy uses the following detonation procedures:

- The command conducting the exercise is responsible for ensuring that impact areas and targets are clear before commencing hazardous activities.
- The use of in-water munitions must be coordinated with submarine operational authorities.
- Aircraft or vessels expending munitions shall not commence firing without permission of the Range Safety Officer or Test Safety Officer for their specific range area.
- Firing units and targets must remain in their assigned areas, and units must fire in accordance with current safety instructions.
- Detonation activities would be conducted during daylight hours.

3.12.2.2.8 Weapons Firing and Munitions Expenditure Safety

Military explosives safety policy is based on the requirements of DoD Defense Explosives Safety Regulation 6055.09. This DoD standard establishes uniform safety requirements applicable to ammunition and explosives and to associated and unrelated personnel and property exposed to the potentially damaging effects of an accident involving ammunition and explosives during, among other things, usage during training, testing, transportation, handling, storage, maintenance, and disposal (U.S. Department of Defense, 2019).

Safety is a primary consideration for all military readiness activities. The range must be able to safely contain the hazard area of the weapons and equipment employed. The hazard area is based on the size and net explosive weight of the weapon, and it includes a safety buffer around the target to account for items going off-range or malfunctioning. The size of the buffer zone is determined by the type of activity. For activities with a large hazard area, special sea and air surveillance measures are implemented to make sure the area is clear before the activities commence. Before aircraft can drop munitions, they are required to make a preliminary pass over the intended target area to ensure that it is clear of boats, divers, or other non-participants. Aircraft carrying munitions are not allowed to fly over surface vessels.

Military readiness activities are delayed, moved, or cancelled if there is a question about public safety. Target areas must be clear of non-participants before conducting military readiness activities. When using munitions with flight termination systems (which terminate the flight of airborne missiles or launch vehicles when they veer from their targeted path), the military is required to follow SOPs to ensure public health and safety. In those cases where a weapons system does not have a flight termination system, the size of the target area that needs to be clear of non-participants is based on the flight distance of the weapon plus an additional distance beyond the system's performance capability.

3.12.3 Environmental Consequences

None of the proposed military readiness activities would be conducted under the No Action Alternative. Therefore, baseline conditions of the existing environment for public health and safety would either remain unchanged or would improve slightly after cessation of ongoing military readiness activities. As a result, the No Action Alternative is not analyzed further within this section.

This section describes and evaluates how and to what degree the activities described in Chapter 2 and Section 3.0.3.3 would potentially affect public health and safety. Each public health and safety stressor is introduced and analyzed by alternative for military readiness activities. Table B-1 and Table B-2 in Appendix B show the warfare areas and associated stressors that were considered for analysis of public health and safety. The stressors vary in intensity, frequency, duration, and location within the Study Area. The stressors applicable to public health and safety are the following:

- **underwater energy** (sonar and underwater explosions)
- **in-air energy** (high-energy lasers and microwaves)
- **physical interactions** (aircraft, vessels, underwater devices/targets, munitions, seafloor devices)

As discussed in Chapter 2, the majority of the military readiness activities that would be conducted under Alternatives 1 and 2 are the same as or similar to those currently being conducted or that have been conducted in the past.

The environmental impact analysis considers SOPs that would be implemented under Alternatives 1 or 2 of the Proposed Action. Relevant SOPs are detailed in Section 3.0.4.

As noted in Section 3.0.2, a significance determination is made only for activities that may have reasonably foreseeable adverse effects on the human environment based on the significance factors in Table 3.0-2. None of the three stressors analyzed in this section would have reasonably foreseeable adverse effects on the human environment as discussed below.

3.12.3.1 Underwater Energy

Active sonar, underwater explosions, air guns, pile driving, and vessel movements produce underwater acoustic energy; and during aircraft overflights, sound travels from air to water.

Underwater acoustic energy is generated from many of the proposed activities; however, not all would be considered in detail in this EIS/OEIS in terms of their effect on public health and safety because the public safety risks from some activities are deemed to be negligible. The public might intermittently hear noise from ships if they are in the general vicinity of a training or testing event, but there would be no effect on public health and safety because of the infrequency and short duration of events. In addition, underwater air guns are used during some pierside testing activities, but public health and safety would not be put at risk because access to pierside locations by non-participants is controlled. Therefore, active sonar and underwater explosions are the only sources of underwater acoustic energy evaluated for potential effects on public health and safety.

The proposed activities that would result in underwater acoustic energy include activities such as amphibious warfare, surface warfare, anti-submarine warfare, mine warfare, sonar maintenance, pierside sonar testing, and unmanned underwater vehicle testing. A limited amount of active sonar would be used during transit between range complexes and military readiness activity's locations.

The effect of active sonar on humans varies with the frequency of sonar involved. Of the four types of sonar (very high-, high-, mid-, and low-frequency), mid-frequency and low-frequency sonar have the greatest potential to affect humans due to the range of human hearing capabilities.

Underwater explosives cause a physical shock front that compresses the explosive material, and the pressure wave then passes into the surrounding water. Generally, the pressure wave would be the primary cause of injury. The effects of an underwater explosion depend on several factors, including the size, type, and depth of the explosive charge and where it is in the water column.

The potential for the public to be exposed to these stressors would be limited to individuals who are underwater and within unsafe proximity to an event. Scuba diving is a popular recreational activity that is typically concentrated around known dive attractions, such as reefs and shipwrecks. The Professional Association of Diving Instructors, one of several scuba diving instruction organizations, suggests that certified open-water divers limit their dives to 60 ft. More experienced divers are generally limited to 100 ft.; in general, no recreational diver should exceed 130 ft. of depth (Professional Association of Diving Instructors, 2023). These depths typically limit this activity's distance from shore.

Military operations overlapping with recreational swimmers or divers would be unlikely. Recreational swimmers and divers are not precluded from operating in public boat lanes or adjoining areas near Navy pierside locations (which include shipyards); however, military operators are diligent in identifying recreational swimmers and divers to ensure that these would be avoided. Additionally, recreational divers would not be expected near naval ships at sea. The locations of popular offshore diving spots are well documented, and dive boats (typically well marked) and diver-down flags would be visible from the ships conducting the military readiness activities. The U.S. Navy Diving Manual (U.S. Department of the Navy, 2016) contains methodologies to determine appropriate safety distances associated with sonar use near Navy divers. These safety distances would also be used as safety buffers to protect public health and safety. If any unauthorized personnel are detected within the sonar activity safety buffer, the activity would be temporarily halted until the area is again cleared.

3.12.3.1.1 Effects from Underwater Energy

Training and Testing. A variety of vessels and underwater devices would be used throughout the Study Area during training and testing activities, as described in Section 3.0.3.3.4.1. Activities would typically involve one or two vessels or underwater devices and may last from one hour to multiple days. For this EIS/OEIS, more vessel traffic and underwater devices use would occur in the California portion than the Hawaii portion of the Study Area (Table 3.0-17).

The effects from vessels during training and testing activities would be minimal because activities involving underwater energy would not occur in the vicinity of recreational swimmers or divers. Established SOPs adequately control safety risks or improve the safety condition of military personnel and the general public.

Modernization and Sustainment of Ranges. Cables deployed on the seafloor during SOAR modernization, the California cable project, and two Hawaii cable projects, generate an EMF. The EMF produced by the cable is less than that of the natural background magnetic force of the earth at distances beyond 0.6 cm (0.25 in.) from the cable. As electromagnetic energy dissipates exponentially by distance from the energy source, the magnetic field from the cable would be equal to 0.1 percent of the earth's at a distance of 6 m (20 ft.). The cables and nodes would be installed at the bottom of the ocean floor, in most cases at a minimum depth of 37 m (120 ft.). Given this depth, divers are unlikely to come

into extended contact with cables or nodes and it is extremely unlikely that they would be affected by the magnetic field.

Conclusion. Military readiness activities would be conducted in accordance with SOPs and range guidelines listed above. Therefore, activities that involve underwater energy would not have reasonably foreseeable adverse effects on public health and safety.

3.12.3.2 In-Air Energy

In-air energy stressors include sources of electromagnetic energy and lasers. The sources of electromagnetic energy include radar and electronic warfare systems. These systems operate similarly to other navigational aids and radars at civilian airports and television weather stations throughout the United States. Electronic warfare systems emit electromagnetic energy similar to that from cell phones, handheld radios, commercial radio stations, and television stations. The military follows documented safety procedures to protect military personnel and the public from electromagnetic energy hazards. These procedures include setting the heights and angles of electromagnetic energy transmissions to avoid direct human exposure, posting warning signs, establishing safe operating levels, and activating warning lights when radar systems are operational. In-air electromagnetic energy would be widely dispersed throughout the Study Area, but more concentrated in portions of the Study Area near ports, naval installations, and range complexes. Because these stressors are operated at power levels, altitudes, and distances from people and animals to ensure that energy received is well below levels that could disrupt behavior or cause injury and because most in-air electromagnetic energy is reflected by water, in-air electromagnetic energy would not affect public health and safety and is not analyzed further in this section.

High-energy lasers are used as weapons to disable targets. The military would operate high-energy laser equipment in accordance with procedures defined in Chief of Naval Operations Instruction 5100.23H, *Navy Safety and Occupational Health Program* (U.S. Department of the Navy, 2020b). These high-energy light sources can cause eye injuries and burns. A comprehensive safety program exists for the use of lasers. Current military safety procedures protect individuals from the hazard of injuries caused by laser energy. Laser safety requirements for aircraft and vessels mandate verification that target areas are clear before commencement of an exercise. In the case of aircraft, during actual laser use, the aircraft run-in headings are restricted to preclude inadvertent lasing of areas where the public may be present.

Training activities involving low-energy lasers include air warfare, surface warfare, and mine warfare.

3.12.3.2.1 Effects from In-Air Energy

Training and Testing. A variety of vessels and aircraft would be used throughout the Study Area during testing and training activities, as described in Section 3.0.3.3.4.1 and Section 3.0.3.3.4.4. Most activities would involve one vessel or aircraft and may last from one hour to multiple days, but activities may occasionally use more than one vessel or aircraft. For this EIS/OEIS, more vessel and aircraft use would occur in the California portion than the Hawaii portion of the Study Area (Table 3.0-17).

The effects from vessels and aircraft during testing and training activities would be minimal because activities involving in-air energy would not occur in the vicinity of the general public. Established SOPs adequately control safety risks or improve the safety condition of military personnel.

Modernization and Sustainment of Ranges. Modernization and sustainment of ranges activities do not involve in-air energy use, therefore would result in no in-air energy effect on public health and safety.

Conclusion. Military readiness activities would be conducted in accordance with SOPs and range guidelines listed above. Therefore, activities that involve in-air energy would not have reasonably foreseeable adverse effects on public health and safety.

3.12.3.2.2 Effects from Physical Interactions

This section evaluates potential effects associated with the interaction of military aircraft, vessels, and equipment with the general public. Public health and safety could be affected by physical collisions between military assets and the public. As described in Section 3.0.3.3.4, military aircraft, vessels, targets, munitions, towed devices, seafloor devices, and military expended materials could be directly encountered by recreational, commercial, institutional, and governmental aircraft, vessels, and individuals such as swimmers, divers, and anglers.

The analysis focuses on the potential for a direct physical interaction with aircraft, vessels, targets, or other expended materials. A vessel or aircraft transiting through the water or air (as would be involved in the vast majority of proposed activities) inherently involves the risk of collision with other vessels or aircraft. However, this risk is greatly diminished by a shared set of international navigational rules for vessels and aircraft. The greatest potential for a physical interaction would be along the coast and near populated areas because that is where public activities are concentrated.

Training and Testing. The potential for a direct physical interaction between the public and aircraft, vessels, targets, or expended materials would remain as previously assessed in the 2018 HSTT and 2022 PMSR EIS/OEISs.

Four amphibious approach lanes have been added, providing California land access from the Northern California Range Complex and PMSR. Because of the proximity of these lanes to publicly accessed areas, there is a greater possibility of interaction between the military and the public during amphibious training activities. However, the military implements strict SOPs that protect public health and safety. These operating procedures include ensuring Amphibious Approach lanes are clear of non-participants prior to commencing training activities.

There would be no effect on public health and safety from physical interactions with testing and training activities, based on the military's implementation of strict SOPs that protect public health and safety. These SOPs include ensuring clearance of the area before commencing training or testing activities involving physical interactions. Because of the military's established safety procedures, the proposed testing and training activities do not pose a potential risk for injury to military personnel or the general public, or cause damage to property. The analysis conclusions for physical interactions during testing and training activities under Alternative 1 are consistent with a negligible determination and therefore would result in an insignificant effect on public health and safety.

Modernization and Sustainment of Ranges. The creation of SUA (W-293 and W-294, which will be contiguous to and augment existing SUA in Southern California) is being proposed via an Airspace Proposal from the Navy to the FAA. Airspace management procedures would be similar to current civilian-military aircraft deconfliction measures. Safety measures taken to ensure containment of Navy activities includes mandatory aircrew Course Rules Brief, mandatory local familiarization training and Range Operations Manual doctrine, pre-flight planning of airspace, route of flight, and deconfliction. Other modernization and sustainment of ranges activities would have the same or similar potentials for physical interactions as described for training and testing activities.

As noted in Section A.3.7 of Appendix A, underwater landing platforms are required to facilitate underwater vehicle pilot proficiency training in the SOCAL and Hawaii range complexes. The platform in SOCAL would be located just west of the SSTC boat lanes (Figure A-11), and the Hawaii installation would be south of the entrance to Pearl Harbor (Figure A-12). LNM would be published to provide marine safety information, such as the establishment and use of these underwater platforms. LNM are made available weekly by the USCG.

Conclusion. Military readiness activities would be conducted in accordance with SOPs and range guidelines listed above. Therefore, activities that involve potential physical interaction would not have reasonably foreseeable adverse effects on public health and safety.

3.12.3.3 Secondary Stressors (Sediment and Water Quality)

Secondary stressors are defined as those stressors that could pose indirect effects on public health and safety through degradation in water quality or changes to sediment and water quality stressors. These secondary stressors include explosives, explosive chemical byproducts, and other materials/debris potentially generated (e.g., marine markers, flares, chaff, targets, and miscellaneous components of other materials).

3.12.3.3.1 Effects from Secondary Stressors

Section 3.2 considers the effects on marine sediments and water quality from these stressors. The analysis therein determined that any effects on water quality would be temporary and minimal. No state or federal standards or guidelines would be violated. Consequently, military readiness activities would not result in reasonably foreseeable adverse effects on public health and safety associated with sediments and water quality.

3.12.4 Summary of Potential Effects on Public Health and Safety

3.12.4.1 Combined Effects of All Stressors

Activities described in this EIS/OEIS that have potential to affect public health and safety include those that release underwater energy or in-air energy or those that result in physical interactions, as well as those that have indirect effects from changes to sediments and water quality. As described throughout this section, the military promotes a proactive and comprehensive safety program designed to reduce to the greatest extent practicable any potential effects on public health and safety from military readiness activities. Elements of this program include implementing strict navigation rules, coordinating and disseminating information on potentially hazardous activities, and using remote sensing technologies (e.g., radar, sonar) or trained Lookouts to ensure that military readiness activities areas are clear of non-participants. Military safety considerations are appropriate to the location and type of activity being conducted, no matter what number of activities are occurring concurrently; consequently, no elevated effects from the combined effect of all stressors are expected. The combined effects of all stressors on public health and safety is consistent with a less than significant determination.

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