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3.1 Air Quality and Climate Change

AIR QUALITY AND CLIMATE CHANGE SYNOPSIS

The Action Proponents considered the stressors to air quality and climate change that could result from the action alternatives within the Study Area. The following conclusions have been reached for the Preferred Alternative (Alternative 1):

Air Quality

- The effects on air quality from implementation of the Preferred Alternative would be less than significant.
- Criteria Air Pollutants: The increase in emissions of criteria pollutants resulting from activities in the Study Area would not cause a violation or contribute to an ongoing violation of the National or state Ambient Air Quality Standards.
- Hazardous Air Pollutants (HAP): Mobile sources would emit negligible amounts of hazardous air pollutants intermittently over a large area. The increase in HAP emissions is not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

Climate Change

Greenhouse Gases: While greenhouse gas emissions generated by military readiness activities alone would not be enough to cause global warming, in combination with past and future emissions from all other sources, they would contribute incrementally to the global warming that produces the adverse effects of climate change.

3.1.1 Introduction

This section describes the air quality in the Study Area and analyzes the potential effects of the proposed military readiness activities on this resource area. It also presents greenhouse gas (GHG) emissions that could result from the implementation of the action alternatives within the Study Area. Appendix G of this EIS/OEIS contains supplemental information for the air quality and GHG emissions analysis.

3.1.2 Clean Air Act

Congress passed the Clean Air Act (CAA) in 1970 and its amendments in 1977 and 1990 to improve air quality and reduce air pollution, set regulatory limits on air pollutants, and ensure basic health and environmental protection from air pollution. The CAA applies to U.S. land mass and coastal waters within 3 NM of shore.

3.1.2.1 Criteria Pollutants and Ambient Air Quality Standards

Under the CAA, the U.S. Environmental Protection Agency (USEPA) establishes National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS that have been established for the following six major pollutants of concern are called “criteria pollutants”: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), and particulate matter (with an aerodynamic size less than or equal to 10 microns [PM_{10}] and with an aerodynamic size less than or equal to 2.5 microns [$PM_{2.5}$]).

Criteria air pollutants are classified as either primary or secondary pollutants based on how they are formed in the atmosphere. Primary air pollutants are emitted directly into the atmosphere from the source of the pollutant. Secondary air pollutants are those formed through atmospheric chemical reactions that usually involve primary air pollutants (or pollutant precursors) and normal constituents of the atmosphere. For example, ozone is a secondary pollutant that is formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors (volatile organic compounds, nitrogen oxides [NO_x], and suspended PM_{10}). Some criteria air pollutants, including PM_{10} and $PM_{2.5}$, are a combination of primary and secondary pollutants.

Areas that exceed a standard are designated as “nonattainment” for that pollutant, while areas that meet a standard are in “attainment” for that pollutant. An area may be nonattainment for some pollutants and attainment for others simultaneously. Areas classified as attainment, after being designated as nonattainment, may be reclassified as maintenance areas subject to maintenance plans showing how the area will continue to meet federal air quality standards. Nonattainment areas for some criteria pollutants are further classified, depending upon the severity of their air quality problem. Classifications include marginal, moderate, serious, severe, and extreme.

The CAA sections 111 and 112 allow USEPA to transfer primary implementation and enforcement authority for most of the federal standards to state, local, or tribal regulatory agencies. These agencies’ authority to implement the CAA requirements is through USEPA-approved State Implementation Plans (SIPs), such as in most California Air Districts; Tribal Implementation Plan; or by delegation, such as in State of Hawaii’s Prevention of Significant Deterioration (PSD) authority to issue PSD permits.

States may establish ambient air quality standards (AAQS) more stringent than the NAAQS. Table 3.1-1 presents the National and state AAQS.

Table 3.1-1: National and State Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS		California AAQS[1]	Hawaii AAQS
		Primary	Secondary	Concentration	Concentration
CO	8-Hour	9 ppm (10 mg/m^3)	-	9.0 ppm (10 mg/m^3)	5 mg/m^3 (4.4 ppm)
	1-Hour	35 ppm (40 mg/m^3)		20 ppm (23 mg/m^3)	10 mg/m^3 (9 ppm)
Pb	30-Day Average	-	-	1.5 µg/m^3	-
	Calendar Quarter	-	-	-	1.5 µg/m^3
	3-Month Rolling Average	0.15 µg/m^3	0.15 µg/m^3	-	-
NO_2	Annual Average	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	0.030 ppm (57 µg/m^3)	70 µg/m^3 (0.04 ppm)
	1-Hour	0.100 ppm (188 µg/m^3)	-	0.18 ppm (339 µg/m^3)	-
O_3	1-Hour	-		0.09 ppm (180 µg/m^3)	-
	8-Hour	0.070 ppm[2]	Same as Primary Standard	0.070 ppm (137 µg/m^3)	157 µg/m^3 (0.08 ppm)
SO_2	Annual Arithmetic Mean	-	-	-	80 µg/m^3 (0.03 ppm)
	24-Hour	-	-	0.04 ppm (105 µg/m^3)	365 µg/m^3 (0.14 ppm)
	3-Hour	-	1300 µg/m^3 (0.5 ppm)	-	1,300 µg/m^3 (0.5 ppm)
	1-Hour	75 ppb (196 µg/m^3)	-	0.25 ppm (655 µg/m^3)	-

Table 3.1-1: National and State Ambient Air Quality Standards (continued)

Pollutant	Averaging Time	NAAQS		California AAQS[1]	Hawaii AAQS
		Primary	Secondary	Concentration	Concentration
PM_{10}	24-Hour	150 µg/m^3	150 µg/m^3	50 µg/m^3	150 µg/m^3
	Annual Arithmetic Mean	-	-	20 µg/m^3	50 µg/m^3
$PM_{2.5}$	24-Hour	35 µg/m^3	35 µg/m^3	-	-
	Annual Arithmetic Mean	9 µg/m^3	15 µg/m^3	12 µg/m^3	-
Hydrogen Sulfide	1-Hour	-		0.03 ppm (42 µg/m^3)	35 µg/m^3 (25 ppb)
Sulfates	24-Hour			25 µg/m^3	-
Visibility Reducing Particles	8-Hour			In sufficient amount to produce an extinction coefficient of 0.23 per km due to particles.	-
Vinyl chloride	24-Hour			0.01 ppm (26 µg/m^3)	-

Sources: (U.S. Environmental Protection Agency, 2024f), last updated February 7, 2024. (California Air Resources Board, 2024); (State of Hawaii Department of Health, 2015)

[1] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O3 standards.

3.1.2.2 General Conformity Rule

Section 176(c)(1) of the CAA, commonly known as the General Conformity Rule, requires federal agencies to ensure that their actions conform to applicable implementation plans for achieving and maintaining the NAAQS for criteria pollutants for nonattainment and maintenance areas. General Conformity Rule applies to federal activities on U.S. land mass and coastal waters within 3 NM of shore. Federal actions are required to conform with the approved State Implementation Plan for those areas of the U.S. designated as nonattainment or maintenance areas for any criteria air pollutants and/or their precursors under the CAA (40 CFR Parts 51 and 93 Subpart B). The purpose of the General Conformity Rule is to ensure that applicable federal activities do not cause or contribute to new violations of the NAAQS, do not worsen existing violations of the NAAQS, and attainment of the NAAQS is not delayed.

A conformity evaluation must be completed for every applicable federal action that generates emissions in a nonattainment or maintenance area to determine and document whether a proposed action complies with the General Conformity Rule.

3.1.2.3 Hazardous Air Pollutants

In addition to the six criteria pollutants, the USEPA currently designates 188 substances as HAPs under the federal CAA. HAPs are air pollutants known or suspected to cause cancer or other serious health effects, or adverse environmental and ecological effects (U.S. Environmental Protection Agency, 2024e). HAP emissions are typically one or more orders of magnitude smaller than concurrent emissions of criteria air pollutants. NAAQS are not established for these pollutants; however, the USEPA has developed National Emissions Standards for Hazardous Air Pollutants (40 CFR parts 61 and 63) that limit emissions of HAPs from specific stationary sources and Mobile Source Air Toxics rules that reduce HAPs emitted by mobile sources, such as cars and trucks. These emissions control standards are intended to achieve the maximum degree of reduction in emissions of the HAPs, taking into consideration the cost of emissions control, non-air-quality health and environmental effects, and energy requirements. To assess risk from exposure to toxics, USEPA has tabulated long-term (chronic) and short-term (acute) dose-response assessments that could be used for risk assessments of hazardous air pollutants (U.S. Environmental Protection Agency, 2024b).

3.1.3 California Ambient Air Quality Standards and Toxic Air Contaminants

The State of California has identified four additional pollutants for ambient air quality standards: visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. As shown in Table 3.1-1, the California Air Resources Board has also established the more stringent California AAQS. These additional pollutants are not analyzed in this EIS because they are not anticipated to be emitted by any emission source from the Proposed Action.

Section 39655 of the California Health and Safety Code defines a toxic air contaminant (TAC) as "an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health." The California Air Resources Board has formally identified over 200 substances and groups of substances as TACs, including Particulate Emissions from Diesel-Fueled Engines (Diesel PM). In addition, federal HAPs are considered TACs in California under the air toxics program pursuant to section 39657 (b) of the California Health and Safety Code.

3.1.4 Hawaii Ambient Air Quality Standards

As shown in Table 3.1-1, the State of Hawaii has also established AAQS for the six criteria pollutants and a state standard for hydrogen sulfide. Hydrogen sulfide was not analyzed in this EIS because it is not emitted by any emission source from the Proposed Action.

3.1.5 Greenhouse Gases

The USEPA specifically identified carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride as GHGs (U.S. Environmental Protection Agency, 2009a) (74 FR 66496). These gases influence global climate by trapping heat in the atmosphere that would otherwise escape to space. Increased concentrations of these gases due to human activities is the primary cause of global warming observed over the last 70 years and contributes significantly to climate change (National Resource Council, 2020). GHGs have varying global warming potential (GWP). GWP is a measure of how much energy the emissions of 1 ton of a gas absorb over a given period of time (usually 100 years), relative to the emissions of 1 ton of CO_2 (U.S. Environmental Protection Agency, 2024g). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. Other common GHGs that result from human activity include CH_4, which is estimated to have a GWP of 27–30 over 100 years; N_2O, which has a GWP of 273. CO_2; and to a lesser extent, CH_4 and N_2O, which are generated from stationary combustion sources as well as vehicles, aircraft, and vessels. High GWP gases include GHGs that are used in refrigeration/cooling systems, such as chlorofluorocarbons and hydrofluorocarbons.

Currently, there are no regulatory thresholds of significance for GHG emissions; however, the CEQ has released interim guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses (Council on Environmental Quality, 2023). The guidance emphasizes that when conducting climate change analyses in NEPA reviews, agencies should consider the following: (1) the potential effects of a proposed action on climate change, including by assessing both GHG emissions and reductions from the proposed action; and (2) the effects of climate change on a proposed action and its environmental effects.

The guidance states that federal agencies should quantify the reasonably foreseeable direct and indirect GHG emissions of their proposed actions and reasonable alternatives (as well as the No Action Alternative). The guidance also recommends that agencies provide additional context for GHG emissions. (Council on Environmental Quality, 2023).

3.1.6 EO 12114 – Environmental Effects Abroad of Major Federal Actions

EO 12114, issued on January 4, 1979, applies to coastal waters and foreign lands beyond 12 NM of the U.S. coastline. The analysis focuses on actions that significantly affect the environment of a foreign nation that is not involved in the action; and actions that significantly affect the environment of a foreign nation by producing an emission or effluent, which is prohibited or strictly regulated by federal law, in the U.S., because its toxic effects on the environment create a serious public health risk.

3.1.7 Approach to Analysis

The air quality impact evaluation requires three separate analyses: the CAA General Conformity Analysis, which applies to U.S. land mass and coastal waters within state waters limit (i.e., 3 NM); an analysis under NEPA, and an analysis under EO 12114. Effects of air pollutants emitted by the proposed military readiness activities in the Pacific Ocean, bays, and inland locations in U.S. shore activities and territorial seas (i.e., up to 12 NM from the coast) are assessed under NEPA. Effects of air pollutants emitted by military readiness activities outside of U.S. territorial seas are evaluated as required under EO 12114.

Criteria pollutants and HAPs emitted more than 3,000 ft. above ground level (AGL) are considered to be above the atmospheric inversion layer and, therefore, do not affect ground-level air quality (U.S. Environmental Protection Agency, 1992). These emissions thus do not affect the concentrations of criteria air pollutants and HAPs in the lower atmosphere, measured at ground-level monitoring stations, upon which federal, state, and local regulatory decisions are based. Greenhouse gas emissions are calculated for all altitudes.

3.1.7.1 General Conformity Evaluation

The General Conformity Evaluation is separate and distinct from the NEPA Analysis. Criteria pollutants emitted by military readiness activities in the Pacific Ocean, bays, and inland locations in U.S. state waters (i.e., up to 3 NM from the coast) are quantified and compared to the applicable thresholds specified in the General Conformity Rule to ensure that the Proposed Action does not interfere with the State or local agency's plan to achieve the NAAQS in nonattainment and maintenance areas.

The first step in the Conformity Evaluation is a Conformity Applicability Analysis and involves calculating the total non-exempt direct and indirect emissions associated with the action. If there is no current activity (the proposed action is completely new), then the sum of the non-exempt direct and indirect emissions equals the net change in emissions. If the action is a change from a current level of emissions, then the current level is defined as the baseline that future emissions are evaluated against. The net change, then, is the difference between the emissions associated with the action and the baseline emissions. The net change may be positive, negative, or zero. The emissions thresholds that trigger the conformity requirements are called *de minimis* levels. The net change calculated for the direct and indirect emissions are compared to the *de minimis* levels. If the net change in emissions does not exceed *de minimis* thresholds, then a General Conformity Determination is not required and the proposed action is presumed to conform to the State Implementation Plan. If the net change in emissions equals or exceeds the *de minimis* conformity applicability threshold values, a formal Conformity Determination must be prepared to demonstrate conformity with the approved State Implementation Plan.

The Navy Guidance for Compliance with the CAA General Conformity Rule, section 4.1, states that a Record of Non-Applicability must be prepared if the proposed action is subject to the Conformity Rule, but is exempt because it fits within one of the exemption categories listed under 40 CFR part 93 Subpart B, because the action's projected emissions are below the *de minimis* conformity applicability threshold values, or is presumed to conform (U.S. Department of the Navy, 2013). The *de minimis* levels for nonattainment and maintenance pollutants are shown in Table 3.1-2.

Table 3.1-2: *De Minimis* Thresholds for General Conformity Determinations

Pollutant	Nonattainment or Maintenance Area Type	*de minimis* Threshold (TPY)
Ozone (VOC or NO_X)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO_X)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
CO, SO_2 and NO_2	All nonattainment and maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$ (1)	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
Lead (Pb)	All nonattainment and maintenance	25

Source: U.S. Environmental Protection Agency (2024c)
(1) $PM_{2.5}$ precursors are sulfur dioxide, oxides of nitrogen, volatile organic compounds, and ammonia.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, NO_2 = nitrogen dioxide,
PM_{10} = particulate matter ≤ 10 microns in diameter, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter,
SO_2 = sulfur dioxide, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compound

3.1.7.2 National Environmental Policy Act

Analysis of health-based air quality effects under NEPA includes estimates of total direct and indirect criteria air pollutants and HAPs emissions for all training and testing activities where aircraft, missiles, or targets operate at or below the 3,000 ft. AGL inversion layer or that involve vessels in U.S. territorial seas (within 12 NM). The NEPA analysis encompasses effects, including CAA and HAPs, within 12 NM from coastline. Total direct and indirect emissions consider all emission increases and decreases that are reasonably foreseeable and are possibly controllable. The analysis considers the future emissions in the area with the action versus the future emissions without the action (i.e., the Baseline Condition/Affected Environment).

3.1.7.3 Executive Order 12114

The analysis of health-based air quality effects under EO 12114 includes emissions estimates of only those activities in which aircraft, missiles, or targets operate at or below 3,000 ft. AGL, and that involve vessels outside of U.S. territorial seas (>12 NM from the coast).).

3.1.8 Air Quality Effect Analysis Framework

Emission sources and the approach used to estimate emissions under Alternative 1 and Alternative 2 in the air quality analysis are based on information from Navy subject matter experts and established training and testing requirements. The data were used to estimate the numbers and types of aircraft, surface ships and vessels, submarines, and munitions (i.e., potential sources of air emissions) that would be involved in training and testing activities under each alternative. The analysis focused on the net increase in emissions that would result from the increased or new activities under two action alternatives compared to the current number of activities. For the SOCAL Range Complex, the SSTC, and the PMSR, the current number of activities are based on the Preferred Alternatives that were evaluated in the 2018 HSTT and 2022 PMSR EIS/OEISs. The current level of activities for the NOCAL Range Complex was estimated. Appendix G contains the basis for emission calculations.

The NOCAL Range Complex consists of two separate areas located offshore of central and northern California, one northwest of San Francisco and the other southwest of Monterey Bay. Both components of the NOCAL Range Complex are located at least 12 NM from shore and extend from the ocean surface to at least 45,000 ft. altitude, which is well above the 3,000 ft. AGL where criteria pollutants and emissions are analyzed under NEPA. GHG emissions are calculated for all altitudes.

Once the emissions are quantified for each alternative, the air quality effect analysis provides a qualitative discussion of effects of the estimated emissions on air quality. These effects may include, but are not limited to, risks to populations resulting from the exposure to HAPs, and changes in ambient concentrations for criteria pollutants and their effects on attaining the AAQS. Based on magnitude of emissions, location and initial dispersion of emissions, duration of exposure, meteorological conditions, wind patterns, buoyancy of pollutants, and other relevant factors, anticipated effects are determined qualitatively.

Emission sources and the approach to estimating emissions are described in Appendix G.

3.1.9 Affected Environment

The affected environment provides the context for evaluating the effects of the proposed military readiness activities on air quality.

3.1.9.1 Region of Influence

The region of influence for air quality is a function of the type of pollutant, emission rates of the pollutant source, proximity to other emission sources, and local and regional meteorology. For inert pollutants (all pollutants other than PM_{10}, $PM_{2.5}$, ozone, and their precursors), the region of influence is generally limited to a few miles downwind from the source but could extend farther downwind depending on existing conditions, magnitude of emissions, and expected plume size and location. Ozone and its precursors, NO_x and volatile organic compound emissions, can travel hundreds of miles on air currents, forming ozone far from the original emissions sources (U.S. Environmental Protection Agency, 2022b). Therefore, the region of influence for air quality under CAA and NEPA includes the Study Area up to 12 NM from the coastline, as well as adjoining land areas several miles inland, which may from time to time be downwind from emission sources associated with the Proposed Action. The region of influence for EO 12114 includes coastal waters and foreign lands beyond 12 NM of the U.S. coastline.

3.1.9.2 Receptors

Identification of receptors, including sensitive receptors, is part of describing the existing air quality environment. Sensitive receptors are individuals in residential areas, schools, parks, hospitals, or other sites who are more susceptible to adverse effects of exposure to air pollutants. On the oceanic portions of the Study Area, crews of commercial vessels and recreational users of the Pacific Ocean could encounter the air pollutants generated by the Proposed Action. Few such individuals are expected to be present and the duration of substantial exposure to these pollutants is limited because the areas are cleared of nonparticipants before event commencement.

The study also evaluates effects on potential receptors within the affected military installations that are not associated with the Proposed Action. These receptors may include military housing residents, daycares and schools, restaurants, and workers within the facility not part of the Proposed Action.

3.1.9.3 Meteorological Conditions and Topography of the Study Area

Pollution dispersion in the air is influenced by meteorological conditions, such as temperature, wind speed and wind direction, and atmospheric stability. Details regarding meteorological conditions and topography of the Study Area are described in Appendix G.

3.1.9.3.1 Hawaii

Winds offshore the Hawaiian Islands are predominantly from the north, northeast, and east at 10 to 20 miles per hour. Air temperatures are moderate and vary slightly by season, ranging from about 70 to 80 degrees Fahrenheit. (Western Regional Climate Center, 2016). The prevailing winds could quickly disperse air pollutants in the region. Frequent rainfall on windward sides of the islands can remove atmospheric dust and other air pollutants. During periods of light and variable winds, typically from the southeast, south, or southwest, local air pollutant concentrations may temporarily increase and volcanic organic gases emissions from the Island of Hawaii may temporarily affect downwind Hawaiian islands.

3.1.9.3.2 Southern and Central California

One of the main influences on meteorology is a semi-permanent high-pressure system (the Pacific High) in the eastern Pacific Ocean. This high-pressure cell maintains clear skies in Southern California for much of the year. When the Pacific High moves south during the winter, this pattern changes and low-pressure centers migrate into the region, causing widespread precipitation.

The Pacific High influences the large-scale wind patterns of California. The predominant regional wind directions are westerly and west-southwesterly during all four seasons. Surface winds typically are from the west (onshore) during the day and from the east (offshore) at night; this diurnal wind pattern is dominant in winter but is weak or absent in summer, when onshore winds may occur both day and night. Along the coast, average wind speeds are low at night, increase during morning hours to a midday peak, then decrease through the afternoon.

Central California wind and temperature patterns are influenced by the proximity to the Pacific Ocean. In Monterey, prevailing winds along the coast often come from the west or northwest, as they are influenced by the cool marine air from the Pacific Ocean. Average wind speeds can vary but are often moderate. Stronger winds may occur during certain weather conditions or seasons. Monterey generally experiences mild temperatures due to its coastal location. Summers tend to be cool, with average high temperatures ranging from the 60s to low 70s Fahrenheit. Winters are also mild, with average high temperatures in the 50s Fahrenheit.

3.1.9.3.3 Northern California

The wind speed and direction in Northern California can vary depending on the specific location, time of year, and weather patterns. Along the coast, in areas such as San Francisco, prevailing winds often come from the west or northwest. These winds are influenced by the cool marine air from the Pacific Ocean. Wind speeds along the coast can vary but are often moderate.

3.1.9.3.4 Wind Roses

Figure 3.1-1 depicts a wind rose for data collected from December 2018 to December 2023 by the weather station (PHNL) located at Daniel K. Inouye International Airport and the relative location within the activity area. Figure 3.1-2, Figure 3.1-3, and Figure 3.1-4 present wind roses for the same time frame for Kauai, Southern Califonia, and Central California, respectively. Figure 3.1-5 presents the wind rose for Northern California. The Northern California wind roses are for locations that are close to the southern part of the NOCAL Range Complex where vessel activities would occur. Full page wind roses are provided in Appendix G.

Winds and currents in the Pacific Ocean flow predominantly from East to West. Above the equator Pacific Ocean trade winds blow from the northeast. An example of the prevailing wind direction and intensity in the Pacific Ocean is presented in Appendix G.

3.1.9.4 Existing Air Quality

Air quality in offshore ocean areas is generally better than the air quality of adjacent onshore areas because there are few or no large stationary sources of HAPs or criteria air pollutants offshore. Much of the air pollutants found in offshore areas are transported there from adjacent land areas by low-level offshore winds, so concentrations of criteria air pollutants generally decrease with increasing distance from land. There is some transfer of pollutants, known as Trans-Pacific transport of Asian pollutants, whereby East Asian pollution is transported across the Pacific Ocean from Asia to North America, especially during springtime. No criteria air pollutant or HAP monitoring stations are located in offshore areas; therefore, air quality in the Study Area must be inferred from the air quality in adjacent land areas where air pollutant concentrations are monitored.

3.1.9.4.1 Hawaii

Figure 3.1-6 presents the Hawaii Range Complex within the Hawaii Study Area. Nearly all the training and testing activities in the Hawaii Study Area take place within the Hawaii Range Complex, generally centered around the Island of Hawaii and the islands of Kauai, Oahu, and Niihau.

State of Hawaii Department of Health Clean Air Branch is responsible for air pollution control in the state. Air quality in Hawaii is generally good, because the small number of major stationary sources located where their exhaust plumes are immediately transported above the ocean away from land mass. Monitored air pollutant concentrations are generally well below State of Hawaii or federal air quality standards. With the exception of short-term SO_2 measurements recorded in 2023 near volcanic activity, none of the air quality monitoring stations in Hawaii recorded criteria air pollutant concentrations that exceeded the AAQS (State of Hawaii Department of Health, 2016). Detailed existing air quality information for the Hawaii Study Area is provided in Appendix G.

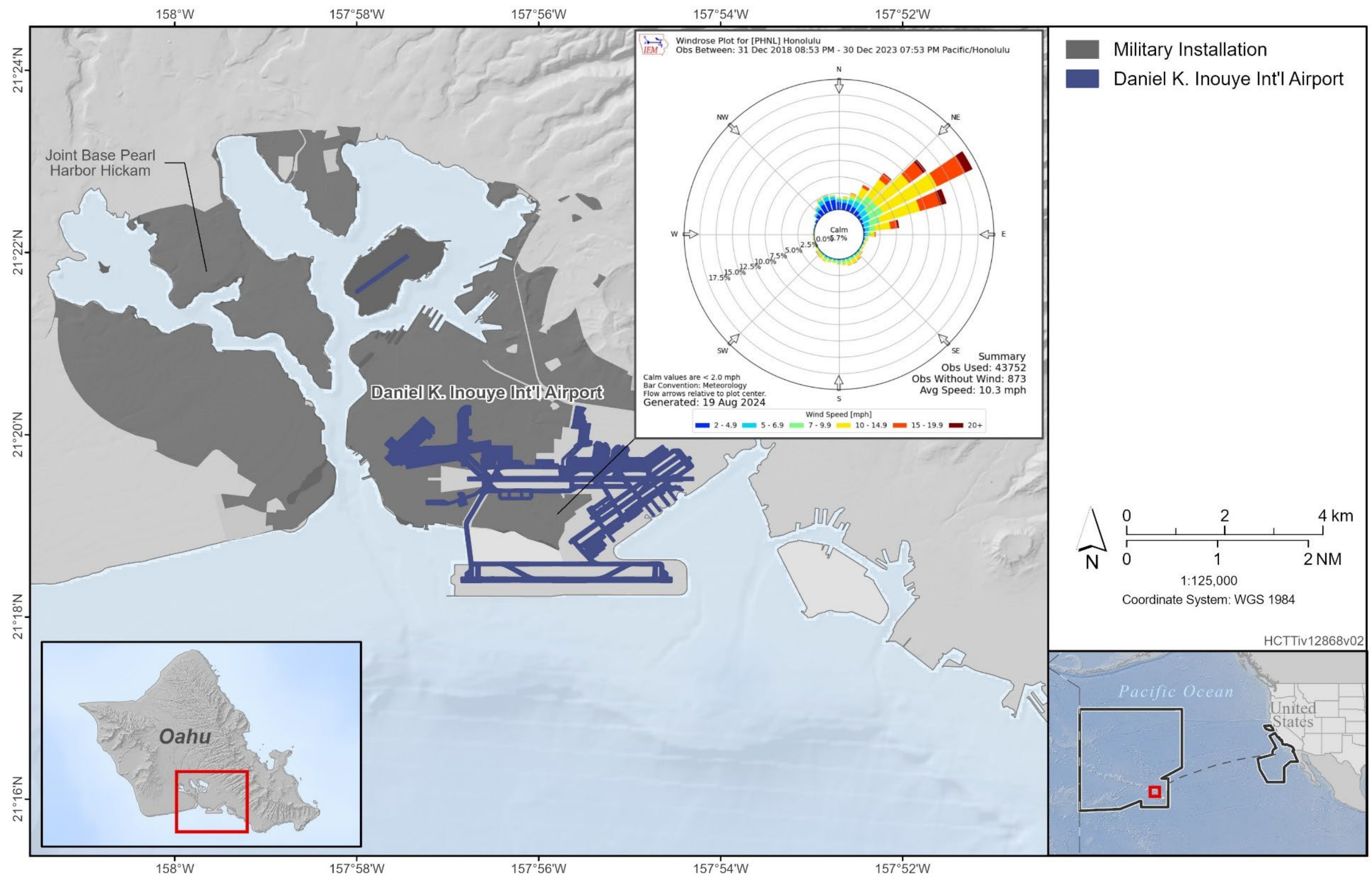

Figure 3.1-1: Location of Honolulu PHNL Weather Station Wind Rose Data Relative to Activity Areas

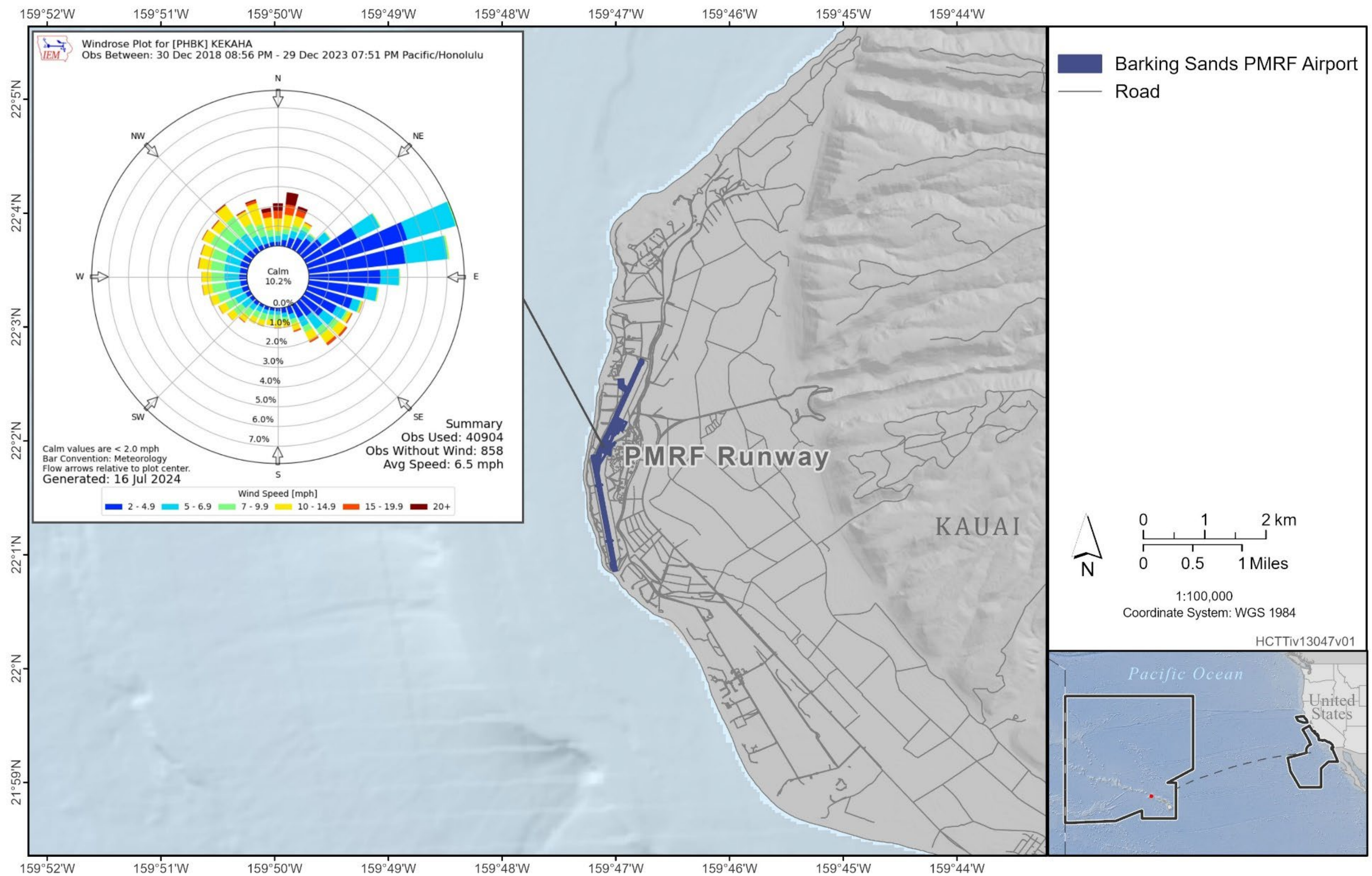

Figure 3.1-2: Location of Kauai PMRF Airfield Weather Station Wind Rose Data Relative to Activity Areas

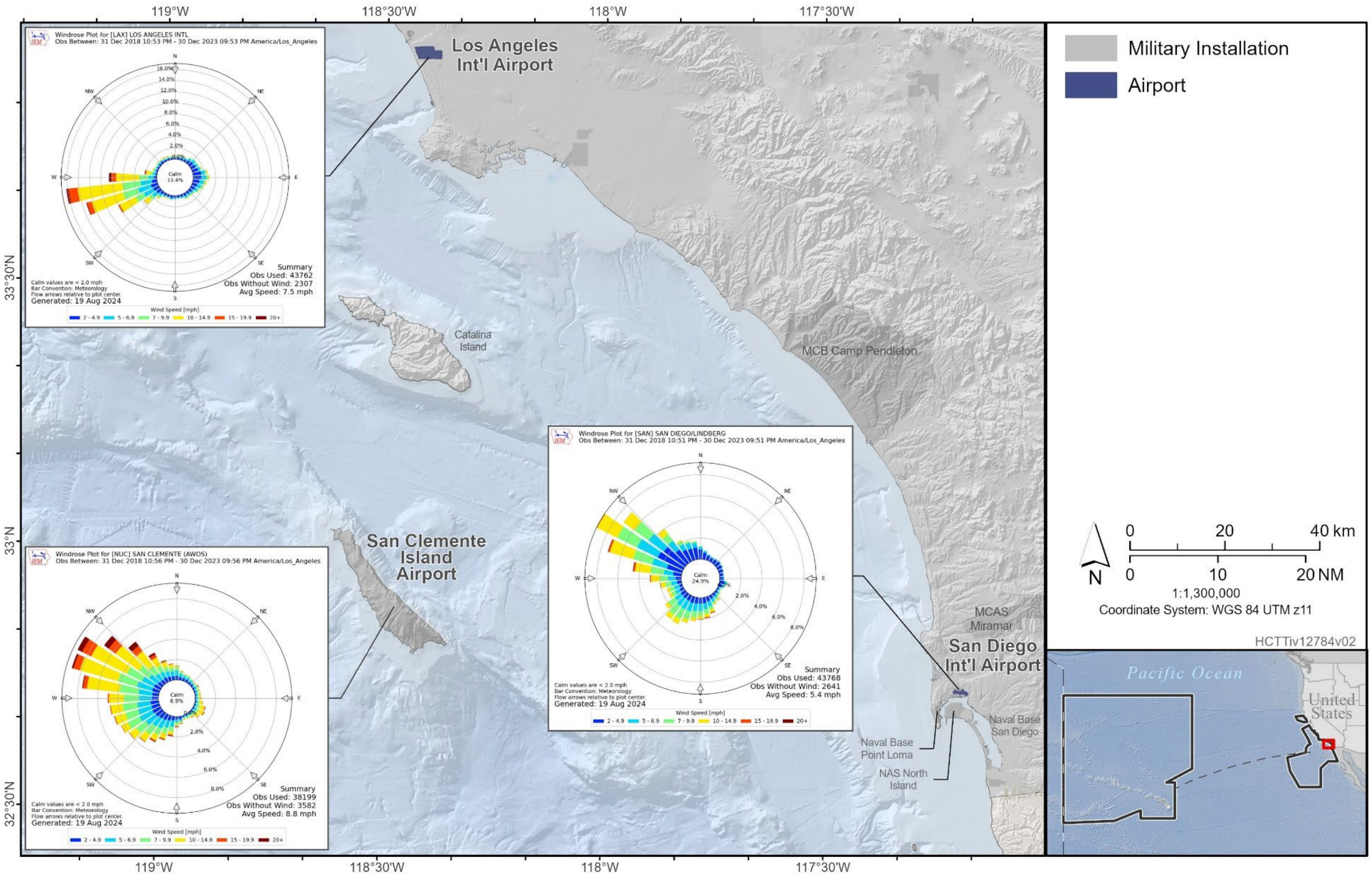

Figure 3.1-3: Location of Southern California Wind Rose Data and Weather Stations Relative to Activity Areas

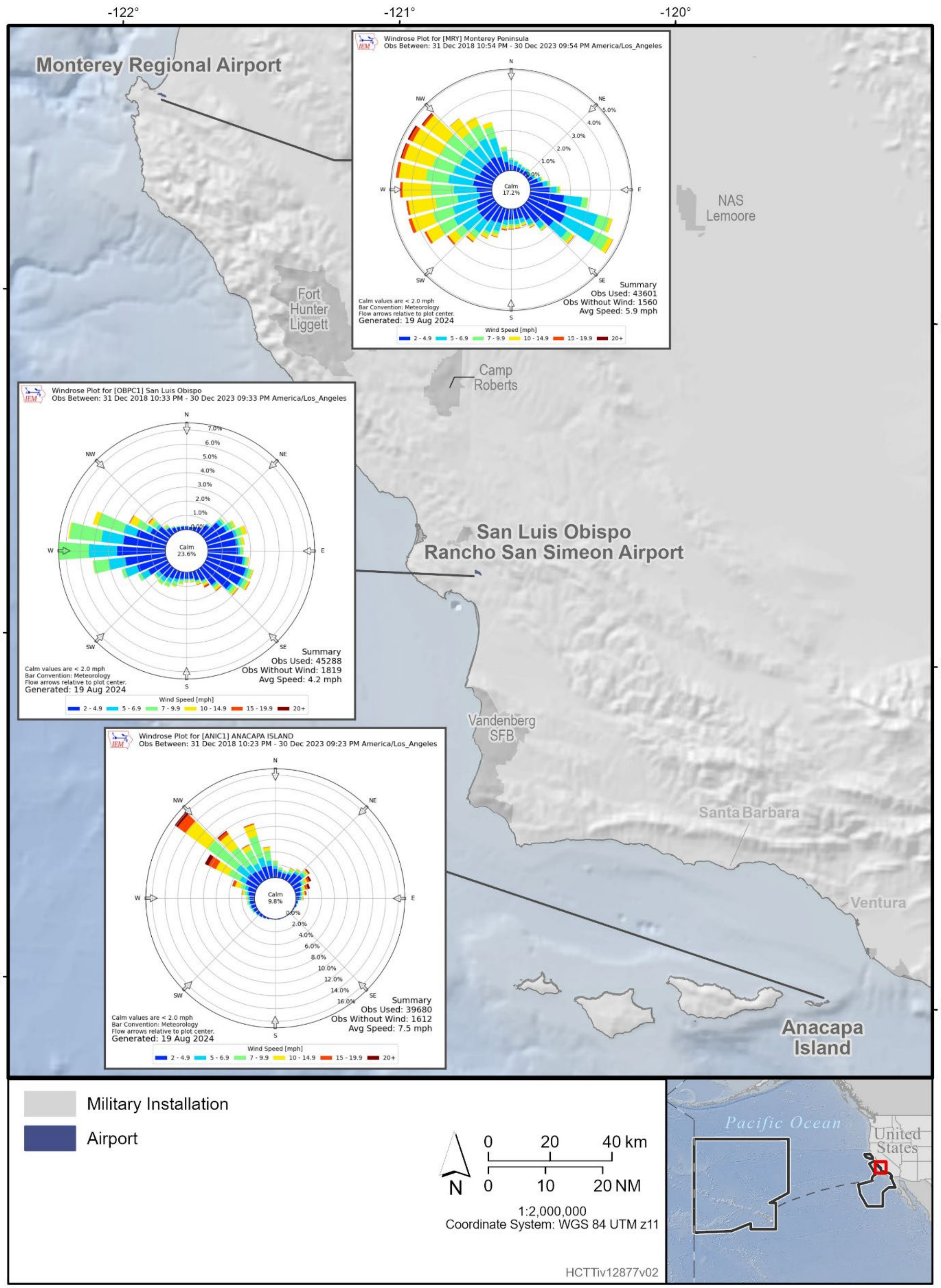

Figure 3.1-4: Location of Central California Wind Rose Data Relative to Activity Areas

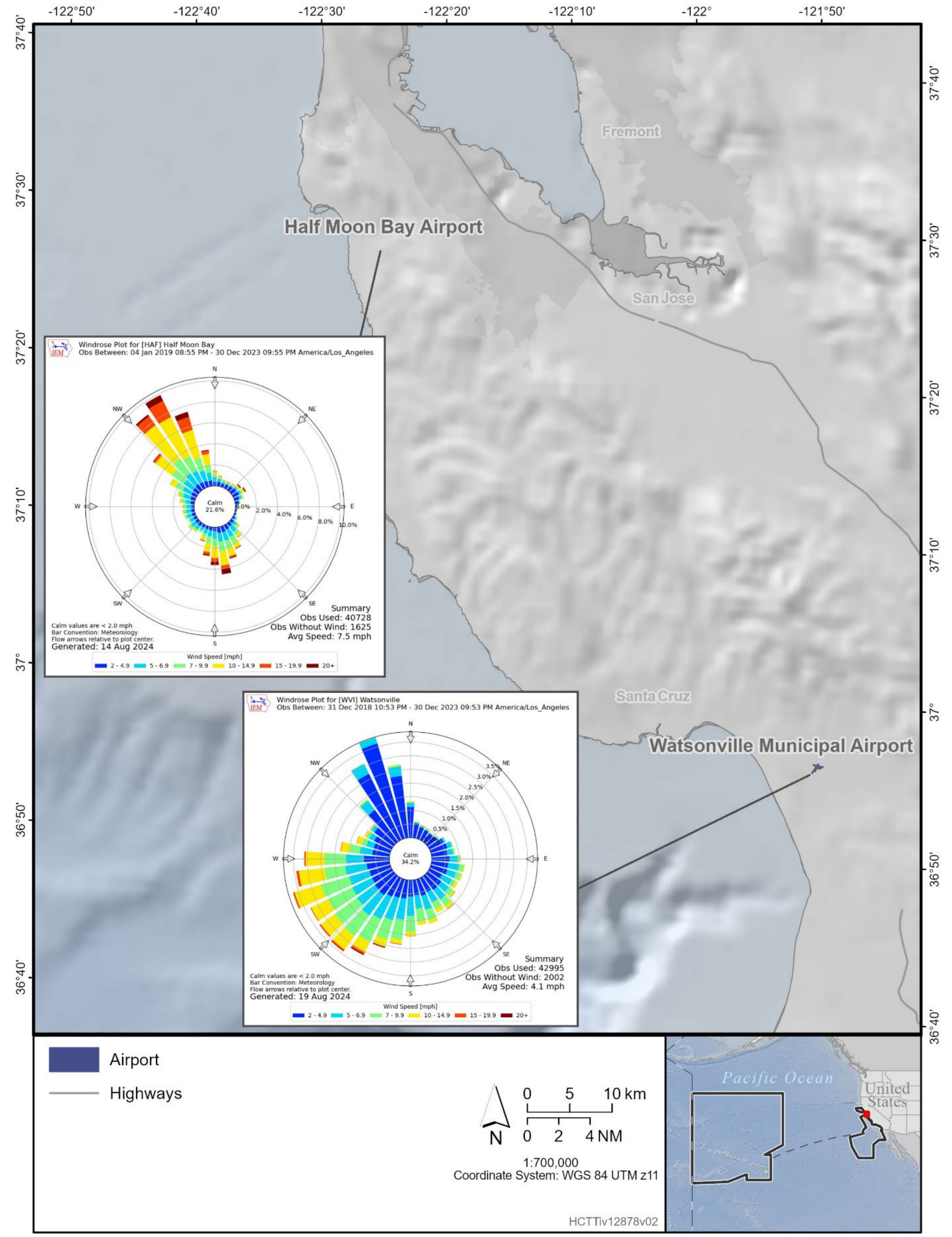

Figure 3.1-5: Location of Northern California Wind Rose Data Relative to Activity Areas

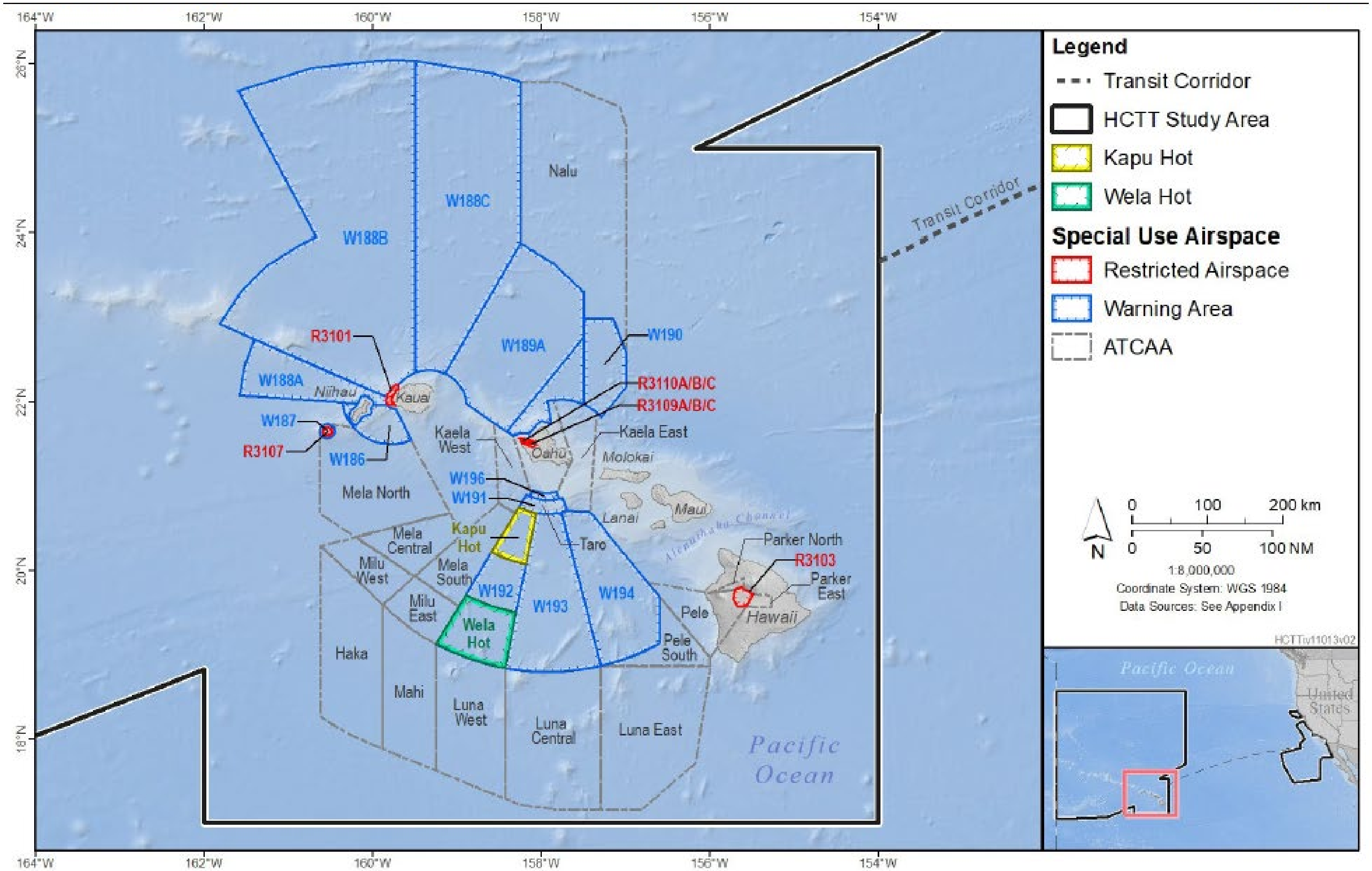

Figure 3.1-6: Hawaii Range Complex

3.1.9.4.2 California Study Area

Table 3.1-3 identifies the NAAQS attainment status of each California air basin and county within the California Study Area. The San Francisco Bay Area and North Coast Air Basins are not affected by emissions from the proposed alternatives, as explained in Section 3.1.9.4.3 and are not included in this table.

Table 3.1-3: NAAQS attainment status of California Counties within the California Study Area

Air Quality Basin	Air Quality District	County/Area	NAAQS Attainment Status
South Coast Air Basin	South Coast Air Quality Management District	Los Angeles County	Extreme nonattainment area for ozone (eight-hour average concentration), a CO maintenance area, a maintenance area for PM_{10}, and a serious non-attainment area for $PM_{2.5}$.
		Orange County	
San Diego Air Basin	San Diego Air Pollution Control District (APCD)	San Diego County	Severe nonattainment area for the 2008 and 2015 ozone (eight-hour average concentration)
South Central Coast Air Basin	Ventura County APCD	Ventura County	Serious nonattainment area for the 2008 and 2015 ozone (eight-hour average concentration)
	Santa Barbara County APCD	Santa Barbara County	In attainment for all NAAQS
	San Luis Obispo County APCD	San Luis Obispo County	Marginal nonattainment area for the 2008 and 2015 ozone (eight-hour average concentration)
North Central Coast Air Basin	Monterey Bay Air Resources District	Monterey County	In attainment for all NAAQS
		Santa Cruz County	In attainment for all NAAQS
		San Benito County	In attainment for all NAAQS

Figure 3.1-7 presents a map of the air basins in the California Study Area. As shown in the figure, many coastal southern, central, and northern California air districts are within the proposed HCTT Study Area. The proposed alternatives do not generate emissions in the San Francisco Bay Area and North Coast Air Basins.

3.1.9.4.2.1 South Coast Air Basin

South Coast Air Basin (SCAB) is classified as an extreme non-attainment area for ozone (eight-hour average concentration) NAAQS, a CO maintenance area, a maintenance area for NO_2, a maintenance area for PM_{10}, and a serious non-attainment area for $PM_{2.5}$. SCI is located within this air basin. Detailed existing air quality information for the SCAB is provided in Appendix G.

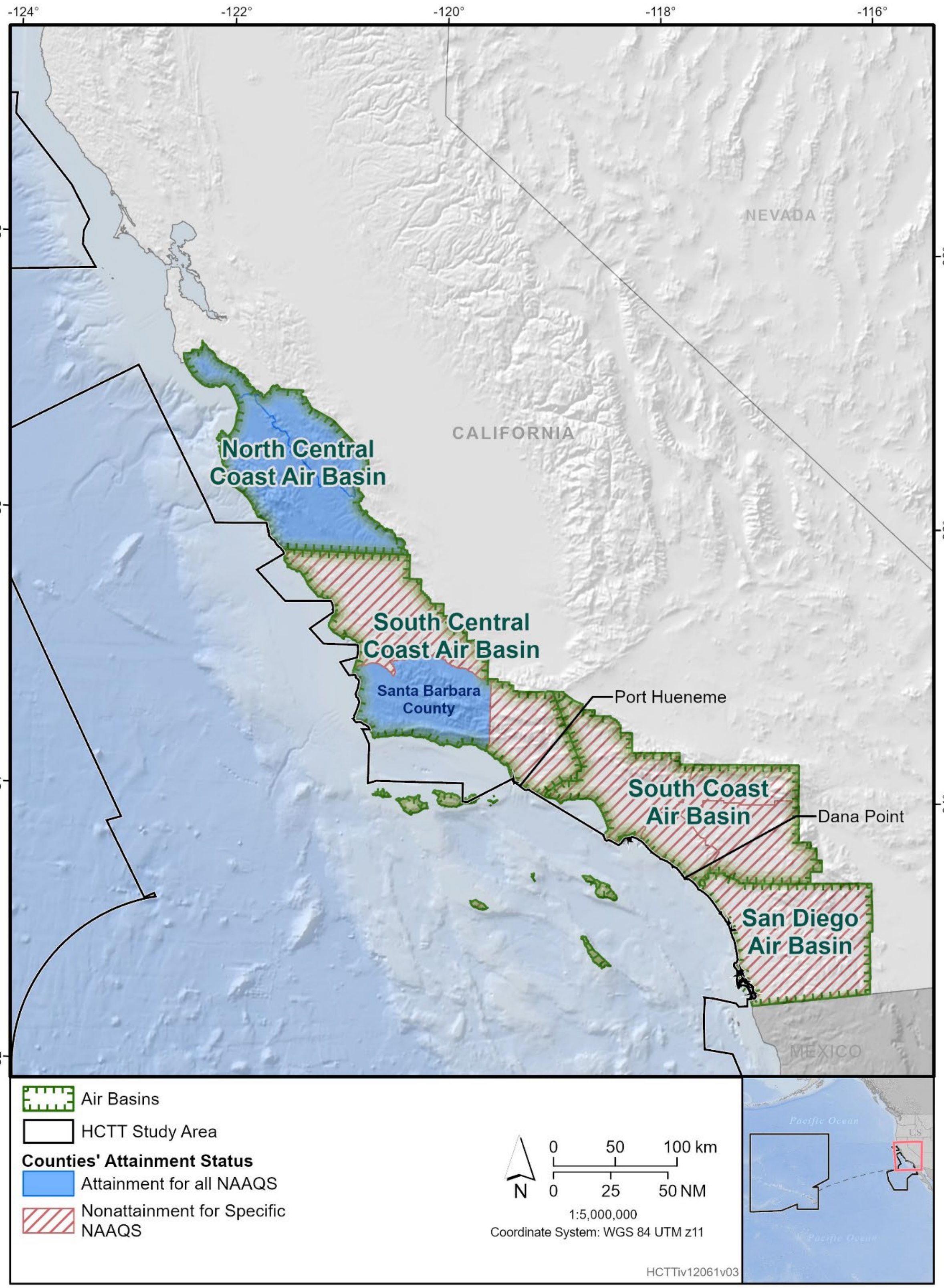

Figure 3.1-7: California Air Basins Within the HCTT Study Area

3.1.9.4.2.2 San Diego Air Basin

The San Diego Air Basin is classified as a severe non-attainment area for the 2008 and 2015 ozone (eight-hour average concentration) NAAQS. Detailed existing air quality information for the San Diego Air Basin, including the San Diego Portside Environmental Justice Neighborhoods[1], is provided in Appendix G.

3.1.9.4.2.3 South Central Coast Air Basin

Ventura County is in the South Central Coast Air Basin, along with Santa Barbara and San Luis Obispo Counties. PMSR activities over land and within coastal waters are within this air basin. PMSR supports training, testing, and evaluation of a wide variety of weapons, ships, aircraft, and specialized systems, as well as Department of Defense, Homeland Defense, foreign military sales, and commercial/private sector programs. The test range also includes portions of Naval Base Ventura County (NBVC) Point Mugu, NBVC Port Hueneme (pile driving), and SNI. The at-sea areas around SNI and Santa Barbara Island are within the Study Area. NBVC Point Mugu and NBVC Port Hueneme are located within the ozone serious nonattainment area of Ventura County Air Pollution Control District (VCAPCD). Santa Barbara Island is in the Santa Barbara County Air Pollution Control District, which is in attainment with all the NAAQS. SNI is designed as an unclassifiable area with respect to NAAQS. Detailed existing air quality information for the South Central Coast Air Basin is provided in Appendix G.

3.1.9.4.3 North Central Coast Air Basin

The NOCAL Range Complex consists of two separate areas located offshore of central and northern California, one northwest of San Francisco and the other southwest of Monterey Bay. The northern part is primarily used for aircraft activities that occur above 3,000 ft. No vessel activities, other than vessel transit in the area, are proposed in the northern area. Therefore, only the criteria and HAP emissions for activities in the southwest of Monterey Bay are analyzed in this EIS/OEIS. These activities fall under the North Central Coast Air Basin (NCCAB), which is composed of Monterey, Santa Cruz, and San Benito counties. Existing air quality information for the North Central Coast Air Basin is provided in Appendix G.

3.1.9.4.4 Hawaii-California Transit Corridor

The Transit Corridor connects the Hawaii Study Area and the California Study Area, which is approximately 2,000 NM away. Typical Navy ship transit time between the Study Areas is five to seven days. Air quality in the Transit Corridor, which is more remote from major stationary sources of air pollutants than either NOCAL, SOCAL, or the Hawaii Range Complex, is unknown but is expected to be of better quality than either of these areas. Activities within the Transit Corridor involve the movement of ships and aircraft to training and testing areas. Emissions associated with vessel activities will be quantified to analyze the air quality effects.

[1] The Portside Community of Environmental Justice Neighborhoods, which consists of the neighborhoods of Barrio Logan, west National City, Logan Heights, and Sherman Heights, was formed as part of California Assembly Bill 617. This bill requires community-focused and community-driven action to reduce air pollution and improve public health in communities that experience disproportionate burdens from exposure to air pollutants. A Community Emissions Reduction Plan (CERP) was adopted in 2021 that includes strategies to reduce air pollution emissions and community exposure to air pollution in the community.

3.1.9.5 Greenhouse Gas Emissions

The USEPA specifically identified carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride as greenhouse gases (U.S. Environmental Protection Agency, 2009a) (74 FR 66496). Carbon dioxide, methane, and nitrous oxide occur naturally in the atmosphere and are exacerbated by human activities. These gases influence global climate by trapping heat in the atmosphere that would otherwise escape to space. The heating effect of these gases is considered the probable cause of global warming observed over the last 50 years (U.S. Environmental Protection Agency, 2009a) and contributes significantly to climate change.

3.1.10 Environmental Consequences

Under the No Action Alternative, the proposed military readiness activities would not be conducted. Therefore, baseline conditions of the existing environment for air quality and greenhouse gas emissions would either remain unchanged or would improve slightly after the current military readiness activities cease. As a result, the No Action Alternative is not analyzed further within this section.

This section evaluates how and to what degree the activities described in Chapter 2 potentially affect air quality within the Study Area. The air quality stressors vary in intensity, frequency, duration, and location within the Study Area. The stressors applicable to air quality in the Study Area are analyzed below:

- Criteria Air Pollutants
- HAPs

The following effects are evaluated:

- Changes in ambient concentrations for criteria pollutants and their effects on compliance with the AAQS
- Potential risks to populations resulting from the exposure to HAPs

As noted in Section 3.0.2, a significance determination is only required for activities that may have reasonably foreseeable adverse effects on the human environment based on the significance factors in 40 CFR section 1501.3(d). Air quality stressors (criteria air pollutants and HAPs) could have a reasonably foreseeable adverse effect; thus, requiring a significance determination.

Stressors are considered to have a significant effect on the human environment based on an examination of the context of the action and the intensity of the effect. In the present instance, the effects of criteria air pollutants and HAPs on air quality would be considered significant if (1) the measurable or anticipated degree of change would be substantial and highly noticeable compared to existing conditions; (2) effects would contribute to an exceedance of a NAAQS; and (3) exposure to hazardous air pollutants would cause significant and unacceptable health effects to populations, including sensitive receptors.

In this analysis, the increase in criteria air pollutant and HAP emissions were estimated for vessels, aircraft, and munitions relative to the current activity levels. For each alternative, emissions estimates were developed by sub-region of the Study Area and other training and testing locations and totaled for the Study Area.

The effects of air emissions for each alternative are categorized by region (e.g., by range complex or testing range) so that differences in background air quality, ambient conditions, atmospheric circulation patterns, regulatory requirements, and receptors, including sensitive receptors, can be addressed. An overall estimate of increase in air pollutant emissions for military readiness activities in the Study Area under each alternative is also provided.

For the SOCAL Range Complex, SSTC, and PMSR, current activities are based on the Preferred Alternatives that were analyzed previously in the 2018 HSTT and 2022 PMSR EIS/OEISs. Current activities for the NOCAL Range Complex and Transit Corridor were estimated. Details of the emission estimates, including activity levels and assumptions, are provided in Appendix G.

3.1.10.1 Effects from Air Emissions under Alternative 1

Alternative 1 reflects a representative year of training and testing to account for the natural fluctuations of training cycles, testing programs, and deployment schedules that generally limit the maximum level of training and testing from occurring for the reasonably foreseeable future.

Table 3.1-4 presents the total estimated increase in emissions under Alternative 1 within the Study Area and includes all emissions generated, regardless of proximity to the coastline. The majority of these emission increases occur beyond state waters, with much of emissions in most areas occurring beyond the state water boundaries.

Table 3.1-4: Annual increase in Criteria Air Pollutant Emissions from Military Readiness Activities Occurring within the HCTT Study Area, Alternative 1[1]

Scenario	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Training	281	827	34	3	63	62
Testing	-6	1	-0.7	2	11	11
Range Modernization and Sustainment	1.1	14	0.4	1.0	0.4	0.4
Total Military Readiness Activities	277	842	33	6	74	73

[1] Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides (precursor to $PM_{2.5}$), TPY = tons per year, VOC = volatile organic compounds

3.1.10.1.1 General Conformity Analysis under Alternative 1 in Areas Designated Nonattainment or Maintenance

Emissions that occurs within 3 NM of nonattainment or maintenance areas are subject to the CAA General Conformity evaluation. For this evaluation, the net emission increases associated with each alternative are compared to the General Conformity *de minimis* thresholds for nonattainment or maintenance areas.

The entire State of Hawaii is in attainment of the NAAQS for all criteria air pollutants. Therefore, a General Conformity Evaluation is not required for those elements of the Proposed Action that occur in Hawaii State waters. Similarly, the near shore military readiness activities within the southern portion of the NOCAL Range Complex occur within attainment areas. As such, a General Conformity Evaluation is not required for those elements of the Proposed Action that occur in this region.

3.1.10.1.1.1 Southern California Areas Designated Nonattainment or Maintenance

The SCAB is classified as an extreme non-attainment area for ozone (eight-hour average concentration) NAAQS, a maintenance area for the 1-Hour (35 parts per million [ppm]) and 8-Hour (9 ppm) CO NAAQS, a maintenance area for the annual NO_2 NAAQS, a maintenance area for the 1987 24-hour PM_{10}, and a serious non-attainment area for the 2006 24-Hour (35 μg/m^3) and the 2012 Annual (12.0 μg/m^3) $PM_{2.5}$ NAAQS.

Table 3.1-5 presents the estimated annual emissions increase, within 0–3 NM, for proposed activities under Alternative 1 as compared to the current level of nearshore activities. The net annual emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds. As shown in Table 3.1-5, estimated annual emission increases for all pollutants are below applicable General Conformity *de minimis* levels. A General Conformity Determination is not required, and a Record of Non-Applicability (Appendix G) has been prepared and presented in Appendix G.

Table 3.1-5: Estimated Net Change in Annual Criteria Air Pollutant Emissions from Military Readiness Activities in the South Coast Air Basin (Within 3 NM), Alternative 1[1]

Source	Emissions Increase by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Net Change in Emissions from all Sources	7.6	5.4	0.5	0.6	0.3	0.2
De Minimis Threshold	100	10	10	70	100	70

[1] Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides (precursor to $PM_{2.5}$), TPY = tons per year, VOC = volatile organic compounds

The San Diego Air Basin is classified as a severe non-attainment area for ozone (eight-hour average concentration) NAAQS.

Table 3.1-6 presents the estimated annual emissions increase, within 0–3 NM, for proposed activities under Alternative 1 as compared to the current level of nearshore activities. The net annual emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds. As shown in Table 3.1-6, estimated annual emission increases for all pollutants are below applicable General Conformity *de minimis* levels. A General Conformity Determination is not required, and a Record of Non-Applicability (Appendix G) has been prepared and presented in Appendix G.

Table 3.1-6: Estimated Net Change in Annual Criteria Air Pollutant Emissions from Military Readiness Activities in the San Diego Air Basin (Within 3 NM), Alternative 1[1]

Source	Emissions Increase by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Net Change in Emissions from all Sources	21	13	1	0.3	5	5
De Minimis Threshold	N/A	25	25	N/A	N/A	N/A

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

3.1.10.1.1.2 South Central Coast Air Basin Designated Nonattainment or Maintenance

Portions of the California Study Area, including PMSR and Port Hueneme, are located within the VCAPCD serious ozone nonattainment area. Table 3.1-7 presents the estimated annual emissions increase, within 0–3 NM, for proposed activities under Alternative 1 as compared to the current level of nearshore activities. The net annual emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds. As shown in Table 3.1-7, estimated annual emission increases for all pollutants are below applicable General Conformity *de minimis* levels. A General Conformity Determination is not required, and a Record of Non-Applicability (Appendix G) has been prepared and presented in Appendix G.

Table 3.1-7: Estimated Net Change in Annual Criteria Air Pollutant Emissions from Military Readiness Activities in the South Central Coast Air Basin (Within 3 NM), Alternative 1[1]

Source	Emissions Increase by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Net Change in Emissions from all Sources	2	10	0.3	0.03	0.4	0.4
De Minimis Threshold	N/A	50	50	N/A	N/A	N/A

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

3.1.10.1.2 National Environmental Policy Act Impacts from Criteria Pollutants and HAPs Under Alternative 1

3.1.10.1.2.1 NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 1 in the State of Hawaii

Table 3.1-8 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. The annual increase in emissions is compared to the 2020 annual emissions, in tons per year, reported for Honolulu County (see Appendix G).

Table 3.1-8: Estimated Net Change in Annual Criteria Air Pollutant Emissions from Military Readiness Activities in the State of Hawaii (Within 12 NM), Alternative 1[1]

Source	Emissions Increase by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	12	32	1	1	9	9
Vessel	35	258	11	0	8	8
Munitions	0.5	0.0	0.0	0.0	0.1	0.1
Range Modernization and Sustainment	0.3	3.9	0.1	0.3	0.1	0.1
Net Change in Emissions from all Sources	48	295	12	2	17	17
Honolulu County Air Emissions for 2020, TPY	77,700	20,652	37,295	11,446	14,553	4,369
Percent of Existing Emissions	0.06%	1.43%	0.03%	0.02%	0.12%	0.40%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

Table 3.1-8 presents the estimated annual increase in emissions of HAPs of concern within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. Emissions are compared to the 2020 Honolulu County HAP emissions.

Table 3.1-9: Estimated Net Change in Annual Hazardous Air Pollutants of Concern Emissions from Military Readiness Activities in the State of Hawaii (Within 12 NM), Alternative 1[1]

HAP	Net Change in Emissions, Aircraft (TPY)	Net Change in Emissions, Vessel (TPY)	Net Change in Emissions, Total (TPY)	2020 Honolulu County Emissions (TPY)	Percent of 2020 Emissions
Methanol	0.020	--	0.020	1,157	0.002%
Toluene	0.007	0.021	0.028	885	0.003%
Formaldehyde	0.134	0.450	0.584	555	0.105%
Xylenes (Mixed Isomers)	0.005	0.015	0.020	577	0.003%
Acetaldehyde	0.046	0.103	0.150	358	0.042%
2,2,4-Trimethylpentane	0.000	0.075	0.075	260	0.029%
Hexane	0.000	0.029	0.029	252	0.012%
Ethyl Benzene	0.002	--	0.002	127	0.001%

[1] Individual values may not add exactly to total values due to rounding.
Notes: TPY = tons per year

As shown in Table 3.1-8, the increase in criteria pollutant emissions within 12 NM is relatively small compared to the existing emissions. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses at frequencies similar to those shown in the wind roses presented in Appendix G. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce negligible to minor increases of air pollutant concentrations near onshore locations.

Similarly, Table 3.1-9 shows that the increase in HAP emissions, within 12 NM, is negligible compared to the current level of HAP emissions in Honolulu County. Due to the low HAP emissions, occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.1.2.2 NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 1 in the South Coast Air Basin

Table 3.1-10 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. The net change in emissions is also presented in tons per day and compared to the 2020 total SCAB daily emissions.

Table 3.1-10: Estimated Net Change in Annual Criteria Air Pollutant Emissions from Military Readiness Activities in the South Coast Air Basin (Within 12 NM), Alternative 1[1]

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	-0.3	0.3	-0.1	-0.1	-1	-1
Vessel	13	33	1.5	0.8	0.4	0.4
Munitions	2	0.2	--	--	0.4	0.3
Range Modernization and Sustainment	0	3	0.1	0.2	0.1	0.1
Net Change in Emissions from all Sources, TPY	15	37	2	1	0.3	0.2
Net Change in Emissions from all Sources, TPD	0.041	0.101	0.004	0.003	0.001	0.000
SCAB Air Emissions for 2020, TPD	1,973	361	562	17	219	87
Percent of Existing Emissions	0.002%	0.028%	0.001%	0.016%	0.000%	0.001%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.

Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SCAB = South Coast Air Basin, SO_X = sulfur oxides, TPD = tons per day, TPY = tons per year, VOC = volatile organic compounds

Table 3.1-8 presents the estimated annual increase in emissions of HAPs of concern within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. Emissions are compared to the 2020 SCAB HAP emissions (see Appendix G).

Table 3.1-11: Estimated Net Change in Annual Hazardous Air Pollutants of Concern Emissions from Military Readiness Activities in the South Coast Air Basin (Within 12 NM), Alternative 1[1]

Pollutant	Net Change in Emissions, Aircraft (TPY)	Net Change in Emissions, Vessel (TPY)	Net Change in Emissions, Total (TPY)	2020 SCAB Emissions (TPY)	Percent of 2020 Emissions
Methanol	-0.002	--	-0.002	5,974	-0.00003%
Toluene	-0.001	0.003	0.003	4,717	0.0001%
Formaldehyde	-0.011	0.066	0.055	4,402	0.0013%
Xylenes (Mixed Isomers)	0.000	0.002	0.002	3,459	0.0001%
Acetaldehyde	-0.004	0.015	0.011	2,830	0.0004%
Benzene	-0.001	0.007	0.006	1,572	0.0004%
Hexane	--	0.004	0.004	1,258	0.0003%
2,2,4-Trimethylpentane	--	0.011	0.011	943	0.0012%
Ethylbenzene	-0.0001	--	-0.0001	629	-0.00002%

Individual values may not add exactly to total values due to rounding.

Notes: SCAB = South Coast Air Basin, TPY = tons per year

As shown in Table 3.1-10, the increase in criteria pollutant emissions within 12 NM is negligible compared to the existing emissions. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses at frequencies similar to those shown in the wind roses presented in Appendix G. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce negligible to minor increases of air pollutant concentrations near onshore locations.

Similarly, Table 3.1-11 shows that the increase in HAP emissions, within 12 NM, is negligible compared to the current level of HAP emissions within SCAB. Therefore, due to negligible HAP emissions, occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.1.2.3 NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 1 in the San Diego Air Basin

Table 3.1-12 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. The net change in emissions is also presented in tons per day and compared to the 2020 total SCAB daily emissions.

Table 3.1-12: Estimated Net Change in Annual Air Pollutant Emissions from Military Readiness Activities in the San Diego Air Basin (Within 12 NM), Alternative 1[1]

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	11	8	1	1	6	6
Vessel	27	50	2	0.02	1	1
Munitions	1	0.1	--	--	0.2	0.1
Range Modernization and Sustainment	0.004	0.052	0.000	0.004	0.002	0.002
Net Change in Emissions from all Sources, TPY	38	59	3	1	8	8
Net Change in Emissions from all Sources, TPD	0.105	0.161	0.008	0.001	0.021	0.021
SDAB Air Emissions for 2020, TPD	501	88	191	3	95	31
Percent of Existing Emissions	0.02%	0.18%	0.004%	0.05%	0.02%	0.07%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SDAB = San Diego Air Basin, SO_X = sulfur oxides, TPD = tons per day, TPY = tons per year, VOC = volatile organic compounds

Table 3.1-13 presents the estimated annual increase in emissions of HAPs of concern within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. Emissions are compared to the 2020 SDAB HAP emissions (Appendix G).

Table 3.1-13: Estimated Net Change in Annual Hazardous Air Pollutants of Concern Emissions from Military Readiness Activities in the San Diego Air Basin (Within 12 NM), Alternative 1[1]

Pollutant	Net Change in Emissions, Aircraft (TPY)	Net Change in Emissions, Vessel (TPY)	Net Change in Emissions, Total (TPY)	2020 SDAB Emissions (TPY)	Percent of 2020 Emissions
Methanol	0.019	--	0.019	2,337	0.001%
Toluene	0.007	0.004	0.011	1,423	0.0007%
Formaldehyde	0.127	0.082	0.209	1,423	0.0147%
Xylenes (Mixed Isomers)	0.005	0.003	0.007	1,118	0.0007%
Acetaldehyde	0.044	0.019	0.063	813	0.0077%
Benzene	0.017	0.009	0.026	508	0.0052%
2,2,4-Trimethylpentane	0.000	0.014	0.014	305	0.0045%
Hexane	--	0.005	0.005	305	0.0017%
Ethylbenzene	0.002	--	0.002	203	0.0009%

[1] Individual values may not add exactly to total values due to rounding.
Notes: SDAB = San Diego Air Basin, TPY = tons per year

As shown in Table 3.1-12, the increase in criteria pollutant emissions within 12 NM is small or negligible compared to the existing emissions. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses at frequencies similar to those shown in the wind roses presented in Appendix G. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce negligible to minor increases of air pollutant concentrations near onshore locations.

Similarly, Table 3.1-13 shows that the increase in HAP emissions, within 12 NM, is negligible compared to the current level of HAP emissions within SCAB. Due to negligible HAP emissions, occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.1.2.4 Effects from Criteria Pollutants and HAPs Under Alternative 1 on the Portside Community

Table 3.1-14 compares the estimated increase in criteria pollutant emissions within 3 NM and 12 NM for proposed activities under Alternative 1 to the 2018 emissions baseline emissions published for the Portside Community (Appendix G). As shown, the estimated increase in emissions is relatively small compared to the 2018 Portside Community emissions, especially for emission increases within 3 NM. Any increases in volatile and inorganic HAP/TAC emissions would be at least an order of magnitude lower than VOC and $PM_{2.5}$ emission increases, resulting in negligible HAP/TAC emission increases relative to the current emissions. Due to the expected low emissions occurring infrequently and given the distance to downwind receptors within the Portside Community, emissions are not expected to cause significant and unacceptable health effects to the Portside Community, including sensitive receptors.

Table 3.1-14: Comparison of the Net Change in Annual Air Pollutant Emissions from Military Readiness Activities in the San Diego Air Basin to the 2018 Portside Community Emissions, Alternative 1

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Portside Community Emission, 2018	--	1,462	1,248	--	728.1	193.9
Net Change in Emissions from all Sources (within 3 NM)	20.8	13.4	1.2	0.3	4.7	4.6
Percent of Portside Community Emissions	--	0.9%	0.1%	--	0.6%	2.4%
Net Change in Emissions from all Sources (within 12 NM)	38.2	58.8	2.9	0.5	7.6	7.5
Percent of Portside Community Emissions	--	4.0%	0.2%	--	1.0%	3.9%

Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 1 in the South Central Coast Air Basin

Table 3.1-15 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. The net change in emissions is also presented in tons per day and compared to the 2020 total South Central Coast Air Basin daily emissions.

Table 3.1-15: Estimated Net Change in Annual Air Pollutant Emissions from Military Readiness Activities in the South Central Coast Air Basin (Within 12 NM), Alternative 11

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	1	1	0	0	1	1
Vessel	7	33	1	0	1	1
Munitions	2	0	0	0	1	1
Net Change in Emissions from all Sources, TPY	11	34	1	0	2	2
Net Change in Emissions from all Sources, TPD	0.03	0.09	0.004	0.0002	0.01	0.01
South Central Coast Air Basin Air Emissions for 2020, TPD	450	43	266	4	66	32
Percent of Existing Emissions	0.01%	0.22%	0.001%	0.005%	0.01%	0.02%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPD = tons per day, TPY = tons per year, VOC = volatile organic compounds

Table 3.1-16 presents the estimated annual increase in emissions of HAPs of concern within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. Emissions are compared to the 2020 South Central Coast Air Basin HAP emissions (Appendix G).

Table 3.1-16: Estimated Net Change in Annual Hazardous Air Pollutants of Concern Emissions from Military Readiness Activities in the South Central Coast Air Basin (Within 12 NM), Alternative 1[1]

Pollutant	Net Change in Emissions, Aircraft (TPY)	Net Change in Emissions, Vessel (TPY)	Net Change in Emissions, Total (TPY)	2020 SCCAB Emissions (TPY)	Percent of 2020 Emissions
Methanol	0.002	--	0.002	7,537	0.000%
Formaldehyde	0.013	0.054	0.067	2,029	0.0033%
Acetaldehyde	0.004	0.012	0.017	1,449	0.0012%
Toluene	0.001	0.003	0.003	870	0.0004%
Xylenes (Mixed Isomers)	0.000	0.002	0.002	580	0.0004%
Benzene	0.002	0.006	0.008	290	0.0027%
2,2,4-Trimethylpentane	--	0.009	0.009	290	0.0031%
Hexane	--	0.004	0.004	290	0.0012%
Ethylbenzene	0.000	--	0.000	145	0.0001%

[1] Individual values may not add exactly to total values due to rounding.
Notes: TPY = tons per year

As shown in Table 3.1-15, the increase in criteria pollutant emissions within 12 NM is small or negligible compared to the existing emissions. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses at frequencies similar to those shown in the wind roses presented in Appendix G. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce negligible to minor increases of air pollutant concentrations near onshore locations.

Similarly, Table 3.1-16 shows that the increase in HAP emissions, within 12 NM, is negligible compared to the current level of HAP emissions within SCAB. Due to negligible HAP emissions occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.1.2.5 NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 1 in the North Central Coast Air Basin

Table 3.1-17 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. The net change in emissions is also presented in tons per day and compared to the 2020 total North Central Coast Air Basin daily emissions.

Table 3.1-17: Estimated Net Change in Annual Air Pollutant Emissions from Military Readiness Activities in the North Central Coast Air Basin (Within 12 NM), Alternative 1[1]

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	0.08	0.20	0.01	0.01	0.06	0.06
Vessel	1	3	0.17	-0.05	0.06	0.06
Munitions	0.2	0.0	0.0	0.000	0.006	0.005
Net Change in Emissions from all Sources, TPY	1	3	0.2	0.0	0.1	0.1
Net Change in Emissions from all Sources, TPD	0.0025	0.0084	0.0005	-0.0001	0.0003	0.0003
North Central Coast Air Basin Air Emissions for 2020, TPD	728	36	191	4	100	57
Percent of Existing Emissions	<0.001%	0.02%	<0.001%	<0.001%	<0.001%	0.001%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPD = tons per day, TPY = tons per year, VOC = volatile organic compounds

Table 3.1-18 presents the estimated annual increase in emissions of HAPs of concern within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. Emissions are compared to the 2020 North Central Coast Air Basin HAP emissions (Appendix G).

Table 3.1-18: Estimated Net Change in Annual Hazardous Air Pollutants of Concern Emissions from Military Readiness Activities in the North Central Coast Air Basin (Within 12 NM), Alternative 1[1]

Pollutant	Net Change in Emissions, Aircraft (TPY)	Net Change in Emissions, Vessel (TPY)	Net Change in Emissions, Total (TPY)	2020 NCCAB Emissions (TPY)	Percent of 2020 Emissions
Methanol	0.0001	--	0.0001	7,537	0.000001%
Formaldehyde	0.001	0.007	0.008	2,029	0.0001%
Acetaldehyde	0.0003	0.002	0.002	1,449	0.00003%
Acrolein	0.0002	0.0003	0.000	870	0.00003%
Naphthalene	--	0.005	0.005	580	0.0003%
Benzene	0.0001	0.001	0.001	290	0.00005%
Toluene	0.00004	0.0004	0.0004	290	0.00002%
Xylenes (Mixed Isomers)	0.00003	0.0002	0.0003	290	0.00002%
1,3-Butadiene	0.0001	--	0.0001	145	0.00001%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: NCCAB: North Central Coast Air Basin, TPY = tons per year

As shown in Table 3.1-17, the increase in criteria pollutant emissions within 12 NM is negligible compared to the existing emissions. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses at frequencies similar to those shown in the wind roses presented in Appendix G. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce negligible to minor increases of air pollutant concentrations near onshore locations.

Similarly, Table 3.1-18 shows that the increase in HAP emissions, within 12 NM, is negligible compared to the current level of HAP emissions within SCAB. The negligible HAP emissions, occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.1.3 Executive Order 12114 Impacts from Criteria Pollutants and HAPs Under Alternative 1 Greater than 12 NM from Shore

Table 3.1-19 presents the estimated total annual emission increase beyond 12 NM under Alternative 1. Approximately 50 percent of emission increases would occur in distances greater than 12 NM offshore. Natural mixing is expected to substantially disperse pollutants before they reach the coastal land mass. No significant effects on air quality are anticipated to occur as a result of criteria pollutants emissions from activities beyond territorial activities.

Table 3.1-19: Estimated Net Change in Annual Air Pollutant Emissions from Military Readiness Activities Greater than 12 NM, Alternative 1[1]

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	17	65	2	2	11	11
Vessel	113	359	14	0	8	8
Munitions	32	1	0	0	26	25
Range Modernization and Sustainment	0.4	4.6	0.1	0.3	0.1	0.1
Net Change in Emissions from all Sources, TPY	161	429	15	3	46	45

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.

Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

3.1.10.1.3.1 Summary of Effects from Criteria Pollutants and HAPs Under Alternative 1

While criteria air pollutants emitted in the Study Area may be transported ashore, they would not affect the attainment status of the relevant air quality control regions, because (1) the increase emissions from the proposed change in military readiness activities are small or negligible compared to the existing emissions in each region, and (2) the pollutants are substantially dispersed during transport. Similarly, the increase in HAP emissions is negligible compared to the HAP emissions in each region. With the small amount of HAP emissions occurring infrequently and given the distance to downwind receptors, emissions are not expected to cause significant and unacceptable health effects to populations, including sensitive receptors. The criteria air pollutants emitted over non-territorial waters within the Study Area would be dispersed over vast areas of open ocean and thus would not have a measurable impact on environmental resources in those areas. Net emission increases within nonattainment or maintenance areas in the Study Area are below the applicable General Conformity Rule *de minimis* thresholds. Therefore, air quality impacts would be less than significant as a result of implementation of Alternative 1.

3.1.10.2 Effects from Air Emissions under Alternative 2

Alternative 2 reflects the maximum number of training activities that could occur within a given year and assumes that the maximum level of activity would occur every year over a seven-year period. This alternative would also include higher levels of annual testing of certain systems to support expedited delivery of these systems to the fleet.

Table 3.1-20 presents the total estimated increase in emissions under Alternative 2 within the Study Area and includes all emissions generated, regardless of proximity to the coastline. The majority of these emissions increases occur beyond state waters, with much of emissions in most areas occurring beyond the state water boundaries.

Table 3.1-20: Annual Criteria Air Pollutant Emissions from Military Readiness Activities Occurring within the HCTT Study Area, Alternative 2

Activity	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Training	379	1,015	40	6	70	69
Testing	5	27	1	3	17	17
Range Modernization and Sustainment	1	14	0	1	0.4	0.4
Total Military Readiness Activities	384	1,042	41	8	87	86

Notes: CO = carbon monoxide, NO_x = oxides of nitrogen, VOC = volatile organic compounds, SO_x = sulfur oxides, PM_{10} = particulate matter less than or equal to 10 microns in aerodynamic diameter, $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in aerodynamic diameter, tpy = tons per year

3.1.10.2.1 General Conformity Analysis under Alternative 2 in Areas Designated Nonattainment or Maintenance

3.1.10.2.1.1 Southern California Areas Designated Nonattainment or Maintenance

Table 3.1-21 presents the estimated annual emissions increase, within 0-3 NM, for proposed activities under Alternative 2 as compared to the current level of nearshore activities. The net annual emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds. As shown in Table 3.1-21, estimated annual emission increases for all pollutants are below applicable General Conformity *de minimis* levels. A General Conformity Determination is not required, and a Record of Non-Applicability (Appendix G) has been prepared and presented in Appendix G.

Table 3.1-21: Estimated Net Change in Annual Criteria Air Pollutant and Precursors Emissions from Military Readiness Activities in the South Coast Air Basin (Within 3 NM), Alternative 2[1]

Source	Emissions Increase by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Net Change in Emissions from all Sources	9.2	9.2	0.7	0.7	0.9	0.8
De Minimis Threshold	100	10	10	70	100	70

[1] Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding.

Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides (precursor to $PM_{2.5}$), TPY = tons per year, VOC = volatile organic compounds

Table 3.1-22 presents the estimated annual emissions increase, within 0-3 NM, for proposed activities within San Diego Air Basin under Alternative 2 as compared to the current level of nearshore activities. The net annual emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds. As shown in Table 3.1-22, estimated annual emission increases for all pollutants are below applicable General Conformity *de minimis* levels. A General Conformity Determination is not required, and a Record of Non-Applicability has been prepared and is presented in Appendix G.

Table 3.1-22: Estimated Net Change in Annual Criteria Air Pollutant and Precursors Emissions from Military Readiness Activities in the San Diego Air Basin (Within 3 NM), Alternative 2[1]

Source	Emissions Increase by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Net Change in Emissions from all Sources	24	22	1	0.4	6	6
De Minimis Threshold	N/A	25	25	N/A	N/A	N/A

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

3.1.10.2.1.2 South Central Coast Air Basin Designated Nonattainment or Maintenance

Portions of PMSR are located within the VCAPCD serious ozone nonattainment area. Table 3.1-23 presents the estimated annual emissions increase, within 0-3 NM, for proposed activities under Alternative 2 as compared to the current level of nearshore activities. The net annual emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds. As shown in Table 3.1-23, estimated annual emission increases for all pollutants are below applicable General Conformity *de minimis* levels. A General Conformity Determination is not required, and a Record of Non-Applicability (Appendix G) has been prepared and presented in Appendix G.

Table 3.1-23: Estimated Net Change in Annual Criteria Air Pollutant and Precursors Emissions from Military Readiness Activities in the South Central Coast Air Basin (Within 3 NM), Alternative 2[1]

Source	Emissions Increase by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Net Change in Emissions from all Sources	2	10	0.3	0.03	0.4	0.4
De Minimis Threshold	N/A	50	50	N/A	N/A	N/A

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

3.1.10.2.2 National Environmental Policy Act Impacts from Criteria Pollutants and HAPs Under Alternative 2

3.1.10.2.2.1 NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 2 in the State of Hawaii

Table 3.1-24 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 2 as compared to the current level of activities. The annual increase in emissions is compared to the 2020 annual emissions, in tons per year, reported for Honolulu County (see Appendix G).

Table 3.1-24: Estimated Net Change in Annual Criteria Air Pollutant and Precursors Emissions from Military Readiness Activities in the State of Hawaii (Within 12 NM), Alternative 2[1]

Source	Emissions Increase by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	13	34	1	1	10	10
Vessel	37	265	11	0	8	8
Munitions	0.500	0.021	0.000	0.000	0.075	0.053
Range Modernization and Sustainment	0.31	3.88	0.10	0.29	0.10	0.10
Total Net Change in Emissions from all Sources	51	302	12	2	18	18
Honolulu County Air Emissions for 2020, TPY	77,700	20,652	37,295	11,446	14,553	4,369
Percent of Existing Emissions	0.07%	1.46%	0.03%	0.02%	0.12%	0.41%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

As shown in Table 3.1-24, the increase in criteria pollutant emissions within 12 NM is relatively small compared to the existing emissions. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses at frequencies similar to those shown in the wind roses presented in Appendix G. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce negligible to minor increases of air pollutant concentrations near onshore locations.

Similar to Alternative 1, the increase in HAP emissions, within 12 NM, is expected to be negligible compared to the current level of HAP emissions in Honolulu County. The low HAP emissions, occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.2.2.2 NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 2 in the South Coast Air Basin

Table 3.1-25 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 2 as compared to the current level of activities. The net change in emissions is also presented in tons per day and compared to the 2020 total SCAB daily emissions.

Table 3.1-25: Estimated Net Change in Annual Criteria Air Pollutant and Precursors Emissions from Military Readiness Activities in the South Coast Air Basin (Within 12 NM), Alternative 2[1]

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	1	2	0	0	0	0
Vessel	17	42	2	1	1	1
Munitions	2	0.2	0.0	0.0	0.4	0.3
Range Modernization and Sustainment	0	3	0	0	0	0
Net Change in Emissions from all Sources	20	47	2	1	1	1
SCAB Air Emissions for 2020, TPD	0.054	0.128	0.005	0.003	0.003	0.003
Percent of Existing Emissions	1,973	361	562	17	219	87
Net Change in Emissions from all Sources	0.003%	0.035%	0.001%	0.019%	0.002%	0.004%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SCAB = South Coast Air Basin, SO_X = sulfur oxides, TPD = tons per day, TPY = tons per year, VOC = volatile organic compounds

Similar to Alternative 1, the increase in HAP emissions, within 12 NM, is expected to be negligible compared to the current level of HAP emissions within SCAB. The negligible HAP emissions occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.2.2.3 NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 2 in the San Diego Air Basin

Table 3.1-26 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 2 as compared to the current level of activities. The net change in emissions is also presented in tons per day and compared to the 2020 total SCAB daily emissions.

Table 3.1-26: Estimated Net Change in Annual Air Pollutant Emissions from Military Readiness Activities in the San Diego Air Basin (Within 12 NM), Alternative 2[1]

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	13	10	1	1	8	8
Vessel	31	61	2	0	1	1
Munitions	1	0.1	0.0	0.0	0.2	0.1
Range Modernization and Sustainment	0.004	0.05	0.0004	0.004	0.002	0.0016
Net Change in Emissions from all Sources, TPY	44	71	3	1	9	9
Net Change in Emissions from all Sources, TPD	0.121	0.196	0.009	0.002	0.025	0.025
SDAB Air Emissions for 2020, TPD	501	88	191	3	95	31
Percent of Existing Emissions	0.02%	0.22%	0.005%	0.07%	0.03%	0.08%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPD = tons per day, TPY = tons per year, VOC = volatile organic compounds

As shown in Table 3.1-26, the increase in criteria pollutant emissions within 12 NM is small or negligible compared to the existing emissions. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses at frequencies similar to those shown in the wind roses presented in Appendix G. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce negligible to minor increases of air pollutant concentrations near onshore locations.

Similar to Alternative 1, the increase in HAP emissions, within 12 NM, is expected to be negligible compared to the current level of HAP emissions within SDAB. The negligible HAP emissions occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.2.2.4 Effects from Criteria Pollutants and HAPs Under Alternative 2 on the Portside Community

Table 3.1-27 compares the estimated increase in criteria pollutant emissions within 3 NM and 12 NM for proposed activities under Alternative 2 to the 2018 emissions baseline emissions published for the Portside Community (Appendix G). As shown, the estimated increase in emissions is relatively small compared to the 2018 Portside Community emissions, especially for emission increases within 3 NM. Any increases in volatile and inorganic HAP/TAC emissions would be at least an order of magnitude lower than VOC and $PM_{2.5}$ emission increases, resulting in negligible HAP/TAC emission increases relative to the current emissions. Due to negligible increase in HAP/TAC, emissions occurring infrequently and given the distance to downwind receptors within the Portside Community, emissions are not expected to cause significant and unacceptable health effects to the Portside Community, including sensitive receptors.

Table 3.1-27: Comparison of the Net Change in Annual Air Pollutant Emissions from Military Readiness Activities in the San Diego Air Basin to the 2018 Portside Community Emissions, Alternative 2

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Portside Community Emission, 2018	--	1,462	1,248	--	728.1	193.9
Net Change in Emissions from all Sources (within 3 NM)	24	22	1	0	6	6
Percent of Portside Community Emissions	--	1.5%	0.1%	--	0.8%	2.9%
Net Change in Emissions from all Sources (within 12 NM)	44	71	3	1	9	9
Percent of Portside Community Emissions	--	4.9%	0.3%	--	1.2%	4.6%

Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

3.1.10.2.2.5 NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 2 in the South Central Coast Air Basin

Table 3.1-28 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 2 as compared to the current level of activities. The net change in emissions is also presented in tons per day and compared to the 2020 total South Central Coast Air Basin daily emissions.

Table 3.1-28: Estimated Net Change in Annual Air Pollutant Emissions from Military Readiness Activities in the South Central Coast Air Basin (Within 12 NM), Alternative 2[1]

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	1	2	0	0	1	1
Vessel	8	35	1	0	1	1
Munitions	2	0.0	0.0	0.0	0.8	0.6
Net Change in Emissions from all Sources, TPY	12	37	1	0	3	2
Net Change in Emissions from all Sources, TPD	0.03	0.10	0.004	0.0004	0.01	0.01
South Central Coast Air Basin Air Emissions for 2020, TPD	450	43	266	4	66	32
Percent of Existing Emissions	0.01%	0.24%	0.002%	0.01%	0.01%	0.02%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.

Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPD = tons per day, TPY = tons per year, VOC = volatile organic compounds

As shown in Table 3.1-28, the increase in criteria pollutant emissions within 12 NM is small or negligible compared to the existing emissions. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses at frequencies similar to those shown in the wind roses presented in Appendix G. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce negligible to minor increases of air pollutant concentrations near onshore locations.

Similar to Alternative 1, the increase in HAP emissions, within 12 NM, is expected to be negligible compared to the current level of HAP emissions within the South Central Coast Air Basin. Therefore, due to negligible HAP emissions, occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.2.2.6 NEPA Impacts from Criteria Pollutants and HAPs Under Alternative 2 in the North Central Coast Air Basin

Table 3.1-29 presents the estimated increase in criteria pollutant emissions within 12 NM for proposed activities under Alternative 2 as compared to the current level of activities. The net change in emissions is also presented in tons per day and compared to the 2020 total North Central Coast Air Basin daily emissions.

As shown in Table 3.1-29, the increase in criteria pollutant emissions within 12 NM is negligible compared to the existing emissions. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses at frequencies similar to those shown in the wind roses presented in Appendix G. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce negligible to minor increases of air pollutant concentrations near onshore locations.

Table 3.1-29: Estimated Net Change in Annual Air Pollutant Emissions from Military Readiness Activities in the North Central Coast Air Basin (Within 12 NM), Alternative 2[1]

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	0	0	0	0	0	0
Vessel	1	4	0	0	0	0
Munitions	0.2	0.0	0.0	0.0	0.0	0.0
Net Change in Emissions from all Sources, TPY	2	4	0	0	0	0
Net Change in Emissions from all Sources, TPD	0.0042	0.0121	0.0006	0.0000	0.0004	0.0004
North Central Coast Air Basin Air Emissions for 2020, TPD	728	36	191	4	100	57
Percent of Existing Emissions	0.0006%	0.03%	0.0003%	0.001%	0.0004%	0.001%

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPD = tons per day, TPY = tons per year, VOC = volatile organic compounds

Similar to Alternative 1, the increase in HAP emissions, within 12 NM, is expected to be negligible compared to the current level of HAP emissions within the North Central Coast Air Basin. Therefore, due to negligible increase in HAP emissions, occurring infrequently and given the distance to downwind receptors, emissions are not expected to contribute to human health risks from HAP exposure in areas where public presence is expected.

3.1.10.2.3 Executive Order 12114 Impacts from Criteria Pollutants and HAPs Under Alternative 2 Greater than 12 NM from Shore

Table 3.1-30 presents the estimated total annual emission increase beyond 12 NM under Alternative 2. Approximately 50 percent of emission increases would occur in distances greater than 12 NM offshore. Natural mixing is expected to substantially disperse pollutants before they reach the coastal land mass. No significant effects on air quality are anticipated to occur as a result of criteria pollutants emissions from activities beyond territorial activities.

Table 3.1-30: Estimated Net Change in Annual Air Pollutant Emissions from Military Readiness Activities Greater than 12 NM, Alternative 2[1]

Source	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	26	83	3	3	19	19
Vessel	193	502	19	1	11	11
Munitions	32	1	0	0	26	25
Range Modernization and Sustainment	0.4	4.6	0.1	0.3	0.1	0.1
Net Change in Emissions from all Sources, TPY	252	590	22	5	56	55

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

3.1.10.2.3.1 Summary of Impacts from Criteria Pollutants and HAPs Under Alternative 2

While criteria air pollutants emitted in the Study Area may be transported ashore, they would not affect the attainment status of the relevant air quality control regions, because (1) the increase emissions from the proposed change in military readiness activities are small or negligible compared to the existing emissions in each region, and (2) the pollutants are substantially dispersed during transport. Similarly, the increase in HAP emissions is negligible compared to the HAP emissions in each region. With the small amount of HAP emissions occurring infrequently and given the distance to downwind receptors, emissions are not expected to cause significant and unacceptable health effects to populations, including sensitive receptors. The criteria air pollutants emitted over non-territorial waters within the Study Area would be dispersed over vast areas of open ocean and thus would not have a measurable impact on environmental resources in those areas. Net emission increases within nonattainment or maintenance areas in the Study Area are below the applicable General Conformity Rule *de minimis* thresholds. Therefore, although the increase in criteria pollutants and HAPs emissions is greater under Alternative 2 than Alternative 1, the air quality impacts would be less than significant as a result of implementation of Alternative 2.

3.1.10.3 Greenhouse Gas Emissions and Climate Change

Activities conducted as part of the Proposed Action would involve mobile sources using fossil fuel combustion as a source of power. Additionally, the expenditure of munitions could generate greenhouse gas emissions. Greenhouse gas emissions, depending on type, can persist in the atmosphere for extended periods of time, from 12 years for methane to up to 200 years for carbon dioxide. While the emissions generated by testing and training activities alone would not be enough to cause global warming, in combination with past and future emissions from all other sources, they would contribute incrementally to the global warming that produces the adverse effects of climate change.

The increase in greenhouse gas emissions for each alternative was calculated for all altitudes using emissions factors provided by the U.S. Navy for aircraft and vessels and published by the USEPA for munitions. Greenhouse gas emissions are summarized in Table 3.1-31. These data show that Alternatives 1 and 2 would result in increases in GHG emissions within the Study Area compared to the current level of activities. GHG emissions from either action alternative would incrementally contribute to future climate change, some effects of which are identified below.

Table 3.1-31: Estimated increase in Annual Greenhouse Gas Emissions from Military Readiness Activities in the Hawaii-California Training and Testing Study Area

Alternative	Annual Increase in CO_2-Equivalent Emissions CO_2 Eq. (in Metric Tons/Year)
Alternative 1	583,053
Alternative 2	693,366

Note: CO_2 Eq. = carbon dioxide equivalent

The CEQ has released interim guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses (Council on Environmental Quality, 2023). The guidance emphasizes that when conducting climate change analyses in NEPA reviews, agencies should consider the following: (1) the potential effects of a proposed action on climate change, including by assessing both GHG emissions and reductions from the proposed action; and (2) the effects of climate change on a proposed action and its environmental impacts.

The guidance also recommends that agencies provide additional context for GHG emissions, in most circumstances through the use of the best available social cost of GHG estimates to help decision-makers and the public make comparisons, evaluate the significance of the proposed action and alternatives, and better understand the tradeoff between alternatives. Agencies can also provide accessible comparisons or equivalents to help the public and decision makers understand GHG emissions in more familiar terms. For example, the estimated increase in GHG emissions from Alternatives 1 and 2 are similar to that of electricity used by 115,069 and 136,840 average U.S. households annually, respectively (U.S. Environmental Protection Agency, 2024d).

To minimize GHG emissions from the action alternatives, the Navy would comply with applicable regulations and GHG policies, and the federal vehicle clean fuels, mileage efficiency, and emissions regulations for mobile sources. The Navy would continue to implement proactive measures to reduce their overall GHG emissions by decreasing the use of fossil fuels and increasing the use of alternative energy sources in accordance with the goals set by EOs, the Energy Policy Acts of 2005 and 2020, and Navy and DoD policies (such as the Navy Climate Action Plan; (U.S. Department of the Navy, 2022). These GHG initiatives are not emission reductions proposed to offset GHG emissions generated by the action alternatives, but rather demonstrate initial responses for the Navy to factor GHG management into Navy proposals and impact analyses.

Climate change could impact implementation of the action alternatives and the adaptation strategies needed to respond to future conditions. For the Study Area, the main effect of climate change is increased storminess and sea level rise, with additional effects documented by climate analyses presented in the Fifth National Climate Assessment (U.S. Global Change Research Program, 2023). Operations by the Navy and USCG have adapted to these changes. However, exacerbation of these conditions in the future could impede proposed activities during extreme events. Regarding sea level rise, the DoD has an active program that develops measures for installations to adapt to this threat and its potential to displace coastal operations and infrastructure (Strategic Environmental Research and Development Program, 2023).

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