Final
Environmental Impact Statement/Overseas Environmental Impact Statement
Hawaii-Southern California Training and Testing

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3.1 AIR QUALITY

PREFERRED ALTERNATIVE SYNOPSIS

The United States Department of the Navy considered all potential stressors that air quality could be exposed to from the Proposed Action. The following conclusions have been reached for the Preferred Alternative (Alternative 1):

- Criteria air pollutants: The emission of criteria pollutants resulting from activities in the Study Area would not cause a violation or contribute to an ongoing violation of the National Ambient Air Quality Standards.

3.1.1 INTRODUCTION

Air pollution is a threat to human health and also damages the environment (U.S. Environmental Protection Agency, 2007a). Air pollution damages trees, crops, other plants, lakes, and animals. In addition to damaging the natural environment, air pollution damages the exteriors of buildings, monuments, and statues. It creates haze or smog that reduces visibility in national parks and cities and interferes with aviation. To improve air quality and reduce air pollution, Congress passed the Clean Air Act in 1963, and its amendments in 1970 and 1990, which set regulatory limits on air pollutants and help to ensure basic health and environmental protection from air pollution.

Air quality is defined by atmospheric concentrations of specific air pollutants—pollutants the United States (U.S.) Environmental Protection Agency (USEPA) determined to be harmful to human health or welfare of the public. The six major air pollutants of concern, called "criteria pollutants," are carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone, particulate matter, and lead. Particulate matter is further categorized as particulates less than or equal to 10 microns in diameter and fine particulate matter less than or equal to 2.5 microns in diameter. The Clean Air Act requires that the USEPA establish National Ambient Air Quality Standards for these criteria pollutants. These standards set specific concentration limits for criteria pollutants in the outdoor air. The particular pollutants were chosen because they are common in outdoor air, considered harmful to public health and welfare, and come from numerous and diverse sources. The concentration limits are designed to aid in protecting public health and the environment. Areas with air pollution problems typically have one or more criteria pollutants consistently present at levels that exceed the National Ambient Air Quality Standards. These areas are designated as a nonattainment area for one of those standards, or a maintenance area when a former nonattainment area has recently achieved attainment for an air quality standard that was previously exceeded.

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 and retain their chemical form. Examples of primary pollutants are the smoke produced by burning wood and volatile organic compounds emitted by industrial solvents. 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. Ozone, a major component of photochemical smog, is a secondary air pollutant. Ozone precursors, nitrogen oxides, and volatile organic compounds chemically react in the atmosphere in the presence of sunlight to form ground-level ozone.

Some criteria air pollutants are a combination of primary and secondary pollutants. Particulate matter less than or equal to 10 microns in diameter and particulate matter less than or equal to 2.5 microns in diameter are generated as primary pollutants by various mechanical processes (e.g., abrasion, erosion, mixing, or atomization) or combustion processes. They are generated as secondary pollutants through chemical reactions or through the condensation of gaseous pollutants (e.g., nitrogen oxides, sulfur oxides, and volatile organic compounds) into fine aerosols.

In addition to the six criteria pollutants, the USEPA has designated 187 substances as hazardous air pollutants under the federal Clean Air Act. Hazardous air pollutants, also known as toxic air pollutants or air toxics, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects (U.S. Environmental Protection Agency, 2016a). National Ambient Air Quality Standards are not established for these pollutants; however, the USEPA developed rules that limit emissions of hazardous air pollutants from specific industrial sources. These emissions control standards are known as "maximum achievable control technologies" and "generally achievable control technologies." They are intended to achieve the maximum degree of reduction in emissions of the hazardous air pollutants, taking into consideration the cost of emissions control, non-air-quality health and environmental impacts, and energy requirements. These emissions are typically one or more orders of magnitude smaller than concurrent emissions of criteria air pollutants. Hazardous air pollutants are analyzed qualitatively in relation to the prevalence of the sources emitting these pollutants during training and testing activities. Mobile sources operating as a result of the proposed action would be functioning intermittently over a large area and would produce negligible ambient hazardous air pollutants in a localized area not located near any publicly accessible areas. For these reasons, hazardous air pollutants are not further evaluated in the analysis.

Most air pollutant emissions are expressed as a rate (e.g., pounds per hour, pounds per day, or tons per year). Typical units for emission factors for a source or source activity are pound per thousand gallons of fuel burned, pound per ton of material processed, and grams per vehicle-mile of travel.

Ambient air quality is reported as the atmospheric concentrations of specific air pollutants at a particular time and location. The units of measure are expressed as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million [ppm] by volume). The ambient air pollutant concentrations measured at a particular location are determined by the pollutant emissions rate, local meteorology, and atmospheric chemistry. Wind speed and direction, the vertical temperature gradient of the atmosphere, and precipitation patterns affect the dispersal, dilution, and removal of air pollutant emissions from the atmosphere.

3.1.1.1 Air Quality Standards

The current National Ambient Air Quality Standards for criteria pollutants are set forth in Table 3.1-1. Areas that exceed a standard are designated as "nonattainment" for that pollutant, while areas that are in compliance with 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, to facilitate their management:

- ozone—marginal, moderate, serious, severe, and extreme

- carbon monoxide—moderate and serious
- particulate matter—moderate and serious

Table 3.1-1: National Ambient Air Quality Standards

Pollutant		*Primary/ Secondary*	*Averaging Time*	*Level*	*Form*
Carbon monoxide		primary	8 hours	9 parts per million	Not to be exceeded more than once per year
			1 hour	35 parts per million	
Lead		primary and secondary	Rolling 3-month period	0.15 micrograms per cubic meter[1]	Not to be exceeded
Nitrogen dioxide		primary	1 hour	100 parts per billion	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 parts per billion[2]	Annual mean
Ozone		primary and secondary	8 hours	0.070 parts per million[3]	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (particulate matter)	particulate matter less than or equal to 2.5 microns in diameter	primary	1 year	12.0 micrograms per cubic meter	Annual mean, averaged over 3 years
		secondary	1 year	15.0 micrograms per cubic meter	Annual mean, averaged over 3 years
		primary and secondary	24 hours	35 micrograms per cubic meter	98th percentile, averaged over 3 years
	particulate matter less than or equal to 10 microns in diameter	primary and secondary	24 hours	150 micrograms per cubic meter	Not to be exceeded more than once per year on average over 3 years
Sulfur dioxide		primary	1 hour	75 parts per billion[4]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 parts per million	Not to be exceeded more than once per year

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

Pollutant	*Primary/ Secondary*	*Averaging Time*	*Level*	*Form*

Source: (U.S. Environmental Protection Agency, 2016b), last updated January 7, 2016.
[1] In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 micrograms per cubic meter as a calendar quarter average) also remain in effect.
[2] The level of the annual nitrogen dioxide standard is 0.053 parts per million. It is shown here in terms of parts per billion for the purposes of clearer comparison to the 1-hour standard level.
[3] Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) ozone standards additionally remain in effect in some areas. Revocation of the previous (2008) ozone standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.
[4] The previous sulfur dioxide standards (0.14 parts per million 24-hour and 0.03 parts per million annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet one year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a State Implementation Plan call under the previous sulfur dioxide standards (40 Code of Federal Regulations 50.4(3)). A State Implementation Plan call is a USEPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required National Ambient Air Quality Standards.

The USEPA delegates the regulation of air quality to the state once the state has an approved State Implementation Plan. States, through their air quality management agencies, are required under the Clean Air Act to prepare a State Implementation Plan to demonstrate how the nonattainment and maintenance areas will achieve and maintain the National Ambient Air Quality Standards.

If the state fails to develop an adequate plan to achieve and maintain the National Ambient Air Quality Standards, or a State Implementation Plan revision is not approved by USEPA, the EPA will impose a Federal Implementation Plan. States may also choose to adopt the Federal Implementation Plan as an alternative to developing their own State Implementation Plan. States may establish air quality standards more stringent than the National Ambient Air Quality Standards. Regardless of whether EPA has approved a State Implementation Plan, Federal entities have to comply with all federal, state, and local requirements respecting control and abatement of air pollution, as long as the requirements are not discriminatory. That is, they are treated like other regulated entities.

The Clean Air Act applies to coastal waters within 3 nautical miles (NM) of shore. The Hawaii-Southern California Training and Testing (HSTT) Study Area includes areas that are in attainment of the National Ambient Air Quality Standards (including the State of Hawaii and Hawaii State waters), unclassified as to the attainment status (including offshore areas outside of State waters (>3 NM), areas in Federal Waters (>3 NM but <12 NM), as well as all offshore areas beyond Federal waters (>12 NM), and areas that are classified as nonattainment or maintenance areas. With the exception of activities in California's South Coast and San Diego Air Basins, training and testing activities in the Study Area take place either within an attainment area (e.g., State of Hawaii waters) or more than 3 NM from shore in areas unclassified for air quality purposes of the Study Area. Further discussion of the attainment status of the Study Area is provided in Sections 3.1.1.2 (Attainment Areas) and 3.1.1.3 (General Conformity Analysis).

The at-sea areas around San Nicolas Island and Santa Barbara Island are partially within the Study Area. San Nicolas Island is in the Ventura County air district and Santa Barbara Island is in the Santa Barbara

County air district. Both islands are in the South Central Coast Air Basin, which is in attainment for all criteria pollutants (U.S. Environmental Protection Agency, 2017). In addition, emissions from the proposed activities under this EIS within these areas would be minimal. Therefore, impacts to these specific areas are not discussed further.

3.1.1.2 Attainment Areas

The Proposed Action includes activities offshore of Hawaii, which is classified as an attainment area for all criteria pollutants under the National Ambient Air Quality Standards. Within attainment areas, the Navy is required to ensure that air quality does not significantly deteriorate as a result of air emissions associated with training and testing activities conducted under the Proposed Action.

The Prevention of Significant Deterioration Program was adopted in the Clean Air Act under 40 CFR Section 52.21. The Prevention of Significant Deterioration Program applies to major stationary sources of air pollutants located in attainment areas, requiring that a source demonstrate that it does not significantly deteriorate the air quality in attainment areas. Under the Prevention of Significant Deterioration program, a "major source" is defined as a facility that emits equal to or greater than 250 tons of a criteria pollutant or regulated precursor.

In contrast, for nonattainment areas, a major source is defined based on the classification of the area under the Clean Air Act. Further discussion of major source threshold for nonattainment areas is provided in the following sections under General Conformity Evaluation.

3.1.1.3 General Conformity Evaluation

Attainment areas are not subject to the General Conformity Rule. The General Conformity analysis is separate and distinct from the National Environmental Policy Act (NEPA) Analysis below at Section 3.1.1.4 (Approach to Analysis). Conformity is concerned with insuring that non-permitted, non-stationary projects conform to the State Implementation Plan. The Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS) analysis is concerned with whether an activity significantly affects the human environment. The two analyses are related in that an air impact that violates a State Implementation Plan is probably "significant" in NEPA terms. Section 176(c)(1) of the Clean Air Act, 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 National Ambient Air Quality Standards for criteria pollutants for nonattainment and maintenance areas. Federal actions are required to conform with the approved State Implementation Plan for those areas of the United States designated as nonattainment or maintenance areas for any criteria air pollutant under the Clean Air Act (40 Code of Federal Regulations [CFR] Parts 51 and 93). The purpose of the General Conformity Rule is to ensure that applicable federal actions within the area regulated by the Clean Air Act would not cause or contribute to a violation of an air quality standard and that the Proposed Action would not adversely affect the attainment and maintenance of National Ambient Air Quality Standards. A conformity evaluation must be completed for every applicable Navy action that generates emissions to determine and document whether a proposed action complies with the General Conformity Rule.

Conformity only applies to nonattainment and maintenance areas for nonattainment and maintenance pollutants and their regulated precursors. Certain Navy training and testing activities take place within nonattainment and maintenance areas. These nonattainment and maintenance areas are identified by their air quality control region (an area designated by the federal government where communities share a common air pollution problem). Two such designated areas in California (South Coast and San Diego;

Figure 3.1-1) were identified as relevant to the Proposed Action and are further discussed in Section 3.1.2.2 (Existing Air Quality).

If a federal action is not an emergency response action presumed to conform under the Rule, does not meet the approved facility emissions budget, is not a listed exempt activity, and is not covered by the Transportation Conformity Rule, then a conformity demonstration evaluating total direct and indirect emissions must be made. The total direct and indirect emissions evaluation considers emission increases that are reasonably foreseeable at the time the Conformity analysis is conducted. Unlike NEPA, there is no need to discuss alternatives or "no action" alternatives. The only relevant emissions are the net increase when all increases and decreases are considered.

The first step in the Conformity analysis is a Conformity Applicability Analysis and involves calculating the 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 (the current level would be zero). 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 do not exceed *de minimis* thresholds, then a General Conformity Determination is not required. The emissions are presumed to conform to the State Implementation Plan. If the net change in emissions equal or exceed 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 Clean Air Act 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 93B, 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 under the General Conformity Rule are shown in Table 3.1-2.

If NEPA documentation is prepared for an action, the determination that the proposed action is not subject to the General Conformity Rule can be described in that documentation. Otherwise, no documentation is required.

Coastal waters within 3 NM of the coast are under the same air quality jurisdiction as the contiguous land area.

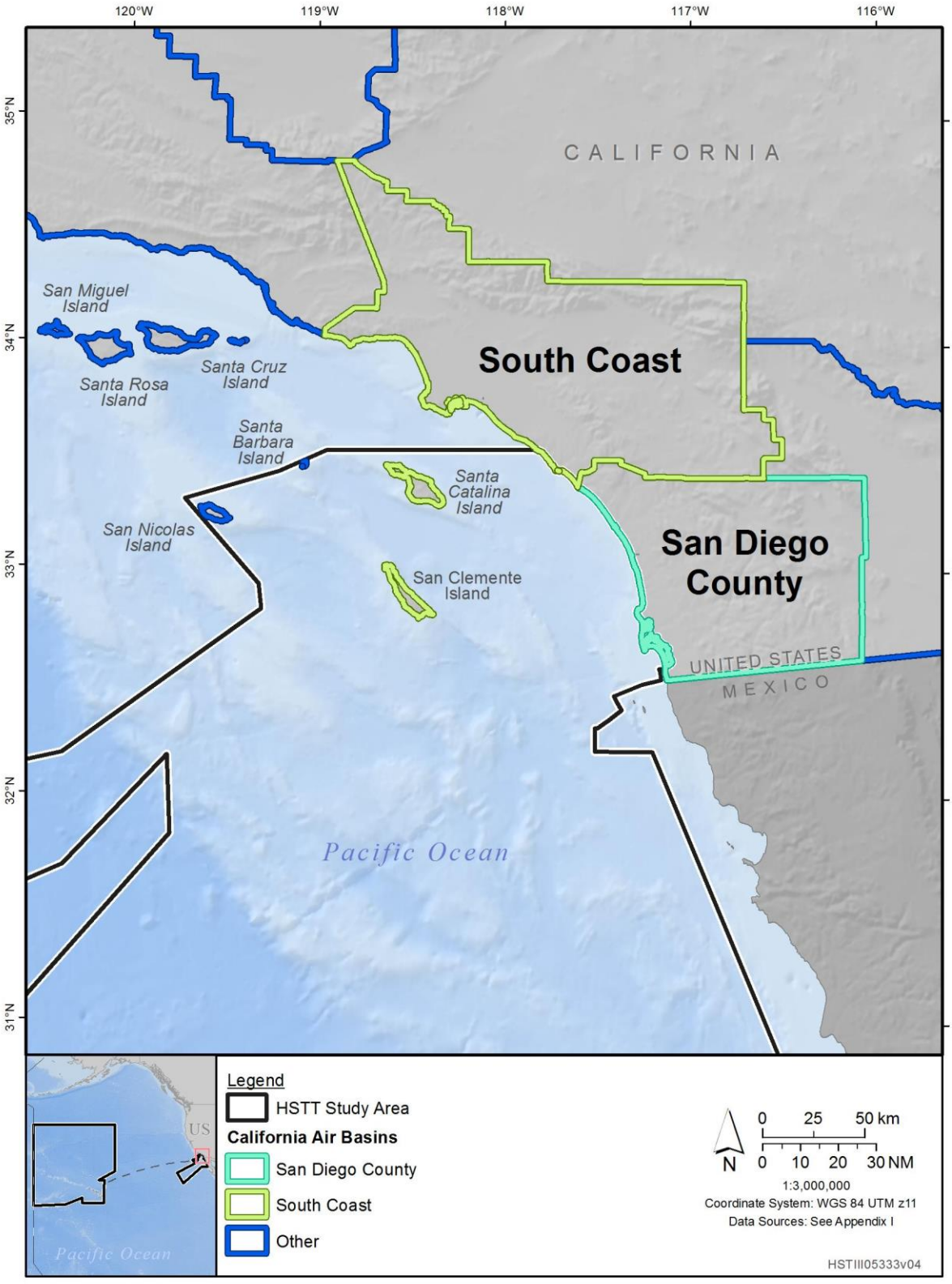

Figure 3.1-1: Air Basins Adjacent to the Southern California Portion of the HSTT Study Area

Note: HSTT = Hawaii-Southern California Training and Testing

Table 3.1-2: *De Minimis* Thresholds for 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
$PM_{2.5}$	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
Lead (Pb)	All nonattainment and maintenance	25

Source: (U.S. Environmental Protection Agency, 2010)

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

3.1.1.3.1.1 Conformity Analysis South Coast Air Basin (California)

The Proposed Action includes activities in the South Coast Air Basin, which is classified as an extreme nonattainment area for the 2008 eight-hour ozone standard; as a maintenance area for carbon monoxide, nitrogen dioxide, particulate matter equal to or less than 10 microns in diameter; and as a serious nonattainment area for particulate matter equal to or less than 2.5 microns in diameter. The Proposed Action is required to demonstrate conformity with the approved State Implementation Plan if the net emissions equal or exceed the *de minimis* emission levels in nonattainment and maintenance areas. If the net emissions are below the *de minimis* emission levels in nonattainment and maintenance areas, a Record of Non-Applicability must be prepared. The *de minimis* levels for nonattainment and maintenance pollutants in the South Coast Air Basin under the General Conformity Rule are shown in Table 3.1-2.

3.1.1.3.1.2 Conformity Analysis San Diego Air Basin (California)

The Proposed Action includes activities that occur in the San Diego Air Basin, which is currently designated a moderate nonattainment area for the 2008 federal eight-hour ozone standard and a maintenance area for carbon monoxide. The Proposed Action is required to demonstrate conformity with the approved State Implementation Plan if the net emissions equal or exceed the *de minimis* emission levels in nonattainment and maintenance areas. If the net emissions are below the *de minimis* emission levels in nonattainment and maintenance areas, a Record of Non-Applicability must be prepared. The *de minimis* levels for nonattainment and maintenance pollutants in the San Diego Air Basin under the General Conformity Rule are shown in Table 3.1-2.

3.1.1.4 Approach to Analysis

3.1.1.4.1 Boundaries of Analysis

The air quality impact evaluation requires three separate analyses: the Clean Air Act General Conformity Analysis, an analysis under NEPA, and an analysis under Executive Order 12114. Impacts of air pollutants emitted by Navy training and testing in the Pacific Ocean, bays and inland locations in U.S. territorial seas (i.e., up to 12 NM from the coast) are assessed under NEPA. Impacts of air pollutants emitted by Navy training and testing activities outside of U.S. territorial seas are evaluated as required under Executive Order 12114 (Environmental Effects Abroad of Major Federal Action). Each coastal state may claim the territorial sea that extends seaward up to 12 NM from its baselines. The coastal State exercises sovereignty over its territorial sea, the air space above it, and the seabed and subsoil beneath it (National Oceanic and Atmospheric Administration, 2017). The State jurisdictions may extend the full distance of territorial seas or may retain historical limits.

The air quality evaluation under the Clean Air Act General Conformity Rule requires an analysis of impacts of air pollutants within state air quality jurisdictions, which are defined as the portions of the Study Area that lie within 3 NM of the coastline of a given jurisdiction. As discussed in Section 3.1.1.3 (General Conformity Evaluation), impacts of air pollutants emitted by Navy training and testing in the Pacific Ocean, bays and inland locations in State waters (i.e., up to 3 NM from the coast) are assessed under the General Conformity Rule of the Clean Air Act and under NEPA. For the purpose of this EIS/OEIS, a comparison of the emissions within 3 NM of the coastline of nonattainment areas in the Study Area has been provided within the analysis of Environmental Consequences.

Air pollutants emitted more than 3,000 feet (ft.) above ground level 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 in the lower atmosphere, measured at ground-level monitoring stations, upon which federal, state, and local regulatory decisions are based. For the analysis of the effects on global climate change, however, all emissions of greenhouse gases from aircraft and vessels participating in training and testing activities, as well as targets and munitions expended, are applicable regardless of altitude (Chapter 4, Cumulative Impacts).

Analysis of health-based air quality impacts under NEPA and Executive Order 12114 includes estimates of criteria air pollutants for all training and testing activities where aircraft, missiles, or targets operate at or below the aforementioned inversion layer or that involve vessels in U.S. territorial seas. The analysis of health- based air quality impacts under Executive Order 12114 includes emissions estimates of only those training and testing activities in which aircraft, missiles, or targets operate at or below 3,000 ft. above ground level, or that involve vessels outside of U.S. territorial seas.

In determining the total direct and indirect emissions caused by the action, agencies must project the future emissions in the area with the action versus the future emissions without the action, what NEPA entitles “the no build option.” The total direct and indirect emissions considers all emission increases and decreases and must be reasonably foreseeable and are possibly controllable through agency’s continuing program responsibility to affect emissions.

3.1.1.4.2 Emission Sources

Criteria air pollutants are generated by the combustion of fuel by surface vessels and by fixed-wing and rotary-wing aircraft. They also are generated by the combustion of explosives and propellants in various types of munitions. Propellants used to fire small-, medium-, and large-caliber projectiles generate

criteria pollutants when detonated. Nonexplosive practice munitions may contain spotting charges and propellants that generate criteria air pollutants when they function. Powered targets require fuel, generating criteria air pollutants during their operation, and towed targets generate criteria air pollutants secondarily because another aircraft or vessel is required to provide power. Stationary targets may generate criteria air pollutants if all or portions of the item burn in a high-order detonation. Chaff cartridges used by ships and aircraft are launched by an explosive charge that generates small quantities of criteria air pollutants. Countermeasure flares, decelerators/parachute flares, and smoke floats are designed to burn for a prescribed period, emitting criteria pollutants in the process.

The primary emissions from many munition types are carbon dioxide, carbon monoxide, and particulate matter; hazardous air pollutants are emitted at low levels (U.S. Environmental Protection Agency, 2007b, 2008a, 2009a). Hazardous air pollutants are analyzed qualitatively in relation to the prevalence of the sources emitting hazardous air pollutants during training and testing activities.

Electronic warfare countermeasures generate emissions of chaff, a form of particulate not regulated under the federal Clean Air Act as a criteria air pollutant. Virtually all radio frequency chaff is 10–100 times larger than regulated particulate matter (i.e., particulate matter less than or equal to 10 microns in diameter and particulate matter less than or equal to 2.5 microns in diameter (Spargo et al., 1999)). The types of training and testing that produce these other emissions may take place throughout the Study Area but occur primarily within special use airspace. Chaff emissions during training and testing primarily occur 3 NM or more from shore. Chaff released over the ocean would disperse in the atmosphere and then settle onto the ocean surface.

A study at Naval Air Station Fallon found that the release of 50,000 cartridges of chaff per year over 10,000 square miles (m^2) would result in an annual average concentration of 0.018 $\mu g/m^3$ for regulated particulate matter. This is far below the National Ambient Air Quality Standards. Similar predictions were made for St. Mary's County, Maryland (on the Chesapeake Bay), where chaff releases contribute no more than 0.008 percent of total particulate matter emissions (Arfsten et al., 2001). Therefore, chaff is not further evaluated as an air quality stressor in this EIS/OEIS.

3.1.1.4.3 Analysis Framework

Emission sources and the approach used to estimate emissions under Alternative 1 and Alternative 2 in the air quality analysis are based, wherever possible, on information from Navy subject matter experts and established training and testing requirements. These 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. Emissions were assessed to identify any possibility for the magnitude of Proposed Action emissions to result in a violation of one or more Ambient Air Quality Standards. It should also be noted that the focus of the analysis is on the net increase in emissions that would result from the two action alternatives over the baseline evaluated in the 2013 Final EIS/OEIS.

This analysis makes use of "screening thresholds," which are defined as thresholds of potential significance that are based on legal standards that are either legislated or contained in regulations promulgated by expert agencies with the input of the public and scientific community, as well as the input of the legal and judicial community. If the emissions projected in any of the regions exceed a screening threshold, then they deserve a more thorough, closer examination. The greater the exceedance, the more rigorous the examination needs to be. In this case, relevant emissions are not expected to exceed any screening threshold or significantly impact the human environment.

In attainment areas and over the study area that is outside jurisdictional boundaries, a screening level of 250 tons per year of any criteria pollutant or regulated precursor has been used as a threshold of potential significance. Although outlying areas are not classified, they are presumed to be analogous to attainment areas. In nonattainment and maintenance areas we are using conformity *de minimis* levels, which are the same as major source thresholds. These thresholds are rational to use for potential significance thresholds, because they are borrowed from laws and regulations that view them as thresholds of increased regulatory concern. They are also conservative, because they are taken from authorities that regulate stationary sources and land-based projects such as new facilities. However, these emissions are actually emitted over a vast area of ocean and dispersed very widely over that area. These thresholds also take cumulative effects into account, because they are smaller in areas of degraded air. In this way, they take into account impacts of past and present activity, as well as the outlook for future attainment in an area.

3.1.1.5 Emissions Estimates

As discussed in Section 3.1.1.4 (Approach to Analysis), the focus of the analysis is on the net increase in emissions that would result from the two action alternatives over the baseline. The baseline is the Preferred Alternative that was evaluated in the 2013 Final EIS/OEIS and selected in the Record of Decision. The Navy has provided improved emission factor data for ships and aircraft that have been updated since the 2013 Final EIS/OEIS. The baseline calculations have been updated to reflect the current emission factor data.

3.1.1.5.1 Aircraft Activities

To estimate aircraft emissions, the operating modes, number of hours of operation, and type of engine for each type of aircraft were evaluated.

Emissions associated with airfield or air station operations ashore are analyzed within the home-basing environmental planning process (U.S. Department of the Navy, 2007, 2009, 2010, 2013, 2014). All fixed-wing aircraft are assumed to travel to and from training and testing ranges at or above 3,000 ft. above mean sea level and, therefore, their transits to and from the ranges do not affect surface air quality. Air combat maneuvers and air-to-air missile exercises are primarily conducted at altitudes well in excess of 3,000 feet above mean sea level and, therefore, are not included in the estimated emissions of criteria air pollutants. Activities or portions of those training or testing activities occurring below 3,000 ft. are included in emissions estimates. Examples of activities typically occurring below 3,000 ft. include those involving rotary-wing aircraft platforms such as mine warfare, surface warfare, and anti-submarine warfare training and testing activities. The number of all training and testing activities and the estimated time spent above or below 3,000 ft. for calculation purposes is included in the air quality emissions estimates presented in Appendix C (Air Quality Emissions Calculations and Record of Non-Applicability).

The types of aircraft identified include the typical aircraft platforms that conduct a particular training or testing exercise (or the closest surrogate when information is not available), including range support aircraft (e.g., non-Navy commercial air services). Estimates of future aircraft sorties are based on evolutionary changes in the Navy's force structure and mission assignments. Where there are no major changes in types of aircraft, future activity levels are estimated from the distribution of baseline activities. The types of aircraft used in each training or testing activity and numbers of sorties flown by such aircraft are presented in Appendix C (Air Quality Emissions Calculations and Record of Non-Applicability).

Several testing activities are similar to training activities, and therefore similar assumptions were made for such activities in terms of aircraft type, altitude, and flight duration. Table 2.6-2 lists Naval Air Systems Command testing activities similar to certain training activities. Where aircraft testing activities were dissimilar to training activities, assumptions for time on range were derived from Navy subject matter experts.

Air pollutant emissions from aircraft were primarily estimated based on the Navy's Aircraft Environmental Support Office Memorandum Reports for individual aircraft categories. When Aircraft Environmental Support Office emission factor data were not available, emission factors were obtained from other published sources.

The emissions calculations performed for each alternative conservatively assume that each aircraft training and testing activity listed in Tables 2.6-1 to 2.6-5 is separately conducted. In practice, a testing activity may be conducted during a training flight. It is also probable that two or more training activities may be conducted during one flight (e.g., chaff or flare exercises may occur during electronic warfare activities; or air-to-surface gunnery and air-to-surface bombing activities may occur during a single flight operation). Conservative assumptions may produce elevated aircraft emissions calculations but accounts for the possibility, however remote, that each aircraft training and testing activity is separately conducted.

3.1.1.5.2 Military Vessel Activities

Military vessel traffic in the Study Area includes military ships and smaller boats providing services for military training and testing activities. The methods for estimating military ship and boat emissions involve evaluating the type of activity and generating the average running hours for ships in each operational area, both within state waters and beyond state waters. The types of military ships and boats as well as the numbers of activities for Alternatives 1 and 2 are derived from range records and Navy subject matter experts regarding ship participant data. Estimates of future military vessel activities are based on anticipated evolutionary changes in the Navy's force structure and mission assignments. Where there are no major changes in types of military vessel, estimates of future activities are based on the historical distribution of military vessel activities. This was done to create annual averages for the years 2010 through 2015. The average annual hours were used for Alternative 1. For Alternative 2, the year with the highest number of operational hours (2010) was selected as the year to represent maximum operations. For both alternatives, the hourly data was used in conjunction with emission factors data generated from the Naval Sea Systems Command Navy and Military Sealift Command Marine Engine Fuel Consumption and Emission Calculator to calculate the emissions from the propulsion and onboard generation systems. Data from the calculator included emission factors for each type of propulsion engine and type of onboard electrical power generation system by ship type, as well as the fuel used by engine systems. The resulting calculations provided information on the time spent at each power level in each part of the Study Area, emission factors for that power level (in pounds of pollutant per hour), and total emissions for each marine vessel for each operational type and mode.

The pollutants for which calculations are made include exhaust total hydrocarbons, carbon monoxide, nitrogen oxides, particulate matter, sulfur dioxide, and carbon dioxide. For marine military engines, 100 percent of all of the particulate matter less than or equal to 10 microns in diameter from gasoline and diesel-fueled engines is assumed to be particulate matter less than or equal to 2.5 microns in diameter (U.S. Environmental Protection Agency, 2010b). For gaseous-fueled engines (liquefied petroleum gas/compressed natural gas), 100 percent of the particulate matter emissions are assumed to

be particulate matter less than or equal to 2.5 microns in diameter (U.S. Environmental Protection Agency, 2010b).

The emissions calculations performed for each alternative conservatively assume that each vessel training and testing activity listed in Chapter 2 (Description of Proposed Action and Alternatives), Tables 2.6-1 to 2.6-5, is separately conducted and separately produces vessel emissions. In practice, one or more testing activities may take advantage of an opportunity to travel at sea and test aboard a vessel conducting a related or unrelated training activity. It is also probable that two or more training activities may be conducted during one training vessel movement (e.g., a ship may conduct large-, medium-, and small-caliber surface-to-surface gunnery exercises during one vessel movement). Furthermore, multiple unit-level training activities may be conducted during a larger composite training unit exercise. Conservative assumptions may produce elevated vessel emissions calculations but account for the possibility, however remote, that each training and testing activity is separately conducted.

3.1.1.5.3 Submarine Activities

No U.S. submarines burn fossil fuel under normal operating conditions (they are nuclear-powered); therefore, no air pollutants are emitted during submarine training or testing activities.

3.1.1.5.4 Naval Gunfire, Missiles, Bombs, Other Munitions and Military Expended Material

Naval gunfire, missiles, bombs, and other types of munitions used in training and testing activities emit air pollutants. To estimate the amounts of air pollutants emitted by munitions during its use, the numbers and types of munitions used during training or testing activities are first totaled. Then generally accepted emissions factors (U.S. Department of the Navy, 2017; U.S. Environmental Protection Agency, 2007a, 2008b, 2009b) for criteria air pollutants are applied to the total amounts. Finally, the total amounts of air pollutants emitted by each munition type are summed to produce total amounts of each criteria air pollutant under each alternative.

3.1.1.6 Climate Change

Greenhouse gases are compounds that contribute to the greenhouse effect—a natural phenomenon in which gases trap heat in the lowest layer of the earth's atmosphere (surface-troposphere system), causing heating (radiative forcing) at the surface of the earth. The primary long-lived greenhouse gases directly emitted by human activities are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. Carbon dioxide, methane, and nitrous oxide occur naturally in the atmosphere. 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 the global warming observed over the last 50 years (U.S. Environmental Protection Agency, 2009c). Global warming and climate change affects many aspects of the environment. Not all effects of greenhouse gases are related to climate. For example, elevated concentrations of carbon dioxide can lead to ocean acidification and stimulate terrestrial plant growth, and methane emissions can contribute to higher ozone levels.

The administrator of the USEPA determined that greenhouse gases in combination endanger both the public health and the public welfare of current and future generations. The USEPA specifically identified carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride as greenhouse gases (U.S. Environmental Protection Agency, 2009b) (74 Federal Register 66496).

To estimate global warming potential, the United States quantifies greenhouse gas emissions using the 100-year timeframe values established in the Intergovernmental Panel on Climate Change Fourth Assessment Report (Intergovernmental Panel on Climate Change, 2014), in accordance with United Nations Framework Convention on Climate Change (United Nations Framework Convention on Climate Change, 2013) reporting procedures. All global warming potentials are expressed relative to a reference gas, carbon dioxide, which is assigned a global warming potential equal to 1. Six other primary greenhouse gases have global warming potentials of 25 for methane, 298 for nitrous oxide, 124 to 14,800 for hydrofluorocarbons, 7,390 to greater than 17,340 for perfluorocarbons, 17,200 for nitrogen trifluoride, and up to 22,800 for sulfur hexafluoride. To estimate the carbon dioxide equivalency of a non-carbon dioxide greenhouse gas, the appropriate global warming potential of that gas is multiplied by the amount of the gas emitted. All seven greenhouse gases are multiplied by their global warming potential and the results are added to calculate the total equivalent emissions of carbon dioxide. The dominant greenhouse gas emitted is carbon dioxide, mostly from fossil fuel combustion (85.4 percent) (U.S. Environmental Protection Agency, 2015). Weighted by global warming potential, methane is the second-largest component of emissions, followed by nitrous oxide. Global warming potential-weighted emissions are presented in terms of equivalent emissions of carbon dioxide, using units of metric ton. The Proposed Action is anticipated to release greenhouse gases to the atmosphere. These emissions are quantified primarily using methods elaborated upon in the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2014 for the proposed Navy training and testing in the Study Area, and estimates are presented in Chapter 4 (Cumulative Impacts). (U.S. Environmental Protection Agency, 2016b).

3.1.1.7 Other Compliance Considerations, Requirements, and Practices

Executive Order 13834, *Executive Order Regarding Efficient Federal Operations,* issued on May 17, 2018, establishes policy for federal agencies to prioritize actions that reduce waste, cut costs, enhance the resilience of Federal infrastructure and operations, and enable more effective accomplishment of their missions.

In January 2018, the Department of Defense (DoD) published the results of a global screening level assessment of installation vulnerabilities to climate-related security risks with the goal of identifying serious vulnerabilities and developing necessary adaptation strategies. The survey evaluated risk from flooding, extreme temperatures, wind, drought and wildfire.

In June 2014, DoD released the 2014 Climate Change Adaptation Roadmap to document DoD's efforts to plan for the changes that are occurring or expected to occur as a result of climate change. The Roadmap provides an overview and specific details on how DoD's adaptation will occur and describes ongoing efforts (U.S. Department of Defense, 2014).

The Navy is committed to improving energy security and environmental stewardship by reducing reliance on fossil fuels. The Navy is actively developing and participating in energy, environmental, and climate change initiatives that will increase use of alternative energy and reduce emissions of greenhouse gases. The Navy has adopted energy, environmental, and climate change goals. These goals include increasing alternative energy use Navy-wide to 50 percent by 2020; reducing non-tactical petroleum use; ensuring environmentally sound acquisition practices; and ensuring environmentally compliant operations for ships, submarines, aircraft, and facilities operated by the Navy.

Equipment used by military units in the Study Area, including ships and other marine vessels, aircraft, and other equipment, are properly maintained and fueled in accordance with applicable Navy requirements. Operating equipment meets federal and state emission standards, where applicable.

3.1.2 AFFECTED ENVIRONMENT

3.1.2.1 General Background

3.1.2.1.1 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 particulate matter less than or equal to 10 microns in diameter, particulate matter less than or equal to 2.5 microns in diameter, ozone, and their precursors), the region of influence is generally limited to a few miles downwind from the source. For a photochemical pollutant such as ozone, however, the region of influence may extend much farther downwind. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors (volatile organic compounds and nitrogen oxides). The maximum impacts of precursors on ozone levels tend to occur several hours after the time of emission during periods of high solar load, and may occur many miles from the source. Ozone and ozone precursors transported from other regions can also combine with local emissions to produce high local ozone concentrations. Therefore, the region of influence for air quality includes the Study Area 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.

3.1.2.1.2 Sensitive Receptors

Identification of sensitive receptors is part of describing the existing air quality environment. Sensitive receptors are individuals in residential areas, schools, parks, hospitals, or other sites for which there is a reasonable expectation of continuous human exposure during the timeframe coinciding with peak pollution concentrations. On the oceanic portions of the Study Area, crews of commercial vessels and recreational users of the northern Atlantic Ocean and Gulf of Mexico 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. These potential receptors are not considered sensitive.

3.1.2.1.3 Climate of the Study Area

The climate conditions in the Study Area provide background on factors influencing air quality. Climate zones within the Study Area vary with latitude or region. The climate of the Pacific Ocean and adjacent land areas is influenced by the temperatures of the surface waters and water currents as well as by wind blowing across the water. Offshore climates are moderate, and seldom have extreme seasonal variations because the ocean is slow to change temperature. Ocean currents influence climate by moving warm and cold water between regions. Adjacent land areas are affected by the wind that is cooled or warmed when blowing over these currents. In addition to its influence on temperature, the wind moves evaporated moisture from the ocean to adjacent land areas and is a major source of rainfall.

Atmospheric stability and mixing height provide measures of the amount of vertical mixing of pollutants. Over water, the atmosphere tends to be neutral to slightly unstable. Over land, atmospheric stability is more variable, being unstable during the day, especially in summer due to rapid surface heating, and stable at night, especially under clear conditions in winter. The mixing height over water typically ranges from 1,640 to 3,281 ft. with a slight diurnal (daytime) variation (U.S. Environmental Protection Agency, 1972). The air quality analysis presented in this EIS/OEIS assumes that 3,000 ft. (40 CFR 93.153(c)(2)(iii)

above ground level is the typical maximum afternoon mixing height, and thus air pollutants emitted above this altitude do not affect ground-level air pollutant concentrations.

With the advent of human-induced climate change, spatial and temporal variations in weather patterns have emerged or have become more pronounced. Very heavy precipitation events have increased across the eastern half of the United States, with the most pronounced increase involving the mid-Atlantic and New England states (Melillo et al. 2014). Other changes apparent along the eastern seaboard include the rising incidence of heat waves and their extended duration and coastal flooding due to sea level rise and storm surge. In the South and along the Gulf Coast, the incidence of extreme storms, such as hurricanes, continues to rise. These changes to weather patterns have long-term consequences for regional climates and the flora and fauna of the regions.

3.1.2.1.3.1 Hawaii

The climate of the Pacific Ocean offshore of the Hawaiian Islands is subtropical. Offshore winds 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. Estimated annual rainfall in ocean areas offshore of Hawaii is estimated at about 25 inches (in.), with most rainfall during the winter season (Western Regional Climate Center, 2016a).

The climate of Hawaii influences air quality in several ways. The prevailing trade winds provide strong, regular regional ventilation that quickly disperses air pollutants and breaks up inversion layers. Frequent rainfall on windward sides of the islands washes dust and other air pollutants out of the atmosphere. During mild Kona (i.e., absence of daily trade winds) weather, local air pollutant concentrations may temporarily increase and volcanic organic gases emissions from the Island of Hawaii may temporarily affect the other islands in the Main Hawaiian Islands.

3.1.2.1.3.2 Southern California

The climate of coastal Southern California and adjacent offshore Pacific Ocean waters consists of warm, dry summers and cool, wet winters. One of the main influences on the climate 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.

Precipitation in coastal Southern California falls almost exclusively as rain. Most of this precipitation falls from late fall through early spring. No measurements are available for the open ocean; rainfall in coastal San Diego County averages about 9.8 in. per year, and rainfall in coastal Los Angeles averages about 14.8 in. (Western Regional Climate Center, 2016b).

3.1.2.2 Existing Air Quality

Air quality in offshore ocean areas is generally higher than the air quality of adjacent onshore areas because there are few or no large sources of 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. No criteria air pollutant monitoring stations are located in offshore areas, so air quality in the Study Area must be inferred from the air quality in adjacent land areas where air pollutant concentrations are monitored.

3.1.2.2.1 Hawaii

Air quality in Hawaii is generally good, because of the small number of major stationary sources and strong ventilation provided by frequent trade winds. Monitored air pollutant concentrations are generally well below State of Hawaii or federal air quality standards. With the exception of short-term sulfur dioxide measurements recorded near volcanic activity, between 2012 and 2014, none of the air quality monitoring stations in Hawaii recorded criteria air pollutant concentrations that exceeded the ambient air quality standards (Hawaii Department of Health, 2016). The entire State of Hawaii is in attainment of the National Ambient Air Quality Standards and State Ambient Air Quality Standards for all criteria air pollutants. Therefore, a Conformity Determination is not required for those elements of the Proposed Action that occur in Hawaii State waters.

3.1.2.2.2 Southern California Portion of the HSTT Study Area

Figure 3.1-1 presents a map of the air basins in the vicinity of the Southern California Portion of the HSTT Study Area.

3.1.2.2.2.1 South Coast Air Basin

South Coast Air Basin is classified as an extreme non-attainment area for ozone (eight-hour average concentration) under the National Ambient Air Quality Standards, a carbon monoxide maintenance area, a maintenance area for nitrogen dioxide, a maintenance area for particulate matter with a diameter less than or equal to 10 microns, and a serious non-attainment area for particulate matter with a diameter less than or equal to 2.5 microns.

3.1.2.2.2.2 San Diego Air Basin

Air quality in the San Diego Air Basin is classified as a non-attainment area for ozone (eight-hour average concentration) under the National Ambient Air Quality Standards, and as a maintenance area for carbon monoxide. The USEPA designated San Diego County as a “moderate” ozone nonattainment area under the 2008 eight-hour ozone standard.

3.1.2.2.3 Transit Corridor

Air quality in the Transit Corridor, which is more remote from major stationary sources of air pollutants than either the Southern California or the Hawaii Range Complex, is unknown but is expected to be of higher quality than either of these areas. Activities within the Transit Corridor involve the movement of ships and aircraft to training and testing areas. Because the movement of these assets would not be solely attributable to training and testing activities associated with the Proposed Action, emissions associated with these transits have not been quantified for this analysis.

3.1.3 Environmental Consequences

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) potentially impact air quality within the Study Area. Tables 3.1-3 to 3.1-10 present the total emissions for the baseline and proposed training and testing activity locations

under each alternative. The air quality stressors vary in intensity, frequency, duration, and location within the Study Area. The stressor applicable to air quality in the Study Area is analyzed below:

- Criteria Air Pollutants

In this analysis, criteria air pollutant emissions estimates were calculated for vessels, aircraft, and munitions. 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 net emissions increases in the various sub regions under the two action alternatives were then compared to the screening thresholds as described above in the Analysis Framework as a step in the determination of significant impact.

The current (baseline) activities are not reflected in any alternative in this EIS/OEIS, but were described in the Preferred Alternative of the Navy's 2013 HSTT Final EIS/OEIS.

Activities conducted as part of the Proposed Action would involve mobile sources using fossil fuel combustion as a source of power. Greenhouse gas emissions were calculated for vessels, aircraft, and munitions using emissions factors provided by the U.S. Navy for aircraft and vessels, and published by the USEPA for munitions.

Details of the emission estimates are provided in Appendix C (Air Quality Emissions Calculations and Record of Non-Applicability).

3.1.3.1 Criteria Air Pollutants

The potential impacts of criteria air pollutants are evaluated by first estimating the emissions from training and testing activities in the Study Area for each alternative. These estimates are then used to determine the potential impact of the emissions on the attainment status of the adjacent designated air quality area. For a nonattainment or maintenance area, this involves evaluating the net change in emissions that would result from implementing the Proposed Action, as compared to current emissions, which are classified as the baseline emissions for the purpose of this analysis. The net change is then compared to screening thresholds to assess compliance. The baseline emissions are defined as the emissions estimated for the Preferred Alternative in the Hawaii-Southern California Training and Testing Final Environmental Impact Statement/Overseas Environmental Impact Statement (U.S. Department of the Navy, 2013). Emissions of criteria air pollutants may affect human health directly by degrading local or regional air quality or indirectly by their effects on the environment. Air pollutant emissions may also have a regulatory effect separate from their physical effect, if additional air pollutant emissions change the attainment status of an air quality control region.

The estimate of criteria air pollutant emissions for each alternative is categorized by region (e.g., by range complex or testing range) so that differences in background air quality, atmospheric circulation patterns, regulatory requirements, and sensitive receptors can be addressed. An overall estimate of air pollutant emissions for Navy training and testing activities in the Study Area under each alternative is provided. Under Alternative 1, emissions were based on the average number of training and testing activities anticipated, based on the prior 6 years of data. Under Alternative 2, emissions were based on the anticipated maximum number of training and testing activities. For vessel operations, the maximum was based on the operations that occurred in 2010 the year of the highest number of operations in the range 2010–2015. While this represented the year of most total operations, the number of operations involving specific vessels in the individual operational areas may or may not have been higher than the

average number used in Alternative 1. These individual variances do not change the overall result of greater total operations when accounting for all vessels in all regions under Alternative 2.

3.1.3.1.1 Impacts from Criteria Pollutants Under Alternative 1

Table 3.1-3 presents the total estimated emission results under Alternative 1 within the Study Area and includes all emissions generated, regardless of proximity to the coastline. The majority of these emissions occur beyond state waters, with the majority of emissions in most areas occurring beyond the state water boundaries.

Table 3.1-3: Annual Criteria Air Pollutant Emissions from Training and Testing Activities Occurring within the HSTT Study Area, Alternative 1

Scenario	*Emissions by Air Pollutant (TPY)*					
	CO	*NO_X*	*VOC*	*SO_X*	*PM_{10}*	*$PM_{2.5}$*
Total Emissions from all Sources	2,036	8,762	802	2,873	378	378
Baseline	1,945	8,726	804	2,885	360	360
Net Increase (Decrease)	91	36	(2)	(12)	18	18

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

A significant portion of the Study Area activities will occur well offshore. While pollutants emitted in the Study Area under Alternative 1 may at times be carried ashore by winds, most training and testing activities would occur more than 12 NM offshore, and natural mixing would substantially disperse pollutants before they reach the coastal land mass. The contributions of air pollutants generated in the Study Area to the air quality in onshore areas are unlikely to measurably add to existing onshore pollutant concentrations because of the distances these offshore pollutants would be transported and their substantial dispersion during transport. In addition, the total quantity of criteria pollutants is very small in relation to the vastness of the study area. When using the Prevention of Significance Deterioration major emitting facility numbers as screening thresholds, any relevant increases are well below the thresholds. Therefore, no significant impacts on air quality as a result of criteria pollutants emissions from activities beyond territorial activities would occur.

In addition to the activities occurring beyond territorial waters, there would be activities closer to shore and these were evaluated to assess local onshore impacts. Emissions within 3 NM of shore are within the area of influence for onshore areas, and therefore have the potential to affect air quality onshore. The subsections that follow evaluate the nearshore emissions within regional areas that include attainment, nonattainment, or maintenance areas. Nearshore is defined as within 3 NM from shore. This is based on the definition of State waters and is the area within which emissions would be most likely to migrate onshore due to proximity. The emissions within 3 NM of the attainment and nonattainment/ maintenance areas are compared with baseline emissions currently occurring within 3 NM of these areas. The net emissions associated with the Proposed Action are then compared to the General Conformity *de minimis* thresholds for nonattainment/maintenance areas, or with the Prevention of Significant Deterioration thresholds for attainment areas, used as screening level analysis for potential significant environmental impact.

3.1.3.1.1.1 Impacts from Criteria Pollutants Under Alternative 1 in the State of Hawaii

As discussed in Section 3.1.2.2.1 (Hawaii) above, the State of Hawaii is classified as attainment for all criteria pollutants under the National Ambient Air Quality Standards.

Table 3.1-4 presents the estimated nearshore emissions under Alternative 1 as compared with baseline nearshore emissions. The net emissions increases are compared with the Prevention of Significant Deterioration Major Emitting Facility threshold.

The air pollutants expected to be emitted under Alternative 1 would not have a measurable impact on air quality in Hawaii waters or adjacent land areas because of the distances from land at which the pollutants are emitted and the generally strong ventilation resulting from regional meteorological conditions. Air pollutant emissions under Alternative 1 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality in land areas. Relative to the baseline, the net emissions associated with Alternative 1 for all pollutants are well below the Prevention of Significant Deterioration Thresholds.

Table 3.1-4: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the State of Hawaii (Within 3 NM), Alternative 1[1]

Source	*Emissions by Air Pollutant (TPY)*					
	CO	*NO_X*	*VOC*	*SO_X*	*PM_{10}*	*$PM_{2.5}$*
Total Emissions from all Sources	18	58	3	18	9	9
Baseline	25	60	3	19	6	6
Net Increase (Decrease)	(7)	(2)	0	(1)	3	3
Prevention of Significant Deterioration Threshold	250	250	250	250	250	250

[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

3.1.3.1.1.2 Impacts from Criteria Pollutants Under Alternative 1 in the South Coast Air Basin

As discussed in Section 3.1.2.2.2.1 (South Coast Air Basin) above, the South Coast Air Basin is classified as an extreme non-attainment area for ozone (eight-hour average concentration) under the National Ambient Air Quality Standards, a carbon monoxide maintenance area, a maintenance area for nitrogen dioxide, a maintenance area for particulate matter with a diameter less than or equal to 10 microns, and a serious non-attainment area for particulate matter with a diameter less than or equal to 2.5 microns.

Table 3.1-5 presents the estimated nearshore emissions under Alternative 1 as compared with baseline nearshore emissions. The net emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds.

The air pollutants expected to be emitted under Alternative 1 would not have a measurable impact on air quality in the South Coast Air Basin water or adjacent land areas because of the distances from land at which the pollutants are emitted and the generally strong ventilation resulting from regional meteorological conditions. Air pollutant emissions under Alternative 1 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality in

land areas. Relative to the baseline, the net emissions associated with Alternative 1 would result in a decrease in emissions within the South Coast Air Basin for all pollutants except volatile organic compounds. The increase in volatile organic compounds is below the *de minimis* emission level of 10 tons per year. As shown in Table 3.1-5, the emissions are below the applicable *de minimis* levels. A Conformity Determination is not required, and a Record of Non-Applicability (Appendix C) has been prepared.

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

Source	*Emissions by Air Pollutant (TPY)*					
	CO	***NO_X***	***VOC***	***SO_X***	***PM_{10}***	***$PM_{2.5}$***
Total Emissions from all Sources	73	104	28	22	19	19
Baseline	99	158	23	34	22	22
Net Increase (Decrease)	(26)	(54)	5	(12)	(3)	(3)
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

3.1.3.1.1.3 Impacts from Criteria Pollutants Under Alternative 1 in the San Diego Air Basin

As discussed in Section 3.1.2.2.2.2 (San Diego Air Basin) above, the San Diego Air Basin is classified as non-attainment area for ozone (eight-hour average concentration) under the National Ambient Air Quality Standards and as a maintenance area for carbon monoxide. Effective June 3, 2016, the San Diego Air Basin was reclassified to a Moderate nonattainment area by USEPA (final approval May 4, 2016, 81 Federal Register 26697).

Table 3.1-6 presents the estimated nearshore emissions under Alternative 1 as compared with baseline nearshore emissions. The net emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds.

The air pollutants expected to be emitted under Alternative 1 would not have a measurable impact on air quality in the San Diego Air Basin water or adjacent land areas because of the distances from land at which the pollutants are emitted and the generally strong ventilation resulting from regional meteorological conditions. Air pollutant emissions under Alternative 1 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality in land areas. Relative to the baseline, the net emissions associated with Alternative 1 would result in a decrease in emissions within the San Diego Air Basin for all nonattainment pollutants (carbon dioxide, nitrogen oxides, and volatile organic compounds). As shown in Table 3.1-6, the emissions are below the applicable *de minimis* levels, which are being used as thresholds of potential significance. A Conformity Determination is not required, and a Record of Non-Applicability (Appendix C) has been prepared.

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

Source	*Emissions by Air Pollutant (TPY)*					
	CO	***NO_X***	***VOC***	***SO_X***	***PM_{10}***	***$PM_{2.5}$***
Total Emissions from all Sources	138	835	445	330	39	39
Baseline	146	855	456	332	39	39
Net Increase (Decrease)	(8)	(20)	(11)	(2)	0	0
De Minimis Threshold	100	100	100	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

3.1.3.1.1.4 Summary of Impacts from Criteria Pollutants Under Alternative 1

While criteria air pollutants emitted in the Study Area over territorial waters may be transported ashore, they would not affect the attainment status of the relevant air quality control regions. The amounts of air pollutants emitted in the Study Area and subsequently transported ashore would be insignificant because (1) emissions from Navy training and testing activities are small compared to the amounts of air pollutants emitted by sources ashore, (2) the distances the air pollutants would be transported are often large, and (3) the pollutants are substantially dispersed during transport. 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 the attainment and nonattainment/maintenance areas in the Study Area are below the Prevention of Significant Deterioration and applicable General Conformity Rule *de minimis* thresholds, respectively. The Prevention of Significance Deterioration thresholds have been used as a surrogate in absence of any defined threshold to evaluate the potential for an adverse impact in attainment areas. Therefore, no significant impacts on air quality as a result of criteria pollutants over territorial waters would occur; and no significant harm to air quality as a result of criteria pollutants over non-territorial waters would occur.

3.1.3.1.2 Impacts from Criteria Pollutants Under Alternative 2

Table 3.1-7 presents the total estimated emission results under Alternative 2 within the Study Area and includes all emissions generated, regardless of proximity to the coastline. The majority of these emissions occur beyond state waters, with the majority of emissions in most areas occurring beyond the state water boundaries.

A significant portion of the Study Area activities will occur well offshore. While pollutants emitted in the Study Area under Alternative 2 may at times be carried ashore by winds, most training and testing activities would occur more than 12 nm offshore, and natural mixing would substantially disperse pollutants before they reach the coastal land mass. The contributions of air pollutants generated in the Study Area to the air quality in onshore areas are unlikely to measurably add to existing onshore pollutant concentrations because of the distances these offshore pollutants would be transported and

their substantial dispersion during transport. Therefore, no significant impacts on air quality as a result of criteria pollutants emissions from activities beyond territorial activities would occur.

Table 3.1-7: Annual Criteria Air Pollutant Emissions from Training and Testing Activities Occurring Within the HSTT Study Area, Alternative 2

Scenario	*Emissions by Air Pollutant (TPY)*					
	CO	*NO_X*	*VOC*	*SO_X*	*PM_{10}*	*$PM_{2.5}$*
Total Emissions from all Sources	2,610	9,497	845	3,783	447	447
Baseline	1,945	8,726	804	2,885	360	360
Net Increase (Decrease)	665	771	41	898	87	87

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

In addition to the activities occurring beyond territorial waters, there would be activities closer to shore and these were evaluated to assess local onshore impacts. Emissions within 3 NM of shore are within the area of influence for onshore areas, and therefore have the potential to affect air quality onshore. The subsections that follow evaluate the nearshore emissions within regional areas that include attainment, nonattainment, or maintenance areas. Nearshore is defined as within 3 NM from shore. This is based on the definition of State waters and is the area within which emissions would be most likely to migrate onshore due to proximity. The emissions within 3 NM of the attainment and nonattainment/ maintenance areas are compared with baseline emissions currently occurring within 3 NM of these areas. The net emissions associated with Alternative 2 are then compared to the General Conformity *de minimis* thresholds for nonattainment/maintenance areas, or the Prevention of Significant Deterioration Major Emitting Facility threshold for attainment areas. For NEPA analysis purposes these are screening thresholds of potential significance.

3.1.3.1.2.1 Impacts from Criteria Pollutants Under Alternative 2 in the State of Hawaii

As discussed in Section 3.1.2.2.1 (Hawaii) above, the State of Hawaii is classified as an attainment area for all criteria pollutants under the National Ambient Air Quality Standards.

Table 3.1-8 presents the estimated nearshore emissions under Alternative 2 as compared with baseline nearshore emissions. The net emissions increases are compared with the Prevention of Significant Deterioration Major Emitting Facility threshold that is being used to ascertain potential significance.

The air pollutants expected to be emitted under Alternative 2 would not have a measurable impact on air quality in Hawaii waters or adjacent land areas because of the distances from land at which the pollutants are emitted and the generally strong ventilation resulting from regional meteorological conditions. Air pollutant emissions under Alternative 2 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality in land areas. Relative to the baseline, the net emissions associated with Alternative 2 for all pollutants are well below the Prevention of Significant Deterioration Thresholds.

Table 3.1-8: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the State of Hawaii (Within 3 NM), Alternative 2[1]

Source	*Emissions by Air Pollutant (TPY)*					
	CO	*NO_X*	*VOC*	*SO_X*	*PM_{10}*	*$PM_{2.5}$*
Total Emissions from all Sources	20	75	3	26	9	9
Baseline	25	60	3	19	6	6
Net Increase (Decrease)	(5)	15	0	7	3	3
Prevention of Significant Deterioration Threshold	250	250	250	250	250	250

[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

3.1.3.1.2.2 Impacts from Criteria Pollutants Under Alternative 2 in the South Coast Air Basin

As discussed in Section 3.1.2.2.2.1 (South Coast Air Basin) above, the South Coast Air Basin is classified as an extreme non-attainment area for ozone (eight-hour average concentration) under the National Ambient Air Quality Standards, a carbon monoxide maintenance area, a maintenance area for nitrogen dioxide, a maintenance area for particulate matter with a diameter less than or equal to 10 microns, and a serious non-attainment area for particulate matter with a diameter less than or equal to 2.5 microns.

Table 3.1-9 presents the estimated nearshore emissions under Alternative 2 as compared with baseline nearshore emissions. The net emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds.

Table 3.1-9: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the South Coast Air Basin (Within 3 NM) Versus Baseline Emissions, Alternative 2[1]

Scenario	*Emissions by Air Pollutant (TPY)*					
	CO	*NO_X*	*VOC*	*SO_X*	*PM_{10}*	*$PM_{2.5}$*
Total Emissions from all Sources	73	104	28	22	20	20
Baseline	99	158	23	34	22	22
Net Increase (Decrease)	(26)	(54)	5	(12)	(2)	(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 of $PM_{2.5}$), TPY = tons per year, VOC = volatile organic compounds

The air pollutants expected to be emitted under Alternative 2 would not have a measurable impact on air quality in the South Coast Air Basin water or adjacent land areas because of the distances from land at which the pollutants are emitted and the generally strong ventilation resulting from regional meteorological conditions. Air pollutant emissions under Alternative 2 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality in

land areas. Relative to the baseline, the net emissions associated with Alternative 2 would result in a decrease in emissions within the South Coast Air Basin for all pollutants except volatile organic compounds. The increase in volatile organic compounds is below the *de minimis* emission level of 10 tons per year.

3.1.3.1.2.3 Impacts from Criteria Pollutants Under Alternative 2 in the San Diego Air Basin

As discussed in Section 3.1.2.2.2.2 (San Diego Air Basin) above, the San Diego Air Basin is classified as a non-attainment area for ozone (eight-hour average concentration) under the National Ambient Air Quality Standards and as a maintenance area for carbon monoxide. The USEPA designated San Diego County as a "moderate" ozone nonattainment area under the 2008 eight-hour ozone standard.

Table 3.1-10 presents the estimated nearshore emissions under Alternative 2 as compared with baseline nearshore emissions. The net emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds.

Table 3.1-10: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the San Diego Air Basin (Within 3 NM), Alternative 2[1]

Source	*Emissions by Air Pollutant (TPY)*					
	CO	***NO_X***	***VOC***	***SO_X***	***PM_{10}***	***$PM_{2.5}$***
Total Emissions from all Sources	139	849	445	340	40	40
Baseline	146	855	456	332	39	39
Net Increase (Decrease)	(7)	(6)	(11)	8	1	1
De Minimis Threshold	100	100	100	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

The air pollutants expected to be emitted under Alternative 2 would not have a measurable impact on air quality in the San Diego Air Basin water or adjacent land areas because of the distances from land at which the pollutants are emitted and the generally strong ventilation resulting from regional meteorological conditions. Air pollutant emissions under Alternative 2 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality in land areas. Relative to the baseline, the net emissions associated with Alternative 2 would result in a decrease in emissions within the San Diego Air Basin for all nonattainment pollutants (carbon dioxide, nitrogen oxides, and volatile organic compounds).

3.1.3.1.2.4 Summary of Impacts from Criteria Pollutants Under Alternative 2

While criteria air pollutants emitted in the Study Area over territorial waters may be transported ashore, they would not affect the attainment status of the relevant air quality control regions. The amounts of air pollutants emitted in the Study Area and subsequently transported ashore would be insignificant because (1) emissions from Navy training and testing activities are small compared to the amounts of air pollutants emitted by sources ashore, (2) the distances the air pollutants would be transported are often large, and (3) the pollutants are substantially dispersed during transport. 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 the attainment and nonattainment/maintenance areas in the Study Area are below the Prevention of Significant Deterioration and applicable General Conformity Rule *de minimis* thresholds, respectively. The Prevention of Significance Deterioration thresholds have been used as a surrogate in the absence of any defined threshold in order to evaluate the potential for an adverse impact in attainment areas. Although the increase in pollutants exceeds major emitting facility level screening criteria, they do so by factors of two to four, which is very small when spread over hundreds of thousands to millions of square nautical miles (see Chapter 2, Description of Proposed Action and Alternatives). As noted earlier, these thresholds are derived from stationary source thresholds, which are applicable to individual land installations that are orders of magnitude smaller than the study area. Therefore, no significant impacts on air quality as a result of criteria pollutants over territorial waters would occur; and no significant harm to air quality as a result of criteria pollutants over non-territorial waters would occur.

3.1.3.1.3 Impacts from Criteria Pollutants Under the No Action Alternative

Under the No Action Alternative, the Navy would not conduct the proposed training and testing activities in the HSTT Study Area. Discontinuing training and testing activities in the Study Area under the No Action Alternative would not measurably improve air quality in the Study Area.

3.1.3.2 Greenhouse Gases 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 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.

Greenhouse gas emissions were calculated 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 3.1-11. Baseline greenhouse gas emissions (i.e., emissions from existing activities) are also presented in the table.

Table 3.1-11: Greenhouse Gas Emissions from Ship and Aircraft Training and Testing Activities in the Hawaii-Southern California Training and Testing Study Area

Alternative	*Annual CO_2-Equivalent Emissions CO_2 Eq. (in Metric Tons/Year)*
Baseline	1,289,56
Alternative 1	1,384,049
Increase in emissions for Alternative 1 compared to Baseline	94,488
Alternative 2	1,655,324
Increase in emissions for Alternative 2 compared to Baseline	365,763

Note: CO_2 Eq. = carbon dioxide equivalent

Ship and aircraft greenhouse gas emissions are compared to U.S. 2014 greenhouse gas emissions in Table 3.1-12. The estimated baseline carbon dioxide equivalent emissions are 0.0187 percent of the

total carbon dioxide equivalent emissions generated by the United States in 2014. The estimated carbon dioxide equivalents emissions from Alternatives 1 and 2 would increase because of increased training and testing activities to about 0.0201 and 0.0241 percent, respectively, of the total carbon dioxide equivalents emissions generated by the United States in 2014.

Table 3.1-12: Comparison of Ship and Aircraft Greenhouse Gas Emissions to United States 2014 Greenhouse Gas Emissions

Alternative	*Annual Greenhouse Gas Emissions (Metric Tons CO_2 Eq.)*	*Percentage of U.S. 2014 Greenhouse Gas Emissions*
Baseline	1,289,561	0.0187%
Alternative 1	1,384,049	0.0201%
Alternative 2	1,655,324	0.0241%
U.S. 2014 greenhouse gas emissions	6,870,500,000	

Source: U.S. Environmental Protection Agency (2016c)
Note: CO_2 Eq. = carbon dioxide equivalent

3.1.4 Summary of Potential Impacts on Air Quality

In this analysis, criteria air pollutant and greenhouse gas emissions estimates were calculated for vessels, aircraft, and munitions. For each alternative, emissions estimates were developed by range complex and other training or testing locations and totaled for the Study Area. Details of the emission estimates are provided in Appendix C (Air Quality Emissions Calculations and Record of Non-Applicability). Hazardous air pollutants were analyzed qualitatively in relation to the type and prevalence of the sources emitting hazardous air pollutants during training and testing activities.

3.1.4.1 Combined Impacts of All Stressors Under Alternative 1

As discussed in Sections 3.1.3.1 (Criteria Air Pollutants), emissions associated with Study Area training and testing under Alternative 1 primarily occur at least 3 NM offshore, and mainly occur beyond 12 NM, with the exception of amphibious operations occurring near shore. For fixed-wing aircraft activities, emissions typically occur above the 3,000 ft. mixing layer. Given these characteristics, the impacts on air quality from the combination of these resource stressors are expected to be similar to the impacts on air quality for any of these stressors taken individually without any additive, synergistic, or antagonistic interaction. Emissions of criteria pollutants are expected to increase under Alternative 1 in comparison to the baseline emissions due to increases in training and testing activity levels, but by amounts below relevant screening thresholds. Within state waters, a comparison of estimated emissions under Alternative 1 to the baseline indicates that some pollutant emissions would be reduced and others would increase. Emissions of volatile organic compounds would undergo a small increase within the South Coast Air Basin. The remaining emissions would decrease within both the South Coast Air Basin and the San Diego Air Basin. Any increases within state waters would be below relevant screening thresholds.

3.1.4.2 Combined Impacts of All Stressors Under Alternative 2

As discussed in Sections 3.1.3.1 (Criteria Air Pollutants), emissions associated with Study Area training and testing under Alternative 2 primarily occur at least 3 NM offshore, and mainly occur beyond 12 NM, with the exception of amphibious operations occurring near shore. For fixed-wing aircraft activities, emissions typically occur above the 3,000 ft. mixing layer. Given these characteristics, the impacts on air quality from the combination of these resource stressors are expected to be similar to the impacts on air quality for any of these stressors taken individually without any additive, synergistic, or antagonistic

interaction. Emissions of criteria pollutants are expected to increase under Alternative 2 in comparison to the baseline emissions due to increases in training and testing activity levels. Although total increases would exceed screening thresholds, the amount would not be significant in comparison to the vast areas potentially affected. Within state waters, a comparison of estimated emissions under Alternative 2 to the baseline indicates that some pollutant emissions would be reduced and others would increase. Emissions of volatile organic compounds would undergo a small increase within the South Coast Air Basin. Emissions of sulfur dioxide and particulate matter would undergo a small increase within the San Diego Air Basin. The remaining emissions would decrease within both the South Coast Air Basin and the San Diego Air Basin. Within state waters any emissions increases are below relevant screening thresholds.

3.1.4.3 Combined Impacts of All Stressors Under the No Action Alternative

As discussed in Sections 3.1.3.1 (Criteria Air Pollutants), under the No Action Alternative, the Navy would not conduct the proposed training and testing activities in the HSTT Study Area. Discontinuing training and testing activities under the No Action Alternative would not measurably improve air quality in the Study Area.

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