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# Overseas Environmental Impact Statement
# Point Mugu Sea Range
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## 3.1 Air Quality

### 3.1.1 Introduction

Air quality is primarily defined by atmospheric concentrations of specific air pollutants—pollutants the United States 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 ($O_3$), suspended particulate matter less than or equal to 10 microns in diameter ($PM_{10}$), fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead. 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. $PM_{10}$ and $PM_{2.5}$ 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 testing and training activities. In this analysis, hazardous air pollutants are not further evaluated because mobile sources associated

with the Proposed Action would be functioning intermittently over a large area, and produce negligible ambient hazardous air pollutants in a localized area not located near any publicly accessible areas.

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 [$\mu g/m^3$] of air) or as a volume fraction (e.g., parts per million 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

In addition to the National Ambient Air Quality Standards, individual states are able to develop their own air quality standards that are more stringent than the federal standards. 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 USEPA 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 USEPA 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 Point Mugu Sea Range (PMSR) Study Area includes areas that are unclassified as to the attainment status (including offshore areas outside of State waters (>3 NM), areas in federal waters (>3 NM but <12 NM), areas beyond federal waters (>12 NM), and areas that are classified as nonattainment areas (South Central Coast Air Basin). 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 Evaluation).

## Table 3.1-1: National Ambient Air Quality Standards

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

[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.
Notes: $PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter, $PM_{10}$ = Particulate matter less than 10 microns in diameter, ppm = parts per million, µg/m$^3$ = micrograms per cubic meter
Source: (U.S. Environmental Protection Agency, 2016b), last updated January 7, 2016.

### 3.1.2 Region of Influence

Identifying the region of influence (ROI) for air quality requires knowledge 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 $O_3$ and its precursors), the ROI is generally limited to a few miles downwind from the source. However, for photochemical pollutants such as $O_3$, the impact area may extend much farther downwind. $O_3$ is a secondary pollutant that is formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors (volatile organic compounds, NOx, and $PM_{10}$). The maximum effect of precursors on $O_3$ levels tends to occur several hours after the time of emission during periods of high solar load (i.e., sunlight) and may occur many miles from the source. $O_3$ and $O_3$ precursors transported from other regions can also combine with local emissions to produce high local $O_3$ 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, and includes Santa Barbara County and Ventura County.

#### 3.1.2.1 Attainment Areas

Within attainment areas, the Navy is required to ensure that air quality does not significantly deteriorate as a result of air emissions associated with testing and training activities conducted under the Proposed Action. Although the Study Area is in attainment of federal standards, the South Central Coast air basin is not in attainment of federal standards.

The Prevention of Significant Deterioration Program was adopted in the Clean Air Act under 40 Code of Federal Regulations [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.

### 3.1.3 Approach to 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 activities 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 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 shores. 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.

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 testing and training activities, as well as targets and munitions expended, are applicable regardless of altitude (Chapter 4, Cumulative Impacts).

#### 3.1.3.1 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 3.1.3 (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 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 testing and training activities take place within a nonattainment area. This nonattainment area is identified as the South Central Coast Air Basin, which is made up of the Ventura County, San Luis Obispo, and Santa Barbara air quality districts (an area designated by the federal government where communities share a common air pollution problem).

If a federal action is not an emergency response action presumed to conform under the Rule, is not a listed exempt activity, and is not covered by the Transportation Conformity Rule, then a conformity applicability analysis evaluating total direct and indirect non-exempt 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; it 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 current environmental baseline conditions that future emissions are evaluated against. The net change, then, is the difference between the emissions associated with the action and the current environmental 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 published in the Conformity Rule. 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 because the action 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.

**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 |

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

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

#### 3.1.3.2 Conformity Applicability Analysis South Central Coast Air Basin (California)

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. Impacts of air pollutants emitted by Navy activities 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.

The Proposed Action includes activities in the South Central Coast Air Basin. Coastal waters within 3 NM of the coast are under the same air quality jurisdiction as the contiguous land areas of the South Central Coast Air Basin. A portion of the South Central Coast Air Basin (Ventura County) is a serious nonattainment area for the National Ambient Air Quality Standards eight-hour $O_3$. 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 pollutants in the South Central Coast Air Basin under the General Conformity Rule are shown in Table 3.1-2.

#### 3.1.3.3 National Environmental Policy Act Evaluation

Analysis of health-based air quality impacts under NEPA includes estimates of criteria air pollutants for all testing and training activities where aircraft, missiles, or targets operate at or below the aforementioned inversion layer or that involve vessels in 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, which NEPA entitles "the no action alternative." The total direct and indirect emissions considers all emission increases and decreases that are reasonably foreseeable and are possibly controllable through agency's continuing program responsibility to affect emissions.

For nonattainment and maintenance criteria pollutants, the conformity *de minimis* levels are useful as NEPA analysis screening thresholds to determine significance. For these pollutants, the General Conformity "*de minimis*" thresholds are identical to "major source" thresholds applicable to new stationary sources under the federal CAA. As such, they represent reasoned decisions under two regulatory programs as quantities that represent thresholds of increased concern. The thresholds are lowered as the air quality of a nonattainment or maintenance area worsens. For example, the threshold for an ozone precursor is ten tons per year in an extreme nonattainment area, but 100 tons per year in a moderate nonattainment area.

The Prevention of Significant Deterioration (PSD) Program was adopted in the Clean Air Act under 40 CFR Section 52.21. The PSD 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 PSD, a "major source" is defined as a facility that emits equal to or greater than 250 tons of a criteria pollutant or regulated precursor. As such, in attainment areas, the major emitting facility threshold of 250 tons per year of a pollutant is the threshold of increased concern; therefore, this threshold is also a suitable screening threshold. In NEPA terms, the foregoing means that the thresholds serve as screening level thresholds of significance. That is, where emissions of a pollutant are below the threshold for a nonattainment, attainment or maintenance area, as applicable,

they would not be significant absent compounding factors, such as proximity of sensitive receptors. Where those emissions exceed the applicable threshold discussed above, they demand a harder look at factors such as region of dispersal. It should be noted that the thresholds are conservative in that they are designed to apply to stationary sources. However, we are applying them to sources that may be diffused and dispersed. It should also be noted that by increasing and decreasing with the air quality of a region, these thresholds take into account other activities in the region in the past and present. As such they are measures of cumulative impacts.

#### 3.1.3.4 Executive Order 12114 Evaluation

The analysis of health-based air quality impacts under Executive Order 12114 includes emissions estimates of only those activities in which aircraft, missiles, or targets operate at or below 3,000 ft. above ground level, and that involve vessels outside of U.S. territorial seas.

#### 3.1.3.5 Greenhouse Gases

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, 2009b). 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, 2009c) (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 Fifth 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: 1990–2017* for the proposed Navy testing and training in the Study Area, and estimates are presented below in Section 3.1.5 (Environmental Consequences).

#### 3.1.3.6 Analysis Framework

Emission sources and the approach used to estimate emissions under the No Action Alternative, Alternative 1, and Alternative 2 in the air quality analysis are based, wherever possible, on information from Navy subject matter experts and established testing and training 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 testing and training 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 current environmental baseline conditions evaluated in the 2002 Final EIS/OEIS and the other environmental assessments that describe current activities within the PMSR Study Area.

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 where Prevention of Significant Deterioration regulations would apply. Under those regulations 250 tons would be the threshold for a "major emitting facility." In nonattainment and maintenance areas conformity *de minimis* levels, which are the same as major source thresholds, are used. 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.

#### 3.1.3.7 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, 2008). Hazardous air pollutants are analyzed qualitatively in relation to the prevalence of the sources emitting hazardous air pollutants during testing and training 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., $PM_{10}$ and $PM_{2.5}$ (Spargo et al., 1999)). The types of testing and training that produce these other emissions may take place throughout the Study Area but occur primarily within special use airspace. Chaff emissions during testing and training 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 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.

#### 3.1.3.8 Emissions Estimates

As discussed in Section 3.1.3 (Approach to Analysis), the focus of the analysis is on the net increase in emissions that would result from the action alternatives over the current environmental baseline conditions. The current environmental baseline is the current activities occurring within the PMSR Study Area as described in the 2002 Final EIS/OEIS and multiple environmental assessments. The Navy has provided improved emission factor data for ships and aircraft that have been updated since the 2002 Final EIS/OEIS. The current environmental baseline calculations have been updated to reflect the current emission factor data.

##### 3.1.3.8.1 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 testing and training ranges at or above 3,000 ft. above mean sea level; 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 ft. above mean sea level and, therefore, are not included in the estimated emissions of criteria air pollutants. Activities or portions of those testing and training 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 air-to-surface warfare activities. The number of all testing and training 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 B (Air Quality Emissions Calculations).

The types of aircraft identified include the typical aircraft platforms that conduct a particular testing or training 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 current activities. The types of aircraft used in each testing or training activity and numbers of sorties flown by such aircraft are presented in Appendix B (Air Quality Emissions Calculations).

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, such as the Air Emissions Guide for Air Force Mobile Sources (Air Force Civil Engineer Center, 2016) or engine manufacturer's data sheets.

The emissions calculations performed for each alternative conservatively assume that each aircraft testing or training activity is separately conducted. In practice, a testing or training activity may be conducted during a flight. It is also probable that two or more testing or 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 account for the possibility, however remote, that each aircraft testing or training activity is separately conducted.

#### 3.1.3.8.2 Military Vessel Activities

Military vessel traffic in the Study Area includes military ships and smaller boats providing services for military testing and training 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 the alternatives, 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. For all 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 $PM_{10}$ from gasoline and diesel-fueled engines is assumed to be $PM_{2.5}$ (U.S. Environmental Protection Agency, 2010a). For gaseous-fueled engines (liquefied petroleum gas/compressed natural gas), 100 percent of the particulate matter emissions are assumed to be $PM_{2.5}$ (U.S. Environmental Protection Agency, 2010a).

The emissions calculations performed for each alternative conservatively assume that each vessel testing and training activity listed in Chapter 2 (Description of Proposed Action and Alternatives) is separately conducted and separately produces vessel emissions. In practice, one or more testing or training activities may take advantage of an opportunity to travel at sea and test aboard a vessel conducting a related or unrelated activity. It is also probable that two or more testing or training activities may be conducted during one 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 activities may be conducted during a larger integrated exercise. Conservative assumptions may produce elevated vessel emissions calculations but account for the possibility, however remote, that each testing or training activity is separately conducted.

#### 3.1.3.8.3 Naval Gunfire, Missiles, Bombs, Other Munitions, and Military Expended Material

Naval gunfire, missiles, bombs, and other types of munitions used in testing and training 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 testing and training activities are first totaled. Generally accepted emissions factors (U.S. Environmental Protection Agency, 2009a) for criteria air pollutants are then 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.

### 3.1.3.9 Other Compliance Considerations, Requirements, and Practices

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 goal that attempted to reduce non-tactical petroleum use; ensure environmentally sound acquisition practices; and ensure environmentally compliant operations for ships, submarines, aircraft, and facilities operated by the Navy. Examples of Navy-wide greenhouse gas reduction projects include energy-efficient construction, thermal and photovoltaic solar systems, geothermal power plants, and the generation of electricity with wind energy. The Navy continues to promote and install new renewable energy projects.

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.

## 3.1.4 Affected Environment

### 3.1.4.1 General Background

#### 3.1.4.1.1 Region of Influence

As described in Section 3.1.2 (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, 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. 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.

#### 3.1.4.1.2 Sensitive Receptors

The air quality analysis includes the identification of sensitive receptors. 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. Within the Study Area, crews of commercial vessels and recreational users in the PMSR area could be exposed to air pollutants generated by the Proposed Action. However, few commercial vessels and recreational users are expected to be present, and the duration of exposure to pollutants would be limited because areas within the PMSR are cleared of nonparticipants before event commencement. Therefore, potential receptors are not considered sensitive.

#### 3.1.4.1.3 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)(xxii)) 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.

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 north and 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 (WeatherSpark, 2019).

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; annual average rainfall in coastal areas within the South Central Coast Air Basin is approximately 20 inches (WeatherSpark, 2019).

#### 3.1.4.2 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.

A portion of the South Central Coast Air Basin (Ventura County) is a serious nonattainment area for the National Ambient Air Quality Standards eight-hour ozone.

##### 3.1.4.2.1 Current Environmental Baseline Conditions

This section provides the current emissions being produced by testing and training activities within the Study Area. These emissions are considered the current environmental baseline conditions and are used to determine the net change in emissions that would potentially occur with the implementation of the Proposed Action.

###### 3.1.4.2.1.1 Criteria Air Pollutants

Air pollutants emitted more than 3,000 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). Emissions released above this altitude distance are often too highly dispersed within the atmosphere to impact pollutant concentrations over land and the surface of the water in the lower atmosphere, measured at ground-level monitoring stations, upon which federal, state, and local regulatory decisions are based. However, since all of the sources of pollutants are mobile, and it is difficult to determine where exactly emissions would be released within the Study Area, all emissions occurring under 3,000 ft. are considered when comparing against the *de minimis* thresholds. The only

emissions not accounted for in Table 3.1-3 are those released from transient flights that originate outside of the PMSR Study Area. Transient flights would generate emissions in the air basin in which they take off. Since transient flights are taking off from various locations and air basins, it is difficult to determine where exactly emissions are being produced and how often.

## Table 3.1-3: Estimated Annual Criteria Pollutant Emissions Under the Current Environmental Baseline Conditions[1]

| Criteria Pollutants | Annual Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|---|
| | CO | $NO_x$ | VOC | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Emissions (0–3 NM) | 55.72 | 27.06 | 20.89 | 4.34 | 0.79 | 0.79 |
| Emissions (3–12 NM) | 143.28 | 10.76 | 58.30 | 1.61 | 0.36 | 0.36 |
| Emissions (>12 NM) | 901.71 | 321.01 | 350.56 | 112.40 | 12.35 | 12.28 |
| **TOTAL** | 1100.71 | 358.84 | 429.75 | 118.35 | 13.69 | 13.62 |

[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, $NO_2$ = 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, NM = nautical miles

#### 3.1.4.2.1.2 Greenhouse Gases

Current testing and training activities in the Study Area involve mobile sources using fossil fuel combustion as a source of power. Additionally, the expenditure of munitions could generate greenhouse gas emissions. Greenhouse gas emissions, depending on type, can persist in the atmosphere for extended periods of time, from 12 years for methane to up to 200 years for carbon dioxide. Unlike criteria air pollutants, where greenhouse gas emissions are released in relation to the atmosphere does not affect their contribution to climate change. 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. Table 3.1-4 shows the greenhouse gas emissions produced under the current environmental baseline conditions and compares them against total national greenhouse gas emissions.

## Table 3.1-4: Estimated Annual Greenhouse Gas Emissions Under the Current Environmental Baseline Conditions

| Emissions of $CO_2e$ (Metric Tons per Year) | |
|---|---|
| Current Environmental Baseline Greenhouse Gas Emissions | 173,713.21 |
| National Greenhouse Gas Emissions | 6,456,700,000 |
| Percent of National Emissions | 0.00269% |
| California Greenhouse Gas Emissions | 424,100,000 |
| Percent of California Emissions | 0.04096% |

## 3.1.5 Environmental Consequences

### 3.1.5.1 No Action Alternative

Under the No Action Alternative, proposed testing and training activities would not occur within the PMSR. Other military activities not associated with this Proposed Action would continue to occur. Sources of air pollutant emissions, as listed above, would not be introduced into the Study Area. Therefore, existing environmental conditions would either remain unchanged or would improve slightly after cessation of ongoing testing and training activities.

Discontinuing the testing and training activities would result in fewer pollutant emissions within the Study Area where testing and training activities have historically been conducted. Therefore, discontinuing testing and training activities under the No Action Alternative would lessen the potential for impacts on the ambient air quality.

### 3.1.5.2 Alternative 1 (Preferred Alternative)

A comparison of operational tempo proposed for each alternative, and proposed types and level of activities, are provided in Section 2.2 (Proposed Action).

#### 3.1.5.2.1 Criteria Air Pollutants

##### 3.1.5.2.1.1 Impacts from Criteria Pollutants Under Alternative 1 (Preferred Alternative) in the South Central Coast Air Basin

Pollutants emitted in the Study Area under Alternative 1 could be carried ashore by winds. However, the majority of testing and training activities would occur more than 12 NM offshore, and natural mixing would substantially disperse pollutants before they reach the coastal land mass. Testing and training emissions could occur within 3 NM of shore, which is within the South Central Coast Air Basin. Transit activities between the Port of Hueneme and 3 NM offshore would generate potential emissions which could impact air quality within the air basin. The subsections that follow evaluate the nearshore emissions within regional areas that include attainment, nonattainment, or maintenance areas. These areas are based on the definition of State waters and represent the area within which emissions would be most likely to migrate onshore due to proximity. 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.

As discussed in Section 3.1.1.3.1 (Conformity Analysis South Central Coast Air Basin [California]) above, the South Central Coast Air Basin is classified as a serious nonattainment area for ozone (eight-hour average concentration) under the National Ambient Air Quality Standards. Table 3.1-5 presents the estimated nearshore emissions under Alternative 1 as compared with baseline nearshore emissions. The net emissions increases were compared with the applicable General Conformity Rule *de minimis* thresholds. The net change between the environmental baseline and Alternative 1 is small, as the differences in vessel operations between the two alternatives is minimal. The number of contract support vessels decreases under Alternative 1 while the number of other support vessel transits increases, resulting in a net difference in vessel transits by a single operation.

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

| Criteria Pollutant | Annual Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|---|
| | CO | $NO_x$ | VOC | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Total 0–3 NM Emissions | 89.03 | 27.92 | 34.54 | 4.44 | 0.84 | 0.84 |
| Baseline | 55.72 | 27.06 | 20.89 | 4.34 | 0.79 | 0.79 |
| Net Increase (Decrease) | 33.31 | 0.86 | 13.65 | 0.10 | 0.05 | 0.05 |
| *De Minimis* Threshold | 100 | 50 | 50 | 100 | 100 | 100 |

[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, $NO_2$ = 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, NM = nautical miles

Air pollutant emissions under Alternative 1 would not result in violations of federal air quality standards because they would not have a measurable impact on air quality in land areas. 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 has been prepared.

#### 3.1.5.2.1.2 National Environmental Policy Act Impacts from Criteria Pollutants Under Alternative 1 (Preferred Alternative) for 0–12 Nautical Miles

Table 3.1-6 presents the total estimated emission results under Alternative 1 within the Study Area and includes all emissions generated, regardless of proximity to the coastline.

Pollutants emitted in the Study Area under Alternative 1 could be carried ashore by winds. However, the majority of testing and training activities would occur more than 12 NM offshore, and natural mixing would substantially disperse pollutants before they reach the coastal land mass. When using the Prevention of Significant Deterioration major emitting facility numbers as screening thresholds, any relevant increases would be well below the thresholds. In addition, the total quantity of criteria pollutants is very small in relation to the vastness of the Study Area. Therefore, no significant impacts on air quality as a result of criteria pollutants emissions from activities beyond territorial activities would occur.

#### 3.1.5.2.1.3 Impacts from Criteria Pollutants Under Alternative 1 (Preferred Alternative) Greater than 12 NM from Shore

Pollutants emitted in the Study Area under Alternative 1 could be carried ashore by winds. However, the majority of testing and training activities would occur more than 12 NM offshore, and natural mixing would substantially disperse pollutants before they reach the coastal land mass.

### Table 3.1-6: Estimated Annual Criteria Pollutant Emissions Produced Between 0 and 12 NM Under Alternative 1[1]

| Criteria Pollutant | Annual Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|---|
| | CO | $NO_x$ | VOC | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Emissions (0–3 NM) | 89.03 | 27.92 | 34.54 | 4.44 | 0.84 | 0.84 |
| Emissions (3–12 NM) | 243.11 | 13.05 | 99.24 | 1.87 | 0.51 | 0.50 |
| **Total Alternative 1 Emissions** | **332.14** | **40.97** | **133.77** | **6.30** | **1.35** | **1.35** |
| Current Environmental Baseline Emissions | 199.00 | 37.82 | 79.19 | 5.95 | 1.15 | 1.15 |
| Increase (Decrease) in Emissions from the Current Environmental Baseline | 133.14 | 3.15 | 54.58 | 0.35 | 0.20 | 0.20 |

[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, $NO_2$ = 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, NM = nautical miles

Table 3.1-7 presents the total estimated emission results under Alternative 1 beyond 12 NM within the Study Area and includes all emissions generated, regardless of proximity to the coastline. When using the Prevention of Significant Deterioration major emitting facility numbers as screening thresholds, any relevant increases, with the exception of CO, would be well below the thresholds. However, the total quantity of criteria pollutants in any one location is very small in relation to the vastness of the Study Area. 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: Estimated Annual Criteria Pollutant Emissions Produced Beyond 12 NM Under Alternative 1[1]

| Criteria Pollutant | Annual Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|---|
| | CO | $NO_x$ | VOC | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Emissions (>12 NM) | 1500.70 | 361.48 | 591.91 | 120.22 | 16.52 | 16.41 |
| Current Environmental Baseline Emissions | 901.71 | 321.01 | 350.56 | 112.40 | 12.35 | 12.28 |
| Increase (Decrease) in Emissions from the Current Environmental Baseline | 598.99 | 40.47 | 241.35 | 7.82 | 4.17 | 4.13 |

[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, $NO_2$ = 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, NM = nautical miles

#### 3.1.5.2.2 Greenhouse Gases

Table 3.1-8 shows the greenhouse gas emissions that would be produced under Alternative 1 and compares them against total national greenhouse gas emissions. Emissions produced under Alternative 1 would make up approximately 0.00337 percent of national greenhouse gas emissions. Therefore, it is unlikely that the implementation of Alternative 1 would significantly contribute to climate change or global warming.

**Table 3.1-8: Estimated Annual Greenhouse Gas Emissions Under Alternative 1**

| Emissions of $CO_2e$ (Metric Tons per Year) | |
|---|---|
| Alternative 1 Greenhouse Gas Emissions | 217,492.09 |
| National Greenhouse Gas Emissions | 6,456,700,000 |
| Percent of National Emissions | 0.00337% |
| California Greenhouse Gas Emissions | 424,100,000 |
| Percent of California Emissions | 0.05128% |

#### 3.1.5.2.3 Summary of Impacts from Criteria Pollutants Under Alternative 1 (Preferred Alternative)

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 testing and training activities would be small compared to the amounts of air pollutants emitted by sources ashore, (2) the distances from which the air pollutants would be transported from are greater than 12 nm from shore 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 areas in the Study Area would be below General Conformity Rule *de minimis* thresholds, respectively. The Prevention of Significant 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. Additionally, the net emission increase 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.

### 3.1.5.3 Alternative 2

A comparison of operational tempo proposed for each alternative, and proposed types and level of activities, are provided in Section 2.2 (Proposed Action).

#### 3.1.5.3.1 Criteria Air Pollutants

##### 3.1.5.3.1.1 Impacts from Criteria Pollutants Under Alternative 2 in the South Central Coast Air Basin

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 Testing and Training Activities in the South Central Coast Air Basin (Within 3 NM), Alternative 2**

| Criteria Pollutant | Annual Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|---|
| | CO | $NO_x$ | VOC | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Alternative 2 Emissions | 27.87 | 26.72 | 9.42 | 4.29 | 0.82 | 0.82 |
| Current Environmental Baseline Emissions | 55.72 | 27.06 | 20.89 | 4.34 | 0.79 | 0.79 |
| Increase (Decrease) in Emissions from the Current Environmental Baseline | (27.85) | (0.35) | (11.47) | (0.04) | 0.02 | 0.02 |
| *De Minimis* Threshold | 100 | 50 | 50 | 100 | 100 | 100 |

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

None of the pollutants would exceed their corresponding *de minimis* thresholds. Therefore, it is unlikely that the implementation of Alternative 2 would significantly affect ambient air quality or potentially result in a violation of the State Implementation Plan.

#### 3.1.5.3.1.2 Impacts from Criteria Pollutants Under Alternative 2 Between 0 and 12 NM From Shore

Table 3.1-10 shows the criteria pollutant emissions that would be produced between 0 and 12 NM from shore under Alternative 2 and provides the net increase or decrease in each pollutant as it relates to the current environmental baseline conditions.

Pollutants emitted in the Study Area under Alternative 2 could be carried ashore by winds. However, the majority of testing and training activities would occur more than 12 NM offshore, and natural mixing would substantially disperse pollutants before they reach the coastal land mass. 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 Significant Deterioration major emitting facility numbers as screening thresholds, any relevant increases would be 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.

## Table 3.1-10: Estimated Annual Criteria Pollutant Emissions Produced Between 0 and 12 NM Under Alternative 2[1]

| Criteria Pollutant | Annual Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|---|
| | CO | $NO_x$ | VOC | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Emissions (0–3 NM) | 27.87 | 26.72 | 9.42 | 4.29 | 0.82 | 0.82 |
| Emissions (3–12 NM) | 59.64 | 9.43 | 23.89 | 1.44 | 0.43 | 0.42 |
| **Total Alternative 2 Emissions** | 87.51 | 36.15 | 33.32 | 5.74 | 1.24 | 1.24 |
| Current Environmental Baseline Emissions | 199.00 | 37.82 | 79.19 | 5.95 | 1.15 | 1.15 |
| Increase (Decrease) in Emissions from the Current Environmental Baseline | (111.49) | (1.67) | (45.87) | (0.21) | 0.09 | 0.09 |

[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, $NO_2$ = 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, NM = nautical miles

#### 3.1.5.3.1.3 Impacts from Criteria Pollutants Under Alternative 2 Beyond 12 Nautical Miles From Shore

Table 3.1-11 shows the criteria pollutant emissions that would be produced beyond 12 NM from shore under Alternative 2 and provides the net increase or decrease in each pollutant as it relates to the current environmental baseline conditions.

The majority of testing and training activities would occur more than 12 NM offshore, and natural mixing would substantially disperse pollutants before they reach the coastal land mass. 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 Significant Deterioration major emitting facility numbers as screening thresholds, any relevant increases would be 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.

## Table 3.1-11: Estimated Annual Criteria Pollutant Emissions Produced Beyond 12 NM Under Alternative 2[1]

| Criteria Pollutant | Annual Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|---|
| | CO | $NO_x$ | VOC | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Emissions (>12 NM) | 419.34 | 339.30 | 148.20 | 117.69 | 15.59 | 15.51 |
| Current Environmental Baseline Emissions | 901.71 | 321.01 | 350.56 | 112.40 | 12.54 | 12.47 |
| Increase (Decrease) in Emissions from the Current Environmental Baseline | (482.37) | 18.29 | (202.36) | 5.29 | 3.25 | 3.23 |

[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, $NO_2$ = 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, NM = nautical miles

#### 3.1.5.3.2 Greenhouse Gases

Table 3.1-12 shows the greenhouse gas emissions that would be produced under Alternative 2 and compares them against total national greenhouse gas emissions. Emissions produced under Alternative 2 would make up approximately 0.00309 percent of national greenhouse gas emissions. Therefore, it is unlikely that the implementation of Alternative 2 would significantly contribute to climate change or global warming.

**Table 3.1-12: Estimated Annual Greenhouse Gas Emissions Under Alternative 2**

| Emissions of $CO_2e$ (Metric Tons per Year) | |
|---|---|
| Alternative 2 Greenhouse Gas Emissions | 199,517.97 |
| National Greenhouse Gas Emissions | 6,456,700,000 |
| Percent of National Emissions | 0.00309% |
| California Greenhouse Gas Emissions | 424,100,000 |
| Percent of California Emissions | 0.0471% |

#### 3.1.5.3.3 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 testing and training activities are small compared to the amounts of air pollutants emitted by sources ashore, (2) the distances from which the air pollutants would be transported from are greater than 12 nm from shore 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 areas in the Study Area are below 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. The net emission increase 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.

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