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## 3.2 AIR QUALITY

Air quality is determined with reference to ambient air concentrations of seven major pollutants determined by the United States (U.S.) Environmental Protection Agency (USEPA) to be of concern with respect to the health and welfare of the general public. These pollutants, called "criteria pollutants," are carbon monoxide (CO), sulfur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), 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.

Ambient air quality is measured by determining the atmospheric concentration of a specific compound that occurs at a particular geographic location. Ambient air quality data are generally reported 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 USEPA has established National Ambient Air Quality Standards (NAAQS) for these pollutants. Areas that violate a Federal air quality standard are designated as nonattainment areas. The California Air Resources Board (CARB) has established California Ambient Air Quality Standards (CAAQS), which generally are more stringent than NAAQS. Table 3.2-1 shows both the Federal and state ambient air quality standards.

Areas within California in which ambient air concentrations of a pollutant exceed the state and/or Federal standard are considered to be nonattainment areas for that pollutant. Nonattainment areas may be classified as basic, serious, severe, or extreme nonattainment areas for a given criteria pollutant. Nonattainment areas are required to develop and execute plans, known as State Implementation Plans (SIPs) that show how the area will meet Federal and state air quality standards. Areas that have achieved attainment may be designated as "maintenance areas," which are subject to maintenance plans showing how the area will continue to meet Federal and State air quality standards.

The ambient air quality levels measured at a particular location are determined by the interactions of emissions, chemical properties, and reactions that occur in the atmosphere, and meteorology. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Chemical reactions can transform pollutant emissions into criteria pollutants. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions.

Pollutant emissions typically refer to the amount of pollutants or pollutant precursors introduced into the atmosphere by a source or group of sources. Pollutant emissions contribute to the ambient air concentrations of criteria pollutants, either by directly affecting the pollutant concentrations measured in the ambient air or by interacting in the atmosphere to form criteria pollutants. Pollutants such as CO, $SO_2$, lead, and some particulates that are emitted directly into the atmosphere from emission sources are referred to as primary pollutants. Some criteria pollutants such as $O_3$, $NO_2$, and some particulates, are formed through atmospheric chemical reactions that are influenced by meteorology, ultraviolet light, and other atmospheric processes. Criteria pollutants formed through these processes are referred to as secondary pollutants. Emissions that lead to formation of secondary pollutants are considered precursors. Thus, for example, Reactive Organic Gases (ROG) and oxides of nitrogen ($NO_x$) are considered precursors for $O_3$. In general, emissions that are considered precursors to secondary pollutants are evaluated and regulated to control the levels of associated criteria pollutants in the ambient air. $PM_{10}$ and $PM_{2.5}$ are generated as primary pollutants by various mechanical processes (for example, abrasion, erosion, mixing, or atomization) or combustion processes. However, $PM_{10}$ and $PM_{2.5}$ can also be formed as secondary pollutants through chemical reactions or by gaseous pollutants condensing into fine aerosols.

**Table 3.2-1: National and California Ambient Air Quality Standards**

| Pollutant | Averaging Time | NAAQS[note 1] | | CAAQS[note 2] |
|---|---|---|---|---|
| | | Primary[note 3] | Secondary[note 4] | Concentration[note 5] |
| Ozone ($O_3$) | 1-Hour | - | Same as Primary Standard | 0.09 ppm (180 µg/m$^3$) |
| | 8-Hour | 0.08 ppm | | 0.070 ppm (137 µg/m$^3$)[note 7] |
| Carbon Monoxide (CO) | 8-Hour | 9.0 ppm (10 mg/m$^3$) | None | 9.0 ppm (10 mg/m$^3$) |
| | 1-Hour | 35 ppm (40 mg/m$^3$) | | 20 ppm (23 mg/m$^3$) |
| Nitrogen Dioxide ($NO_2$)[note 6] | Annual Average | 0.053 ppm (100 µg/m$^3$) | Same as Primary Standard | 0.030 ppm (56 µg/m$^3$) |
| | 1-Hour | - | | 0.18 ppm (338 µg/m$^3$) |
| Sulfur Dioxide ($SO_2$) | Annual Average | 80 µg/m$^3$ (0.03 ppm) | - | - |
| | 24-Hour | 365 µg/m$^3$ (0.14 ppm) | - | 0.04 ppm (105 µg/m$^3$) |
| | 3-Hour | - | 1300 µg/m$^3$ (0.5 ppm) | - |
| | 1-Hour | - | - | 0.25 ppm (655 µg/m$^3$) |
| Suspended Particulate Matter ($PM_{10}$) | 24-Hour | 150 µg/m$^3$ | Same as Primary Standard | 50 µg/m$^3$ |
| | Annual Arithmetic Mean | - | | 20 µg/m$^3$ |
| Fine Particulate Matter ($PM_{2.5}$) | 24-Hour | 35 µg/m$^3$ | Same as Primary Standard | - |
| | Annual Arithmetic Mean | 15 µg/m$^3$ | | 12 µg/m$^3$ |
| Lead (Pb)[note 7] | 30-Day Average | - | - | 1.5 µg/m$^3$ |
| | Calendar Quarter | 1.5 µg/m$^3$ | Same as Primary Standard | - |
| Hydrogen Sulfide (HS) | 1-Hour | No Federal Standards | | 0.03 ppm (42 µg/m$^3$) |
| Sulfates ($SO_4$) | 24-Hour | | | 25 µg/m$^3$ |
| Visibility Reducing Particles | 8-Hour (10 am to 6 pm, Pacific Standard Time) | | | In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. |
| Vinyl chloride[7] | 24-Hour | | | 0.01 ppm (26 µg/m$^3$) |

[1] NAAQS (other than $O_3$, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The $O_3$ standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For $PM_{10}$, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the USEPA for further clarification and current federal policies.

[2] California Ambient Air Quality Standards for $O_3$, CO (except Lake Tahoe), $SO_2$ (1- and 24-hour), $NO_2$, $PM_{10}$, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded.

[3] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[4] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[5] Concentration expressed first in units in which it was promulgated. Ppm in this table refers to ppm by volume or micromoles of pollutant per mole of gas.

[6] The Air Resources Board has approved new $NO_2$ standards. The new 1-hour CAAQS will be 0.18 ppm, and the new annual CAAQS will be 0.030 ppm. The standards are in the process of implementation.

[7] The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Note: µg/m$^3$ = milligrams per cubic meter
Source: CARB 2007a, USEPA 2005.

In addition to those pollutants that are designated criteria pollutants, additional pollutants that are considered to have the potential for health effects are categorized as hazardous air pollutants (HAPs) under Section 112 of the Clean Air Act (CAA). The USEPA has identified 188 substances as HAPs. Examples of HAPs include benzene, which is found in gasoline; perchloroethylene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper in some industries. HAPs are regulated under the Clean Air Act provisions, including the National Emission Standards for Hazardous Air Pollutants, which apply to specific sources of HAPs, and the Urban Air Toxics Strategy, which applies to area sources. The California EPA has also adopted rules governing HAPS, including the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588), and local rules governing toxics new source review.

In addition to criteria pollutants and HAPs, combustive emission sources are also a source of carbon dioxide ($CO_2$) and minor amounts of nitrous oxide ($N_2O$) and methane ($CH_4$), which are considered greenhouse gases (GHGs). The USEPA does not currently regulate greenhouse gases. Notwithstanding the lack of USEPA regulation of GHG emissions, in 2006, the California Legislature adopted Assembly Bill (AB 32), the California Global Warming Solutions Act of 2006. AB 32 requires the CARB, the state agency charged with regulating statewide air quality, to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020. As the policy making process continues, CARB is considering a broader set of mitigation measures, including carbon sequestration projects and best management practices that are technologically feasible and cost effective. Greenhouse gases as defined under AB 32 include: $CO_2$, $CH_4$, $N_2O$, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The provisions of AB 32 do not specifically address military operations; however, military operations are not specifically exempted by the legislation and may be addressed through implementation of future programs developed by CARB.

### 3.2.1 Affected Environment

The Southern California (SOCAL) Range Complex encompasses the surface and subsurface ocean Operating Areas (OPAREAs), over-ocean military airspace, and San Clemente Island (SCI). Portions of the SOCAL Range Complex lie within two different air quality regulatory jurisdictions, and portions are not within any air quality regulatory jurisdiction. SCI lies within the South Coast Air Basin (SCAB)[1]. Coastal waters within 3 nautical miles (nm) (5.5 kilometers [km]) of a shoreline are part of the same air quality jurisdiction as the contiguous land area.[2] Therefore, the waters within 3 nm of SCI lie within the SCAB. Portions of the OPAREAs lie within 3 nm of the shoreline of San Diego County; these ocean areas are within the San Diego Air Basin (SDAB). Portions of the SOCAL OPAREAs that lie outside coastal waters and beyond 3 nm of a coastline (i.e., that are not part of the SCAB or SDAB) are not within any air quality jurisdiction.

[1] SCI is in the County of Los Angeles.

[2] The regulations of the CARB define "California Coastal Waters" as the "area between the California coastline and a line starting at the California-Oregon border at the Pacific Ocean thence to 42.0 north, 125.5 west; thence to 41.0 north, 125.5 west; thence to 40.0 north, 125.5 west; thence to 39.0 north, 125.0 west; thence to 38.0 north, 124.5 west; thence to 37.0 north, 123.5 west; thence to 36.0 north, 122.5 west; thence to 35.0 north, 121.5 west; thence to 34.0 north, 120.5 west; thence to 33.0 north, 119.5 west; thence to 32.5 north, 118.5 west.

### 3.2.1.1 SOCAL Operating Areas

#### 3.2.1.1.1 Existing Conditions

The condition of the Affected Environment (existing conditions) includes impacts on Air Quality from past and present natural causes and manmade activities. The following discussion describes some of these factors.

The SCAB is composed of Orange County and substantial portions of Los Angeles, Riverside, and San Bernardino counties, and includes the largest urban area in the western United States. With 15 million inhabitants, the SCAB encompasses 43 percent of California's population, and accounts for 40 percent of all vehicle miles traveled, and one-third of all air pollutant emissions in the State (CARB 2006). Motor vehicles are the largest emission sources of CO, $NO_x$, and ROGs. There is a heavy concentration of industrial facilities, several major airports, two major shipping ports, and a dense freeway and surface street network.

The SDAB is composed of San Diego County, and encompasses 8 percent of the state's population. With a growth rate of 54 percent since 1981, San Diego is one of the fastest growing areas in the state. San Diego accounts for about 9 percent of vehicle miles driven in California, and includes industrial facilities, an international airport, and a significant seaport. Presently, 7 percent of California's air pollution is generated within the SDAB (CARB 2006).

The climate of Southern California is characterized by warm, dry summers and mild, wet winters. One of the main determinants of the climatology is a semipermanent high-pressure area (the Pacific High) in the eastern Pacific Ocean. In the summer, this pressure center is located well to the north, causing storm tracks to be directed north of California. This high-pressure cell maintains clear skies in Southern California for much of the year. When the Pacific High moves southward during the winter, this pattern changes, and low-pressure centers migrate into the region, causing widespread precipitation. The Pacific High also influences the wind patterns of California. The predominant wind directions are westerly and west-southwesterly during all four seasons, and the average annual wind speed is 5.6 mi./hour (hr.) (8.2 meters (m)/second [sec.]).

A common atmospheric condition known as a temperature inversion affects air quality in Southern California. During an inversion, air temperatures get warmer with increasing height. Subsidence inversions occur during the warmer months (May through October) as descending air associated with the Pacific high-pressure cell comes into contact with cool marine air. The boundary between the layers of air represents a temperature inversion that traps pollutants below it. Inversion layers are important elements of local air quality because they inhibit the dispersion of pollutants, thus resulting in a temporary degradation of air quality.

Coastal waters within the SDAB are classified as a basic nonattainment area for the 8-hour NAAQS for $O_3$, and a maintenance area for CO. The SCAB, which includes waters contiguous to SCI, is classified as a severe nonattainment area for the 8-hour NAAQS for $O_3$, a serious nonattainment area for CO, a maintenance area for $NO_2$, a serious nonattainment area for $PM_{10}$, and a nonattainment area for $PM_{2.5}$. It should be noted, however, that in the Draft Final 2007 Air Quality Management Plan (AQMP), the South Coast Air Quality Management District (SCAQMD) states they are requesting to be redesignated to an extreme nonattainment area for the 8-hour NAAQS for $O_3$. Redesignation would allow the SCAQMD additional time to attain the standard.

As discussed in Section 1.3.2, a separate Draft Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS) (hereafter referred to as "EIS/OEIS") has been prepared to address Navy activities on the Point Mugu Sea Range; however, certain training activities, specifically those involving use of sonar, occurring on the southern portion of the Sea Range are

not addressed in the Point Mugu EIS/OEIS. These training activities and associated emissions are addressed in this air quality impacts analysis.

There are no stationary sources of emissions within the SOCAL OPAREAs (outside of SCI).

#### 3.2.1.1.2 Current Mitigation Measures

Equipment used by military organizations within the SOCAL OPAREAs, including ships and other marine vessels, aircraft, and other equipment, are properly maintained in accordance with applicable Navy and Marine Corps requirements thus reducing potential impacts to air quality. Operating equipment meets Federal and state emission standards, where applicable.

### 3.2.1.2 San Clemente Island

#### 3.2.1.2.1 Existing Conditions

General climatic conditions at SCI are the same as for the SOCAL OPAREAs (see Section 3.2.1.1). At SCI, the precipitation averages about 4 to 9 inches (in.) (10 to 23 centimeters [cm]) annually. The mean temperature is 62.2 degrees Fahrenheit ($^{o}$F) (16.8 degrees Celsius [$^{o}$C]), and the mean maximum and mean minimum temperatures are 75.7 $^{o}$F (24.3 $^{o}$C) and 48.5 $^{o}$F (9.2 $^{o}$C), respectively.

SCI is within SCAB, which is classified as a severe nonattainment area for the 8-hour NAAQS for $O_3$, a serious nonattainment area for CO, a maintenance area for $NO_2$, a serious nonattainment area for $PM_{10}$, and a nonattainment area for $PM_{2.5}$. As discussed in Section 3.2.1.1.1, the Draft Final 2007 AQMP includes a request for redesignation to an extreme nonattainment area for the 8-hour NAAQS for $O_3$.

Stationary sources of emissions at SCI include the generators at the main power plant in Wilson Cove, as well as other SCI generators identified as emergency generators, including the Range Electronic Warfare Stimulator (REWS) power plant in the Shore Bombardment Area (SHOBA), boilers and water heaters, internal combustion engines, and gas turbine engines. Emissions estimates were obtained from the AQMD 2004-2005 Air Emissions Report (SCAQMD 2005) to establish an air quality baseline. Emissions from stationary sources on SCI are summarized in Table 3.2-2.

Emissions from the main power plant have been exempted from the SCAQMD's RECLAIM program (SCAQMD Regulation) because the source has been evaluated with respect to impacts to the SCAB and has been determined to have an insignificant impact on the air quality in the basin (SCAQMD 1997).

**Table 3.2-2: Estimated Emissions from Stationary Sources**

| Stationary Sources | Emissions, tons/year | | | | |
|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ |
| Total Permitted Emissions | 31.58 | 114.66 | 11.97 | 2.36 | 2.76 |
| Total Non-Permitted Emissions | 0.23 | 1.05 | 0.30 | 0.08 | 0.06 |
| Total | 31.81 | 115.71 | 12.27 | 2.44 | 2.82 |

Nonstationary sources operating at SCI include sources involved in military activities such as aircraft and marine vessels, and ground vehicles. Emissions from ground vehicles are not regularly inventoried, and no current estimate of ground vehicle emissions on SCI is available. Emissions associated with aircraft and marine vessels operating at SCI are included in the SIP emissions budget and are discussed below.

**State Implementation Plan: Emissions from Military Activities at San Clemente Island and Contiguous Waters and Airspace**

The SCAQMD is responsible for the development of the SIP for the SCAB. The SIP contains estimates of emissions for criteria pollutants, known as the emissions inventory. The purpose of the SIP emissions inventory is to provide input to the attainment demonstration, which documents that the emissions can be accommodated in the air basin without hindering further progress toward attainment. The SCAQMD develops its portion of the California SIP in the Air Quality Management Plan (AQMP). The AQMP is updated approximately every 3 years. The most recent approved plan is the 2003 AQMP, which contains emission forecasts for military activities at SCI and in the waters and airspace contiguous to SCI (to 3 nm, below 3000 ft Mean Sea Level [MSL]). The emission forecasts for 2006 included in the 2003 AQMP (SCAQMD 2002) and the updated 2007 AQMP are presented in Table 3.2-3. On March 13, 2002, the SCAQMD confirmed by letter to the Navy that the emissions associated with military activities at SCI and its contiguous waters were included in the update to the SIP inventory (SCAQMD 2002). Furthermore, the SCAQMD has included in the SIP a 1-percent growth factor in allowable emissions from Navy and Marine Corps activities at SCI and contiguous waters and airspace to account for future increases in operational tempo.

In addition to the SIP budget for SCI, the SCAQMD has included emissions associated with the replacement of the Amphibious Assault Vehicles (AAVs) with Expeditionary Fighting Vehicles (EFVs). The SIP budget includes emissions for Fiscal Years (FY) 2007-2008, and additional emissions for FY2009 for the EFVs.

**Table 3.2-3: SCI Emissions Included in 2007 AQMP**

| Emission Source | Emissions, tons/year | | | | |
|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ |
| Aircraft – Range Operations | 4.57 | 5.66 | 0.48 | 0.31 | 3.39 |
| Surface Ships | 17.94 | 29.05 | 10.66 | 6.13 | 1.16 |
| Ordnance | 21.20 | 0.07 | 0.01 | 0.00 | 0.26 |
| Naval Auxiliary Landing Field (NALF) Aircraft | 333.15 | 55.71 | 106.43 | 3.66 | 61.35 |
| SCI Emissions Total | **376.86** | **90.49** | **117.58** | **10.10** | **66.16** |
| EFVs | 4.51 | 9.62 | 1.44 | 0.18 | 36.20 |
| **Total** | **381.37** | **100.11** | **119.02** | **10.28** | **102.36** |

As discussed above, emissions for SCI are projected to grow by 1 percent per year starting in the year 2006.

Emission factors for greenhouse gases are not currently available for aircraft, ships, and ordnance operations. As state and Federal regulatory requirements develop in the future, the Navy may be required to quantify and address greenhouse gas emissions from military operations. The total $CO_2$-equivalent emissions in the state of California were estimated at 492 million metric tons (MT) in 2004, and total U.S. emissions were estimated at 7,074 million MT.

#### 3.2.1.2.2 Current Mitigation Measures

Equipment used within the SCI, including marine vessels, aircraft, ground vehicles, and other equipment, are properly maintained in accordance with applicable Navy and Marine Corps requirements, this reducing potential impacts to air quality. Operating equipment meets Federal emission standards, where applicable.

## 3.2.2 Environmental Consequences

### 3.2.2.1 Approach to Analysis

The evaluation of potential air quality impacts includes two separate analyses. Effects of air pollutant emissions from SOCAL Range Complex operations occurring within U.S. Territory (i.e., within 12 nm of the coastline) are assessed under NEPA. Effects of air pollutant emissions from SOCAL range operations occurring outside U.S. Territory are assessed under Executive Order (EO) 12114. For the purposes of assessing air quality effects under NEPA, all operations involving the use of aircraft, vessels, and ground equipment at or below 3,000 ft (914 m) in those areas within U.S. territorial waters were included in the emissions estimates. This includes all operations on SCI. For the purposes of assessing air quality effects under EO 12114, only those aircraft, vessels, and missiles/targets operations occurring at or below 3,000 ft (914 m) and outside of U.S. territorial waters were considered in the evaluation.

The NEPA analysis involves estimating emissions generated from the proposed activities and assessing potential impacts on air quality, including an evaluation of potential exposures to toxic air pollutant emissions. Trace amounts of air toxics emissions would be generated from combustion sources and use of ordnance. Air toxics emissions include hazardous air pollutants not covered under the ambient air quality standards. Potential hazardous air pollutant sources are associated with missile and target operations and include rocket motor exhaust and unspent missile fuel vapors. These emissions would be minor and would not result in adverse impacts due to the distance from sensitive receptors that could be affected by air toxics and the negligible levels of emissions.

The NEPA analysis includes a CAA General Conformity Analysis in order to make an applicability determination pursuant to the General Conformity Rule (40 C.F.R. § 93[B]), by focusing on operations that could potentially impact nonattainment areas within the Region of Influence (ROI). As noted, the EIS Study Area lies partially within two air basins. The SCAB and SDAB have different SIP requirements. In evaluating conformity with the respective SIP components for each air basin, emissions were allocated between the SCAB and SDAB, based on the location of the emission within the SOCAL Range Complex. The CAA Conformity Applicability Analysis is presented in Section 3.2.3 and includes an analysis of the applicability of the General Conformity Rule.

The EO-compliant analysis involves estimating emissions generated from the proposed activities and assessing potential impacts on air quality outside U.S. Territory. The General Conformity Rule does not apply since the CAA is not applicable to actions outside the United States.

The data for the air quality analysis is based, wherever possible, on parametric information from the Southern California Offshore Range (SCORE) records and data files. The primary source is the SCORE Participants data as supplemented by additional range data and interviews with Subject Matter Experts (SMEs) on military operations. These data were used to estimate numbers and types of aircraft, surface ships and vessels, submarines, and ordnance that would be involved in each alternative. Each of these constitutes a potential source of air emissions. The approach used to characterize emissions from each of the emission source categories is summarized below. An itemized list of emission sources and summary of the approach used to prepare emissions estimates for the No Action Alternative (baseline), Alternative 1, and Alternative 2 are presented below.

**Aircraft Operations**

The methodology for estimating aircraft emissions involves evaluating the type of operations for each type of aircraft, the number of hours of operation for each aircraft type, the type of engine in each aircraft, and the mode of operation for each type of aircraft engine. Emissions occurring or

that would occur above 3,000 ft (915 m) were considered to be above the atmospheric inversion layer and therefore without impact on the local air quality. Aircraft flights, for the most part originate from onshore air stations, but some are from aircraft carriers offshore. It was assumed that all aircraft would be traveling from their home base to the SOCAL OPAREAs at an elevation above 3,000 ft (915 m), and that transit to the range would therefore not affect local air quality. Flights originating from the SCI Naval Auxiliary Landing Field (NALF) Airfield were assumed to be accounted for in the NALF Airfield Operations.

The types of aircraft and numbers of sorties for the No Action Alternative are derived from the Participants tables in the SCORE Participants data. For Alternatives 1 and 2, operational estimates of future aircraft use percentages were obtained based on evolutionary changes in the Navy force structure and mission assignments. Where there were no major changes in types of aircraft, future operations estimates were based on the percentage distribution of baseline operations. For operations where specific aircraft were not designated (i.e., where "other" aircraft were indicated), the SH-2 was used to represent rotary-wing aircraft and the F/A-18 was used to represent fixed-wing aircraft.

Time on range for the No Action Alternative was based on calculations of average times derived from range records. To estimate times on range for each aircraft operation in Alternatives 1 and 2, an average time was extrapolated from the data during the baseline year. Estimated altitudes of operations for all aircraft were obtained from SMEs (aircrew members) in operational squadrons. Helicopters, including the SH-60, CH-46, CH-53, and UH-1, were assumed to operate below 3,000 ft (915 m) elevation during their time in the SOCAL OPAREAs while participating in operations. To estimate times in the various air quality zones of interest, the locations of representative operations were analyzed, and their paths plotted. Time in the individual areas was then estimated based upon operational maneuvers and routine flight path analysis.

SCI NALF Airfield operations include emissions from aircraft takeoffs and landings at the airfield, emissions from stationary sources, and emissions from ground vehicles and ground support equipment (GSE). Emissions from stationary sources and ground support equipment were assumed to be the same for all alternatives. Emissions from NALF operations were calculated based on the numbers of operations projected for each type of aircraft at the NALF on an annual basis.

Emissions were estimated based on times in mode, using the Navy's Aircraft Emission Support Office (AESO) Memorandum Reports for individual aircraft categories (Aircraft Emission Estimates: Landing and Takeoff Cycle and Maintenance Testing, and Aircraft Emission Estimates: Mission Operations, AESO 1998a, 1998b, 1999a-1999q, 2000a-2000e). For aircraft for which AESO emission factors were not available (such as the Learjet aircraft), emission factors were obtained from the Federal Aviation Administration's (FAA) Emission and Dispersion Modeling System (EDMS), which is the FAA's approved model for military airfield and civilian airport operations (FAA 2005).

### Surface Ship Operations

Naval vessel traffic in the SOCAL OPAREAs is composed of military ship and boat traffic, including support vessels providing services for military training exercises and tests. A number of nonmilitary commercial vessels and recreational vessels are also regularly present within the SOCAL OPAREAs. These vessels were not evaluated in the air quality analysis as they are not part of the Navy's action. The methodology for estimating marine vessel emissions involves evaluating the type of operation for each type of vessel, the number of hours of operation for each vessel type, the type of propulsion engine in each vessel, and the type of generator used onboard each type of vessel.

The types of surface ships and numbers of operations for the No Action Alternative are derived from the SCORE Participants data. For Alternatives 1 and 2, operational estimates of future ship use percentages were obtained based on evolutionary changes in the Navy force structure and mission assignments. Where there were no major changes in types of ships, future operations estimates were based on the percentage distribution of historical operations.

For surface ships, times for each operation were estimated by taking an average over the total number of operations for each type of training, as recorded by SCORE. Detailed estimates of operations for baseline operations and for future operations were obtained based on discussions with Fleet SMEs.

To estimate times in the various air quality zones of interest, the locations of representative operations were analyzed, and their paths plotted. Time in the individual areas was then estimated based upon operational maneuvers. The resultant information provided an estimate for baseline and future operations of Navy vessels with respect to time operating on the range and the percentage of the time spent in each part of the SOCAL OPAREAs. In addition, information provided by Fleet participants was used to develop a breakdown of time spent at each power level used during range operations in which marine vessels participated.

Emission factors for marine vessels were then obtained from the database developed for Naval Sea Systems Command (NAVSEA) by JJMA Consultants (JJMA 2001). Emission factors were provided for each marine vessel type and operational mode (i.e., power level). The resulting calculations provided information regarding the time spent at each power level in each part of the SOCAL OPAREAs, emission factors for that power level (in pounds [lb] of pollutant per hour), and total emissions for each marine vessel for each operational type and mode.

#### Submarine Operations

All tactical submarines in the U.S. Fleet are nuclear powered. Since no U.S. submarines burn fossil fuel, it was assumed that they would have no airborne emissions associated with their operations.

#### Naval Gunfire and Missile Ordnance

Ordnance emissions emanate from naval gunfire, missiles, bombs, and other types of ordnance used in the various operations. To estimate emissions from use of ordnance, the number and type of each type of ordnance was totaled for each of the operations. Ordnance was classified by category and type. Where available, emission factors were derived from the Navy's Ordnance Data for Toxic Hazards Associated with Pyrotechnic Items (NAVSEA SW050-AC-ORD-010, NAVAIR 11-15-8) (DoN 1996). Where emission factors for specific types of ordnance were not available from this reference, USEPA's AP-42 emission factor database was used, with assumptions regarding the type of ordnance (USEPA 2006). Ordnance emissions were assumed to occur within U.S. Territory.

#### Ground Vehicles and Ground Support Equipment

Some ground vehicles participate in operations at SCI. Ground vehicle emissions were estimated based on emission factors provided by the Navy and U.S. Marine Corps (USMC) for their vehicles. Where emission factors were not available (for the Fast Attack Vehicles [FAVs]), emissions were estimated based on CARB emission factors 2007 data for light duty, diesel-powered trucks (CARB 2007b). To estimate emissions for FAVs, it was assumed that each vehicle would operate with four starts per day and would travel 5 miles (mi.) (8 kilometers [km]) per trip at an average speed of 25 mi. per hour (40 km per hour).

#### SOCAL Range Complex Enhancements

The Navy has identified specific investments and recommendations to optimize range capabilities required to adequately support training for all missions and roles assigned to the SOCAL Range

Complex under the Proposed Action. These enhancements include installation of the Shallow Water Training Range (SWTR). Potential emissions associated with SWTR construction are addressed in Section 3.2.2.4.3, below in the context of Alternative 2.

#### 3.2.2.2 No Action Alternative

Under the No Action Alternative, there would be no increase in operations from baseline activities. The emissions levels would remain constant for those emission sources that are not affected by other Federal, state, or local requirements to reduce air emissions. Emissions associated with motor vehicles may decrease due to the implementation of Federal and California CAA requirements to reduce tailpipe emissions; however, motor vehicles do not constitute a large source of emissions in the SOCAL Range Complex.

Emissions for the No Action Alternative reflect baseline levels that are currently occurring in the SOCAL Range Complex. Emissions occurring in the offshore areas may be transported onshore and may affect the existing air basins. The impact of emissions occurring offshore is, however, small in comparison with onshore emission sources given the distance transported and the dispersion that occurs during transport. Any impacts are reflected in current background emissions in the affected air basins. Impacts for the No Action Alternative would not be different from the baseline impacts.

##### 3.2.2.2.1 SOCAL Operating Areas

The total air emissions associated with the No Action Alternative are presented in Table 3.2-4 for emissions within the SOCAL OPAREAs. Table 3.2-4 presents a breakdown of emissions in the SOCAL OPAREAs subject to NEPA (within U.S. Territory) versus those subject to EO 12114 (outside U.S. Territory). Emissions were further segregated into those emissions occurring within 12 nm (22.2 km) of SCI and those emissions occurring within 12 nm (22.2 km) of the mainland (San Diego County). There is no increase in emissions above the baseline within U.S. Territory under the No Action Alternative.

The portion of the emissions occurring within 3 nm of SCI have been accounted for in the 2007 AQMP and are consistent with the SIP emissions budget for the SCAB as discussed in Section 3.2.1.2.1.

**Table 3.2-4: Annual Air Emissions within SOCAL OPAREAs for No Action Alternative**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| **Within U.S. Territory – SCI** | | | | | | |
| Aircraft Operations | 5.04 | 7.28 | 0.51 | 0.40 | 4.68 | 4.63 |
| Marine Vessel Operations | 65.01 | 45.42 | 7.92 | 22.52 | 3.55 | 3.51 |
| Ordnance | 25.12 | 1.15 | 0.00 | 0.01 | 2.66 | 1.89 |
| **Total** | **95.17** | **53.85** | **8.43** | **22.93** | **10.89** | **10.03** |
| **Within U.S. Territory – San Diego County** | | | | | | |
| Aircraft Operations | 3.75 | 5.22 | 0.42 | 0.28 | 1.92 | 1.90 |
| Marine Vessel Operations | 204.57 | 511.55 | 21.22 | 224.04 | 29.72 | 29.42 |
| Ordnance | 0.09 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total** | **208.41** | **516.78** | **21.64** | **224.32** | **31.64** | **31.32** |
| **Outside U.S. Territory – Offshore San Diego Air Basin** | | | | | | |
| Aircraft Operations | 16.45 | 40.16 | 1.85 | 1.81 | 23.16 | 22.93 |
| Marine Vessel Operations | 583.20 | 437.81 | 50.56 | 281.98 | 43.31 | 42.87 |
| **Total** | **599.65** | **477.97** | **52.41** | **283.79** | **66.47** | **65.8** |
| **Outside U.S. Territory – Offshore Mexico** | | | | | | |
| Aircraft Operations | 2.41 | 1.94 | 0.45 | 0.10 | 1.15 | 1.14 |
| Marine Vessel Operations | 43.84 | 28.03 | 3.95 | 11.12 | 1.77 | 1.75 |
| **Total** | **46.25** | **29.97** | **4.40** | **11.22** | **2.92** | **2.89** |

#### 3.2.2.2.2 San Clemente Island

The total air emissions on SCI associated with the No Action Alternative are presented in Table 3.2-5. For the purpose of this analysis, all ground vehicle operations and all NALF operations would occur on SCI. There is no increase in emissions above the baseline on SCI under the No Action Alternative.

Emissions occurring on SCI have been accounted for in the 2007 AQMP and are consistent with the SIP emissions budget for the SCAB as discussed in Section 3.2.1.2.1.

**Table 3.2-5: Annual Air Emissions on SCI for No Action Alternative**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| NALF Operations | 132.86 | 37.97 | 33.63 | 1.89 | 28.11 | 27.83 |
| Ground Vehicle Operations | 0.10 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 |
| **Total** | **132.96** | **37.99** | **33.64** | **1.89** | **28.11** | **27.83** |

### 3.2.2.3 Alternative 1

To assess the potential for air quality impacts resulting from emissions that would result from increases in operations on the SOCAL Range Complex, impacts onshore in the nonattainment air basins should be addressed. The offshore area in which most of the SOCAL Range Complex operations occur is considered unclassifiable/attainment under U.S. EPA NAAQS. Direct impacts to the offshore areas would therefore be compared with Prevention of Significant Deterioration (PSD) major source thresholds, as onshore areas that are unclassifiable/attainment areas regulated under PSD requirements. The PSD major source thresholds are 250 tons per year.

Emissions from the offshore coastal areas also have the potential to affect air quality on shore. Over the last decade, CARB has done a series of technical assessments of transport relationships between air basins in California. The assessments identify transport couples consisting of an upwind and a downwind area. CARB also characterizes the contribution of transported pollutants as overwhelming, significant, or inconsequential. The influence of transport on a downwind area can vary widely day by day, depending mostly on the weather. As a result, a transport couple can have multiple characterizations. CARB approved the initial assessment in 1990, and updated the assessment in 1993, 1996, and 2001. Transport from the SCAB to the SDAB has been identified as a transport couple by the CARB (CARB 2004).

The CARB and the SCAQMD have determined that emissions occurring at SCI do not affect the SCAB attainment status, and thus have exempted stationary and mobile sources at SCI from AQMP control measures designed to reduce emissions from sources operating solely on SCI. For example, the SCAQMD, in its Environmental Assessment of the RECLAIM Rule, states that "the associated impacts from the emission increases on SCI would not be transported to the South Coast Air Basin." (SCAQMD 1995).

It has been established through the Southern California Ozone Study (CARB 1997) that transport from the South Coast Air Basin to the San Diego Air Basin contributes to pollutant concentrations in the SDAB. General meteorological trends indicate that pollutants are transported southeasterly rather than to the northeast; hence emissions occurring in offshore areas would not be expected to contribute to pollutant concentrations in the SCAB. Thus emissions would be transported from the SOCAL OPAREAs to those air basins to the east and south. This would include the SDAB and Mexico.

As shown in Chapter 1, the SOCAL OPAREAs are mainly located to the west of the SDAB and Mexico. The only portions of the SOCAL OPAREAs directly offshore of the SDAB are the San Pedro Channel Operating Area (SPCOA) and Camp Pendleton Amphibious Assault Area (CPAAA). Based on the location of SOCAL OPAREAs, emissions occurring within the areas to the west of the SDAB would most likely contribute to pollutant concentrations onshore in the SDAB, with some transport south to Mexico. Emissions occurring on SCI, within the San Clemente Island Range Complex (SCIRC), offshore of Marine Corps Base (MCB) Camp Pendleton and Silver Strand Training Complex (SSTC), in the northern portion of W-291, Northern Air Operating Area (NAOPA), Advance Research Projects Agency (ARPA), Encinitas Naval Electronic Test Area (ENETA), and potentially those emissions occurring within the Western San Clemente Operating Area (WSCOA) would have the potential to affect air quality in the SDAB. Emissions occurring within the southern portion of W-291, including the Papa areas, Fleet Training Area (FLETA) HOT, and Missile Range (MISR) areas would have the potential to affect air quality in Mexico.

The *de minimis* threshold for conformity for the SDAB is 100 tons per year for ozone precursors $NO_x$ and ROG, and maintenance pollutant CO. The *de minimis* thresholds have been set forth to identify emission levels above which a proposed action has the potential to adversely affect the air basin. Accordingly, to evaluate whether the offshore operations have the potential to adversely affect the SDAB, the 100-ton-per-year threshold was used as a screening threshold. The major source threshold for the Federal Operating Permits requirement is also 100 tons per year for all pollutants. This threshold was also applied to the onshore areas of Mexico for conservative purposes.

#### 3.2.2.3.1 SOCAL Operating Areas

The total air emissions associated with Alternative 1 are presented in Table 3.2-6 for emissions within the SOCAL OPAREAs. Table 3.2-6 presents a breakdown of emissions in the SOCAL OPAREAs subject to NEPA (within U.S. Territory) versus those subject to EO 12114 (outside

U.S. Territory). Emissions within U.S. Territory were further segregated into those emissions occurring within 12 nm (66.6 km) of SCI and those emissions occurring within 12 nm (66.6 km) of the mainland coast of San Diego County. The table also breaks down those emissions occurring in the area offshore of the SDAB and the area offshore of Mexico.

#### 3.2.2.3.2 San Clemente Island

The total air emissions associated with Alternative 1 are presented in Table 3.2-7 for emissions occurring on SCI. For the purpose of this analysis, all ground vehicle operations and all NALF operations would occur on SCI.

As a conservative assumption, all of the emissions occurring on SCI, the emissions occurring within 12 nm from the mainland coast of San Diego County, and emissions occurring offshore of the SDAB could have the potential to affect the air quality in the SDAB. Table 3.2-8 presents a summary of the air emissions under Alternative 1 that would have the potential for transport onshore to affect air quality in the SDAB, and a summary of those emissions that would have the potential to be transported onshore to Mexico. The total emission increases that have the potential to affect the SDAB are above the screening threshold of 100 tons per year for CO and $NO_x$ assuming that all of the emissions would be transported from offshore areas onshore to affect the air basin.

It is unlikely that all of the emissions occurring on an annual basis would be transported onshore into one air basin. While prevailing winds in the area are generally from the west, emissions may be transported in any direction. Regardless, should emissions travel to the shore; emissions would be dispersed and would not affect a single location. Thus while emission increases above baseline would be above the screening thresholds for those emissions that have the potential to affect the SDAB, emissions occurring within the SOCAL Range Complex would not be anticipated to result in an adverse impact on the air quality in the SDAB or Mexico.

As discussed in Section 3.2.1.2.1, Existing Conditions, emission factors for greenhouse gases are not currently available for aircraft, ships, and ordnance operations. The total $CO_2$-equivalent emissions in the state of California were estimated at 492 million MT in 2004, and total U.S. emissions were estimated at 7,074 million MT. The contribution of Alternative 1 operations would be small in comparison with both the California and U.S. emission estimates and would not be anticipated to contribute substantially to global climate change.

**Table 3.2-6: Annual Air Emissions within SOCAL OPAREAs for Alternative 1**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| **Within U.S. Territory – SCI Offshore** | | | | | | |
| Aircraft Operations | 19.76 | 22.29 | 1.85 | 1.31 | 13.75 | 13.61 |
| Marine Vessel Operations | 72.65 | 56.36 | 10.51 | 29.48 | 9.78 | 9.68 |
| Ordnance | 39.66 | 1.97 | 0.00 | 0.02 | 3.37 | 2.36 |
| **Total** | **132.07** | **80.62** | **12.36** | **30.81** | **26.90** | **25.65** |
| **Net Increase over Baseline** | **36.90** | **26.77** | **3.93** | **7.88** | **16.01** | **15.62** |
| **Within U.S. Territory – San Diego County** | | | | | | |
| Aircraft Operations | 4.17 | 5.83 | 0.47 | 0.31 | 2.11 | 2.09 |
| Marine Vessel Operations | 229.65 | 560.54 | 29.67 | 224.80 | 32.08 | 31.76 |
| Ordnance | 0.09 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total** | **233.91** | **566.38** | **30.14** | **225.11** | **34.19** | **33.85** |
| **Net Increase over Baseline** | **25.50** | **49.60** | **8.50** | **0.79** | **2.55** | **2.53** |
| **Outside U.S. Territory – Offshore San Diego Air Basin** | | | | | | |
| Aircraft Operations | 28.69 | 55.15 | 2.93 | 2.69 | 32.66 | 32.33 |
| Marine Vessel Operations | 636.96 | 492.10 | 57.58 | 310.73 | 74.35 | 73.61 |
| **Total** | **665.65** | **547.25** | **60.51** | **313.42** | **107.01** | **105.94** |
| **Net Increase over Baseline** | **66.00** | **69.28** | **8.1** | **29.63** | **40.54** | **40.14** |
| **Outside U.S. Territory – Offshore Mexico** | | | | | | |
| Aircraft Operations | 3.18 | 2.15 | 0.60 | 0.12 | 1.30 | 1.29 |
| Marine Vessel Operations | 49.73 | 32.19 | 4.50 | 13.14 | 2.11 | 2.09 |
| **Total** | **52.91** | **34.34** | **5.10** | **13.26** | **3.41** | **3.38** |
| **Net Increase over Baseline** | **6.66** | **4.37** | **0.70** | **2.04** | **0.49** | **0.49** |

**Table 3.2-7: Annual Air Emissions on SCI for Alternative 1**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| NALF Operations | 153.67 | 47.18 | 35.98 | 2.30 | 29.14 | 28.85 |
| Ground Vehicle Operations | 0.19 | 0.21 | 0.02 | 0.00 | 0.01 | 0.01 |
| **Total** | **153.86** | **47.39** | **36.00** | **2.30** | **29.15** | **28.86** |
| **Net Increase over Baseline** | **20.90** | **9.40** | **2.36** | **0.41** | **1.04** | **1.03** |

**Table 3.2-8: Total Annual Air Emissions, Alternative 1**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| **Emissions with the Potential to Affect the San Diego Air Basin** | | | | | | |
| Within U.S. Territory – SCI Offshore | 132.07 | 80.62 | 12.36 | 30.81 | 26.90 | 25.65 |
| Within U.S. Territory – San Diego County | 233.91 | 566.38 | 30.14 | 225.11 | 34.19 | 33.85 |
| Offshore | 665.65 | 547.25 | 60.51 | 313.42 | 107.01 | 105.94 |
| San Clemente Island | 153.86 | 47.39 | 36.00 | 2.30 | 29.15 | 28.86 |
| **Total** | **1185.49** | **1241.64** | **139.01** | **571.64** | **197.25** | **194.3** |
| **Net Increase over Baseline** | **135.06** | **150.02** | **21.23** | **40.34** | **59.59** | **58.78** |
| **Emissions with the Potential to Affect Mexico** | | | | | | |
| Offshore | 52.91 | 34.34 | 5.10 | 13.26 | 3.41 | 3.38 |
| **Total** | **52.91** | **34.34** | **5.10** | **13.26** | **3.41** | **3.38** |
| **Net Increase over Baseline** | **6.66** | **4.37** | **0.70** | **2.04** | **0.49** | **0.49** |

#### 3.2.2.4 Alternative 2

To evaluate the potential for air quality impacts resulting from emission increases associated with increased operations under Alternative 2, the same thresholds were used as for Alternative 1.

##### 3.2.2.4.1 SOCAL Operating Areas

The total air emissions associated with Alternative 2 are presented in Table 3.2-9 for emissions within the SOCAL OPAREAs. Table 3.2-9 presents a breakdown of emissions in the SOCAL OPAREAs subject to NEPA (within U.S. Territory) and those subject to EO 12114 (outside U.S. Territory). Emissions within U.S. Territory were further segregated into those emissions occurring within 12 nm (66.6 km) of SCI and those emissions occurring within 12 nm (66.6 km) of the mainland coast of San Diego County. The table also breaks down those emissions occurring in the area offshore of the SDAB and the area offshore of Mexico.

##### 3.2.2.4.2 San Clemente Island

The total air emissions associated with Alternative 2 are presented in Table 3.2-10 for emissions occurring on SCI. For the purpose of this analysis, all ground vehicle operations and all NALF operations would occur on SCI. Net emissions are below the screening thresholds for all pollutants.

Table 3.2-11 presents a summary of the total air emissions under Alternative 2 that would have the potential for transport onshore to affect air quality in the SDAB, and a summary of those emissions that would have the potential to be transported onshore to Mexico. The total emission increases that have the potential to affect the SDAB are above the screening threshold of 100 tons

per year for CO and $NO_x$ assuming that all of the emissions would be transported from offshore areas onshore to affect the air basin.

**Table 3.2-9: Annual Air Emissions within SOCAL OPAREAs for Alternative 2**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| **Within U.S. Territory – SCI Offshore** | | | | | | |
| Aircraft Operations | 21.95 | 24.46 | 2.08 | 1.43 | 14.81 | 14.66 |
| Marine Vessel Operations | 83.45 | 64.95 | 12.64 | 34.86 | 13.02 | 12.89 |
| Ordnance | 48.26 | 2.59 | 0.00 | 0.02 | 4.44 | 3.11 |
| **Total** | **153.66** | **92** | **14.72** | **36.31** | **32.27** | **30.66** |
| **Net Increase over Baseline** | **58.49** | **38.15** | **6.29** | **13.38** | **21.38** | **20.63** |
| **Within U.S. Territory – San Diego County** | | | | | | |
| Aircraft Operations | 4.31 | 6.00 | 0.49 | 0.32 | 2.16 | 2.14 |
| Marine Vessel Operations | 231.42 | 564.12 | 30.29 | 224.86 | 32.36 | 32.04 |
| Ordnance | 0.09 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total** | **235.82** | **570.13** | **30.78** | **225.18** | **34.52** | **34.18** |
| **Net Increase over Baseline** | **27.41** | **53.35** | **9.14** | **0.86** | **2.88** | **2.86** |
| **Outside U.S. Territory – Offshore San Diego Air Basin** | | | | | | |
| Aircraft Operations | 29.40 | 57.41 | 3.04 | 2.79 | 33.91 | 33.57 |
| Marine Vessel Operations | 670.52 | 521.13 | 62.50 | 328.43 | 90.70 | 89.79 |
| **Total** | **699.92** | **578.54** | **65.54** | **331.22** | **124.61** | **123.36** |
| **Net Increase over Baseline** | **100.27** | **100.57** | **13.13** | **47.43** | **58.14** | **57.56** |
| **Outside U.S. Territory – Offshore Mexico** | | | | | | |
| Aircraft Operations | 3.25 | 2.82 | 0.61 | 0.15 | 1.66 | 1.64 |
| Marine Vessel Operations | 55.85 | 35.60 | 5.03 | 14.24 | 2.28 | 2.26 |
| **Total** | **59.10** | **38.42** | **5.64** | **14.39** | **3.94** | **3.90** |
| **Net Increase over Baseline** | **12.85** | **8.45** | **1.24** | **3.17** | **1.02** | **1.01** |

**Table 3.2-10: Annual Air Emissions on SCI for Alternative 2**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| NALF Operations | 165.78 | 54.63 | 37.75 | 2.65 | 31.72 | 31.40 |
| Ground Vehicle Operations | 0.25 | 0.36 | 0.03 | 0.00 | 0.02 | 0.02 |
| **Total** | **166.03** | **54.99** | **37.78** | **2.65** | **31.74** | **31.42** |
| **Net Increase over Baseline** | **33.07** | **17.00** | **4.14** | **0.76** | **3.63** | **3.59** |

**Table 3.2-11: Total Annual Air Emissions, Alternative 2**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| **Emissions with the Potential to Affect the San Diego Air Basin** | | | | | | |
| Within U.S. Territory – SCI Offshore | 153.66 | 92 | 14.72 | 36.31 | 32.27 | 30.66 |
| Within U.S. Territory – San Diego County | 235.82 | 570.13 | 30.78 | 225.18 | 34.52 | 34.18 |
| Offshore | 699.92 | 578.54 | 65.54 | 331.22 | 124.61 | 123.36 |
| San Clemente Island | 166.03 | 54.99 | 37.78 | 2.65 | 31.74 | 31.42 |
| **Total** | **1255.43** | **1295.66** | **148.82** | **595.36** | **223.14** | **219.62** |
| **Net Increase over Baseline** | **199.02** | **200.52** | **29.8** | **64.84** | **83.42** | **82.06** |
| **Emissions with the Potential to Affect Mexico** | | | | | | |
| Offshore | 59.10 | 38.42 | 5.64 | 14.39 | 3.94 | 3.90 |
| **Total** | **59.10** | **38.42** | **5.64** | **14.39** | **3.94** | **3.90** |
| **Net Increase over Baseline** | **12.85** | **8.45** | **1.24** | **3.17** | **1.02** | **1.01** |

It is unlikely that all of the emissions occurring on an annual basis would be transported onshore into one air basin. While prevailing winds in the area are generally from the west, emissions may be transported in any direction. Regardless, should emissions travel to the shore, emissions would be dispersed and would not affect a single location. Thus while emission increases above baseline would be above the screening thresholds for those emissions that have the potential to affect the SDAB, emissions occurring within the SOCAL Range Complex would not be anticipated to result in an adverse impact on the air quality in the SDAB or Mexico.

As discussed in Section 3.2.1.2.1, Existing Conditions, emission factors for greenhouse gases are not currently available for aircraft, ships, and ordnance operations. The total $CO_2$-equivalent emissions in the state of California were estimated at 492 million MT in 2004, and total U.S. emissions were estimated at 7,074 million MT. The contribution of Alternative 2 operations would be small in comparison with both the California and U.S. emission estimates and would not be anticipated to contribute substantially to global climate change.

#### 3.2.2.4.3 Shallow Water Training Range

The SWTR would involve installation of underwater instrumentation in the form of undersea cables and sensor nodes. The installation activities have the potential to affect air quality, primarily due to use of cable-laying vessels and other construction activities. Installation of the SWTR instrumentation array will be done in phases determined by multiple factors, including: weather, ship availability and capacity, production schedules for nodes and cable, installation time, total environmental impact of installation, funding availability, and efficiency. For the SWTR extension, construction activities were assumed to be similar to the SOAR Refurbishment project; however, the area over which the activities would occur would involve an area of 500 $nm^2$ versus 670 $nm^2$ for the SOAR Refurbishment project. Table 3.2-12 presents a summary of temporary construction air emissions associated with the SWTR Enhancements.

**Table 3.2-12: Construction Air Emissions, SWTR Enhancements**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| **SWTR Extension – Within U.S. Territory – SCI** | | | | | | |
| Horizontal Directional Drilling | 0.65 | 4.35 | 0.12 | 0.17 | 0.13 | 0.13 |
| Trunk Cable Installation Plus Array Installation | 0.08 | 1.07 | 0.01 | 0.08 | 0.03 | 0.03 |
| Offshore Survey | 0.24 | 3.08 | 0.06 | 0.18 | 0.07 | 0.07 |
| **Total** | **0.97** | **8.50** | **0.19** | **0.44** | **0.23** | **0.23** |
| **SWTR Extension – Within U.S. Territory – Mainland** | | | | | | |
| Horizontal Directional Drilling | 0.06 | 0.36 | 0.02 | 0.02 | 0.01 | 0.01 |
| Offshore Survey | 0.17 | 2.04 | 0.02 | 0.15 | 0.05 | 0.05 |
| Trunk Cable Installation Plus Array Installation | 0.31 | 2.37 | 0.07 | 0.12 | 0.07 | 0.07 |
| **Total** | **0.54** | **4.77** | **0.10** | **0.29** | **0.13** | **0.13** |

## 3.2.3 General Conformity Evaluation

Under the provisions of 40 C.F.R. Parts 51 and 93, Federal actions are required to conform with the approved SIP for those areas that are categorized as nonattainment or maintenance areas for any criteria pollutant. The purpose of the General Conformity Rule is to demonstrate that the Proposed Action would not cause or contribute to a violation of an air quality standard, and that the project would not adversely affect the air basin's ability to attain and maintain the ambient air quality standards.

### 3.2.3.1 South Coast Air Basin Activities

The Proposed Action includes activities in the SCAB, which is classified as a severe nonattainment area for the Federal 8-hour ozone standard, a maintenance area for $NO_2$, and a nonattainment area for CO and $PM_{10}$. The provisions of the General Conformity Rule state that a Proposed Action is exempt from the requirements of a full conformity demonstration for those pollutants for which emissions increases are below the *de minimis* emissions levels specified in the applicable regulations. The SCAQMD has not yet developed and received approval for a SIP for the Federal 8-hour ozone standard; the alternatives including the Proposed Action are therefore required to demonstrate conformity with the current approved SIP, which is based on the Federal 1-hour ozone standard. In accordance with the General Conformity Rule, as adopted by the SCAQMD in Regulation XIX, Rule 1901, the *de minimis* levels for ozone precursors, $NO_2$, CO, and $PM_{10}$ are as follows:

| | |
|---|---|
| Ozone precursors ($NO_x$ and ROGs) | 25 tons (22,680 kilogram [kg]) per year |
| $NO_2$ | 100 tons (90,720 kg) per year |
| CO | 100 tons (90,720 kg) per year |
| $PM_{10}$ | 70 tons (63,504 kg) per year |

It should be noted that should the SCAB be redesignated as an extreme nonattainment area for the 8-hour NAAQS for $O_3$ as indicated in the Draft Final 2007 AQMP, the *de minimis* levels for ozone precursors $NO_x$ and ROG would be 10 tons (9,072 kg) per year.

The SCAB also has been designated a nonattainment area for $PM_{2.5}$. In accordance with EPA guidelines for the General Conformity Rule 71 Fed. Reg. 17004-17009 (April 5, 2006). The EPA has established a *de minimis* level of 100 tons per year for both direct $PM_{2.5}$ emissions and

emissions of $PM_{2.5}$ precursors. $PM_{2.5}$ precursors include $SO_2$, NOx, volatile organic compounds (VOCs), and ammonia. Emissions of ammonia associated with Navy activities would be negligible and are not quantified in this evaluation.

Table 3.2-13 provides a summary of annual air emissions within 3 nm (5.6 km) from SCI. The estimated emissions for operations on SCI and within 3 nm (6 km) of SCI were estimated for the No Action Alternative, Alternative 1, and Alternative 2. Because ground vehicle emissions were included in the overall SCAQMD SIP emissions budget for the SCAB for mobile sources, ground vehicles were not included in the total budget for SCI operations that was submitted to the SCAQMD for inclusion in the update to the AQMP. Ground vehicle emissions are therefore not included in Table 3.2-13. The net emissions increase over the baseline case was then calculated. The results are shown in Table 3.2-13. As shown in the table, the net emissions increases for CO, $NO_x$ (as $NO_2$ precursor), ROG, $PM_{10}$, $PM_{2.5}$, and $PM_{2.5}$ precursors are below the *de minimis* thresholds for requiring a full conformity determination, and are therefore exempt from further analysis.

As discussed in Section 3.2.1.2.1, the SCAQMD has included SCI emissions in their most recent update to the ozone SIP emissions inventory, including a 1 percent growth factor to accommodated estimated increases in operational tempo at SCI and in contiguous waters within 3 nm (5.6 km).

Emissions associated with the No Action Alternative and Alternative 1 would be less than the *de minimis* thresholds for all pollutants, and would therefore not require a Conformity Determination. Should the SCAB be redesignated as an extreme nonattainment area for the 8-hour NAAQS for $O_3$, emissions of ROG would still be below the *de minimis* threshold of 10 tons per year. Emissions of $NO_x$ would, however, be above the *de minimis* threshold of 10 tons per year for Alternative 1.

As shown in Table 3.2-13, $NO_x$ emissions increases associated with Alternative 2 would likely be greater than the *de minimis* emission levels set by regulations, regardless of the designation of the SCAB as a "severe" or "extreme" nonattainment area for $O_3$. The total $NO_x$ emissions for the SCI activities contained in the SIP emissions budget, including emissions from the EFVs, is 100.11 tons (90,818 kg) per year for 2006, with a 1-percent increase for each subsequent year. Under Alternative 2, while $NO_x$ emissions would be above the *de minimis* thresholds, they would be within the SIP emissions budget. Also, should the SCAB be redesignated as an extreme nonattainment area for the 8-hour NAAQS for $O_3$, emissions under Alternative 1 would also be within the SIP emissions budget. The proposed action under both Alternatives 1 and 2 would therefore conform to the SIP.

**Table 3.2-13: Annual Air Emissions within 3 nm from SCI**

| Emission Source | Emissions, tons/year | | | | | |
|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | $PM_{10}$ | $PM_{2.5}$ |
| **No Action Alternative** | | | | | | |
| Aircraft Operations | 1.13 | 1.76 | 0.12 | 0.10 | 1.14 | 1.13 |
| Marine Vessels | 8.69 | 12.84 | 3.22 | 7.22 | 1.16 | 1.15 |
| Ordnance | 25.12 | 1.15 | 0.00 | 0.01 | 2.66 | 1.89 |
| NALF Operations | 132.86 | 37.97 | 33.63 | 1.89 | 28.11 | 27.83 |
| **Total** | **167.80** | **53.72** | **36.97** | **9.22** | **33.07** | **32.00** |
| **Alternative 1** | | | | | | |
| Aircraft Operations | 9.11 | 9.73 | 0.85 | 0.57 | 5.61 | 5.55 |
| Marine Vessels | 10.90 | 17.35 | 4.88 | 10.34 | 4.13 | 4.09 |
| Ordnance | 39.66 | 1.97 | 0.00 | 0.02 | 3.37 | 2.36 |
| NALF Operations | 153.67 | 47.18 | 35.98 | 2.30 | 29.14 | 28.85 |
| **Total** | **213.34** | **76.23** | **41.71** | **13.23** | **42.25** | **40.85** |
| **Alternative 2** | | | | | | |
| Aircraft Operations | 11.10 | 11.63 | 1.06 | 0.68 | 6.50 | 6.44 |
| Marine Vessels | 12.09 | 19.82 | 5.99 | 12.03 | 5.51 | 5.45 |
| Ordnance | 48.26 | 2.59 | 0.00 | 0.02 | 4.44 | 3.11 |
| NALF Operations | 165.78 | 54.63 | 37.75 | 2.65 | 31.72 | 31.40 |
| **Total** | **237.23** | **88.67** | **44.80** | **15.38** | **48.17** | **46.40** |
| **Increase over Baseline** | | | | | | |
| Alternative 1 | **45.54** | **22.51** | **4.74** | **4.01** | **9.18** | **8.85** |
| Alternative 2 | **69.43** | **34.95** | **7.83** | **6.16** | **15.1** | **14.4** |
| ***De minimis* limits** | **100** | **25[a]/100[b]** | **25[a]/100[b]** | **100[b]** | **70** | **100** |
| **SCAQMD SIP Budget** | **381.37** | **100.11** | **119.02** | **10.28** | **102.36** | **101.34[c]** |

[a]De minimis threshold for $NO_x$ and ROGs would be 10 tons per year should the SCAB be redesignated to an extreme nonattainment are for the 8-hour NAAQS for $O_3$.
[b]As $NO_2$ (for $NO_x$) and $PM_{2.5}$ precursor.
[c]Assuming $PM_{10}$ is composed of 99% $PM_{2.5}$.

### 3.2.3.2 San Diego Air Basin Activities

The SOCAL Range Complex also includes activities that occur in the SDAB, which is classified as a basic nonattainment area for the federal 8-hour ozone standard, and a maintenance area for CO. In accordance with the General Conformity Rule, as adopted by the San Diego Air Pollution Control District (SDAPCD) in its Regulation XV, of which Rule 1501 applies to Federal Actions, the *de minimis* levels for ozone precursors (based on the current approved SIP) and CO are as follows:

| | |
|---|---|
| Ozone precursors ($NO_x$ and ROGs) | 100 tons (90,720 kg) per year |
| CO | 100 tons (90,720 kg) per year |

The estimated emissions for operations within 3 nm (5.6 km) of the San Diego mainland coast were estimated for the No Action Alternative, Alternative 1, and Alternative 2. The net emissions increase over the baseline case was then calculated. The results are shown in Table 3.2-14. As shown in the table, the net emissions for CO, $NO_x$, and ROG are below the *de minimis* thresholds for requiring a full conformity determination, and are therefore exempt from further analysis.

**Table 3.2-14: Annual Air Emissions within 3 nm from the San Diego Air Basin**

| Emission Source | Emissions, tons/year | | |
|---|---|---|---|
| | CO | NOx | ROG |
| **No Action Alternative** | | | |
| Aircraft Operations | 2.60 | 3.59 | 0.30 |
| Marine Vessels | 104.07 | 234.73 | 12.64 |
| Ordnance | 0.09 | 0.01 | 0.00 |
| **Total** | **106.76** | **238.33** | **12.94** |
| **Alternative 1** | | | |
| Aircraft Operations | 2.91 | 4.03 | 0.34 |
| Marine Vessels | 106.77 | 236.91 | 13.36 |
| Ordnance | 0.09 | 0.01 | 0.00 |
| **Total** | **109.77** | **240.95** | **13.7** |
| **Alternative 2** | | | |
| Aircraft Operations | 3.02 | 4.16 | 0.35 |
| Marine Vessels | 107.27 | 237.93 | 13.54 |
| Ordnance | 0.09 | 0.01 | 0.00 |
| **Total** | **110.38** | **242.1** | **13.89** |
| **Increase over Baseline** | | | |
| Alternative 1 | **3.01** | **2.62** | **0.76** |
| Alternative 2 | **3.62** | **3.77** | **0.95** |
| ***De minimis* limits** | **100** | **100** | **100** |

#### 3.2.3.3 Hazardous Air Pollutants

As discussed above, the USEPA has listed 188 substances that are regulated under Section 112 of the Clean Air Act, and the state of California has identified additional substances that are regulated under state and local air toxics rules. HAPs are emitted from a variety of processes that are associated with SOCAL Range Complex activities, including combustion sources and ordnance use. Trace amount of HAPs are emitted from sources participating in range activities, including aircraft, marine vessels, ground vehicles, ground support equipment, and ordnance. The amounts that would be emitted are small in comparison with the emissions of criteria pollutants; emission factors for most HAPs from combustion sources are roughly three or more orders of magnitude lower than emission factors for criteria pollutants (CARB 2007c). Emissions of HAPs from ordnance use are smaller still, with emission factors ranging from roughly $10^{-5}$ to $10^{-15}$ lb of individual HAP per item for cartridges to $10^{-4}$ to $10^{-13}$ lb of individual HAPs per item for mines and smoke pots (USEPA 2006).

Emissions of HAPs would occur over the entire range and would be subject to deposition on the water and dispersion due to wind mixing and other dissipation factors. Because the majority of activities occur offshore where no sensitive receptors (i.e., residents, schools, hospitals, etc.) are located, and onshore activities within SCI occur within a restricted area, no health effects would be anticipated from emissions of HAPs.

### 3.2.4 Mitigation Measures

As noted above in Sections 3.2.1.1.2 and 3.2.1.2.2, the equipment used by military organizations within the SOCAL Range Complex, including ships and other marine vessels, aircraft, and other equipment, are properly maintained in accordance with applicable Navy and Marine Corps requirements. Operating equipment meets Federal and state emission standards, where applicable.

Because potential air quality impacts would not exceed regulatory thresholds, no mitigation measures are required beyond the Navy's current Standard Operating Procedures (SOPs) and Best Management Practices (BMPs) to reduce air emissions to the extent possible.

### 3.2.5 Unavoidable Adverse Environmental Effects

Increases in levels of operational activity in the SOCAL OPAREAs would impact air quality and would contribute air pollutant emissions to the San Diego, South Coast, and Mexico air basins. Emissions associated with operations that are under the jurisdiction of the SCAQMD have been accommodated in the SIP for the SCAB. As the purpose of the SIP is to demonstrate that air quality standards would not be exceeded, the emissions occurring within the jurisdiction of the SCAQMD would not result in an exceedance of the air quality standards within the SCAB. Operational activities within the SOCAL OPAREAs would also contribute emissions to the air in the SDAB and the onshore areas of Mexico. The net emissions are within the major source thresholds and *de minimis* thresholds for air pollutants within the affected air basins and would not be anticipated to cause an exceedance of an air quality standard.

### 3.2.6 Summary of Effects by Alternative

As shown in Table 3.2-15, emissions associated with implementation of Alternatives 1 and 2 would result in increases in air emissions above baseline (No Action Alternative) conditions. Within U.S. Territory, emission increases are mainly associated with increased operations at the NALF, surface vessels, aircraft operations, and ordnance use. Outside U.S. Territory, emission increases are mainly associated with increased surface vessel operations, with additional contributions from aircraft operations. In conclusion, the reasonably foreseeable actions that could add incremental impacts to the past and present impacts to air quality, discussed in this section, are included in the analyses under the No Action Alternative, Alternative 1, and Alternative 2. All impacts that would result in increases in emissions of air pollutants are not anticipated to result in exceedances of the air quality standards as outlined below in Table 3.2-15.

**Table 3.2-15: Summary of Effects by Alternative**

| Alternative | NEPA (On-Land and U.S. Territorial Waters) | EO 12114 (Non-U.S. Territorial Waters) |
|---|---|---|
| **No Action Alternative** | • The No Action Alternative involves maintaining operations at the baseline levels. Emissions for the No Action Alternative reflect baseline levels that are currently occurring. There is no increase in emissions above the baseline within U.S. Territory under the No Action Alternative. | • The No Action Alternative involves maintaining operations at the baseline levels. Emissions for the No Action Alternative reflect baseline levels that are currently occurring. There is no increase in emissions above the baseline outside the U.S. Territory under the No Action Alternative. |
| **Alternative 1** | • Within U.S. Territory, emission increases are mainly associated with increased operations at the NALF, surface vessels, aircraft operations, and ordnance use.<br>• Emission increases over baseline for Alternative 1 that could affect the SDAB would be less than the screening thresholds of 100 tons per year for all pollutants. Emission increases would therefore not be considered major and would not result in an adverse impact on the air quality.<br>• Emission increases over baseline for Alternative 1 within 3 nm (5.6 km) of shore would be subject to the requirements of the General Conformity Rule. Emission increases for CO, SOx, $PM_{10}$, and $PM_{2.5}$ and $PM_{2.5}$ precursors within 3 nm (5.6 km) of SCI would be less than the de minimis levels for these pollutants. Emission increases within 3 nm (5.6 km) of San Diego County would be below the *de minimis* levels for all pollutants.<br>• Emission increases over baseline for NOx within 3 nm (5.6 km) of SCI for Alternative 1 are below the *de minimis* levels. The Proposed Action under Alternative 1 would therefore not be subject to a Conformity Determination under the General Conformity Rule. A Record of Non-Applicability has been prepared. Should the SCAB be redesignated as an extreme nonattainment area for the 8-hour NAAQS for $O_3$, emission increases over baseline for NOx would be above the *de minimis* levels but would be within the SCAQMD SIP emissions budget for the SCIRC. The Proposed Action under Alternative 1 would therefore conform with the SIP under the General Conformity Rule. | • Outside U.S. Territory, emission increases are mainly associated with increased surface vessel operations, with additional contributions from aircraft operations.<br>• Although Alternative 1 would result in increases in emissions of air pollutants over the No Action Alternative, all air impacts outside U.S. territorial waters would not be expected to result in an exceedance of an air quality standard.<br>• Emission increases over baseline for Alternative 1 that could affect Mexico would be less than the screening threshold. Emission increases would therefore not be considered major and would not result in an adverse impact on the air quality. |

**Table 3.2-15: Summary of Effects by Alternative (cont'd)**

| Alternative | NEPA (On-Land and U.S. Territorial Waters) | EO 12114 (Non-U.S. Territorial Waters) |
|---|---|---|
| **Alternative 2 (Preferred Alternative)** | • Impacts would be the same as described under Alternative 1 plus the following:<br>• Emissions associated with construction for the SWTR Enhancements would be less than the *de minimis* levels and would not substantially contribute to emissions during any single year. Emissions are temporary. | • Impacts would be the same as described under Alternative 1. |
| **Mitigation Measures** | • Equipment used by the Navy, including marine vessels, aircraft, ground vehicles, and other equipment, are properly maintained in accordance with applicable Navy and Marine Corps requirements. Operating equipment meets Federal emission standards, where applicable. | • Equipment used by the Navy, including marine vessels, aircraft, ground vehicles, and other equipment, are properly maintained in accordance with applicable Navy and Marine Corps requirements. Operating equipment meets Federal emission standards, where applicable. |