
3.2 Air Quality

Supplemental Environmental Impact Statement/ Overseas Environmental Impact Statement Northwest Training and Testing

TABLE OF CONTENTS

3.2	Air Quality	3.2-1
3.2.1	Introduction and Methods	3.2-1
3.2.1.1	General Conformity Evaluation	3.2-3
3.2.1.2	National Environmental Policy Act Evaluation	3.2-3
3.2.2	Affected Environment.....	3.2-5
3.2.2.1	Region of Influence	3.2-5
3.2.2.2	Climate of the Northwest Training and Testing Study Area	3.2-5
3.2.2.3	Regional Air Pollutant Sources and Emissions.....	3.2-5
3.2.2.4	Existing Air Quality.....	3.2-5
3.2.3	Environmental Consequences	3.2-8
3.2.3.1	Criteria Air Pollutants	3.2-8
3.2.3.2	Greenhouse Gases and Climate Change.....	3.2-25
3.2.3.3	Summary of Potential National Environmental Policy Act Impacts (Combined Impacts of All Stressors) on Air Quality.....	3.2-27

List of Figures

There are no figures in this section.

List of Tables

Table 3.2-1: National Ambient Air Quality Standards.....	3.2-2
Table 3.2-2: Attainment Status of Pierside and Inland Water Locations.....	3.2-7
Table 3.2-3: Estimated Annual Baseline Criteria Air Pollutant Emissions.....	3.2-9
Table 3.2-4: Estimated Annual Baseline Criteria Air Pollutant Emissions within 3 Nautical Miles.....	3.2-10
Table 3.2-5: Estimated Annual Baseline Criteria Air Pollutant Emissions Within 12 Nautical Miles	3.2-10
Table 3.2-6: Estimated Annual Baseline Criteria Air Pollutant Emissions Greater than 12 Nautical Miles.....	3.2-10
Table 3.2-7: Estimated Annual Criteria Air Pollutant Emissions from Training Under Alternative 1 ...	3.2-12
Table 3.2-8: Estimated Annual Criteria Air Pollutant Emissions from Testing Under Alternative 1	3.2-13

Table 3.2-9: Estimated Annual Criteria Air Pollutant Emissions in the Northwest Training and Testing Study Area Under Alternative 1	3.2-14
Table 3.2-10: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the Olympic Northwest Washington Intrastate (Within 3 NM) Under Alternative 1.....	3.2-15
Table 3.2-11: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the Puget Sound Intrastate (Within 3 NM) Under Alternative 1.....	3.2-16
Table 3.2-12: Estimated Annual Criteria Air Pollutant Emissions Within 12 NM Under Alternative 1.....	3.2-17
Table 3.2-13: Estimated Annual Criteria Air Pollutant Emissions Greater than 12 NM Under Alternative 1.....	3.2-17
Table 3.2-14: Estimated Annual Criteria Air Pollutant Emissions from Training Under Alternative 2	3.2-19
Table 3.2-15: Estimated Annual Criteria Air Pollutant Emissions from Testing Under Alternative 2... ..	3.2-20
Table 3.2-16: Estimated Annual Criteria Air Pollutant Emissions in the Northwest Training and Testing Study Area Under Alternative 2	3.2-21
Table 3.2-17: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the Olympic Northwest Washington Intrastate (Within 3 NM) Under Alternative 2.....	3.2-22
Table 3.2-18: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the Puget Sound Intrastate (Within 3 NM) Under Alternative 2.....	3.2-23
Table 3.2-19: Estimated Annual Criteria Air Pollutant Emissions Within 12 NM Under Alternative 2.....	3.2-24
Table 3.2-20: Estimated Annual Criteria Air Pollutant Emissions Greater than 12 NM Under Alternative 2.....	3.2-24
Table 3.2-21: Estimated Annual Greenhouse Gas Emissions in the Northwest Training and Testing Study Area	3.2-26
Table 3.2-22: Comparison of Total Annual Study Area Greenhouse Gas Emissions to Emissions in the States Within the Study Area.....	3.2-26

3.2 Air Quality

3.2.1 Introduction and Methods

The approach to analyzing air quality impacts produced by the Proposed Action was explained in the 2015 Northwest Training and Testing (NWTT) Final Environmental Impact Statement (EIS)/Overseas EIS (OEIS). Laws, regulations, and guidance that were described in the previous EIS/OEIS remain applicable to this Supplemental Environmental Impact Statement Supplemental, with two exceptions.

First, the previous EIS/OEIS relied on draft guidance from the Council on Environmental Quality, put forth on December 18, 2014, to analyze the impacts that greenhouse gases emitted by the Proposed Action would have on climate. On August 1, 2016, the Council on Environmental Quality put forward the finalized guidance, removing the suggested 25,000-metric ton threshold for quantification of projected greenhouse gas (GHG) from the 2014 revised draft guidance. Executive Order (EO) 13783 (March 28, 2017) led to the withdrawal of this final guidance for further consideration. EO 13834, issued on May 17, 2018, established policy for federal agencies to prioritize actions that reduce waste, cut costs, enhance the resilience of federal infrastructure and operations, and enable more effective accomplishment of their missions. The Implementing Instructions for EO 13834, issued April 2019, provide instructions to Federal agencies regarding the implementation of EO 13834 including agency planning, reporting requirements, and accountability. Department of Defense (DoD) Directive 4715.21, Climate Change Adaptation and Resilience, issued on January 14, 2016, establishes policy and assigns responsibilities to provide the DoD with the resources necessary to assess and manage risks associated with the impacts of climate change. Although it is not required, GHG emissions are quantified in this Supplemental but are analyzed by illustrating their cumulative contribution to climate change.

Secondly, a new eight-hour National Ambient Air Quality Standard (NAAQS) of 0.070 parts per million for ozone was adopted (U.S. Environmental Protection Agency, 2016). The final rule was signed on October 1, 2015 and became 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.

The attainment status of the NWTT Study Area and the associated regulatory thresholds remains unchanged from the 2015 NWTT Final EIS/OEIS, with the following exception: As of October 11, 2016, the Seattle-Tacoma area transitioned from a maintenance area for carbon monoxide (CO) to an attainment area. The area completed the 20-year maintenance period required by the Clean Air Act (CAA). NAAQS for criteria pollutants are presented in Table 3.2-1.

Table 3.2-1: National Ambient Air Quality Standards

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

Table 3.2-1: National Ambient Air Quality Standards (continued)

<i>Pollutant</i>	<i>Primary/ Secondary</i>	<i>Averaging Time</i>	<i>Level</i>	<i>Form</i>
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⁽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.

Source: U.S. Environmental Protection Agency (2016), last updated December 20, 2016.

3.2.1.1 General Conformity Evaluation

The purpose of the General Conformity Rule is to ensure that applicable federal actions, such as the Proposed Action evaluated in this Supplemental EIS/OEIS, would not cause or contribute to a violation of NAAQS and that the Proposed Action would not adversely affect the attainment and maintenance of NAAQS (40 Code of Federal Regulations [CFR] parts 51 and 93). General Conformity review only applies to emissions of criteria pollutants in nonattainment or maintenance areas. Attainment areas are not subject to the General Conformity Rule. If a federal action is not an emergency response action presumed to conform under the Rule, does not meet the approved facility emissions budget, and is not a listed exempt activity, then a conformity demonstration evaluating total direct and indirect emissions must be made. The total direct and indirect emissions evaluation considers emission increases that are reasonably foreseeable at the time the Conformity analysis is conducted. The emission increases are compared to “*de minimis*” thresholds. Projected emissions at or above the *de minimis* level trigger the requirement for conformity determination. For conformity purposes, only the emissions of nonattainment and maintenance criteria pollutants and precursors in non-attainment and maintenance areas are considered. The only relevant emissions are the net increases when all increases and decreases are considered. Portions of the Study Area that lie within 3 nautical miles (NM) of the coast in Alaska and Washington are within state air quality jurisdictions and would be evaluated for General Conformity.

3.2.1.2 National Environmental Policy Act Evaluation

The air quality impact evaluation requires two separate analyses: (1) impacts of air pollutants emitted by Navy training and testing within U.S. territorial seas (i.e., within 12 NM of the coast) are assessed under the National Environmental Policy Act (NEPA), and (2) impacts of air pollutants emitted by Navy training and testing activities outside U.S. territorial seas are evaluated under EO 12114. State waters are within

the jurisdiction of the respective state. The approach to the analysis of health-based air quality impacts under NEPA was described in the 2015 NWTT Final EIS/OEIS.

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 CAA 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. Certain source categories, such as Petroleum refineries are defined as a PSD major source if they emit 100 tons per year or greater of an attainment criteria pollutant or regulated precursor. The proposed action does not fall under any of those source categories. 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.

In addition to criteria pollutants, the NEPA air quality analysis also addresses the hazardous air pollutants emitted by the proposed activities and assesses their potential impacts on air quality. The United States Environmental Protection Agency (USEPA) has designated 187 substances as hazardous air pollutants (HAPs) under the federal Clean Air Act. HAPs, 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). NAAQS are not established for these pollutants; however, the USEPA has developed rules that limit emissions of HAP from specific stationary 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 HAPs from stationary sources, taking into consideration the cost of emissions control, non-air-quality health and environmental impacts, and energy requirements. For the proposed action, HAPs are generated, in addition to criteria air pollutants, by combustion of fuels, explosives, propellants, and the materials of which targets, munitions, and other training and testing materials are constructed (e.g., plastic, paint, wood). Fugitive volatile and semivolatile petroleum compounds also may be emitted whenever mechanical devices are used. For most source types, HAP emissions are typically one or more orders of

magnitude smaller than concurrent emissions of criteria air pollutants and only become a concern when large amounts of fuel, explosives, or other materials are consumed during a single activity or in one location. Emissions of HAPs are intermittent and dispersed over a vast ocean area. Because only small quantities of hazardous air pollutants are emitted into the lower atmosphere, which is well mixed over the ocean, the potential for exposure is very low and the risk presented by the emissions is similarly very low. A quantitative evaluation of hazardous air pollutant emissions is thus not warranted and was not conducted.

3.2.2 Affected Environment

3.2.2.1 Region of Influence

The Study Area for this Supplemental is the same as analyzed in the 2015 NWTT Final EIS/OEIS. For purposes of this Supplemental, the region of influence for air quality remains the same as that identified in the 2015 NWTT Final EIS/OEIS (U.S. Department of the Navy, 2015), which 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.

3.2.2.2 Climate of the Northwest Training and Testing Study Area

Climate in the Study Area was discussed in the 2015 NWTT Final EIS/OEIS. The climate within the region of influence has not changed since the publication of the 2015 NWTT Final EIS/OEIS (Climate.com, 2017). The climate of the coastal Pacific Northwest is generally characterized by cool, dry summers and mild winters with abundant precipitation. Average annual air temperature gradually decreases, and average annual precipitation gradually increases from northern California to southeastern Alaska. Total annual rainfall approximately doubles, from about 70 inches (in.) (178 centimeters [cm]) per year in northern California to over 150 in. (381 cm) per year in Ketchikan, Alaska.

3.2.2.3 Regional Air Pollutant Sources and Emissions

Regional air pollutant sources include aviation and marine activities as well as shore facilities. The pollutant sources within the Study Area in Washington, Oregon, California, and Alaska were discussed in the 2015 NWTT Final EIS/OEIS and have not changed since that document was prepared.

3.2.2.4 Existing Air Quality

Existing air quality within the Study Area in Washington, Oregon, California, and Alaska was discussed in the 2015 NWTT Final EIS/OEIS. Generally, air quality in offshore ocean areas is better 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 in offshore areas; thus, air quality in the Study Area must be inferred from the air quality in adjacent land areas where air pollutant concentrations are monitored.

No training or testing activities would take place in a nonattainment area. The only maintenance areas within the Study Area are for particulate matter ≤ 10 microns in diameter (PM_{10}) and particulate matter ≤ 2.5 microns in diameter ($PM_{2.5}$). Specifically, within the Puget Sound Intrastate Air Quality Control Region, Pierce County and Seattle-Kent-Tacoma area are designated as maintenance for the PM_{10} NAAQS (79 Federal Register 49239), and portions of the Tacoma area in Pierce County are designated as maintenance for $PM_{2.5}$ NAAQS (80 Federal Register 7347). In the region managed by Olympic Region Clean Air Agency, Thurston County is an air quality maintenance area for PM_{10} . The Seattle-Tacoma area

1-hour ozone area stopped being designated as a maintenance area when the implementation rule for the 1997 8-hour ozone NAAQS revoked the 1-hour standard in 2005. Since that time, this area is designated as attainment/unclassifiable for all ozone NAAQS. As of October 11, 2016, the Seattle-Tacoma area transitioned from a maintenance area for CO to an attainment area. The area completed the 20-year maintenance period required by the CAA. The 2015 ozone NAAQS does not trigger any conformity requirement for any area in Washington, Oregon, or Alaska. Table 3.2-2 presents the attainment status of the Study Area's pierside and Inland Water locations.

Table 3.2-2: Attainment Status of Pierside and Inland Water Locations

Air Quality Control Region	Pierside Location	County/Area	National Ambient Air Quality Standards Attainment Status
Puget Sound Intrastate Air Quality Control Region	Puget Sound Naval Shipyard	Kitsap	Attainment of all applicable standards
	Keyport Range Site	Kitsap	Attainment of all applicable standards
	Explosive Ordnance Disposal Underwater Training Range in Hood Canal	Kitsap	Attainment of all applicable standards
	Naval Base (NB) Kitsap Bangor	Kitsap	Attainment of all applicable standards
	Portions of Dabob Bay Range Complex	Kitsap	Attainment of all applicable standards
	Portions of Chinook Military Operations Area	Kitsap	Attainment of all applicable standards
	NB Kitsap @ Bremerton	Kitsap	Attainment of all applicable standards
	NB Kitsap @ Bangor	Kitsap	Attainment of all applicable standards
	NB Everett	Snohomish County.	Attainment of all applicable standards
		Carr Inlet Operations	Pierce Pierce, Tacoma Area
Olympic-Northwest Washington Air Quality Control Region	Quinault Range Site	Jefferson	Attainment of all applicable standards
	Portions of Dabob Bay Range Complex	Jefferson	Attainment of all applicable standards
	Not applicable (included for completeness only)	Thurston, Olympia, Tumwater, Lacey areas	Maintenance Area for 1987 PM ₁₀ standard
Olympic Region Air Basin portion			
Olympic-Northwest Washington Air Quality Control Region	Whidbey Island	Island	Attainment of all applicable standards
	Navy 7 Operating Area (OPAREA)	Island	Attainment of all applicable standards
	Explosives Ordnance Disposal Underwater Training Range Crescent Harbor	Island	Attainment of all applicable standards
	Chinook Military Operations Areas A and B	Island	Attainment of all applicable standards
Northwest Air Basin			
Southeast Alaska Intrastate Air Quality Control Region	Southeast Alaska Acoustic Measurement Facility	Western Behm Canal -	Attainment of all applicable standards

Notes: PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter

3.2.3 Environmental Consequences

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact air quality within the Study Area. Tables 2.5-1 through 2.5-3 present the baseline and proposed training and testing activity locations for each alternative (including number of activities and ordnance expended). The air quality stressors vary in intensity, frequency, duration, and location within the Study Area. The stressor applicable to air quality in the Study Area analyzed herein include criteria air pollutants.

Emissions within 3 NM of shore are within the area of influence for onshore areas, and therefore have the potential to affect air quality onshore. The discussions that follow evaluate the nearshore emissions within regional areas that include maintenance areas. Nearshore is defined as within 3 NM from shore. This is based on the definition of State waters and is the area within which emissions would be most likely to migrate onshore due to proximity. The emissions within 3 NM of the nonattainment/maintenance areas are compared with baseline emissions currently occurring within 3 NM of these areas. The net emissions associated with the Proposed Action are then compared to the General Conformity *de minimis*/major source thresholds for nonattainment/maintenance areas. The Navy training and testing activities offshore of Oregon and California occur exclusively more than 12 NM from shore, so Air Quality Control Regions in those states are not affected.

Criteria air pollutant emissions were estimated for vessels, aircraft, and ordnance. For each alternative, emissions were estimated by Air Quality Control Region and by type of activity (training or testing). The emission estimates are provided in Appendix C (Air Quality Example Calculations). 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. Hazardous air pollutants emissions are typically one or more orders of magnitude smaller than concurrent emissions of criteria air pollutants. Mobile sources operating as a result of the Proposed Action would be functioning intermittently over a large area and would produce negligible ambient hazardous air pollutants in a localized area not located near any publicly accessible areas. For this reason, hazardous air pollutants analyzed qualitatively in the 2015 NWTT Final EIS/OEIS remain valid and are not further analyzed in this document.

3.2.3.1 Criteria Air Pollutants

The potential impacts of criteria air pollutants were evaluated in the 2015 NWTT Final EIS/OEIS by estimating the emissions from training and testing activities in the Study Area for each alternative. The analysis concluded that, for the Preferred Alternative (Alternative 1), reasonably foreseeable emissions of criteria air pollutants in attainment areas would not cause federal ambient air quality standards to be exceeded, reasonably foreseeable emissions of criteria air pollutants in maintenance areas would not exceed applicable federal *de minimis* levels.

Most of the activities included in the Proposed Action that produce emissions are similar to those described in the 2015 NWTT Final EIS/OEIS. Modifications include changes to tempo of activity and renaming or combining related types of activities for greater clarity in this document and consistency across all Navy at-sea planning documents. The tempo and types of training and testing activities have fluctuated because of the introduction of new technologies, the evolving nature of international events, advances in warfighting doctrine and procedures, and changes in force structure. Such developments influence the frequency, type, duration, intensity, and location of required training and testing activities. The activities analyzed in this Supplemental are largely a continuation of activities that have been

ongoing and were analyzed previously in the 2015 NWTT Final EIS/OEIS. The new and renamed training and testing events are listed in Tables 2.5-1, 2.5-2, and 2.5-3 of this Supplemental.

The estimates of criteria air pollutant emissions for each alternative are organized by activity (i.e., either training or testing). These emissions are further categorized by region (e.g., Air Quality Control Region) so that differences in background air quality, atmospheric circulation patterns, regulatory requirements, and sensitive receptors can be addressed. Total air pollutant emissions for Navy training and testing activities in the Study Area under each alternative are also estimated. The delta (increase or decrease) in total estimated emissions of each criteria pollutant or relevant precursor is then compared to the *de minimis*/major source threshold or the major emitting facility threshold, as appropriate for a given pollutant/precursor in a given area. If there are no compounding factors, then pollutants/precursors below the thresholds can be presumed to be not significant. Emission deltas above the thresholds demand consideration of other factors, as they may be significant.

3.2.3.1.1 Baseline Emissions

The baseline emissions, such as CO, nitrogen oxides (NO_x), volatile organic compounds (VOC), sulfur oxides (SO_x), PM₁₀, and PM_{2.5}, are defined as the emissions estimated for the Preferred Alternative that was proposed in the 2015 NWTT Final EIS/OEIS (U.S. Department of the Navy, 2015). Baseline training and testing emissions were revised to update the vessel, aircraft, and ordnance emission factors. For training activities only, historical fleet surface ship underway hours were used, instead of individual training activities, to estimate the emissions. Underway “days” of the combatant ships homeported in the Pacific Northwest were evaluated for combatant ships (destroyers, cruisers, and frigates), as all other large vessels homeported in the Pacific Northwest are either nuclear powered (aircraft carriers and submarines) or are not tracked for training or testing purposes (submarine tenders, resupply ships). In all cases except one, a full 24-hour schedule was assumed to estimate the underway hours. For Ammo, described as a ship steaming from Everett to Indian Island to onload or offload weapons, six hours underway were assumed for each underway day. Fleet Week/Port Visit days/hours were excluded as they are not related to activities covered in this Supplemental.

Total criteria air pollutant baseline emissions are summarized in Table 3.2-3. Table 3.2-4, Table 3.2-5, and Table 3.2-6 present the emissions estimated for the 2015 NWTT Final EIS/OEIS Preferred Alternative within 3 NM, within 12 NM, and greater than 12 NM, respectively, with the above revisions incorporated.

Table 3.2-3: Estimated Annual Baseline Criteria Air Pollutant Emissions

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	143.9	332.6	11.0	117.1	17.4	17.0
Testing activities	30.7	62.3	3.2	13.8	2.5	2.5
Total Study Area	174.6	394.9	14.2	130.9	19.9	19.5

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds.

Table 3.2-4: Estimated Annual Baseline Criteria Air Pollutant Emissions within 3 Nautical Miles

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	25.0	67.1	1.6	15.7	8.7	8.6
Testing activities	27.5	50.2	3.0	11.0	1.6	1.6
Study Area – within 3 NM	52.6	117.3	4.6	26.7	10.3	10.2

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds.

Table 3.2-5: Estimated Annual Baseline Criteria Air Pollutant Emissions Within 12 Nautical Miles

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	39.5	94.8	2.7	27.9	9.7	9.6
Testing activities	27.9	51.2	3.0	11.4	1.6	1.6
Study Area – within 12 NM	67.5	146.0	5.7	39.3	11.3	11.2

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds.

Table 3.2-6: Estimated Annual Baseline Criteria Air Pollutant Emissions Greater than 12 Nautical Miles

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	104.4	237.8	8.3	89.2	7.7	7.4
Testing activities	2.8	11.1	0.2	2.4	0.9	0.9
Study Area – greater than 12 NM	107.2	248.9	8.5	91.6	8.6	8.3

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds.

3.2.3.1.2 Air Emissions Under Alternative 1

3.2.3.1.2.1 Training Activities

Table 3.2-7 presents the total estimated training-related criteria air pollutant and precursor emissions in the Study Area under Alternative 1 and includes all emissions generated, regardless of proximity to the coastline. Most of these emissions occur beyond state waters. Under Alternative 1, the annual number of Navy training activities in the Study Area would, in most cases, decrease or remain the same in comparison to the 2015 NWTT Final EIS/OEIS Preferred Alternative levels. Exceptions are Air Combat

Maneuver, Tracking Exercise – Maritime Patrol Aircraft, Surface Ship Sonar Maintenance, and Precision Anchoring. Emissions of CO and VOC from training activities less than 3,000 ft. above ground level would decrease relative to baseline emissions. Emissions from other criteria pollutants would slightly increase. Under Alternative 1, about 27 percent of training emissions would be produced in state waters (0–3 NM offshore), approximately 35 percent would be produced in federal waters (0–12 NM offshore), and about 65 percent of training emissions would be produced outside U.S. Territorial Seas (more than 12 NM offshore).

The air pollutant that would be emitted in the greatest quantity by aircraft under Alternative 1 is NO_x, followed by SO_x and CO. These pollutants are emitted mostly by aircraft involved in anti-submarine warfare training activities. The air pollutant that would be emitted in the greatest quantities by surface vessels is NO_x, followed by SO_x and CO. These pollutants are emitted by vessels involved in a variety of training activities in the offshore operational areas, including anti-submarine warfare, anti-surface warfare, and electronic warfare. The air pollutant that would be emitted in the greatest quantity by munitions is CO, which would be emitted under Alternative 1 by bombs, rockets, missiles, smokes, flares, and gun rounds.

Table 3.2-7: Estimated Annual Criteria Air Pollutant Emissions from Training Under Alternative 1

Air Quality Control Region	Source Type	Air Pollutant Emissions (tons per year)					
		CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Olympic-Northwest Washington Intrastate (WA) – Within 3 NM	Aircraft	0.4	0.5	0.0	0.1	0.3	0.3
	Vessels	15.2	70.3	0.9	19.7	2.5	2.5
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	15.6	70.8	0.9	19.8	2.8	2.8
Puget Sound Intrastate (WA) – Within 3 NM	Aircraft	0.1	0.1	0.0	0.0	0.1	0.1
	Vessels	8.4	33.8	0.6	9.7	4.9	4.9
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	8.5	33.9	0.6	9.8	4.9	4.9
3–12 NM	Aircraft	0.2	0.2	0.0	0.1	0.2	0.2
	Vessels	11.5	22.4	0.8	11.2	0.6	0.6
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	11.8	22.6	0.8	11.3	0.7	0.7
Federal (within 12 NM)	Aircraft	0.7	0.8	0.0	0.2	0.5	0.5
	Vessels	35.2	126.5	2.3	40.6	7.9	7.9
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	35.9	127.3	2.3	40.8	8.5	8.5
Outside U.S. Territorial Seas, EO 12114 (+12 NM)	Aircraft	11.9	77.7	1.2	14.2	4.9	4.9
	Vessels	73.5	143.2	5.0	71.3	3.6	3.6
	Ordnance	2.47	0.1	0.0	0.0	1.3	1.1
	Subtotal	87.9	221.0	6.2	85.5	9.8	9.6
Study Area	Total	123.8	348.3	8.5	126.3	18.2	18.0

Notes: (1) NM = nautical miles, CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds, EO = Executive Order

(2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

(3) Training and testing activities offshore of Oregon and California occur exclusively more than 12 NM from shore, so Air Quality Control Regions in those states are not affected.

(4) No training activities occur in Alaska.

3.2.3.1.2.2 Testing Activities

Under Alternative 1, the annual number of Navy testing activities in the Study Area would increase in comparison to the 2015 NWTT Final EIS/OEIS Preferred Alternative levels. This includes testing activities that were not previously analyzed, such as Undersea Warfare Testing, Simulant Testing, and Radar Testing. Emissions of all criteria pollutants would also significantly increase relative to the baseline emissions. The majority of emission increase is due to emissions from Mine Detection and Classification Testing, Unmanned Underwater Vehicle Testing, and Torpedo Tests – Non-Explosive. Table 3.2-8 lists the estimated testing-related criteria air pollutant and precursor emissions in the Study Area by region

under Alternative 1. Training and testing activities offshore of Oregon and California occur exclusively more than 12 NM from shore, so Air Quality Control Regions in those states are not affected.

Table 3.2-8: Estimated Annual Criteria Air Pollutant Emissions from Testing Under Alternative 1

Air Quality Control Region	Source Type	Air Pollutant Emissions (tons per year)					
		CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Southeast Alaska Intrastate (AK) - Within 3 NM	Aircraft	0.0	0.0	0.0	0.0	0.0	0.0
	Vessels	3.0	32.5	0.3	10.7	1.0	1.0
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	3.0	32.5	0.3	10.7	1.0	1.0
Olympic-Northwest Washington Intrastate (WA) - Within 3 NM	Aircraft	0.8	3.2	0.1	0.6	0.3	0.3
	Vessels	15.5	163.7	1.9	56.1	1.1	1.1
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	16.4	166.9	2.0	56.7	1.4	1.4
Puget Sound Intrastate (WA) - Within 3 NM	Aircraft	0.0	0.0	0.0	0.0	0.0	0.0
	Vessels	2.2	13.9	0.6	5.4	1.1	1.1
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	2.3	13.9	0.6	5.4	1.1	1.1
3–12 NM	Aircraft	0.0	0.1	0.0	0.0	0.0	0.0
	Vessels	0.4	0.9	0.0	0.4	0.0	0.0
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	0.5	1.0	0.0	0.4	0.0	0.0
Federal (within 12 NM)	Aircraft	0.9	3.4	0.1	0.7	0.4	0.4
	Vessels	21.2	210.9	2.8	72.5	3.3	3.3
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	22.1	214.3	2.9	73.2	3.7	3.7
Outside U.S. Territorial Seas, EO 12114 (+12 NM)	Aircraft	2.5	9.5	0.2	1.9	1.0	1.0
	Vessels	29.4	60.2	4.3	34.0	3.6	3.6
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	31.9	69.7	4.5	35.9	4.7	4.7
Study Area	Total	54.0	284.0	7.4	109.1	8.3	8.3

Notes: (1) NM = nautical mile(s), CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds, EO = Executive Order.

(2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

(3) Training and testing activities offshore of Oregon and California occur exclusively more than 12 NM from shore, so Air Quality Control Regions in those states are not affected.

Under Alternative 1, emissions of all criteria pollutants from testing activities would significantly increase within the Study Area compared to the 2015 NWTT Final EIS/OEIS Preferred Alternative. This increase is due to additional testing operations, including operations that were previously not analyzed and a change in emission calculation methodology.

As shown in Table 3.2-8, about 33 percent of testing emissions would be produced 3 NM or more from shore. About 67 percent of air pollutant emissions would be produced in state waters. As shown in Table 3.2-8, the air pollutant that would be emitted in the greatest quantity by aircraft under Alternative 1 is NO_x, followed by CO. These emissions are associated mostly with aircraft involvement in anti-submarine warfare. As shown in Table 3.2-8, the air pollutant that would be emitted in the greatest quantities by surface vessels is NO_x, followed by SO_x. These emissions are associated with vessel involvement in a variety of testing activities. No air pollutants would be emitted by munitions, which would consist of torpedoes and sonobuoys.

Table 3.2-9 presents the total estimated emission results under Alternative 1 within the Study Area and includes all emissions generated, regardless of proximity to the coastline. Under Alternative 1, the annual numbers of Navy training and testing activities in the Study Area would increase. The estimated emissions would also increase for all pollutants in the Study Area compared to the baseline.

Table 3.2-9: Estimated Annual Criteria Air Pollutant Emissions in the Northwest Training and Testing Study Area Under Alternative 1

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	123.8	348.3	8.5	126.3	18.2	18.0
Testing activities	54.0	284.0	7.4	109.2	8.3	8.3
Total Study Area	177.7	632.3	15.9	235.5	26.6	26.4
2015 NWTT Final EIS/OEIS Preferred Alternative	174.6	394.9	14.2	130.9	19.9	19.5
Net change (tpy)	3.1	237.4	1.7	104.6	6.6	6.8
Net change (%)	2%	60%	12%	80%	33%	35%

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons/year, VOC = volatile organic compounds. (2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

3.2.3.1.3 Impacts from Air Emissions Under Alternative 1

3.2.3.1.3.1 General Conformity Analysis Under Alternative 1

No training or testing activities would take place in a nonattainment area. The only maintenance areas within the Study Area are for PM₁₀ and PM_{2.5}. Specifically, within the Puget Sound Intrastate Air Quality Control Region, Pierce County, and Seattle-Kent-Tacoma area are designated as maintenance for the PM₁₀ NAAQS, and the Tacoma area is designated as maintenance for PM_{2.5}. In the region managed by Olympic Region Clean Air Agency, Thurston County is an air quality maintenance area for PM₁₀. As shown in Table 3.2-2, most of the pierside and Inland Water locations within Puget Sound Intrastate Air Quality and all of the locations within Olympic Region Clean Air Agency are in attainment areas. Therefore, as a conservative estimate it was assumed that all of the activities occurring within the Puget Sound Intrastate Air Quality Control Region and the Olympic-Northwest Washington Air Quality Control Region would take place in the maintenance areas for PM₁₀ and/or PM_{2.5}, as applicable. Table 3.2-10 presents the estimated nearshore emissions within the Olympic Northwest Washington Intrastate under Alternative 1 as compared with baseline nearshore emissions. Table 3.2-11 presents the estimated nearshore emissions within the Puget Sound Intrastate under Alternative 1 as compared with baseline nearshore emissions. As required by 40 CFR Part 93, Table 3.2-11 includes *de minimis* thresholds for PM_{2.5}, including NO_x, VOC, and SO_x. Ammonia is also a precursor for PM_{2.5}. However, ammonia emissions from Navy vessels and aircraft are expected to be negligible and are not included in this analysis. The net emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds. As shown in Table 3.2-10 and Table 3.2-11, there are no exceedances of *de minimis* thresholds in the two affected maintenance areas.

Table 3.2-10: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the Olympic Northwest Washington Intrastate (Within 3 NM) Under Alternative 1

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Total Emissions from all Sources	32.0	237.7	2.9	76.5	4.2	4.2
Baseline	27.6	69.7	2.3	15.6	3.0	2.9
Net Increase (Decrease)	4.4	168.0	0.6	60.9	1.2	1.3
<i>De Minimis</i> Threshold	N/A	N/A	N/A	N/A	100	N/A

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons/year, VOC = volatile organic compounds. (2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

Table 3.2-11: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the Puget Sound Intrastate (Within 3 NM) Under Alternative 1

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Total Emissions from all Sources	10.8	47.8	1.2	15.1	6.1	6.1
Baseline	18.2	41.4	1.7	9.0	7.2	7.2
Net Increase (Decrease)	(7.5)	6.4	(0.5)	6.1	(1.1)	(1.1)
<i>De Minimis</i> Threshold	N/A	100	100	100	100	100

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons/year, VOC = volatile organic compounds. (2) Table includes PM_{2.5} precursors (i.e., NO_x, VOC, SO_x). Ammonia emissions are expected to be negligible. Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

Total air pollutant emissions from these activities would be well below the *de minimis* thresholds for PM₁₀ and PM_{2.5}. As a result, no further analysis of conformity is required under Alternative 1 and a Record of Non-Applicability would be prepared in accordance with Navy guidance. Representative air pollutant emissions calculations and a Record of Non-Applicability are provided in Appendix C (Air Quality Example Calculations).

3.2.3.1.3.2 National Environmental Policy Act Impacts from Air Emissions Under Alternative 1

Table 3.2-12 and Table 3.2-13 present the total estimated emission results under Alternative 1 within 12 NM and greater than 12 NM, respectively. The estimated emissions would increase, for NO_x and SO_x in distances within 12 NM compared to the baseline and for all pollutants in distances greater than 12 NM compared to the baseline. In terms of screening thresholds, the bulk of emissions are outside territorial waters, where attainment status is undefined and generally meets attainment criteria. The major emitting facility 250-ton threshold is not exceeded in the Study Area as a whole and in areas beyond state waters.

Table 3.2-12: Estimated Annual Criteria Air Pollutant Emissions Within 12 NM Under Alternative 1

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	35.9	127.3	2.3	40.8	8.5	8.5
Testing activities	22.1	214.3	2.9	73.2	3.7	3.7
Total – within 12 NM	58.0	341.6	5.2	114.0	12.1	12.1
Revised 2015 NWTT Final EIS/OEIS Preferred Alternative – Emissions within 0–12 NM	67.5	146.0	5.7	39.3	11.3	11.3
Net change (tpy)	(9.5)	195.6	(0.5)	74.7	0.8	0.6
Net change (%)	(14%)	134%	(9%)	190%	7%	5%

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons/year, VOC = volatile organic compounds. (2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

Table 3.2-13: Estimated Annual Criteria Air Pollutant Emissions Greater than 12 NM Under Alternative 1

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	87.9	221.0	6.2	85.5	9.8	9.8
Testing activities	31.9	69.7	4.5	35.9	4.7	4.7
Total – greater than 12 NM	119.8	290.7	10.7	121.4	14.5	14.5
2015 NWTT Final EIS/OEIS Preferred Alternative – Emissions greater than 12 NM	107.2	248.9	8.5	91.6	8.6	8.3
Net change (tpy)	11.1	36.4	2.1	28.7	5.2	5.2
Net change (%)	10%	15%	24%	31%	61%	61%

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons/year, VOC = volatile organic compounds. (2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

3.2.3.1.3.3 Summary – Alternative 1

Criteria air pollutants emitted in the Study Area within state waters could be transported ashore but 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 minor because (1) emissions from Navy training and testing activities would be small compared to the amounts of air pollutants emitted by mobile and stationary emission sources ashore, including motor vehicles; (2) the pollutants are emitted over large areas (i.e., the Study Area is an area source); (3) the distances the air pollutants would be transported are often large; and (4) the pollutants would be substantially dispersed during transport. The criteria air pollutants emitted over nonterritorial waters within the Study Area would be dispersed over vast areas of open ocean and thus would not cause significant harm to environmental resources in those areas. Net emission increases of relevant pollutants and precursors within the maintenance areas in the Study Area are below the applicable General Conformity Rule *de minimis* thresholds. 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.

3.2.3.1.4 Air Emissions Under Alternative 2

3.2.3.1.4.1 Training Activities

Under Alternative 2, the annual number of Navy training activities in the Study Area would remain approximately the same as the 2015 NWTT Final EIS/OEIS Preferred Alternative levels or increase for some operations. Emissions of all criteria pollutants would increase relative to the 2015 NWTT Final EIS/OEIS Preferred Alternative emissions. Table 3.2-14 lists the estimated training-related criteria air pollutant and precursor emissions in the Study Area by region under Alternative 2. Under Alternative 2, about 30 percent of training emissions would be produced in state waters (0–3 NM offshore), about 37 percent would be produced in federal waters (within 12 NM offshore), and about 63 percent of training emissions would be produced in international waters (more than 12 NM offshore).

The air pollutant that would be emitted in the greatest quantity by aircraft under Alternative 2 is NO_x, followed by SO_x and CO. These pollutants are emitted mostly by aircraft involved in anti-submarine warfare training activities. The air pollutant that would be emitted in the greatest quantities by surface vessels is NO_x, followed by SO_x and CO. These pollutants are emitted by vessels involved in a variety of training activities, including anti-submarine warfare, anti-surface warfare, and electronic warfare. The air pollutant that would be emitted in the greatest quantity by munitions is CO, which would be emitted under Alternative 2 by bombs, rockets, missiles, smokes, flares, and gun rounds. Under Alternative 2, training emissions would increase on average by about 20 percent for NO_x, SO_x, and 40 percent for PM in the Study Area compared to the baseline.

Table 3.2-14: Estimated Annual Criteria Air Pollutant Emissions from Training Under Alternative 2

Air Quality Control Region	Source Type	Air Pollutant Emissions (tons per year)					
		CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Olympic-Northwest Washington Intrastate (WA) - Within 3 NM	Aircraft	0.5	0.7	0.1	0.2	0.4	0.4
	Vessels	18.7	82.8	1.1	23.2	2.9	2.9
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	19.2	83.5	1.1	23.4	3.3	3.3
Puget Sound Intrastate (WA) - Within 3 NM	Aircraft	0.1	0.1	0.0	0.0	0.1	0.1
	Vessels	11.0	42.5	0.8	12.5	8.9	8.9
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	11.1	42.6	0.8	12.6	8.9	8.9
3-12 NM	Aircraft	0.3	0.3	0.0	0.1	0.2	0.2
	Vessels	12.6	24.5	0.9	12.2	0.6	0.6
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	12.9	24.7	0.9	12.3	0.8	0.8
Federal (within 12 NM)	Aircraft	0.9	1.1	0.1	0.3	0.7	0.7
	Vessels	42.3	149.7	2.8	48.0	12.4	12.4
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	43.2	150.8	2.9	48.3	13.1	13.1
Outside U.S. Territorial Seas, EO 12114 (+12 NM)	Aircraft	12.6	78.7	1.3	14.5	6.1	6.1
	Vessels	82.4	160.4	5.6	79.9	4.0	4.0
	Ordnance	3.2	0.2	0.0	0.0	1.7	1.4
	Subtotal	98.1	239.3	6.9	94.3	11.9	11.9
Study Area	Total	141.4	390.1	9.8	142.6	24.9	24.9

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds, EO = Executive Order.

(2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

(3) Training and testing activities offshore of Oregon and California occur exclusively more than 12 NM from shore, so Air Quality Control Regions in those states are not affected.

(4) No training activities occur in Alaska.

3.2.3.1.4.2 Testing Activities

Under Alternative 2, the annual number of Navy testing activities in the Study Area would increase in comparison to the 2015 NWTT Final EIS/OEIS Preferred Alternative levels. Table 3.2-15 lists the estimated testing-related criteria air pollutant and precursor emissions in the Study Area by air quality control region under Alternative 2. About 34 percent of testing-related emissions would be produced

more than 3 NM offshore, while about 66 percent of emissions would be produced within 3 NM of shore. Emissions of all criteria pollutants would significantly increase relative to the 2015 NWTT Final EIS/OEIS Preferred Alternative emissions.

Table 3.2-15: Estimated Annual Criteria Air Pollutant Emissions from Testing Under Alternative 2

Air Quality Control Region	Source Type	Air Pollutant Emissions (tons per year)					
		CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Southeast Alaska Intrastate (AK) - Within 3 NM	Aircraft	0.0	0.0	0.0	0.0	0.0	0.0
	Vessels	4.5	49.4	0.5	16.2	1.6	1.6
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	4.5	49.4	0.5	16.2	1.6	1.6
Olympic-Northwest Washington Intrastate (WA) - Within 3 NM	Aircraft	0.9	3.5	0.1	0.7	0.4	0.4
	Vessels	15.9	167.4	2.0	57.3	6.4	6.4
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	16.8	171.0	2.0	58.0	6.8	6.8
Puget Sound Intrastate (WA)- Within 3 NM	Aircraft	0.0	0.0	0.0	0.0	0.0	0.0
	Vessels	2.2	13.9	0.6	5.4	1.1	1.1
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	2.3	13.9	0.6	5.4	1.1	1.1
3-12 NM	Aircraft	0.1	0.1	0.0	0.0	0.0	0.0
	Vessels	0.6	1.2	0.0	0.5	0.0	0.0
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	0.6	1.3	0.1	0.6	0.1	0.1
Federal (within 12 NM)	Aircraft	1.0	3.7	0.1	0.7	0.4	0.4
	Vessels	23.3	231.9	3.1	79.4	9.2	9.2
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	24.2	235.6	3.2	80.2	9.6	9.6
Outside U.S. Territorial Seas, EO 12114 (+12 NM)	Aircraft	2.5	9.5	0.2	1.9	1.0	1.0
	Vessels	30.8	63.0	4.4	35.6	3.8	3.8
	Ordnance	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	33.3	72.6	4.6	37.5	4.8	4.8
Study Area	Total	57.6	308.1	7.8	117.6	14.4	14.4

Table 3.2-15: Estimated Annual Criteria Air Pollutant Emissions from Testing Under Alternative 2 (continued)

Air Quality Control Region	Source Type	Air Pollutant Emissions (tons per year)					
		CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds, EO = Executive Order.

(2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

(3) Training and testing activities offshore of Oregon and California occur exclusively more than 12 NM from shore, so Air Quality Control Regions in those states are not affected.

The air pollutant that would be emitted in the greatest quantity by aircraft under Alternative 2 is NO_x, followed by CO. These pollutants are emitted mostly by aircraft involved in anti-submarine warfare. The air pollutant that would be emitted in the greatest quantities by surface vessels is NO_x, followed by SO_x and CO. These pollutants are emitted by vessels involved in a variety of testing activities. No air pollutants would be emitted by munitions, which would consist of torpedoes and sonobuoys.

Table 3.2-16 presents the total estimated emission results under Alternative 2 within the Study Area and includes all emissions generated, regardless of proximity to the coastline.

Table 3.2-16: Estimated Annual Criteria Air Pollutant Emissions in the Northwest Training and Testing Study Area Under Alternative 2

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	141.4	390.1	9.8	142.6	24.9	24.9
Testing activities	57.5	308.1	9.7	117.6	14.4	14.4
Total Study Area	198.9	698.3	19.5	260.3	39.4	39.4
Baseline	174.6	394.9	14.2	130.9	19.9	19.5
Net change (tpy)	24.3	303.4	5.3	129.4	19.4	19.8
Net change (%)	14%	77%	37%	99%	97%	101%

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons per year, VOC = volatile organic compounds.

(2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

Under Alternative 2, the annual number of training and testing activities in the Study Area would increase relative to the baseline. Emissions of all criteria pollutants would increase due to increases in the numbers of several training activities and the addition of new activities resulting in vessel emissions.

3.2.3.1.5 Impacts from Air Emissions Under Alternative 2

3.2.3.1.5.1 General Conformity Analysis under Alternative 2

No training or testing activities would take place in a nonattainment area. The only maintenance areas within the Study Area are for PM₁₀ and PM_{2.5}. Specifically, within the Puget Sound Intrastate Air Quality Control Region, Pierce County and Seattle-Kent-Tacoma area are designated as maintenance for the PM₁₀ NAAQS; and the Tacoma area is designated as maintenance for PM_{2.5}. In the region managed by Olympic Region Clean Air Agency, Thurston County is an air quality maintenance area for PM₁₀. As shown in Table 3.2-2, most of the pierside and Inland Water locations within Puget Sound Intrastate Air Quality, and all of the locations within the Olympic Region Clean Air Agency are in attainment areas; therefore, as a conservative estimate it was assumed that all of the activities occurring within the Puget Sound Intrastate Air Quality Control Region and the Olympic-Northwest Washington Air Quality Control Region would take place in the maintenance areas for PM₁₀ and/or PM_{2.5}, as applicable. Table 3.2-17 presents the estimated nearshore emissions within the Olympic Northwest Washington Intrastate under Alternative 2 as compared with baseline nearshore emissions. Table 3.2-18 presents the estimated nearshore emissions within the Puget Sound Intrastate under Alternative 2 as compared with baseline nearshore emissions. As required by 40 CFR Part 93, Table 3.2-18 includes *de minimis* thresholds for PM_{2.5}, including NO_x, VOC, and SO_x. Ammonia is also a precursor for PM_{2.5}. However, ammonia emissions from Navy vessels and aircraft are expected to be negligible and are not included in this analysis. The net emissions increases are compared with the applicable General Conformity Rule *de minimis* thresholds. As shown in Table 3.2-17 and Table 3.2-18, there are no exceedances of *de minimis* thresholds in the two affected maintenance areas.

Table 3.2-17: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the Olympic Northwest Washington Intrastate (Within 3 NM) Under Alternative 2

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Total Emissions from all Sources	36.0	254.5	3.2	81.5	10.1	10.1
Baseline	27.6	69.7	2.3	15.6	3.0	2.9
Net Increase (Decrease)	8.4	184.8	0.9	65.9	7.1	7.2
<i>De Minimis</i> Threshold	N/A	N/A	N/A	N/A	100	N/A

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons/year, VOC = volatile organic compounds

(2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

Table 3.2-18: Estimated Net Change in Annual Air Pollutant Emissions from Training and Testing Activities in the Puget Sound Intrastate (Within 3 NM) Under Alternative 2

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Total Emissions from all Sources	13.4	56.5	1.4	17.9	10.1	10.1
Baseline	18.2	41.4	1.7	9.0	7.2	7.2
Net Increase (Decrease)	(4.8)	15.1	(0.3)	8.9	2.9	2.9
<i>De Minimis</i> Threshold	N/A	100	100	100	100	100

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons/year, VOC = volatile organic compounds

(2) Table includes PM_{2.5} precursors (i.e., NO_x, VOC, SO_x). Ammonia emissions are expected to be negligible. Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

Total air pollutant emissions from these activities would be well below the *de minimis* thresholds for PM₁₀ and PM_{2.5}. As a result, no further analysis of conformity is required under Alternative 2, and a Record of Non-Applicability would be prepared in accordance with Navy guidance. Representative air pollutant emissions calculations and a Record of Non-Applicability are provided in Appendix C (Air Quality Example Calculations).

3.2.3.1.5.2 NEPA Impacts from Air Emissions Under Alternative 2

Table 3.2-19 and Table 3.2-20 present the total estimated emission results under Alternative 2 within 12 NM and greater than 12 NM, respectively. The estimated emissions increase within 12 NM, compared to the baseline for all pollutants. The estimated emissions would increase, on average about 50 percent, for all pollutants in distances greater than 12 NM compared to the baseline. In terms of screening thresholds, the major emitting facility 250-ton threshold is not exceeded in areas beyond state waters.

Table 3.2-19: Estimated Annual Criteria Air Pollutant Emissions Within 12 NM Under Alternative 2

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	43.2	150.8	2.9	48.3	13.1	13.1
Testing activities	24.2	235.6	3.2	80.2	9.6	9.6
Total – within 12 NM	67.5	386.4	6.0	128.5	22.6	22.6
2015 NWTT Final EIS/OEIS Preferred Alternative – Emissions within 3–12 NM	67.5	146.0	5.7	39.3	11.3	11.5
Net change (tpy)	0.03	240.4	0.3	89.2	11.3	11.1
Net change (%)	0.0%	165%	5%	227%	99%	96%

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons/year, VOC = volatile organic compounds. (2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

Table 3.2-20: Estimated Annual Criteria Air Pollutant Emissions Greater than 12 NM Under Alternative 2

Source	Emissions by Air Pollutant (tons per year)					
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Training activities	98.1	239.3	6.9	94.3	11.9	11.6
Testing activities	33.3	72.6	4.6	37.5	4.8	4.8
Total – greater than 12 NM	131.4	311.9	11.5	131.8	16.7	16.4
2015 NWTT Final EIS/OEIS Preferred Alternative – Emissions greater than 12 NM	107.2	248.9	8.5	91.6	8.6	8.3
Net change (tpy)	24.2	63.0	3.1	40.2	8.1	8.2
Net change (%)	23%	25%	36%	44%	95%	98%

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{2.5} = particulate matter ≤ 2.5 microns in diameter, PM₁₀ = particulate matter ≤ 10 microns in diameter, SO_x = sulfur oxides, tpy = tons/year, VOC = volatile organic compounds. (2) Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. Only air pollutants emitted below 3,000 feet above ground level are included in the analysis. PM_{2.5} is included in PM₁₀.

3.2.3.1.5.3 Summary – Alternative 2

Criteria air pollutants emitted in the Study Area could be transported ashore but 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 minimal because (1) emissions from Navy training and testing activities would be small compared to the amounts of air pollutants emitted by mobile and stationary emission sources ashore, including motor vehicles; (2) the air pollutants would be emitted over a large area; (3) the distances the air pollutants would be transported are often large, and (4) the pollutants would be substantially dispersed during transport. The criteria air pollutants emitted over nonterritorial waters within the Study Area would be dispersed over vast areas of open ocean and thus would not cause significant harm to environmental resources in those areas. Net emission increases within the maintenance areas in the Study Area are below the applicable Major Source/General Conformity Rule *de minimis* thresholds. 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.

3.2.3.1.6 Impacts from Criteria Pollutants Under the No Action Alternative

Under the No Action Alternative, the proposed training and testing activities would not occur. Air emissions, as listed above, would not be introduced into the marine environment. Therefore, existing environmental conditions would either remain unchanged or would improve slightly after cessation of ongoing training and testing activities.

Discontinuing the training and testing activities would result in fewer air pollutants within the environment where training and testing activities have historically been conducted. Therefore, discontinuing training and testing activities under the No Action Alternative would lessen the potential for impacts from emissions, but would not measurably improve air quality in the Study Area.

3.2.3.2 Greenhouse Gases and Climate Change

Activities conducted as part of the Proposed Action would involve mobile sources using fossil fuel combustion as a source of power. Additionally, the expenditure of munitions could generate greenhouse gas emissions. Greenhouse emissions, depending on type, can persist in the atmosphere for extended periods of time, from 12 years for methane to up to 200 years for carbon dioxide. Climate change was discussed in the 2015 NWTT Final EIS/OEIS in Section 4.4.4 (Climate Change); that discussion remains valid and current.

Where possible, greenhouse gas emissions for Baseline and Alternatives 1 and 2 were calculated using emissions factors provided by the U.S. Navy for aircraft and vessels. In cases where greenhouse gas emission factors were not available, greenhouse gas emissions were estimated based on fuel consumption and USEPA emission factors. Greenhouse gas emissions generated by munitions activities were assumed to be negligible. In addition, carbon dioxide emissions were assumed to represent the total greenhouse gas emission, assuming that nitrous oxide and methane emissions would be relatively negligible for aircraft and vessel operations. Greenhouse gas emissions are summarized in Table 3.2-21. Baseline greenhouse gas emissions (i.e., emissions from existing activities) are also presented in the table.

Table 3.2-21: Estimated Annual Greenhouse Gas Emissions in the Northwest Training and Testing Study Area

<i>Alternative</i>	<i>Annual CO₂-Equivalent Emissions CO₂ Eq. (in Metric Tons/Year)</i>
Baseline	256,354
Alternative 1	256,454
Increase in emissions for Alternative 1 compared to Baseline	100
Alternative 2	268,106
Increase in emissions for Alternative 2 compared to Baseline	11,752

Note: Estimated Baseline Greenhouse Gas emissions include emissions from flights supporting the High-Speed Anti-Radiation Missile (HARM) operation. The HARM activity was broken out separately in the 2015 analysis but has since been removed, and the flights that conduct it have been absorbed into the other Electronic Warfare flights.

Table 3.2-22 compares the estimated Annual Greenhouse Gas Emissions to the greenhouse gas emissions in the states within the Study Area. The estimated baseline carbon dioxide equivalent emissions range from 0.06 percent of the total carbon dioxide equivalent emissions generated by the activities conducted in California in 2017 to approximately 0.68 percent of the total carbon dioxide equivalent emissions generated by activities conducted in Alaska in 2015, with the percentage of carbon dioxide equivalent emissions increasing for Alternatives 1 and 2.

Table 3.2-22: Comparison of Total Annual Study Area Greenhouse Gas Emissions to Emissions in the States Within the Study Area

<i>Alternative</i>	<i>Annual CO₂-Equivalent Emissions CO₂ Eq. (in MM Metric Tons/Year)</i>	<i>Annual CO₂-Equivalent Emissions CO₂ Eq. (in MM Metric Tons/Year)</i>			
		<i>California (2017)</i>	<i>Oregon (2017 - Preliminary)</i>	<i>Washington (2017)</i>	<i>Alaska (2015)</i>
		424	64	97.5	39.56
Baseline	0.256	0.060%	0.40%	0.26%	0.65%
Alternative 1	0.256	0.060%	0.40%	0.26%	0.65%
Alternative 2	0.268	0.063%	0.42%	0.27%	0.68%

Note: The states' referenced GHG emissions are based on the latest published data, listed below.

Sources: Alaska Department of Environmental Conservation (2018), California Air Resources Board (2020), Oregon Global Warming Commission (2018), State of Washington Department of Ecology (2018)

3.2.3.3 Summary of Potential National Environmental Policy Act Impacts (Combined Impacts of All Stressors) on Air Quality

3.2.3.3.1 Alternative 1 and Alternative 2

Approximately one half of emissions associated with Study Area training and testing under both Alternative 1 and Alternative 2 would occur beyond state waters. Fixed-wing aircraft emissions typically occur above the 3,000 ft. mixing layer. Given these characteristics, the impacts on air quality from the combination of these resource stressors are expected to be similar to the impacts on air quality for any of these stressors taken individually without any additive, synergistic, or antagonistic interaction. Emissions of criteria pollutants and hazardous air pollutants are expected to increase under Alternative 1 and Alternative 2 compared to the 2015 NWTT Final EIS/OEIS Preferred Alternative emissions. Net increase of emissions of criteria pollutants beyond state waters are below relevant screening thresholds. Within state waters, a comparison of estimated emissions under Alternative 1 to the baseline indicates that most pollutant emissions would be reduced. Any increases within state waters would be below relevant screening thresholds. Beyond state waters, net increase of emissions of criteria pollutants under Alternative 2, are below relevant screening thresholds, and any increases within state waters would be below relevant screening thresholds.

Emissions of hazardous air pollutants are intermittent and dispersed over a vast ocean area. Negligible amounts of hazardous air pollutants would be emitted into the lower atmosphere, well mixed over the ocean, and not located near publicly accessible areas. Therefore, the potential for public exposure is very low and the health risks presented by the emissions are similarly very low. Therefore, a quantitative evaluation of hazardous air pollutant emissions is thus not warranted and was not conducted.

For Alternative 1, the estimated total Study Area GHG emissions, presented in carbon dioxide equivalent, range from 0.06 percent of the total carbon dioxide equivalent emissions generated by the activities conducted in California in 2017 to approximately 0.68 percent of the total carbon dioxide equivalent emissions generated by activities conducted in Alaska in 2015. For Alternative 2, the estimated total Study Area GHG emissions, presented in carbon dioxide equivalent, range from 0.06 percent of the total carbon dioxide equivalent emissions generated by the activities conducted in California in 2016 to approximately 0.66 percent of the total carbon dioxide equivalent emissions generated by activities conducted in Alaska in 2015.

3.2.3.3.2 No Action Alternative

Under the No Action Alternative analyzed in this Supplemental, the Navy would not conduct proposed at-sea training and testing activities in the NWTT Study Area. Air emissions, as listed above, would not be introduced into the marine environment. Therefore, existing environmental conditions would either remain unchanged or would improve slightly after cessation of ongoing training and testing activities.

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