

APPENDIX C

Air Quality Emissions Calculations and Record of Non-Applicability

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Draft
Environmental Impact Statement/Overseas Environmental Impact Statement
Atlantic Fleet Training and Testing

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APPENDIX C AIR QUALITY EMISSIONS CALCULATIONS AND RECORD OF NON-APPLICABILITY

This appendix discusses emission factor development and calculations including assumptions employed in the analyses presented in the Air Quality section of Chapter 3 (Section 3.1).

C.1 AIR QUALITY EXAMPLE CALCULATIONS

C.1.1 SURFACE ACTIVITIES EMISSIONS

Surface activities consist of activities associated with boat and vessel traffic. Fleet training activities incorporate a variety of marine vessels including cruisers, destroyers, frigates, carriers, riverine vessels, and rigid hull inflatable boats. Larger vessels also have generators operating onboard to provide electricity for non-propulsion functions. Each of these vessels incorporates different propulsion methods such as marine outboard engines, diesel engines, and gas turbines. Calculations are based on the combustion of fossil fuels (primarily diesel) in these engines and the time they run.

C.1.1.1.1 Marine Outboard Engines

The U.S. Environmental Protection Agency (USEPA) has published emissions factors for air pollutants produced by several types of two-stroke and four-stroke outboard engines. These engines are operated on a variety of small boats and vessels involved in nearshore training and testing activities. Emission factors were obtained from USEPA NONROAD documentation for Compression Ignition and Spark Ignition engines.

Emissions estimates for surface craft utilizing outboard engines were calculated using USEPA NONROAD factors multiplied by the engine horsepower and hours of operation.

$$\text{Emissions} = \text{HP} \times \text{HR/YR} \times \text{EF} \times \text{ENG}$$

Where:

Emissions = Surface craft Emissions (pound per year)

HP = Horsepower (reflective of a particular load factor/engine power setting)

HR/YR = Hours per year

EF = Emission factor for specific engine type ENG = Number of engine

To determine the entire project emissions, a calculation was conducted for each surface vessel type and for each pollutant and converted to tons, then compared to the baseline Study Area emissions. The baseline is defined as the training and testing identified as the Preferred Alternative in the Atlantic Fleet Forces Training and Testing Final Environmental Impact Statement/Overseas Environmental Impact Statement released in August 2013. These values were summed according to the appropriate pollutant to provide the cumulative emissions associated with surface vessel emissions activities.

C.1.1.1.2 Diesel Engines

Large vessel emissions were calculated in a similar fashion using emission factors from the Naval Sea Systems Command Navy and Military Sealift Command Marine Engine Fuel Consumption and Emission Calculator for the propulsion system and the supplemental ship service generator(s).

Diesel engine emission factors were multiplied by the engine horsepower and annual hours of operation to calculate the pounds of pollutant emissions per year. This value was then converted to a tons per year value for comparison with the Study Area total summed emissions on an individual pollutant basis.

C.1.2 AIR ACTIVITIES EMISSIONS

Fleet training and Naval Air Systems Command testing consists of various activities associated with airplanes or helicopters. Aircraft activities of concern are those that occur from ground level up to 3,000 feet (ft.) above ground level. The 3,000 ft. above ground level ceiling is the default atmospheric mixing height above which any pollutant generated would not contribute to increased pollutant concentrations at ground level (known as the mixing zone). All pollutant emissions from aircraft generated greater than 3,000 ft. (914 m) above ground level are excluded from this analysis. The pollutant emission rate is a function of the engine's operating mode, the fuel flow rate, and the engine's overall efficiency. Emissions for one complete flight for a particular aircraft are calculated by knowing the specific engine pollutant emission factors for each mode of operation.

For this EIS/OEIS, emission factors for most military engines were obtained from Navy's Aircraft Environmental Support Office (AESO) memoranda. For those aircraft for which engine data from AESO was unavailable, applicable data from other reputable data sources was used. Emissions factors vary depending on engine power mode, time in each mode, and fuel flow. Using these data, as well as information on hours of cruise time and number of landing/takeoff activities on a vessel, pollutant emissions for each aircraft and activity were calculated by applying the equation below.

$$\text{Emissions} = \text{TIM} \times \text{FF} \times \text{EF} \times \text{ENG} \times \text{CF}$$

Where:

Emissions = Aircraft Emissions (lb. per activity) (for EF in lb./1000 gallon fuel) TIM = Time-in-mode at a specified power setting (hr/activity).

FF = Fuel flow at a specified power setting (gallons/hr/engine)

EF = Emission factor for specific engine type and power setting (lb./1000 gallons of fuel used) ENG = Number of engines on aircraft

As the equation indicates, emissions were estimated by first calculating total fuel used in each of the different modes with the appropriate emission factor.

C.1.3 ORDNANCE AND MUNITIONS EMISSIONS

Available emissions factors (AP-42, Compilation of Air Pollutant Emission Factors) were utilized. These factors were then multiplied by the net weight of the explosive (or a conversion factor for pounds per item) and the number of times that the munition was used during a designated time frame. This calculation provided annual pounds per year of emissions, which were converted to tons per year for comparison purposes.

$$\text{Emissions} = \text{EXP/YR} \times \text{EF}$$

Where:

Emissions = Ordnance Emissions (lb. per year)

EXP/YR = Explosives, propellants, and pyrotechnics used per year EF = Emissions factor

C.1.4 RECORD OF NON-APPLICABILITY

A Record of Non-Applicability For Clean Air Act Conformity has been prepared in accordance with the Navy Guidance for Compliance with the Clean Air Act General Conformity Rule (30 July 2013) and is included on the following page.

C.1.5 EMISSIONS ESTIMATES SPREADSHEETS

The following spreadsheets (Tabs A - P) contain data used for the emissions calculations for vessels, aircraft, and munitions, respectively.

TAB A: Appendix C: Air Quality Emissions Estimates

Appendix Organization

Tab A	Appendix C Introduction
Tab B	Baseline (Preferred Alternative from V2)
Tab C	Emissions Summary
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Acronyms

A/C	aircraft
AESO	Aircraft Environmental Support Office
CO	Carbon monoxide
gal	gallon
GPH	gallons per hour
HC	hydrocarbons
hp	horsepower
hr	hour
lb	pound
NM	nautical mile
NOx	Nitrogen oxides
PM	Particulate matter
SOx	Sulfur dioxide
VOC	Volatile organic compounds
yr	year

Data Organization

Designation^a	Relationship to EPA Region (coastal states)
Northeast OPAREA	Region 1: Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut Region 2: New York and New Jersey
VACAPES OPAREA	Region 3: Delaware, Virginia
Cherry Pt OPAREA	Region 4: North Carolina, South Carolina, Georgia
JAX OPAREA	Region 4: Florida
Key West OPAREA	Region 4: Florida
GOMEX OPAREA	Region 4: Florida and Alabama Region 6: Louisiana, Texas
Outside Range Complexes	Other locations within the Study Area that are not in the OPAREA boundaries

^a the OPAREA designation includes adjacent state waters. These are also separately delineated in the calculations.

TAB B: Baseline (Preferred Alternative in the Atlantic Fleet Forces Training and Testing Final Environmental Impact Statement/Overseas Environmental Impact Statement released in August 2013)

Table 1. Estimated Annual Criteria Air Pollutant Emissions from Training, Alternative 2

Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Northeast Range Complex						
State waters (0-3 nm)						
Aircraft	0.04	0.17	0.01	0.01	0.04	0.04
Vessel	0.24	0.25	0.10	0.05	0.01	0.01
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.27	0.42	0.11	0.06	0.05	0.05
Waters of the U.S. (3-12 nm)						
Aircraft	0.02	0.07	0.00	0.00	0.02	0.02
Vessel	0.52	0.63	0.28	0.12	0.01	0.01
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.54	0.71	0.29	0.12	0.03	0.03
International waters (>12 nm)						
Aircraft	0.76	3.13	0.16	0.15	0.76	0.76
Vessel	5.84	6.38	0.51	1.28	0.14	0.14
Ordnance	0.04	0.00	0.00	0.00	0.03	0.03
Total	6.64	9.50	0.68	1.43	0.92	0.90
Total for Northeast Range Complex	0.81	3.37	0.17	0.16	0.81	0.81
Aircraft	0.81	3.37	0.17	0.16	0.81	0.81
Vessel	5.84	6.38	0.51	1.28	0.14	0.14
Ordnance	0.04	0.00	0.00	0.00	0.03	0.03
Total	7.46	10.63	1.07	1.61	1.00	0.98
				Percent In-State		0.04
Virginia Capes Range Complex						
State waters (0-3 nm)						
Aircraft	24.43	25.29	2.16	1.58	8.27	8.27
Vessel	1.49	30.89	2.92	3.37	0.20	0.20
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	25.92	56.18	5.08	4.94	8.47	8.47
Waters of the U.S. (3-12 nm)						
Aircraft	1.98	2.14	0.18	0.13	0.69	0.69
Vessel	124.12	81.21	19.50	25.76	2.35	2.35
Ordnance	2.27	0.09	0.00	0.00	0.13	0.09
Total	128.38	83.45	19.68	25.89	3.17	3.13
International waters (>12 nm)						
Aircraft	22.81	52.66	2.70	2.19	13.35	13.35
Vessel	593.25	390.35	56.02	182.75	16.80	16.80
Ordnance	20.47	0.82	0.00	0.00	1.21	0.79
Total	636.53	443.84	58.72	184.94	31.37	30.94
Total for Virginia Capes Range Complex	49.22	80.10	5.04	3.90	22.31	22.31
Aircraft	49.22	80.10	5.04	3.90	22.31	22.31
Vessel	718.86	502.46	78.43	211.87	19.36	19.36
Ordnance	22.75	0.91	0.00	0.00	1.35	0.87
Total	790.82	583.47	83.48	215.77	43.01	42.54
				Percent In-State		0.06
Cherry Point Range Complex						
State waters (0-3 nm)						
Aircraft	5.74	5.82	0.52	0.36	1.85	1.85
Vessel	16.35	34.36	2.46	35.46	3.09	3.09
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	22.09	40.18	2.98	35.82	4.94	4.94
Waters of the U.S. (3-12 nm)						
Aircraft	0.86	0.89	0.07	0.05	0.30	0.30
Vessel	41.97	46.86	4.88	36.63	3.48	3.48
Ordnance	0.56	0.01	0.00	0.00	0.01	0.01
Total	43.39	47.76	4.95	36.69	3.79	3.78
International waters (>12 nm)						
Aircraft	19.72	187.44	2.59	5.56	42.85	42.85
Vessel	858.49	472.22	72.86	191.08	14.90	14.90

Table 2. Estimated Annual Criteria Air Pollutant Emissions from Training, Alternative 2

Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Northeast Range Complex						
State waters (0-3 nm)						
Aircraft	0.01	0.03	0.00	0.00	0.01	0.01
Vessel	0.98	2.45	0.08	0.39	0.06	0.06
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.99	2.48	0.08	0.39	0.08	0.07
Waters of the U.S. (3-12 nm)						
Aircraft	0.26	0.28	0.02	0.01	0.08	0.08
Vessel	3.34	3.25	0.30	0.78	0.08	0.08
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	3.61	3.53	0.32	0.80	0.17	0.17
International waters (>12 nm)						
Aircraft	1.27	1.76	0.14	0.11	0.54	0.54
Vessel	62.53	40.17	5.75	19.02	1.70	1.70
Ordnance	0.02	0.00	0.00	0.00	0.01	0.00
Total	63.83	41.93	5.89	19.12	2.25	2.25
Total for Northeast Range Complex	1.54	2.06	0.16	0.12	0.64	0.64
Aircraft	1.54	2.06	0.16	0.12	0.64	0.64
Vessel	66.86	47.03	6.12	20.13	1.85	1.85
Ordnance	0.02	0.00	0.00	0.00	0.01	0.00
Total	68.42	49.06	6.29	20.31	2.50	2.49
				Percent In-State		0.04
Virginia Capes Range Complex						
State waters (0-3 nm)						
Aircraft	1.29	1.34	0.11	0.08	0.44	0.44
Vessel	1.91	3.02	0.16	0.48	0.06	0.06
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	3.20	4.36	0.27	0.57	0.50	0.50
Waters of the U.S. (3-12 nm)						
Aircraft	1.80	1.86	0.16	0.12	0.61	0.61
Vessel	18.91	13.84	1.75	4.08	0.39	0.39
Ordnance	0.41	0.02	0.00	0.00	0.06	0.04
Total	21.11	15.72	1.91	4.19	1.06	1.04
International waters (>12 nm)						
Aircraft	12.14	17.10	1.15	0.88	4.96	4.96
Vessel	289.14	171.96	25.43	67.95	5.71	5.71
Ordnance	3.65	0.17	0.00	0.00	0.52	0.35
Total	304.94	189.24	26.58	68.83	11.19	11.01
Total for Virginia Capes Range Complex	15.23	20.30	1.42	1.07	6.01	6.01
Aircraft	15.23	20.30	1.42	1.07	6.01	6.01
Vessel	309.96	188.84	27.34	72.51	6.16	6.16
Ordnance	4.06	0.19	0.00	0.00	0.58	0.39
Total	329.25	209.32	28.76	73.59	12.74	12.55
				Percent In-State		0.01
Cherry Point Range Complex						
State waters (0-3 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.52	2.21	0.00	0.23	0.04	0.04
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.52	2.21	0.00	0.23	0.04	0.04
Waters of the U.S. (3-12 nm)						
Aircraft	0.06	0.06	0.01	0.01	0.03	0.03
Vessel	0.72	1.30	0.08	0.26	0.03	0.03
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.82	1.40	0.09	0.26	0.06	0.06
International waters (>12 nm)						
Aircraft	3.99	4.33	0.36	0.27	1.39	1.39
Vessel	32.86	22.86	3.25	12.87	1.22	1.22

Ordnance	5.00	0.13	0.00	0.00	0.13	0.07
Total	883.21	659.79	75.44	196.63	57.88	57.82
Total for Cherry Point Range Complex						
Aircraft	26.32	194.15	3.18	5.97	45.00	45.00
Vessel	916.81	553.44	81.20	266.17	21.47	21.47
Ordnance	0.00	0.15	0.00	0.00	0.14	0.07
Total	943.69	747.79	84.37	272.14	66.61	66.54
Percent In-State						
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Jacksonville Range Complex						
State waters (0-3 nm)						
Aircraft	5.07	5.97	0.48	0.36	1.86	1.86
Vessel	4.75	9.78	3.02	6.38	0.56	0.56
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	9.85	15.76	3.49	6.74	2.41	2.41
Waters of the U.S. (3-12 nm)						
Aircraft	1.98	2.36	0.19	0.14	0.74	0.74
Vessel	73.58	50.01	14.31	19.36	1.68	1.68
Ordnance	1.24	0.05	0.00	0.00	0.13	0.08
Total	76.81	52.43	14.50	19.50	2.55	2.49
International waters (>12 nm)						
Aircraft	31.53	214.14	4.32	6.83	49.42	49.42
Vessel	758.55	440.02	65.38	182.66	15.09	15.09
Ordnance	11.18	0.49	0.00	0.00	1.15	0.88
Total	801.28	654.64	69.72	189.53	65.65	65.19
Total for Jacksonville Range Complex						
Aircraft	38.60	222.48	4.55	7.33	52.02	52.02
Vessel	836.93	499.81	82.72	208.44	17.33	17.33
Ordnance	12.42	0.54	0.00	0.00	1.28	0.75
Total	887.95	722.88	87.27	215.77	70.62	70.10
Percent In-State						
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Key West Range Complex						
State waters (0-3 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.01	0.34	0.00	0.04	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.34	0.00	0.04	0.00	0.00
Waters of the U.S. (3-12 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.00	0.00	0.00	0.00	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00
International waters (>12 nm)						
Aircraft	10.07	10.37	0.89	0.65	3.40	3.40
Vessel	0.00	0.00	0.00	0.00	0.00	0.00
Ordnance	0.83	0.01	0.00	0.00	0.02	0.01
Total	10.90	10.38	0.89	0.65	3.41	3.41
Total for Key West Range Complex						
Aircraft	10.07	10.37	0.89	0.65	3.40	3.40
Vessel	0.01	0.34	0.00	0.04	0.00	0.00
Ordnance	0.83	0.01	0.00	0.00	0.02	0.01
Total	11.00	10.72	0.89	0.69	3.42	3.41
Percent In-State						
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Gulf of Mexico Range Complex						
State waters (0-3 nm)						
Aircraft	4.34	4.45	0.38	0.28	1.46	1.46
Vessel	0.05	3.32	0.14	0.36	0.02	0.02
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.43	7.77	0.53	0.63	1.48	1.48
Waters of the U.S. (3-12 nm)						
Aircraft	0.04	0.05	0.00	0.00	0.01	0.01
Vessel	2.41	1.70	0.59	0.56	0.05	0.05
Ordnance	0.16	0.00	0.00	0.00	0.01	0.01

Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	36.86	27.19	3.61	13.13	2.61	2.61
Total for Cherry Point Range Complex						
Aircraft	4.08	4.43	0.37	0.27	1.42	1.42
Vessel	34.12	26.38	3.37	13.35	1.29	1.29
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	38.20	30.80	3.74	13.62	2.72	2.71
Percent In-State						
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Jacksonville Range Complex						
State waters (0-3 nm)						
Aircraft	0.01	0.03	0.00	0.00	0.01	0.01
Vessel	0.72	2.32	0.06	0.26	0.04	0.04
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.72	2.35	0.06	0.27	0.05	0.05
Waters of the U.S. (3-12 nm)						
Aircraft	0.43	0.45	0.04	0.03	0.15	0.15
Vessel	10.27	9.28	1.06	1.97	0.23	0.23
Ordnance	0.17	0.00	0.00	0.00	0.02	0.01
Total	10.86	9.73	1.10	2.00	0.39	0.39
International waters (>12 nm)						
Aircraft	5.77	6.98	0.54	0.40	2.14	2.14
Vessel	98.10	74.85	9.56	28.51	2.90	2.90
Ordnance	1.52	0.00	0.00	0.00	0.15	0.12
Total	105.39	81.83	10.09	28.91	5.21	5.16
Total for Jacksonville Range Complex						
Aircraft	6.21	7.33	0.58	0.43	2.30	2.30
Vessel	104.09	86.49	10.67	30.75	3.17	3.17
Ordnance	1.69	0.05	0.00	0.00	0.18	0.13
Total	111.98	93.91	11.25	31.18	5.65	5.59
Percent In-State						
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Key West Range Complex						
State waters (0-3 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.05	0.07	0.00	0.01	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.05	0.07	0.00	0.01	0.00	0.00
Waters of the U.S. (3-12 nm)						
Aircraft	0.11	0.01	0.01	0.03	0.03	0.03
Vessel	1.11	0.89	0.11	0.29	0.03	0.03
Ordnance	0.01	0.00	0.00	0.00	0.00	0.00
Total	1.23	1.00	0.12	0.30	0.06	0.06
International waters (>12 nm)						
Aircraft	0.42	0.48	0.04	0.03	0.15	0.15
Vessel	7.85	5.89	0.74	1.91	0.18	0.18
Ordnance	0.11	0.03	0.00	0.00	0.00	0.00
Total	8.38	6.40	0.78	1.94	0.34	0.34
Total for Key West Range Complex						
Aircraft	0.52	0.59	0.05	0.04	0.19	0.19
Vessel	9.02	6.85	0.96	2.22	0.21	0.21
Ordnance	0.12	0.03	0.00	0.00	0.00	0.00
Total	9.66	7.47	0.90	2.25	0.41	0.40
Percent In-State						
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Gulf of Mexico Range Complex						
State waters (0-3 nm)						
Aircraft	3.86	3.96	0.34	0.25	1.30	1.30
Vessel	1.32	2.76	0.11	0.38	0.05	0.05
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	5.18	6.72	0.45	0.63	1.35	1.35
Waters of the U.S. (3-12 nm)						
Aircraft	1.43	1.47	0.13	0.09	0.48	0.48
Vessel	4.11	4.23	0.46	2.51	0.25	0.25
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00

Total	2.62	1.74	0.59	0.57	0.08	0.08
International waters (>12 nm)						
Aircraft	3.57	6.98	0.34	0.32	1.91	1.91
Vessel	69.18	40.81	6.23	18.34	1.58	1.58
Ordnance	1.48	0.03	0.00	0.00	0.10	0.06
Total	74.23	47.82	6.57	18.66	3.59	3.55
Total for GOMEX Range Complex						
Aircraft	7.95	11.47	0.73	0.60	3.38	3.38
Vessel	71.68	45.83	6.95	19.26	1.65	1.65
Ordnance	1.64	0.03	0.00	0.00	0.11	0.07
Total	81.27	57.33	7.69	19.85	5.15	5.11
				Percent In-State		0.09
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Other AFTT Areas (Outside Range Complexes)						
State waters (0-3 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.13	0.11	0.13	0.03	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.13	0.11	0.13	0.03	0.00	0.00
Waters of the U.S. (3-12 nm)						
Aircraft	0.00	0.07	0.00	0.00	0.02	0.02
Vessel	6.44	4.61	0.95	1.41	0.13	0.13
Ordnance	0.05	0.01	0.00	0.00	0.00	0.00
Total	6.50	4.69	0.95	1.41	0.15	0.15
International waters (>12 nm)						
Aircraft	0.42	0.45	0.05	0.02	0.13	0.13
Vessel	26.01	19.79	2.37	7.75	0.73	0.73
Ordnance	0.78	0.07	0.00	0.00	0.02	0.01
Total	27.22	20.32	2.42	7.77	0.87	0.87
Total for Other AFTT Areas (Outside Range Complexes)						
Aircraft	0.49	0.52	0.06	0.03	0.15	0.15
Vessel	32.57	24.51	3.45	9.18	0.86	0.86
Ordnance	0.87	0.08	0.00	0.00	0.02	0.02
Total	33.93	25.12	3.51	9.21	1.03	1.03
				Percent In-State		0.01
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Total for AFTT Study Area (Training-Related Emissions)						
State waters (0-3 nm)						
Aircraft	39.62	41.70	3.55	2.58	13.47	13.47
Vessel	23.08	79.06	9.77	45.68	3.89	3.89
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	62.70	120.76	13.32	48.26	17.35	17.35
Waters of the U.S. (3-12 nm)						
Aircraft	4.94	5.58	0.45	0.34	1.78	1.78
Vessel	249.06	185.02	40.51	86.84	7.71	7.71
Ordnance	4.42	0.17	0.00	0.00	0.29	0.18
Total	258.42	190.77	40.96	87.18	9.78	9.67
International waters (>12 nm)						
Aircraft	88.90	475.16	11.06	15.72	111.81	111.81
Vessel	2,311.32	1,369.57	203.38	583.89	49.24	49.24
Ordnance	32.79	1.56	0.00	0.00	2.65	1.62
Total	2,440.01	1,846.29	214.44	599.61	163.70	162.68
Total for Study Area Complexes						
Aircraft	133.47	522.44	15.06	18.64	127.06	127.06
Vessel	2583.45	1633.66	253.66	716.40	60.83	60.83
Ordnance	44.21	1.79	0.00	0.00	2.94	1.80
Total	2761.13	2157.89	268.72	735.04	190.84	189.70

Total	5.54	5.70	0.58	2.60	0.73	0.73
International waters (>12 nm)						
Aircraft	1.12	1.43	0.11	0.09	0.45	0.45
Vessel	23.88	20.61	2.62	14.08	1.36	1.36
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	25.00	22.03	2.73	14.16	1.81	1.81
Total for GOMEX Range Complex						
Aircraft	6.42	6.87	0.58	0.43	2.23	2.23
Vessel	29.30	27.65	3.18	16.96	1.67	1.67
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	35.72	34.47	3.76	17.39	3.89	3.89
				Percent In-State		0.16
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Other AFTT Areas (Outside Range Complexes)						
State waters (0-3 nm)						
Aircraft	0.01	0.02	0.00	0.00	0.01	0.01
Vessel	0.04	0.04	0.00	0.01	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.04	0.06	0.00	0.01	0.01	0.01
Waters of the U.S. (3-12 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.65	0.62	0.00	0.20	0.02	0.02
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.65	0.62	0.00	0.20	0.02	0.02
International waters (>12 nm)						
Aircraft	0.10	0.40	0.02	0.02	0.11	0.11
Vessel	4.84	4.37	0.51	1.35	0.15	0.15
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.95	4.85	0.54	1.37	0.26	0.26
Total for Other AFTT Areas (Outside Range Complexes)						
Aircraft	0.11	0.52	0.03	0.02	0.12	0.12
Vessel	5.53	5.05	0.56	1.56	0.17	0.17
Ordnance	0.00	0.00	0.00	0.00	0.01	0.00
Total	5.64	5.57	0.61	1.58	0.30	0.29
				Percent In-State		0.01
Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Total for AFTT Study Area (Training-Related Emissions)						
State waters (0-3 nm)						
Aircraft	5.16	5.40	0.46	0.34	1.78	1.78
Vessel	5.55	14.00	0.45	1.77	0.26	0.26
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	10.71	19.40	0.91	2.10	2.02	2.01
Waters of the U.S. (3-12 nm)						
Aircraft	4.11	4.28	0.37	0.27	1.40	1.40
Vessel	39.12	33.43	3.83	10.08	1.03	1.03
Ordnance	0.59	0.03	0.00	0.00	0.08	0.05
Total	43.82	37.74	4.19	10.35	2.51	2.48
International waters (>12 nm)						
Aircraft	24.84	32.48	2.36	1.79	9.75	9.75
Vessel	514.21	340.77	47.86	145.69	13.22	13.22
Ordnance	5.30	0.24	0.00	0.00	0.70	0.47
Total	544.34	373.49	50.22	147.48	23.67	23.44
Total for Study Area Complexes						
Aircraft	34.11	42.15	3.18	2.39	12.91	12.90
Vessel	558.87	388.21	52.14	157.54	14.51	14.51
Ordnance	5.89	0.26	0.00	0.00	0.78	0.52
Total	598.88	430.62	55.32	159.93	28.20	27.93

Waters of the U.S. (3-12 nm)						
Aircraft	0.06	0.07	0.01	0.00	0.02	0.02
Vessel	6.44	4.61	0.95	1.41	0.13	0.13
Ordnance	0.09	0.01	0.00	0.00	0.00	0.00
Total	6.59	4.69	0.96	1.41	0.16	0.16
International waters (>12 nm)						
Aircraft	0.42	0.45	0.05	0.02	0.13	0.13
Vessel	26.01	19.79	2.37	7.75	0.73	0.73
Ordnance	0.78	0.07	0.00	0.00	0.02	0.01
Total	27.22	20.32	2.42	7.77	0.87	0.87
Total for Other AFTT Areas (Outside Range Complexes)						
Aircraft	0.49	0.52	0.06	0.03	0.15	0.15
Vessel	32.57	24.51	3.45	9.18	0.86	0.86
Ordnance	0.87	0.08	0.00	0.00	0.02	0.02
Total	33.93	25.12	3.51	9.21	1.03	1.03
Percent In-State						
						0.01
Source	CO	NOx	VOC	SOx	PM10	PM2.5
Total for AFTT Study Area (Training-Related Emissions)						
State waters (0-3 nm)						
Aircraft	39.62	41.70	3.55	2.58	13.47	13.47
Vessel	23.08	79.06	9.77	45.68	3.89	3.89
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	62.70	120.76	13.32	48.26	17.35	17.35
Waters of the U.S. (3-12 nm)						
Aircraft	4.94	5.58	0.45	0.34	1.78	1.78
Vessel	249.06	185.02	40.51	86.84	7.71	7.71
Ordnance	4.42	0.17	0.00	0.00	0.29	0.18
Total	258.42	190.77	40.96	87.18	9.78	9.67
International waters (>12 nm)						
Aircraft	88.90	475.16	11.06	15.72	111.81	111.81
Vessel	2,311.32	1,369.57	203.38	583.89	49.24	49.24
Ordnance	39.79	1.56	0.00	0.00	2.65	1.62
Total	2440.01	1846.29	214.44	599.61	163.70	162.68
Total for Study Area Complexes						
Aircraft	133.47	522.44	15.06	18.64	127.06	127.06
Vessel	2583.45	1633.66	253.66	716.40	60.83	60.83
Ordnance	44.21	1.73	0.00	0.00	2.94	1.80
Total	2761.13	2157.83	268.72	735.04	190.84	189.70

Waters of the U.S. (3-12 nm)						
Aircraft	0.00	0.01	0.00	0.00	0.00	0.00
Vessel	0.65	0.65	0.07	0.20	0.02	0.02
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.65	0.66	0.07	0.20	0.03	0.03
International waters (>12 nm)						
Aircraft	0.10	0.49	0.02	0.02	0.11	0.11
Vessel	4.84	4.37	0.51	1.35	0.15	0.15
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.95	4.85	0.54	1.37	0.26	0.26
Total for Other AFTT Areas (Outside Range Complexes)						
Aircraft	0.11	0.52	0.03	0.02	0.12	0.12
Vessel	5.53	5.05	0.59	1.56	0.17	0.17
Ordnance	0.00	0.00	0.00	0.00	0.01	0.00
Total	5.64	5.57	0.61	1.58	0.30	0.29
Percent In-State						
						0.01
Source	CO	NOx	VOC	SOx	PM10	PM2.5
Total for AFTT Study Area (Testing-Related Emissions)						
State waters (0-3 nm)						
Aircraft	5.16	5.40	0.46	0.34	1.76	1.76
Vessel	5.55	14.00	0.45	1.77	0.26	0.26
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	10.71	19.40	0.91	2.10	2.02	2.01
Waters of the U.S. (3-12 nm)						
Aircraft	4.11	4.28	0.37	0.27	1.40	1.40
Vessel	39.12	33.43	3.83	10.08	1.03	1.03
Ordnance	0.59	0.03	0.00	0.00	0.08	0.05
Total	43.82	37.74	4.19	10.35	2.51	2.48
International waters (>12 nm)						
Aircraft	24.84	32.48	2.36	1.79	9.75	9.75
Vessel	514.21	340.77	47.86	145.69	13.22	13.22
Ordnance	5.30	0.24	0.00	0.00	0.70	0.47
Total	544.34	373.49	50.22	147.48	23.67	23.44
Total for Study Area Complexes						
Aircraft	34.11	42.15	3.18	2.39	12.91	12.90
Vessel	558.87	388.21	52.14	157.54	14.51	14.51
Ordnance	5.89	0.26	0.00	0.00	0.78	0.52
Total	598.88	430.62	55.32	159.93	28.20	27.93

TAB C: SUMMARY

Table 1. Vessel Emissions by OPAREA - outside of state waters

	Annual Totals in Tons per Year for Alternative 1						Annual Totals in Tons per Year for Alternative 2					
	VOCs	CO	NO _x	SO _x	PM ₁₀	CO ₂	VOCs	CO	NO _x	SO _x	PM ₁₀	CO ₂
Northeast	1.16	6.40	31.88	10.44	1.45	5,562	0.09	2.11	4.10	0.62	0.20	299
VACAPES	108.16	755.43	3404.96	932.48	107.62	502,660	101.79	727.45	3648.88	1,011.04	118.40	520,979
Cherry Pt	94.68	284.43	802.71	158.70	24.96	71,511	23.99	121.50	705.50	177.83	27.17	62,978
JAX	33.10	348.88	972.25	291.31	26.82	156,452	44.41	480.49	1,887.41	522.95	54.12	273,108
Key West	2.69	8.29	75.07	12.32	1.85	6,222	0.99	8.18	25.22	9.25	0.89	4,581
GOMEX	2.28	105.76	404.09	104.66	14.44	54,197	0.99	11.78	47.91	15.77	1.79	9,488
Outside RCs	52.75	822.52	1672.05	375.87	46.14	215,401	138.74	525.89	4,088.86	641.55	80.41	326,174

Table 2. Vessel Emissions by OPAREA - inside of state waters

	Annual Totals in Tons per Year for Alternative 1						Annual Totals in Tons per Year for Alternative 2					
	VOCs	CO	NO _x	SO _x	PM ₁₀	CO ₂	VOCs	CO	NO _x	SO _x	PM ₁₀	CO ₂
Northeast	0.03	0.09	0.92	0.19	0.02	.99	0.01	0.02	0.27	0.02	0.00	.8
VACAPES	2.26	12.79	71.24	18.94	2.21	11,587	2.48	15.19	75.27	19.35	2.43	11,601
Cherry Pt	0.08	0.27	2.17	0.46	0.06	297	0.05	0.17	1.47	0.29	0.09	151
JAX	0.33	2.63	11.08	2.97	0.35	1,889	0.51	3.56	17.11	4.16	0.60	2,593
Key West	0.02	0.07	0.62	0.20	0.03	102	0.01	0.09	0.57	0.06	0.01	91
GOMEX	0.06	0.43	1.43	0.24	0.05	112	0.01	0.09	0.31	0.03	0.00	14
Outside RCs	0.10	0.42	2.38	0.49	0.07	273	2.20	28.36	66.05	11.62	2.61	6,833

Table 3. Small Boat and Riverine Vessels by OPAREA

	Alt 1 & Alt 2					
	VOCs	CO	NO _x	SO _x	PM ₁₀	CO ₂
Northeast	5.0	30.7	230.1	42.6	4.4	18,513
VACAPES	10.5	210.4	325.6	100.8	10.3	51,568
Chesapeake Bay	91.9	393.7	2,318.4	496.9	49.1	209,767
Charleston	0.4	2.2	87.8	5.1	0.3	7,362
JAX	1.5	5.1	51.3	8.2	1.2	4,039
Cape Canaveral/ SE						
FL	5.1	35.9	226.4	44.6	4.2	16,628
Key West	0.0	0.1	0.9	0.1	0.0	.59
Panama City	0.84	8.99	11.98	3.68	5.73	6.77
GOMEX	1.49	5.21	48.59	7.71	1.18	1.44
Outside RCs	0.10	0.42	2.38	0.49	0.07	273

Table 4. Aircraft Emissions by OPAREA

Area	Annual Totals in Tons per Year for Alternative 1						Annual Totals in Tons per Year for Alternative 2					
	VOCs	CO	NO _x	SO _x	PM ₁₀	CO ₂	VOCs	CO	NO _x	SO _x	PM ₁₀	CO ₂
Northeast	0.70	7.67	12.15	3.00	4.72	4,335	1.22	13.19	17.86	4.36	8.43	7,184
VACAPES	7.16	88.40	160.03	22.83	39.55	47,181	9.17	110.02	182.16	30.51	54.07	58,321
Cherry Pt	5.00	39.17	28.83	3.72	4.88	7,696	5.00	39.17	28.83	3.72	4.88	7,696
JAX	13.86	95.36	74.89	10.94	12.93	18,765	14.09	96.28	77.22	11.42	14.49	20,241
Key West	0.09	0.38	0.38	0.34	0.03	498	0.09	0.38	0.38	0.34	0.03	498
GOMEX	0.91	11.78	11.14	3.71	6.65	5,406	0.99	11.94	11.31	3.76	6.72	5,601
Panama City	0.79	8.44	8.65	3.00	5.67	4,352	0.99	9.99	10.23	3.55	6.71	5,148

Table 5. Aircraft Emissions within state waters boundaries by OPAREA

Area	Annual Totals in Tons per Year for Alternative 1						Annual Totals in Tons per Year for Alternative 2					
	VOCs	CO	NO _x	SO _x	PM ₁₀	CO ₂	VOCs	CO	NO _x	SO _x	PM ₁₀	CO ₂
Northeast	0	0	0	0	0	0	0	0	0	0	0	0
VACAPES	0.27	3.77	20.41	0.70	1.45	3,998	0.27	3.77	20.41	0.70	1.45	3,998
Cherry Pt	10.90	193.57	101.93	40.77	77.14	59,064	10.90	193.57	101.93	40.77	77.14	59,064
JAX	0.06	0.60	0.61	0.21	0.40	307	0.06	0.60	0.61	0.21	0.40	307
Key West	0	0	0	0	0	0	0	0	0	0	0	0
GOMEX	0.0	0.1	0.1	0.0	0.1	39	0.0	0.1	0.1	0.0	0.1	39
Panama City	0.79	8.44	8.65	3.00	5.67	4,352	0.99	9.99	10.23	3.55	6.71	5,148

Table 6. Munition Emissions by OPAREA

Location	Alternative 1								Alternative 2							
	VOC	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	Pb	VOC	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	Pb
Northeast / NUWC	0.00	0.76	0.01	0.00	3.90	2.98	0.51	0.00	0.00	0.76	0.01	0.00	3.89	2.98	0.51	0.00
Newport	0.13	61.20	1.05	0.02	168.56	129.34	49.35	0.31	0.13	61.20	1.05	0.02	168.55	129.33	49.35	0.31
Virginia Capes	0.00	17.80	0.32	0.00	5.79	4.27	10.88	0.03	0.00	17.80	0.32	0.00	5.78	4.26	10.87	0.03
Cherry Pt.	0.01	37.80	0.66	0.01	22.18	16.66	33.91	0.21	0.01	37.80	0.66	0.00	22.17	16.66	33.91	0.21
Jacksonville	0.00	3.96	0.08	0.00	0.23	0.13	2.57	0.00	0.00	3.96	0.08	0.00	0.22	0.12	2.57	0.00
Key West	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GOMEX / Panama	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
City	0.00	3.69	0.07	0.00	4.88	3.69	3.61	0.02	0.00	3.69	0.07	0.00	4.85	3.68	3.61	0.02
Other APTT	0.00	1.35	0.02	0.00	0.43	0.32	0.70	0.00	0.00	1.35	0.02	0.00	0.42	0.31	0.70	0.00
Study Area Total	0.15	126.33	2.20	0.03	205.96	157.40	101.54	0.58	0.15	126.33	2.20	0.02	205.88	157.34	101.52	0.56

Table 7. Emissions within State Water Boundaries

Area	All Emissions in State Waters, Alternative 1					All Emissions in State Waters, Alternative 2				
	VOCs	CO	NO _x	SO _x	PM	VOCs	CO	NO _x	SO _x	PM
Northeast	5.12	30.77	231.02	42.84	5.36	5.09	30.69	230.37	42.67	5.36
VACAPES	13.01	226.95	417.25	120.42	14.16	13.23	229.35	421.27	120.83	14.38
Chesapeake Bay	52.48	993.70	2318.42	496.89	60.52	52.48	993.70	2318.42	496.89	60.52
Cherry Pt.	0.08	0.27	2.17	0.46	0.06	0.05	0.17	1.47	0.29	0.09
Charleston	0.38	2.15	57.82	9.11	0.35	0.38	2.15	57.82	9.11	0.35
JAX	1.85	8.34	69.03	11.39	1.91	2.04	11.29	69.03	12.38	2.21
Cape Canaveral/ SE										
FL	5.1	35.9	226.4	44.6	5.1	5.1	35.9	226.4	44.6	5.1
Key West	0.06	0.16	1.52	0.39	0.05	0.05	0.12	1.28	0.20	0.04
Panama City	0.84	8.99	11.98	3.68	5.73	0.99	10.53	13.56	4.23	6.77
GOMEX	1.49	5.21	48.59	7.71	1.18	1.44	4.81	47.47	7.50	1.13
Outside RCs	0.10	0.42	2.38	0.49	0.07	2.60	28.36	66.05	11.62	2.61

3380.60

Table 8. Grand Total Emissions Summary

Area	Alternative 1						Alternative 2					
	VOCs	CO	NO _x	SO _x	PM	CO ₂	VOCs	CO	NO _x	SO _x	PM	CO ₂
Northeast	6.34	43.73	273.06	56.28	14.52	28,213	6.37	46.75	252.42	48.20	15.90	26,093
VACAPES	126.06	1,126.22	9,361.83	1,075.04	209.22	612,995	124.09	1,124.25	4,232.97	1,151.70	393.96	642,517
Cherry Pt	40.13	343.83	891.52	169.00	41.72	86,806	23.41	180.79	733.53	130.95	36.81	36,138
JAX	48.76	430.23	1,109.36	313.03	75.06	181,340	60.49	607.27	2,033.74	546.75	92.58	299,970
Key West	2.78	13.32	77.58	12.99	4.92	6,872	0.92	15.32	30.75	10.59	3.18	6,547
GOMEX	9.67	127.25	463.74	116.05	25.83	63,235	3.04	32.06	106.10	27.02	14.44	18,485
Outside RCs	53.64	332.74	1,683.07	363.46	55.53	220,027	162.29	569.59	4,160.17	656.71	90.15	337,156
	290	2,481	8,462	2,126	427	1,098,429	387	2,576	11,610	2,642	610	1,296,256
	-41	-1,031	5,746	1,218	203	-1,772,363	55	-936	8,894	1,734	366	-1,564,557

Table 9. Emissions Summary for the Baseline - Grand Total

Area	VOCs	CO	NO _x	SO _x	PM	CO ₂
Northeast	10.29	139.13	116.51	27.02	5.35	17,533
VACAPES	112.24	1,120.07	792.79	285.36	55.75	426,062
Cherry Pt	88.12	986.89	778.53	285.77	69.39	345,643
JAX	100.35	1,041.06	829.30	230.44	76.59	350,119
Key West	1.80	20.66	18.19	2.94	3.62	283,606
GOMEX	14.38	164.05	163.11	41.88	11.53	68,918
Outside RCs	4.12	39.57	30.69	10.79	1.33	8,114
	331.33	3512.03	2715.72	908.30	224.07	2860812

Table 10. Emissions Summary for the Baseline - State Waters

Area	VOCs	CO	NO _x	SO _x	PM	CO ₂
Northeast	3.12	64.51	60.84	5.59	2.02	6,119
VACAPES	5.35	23.12	50.54	5.51	8.97	118.45
Cherry Pt	4.02	22.62	42.40	36.05	4.58	115.06
JAX	4.98	51.70	31.26	10.50	3.11	44.16
Key West	0.01	0.06	0.41	0.05	0.00	0.54
GOMEX	2.98	48.64	56.95	4.62	4.24	31.99
Outside RCs	0.13	0.17	0.17	0.04	0.01	0.53

Table 11. Net Change for State Water Emissions

Area	Annual Totals in Tons per Year for Alternative 1					Annual Totals in Tons per Year for Alternative 2				
	VOCs	CO	NO _x	SO _x	PM	VOCs	CO	NO _x	SO _x	PM
Northeast	2.00	-39.74	170.19	37.29	3.37	1.97	-33.82	169.53	37.12	3.24
VACAPES	60.14	591.53	2675.13	611.80	65.72	60.36	593.93	2,675.15	612.21	65.94
Cherry Pt	-3.56	-20.26	17.58	-26.48	-3.97	-3.59	17.12	61.00	5.01	72.19
JAX	-3.13	-43.36	31.76	0.89	-1.20	-2.94	-40.41	37.79	2.09	-0.90
Key West	0.05	0.10	1.11	0.28	0.05	0.04	0.06	0.87	0.15	0.03
GOMEX	-0.65	-34.44	3.62	6.77	2.67	-0.55	-33.30	4.09	7.11	3.66
Outside RCs	-0.04	0.23	2.21	0.45	0.06	-2.47	28.19	65.88	11.58	2.60

Table 12. Net Change for Total Emissions

Area	Annual Totals in Tons per Year for Alternative 1						Annual Totals in Tons per Year for Alternative 2					
	VOCs	CO	NO _x	SO _x	PM	CO ₂	VOCs	CO	NO _x	SO _x	PM	CO ₂
Northeast	-3.35	-93.54	158.55	29.26	9.19	10,954	-3.92	-92.38	139.76	21.29	11.51	8,444
VACAPES	15.82	6.15	3,169.04	785.68	153.48	186,933	11.61	4.18	3,440.18	872.35	298.21	216,455
Cherry Pt	-47.99	-643.08	113.00	-116.77	-27.61	-258,837	-58.70	-806.10	15.40	-94.62	-30.52	-247,445
JAX	-51.63	-550.89	273.45	62.59	-1.89	-168,779	-53.89	-438.79	1,203.94	236.31	15.67	-50,147
Key West	0.98	7.34	39.96	10.05	1.10	276,759	-0.97	-5.54	12.56	7.66	-0.65	277,098
GOMEX	-4.71	-37.46	314.62	74.07	14.20	-3,669	-11.34	-132.59	-43.00	-34.36	-2.31	-50,439
Outside RCs	49.51	293.17	1,652.39	372.66	54.26	211,914	158.17	530.02	4,129.43	645.92	88.82	329,042

TAB D: SHIP EMISSIONS

Vessel Steaming Hours by State vs International Waters and by OpArea

		Alternative 1		Alternative 2		Alternative 1														Alternative 2														Alternative 2													
		Steaming Hrs ¹ Open Water	Steaming Hrs ¹ State Waters	Steaming Hrs ¹ Open Water	Steaming Hrs ¹ State Waters	Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons								Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons																					
		CO	NO _x	HC	SO _x	PM10	CO2	CO	NO _x	HC	SO _x	PM10	CO2	CO	NO _x	HC	SO _x	PM10	CO2	CO	NO _x	HC	SO _x	PM10	CO2	CO	NO _x	HC	SO _x	PM10	CO2																
CVN	Northeast	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	VACAPES	2,761	23.44	0.43	1.92	0.17	946	0	0.05	0.00	0.00	0.00	0.00	2	1.06	12.46	0.27	1.20	0.10	592	0	0.03	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	Cherry Pt	46	0.03	0.39	0.01	0.03	0.00	16	0	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	JAX	1,207	0.74	10.11	0.19	0.84	0.07	413	0	0.01	0.00	0.00	0.00	0	0.64	8.64	0.16	0.72	0.06	353	0	0.01	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	Key West	86	0.05	0.72	0.01	0.06	0.01	29	0	0.00	0.00	0.00	0.00	0	0.06	0.80	0.01	0.07	0.01	33	0	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	GOMEX	0	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
CG	Outside RCs	551	1	792	1	0.34	4.61	0.09	0.38	0.03	188	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.49	6.63	0.12	0.55	0.05	271	0	0.00	0.00	0.00	0.00	0.00	0														
	Northeast	91	2.81	3.76	0.20	2.53	0.11	1,136	0.01	0.14	0.00	0.05	0.01	35	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	VACAPES	6,699	207.93	286.11	14.64	190.08	8.22	85,811	1.90	19.56	0.17	7.53	0.69	4,784	125.13	172.00	8.81	114.33	4.94	51,597	1.12	11.56	0.10	4.45	0.41	2,828	0	0.03	0.00	0.00	0.00	0.00	0														
	Cherry Pt	1,122	34.53	44.93	2.43	30.68	1.27	13,641	0.03	0.29	0.00	0.11	0.01	70	16.99	22.11	1.19	15.10	0.63	6,712	0.01	0.14	0.00	0.05	0.01	35	0	0.00	0.00	0.00	0.00	0.00	0														
	JAX	2,756	85.15	113.66	5.99	76.64	3.24	34,313	0.39	4.00	0.03	1.54	0.14	978	104.55	139.50	7.35	94.08	3.98	42,118	0.47	4.85	0.04	1.87	0.17	1,187	0	0.01	0.00	0.00	0.00	0.00	0														
	Key West	47	0.1	1.46	2.01	0.10	1.34	0.06	603	0.01	0.14	0.00	0.05	0.01	35	3.69	4.79	0.26	3.28	0.14	1,455	0.00	0.01	0.00	0.01	0.00	3	0	0.00	0.00	0.00	0.00	0.00	0													
DDG-1000	GOMEX	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	Outside RCs	551	2	1704	2	16.96	22.07	1.19	15.07	0.62	6,699	0.01	0.14	0.00	0.05	0.01	35	52.43	68.09	3.68	46.54	1.93	20,680	0.03	0.29	0.00	0.11	0.01	70	0	0.00	0.00	0.00	0.00	0.00	0											
	Northeast	110	1.86	8.76	0.11	3.30	0.32	2,051	0.02	0.03	0.00	0.01	0.00	12	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	VACAPES	15,326	263.47	1226.03	15.01	462.62	44.70	287,865	7.14	10.14	0.45	4.68	0.63	3,764	279.57	1,301.47	15.92	491.07	47.44	305,545	7.42	10.53	0.46	4.86	0.66	3,908	0	0.03	0.00	0.00	0.00	0.00	0														
	Cherry Pt	47	0.81	3.76	0.05	1.42	0.14	883	0.02	0.03	0.00	0.01	0.00	12	22.90	108.56	1.30	40.89	3.94	25,371	0.02	0.03	0.00	0.01	0.00	12	0	0.00	0.00	0.00	0.00	0.00	0														
	JAX	4,875	82.68	388.38	4.70	146.41	14.12	90,970	1.14	1.62	0.07	0.75	0.10	601	91.55	430.16	5.21	162.16	15.63	100,750	1.23	1.75	0.08	0.81	0.11	649	0	0.01	0.00	0.00	0.00	0.00	0														
LCS	Key West	86	0.1	1.46	6.86	0.08	2.58	0.25	1,606	0.02	0.03	0.00	0.01	0.00	12	1.61	7.62	0.09	2.87	0.28	1,781	0.00	0.00	0.00	0.00	0.00	1	0	0.00	0.00	0.00	0.00	0.00	0													
	GOMEX	148	0.4	2.50	11.77	0.14	4.44	0.43	2,756	0.02	0.03	0.00	0.01	0.00	12	6.83	32.38	0.39	12.20	1.17	7,568	0.01	0.01	0.00	0.01	0.00	5	0	0.00	0.00	0.00	0.00	0.00	0													
	Outside RCs	7,466	254	125.05	592.57	7.10	223.20	21.48	138,495	0.18	0.26	0.01	0.12	0.02	96	55.80	244.65	3.20	92.87	9.09	58,341	6.03	8.55	0.38	3.95	0.53	3,175	0	0.03	0.00	0.00	0.00	0.00	0													
	Northeast	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	VACAPES	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	77.32	307.53	5.37	81.16	11.05	41,691	2.57	4.96	0.20	0.76	0.24	361	0	0.00	0.00	0.00	0.00	0.00	0														
	Cherry Pt	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	16.10	65.07	1.11	17.28	2.32	8,884	0.04	0.08	0.00	0.01	0.00	6	0	0.00	0.00	0.00	0.00	0.00	0														
LSD	JAX	756	17.99	71.67	1.25	18.32	2.57	9,723	0.55	1.06	0.04	0.16	0.05	77	211.19	847.33	14.63	224.38	30.35	115,306	3.28	5.02	0.28	1.03	0.33	500	0	0.03	0.00	0.00	0.00	0.00	0														
	Key West	25	0	0	0.58	2.33	0.04	0.62	0.08	319	0.00	0.00	0.00	0	0	2.77	11.21	0.19	2.98	0.40	1,531	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0													
	GOMEX	3,858	89.28	360.81	6.17	95.82	12.89	49,253	0.28	0.53	0.02	0.08	0.03	39	2.77	11.21	0.19	2.98	0.40	1,531	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0														
	Outside RCs	314	1	8592	536	7.28	29.41	0.50	7.81	1.05	4,014	0.02	0.04	0.00	0.01	0.00	3	219.42	893.26	15.34	219.45	30.64	112,580	21.20	40.90	1.64	6.24	1.98	2,979	0	0.00	0.00	0.00	0.00	0.00	0											
	Northeast	57	0.63	9.84	0.32	0.72	0.06	474	0.02	0.30	0.01	0.02	0.00	11	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0															
	VACAPES	2,756	30.42	478.18	15.52	35.19	3.05	23,014	1.14	17.22	0.58	1.29	0.06	602	26.46	415.91	13.50	30.61	2.66	20,024	0.96	14.50	0.49	1.09	0.05	507	0	0.00	0.00	0.00	0.00	0.00	0														
LHA	Cherry Pt	1,093	11.65	183.41	5.94	13.49	1.19	8,909	0.04	0.60	0.02	0.05	0.00	21	8.95	140.80	4.56	10.35	0.91	6,841	0.02	0.30	0.01	0.02	0.00	11	0	0.00	0.00	0.00	0.00	0.00	0														
	JAX	14	0	0	0.17	2.64	0.09	0.19	0.02	124	0.02	0.30	0.01	0.02	0.00	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0															
	Key West																																														

SSGN	Northeast	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	VACAPES	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	Cherry Pt	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	JAX	204	3	1920	0.01	0.41	0.01	0.02	0.00	14	0.00	0.00	0.00	0.00	0.00	0	0.11	3.89	0.07	0.22	0.02	127	0.00	0.00	0.00	0.00	0.00	0	
	Key West	566	1	888	0.03	1.15	0.02	0.07	0.01	37	0.00	0.00	0.00	0.00	0.00	0	0.05	1.80	0.03	0.10	0.01	59	0.00	0.00	0.00	0.00	0.00	0	
	GOMEX	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	Outside RCs	148	1	240	0.01	0.30	0.01	0.02	0.00	10	0.00	0.00	0.00	0.00	0.00	0	0.01	0.49	0.01	0.03	0.00	16	0.00	0.00	0.00	0.00	0.00	0	
SSN	Northeast	10,050	11	0	0.60	4.57	0.25	0.85	0.15	409	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	VACAPES	3,871	80	6888	0.23	1.76	0.10	0.33	0.06	158	0.00	0.00	0.00	0.00	0.00	0	0.41	3.14	0.17	0.59	0.10	281	0.00	0.01	0.00	0.00	0.00	1	
	Cherry Pt	354	1	0	0.02	0.16	0.01	0.03	0.01	14	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	JAX	1,397	15	1920	0.08	0.64	0.03	0.12	0.02	57	0.00	0.00	0.00	0.00	0.00	0	0.12	0.87	0.05	0.16	0.03	78	0.00	0.00	0.00	0.00	0.00	0	
	Key West	129	1	0	0.01	0.06	0.00	0.01	0.00	5	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	GOMEX	23	1	0	0.00	0.01	0.00	0.00	0.00	1	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	Outside RCs	11,458	12	20424	0.69	5.21	0.29	0.97	0.17	457	0.00	0.00	0.00	0.00	0.00	0	1.25	9.52	0.51	1.81	0.31	861	0.04	0.33	0.00	0.07	0.00	29	
T-AH	Northeast	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	VACAPES	38	1	72	0.27	2.02	0.13	1.41	0.40	698	0.01	0.05	0.00	0.04	0.01	18	0.50	3.79	0.25	2.64	0.74	1,306	0.01	0.05	0.00	0.04	0.01	18	
	Cherry Pt	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	JAX	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	Key West	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	GOMEX	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	Outside RCs	4	1	24	0.03	0.26	0.02	0.18	0.05	89	0.01	0.05	0.00	0.04	0.01	18	0.16	1.25	0.08	0.87	0.24	429	0.00	0.00	0.00	0.00	0.00	0	
T-AKE	Northeast	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	VACAPES	1,505	31	600	1.82	228.84	22.56	27.83	3.53	13,053	0.08	1.34	0.19	0.17	0.02	83	3.12	91.21	8.99	11.09	1.41	5,203	0.03	0.52	0.07	0.07	0.01	32	
	Cherry Pt	331	1	144	0.1	1.70	50.08	4.93	6.09	0.77	2,855	0.00	0.04	0.01	0.01	0.00	3	0.74	21.77	2.14	2.65	0.34	1,241	0.00	0.00	0.00	0.00	0	
	JAX	395	4	192	2.04	59.88	5.90	7.28	0.92	3,415	0.01	0.17	0.02	0.02	0.00	11	0.99	29.11	2.87	3.54	0.45	1,660	0.01	0.09	0.01	0.01	0.00	5	
	Key West	19	1	0	0.10	2.92	0.29	0.35	0.04	166	0.00	0.04	0.01	0.01	0.00	3	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	GOMEX	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	Outside RCs	892	1	3888	4	4.59	134.88	13.27	16.40	2.08	7,690	0.00	0.04	0.01	0.01	0.00	3	19.99	587.88	57.82	71.46	9.08	33,518	0.01	0.17	0.02	0.02	0.00	11
T-AO	Northeast	9	1	0	0.25	3.48	0.11	0.23	0.02	102	0.02	0.27	0.01	0.02	0.00	8	0.00	0.00	0.00	0.00	0.00	0	0.02	0.27	0.01	0.02	0.00	8	
	VACAPES	2,018	42	2328	47	52.73	730.84	23.85	48.44	4.29	21,393	0.75	11.31	0.38	0.82	0.07	325	60.80	842.72	27.50	55.85	4.95	24,669	0.75	11.31	0.38	0.82	0.07	325
	Cherry Pt	1,098	2	624	1	28.31	392.04	12.79	25.95	2.30	11,479	0.04	0.54	0.02	0.04	0.00	15	16.09	222.76	7.27	14.74	1.31	6,522	0.04	0.54	0.02	0.04	0.00	15
	JAX	955	10	1056	11	24.78	343.20	11.20	22.73	2.01	10,048	0.18	2.69	0.09	0.20	0.02	77	27.39	379.48	12.38	25.13	2.23	11,110	0.18	2.69	0.09	0.20	0.02	77
	Key West	139	1	0	3.60	49.83	1.63	3.30	0.29	1,459	0.02	0.27	0.01	0.02	0.00	8	0.00	0.00	0.00	0.00	0.00	0	0.02	0.27	0.01	0.02	0.00	8	
	GOMEX	28	1	0	0.74	10.25	0.33	0.58	0.06	300	0.02	0.27	0.01	0.02	0.00	8	0.00	0.00	0.00	0.00	0.00	0	0.02	0.27	0.01	0.02	0.00	8	
	Outside RCs	1,477	2	5688	5	38.08	527.17	17.20	34.89	3.09	15,436	0.04	0.54	0.02	0.04	0.00	15	146.60	2,029.70	66.21	134.33	11.90	59,430	0.04	0.54	0.02	0.04	0.00	15
T-AOE	Northeast	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	VACAPES	658	14	2328	47	36.36	105.54	3.53	28.65	2.82	2,789	0.25	3.12	0.04	0.94	0.09	570	128.59	372.84	12.48	101.19	9.97	9,766	0.82	10.46	0.14	3.15	0.29	1,915
	Cherry Pt	289	1	624	1	15.55	44.27	1.50	11.99	1.18	995	0.02	0.22	0.00	0.07	0.01	41	34.26	97.35	3.31	26.35	2.60	2,145	0.02	0.22	0.00	0.07	0.01	41
	JAX	76	1	264	3	4.19	12.05	0.41	3.27	0.32	297	0.02	0.22	0.00	0.07	0.01	41	14.54	41.76	1.41	11.32	1.12	1,013	0.05	0.67	0.01	0.20	0.02	122
	Key West	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	GOMEX	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	Outside RCs	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
T-ARS	Northeast	4	1	0	0.01	0.08	0.00	0.02	0.00	9	0.00	0.02	0.00	0.00	0.00	2	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	
	VACAPES	555	12	720	14	0.91	9.17	0.36	1.93	0.25	970	0.02	0.23	0.00	0.05	0.00	24	1.18	11.86	0.46	2.49	0.33	1,256	0.02	0.27	0.01	0.06	0.00	28
	Cherry Pt	268	1	0	0.43	4.34	0.17	0.91	0.12	459	0.00	0.02	0.00	0.00	0.00	2	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	JAX	142	2	96	1	0.23	2.33	0.09	0.49	0.06	246	0.00	0.04	0.00	0.01	0.00	4	0.16	1.57	0.06	0.33	0.04	166	0.00	0.02	0.00	0.00	0.00	2
	Key West	499	1	0	0.80	8.06	0.32	1.69	0.22	853	0.00	0.02	0.00	0.00	0.00	2	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	GOMEX	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	
	Outside RCs	758	1	2794	3	1.21	12.23	0.48	2.57	0.34	1,295	0.00	0.02	0.00	0.00	0.00	2	4.46	44.89	1.77	9.44	1.24	4,754	0.01	0.06	0.00	0.01	0.00	6
T-ATF	Northeast	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.0										

TAB E: Training in State Waters

State Waters Activities¹

Vessel Type	Total Annual Hours							
	NE - Naragansett	VACAPES	Ches Bay + Trib	Charleston	JAX /St Johns/ Mayport	Cape Canaveral/ SE FL	Panama City	GOMEX/ Corpus Christie
RCB	5,458	124	35,051	0	2,226	4,952	20	2,226
LCAC	0	3,198	5,979	0	0	0	0	0
DDG	0	780	0	0	0	0	0	0
LCU/LCM	0	1,160	1,426	0	0	0	0	0
RIB (Zodiac)	8,472	3,202	20,074	12,651	2,734	600	75	2,202
Mark V	3,232	390	36,770	0	200	4,352	75	152
CRRC	2,202	228	3,072	0	2,402	600	75	2,202
PC	0	780	50	0	0	0	0	0
TATF	0	170	795	0	0	0	0	0
TARS	0	218	795	0	0	0	0	0
HSMST	0	0	36	0	0	0	0	0

EMISSIONS BY AREA

Vessel Type NE - Naragansett Bay, RI	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
Riverine Command - RC MPDE	3.07	7.67	74.78	11.13	1.80	4342
LCAC (SSGTG/MPGT) (80/3955)	0	0	0	0	0	0
DDG (SSGTG/MPGT)	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0.25	1.44	38.72	6.10	0.64	4,930
Mark V	1.70	21.36	115.51	25.29	1.86	9,144
CRRC	0.03	0.20	1.09	0.13	0.09	96
PC	0	0	0	0	0	0
TATF	0	0	0	0	0	0
TARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	5.0	30.7	230.1	42.6	4.4	18,513

Vessel Type VA Capes	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
RCB	0.07	0.17	1.70	0.25	0.04	98.65
LCAC	5.58	29.30	183.17	61.31	6.87	33,094
DDG	1.56	23.29	44.66	24.24	1.15	10,750
LCU/LCM	0.30	21.00	26.07	1.80	0.91	977
RIB (Zodiac)	0.10	0.54	14.63	2.31	0.24	1,863
Mark V	0.20	2.58	13.94	3.05	0.22	1,103
CRRC	0.00	0.02	0.11	0.01	0.01	10
PC	2.35	131.57	28.93	6.41	0.87	2,994
TATF	0.18	1.56	8.87	0.66	0.08	306
TARS	0.14	0.35	3.51	0.74	0.10	372
HSMST	0	0	0	0	0	0
Total Emissions in Tons	10.5	210.4	325.6	100.8	10.5	51,568

Chesapeake Bay & Tributaries	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
RCB	19.71	49.27	480.23	71.48	11.57	27,886
LCAC	10.43	54.78	342.46	114.62	12.85	61,873
DDG	0	0	0	0	0	0
LCU/LCM	0.37	25.82	32.05	2.22	1.12	1,201
RIB (Zodiac)	0.60	3.41	91.74	14.45	1.51	11,682
Mark V	19.30	243.05	1,314.16	287.73	21.14	104,030
CRRC	0.04	0.28	1.53	0.18	0.12	134
PC	0.15	8.43	1.85	0.41	0.06	192
TATF	0.84	7.32	41.47	3.11	0.36	1,429

TARS	0.50	1.27	12.80	2.69	0.35	1,356
HSMST	0.00	0.03	0.12	0.00	0.00	4
Total Emissions in Tons	51.9	393.7	2,318.4	496.9	49.1	209,787

Vessel Type Charleston	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
RCB	0	0	0	0	0	0
LCAC	0	0	0	0	0	0
DDG	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0.38	2.15	57.82	9.11	0.95	7,362
Mark V	0	0	0	0	0	0
CRRC	0	0	0	0	0	0
PC	0	0	0	0	0	0
TATF	0	0	0	0	0	0
TARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	0.4	2.2	57.8	9.1	0.9	7,362

Vessel Type JAX/ St John/ Mayport	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
RCB	1.25	3.13	30.50	4.54	0.74	1,771
LCAC	0	0	0	0	0	0
DDG	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0.08	0.46	12.49	1.97	0.21	1,591
Mark V	0.11	1.32	7.15	1.57	0.12	566
CRRC	0.03	0.22	1.19	0.14	0.10	105
PC	0	0	0	0	0	0
TATF	0	0	0	0	0	0
TARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	1.5	5.1	51.3	8.2	1.2	4,033

Vessel Type Cape Canaveral/ SE FL	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
RCB	2.78	6.96	67.85	10.10	1.64	3,940
LCAC	0	0	0	0	0	0
DDG	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0.02	0.10	2.74	0.43	0.05	349
Mark V	2.28	28.77	155.54	34.05	2.50	12,313
CRRC	0.01	0.05	0.30	0.03	0.02	26
PC	0	0	0	0	0	0
TATF	0	0	0	0	0	0
TARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	5.09	35.88	226.43	44.62	4.21	16,628

Vessel Type Panama City	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
RCB	0.01	0.03	0.27	0.04	0.01	16
LCAC	0	0	0	0	0	0
DDG	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0.00	0.01	0.34	0.05	0.01	44
Mark V	0.04	0.50	2.68	0.59	0.04	212
CRRC	0.00	0.01	0.04	0.00	0.00	3
PC	0	0	0	0	0	0
TATF	0	0	0	0	0	0

TARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	0.1	0.5	3.3	0.7	0.1	275

Vessel Type Key West	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
RCB	0.04	0.09	0.90	0.13	0.02	53
LCAC	0	0	0	0	0	0
DDG	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0	0	0	0	0	0
Mark V	0	0	0	0	0	0
CRRC	0	0	0	0	0	0
PC	0	0	0	0	0	0
TATF	0	0	0	0	0	0
TARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	0.0	0.1	0.9	0.1	0.0	53

Vessel Type GOMEX/ Corpus Christie	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
RCB	1.25	3.13	30.50	4.54	0.74	1,771
LCAC	0	0	0	0	0	0
DDG	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0.07	0.37	10.06	1.59	0.17	1,281
Mark V	0.08	1.00	5.43	1.19	0.09	430
CRRC	0.03	0.20	1.09	0.13	0.09	96
PC	0	0	0	0	0	0
TATF	0	0	0	0	0	0
TARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	1.4	4.7	47.1	7.4	1.1	3,579

¹ State water activities provided by US Navy, AFTT Inshore Events_08Feb2017_NAEMO WEB.xlsx

TAB F: AIRCRAFT EMISSIONS

Training Aircraft Operational Hours below 3,000 Ft (except for GHG) by OpArea (all activities in international waters)

		Alternative 1		Alternative 2		Alternative 1							Alternative 2						
		Cruise ¹		Cruise ¹		Annual Emissions in Tons							Annual Emissions in Tons						
		LTOs (#) ¹	(Hrs)	LTOs (#) ¹	(Hrs)	VOC	CO	NOx	SO2	PM _{10/2.5}	CO2e	VOC	CO	NOx	SO2	PM _{10/2.5}	CO2e		
F-18/EA-18G	VACAPES	58	37	58	37	1.45	6.76	2.67	0.42	1.20	587	1.45	6.76	2.67	0.42	1.20	587		
	GOMEX		5		5	0.00	0.01	0.24	0.04	0.11	52	0.00	0.01	0.24	0.04	0.11	52		
	JAX	491	41	491	41	12.24	56.84	9.34	1.53	4.28	2097	12.24	56.84	9.34	1.53	4.28	2,097		
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Cherry Pt	157	24	157	24	3.92	18.20	3.54	0.57	1.61	790	3.92	18.20	3.54	0.57	1.61	790		
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F-35	VACAPES	58	37	58	37	0.22	18.61	9.22	2.36	1.30	3713	0.22	18.61	9.22	2.36	1.30	3,713		
	GOMEX		5		5	0.03	2.43	1.11	0.31	0.17	467	0.03	2.43	1.11	0.31	0.17	467		
	JAX	491	41	491	41	0.33	24.13	17.01	3.10	1.47	5759	0.33	24.13	17.01	3.10	1.47	5,759		
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Cherry Pt	157	24	157	24	0.17	13.24	7.97	1.69	0.87	2905	0.17	13.24	7.97	1.69	0.87	2,905		
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
V-22	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Cherry Pt	110		110		0.00	0.17	0.39	0.11	0.07	163.4	0.00	0.17	0.39	0.11	0.07	163.41		
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
P-3	VACAPES		15		15	0.02	0.07	0.31	0.08	0.15	119	0.02	0.07	0.31	0.08	0.15	119		
	GOMEX		15		15	0.02	0.07	0.31	0.08	0.15	119	0.02	0.07	0.31	0.08	0.15	119		
	JAX		53		53	0.06	0.23	1.07	0.28	0.51	410	0.06	0.23	1.07	0.28	0.51	410		
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Northeast		8		8	0.01	0.03	0.16	0.04	0.08	61	0.01	0.03	0.16	0.04	0.08	61		
	Cherry Pt		4		4	0.00	0.02	0.08	0.02	0.04	31	0.00	0.02	0.08	0.02	0.04	31		
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
P-8	VACAPES		64		64	0.07	1.10	7.45	0.77		1088	0.07	1.10	7.45	0.77	0.00	1,088		
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	JAX		185		185	0.21	3.17	21.40	2.20		3124	0.21	3.17	21.40	2.20	0.00	3,124		
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Northeast		42		42	0.05	0.73	4.91	0.51		718	0.05	0.73	4.91	0.51	0.00	718		
	Cherry Pt		16		16	0.02	0.28	1.89	0.19		276	0.02	0.28	1.89	0.19	0.00	276		
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
AV-8B	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Cherry Pt	107	3	107	3	0.46	2.64	0.49	0.15	0.41	211	0.46	2.64	0.49	0.15	0.41	211		
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
H-60	VACAPES	64	14,149	64	19,914	4.99	53.36	54.41	18.88	35.70	27395	7.01	74.97	76.54	26.56	50.23	38,534		
	GOMEX		2,469		2,517	0.86	9.25	9.48	3.29	6.22	4770	0.88	9.43	9.66	3.35	6.34	4,863		
	JAX	129	2,447	129	3,107	0.94	9.80	9.57	3.33	6.28	4836	1.17	12.28	12.10	4.21	7.94	6,111		
	Key West		243		816	0.08	0.91	0.93	0.32	0.61	470	0.29	3.06	3.13	1.09	2.06	1,577		
	Northeast		1,843		3,315	0.64	6.91	7.07	2.45	4.64	3561	1.16	12.43	12.73	4.41	8.35	6,405		
	Cherry Pt	234	612	234	612	0.37	3.43	2.67	0.95	1.75	1377	0.37	3.43	2.67	0.95	1.75	1,377		
	Panama City		2,252		2,664	0.79	8.44	8.65	3.00	5.67	4352	0.93	9.99	10.23	3.55	6.71	5,148		
H-53	VACAPES		1,812			0.39	8.35	85.02	0.00	0.61	13807	0.39	8.35	85.02	0.00	0.61	13,807		
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	JAX		342			0.07	1.58	16.05	0.00	0.12	2607	0.07	1.58	16.05	0.00	0.12	2,607		
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Cherry Pt		250			0.05	1.15	11.73	0.00	0.08	1905	0.05	1.15	11.73	0.00	0.08	1,905		
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	VACAPES		398			0.02	0.14	0.80	0.31	0.58	442	0.02	0.14	0.80	0.31	0.58	442		

UH-1	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX	118				0.01	0.04	0.24	0.09	0.17	131	0.01	0.04	0.24	0.09	0.17	131	0
	Key West	24				0.00	0.01	0.05	0.02	0.03	27	0.00	0.01	0.05	0.02	0.03	27	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	27				0.00	0.01	0.05	0.02	0.04	30	0.00	0.01	0.05	0.02	0.04	30	0
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AH-1	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX	2				0.00	0.01	0.00	0.00	0.00	3	0.00	0.01	0.00	0.00	0.00	3	0
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	5				0.00	0.02	0.01	0.00	0.01	7	0.00	0.02	0.01	0.00	0.01	7	0
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Learjet	VACAPES	13				0.00	0.02	0.15	0.02	0.00	31	0.00	0.02	0.15	0.02	0.00	31	0
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Aircraft Operational Hours below 3,000 Ft (except for GHG) by OpArea (all activities in state waters)																	
Alternative 1									Alternative 2								
		Cruise ¹ (Hrs)	Annual Emissions in Tons						Cruise (Hrs)	Annual Emissions in Tons							
			VOC	CO	NOx	SO ₂	PM _{10/2.5}	CO _{2e}		VOC	CO	NOx	SO ₂	PM _{10/2.5}	CO _{2e}		
H-60	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	VACAPES	523	0.18	1.96	2.01	0.70	1.32	1011	523	0.18	1.96	2.01	0.70	1.32	1,011	523	
	Cherry Pt	2	0.00	0.01	0.01	0.00	0.01	5	2	0.00	0.01	0.01	0.00	0.01	5	2	
	JAX	159	0.06	0.60	0.61	0.21	0.40	307	159	0.06	0.60	0.61	0.21	0.40	307	159	
	Key West									0.00	0.00	0.00	0.00	0.00	0		
	GOMEX	20	0.01	0.07	0.08	0.03	0.05	39	20	0.01	0.07	0.08	0.03	0.05	39	20	
	Panama City	2,252	0.79	8.44	8.65	3.00	5.67	4352	2,664	0.93	9.99	10.23	3.55	6.71	5,148	2,664	
H-53	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	VACAPES	392	0.08	1.81	18.40	0.00	0.13	2988	392	0.08	1.81	18.40	0.00	0.13	2,988	392	
	Cherry Pt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
UH-1	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Cherry Pt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AH-1	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Cherry Pt	22	10.90	193.56	101.92	40.77	77.13	59060	22	10.90	193.56	101.92	40.77	77.13	59,060	22	
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

1 Data on LTOs and Cruise time provided by US Navy, NAVAIR Assumptions.docx, Marine Corps Training Cycle.xlsx, C2X sorties hours.xlsx, IKE C2X.xlsx, AFTT Training Air Analysis.xlsx .

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TABG: MUNITION EMISSIONS[illegible]

[illegible][illegible]

² Munitions Usage Estimates provided by US Navy, *AFTT Training Air Analysis.xlsx* (March 29), *AFTT Inshore Events_08Feb2017_NAEMO Web.xlsx*, Appendix F, Draft AFTT EIS May 2017.

EMISSION TOTALS BY OPAREA																
Location	Alternative 1								Alternative 2							
	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}	CO ₂	Pb	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}	CO ₂	Pb
Northeast / NWUC	0.8	0.0	0.0	0.0	3.9	3.0	0.5	0.0	0.8	0.0	0.0	0.0	3.9	3.0	0.5	0.0
Newport	61.2	1.0	0.1	0.0	388.8	150.3	49.4	0.3	61.2	1.0	0.1	0.0	388.8	150.3	49.3	0.3
Virginia Camp	4.3	0.3	0.0	0.0	5.8	4.3	0.8	0.0	4.3	0.3	0.0	0.0	5.8	4.3	0.8	0.0
Jacksonville	37.8	0.7	0.0	0.0	22.2	36.7	35.9	0.2	37.8	0.7	0.0	0.0	22.2	36.7	35.9	0.2
Key West	4.0	0.1	0.0	0.0	2.2	3.1	2.6	0.0	4.0	0.1	0.0	0.0	2.2	3.1	2.6	0.0
CONEX / Panama City	3.7	0.1	0.0	0.0	4.9	3.7	3.6	0.0	3.7	0.1	0.0	0.0	4.8	3.7	3.6	0.0
Other APTT	1.4	0.0	0.0	0.0	0.4	0.3	0.7	0.0	1.4	0.0	0.0	0.0	0.4	0.3	0.7	0.0
Study Area Total	126.5	2.2	0.2	0.1	206.8	157.4	101.5	0.6	126.5	2.2	0.2	0.1	205.9	157.3	101.5	0.6

TAB H: SHIP AND BOAT EMISSION FACTORS

Data Source: Navy and MSC Marine Engine Fuel Consumption and Emission Calculator

Ship/Boat Type	Vessel Mode	Emissions Factors (lb/HR)						Engine model ¹	a ² Engines	Use ³
		HC	CO	NOx	SOx	PM10/2.5	CO2			
Nuclear Aircraft Carrier - Nimitz Class	CVN-1	0.31	1.23	16.73	1.39	0.12	683.62	16-64SE5		4 Emergency Diesel Generator
	CVN-R	0.03	0.12	1.65	0.14	0.01	67.61			
Guided Missile Cruiser - Ticonderoga	CG-68	4.32	61.51	79.58	54.5	2.25	24,190.71	301-K17 LM2500		8 Ship Service Gas Turbine Generator 4 Gas Turbines
	CG-R	2.48	27.73	285.54	108.99	10.04	69,838.52			
Guided Missile Destroyer - Arleigh Burke Class	DDG-51	4.01	59.72	114.52	62.15	2.96	27,564.55	301-K34 LM2500		8 Ship Service Gas Turbine Generator 4 Gas Turbines
	DDG-51R	2.39	30.57	374.60	134.53	12.27	85,141			
Guided Missile Destroyer - Zumwalt Class	DDG-1000	1.90	33.45	158.67	53.75	5.75	37,074.37	MT-5 MT-30		2 Emergency Diesel Generator 2 Auxiliary Turbine Generator - Main 2 Turbine Generator
	DDG-1000R	2.88	45.65	64.80	29.91	4.05	24,025.17	18PA66S1C MT-30 V1708		2 Main Propulsion Diesel Engine 2 Main Turbine Generator 4 Ship Service Diesel Generator
Littoral Combat Ship	LCS-1	3.19	46.14	186.77	49.68	6.67	25,512.41			
	LCS-1R	6.12	79.12	152.6	23.27	7.40	11,115.68			
Torpedo Retrieval Boat - San Antonio Class	LSR-44	10.84	21.25	394.51	24.6	2.17	16,263.96	38D9-1/8 PC25V		4 Ship Service Diesel Generator 4 Main Propulsion Diesel Engine
	LSR-44R	20.43	40.02	604.28	45.39	2.17	21,126.47			
Amphibious Assault Ship - America Class	LHA-6	14.48	8.38	277.87	66.87	8.38	35,922.07	12PA66 LM2500+		6 Ship Service Diesel Generator 2 Main Turbine Generator
	LHA-6R	15.15	18.73	139.99	47.97	5.84	28,053.16			
Amphibious Assault Ship - Wasp	LHD-5	5.77	8.08	47.89	35.12	28.57	47,632.68	Boiler 16-251C		2 Emergency Diesel Generator
	LHD-5R	5.10	7.60	40.12	120.70	24.23	47,490.25			
Landing Transport Dock - San Antonio Class	LPD-19	16.86	31.61	272.28	37.54	3.29	16,767.15	3608 (Tier I) PC255TC		5 Ship Service Diesel Generator 4 Main Propulsion Diesel Engine
	LPD-19R	14.36	28.06	263.25	32.38	2.81	15,025.58			
Patrol Coastal	PC-14	6.02	397.36	74.18	16.43	2.24	7,676.62	16RP200M 3306B		4 Main Propulsion Diesel Engine Ship 2 Service Diesel Generator
	PC-14R	7.22	43.15	78.36	17.51	2.37	8,064.32			
Joint High Speed Vessel (JHSV) or Expeditionary Fast Transport (EPF)	JHSV-1	17.13	384.25	745.63	113.53	35.23	54,287.50	20V3000M71L 3405		4 Main Propulsion Diesel Engine 4 Ship Service Diesel Generator
	JHSV-1R	4.65	100.83	200.57	30.32	3.30	14,530.65			
Amphibious Combat Command (LCC)	LCC-20	2.23	2.96	19.10	36.49	10.96	18,271.08	Boiler 38D9-1/8		2 Emergency Diesel Generator
	LCC-20R	2.19	2.96	17.38	36.40	10.96	18,217.99			
MV Delors Chauvet	MV DC	3.73	6.82	193.74	11.60	2.04	5,072.73	44X 3608TA		2 Ship Service Diesel Generator 2 Main Propulsion Diesel Engine
	MV DCR	2.64	4.35	86.92	36.40	10.96	18,217.99			
SSGN	SSGN-728	0.07	0.11	4.05	0.23	0.02	132.35	38D9-1/8		1 Emergency Diesel Generator
	SSGN-728R	0.01	0.01	0.40	0.03	0.03	12.38			
SSN	SSN-774	0.05	0.12	0.91	0.17	0.03	81.42	36128 (Tier I)		1 Emergency Diesel Generator
	SSN-774R	0.00	0.01	0.09	0.02	0.00	8.00			
TAH	AH-19	6.82	13.79	103.87	72.21	20.28	35,773.75	Boiler 12V 25/30 18V 20/27 3608		3 Ship Service Diesel Generator 1 Auxiliary Diesel Generator
	AH-19R	6.83	13.71	101.56	71.91	20.05	35,663.29			
TAKE	T-AKE-5	29.73	10.28	302.32	36.75	4.67	17,236.10	36168 RD 8L 48/60 48/60	9L	1 Emergency Diesel Generator 2 IPG 2 IPG
	T-AKE-5R	12.00	5.31	86.45	11.25	0.95	5,368.46			
TAO	T-AO-189	23.26	51.51	713.11	47.19	4.18	20,880.33	16V-92TA 81B3-7305 18-251F PC4.2V		1 Emergency Diesel Generator 2 Ship Service Diesel Generator 2 Main Propulsion Diesel Engine
	T-AO-189R	17.96	35.30	538.20	39.08	3.45	15,482.22			
TACE	T-ACE-8	10.60	109.76	311.32	84.23	8.32	6,744.69	3608 LM2500		5 Ship Service Diesel Generator 4 Main Propulsion Gas Turbine
	T-ACE-8R	5.35	35.08	445.24	134.03	12.22	81,478.38			
TARS	T-ARS-52	1.27	3.20	32.21	6.77	0.89	3,410.91	0399(M) 0399(S)		4 Main Propulsion Diesel Engine 8 Ship Service Diesel Generator
	T-ARS-52R	0.82	3.37	38.12	8.10	0.68	3,975.10			
TATP	T-ATP-172	2.11	18.41	104.32	7.62	0.91	3,594.48	16V-71T 7163-7305 20-64SE7		5 Ship Service Diesel Generator 2 Main Propulsion Diesel Engine
	T-ATP-172R	2.59	13.35	139.75	10.24	1.07	4,845.75			
Landing Craft Air Cushion	LCAC	3.49	18.32	114.55	38.34	4.30	20,697	Legacy: 4 Allied-Signal TF-40 gas turbines (2 propulsion / 2 lift); 16,000 hp sustained 3000 KW *4		
Landing Craft Utility	LCU	0.52	36.21	44.36	3.11	1.57	1,683.91	2 Detroit 12V-71 Diesel engines, twin shaft, 680 hp sustained,		
Amphibious Assault Vehicle	AAV-2	0.82	0.76	6.22	1.25	0.26		Detroit Diesel 8V-531 (P-7), Cummins VT 400 303 (P-7A1)		
Mark V	Mk V-3	1.05	13.22	71.48	15.65	1.15	5,658.42	2x 2285 HP MTU 12V396 TE34 engines		
Rigid Inflatable Boat (Zodiac)	RIB-4	0.06	0.34	9.14	1.44	0.15	1,163.88	Dual Caterpillar 3126 DITA, 6 in-line cylinder diesel, turbocharged, aftercooled.		
Combat Rubber Rafting Craft	CRRC	0.0244	0.1808	0.9945	0.1165	0.0814	87.23	55 HP 2-stroke engine gas diesel		
High Speed Manoverable Surface Target	HSMT	0.099	1.691	6.937	0.004	0.210	247.63	200 HP - 2 outboards		
River Command Boat	RCB	1.12	2.81	27.40	4.08	0.66	15.91	850 HP X 2		

¹ Data from Navy and MSC Marine Engine Fuel Consumption & Emissions Calculator, US Navy, October 2016

GPH = specific fuel consumption constant X HP / fuel specific weight	
SFC diesel =	0.4
SFC gas =	0.5
FSW diesel =	7.2
FSW gas =	6.1
	0.138 MMbtu/gal diesel 0.125 MMbtu/gal motor gas
	161.5 lb/MMBTU 154.8 lb/MMBTU
	22.287 lb CO2/gal diesel 19.35 lb CO2/gal motor gas
LCAC	889 GPH

Ship/Boat Type	Vessel Mode	Emissions Factors (lb/hr)						Engine model ¹	z ² Engines	Use ¹
		HC	CO	NOx	SOx	PM10/2.5	CO2			
LCU	75 GPH									
MK V	254 GPH									
RIB	52 GPH									

EFs for small craft ³		lb/hp-hr					
	HC	CO	NOx	SO2	PM	CO2	
50-100	0.000231936	0.0040769	0.0173417	9.86258E-06	0.000526	1.0654218	
174-302	0.000231936	0.0040769	0.0173417	9.86258E-06	0.000526	1.0654218	

³ 2014 National Emissions Inventory, Version 1 Technical Support Document, USEPA, December 2016.

TAB I: MUNITION EMISSION FACTORS¹

Type	Study Area Category	DODEC ID	CO ₂	CO	NO _x	Emission Factor (lb/item)		PM ₁₀	PM _{2.5}	Pb
.50 CAL Blank	Small cal	A557	0.0021	0.0018	0.000028	0	0	0.000098	0.000088	0.000012
25 MM	medium cal	M793	0.043	0.085	0.0015	0	0	0.0033	0.0017	0.000049
81 MM HE Cartridge	large cal	C256	1.4	0.097	0.016	0	0	0.17	0.093	0.00069
2.75 In Rocket HE	rocket	H163	0.7	0.4	0.0056	0	0	0.24	0.12	0.0006
2.75 in Rocket (Practice)	rocket	H974	4.8	0.53	0	0	0	0.16	0.17	0.07
Floating Smoke Pot	for marine marker	K867	0.51	0.89	0.0028	0.022	0.0032	30	23	0.016
Grenade	grenade	G900	0.021	0.0008	0.00067	0.00000032	0.026	0.07	0.049	0.011
Flare	CM flare	L410	0.011	0.0013	0.00013	0.0004	0.0000079	0.0062	0.0062	0
Flare	III. Flare	L311	0.14	0.011	0.0031	0.00033	0.000073	0.12	0.12	0.0000023
2.75 In Rocket fleschette	rocket	H459	2.4	1.5	0.026	0	0	0.11	0.1	0.051

¹Emission Factors from USEPA AP-42 Section 15 (various dates)

MV-22													
Flight Mode	Fuel Used (lbs)	Emission Indices (lb per 1,000 lb fuel)						Total Emissions in lb/op					
		HC	CO	NOx	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NOx	SO ₂	PM _{10/2.5}	CO ₂
Short Take Off													
APU	103.9	0.19	5.89	5.95	2.22	0.22	3,235	0.02	0.61	0.61	0.29	0.02	334
Start/Warm up	60	8.5	4.08	4.08	2.22	1.58	3,231	0.01	0.53	0.35	0.13	0.08	138
Warm up	220	0.02	3.33	6.03	2.22	1.58	3,219	0.00	0.73	1.92	0.49	0.35	708
Taxi Out	110	0.02	3.33	6.02	2.22	1.58	3,219	0.00	0.37	0.66	0.24	0.17	554
Engine Run up	17.2	0.02	1.58	8.41	2.22	1.58	3,216	0.00	0.03	0.14	0.04	0.03	55
Takeoff	68.7	0.01	0.45	15.06	2.22	1.58	3,208	0.00	0.03	1.03	0.15	0.11	220
FW Climbout	54.7	0.01	0.69	12.35	2.22	1.58	3,211	0.00	0.04	0.68	0.12	0.09	176
Vertical Landing													
FW Approach	121.0	0.02	1.20	9.57	2.22	1.58	3,219	0.00	0.15	1.16	0.27	0.19	389
Transition (90°) Landing	43.7	0.02	1.04	10.22	2.22	1.58	3,218	0.00	0.05	0.45	0.10	0.07	140
Taxi to apron	66.0	0.02	3.33	6.03	2.22	1.58	3,219	0.00	0.23	1.40	0.15	0.10	213
Cool/Shutdown	24.0	0.1	8.90	4.09	2.22	1.58	3,221	0.00	0.21	0.10	0.05	0.04	77
APU	34.4	0.19	5.89	5.95	2.22	0.22	3,235	0.01	0.20	0.20	0.08	0.01	111

LTO Total																		49.80	231.14	29.97	5.03	13.82	6,790
Cruise																							
Hourly	1	85% N2	2	60	3318	6636	0.12	0.72	14.75	2.22	6.56	3191.30	0.84	4.78	97.88	14.73	43.53	21,175					

P-3																			
1. Type of Operation	Total Number of Operations	2.3 Engine Power Setting	2.3 No. of Engines in Use	2.3 Time in (min)	2.3 Fuel Flow per Engine (lb/hr)	2.3 Total Fuel Used (lb)	Emissions in lbs/1000 lbs fuel						Total Emissions in lb/op						
							2.3 HC	2.3 CO	2.3 NOx	5 SO2	PM10/2.5	2.3 CO2	VOC	CO	NOx	SO2	PM10/2.5	CO2e	
Cruise	Hourly	1 37% ship		4	60	1200	4800	0.41	1.82	8.42	2.22	3.97	3216	2.09	8.74	40.42	10.66	19.06	15,437

Type of Operation		Total Number of Operations	^{2.0} Engine Power Setting	^{2.0} No. of Engines in Use	^{2.3} Time in Mode/engine (min)	^{2.3} Fuel Flow (lb/hr)	^{2.0} Total Fuel Used (lb)	Emissions in lbs/ lbs fuel						Total Emissions in lb/op					
								^{2.3} HC	^{2.3} CO	^{2.3} NOx	⁵ SO2	PM _{10/2.5}	^{2.3} CO2	VOC	CO	NOx	SO2	PM _{10/2.5}	CO2e
Cruise	Hourly	1	30	4	60	2683	10732	0.000	0.003	0.022	0.002	ND	3.154	2.28	34.34	231.81	23.89	ND	39,849

AV-8B		Emissions in lbs/1000 lbs fuel													Total Emissions in lb/op				
Type of Operation	Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/engn (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	HC	CO	NOx	SO2	PM _{2.5}	CO2	VOC	CO	NOx	SO2	PM _{2.5}	CO2e	
Short Takeoff																			
	APU Use	1 ON	1	5	197	16.4	0.25	2	6.25	2.22	0.22	3170	0.0	0.0	0.1	0.0	0.0	52	
	Start/Warm-up	1 26% RPM	1	10	1137	189.5	19.66	106.3	1.8	2.22	11.1	2919	3.7	20.1	0.3	0.4	2.1	553	
	Unstick	1 40% RPM	1	0.3	1786	8.9	3.67	65.7	2.5	2.22	9.1	3040	0.0	0.6	0.0	0.0	0.1	27	
	Taxi Out	1 26% RPM	1	5	1137	94.8	19.66	106.3	1.8	2.22	11.1	2919	1.9	10.1	0.2	0.2	1.1	277	
	Engine Run-up	1 55% RPM	1	0.5	3321	27.7	1.26	25.5	4.5	2.22	6.4	3114.5	0.6	0.7	0.1	0.1	0.2	86	
	Takeoff	1 91% RPM	1	0.5	9441	78.7	0.35	3.6	12.7	2.22	2.5	3151.8	0.0	0.3	0.0	0.0	0.2	248	
	Climb-out	1 95% RPM	1	0.5	7937	58.6	0.49	6.4	9.5	2.22	3.5	3153.6	0.0	0.4	0.6	0.1	0.2	185	
Vertical Landing Straight In																			
	Approach	1 79% RPM	1	2.5	6381	265.9	0.54	7.7	8.6	2.22	3.8	3144	0.1	2.0	2.3	0.6	1.0	836	
	Set up for VL	1 84% RPM	1	1.5	5785	144.6	0.61	9.3	7.9	2.22	4.2	3141.2	0.5	1.3	1.1	0.3	0.6	454	
	VL Landing	1 99% RPM	1	0.75	12258	153.2	0.26	2.2	16.3	2.22	1.9	3155	0.0	0.3	2.5	0.3	0.3	483	
	On Runway	1 26% RPM	1	0.3	1137	5.7	0.26	106.3	1.8	2.22	11.1	2919	0.1	0.6	0.0	0.0	0.1	17	
	Unstick	1 40% RPM	1	0.5	1786	8.9	3.67	65.7	2.5	2.22	9.1	3040	0.0	0.6	0.0	0.0	0.1	27	
	Taxi In/Shutdown	1 26% RPM	1	5	1137	94.8	19.66	106.3	1.8	2.22	11.1	2919	1.9	10.1	0.2	0.2	1.1	277	
	LTO Total												8.9	47.2	8.5	2.5	6.9	3,322	
Cruise																			
	Hourly	1 67% RPM	1	60	4313	4313.0	0.88	16	5.9	2.22	5.3	3130	4.0	69.0	25.4	9.6	22.9	13,495	

MV-22													
Flight Mode	Fuel Used (lbs)	Emission Indices (lb per 1,000 lb fuel)					Total Emissions in lb/op						
		HC	CO	NOx	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NOx	SO ₂	PM _{10/2.5}	CO ₂
Short Take Off													
APU	103.3	0.19	5.89	5.95	2.22	0.22	3,235	0.02	0.61	0.61	0.23	0.02	334
Start/Warm up	160	0.1	8.5	4.09	2.22	1.58	3,221	0.01	0.53	0.25	0.13	0.09	193
Warm up	220	0.2	3.33	6.02	2.22	1.58	3,219	0.00	0.79	1.32	0.35	0.48	708
Taxi Out	110	0.02	3.33	6.02	2.22	1.58	3,219	0.00	0.37	0.66	0.24	0.17	354
Engine Run up	17.2	0.02	1.58	8.41	2.22	1.58	3,216	0.00	0.03	0.14	0.04	0.03	55
Takeoff	68.7	0.01	0.45	15.06	2.22	1.58	3,208	0.00	0.03	1.03	0.15	0.11	220
FW Climbout	54.7	0.01	0.69	12.35	2.22	1.58	3,211	0.00	0.04	0.68	0.12	0.09	176
Vertical Landing													
FW Approach	121.0	0.02	1.20	9.57	2.22	1.58	3,214	0.00	0.15	1.16	0.27	0.19	369
Transition (90°) Landing	43.7	0.02	1.04	10.22	2.22	1.58	3,215	0.00	0.05	0.45	0.10	0.07	140
Taxi to apron	0.02	0.02	3.33	6.02	2.22	1.58	3,219	0.00	0.21	0.40	0.15	0.10	218
Cool/Shutdown	24.0	0.1	8.90	4.09	2.22	1.58	3,221	0.00	0.21	0.10	0.05	0.04	77
APU	34.4	0.19	5.89	5.95	2.22	0.22	3,235	0.01	0.20	0.20	0.08	0.01	111

LTO Total									0.05	3.16	7.00	2.05	1.27	2,971
Cruise	Hourly	3,540	0.01	0.60	13.19	2.22	1.58	3210	0.04	2.12	46.69	7.86	5.59	11,363

Learjet														
Flight Mode	Fuel Used (lbs)	Emission Indices (lb per 1,000 lb fuel)							Emissions from 1 Hour in Flight Mode in Pounds					
		HC	CO	NOx	SO ₂	PM _{10/2.5}	CO ₂		VOC	CO	NOx	SO ₂	PM _{10/2.5}	CO ₂
Cruise - Hourly	1,476	0.07	1.62	16.08	2.22	0.085	3252.46		0.10332	2.39	23.73	3.28	0.13	4,801

F-35														
Mode/Starting Point for Leg		Power	Time (min)	Flight Emissions (lb/operation)										
				HC	CO	NOx	SO ₂	PM10/2.5	CO ₂					
IPP Use		Main Engin	0.59	< 0.000	0.00	0.01	0.00	0.00	4					
Start/Warm Up		GI (10% ETR	6.00	< 0.098	3.74	0.43	0.19	0.03	647					
Unstick		35% ETR	0.08	< 0.000	0.01	0.10	0.01	0.00	32					
Taxi		GI (10% ETR	6.00	< 0.098	3.74	0.43	0.20	0.02	649					
Unstick		35% ETR	0.08	< 0.000	0.01	0.10	0.01	0.00	32					
Taxi to position & hold		GI (10% ETR	0.50	< 0.008	0.31	0.04	0.02	0.00	54					
P3-F-35B Short Takeoff (STO)		Departure	1	< 0.002	0.18	12.12	0.46	0.05	1,537					
P25-F-35B STOVL Pattern Takeoff Portion (Austere Ops)		Pattern	1	< 0.000	0.06	3.56	0.14	0.02	471					
P13-F-35B Overhead Break/Carrier Break Arrival to Vertical Landing (VL)		Arrival	1	< 0.014	0.68	14.07	0.84	0.08	2,803					
Rollout to taxiway		FI (15% ETR	0.55	< 0.005	0.10	0.16	0.03	0.00	100					
Weapon check		GI (10% ETR	3.00	< 0.049	1.87	0.21	0.10	0.01	323					
Unstick		35% ETR	0.08	< 0.000	0.01	0.11	0.01	0.00	34					
Taxi		GI (10% ETR	3.00	< 0.048	1.82	0.22	0.10	0.01	326					
Hot refuel		GI (10% ETR	7.00	< 0.114	4.37	0.50	0.23	0.02	754					
Unstick		35% ETR	0.08	< 0.000	0.01	0.11	0.01	0.00	34					
Taxi to park & shutdown		GI (10% ETR	0.60	< 0.010	0.36	0.04	0.02	0.00	63					
Total for 1 LTO			1	< 0.446	17.29	32.20	2.37	0.22	7,866					
*Cruise - 1 hour		Fuel Use												
		ITAR	60	10.95	979.86	448.54	124.16	69.99	188,608					

*from Lemoore Op AQ Calcs 2012 (ITAR protected)

UH-1														
Flight Operation	Fuel used lb	HC	CO	Emissions in lbs/1000 lbs fuel				Flight Emissions (lb/operation)						
				NOx	SO ₂	PM ₁₀	PM _{2.5}	CO ₂	VOC	CO	NOx	SO ₂	PM _{10/2.5}	CO2
Departure:														
Warm Up	74.0	6.21	28.36	3.13	2.22	4.20	4.20	3,145	0.49	2.10	0.29	0.16	0.31	239
Taxi Out	33.8	0.13	1.11	5.67	2.22	4.20	4.20	3,207	0.00	0.04	0.19	0.08	0.14	108
Hover	23.1	0.13	1.01	5.79	2.22	4.20	4.20	3,207	0.00	0.02	0.13	0.05	0.10	74
Climbout	36.3	0.13	0.88	6.02	2.22	4.20	4.20	3,207	0.01	0.03	0.22	0.08	0.15	116
Arrival:														
Descent	24.1	0.28	5.76	4.3	2.22	4.20	4.20	3,202	0.01	0.14	0.10	0.05	0.10	77
Approach	25.8	0.20	4.22	4.54	2.22	4.20	4.20	3,204	0.01	0.11	0.12	0.06	0.11	83
Taxi to Sdm	22.5	0.13	1.11	5.67	2.22	4.20	4.20	3,207	0.00	0.02	0.13	0.05	0.09	72
Shut Down	4.9	6.21	28.36	3.13	2.22	4.20	4.20	3,145	0.03	0.14	0.03	0.01	0.02	16
Total in Pounds									0.55	2.60	1.14	0.54	1.03	779
1- hr Cruise:	692	0.13	1.01	5.79	2.22	4.20	4.20	3,207	0.10	0.70	4.01	1.54	2.91	2,221

AH-1														
Flight Operation	Fuel used lb	HC	CO	Emissions in lbs/1000 lbs fuel				Flight Emissions (lb/operation)						
				NOx	SO ₂	PM ₁₀	PM _{2.5}	CO ₂	VOC	CO	NOx	SO ₂	PM _{10/2.5}	CO2
Departure:														
Warm Up	79.5	0.98	22.49	4.29	2.22	4.20	4.20	3,162	0.08	1.79	0.34	0.18	0.33	251
Taxi Out	39.32	0.57	11.7	5.37	2.22	4.20	4.20	3,213	0.02	0.46	0.21	0.09	0.17	126
Hover	13.11	0.57	11.7	5.37	2.22	4.20	4.20	3,213	0.01	0.15	0.07	0.03	0.06	42
Climbout	29.19	0.56	10.13	5.61	2.22	4.20	4.20	3,217	0.02	0.30	0.16	0.06	0.12	94
Arrival:														
Approach	113.8	0.61	14.04	5.07	2.22	4.20	4.20	3,205	0.07	1.60	0.58	0.25	0.48	365
Taxi to Sdm	39.3	0.57	11.7	5.37	2.22	4.20	4.20	3,213	0.02	0.46	0.21	0.09	0.17	126
Shut Down	10.9	2.54	39.81	3.28	2.22	4.20	4.20	3,060	0.03	0.44	0.04	0.02	0.05	33
Total in Pounds									0.26	5.19	1.61	0.72	1.37	1,038
1- hr Cruise:	850	0.56	10.54	5.55	2.22	4.20	4.20	3,216	0.50	8.96	4.73	1.89	3.57	2,734

¹ for information on aircraft references, see Tab N, Aircraft References

TAB K: AIRCRAFT ACTIVITY - TESTING¹

H-60			Alternative 1 Total Hrs															Alternative 2 Total Hrs														
	# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events	Panama City	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events	Panama City		
Anti-Submarine Warfare Torpedo Test	1	30		0	29	870	72	2,160	0	0	0	0	0	0	0	0	0	0	43	1,290	121	3,630	0	0	0	0	0	0	0	0	0	
Anti-Submarine Warfare Tracking Test – Helicopter	1	30	5	150	6	180	190	5,700	8	240	61	1,830	0	0	0	0	6	180	12	360	280	8,400	27	810	110	3,300	0	0	0	0	0	
Kilo Dip	1	1	3	3	3	3	30	30	3	3	2	2	0	0	0	0	6	6	6	6	40	40	6	6	4	4	0	0	0	0	0	
Chaff Test	3	30	20	1,800	4	360	24	2,160	0	0	0	0	0	0	0	0	20	1,800	4	360	24	2,160	0	0	0	0	0	0	0	0	0	
Flare Test	1	30	10	300	0	0	20	600	0	0	0	0	0	0	0	0	10	300	0	0	20	600	0	0	0	0	0	0	0	0	0	
Airborne Dipping Sonar Minehunting Test	1	30	0	0	0	0	8	240	0	0	0	0	0	0	0	19	570	0	0	0	0	18	540	0	0	0	0	0	0	32	960	
Airborne Laser Based Mine Detection System Test	1	2	0	0	0	0	50	100	0	0	0	0	0	0	0	40	80	0	0	0	0	50	100	0	0	0	0	0	0	40	80	
Airborne Mine Neutralization System Test	1	2	0	0	0	0	29	58	0	0	0	0	0	0	0	21	42	0	0	0	0	50	100	0	0	0	0	0	0	32	64	
Airborne Sonobuoy Minehunting Test	1	30	0	0	0	0	24	720	0	0	0	0	0	0	0	52	1,560	0	0	0	0	24	720	0	0	0	0	0	0	52	1,560	
Air-to-Surface Gunnery Test	1	2	0	0	43	86	128	256	0	0	0	0	0	0	0	0	0	0	55	110	280	560	0	0	0	0	0	0	0	0	0	
Air-to-Surface Missile Test	1	3	5	15	33	99	133	399	0	0	0	0	0	0	0	0	10	30	38	114	444	1,332	0	0	0	0	0	0	0	0	0	
High-Energy Laser Weapons Test	1	2	0	0	0	0	108	216	0	0	0	0	0	0	0	0	0	0	0	0	0	108	216	0	0	0	0	0	0	0	0	
Laser Targeting Test	3	0.5	0	0	0	0	8	12	0	0	0	0	0	0	0	0	0	0	0	0	8	12	0	0	0	0	0	0	0	0	0	
Rocket Test	1	3	0	0	51	153	33	99	0	0	0	0	0	0	0	0	0	0	57	171	35	105	0	0	0	0	0	0	0	0	0	
Maritime Security	1	4	0	0	12	48	20	80	0	0	0	0	0	12	48	0	0	0	0	12	48	20	80	0	0	0	0	12	48	0	0	
Alternative 1 Totals				2,268		1,799		12,830		243		1,832		48		2,252	Alternative	2,316		2,459		18,595		816		3,304		48		2,664		

¹ Provided by US Navy, NAVAIR Assumptions.docx, March 30, 2017

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TAB L: AIRCRAFT ACTIVITY - TRAINING¹

5 yrs presented annually

UH-1	Alternative Total Hrs													
# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Missile Exercise Air-to-Air	15	1	0	0	2	24	8	120	2	24	0	0	2	24
Missile Exercise Surface-to-Air	15	1	0	0	0	0	0.4	6	0	0	0	0	0	0
Antisubmarine Warfare Torpedo Exercise - Ship	8	2	0	0	3	51	8	128	0	0	0	0	0	0
Antisubmarine Warfare Torpedo Exercise - Submarine	6	3	0	0	2	43	8	144	0	0	1	22	0	0
Gunnery Exercise Air-to-Surface Small Caliber	1	1	0	0	0	0	0	0	0	0	0	0	3	3
Alternative Totals				0		118		398		24		22		27

Learjet	Alternative Total Hrs													
# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Gunnery Exercise Surface-to-Air Medium Caliber	1	1	0	0	0	0	1	1	0	0	0	0	0	0
Gunnery Exercise Surface-to-Air Large Caliber	1	1	0	0	0	0	5	5	0	0	0	0	0	0
Gunnery Exercise Surface-to-Air Medium Caliber	1	1	0	0	0	0	7	7	0	0	0	0	0	0
Alternative Totals				0		0		13		0		0		0

H-60	Alternative Total Hrs													
# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Gunnery Exercise Air-to-Surface Small Caliber	1	1	0	0	40	40	112	112	0	0	0	0	24	24
Missile Exercise Air-to-Surface - Rocket	1	1	2	2	20	20	20	20	0	0	0	0	0	0
Missile Exercise Air-to-Surface	1	1	0	0	18	18	14	14	0	0	0	0	3	3
Laser Targeting - Aircraft	1	1	0	0	55	55	27	27	0	0	0	0	0	0
Antisubmarine Warfare Tracking Exercise - Helicopter	1	3	1	2	74	222	2	5	0	0	0	0	2	7
Antisubmarine Warfare Torpedo Exercise - Helicopter	1	3	0	0	3	8	1	2	0	0	0	0	0	0
Antisubmarine Warfare Torpedo Exercise - Submarine	3	3	0	0	0	0	0	0	0	0	1	11	0	0
Airborne Mine Countermeasures - Mine Detection	1	2	62	124	63	127	308	616	0	0	0	0	74	148
Mine Countermeasure Mine Neutralization Remotely	1	2	26	53	14	28	126	252	0	0	0	0	14	28
Search and Rescue	1	1	0	0	125	125	200	200	0	0	0	0	0	0
Personnel Insertion/Extraction - Air	1	2	10	20	2	4	36	71	0	0	0	0	0	0
PMINT	1	63.8	0	0	0	0	0	0	0	0	0	0	1	64
ARGMEUX	1	149.3	0	0	0	0	0	0	0	0	0	0	1	149
CERTEX	1	139.4	0	0	0	0	0	0	0	0	0	0	1	139
Alternative Totals				201		648		1,319		0		11		564

H-53	Alternative Total Hrs													
# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Airborne Mine Countermeasures - Towed Mine Neutralization	1	2	0	0	31	62	176	352	0	0	0	0	37	73
Airborne Mine Countermeasures - Mine Detection	1	2	0	0	63	127	308	616	0	0	0	0	74	148
Mine Countermeasure Mine Neutralization Remotely	1	2	0	0	14	28	126	252	0	0	0	0	14	28
Search and Rescue	1	1	0	0	125	125	200	200	0	0	0	0	0	0
Alternative Totals				0		342		1,420		0		0		250

F-18E/F	Alternative Total Hrs													
# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Gunnery Exercise Air-to-Surface Medium Caliber	2.5	0.33	6	5	49	40	44	36	0	0	0	0	29	24
Mine Laying	2.5	0.33	0	0	0.2	0.2	1	1	0	0	0	0	0.4	0.3
Alternative Totals				5		41		37		0		0		24

F-35		Alternative Total Hrs													
	# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Gunnery Exercise Air-to-Surface Medium Caliber	2.5	0.33	6	5	49	40	44	36	0	0	0	0	29	24	0
Mine Laying	2.5	0.33	0	0	0.2	0.2	1	1	0	0	0	0	0.4	0.3	0
Alternative Totals					5	41		37		0		0		24	

P-3		Alternative Total Hrs													
	# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Antisubmarine Warfare Tracking Exercise - Maritime Patrol Aircraft	2.5	1	0	0	18	46	6	15	0	0	3	8	2	4	0
Antisubmarine Warfare Torpedo Exercise - Maritime Patrol Aircraft	2.5	1	0	0	3	7	0	0	0	0	0	0	0	0	0
Alternative Totals					0	53		15		0		8		4	

P-8		Alternative Total Hrs													
	# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Antisubmarine Warfare Tracking Exercise - Maritime Patrol Aircraft	2.5	1	0	0	74	184	25	62	0	0	13	32	6	16	0
Antisubmarine Warfare Torpedo Exercise - Maritime Patrol Aircraft	2.5	1	0	0	0	0	1	2	0	0	0	0	0	0	0
Antisubmarine Warfare Torpedo Exercise - Submarine	3	3	0	0	0	0	0	0	0	1	11	0	0	0	0
Mine Laying	2.5	0.33	0	0	0	0.2	1	1	0	0	0	0	0.4	0.3	0
Alternative Totals					0	185		64		0		42		16	

AV-8B		Alternative Total Hrs													
	# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Gunnery Exercise Air-to-Surface Medium Caliber	2.5	0.33	0	0	5	4	0	0	0	0	0	0	4	3	0
Alternative Totals					0	4		0		0		0		3	

AH-1		Alternative Total Hrs													
	# a/c	Hr/event	# Events	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events
Gunnery Exercise Air-to-Surface Small Caliber	1	1	0	0	0	0	0	0	0	0	0	0	2	2	0
Missile Exercise Air-to-Surface - Rocket	1	1	0	0	2	2	0	0	0	0	0	0	2	2	0
Missile Exercise Air-to-Surface	1	1	0	0	0	0	0	0	0	0	0	0	3	3	0
Alternative Totals					0	2		0		0		0		5	

1 Provided by US Navy, AFTT Training Air Analysis.xlsx, March 30 2017; IKE C2X.xlsx, March 29 2017; C2X Sorties hours.xlsx, March 13 2017; Marine Corps training cycle.xlsx, March 29 2017.

TAB M: AIRCRAFT ACTIVITY BY REGION¹

VA CAPES Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
398	13	14,149	19,914	1,420	37	37	15	64	0	0	0	0

VA CAPES LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	64	0	0	58	58	0	0	0	0	0	0

VA CAPES Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	523	0	392	0	0	0	0	0	0	0	0

GOMEX Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	2,469	2,517	0	5	5	0	0	0	0	0	0

GOMEX LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

GOMEX Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	20	0	0	0	0	0	0	0	0	0	0

JAX Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
118	0	2,447	3,107	342	41	41	53	185	0	4	2	0

JAX LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	129	0	0	491	491	0	0	0	0	0	0

JAX Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	159	0	0	0	0	0	0	0	0	0	0

KW Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
24	0	243	816	0	0	0	0	0	0	0	0	0

KW LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

KW Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

NE Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	1,843	3,315	0	0	0	0	8	42	0	0	0

NE LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

NE Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

CHERRY PT Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
27	0	612	612	250	24	24	4	16	0	3	5	0

CHERRY PT LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	233.5	0	0	157	157	0	0	0	107	0	110

CHERRY PT Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	2.4	0	0	0	0	0	0	0	0	22	0

OTHER Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	2,252	2,664	0	0	0	0	0	0	0	0	0

OTHER LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

OTHER Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	2,252	2,664	0	0	0	0	0	0	0	0	0

¹ Provided by US Navy, AFTT Training Air Analysis.xlsx, March 30 2017; IKE C2X.xlsx, March 29 2017; C2X Sorties hours.xlsx, March 13 2017; Marine Corps training cycle.xlsx, March 29 2017, NAVAIR Assumptions.docx, March 30 2017.

TAB N: AIRCRAFT ENGINE EMISSION FACTOR SOURCES
cruise based on 1 hour

Aircraft	Source of Emissions Indices Information
AH-1W	AESO Memorandum Report No. 9824, Revision C, November 2015.
AV-8B - LTO	AESO Memorandum Report No. 9913, Revision D, November 2009.
AV-8B - Cruise	AESO Memorandum Report No. 9963, Revision C, November 2009.
CH-53 - LTO	AESO Memorandum Report No. 2015-01 Revision B, September 2015.
CH-53 - cruise	
E-2 / E-2C - Cruise	AESO Memorandum Report No. 9920, Revision E. September 2015.
P-8 - Cruise	Engine Datasheet 8CM051, ICAO Engine Exhaust Emissions Data Bank (ICAO, 2013)
F-35B - LTO	JSF Emissions Package_2011-12-28.xls from Flint Webb, 2013.
F-35B Cruise	From "Demonstration Sortie Cruise" from F-35 West-Coast Basing EIS, 2014
FA-18E/F & EA-18G - LTO	AESO Memorandum Report No. 9815, Revision H. November 2015
FA-18E/F & EA-18G Cruise	AESO Memorandum Report No. 9933, Revision E, November 2015
Learjet	Air Emissions Guide for Air Force Mobile Sources, Air Force Civil Engineer Center, August 2013
HH-60 - LTO	AESO Memorandum Report No. 9929 Revision C. January 2016
HH-60 - cruise	
P-3	AESO Memorandum Report No. 9911, Revision C, Feb 2010.
V-22 - LTO	AESO Memorandum Report No. 9946, Revision G, April 2016
V-22 - Cruise	
UH-1N - LTO	AESO Memorandum Report No. 9904, Revision A, May 1999
UH-1N - Cruise	AESO Memorandum Report No. 9962, Rev A November 2009
PM2.5 = PM10 emissions, in accordance with AESO Memorandum Report No. 2013-04 Revision A, January 2014. <i>PM2.5 to PM10 Ratio for Aircraft Emitted Particles</i> .	
AESO Report 2012-01D, December 2014. <i>Sulfur Dioxide Emission Index Using JP-5 and JP-8 Fuel</i> .	
	Received updated Memoranda too late to update for this version, will incorporate for Final EIS.

TAB O: MUNITION ACTIVITY DATA¹

Inshore Munitions - Alternatives 1 and 2 - State Waters

Location	Munitions/Materials		
	Projectiles		Counter measure
	Small Caliber (Non-explosive)	Marine Marker	Flare
	Number	Number	Number
Boston, MA	0	0	0
Narragansett Bay, RI	8,300	65	0
Earle, NJ	0	0	0
Delaware Bay, DE	0	0	0
Wilmington, DE	0	0	0
Hampton Roads, VA	0	0	0
James River and Tributaries, VA	102,000	660	20,400
York River, VA	0	20	0
Lower Chesapeake Bay	28,800	0	0
Morehead City, NC	0	0	0
Cosper River, SC	5,100	0	0
Savannah, GA	0	0	0
King's Bay, GA	0	0	0
Mayport, FL	0	0	0
Port Canaveral, FL	12,800	60	0
Tampa, FL	0	0	0
Beaumont, TX	0	0	0
Corpus Christi, TX	0	0	0

Munitions for Use During Training in a Single Year under Alternatives 1 and 2 - Beyond State Waters

Munitions/Materials	Range Complex							
	Northeast	VACAPES	Cherry Point	JAX	Key West	GOMEX	Other RC	SINKEX <i>Area</i>
	Number	Number	Number	Number	Number	Number	Number	Number
Bombs								
Bombs (Explosive)	0	76	0	50	0	4	0	12
Bombs (Non-Explosive)	0	2,248	599	1,369	0	270	0	0
Projectiles								
Small-Caliber (Non-Explosive)	36,600	3,806,350	833,675	1,436,775	0	237,500	200,000	0
Small-Caliber (Casing Only)	0	3,400	0	1,000	0	0	0	0
Medium-Caliber (Explosive)	0	65,312	23,200	58,952	0	6,250	1,350	0
Medium-Caliber (Non-Explosive)	1,000	800,769	358,574	433,234	56,000	32,000	21,250	0
Large-Caliber (Explosive)	0	2,998	756	1,160	0	260	96	200
Large-Caliber (Non-Explosive)	0	3,802	1,131	1,388	0	638	196	0
Large-Caliber (Casing only)	0	0	960	0	0	0	0	0
Missiles								
Missiles (Explosive)	4	155	106	136	8	8	0	4
Rockets (Explosive)	0	1,254	76	1,330	0	76	0	0
Rockets (Non-Explosive)	0	2,708	289	2,996	0	289	0	0
Rockets (Non-Explosive) Flechette	0	143	15	153	0	15	0	0
Countermeasures								
Flares	0	1,000	22,300	38,000	31,000	1,840	0	0
Other								
Grenades (Explosive)	56	70	28	28	0	28	0	0
Illumination Flare	0	40	48	48	8	0	0	0
Marine Marker	192	10,136	332	1,263	0	303	24	0
Total	37,882	4,709,821	1,363,843	2,194,749	276,062	285,868	222,916	219

Munitions for Use During Testing in a Single Year under Alternatives 1 and 2 - Beyond State Waters

Munitions/Materials	Range Complex						Testing Ranges		
	Northeast	VACAPES	Cherry Point	JAX	Key West	GOMEX	NUWC Newport	SFOMF	NSWC Panama City
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Bombs									
Bombs (Explosive)	0	2	0	0	0	0	0	0	0
Bombs (Non-Explosive)	0	964	0	12	0	0	0	0	0
Projectiles									
Small-Caliber (Non-Explosive)	4,800	77,800	4,800	4,800	4,800	17,800	0	0	7,000
Medium-Caliber (Explosive)	3,860	17,270	3,360	14,860	3,360	3,360	0	0	0
Medium-Caliber (Non-Explosive)	9,060	239,660	8,160	237,360	32,660	22,660	0	0	5,100
Large-Caliber (Explosive)	132	3,268	132	6,276	832	928	0	4	100
Large-Caliber (Non-Explosive)	1,761	6,147	1,440	14,524	9,130	2,774	0	0	280
Missiles									
Missiles (Explosive)	10	176	0	70	0	12	0	0	0
Missiles (Non-Explosive)	24	899	24	136	31	24	0	0	0
Rockets (Explosive)	0	206	0	200	0	0	0	0	0
Rockets (Non-Explosive)	0	746	0	403	0	0	0	0	0
Rockets (Non-Explosive) Flechette	0	243	0	135	0	0	0	0	0
Countermeasures									
Flares	0	20,135	0	0	0	600	0	0	0

¹ Munitions Usage Estimates provided by US Navy, AFTT Training Air Analysis.xlsx (March 29), AFTT Inshore Events_08Feb2017_NAEMO Web.xlsx, Appendix F, Draft AFTT EIS May 2017.

TAB P. BASELINE (V2 PREFERRED ALTERNATIVE) MUNITION SUMMARY¹

TOTALS BY COMPLEX for TRAINING AND TESTING COMBINED (TPV)		CO	NO _x	VOC	SO _x	PM10	PM2.5
	Northeast / NUWC Newport	0.0685	0.0018	0.0000	0.0000	0.0344	0.0063
	Virginia Capes	26.8013	1.1019	0.0000	0.0000	1.9281	1.2623
	Navy Cherry Pt.	5.5601	0.1465	0.0000	0.0000	0.1426	0.0755
	Jacksonville	14.1096	0.5870	0.0000	0.0001	1.4573	0.8805
	Key West	1.0447	0.0405	0.0000	0.0000	0.0221	0.0155
	GOMEX / Panama City	1.9943	0.0437	0.0000	0.0000	0.1222	0.0739
	Other AFTT	0.8713	0.0820	0.0000	0.0000	0.0262	0.0159
	Grand Total for ALT 2	50.4497	2.0034	0.0000	0.0001	3.7328	2.3300

¹ Atlantic Fleet Forces Training and Testing Final Environmental Impact Statement/Overseas Environmental Impact Statement, August 2013

C.2 RECORD OF NON-APPLICABILITY FOR CLEAN AIR ACT CONFORMITY

The proposed action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

Proposed Action.

Action Proponent: US Navy, Fleet Forces
Location: Jacksonville, FL and surrounding area
Proposed Action Name: Atlantic Fleet Testing and Training
Proposed Action & Emissions Summary:

The action involves operation of military aircraft, vessels, and small boats in order to achieve requisite training and testing requirements. Small boats and vessels would be operational in the riverine environment in the Jacksonville Florida locality. These nearshore activities generate emissions primarily through fossil fuel combustion from engine operation. Part of Nassau County, which is adjacent to Jacksonville, is nonattainment for sulfur dioxide. As a result, proposed action emissions were evaluated to assess compliance with the General Conformity Rule *de minimis* thresholds. Table C.C.2-1 provides a summary of the evaluation.

Table C.C.2-1: Proposed Action Sulfur Dioxide Emissions Compared to General Conformity Rule *de Minimis* Thresholds

<i>Annual Emissions</i>	<i>SO²</i>
Alternative 1	11.39
Baseline	10.50
Net Change	0.89
<i>de minimis</i> thresholds	100
Potential Exceedance	No
Alternative 2	12.58
Baseline	10.50
Net Change	2.08
<i>de minimis</i> thresholds	100
Potential Exceedance	No

Included with this RONA is a summary of the calculations and data used. The U.S. Navy concludes that *de minimis* thresholds for sulfur dioxide would not be exceeded as a result of implementation of the proposed action. Formal Conformity Determination procedures are not required, resulting in this RONA. The emissions data supporting that conclusion is shown in Table C.C.2-1, which is a summary of the calculations, methodology, and data attached to this RONA.

Affected Air Basin(s): Jacksonville (Florida)-Brunswick (Georgia) Interstate Air Quality Control Region

Date RONA prepared:

RONA prepared by:

RONA Approval:

Signature: _____

Name/Rank: _____ Date: _____

Position: _____

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