

APPENDIX H

AIR QUALITY EMISSIONS CALCULATIONS

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Draft

**Supplemental Environmental Impact Statement/
Overseas Environmental Impact Statement
Atlantic Fleet Training and Testing**

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H AIR QUALITY EMISSIONS CALCULATIONS

H.1 AIR QUALITY EMISSIONS CALCULATIONS

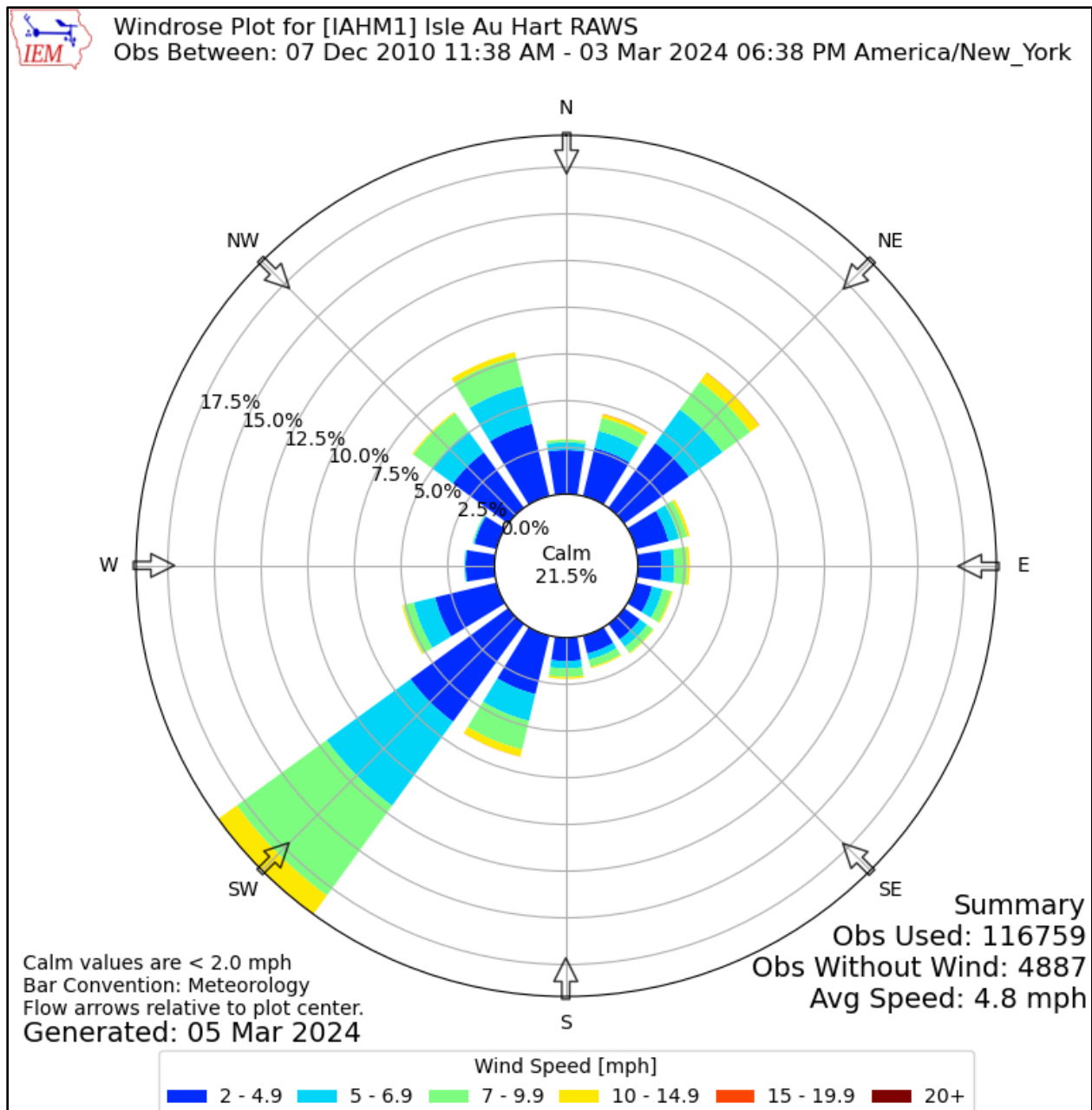


Figure H-1: Island 30 Miles Southwest of Bar Harbor

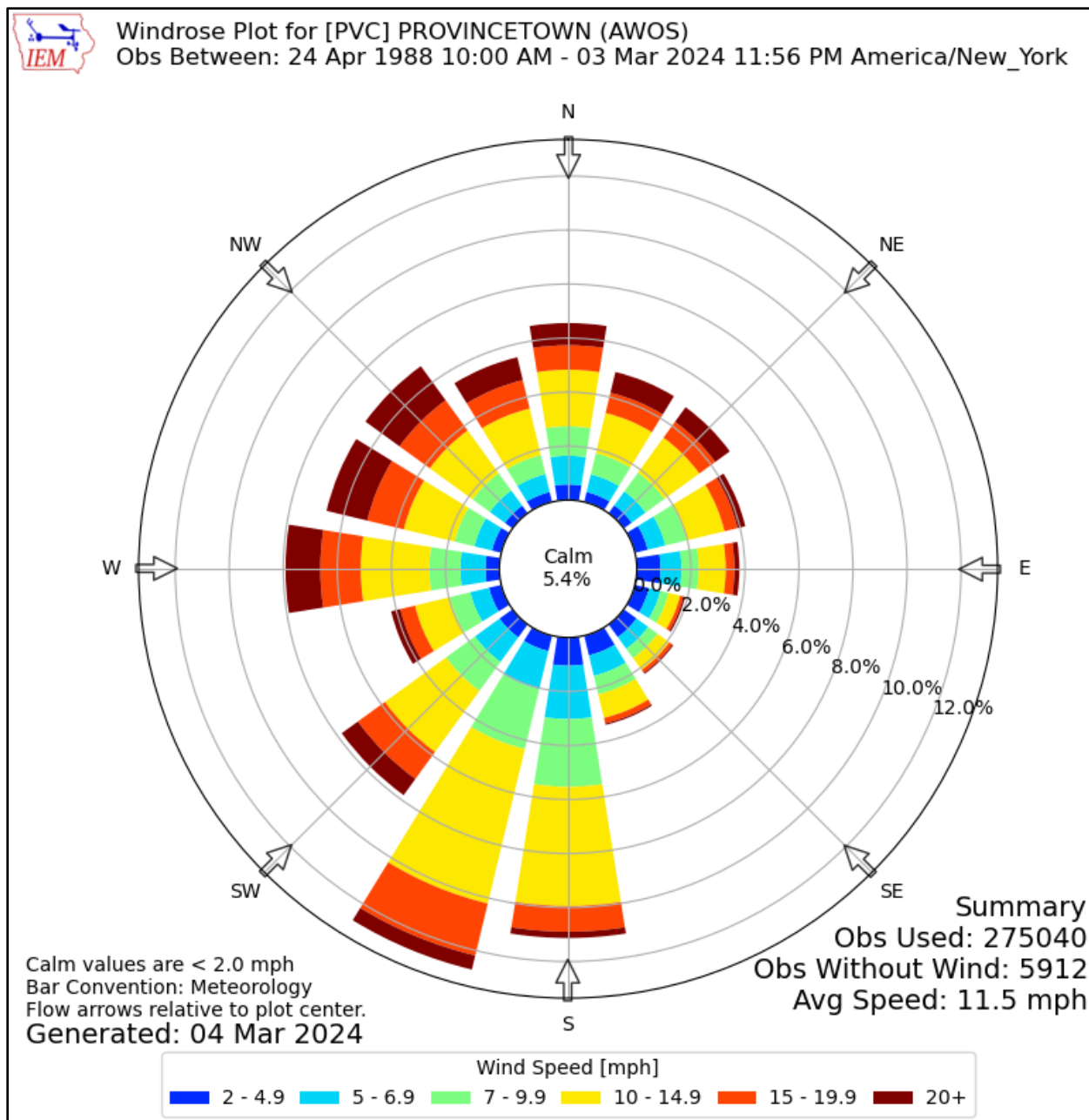


Figure H-2: Northern Tip of Cape Cod

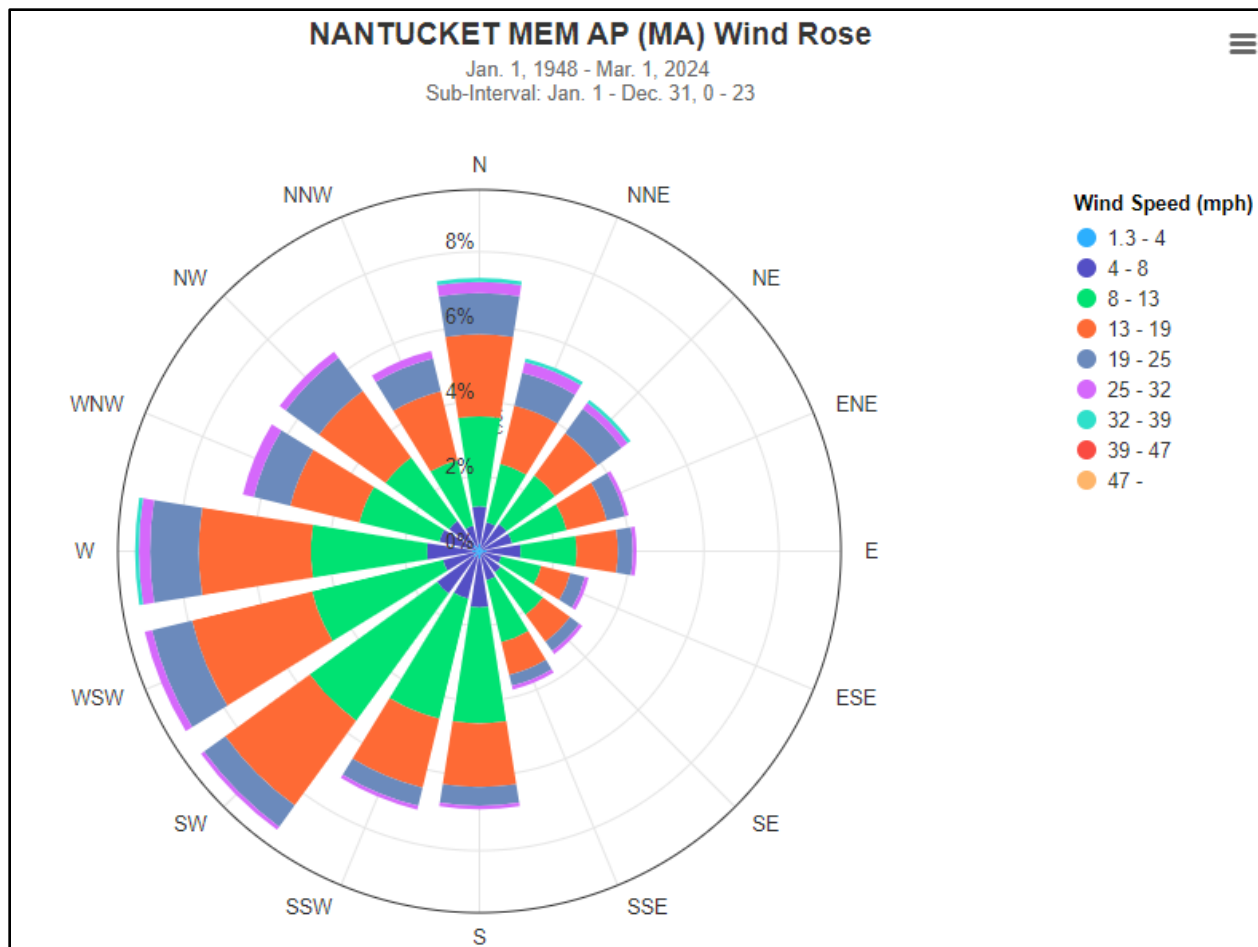


Figure H-3: Directly Between the Boston and Narragansett Bay Operating Areas

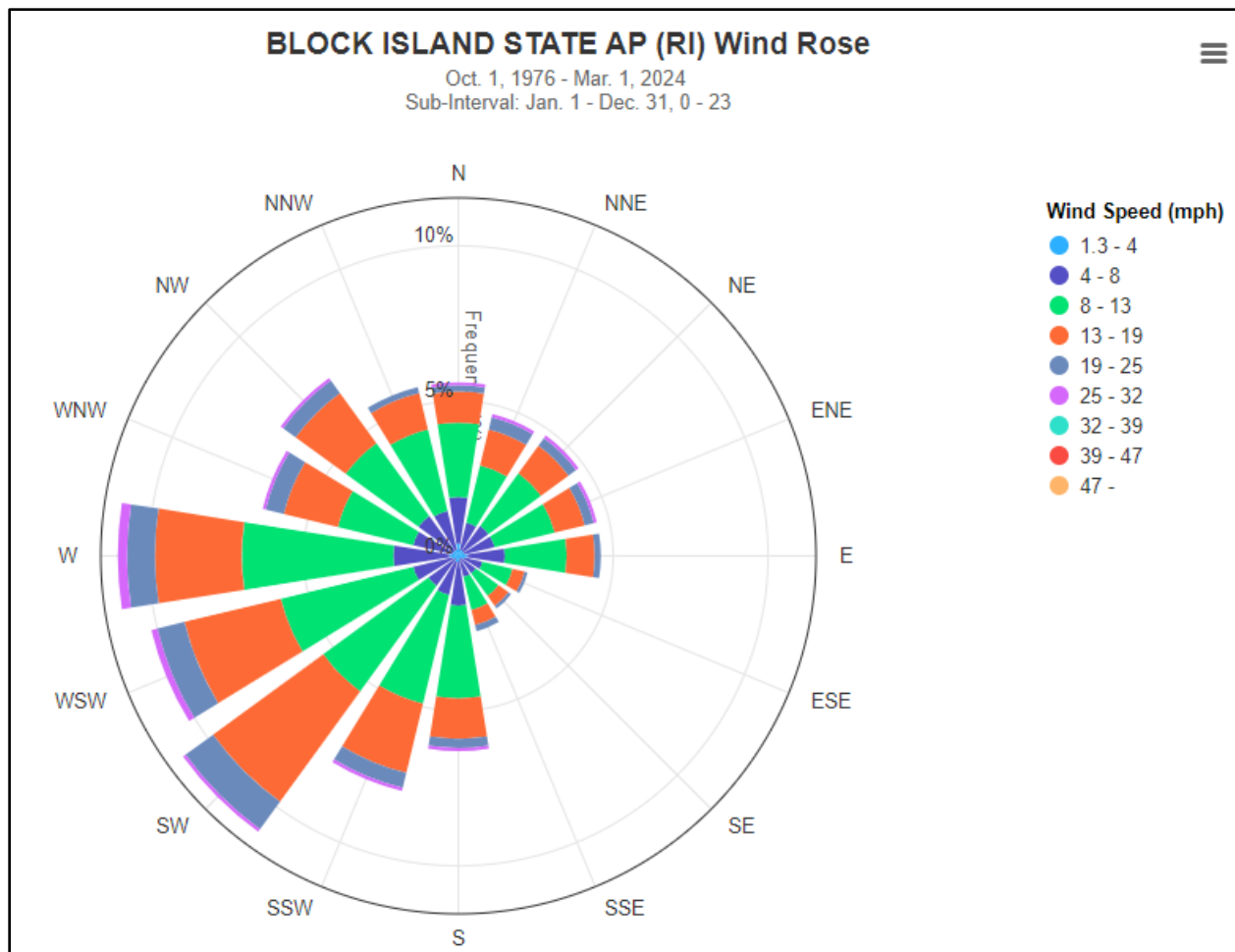


Figure H-4: On the Inshore Boundary of the Narragansett Bay Operating Area

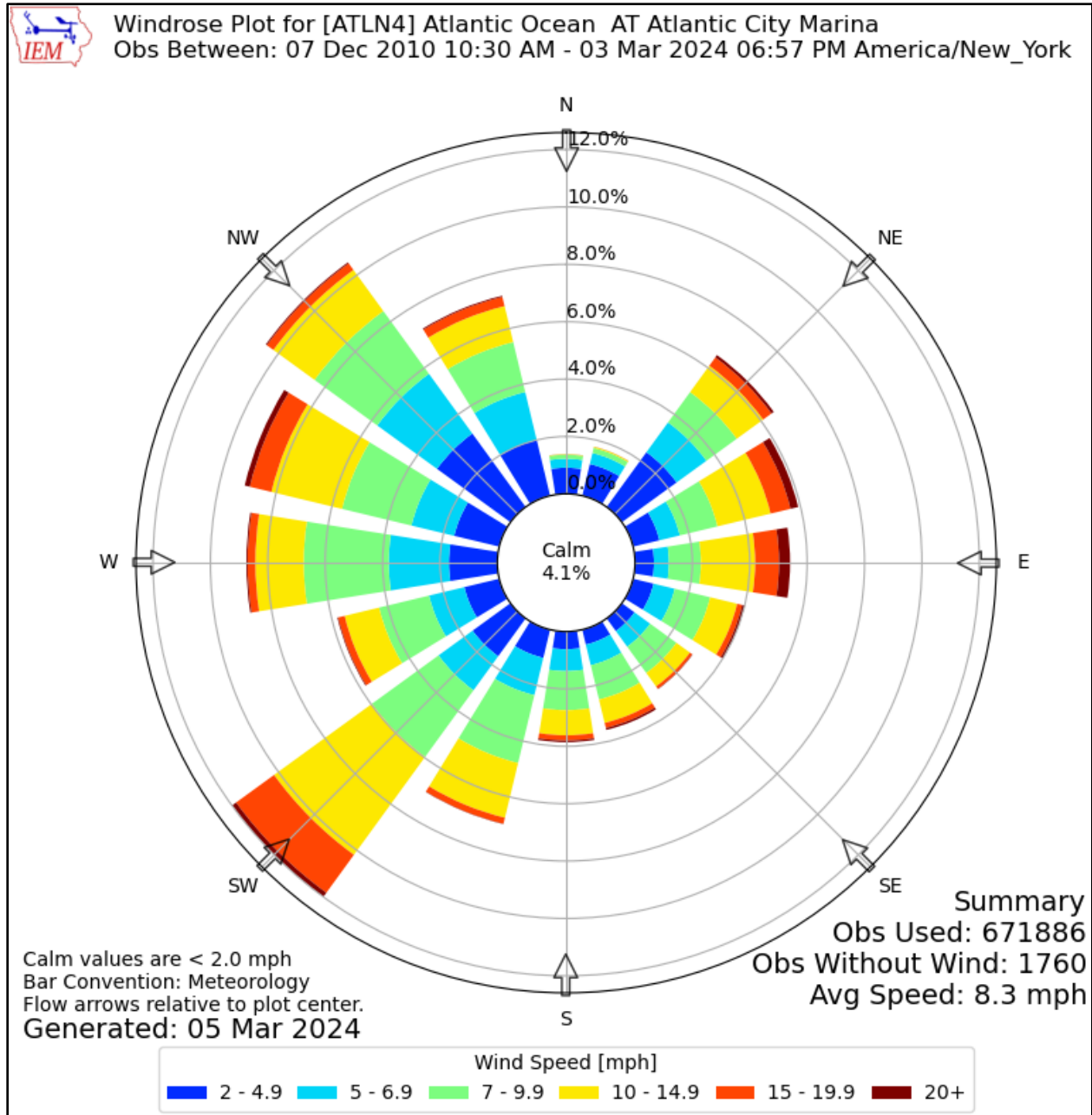


Figure H-5: Site Is 1 Mile from the Coast Inside the Atlantic City Marina Entrance Channel

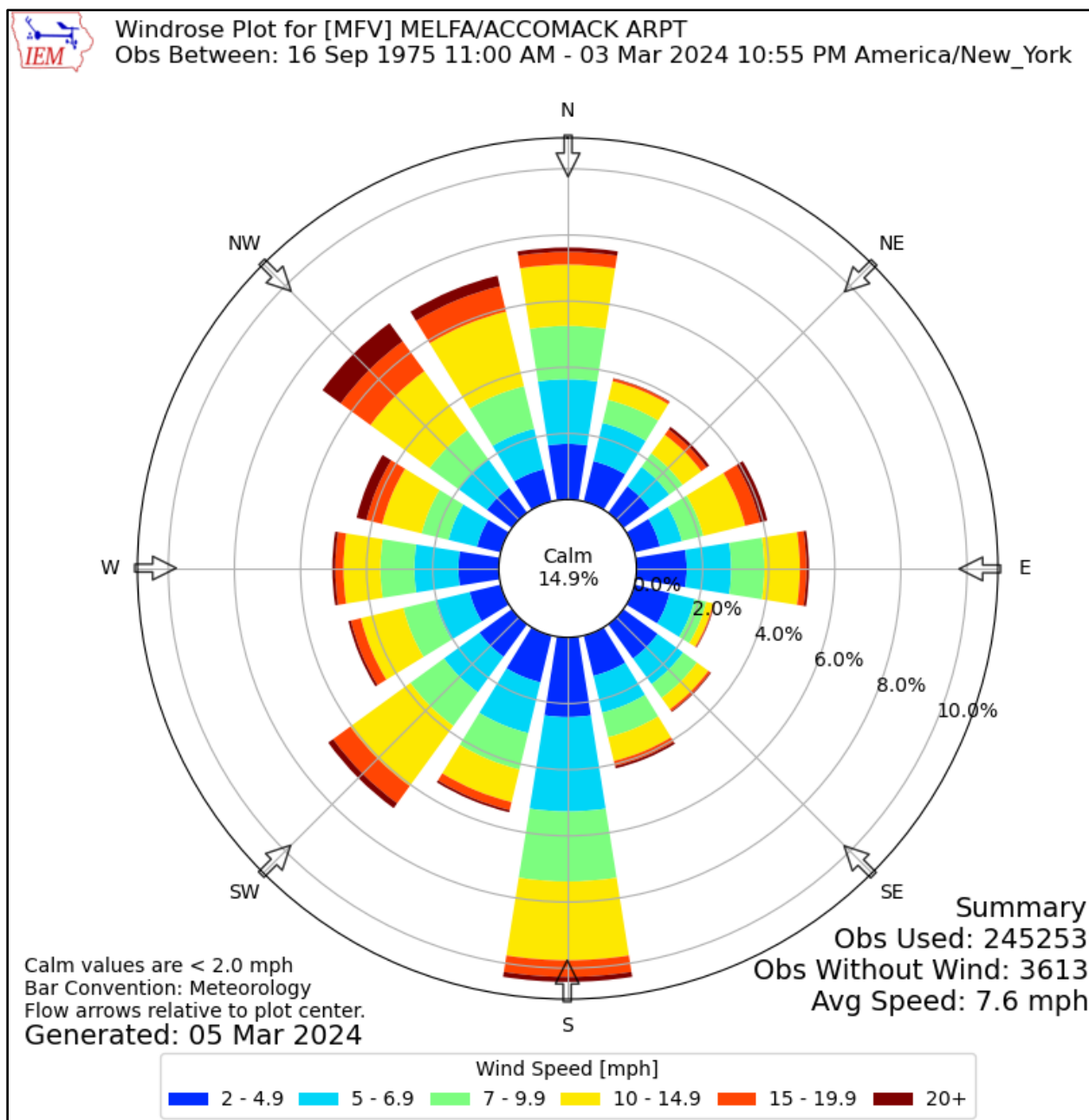


Figure H-6: Fifty Miles North/Northeast of Virginia Beach and West of Chesapeake Bay

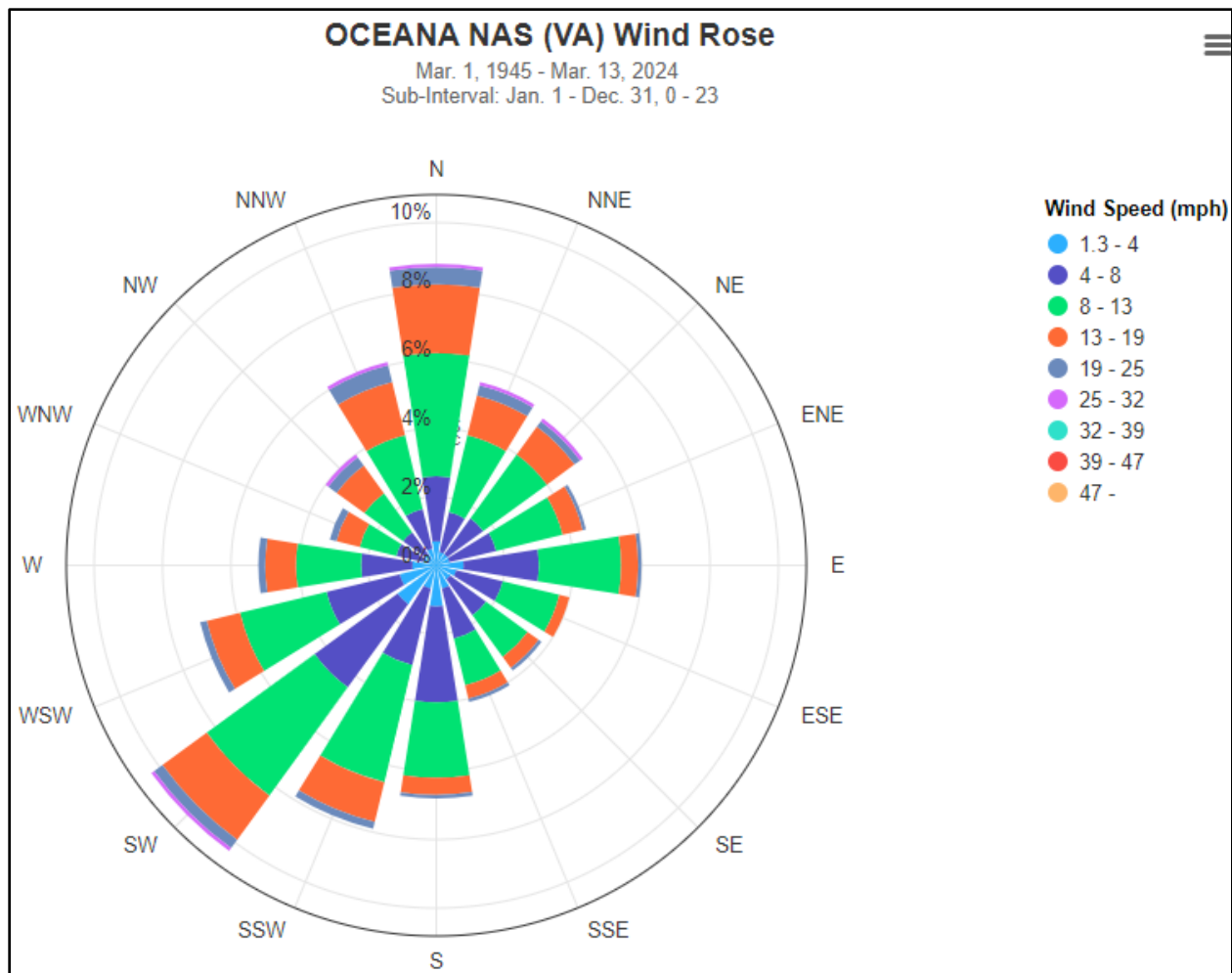


Figure H-7: On the Coast at Virginia Beach

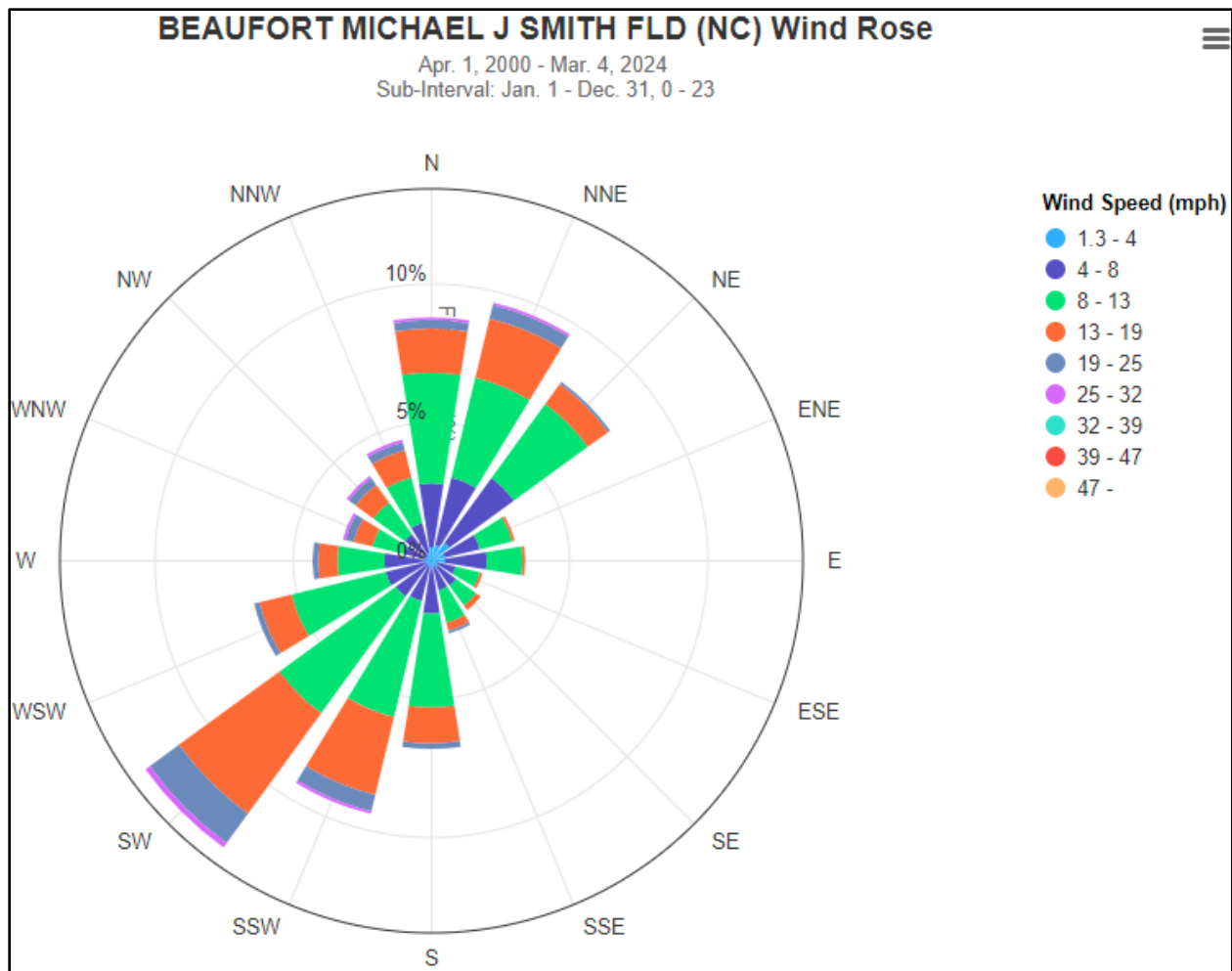


Figure H-8: Central North Carolina – 72 Miles Southwest of Cape Hatteras

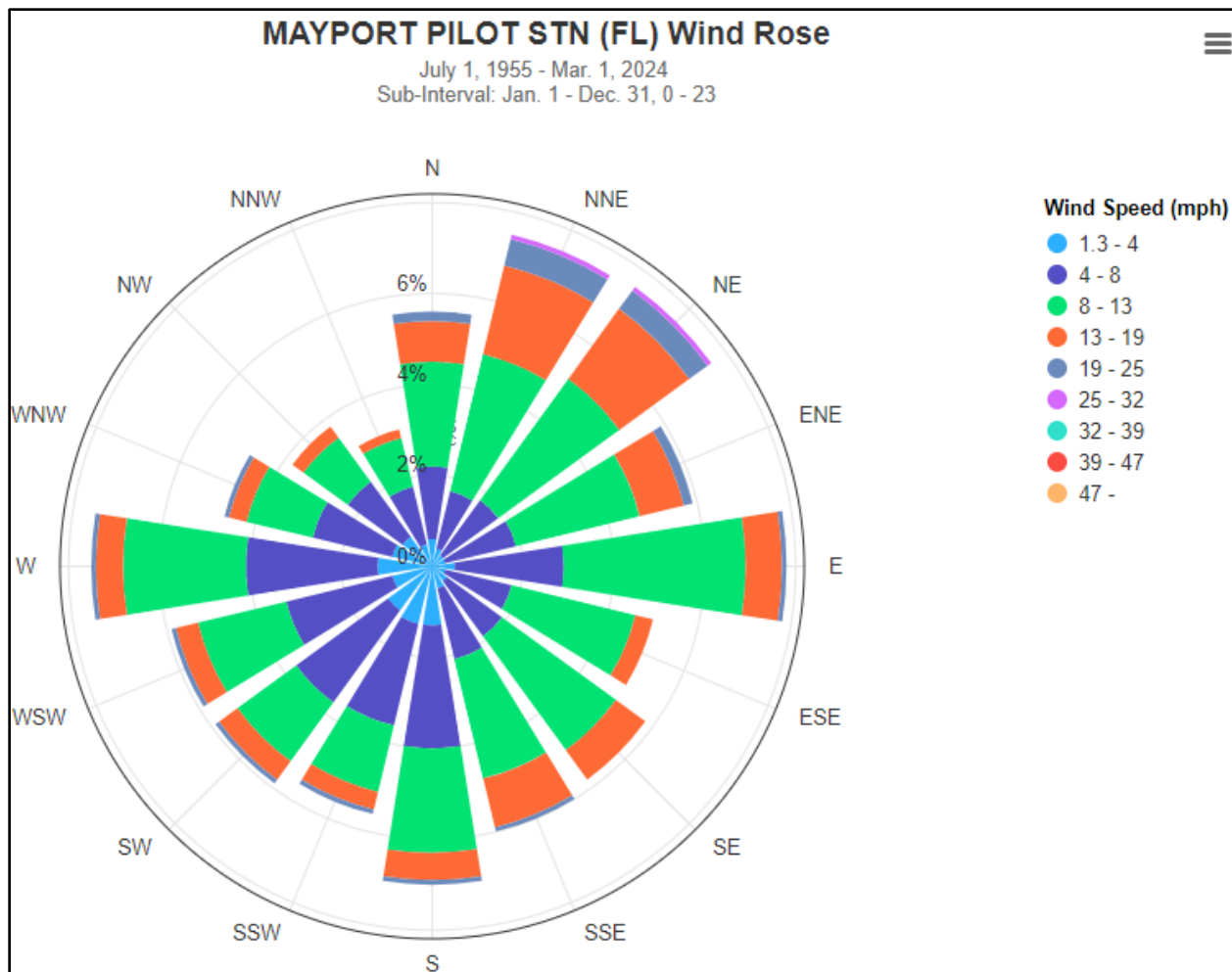


Figure H-9: Directly on the Coast East Of Jacksonville

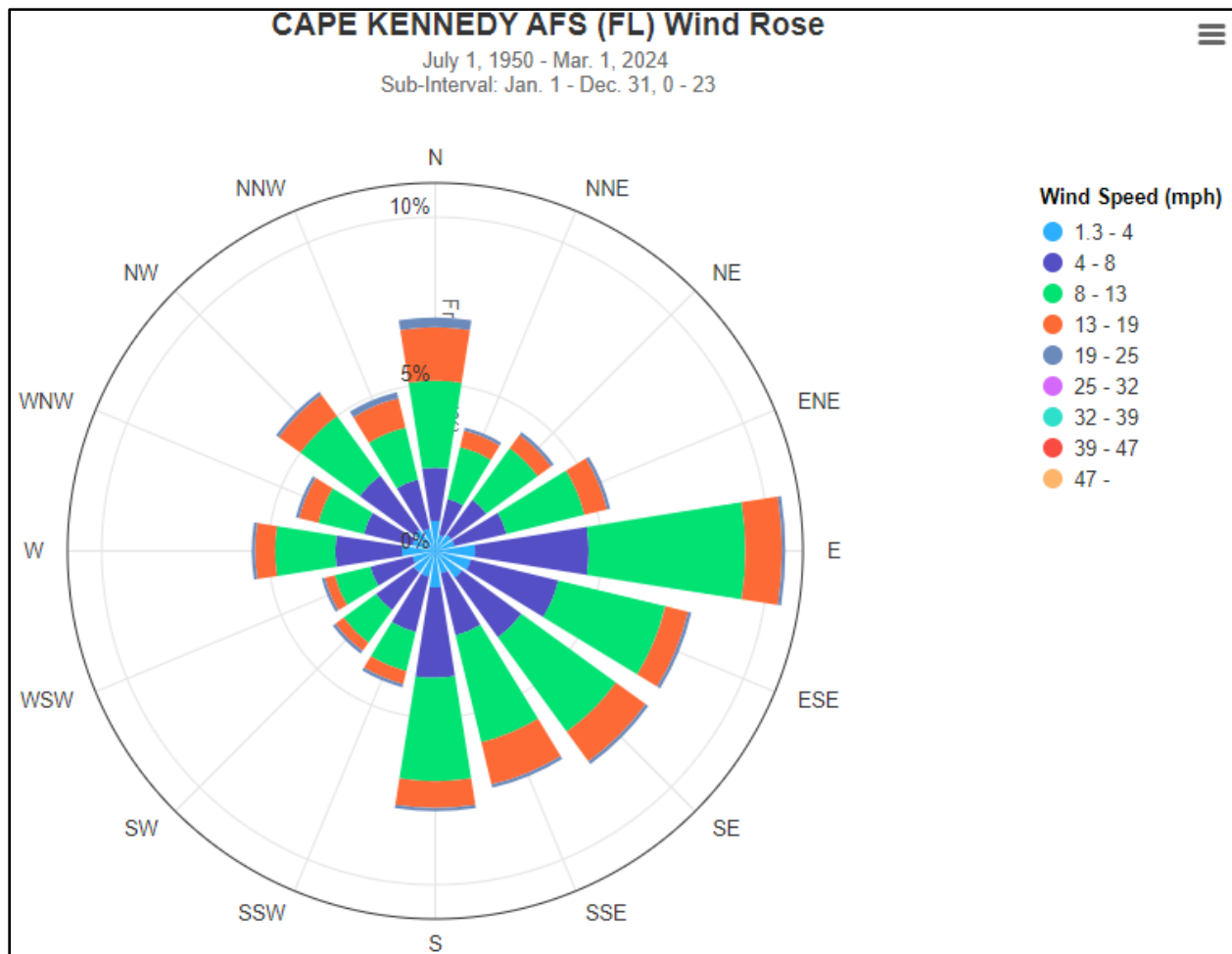
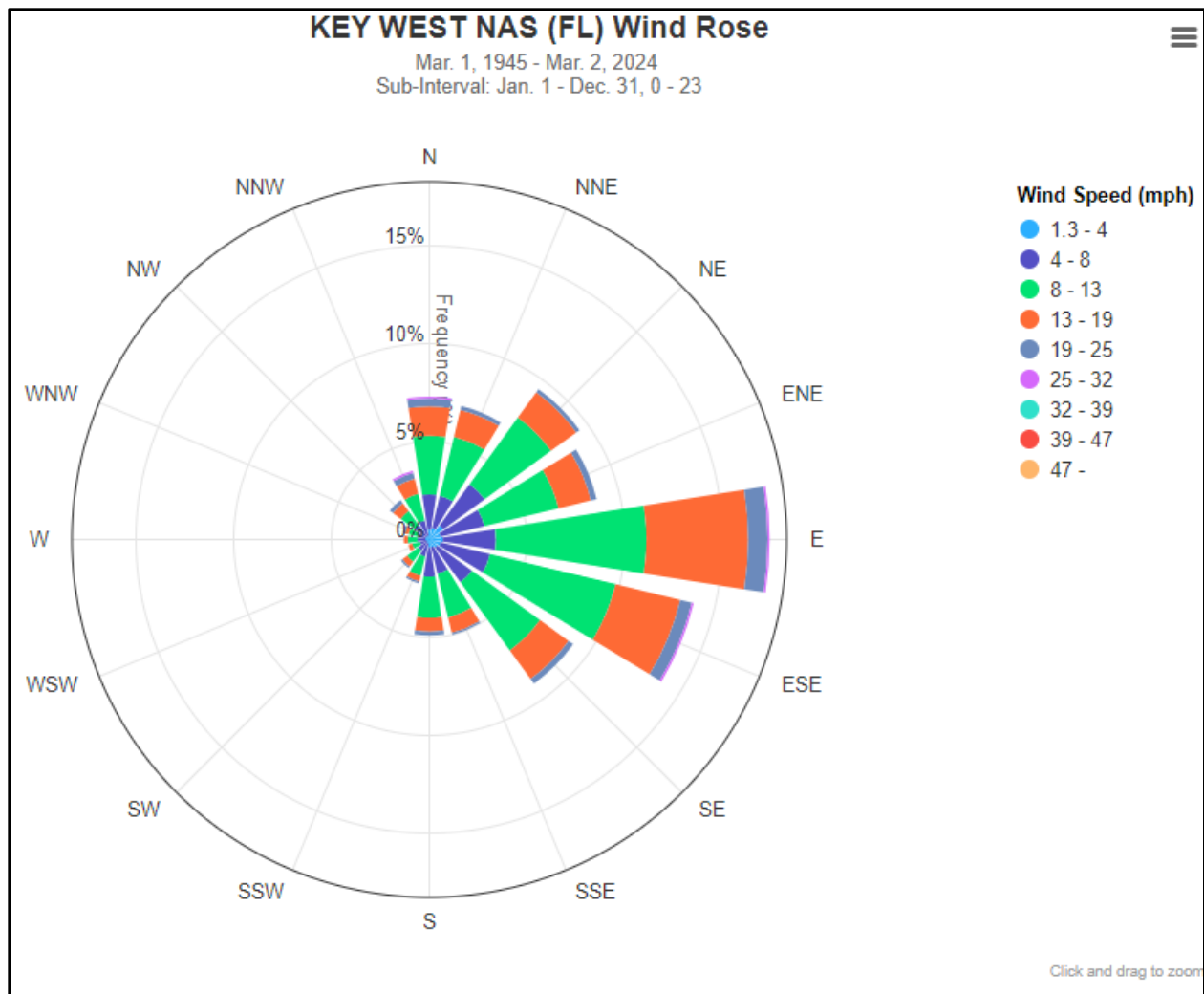


Figure H-10: On the Beach at Cape Canaveral



**Figure H-11: A Few Miles North of the Key West Operating Area, Elevation 6 Feet
Mean Sea Level**

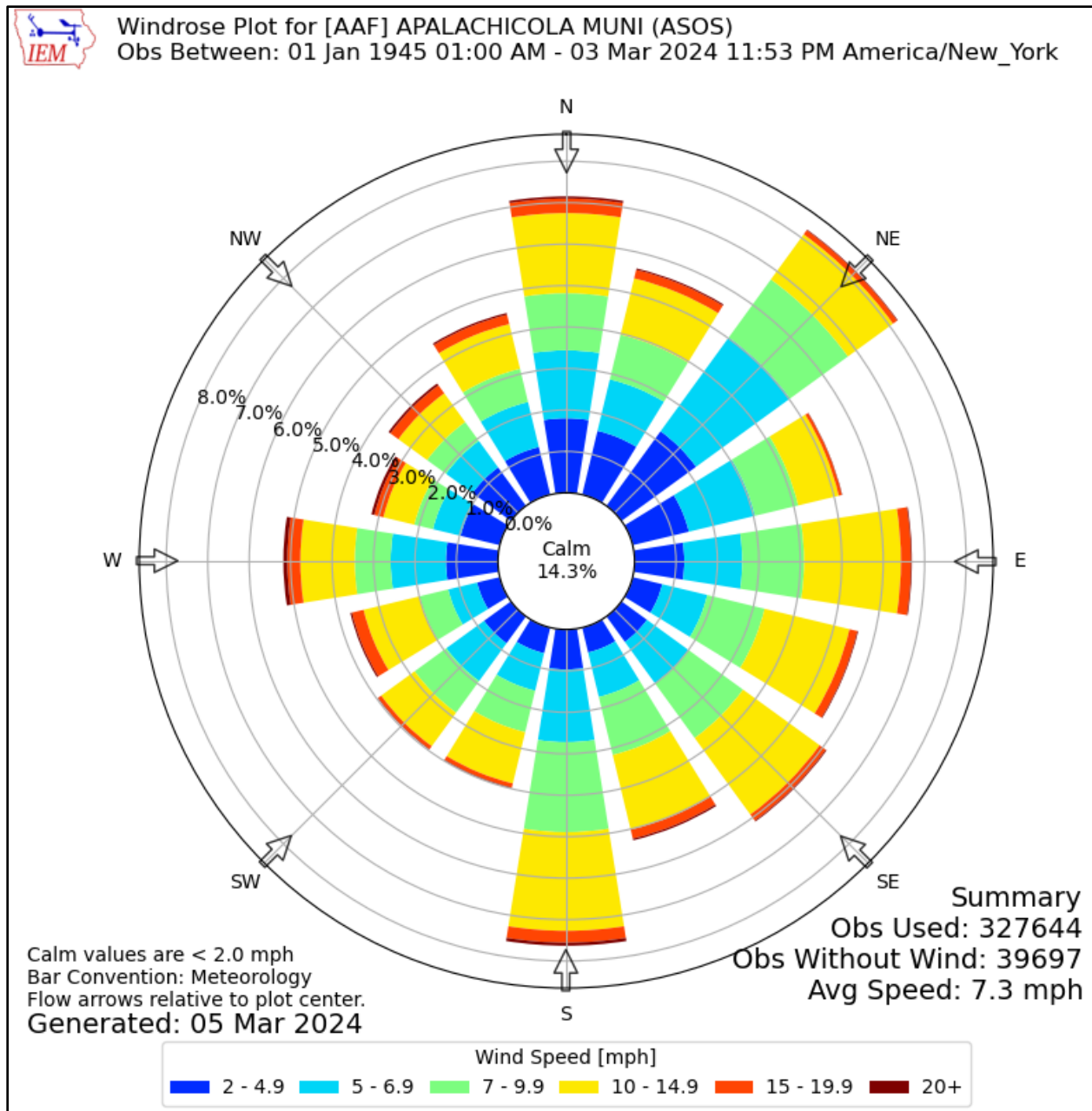


Figure H-12: Site Is on the Coast and Directly North of the Boundary of the Panama City Operating Area

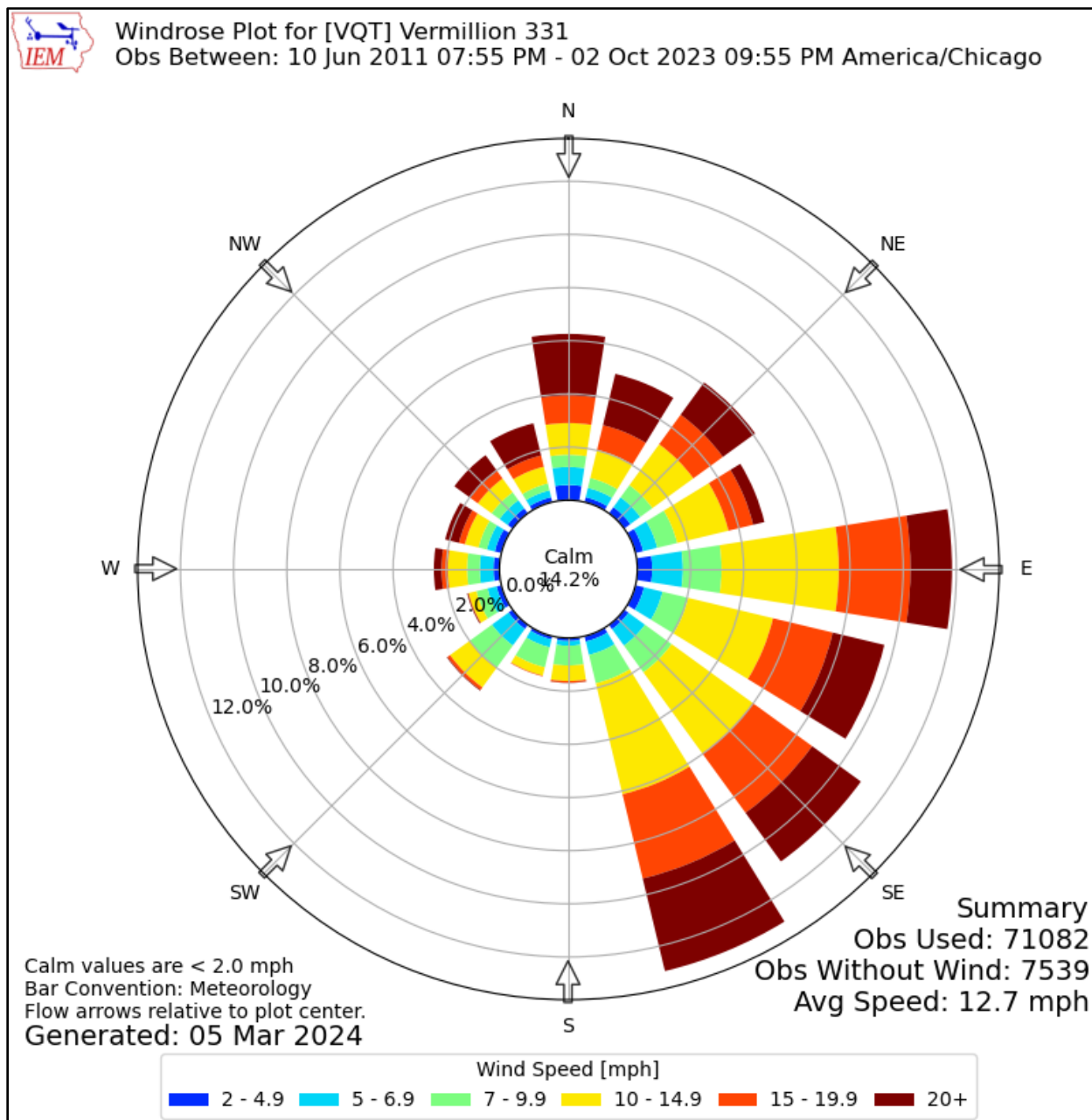


Figure H-13: This Site Is 132 Miles Southwest of Morgan City and Just West of the New Orleans Operating Area

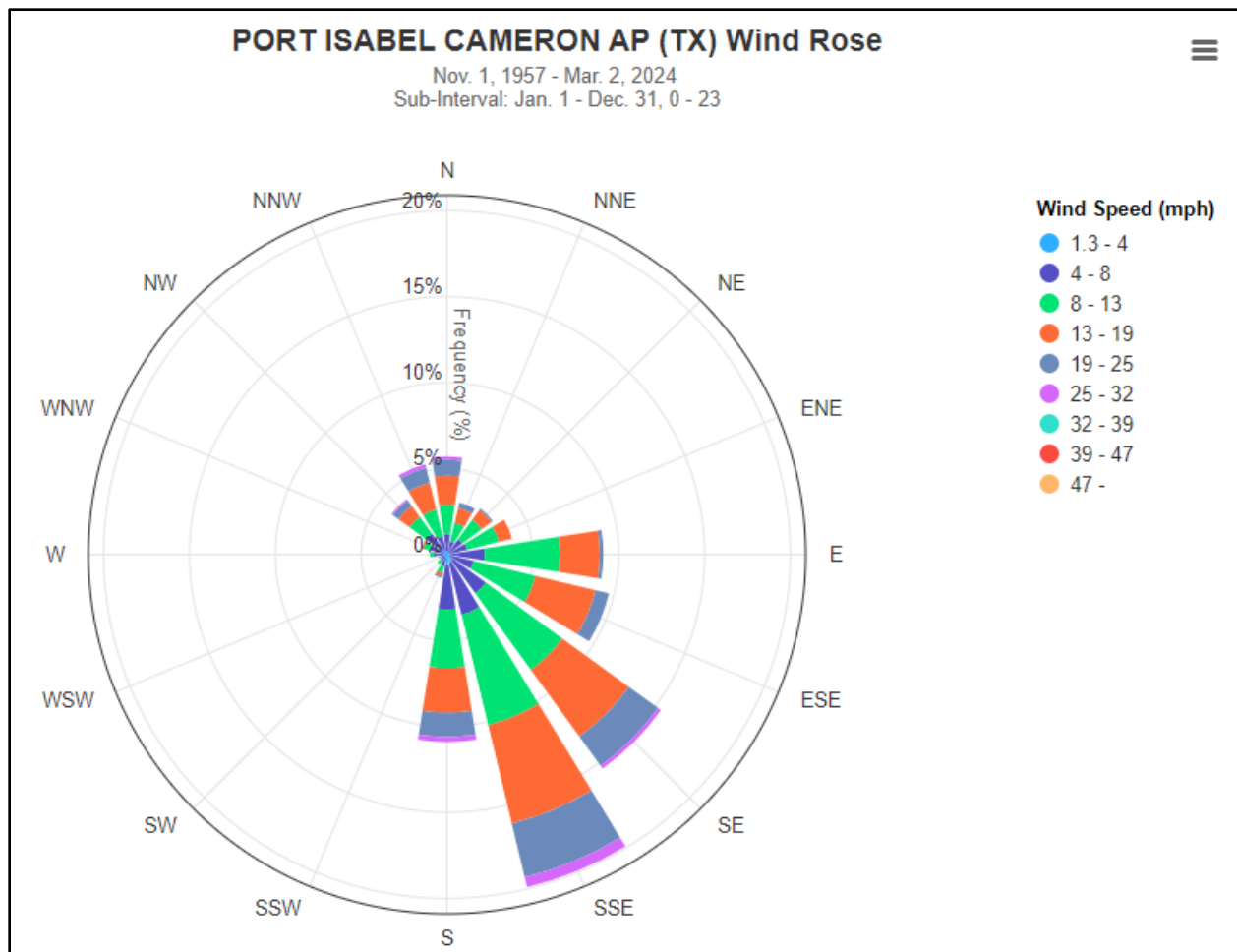


Figure H-14: On the Beach 20 Miles Northeast of Brownsville

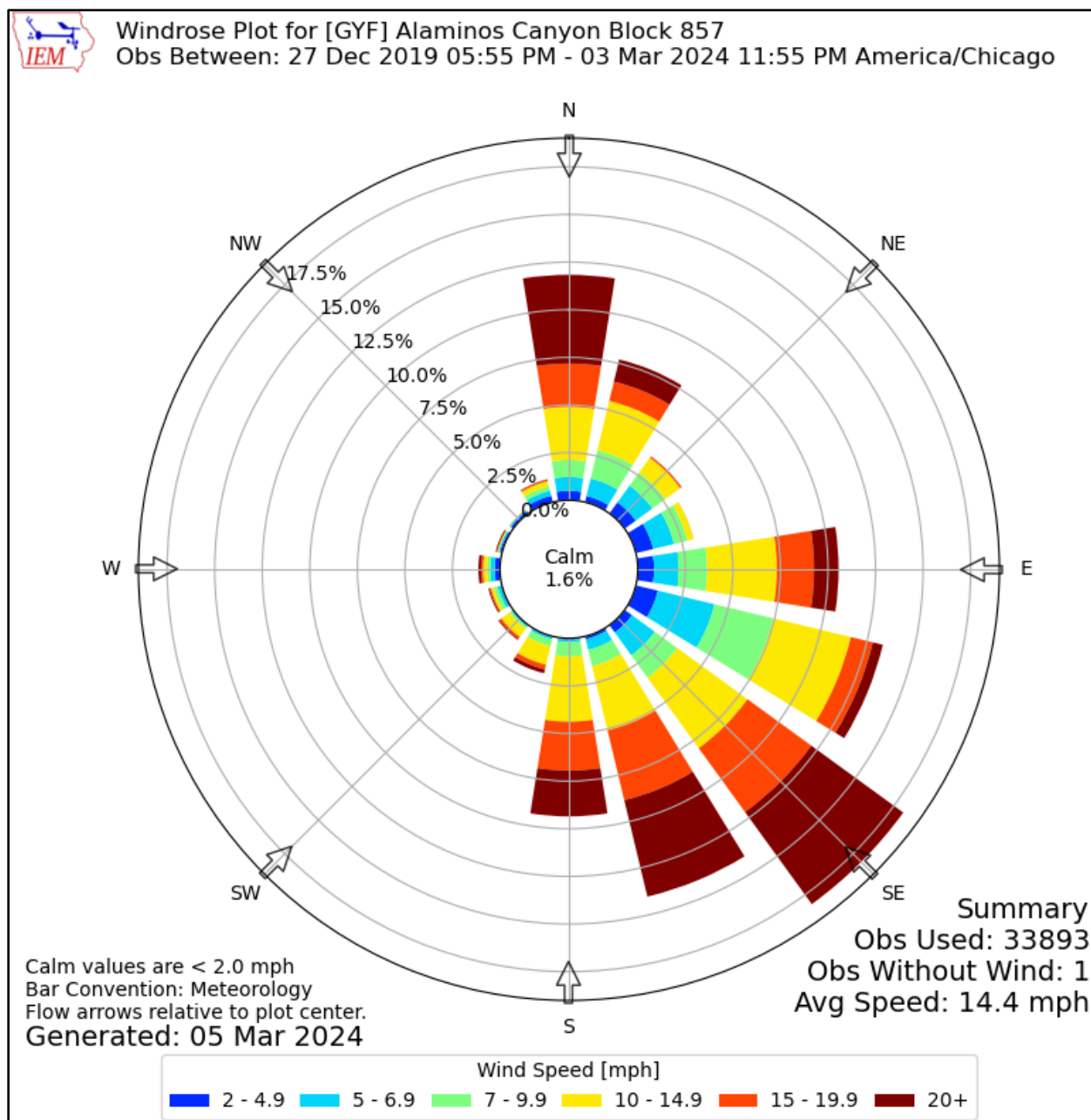


Figure H-15: A Few Miles East of the Center of the Corpus Christi Operating Area

Table H-1: Current and Proposed Navy and Marine Corps Training Activities

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1 ¹	2018 EIS/OEIS Annual # of Activities Alt 1 ¹ - Average	Annual # of Activities Alt 1	Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103	Change in # of Events Alt 1 = Alt 2	Location
Major Training Exercise - Large Integrated ASW						
Composite Training Unit Exercise	0	0		1	1	Gulf of Mexico Range Complex
	2 to 3	2.5		3	1	Jacksonville Range Complex
					-	Navy Cherry Point Range Complex
					-	Virginia Capes Range Complex
Major Training Exercise - Medium Integrated ASW						
Sustainment Exercise	6	6		2	(4)	Jacksonville Range Complex
					-	Navy Cherry Point Range Complex ²
					-	Virginia Capes Range Complex
Small Integrated ASW Training						
Navy Undersea Warfare Training Assessment Course	6	6		2	(4)	Jacksonville Range Complex
	6	6		2	(4)	Navy Cherry Point Range Complex
	6	6		2	(4)	Virginia Capes Range Complex
Surface Warfare Advanced Tactical Training	6	6		2	(4)	Jacksonville Range Complex
					-	Navy Cherry Point Range Complex
					-	Virginia Capes Range Complex
Medium Coordinated ASW Training						
Tactical Development Exercise	2	2		1	(1)	Jacksonville Range Complex
	1	1		0	(1)	Navy Cherry Point Range Complex
	1.00	1.00		1	-	Virginia Capes Range Complex
Small Coordinated ASW Training						
Small Coordinated ASW	4	4		5	1	Jacksonville Range Complex
	5	5		4	(1)	Navy Cherry Point Range Complex
	5	5		5	-	Virginia Capes Range Complex
Amphibious Ready Group Marine Expeditionary Unit Exercise	0	0		1	1	Navy Cherry Point Range Complex

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
Air Warfare						
Air Combat Maneuvers	1270	1270		1270		Jacksonville Range Complex
	6300	6300		6300	-	Key West Range Complex
	1155	1155		1925	770	Navy Cherry Point Range Complex
	1200	1200		1200	-	Virginia Capes Range Complex
Air Defense Exercise	85	85		85	-	Gulf of Mexico Range Complex
	5157	5157		938	(4,219)	Jacksonville Range Complex
	5166	5166		1601	(3,565)	Navy Cherry Point Range Complex
	3425	3425		3425	-	Virginia Capes Range Complex
Gunnery Exercise Air-to-Air Medium-Caliber	75	75		40	(35)	Jacksonville Range Complex
	70	70		20	(50)	Key West Range Complex
	40	40		40	-	Navy Cherry Point Range Complex
	120	120		80	(40)	Virginia Capes Range Complex
Gunnery Exercise Air-to-Air Small-Caliber	0	0		5	5	Jacksonville Range Complex
	0	0		5	5	Virginia Capes Range Complex
Gunnery Exercise Surface-to-Air Large-Caliber	7	7		10	3	Jacksonville Range Complex
	25	25		25	-	Virginia Capes Range Complex
Gunnery Exercise Surface-to-Air Medium-Caliber	31	31		22	(9)	Jacksonville Range Complex
	23	23		9	(14)	Navy Cherry Point Range Complex
	10	10		0	(10)	Other AFTT Areas
	59	59		39	(20)	Virginia Capes Range Complex
Missile Exercise – Man-Portable Air Defense System	5	5		14	9	Navy Cherry Point Range Complex
Missile Exercise Air-to-Air	0	0		30	30	Gulf of Mexico Range Complex
	48	48		15	(33)	Jacksonville Range Complex
	8	8		16	8	Key West Range Complex
	48	48		15	(33)	Navy Cherry Point Range Complex
	40	40		16	(24)	Virginia Capes Range Complex

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
Missile Exercise Surface-to-Air	2	2		2	-	Gulf of Mexico Range Complex
	5	5		6	1	Jacksonville Range Complex
	2	2		2	-	Navy Cherry Point Range Complex
	2	2		2	-	Northeast Range Complexes
	30	30		36	6	Virginia Capes Range Complex
<i>Amphibious Warfare</i>						
Amphibious Assault	5	5		5	-	Navy Cherry Point Range Complex
Amphibious Operations in a Contested Environment	0	0		45	45	Navy Cherry Point Range Complex
	0	0		12	12	Virginia Capes Range Complex
Amphibious Raid	20	20		20	-	Jacksonville Range Complex
	34	34		34	-	Navy Cherry Point Range Complex
Amphibious Ready Group Marine Expeditionary Unit Composite Training Unit Exercise	5	5		1	(4)	Navy Cherry Point Range Complex
Amphibious Squadron Marine Expeditionary Unit Integration Training	1	1		1	-	Navy Cherry Point Range Complex
Amphibious Vehicle Maneuvers	0	0		0	-	Jacksonville Range Complex
	2	2		2	-	Jacksonville Range Complex Inshore
	186	186		46	(140)	Virginia Capes Range Complex
	0	0		256	256	Virginia Capes Range Complex Inshore - JEB Little Creek Fort Story
Naval Surface Fire Support Exercise – At Sea	4	4		2	(2)	Gulf of Mexico Range Complex
	12	12		6	(6)	Jacksonville Range Complex
	2	2		2	-	Navy Cherry Point Range Complex
	38	38		19	(19)	Virginia Capes Range Complex
Naval Surface Fire Support Exercise – Land-Based Target	13	13		13	-	Navy Cherry Point Range Complex
Non-combat Evacuation Operation	1	1		1	-	Navy Cherry Point Range Complex

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
Anti-Submarine Warfare						
Anti-Submarine Warfare Torpedo	14	14		14	-	Jacksonville Range Complex
Exercise - Helicopter	4	4		4	-	Virginia Capes Range Complex
Anti-Submarine Warfare Torpedo	14	14		14	-	Jacksonville Range Complex
Exercise – Maritime Patrol Aircraft	4	4		4	-	Virginia Capes Range Complex
Anti-Submarine Warfare Torpedo	16	16		16	-	Jacksonville Range Complex
Exercise – Ship	5	5		5	-	Virginia Capes Range Complex
Anti-Submarine Warfare Torpedo	12	12		12	-	Jacksonville Range Complex
Exercise – Submarine	6	6		6	-	Northeast Range Complexes
	2	2		2	-	Virginia Capes Range Complex
Anti-Submarine Warfare Tracking	0	0		3	3	Gulf of Mexico Range Complex
Exercise – Helicopter	370	370		370	-	Jacksonville Range Complex
	12	12		12	-	Navy Cherry Point Range Complex
	24	24		24	-	Other AFTT Areas
	8	8		8	-	Virginia Capes Range Complex
Anti-Submarine Warfare Tracking	525	525		475	(50)	Jacksonville Range Complex
Exercise – Maritime Patrol Aircraft	46	46		35	(11)	Navy Cherry Point Range Complex
	90	90		80	(10)	Northeast Range Complexes
	176	176		155	(21)	Virginia Capes Range Complex
Anti-Submarine Warfare Tracking	5	5	5	5	-	Gulf of Mexico Range Complex
Exercise - Ship	440	440	290	440	-	Jacksonville Range Complex
	55	55	33	55	-	Navy Cherry Point Range Complex
	5	5	5	5	-	Northeast Range Complexes
	110	110	55	110	-	Other AFTT Areas
	220	220	120	220	-	Virginia Capes Range Complex
Anti-Submarine Warfare Tracking	13	13		13	-	Jacksonville Range Complex
Exercise – Submarine	1	1		1	-	Navy Cherry Point Range Complex
	18	18		18	-	Northeast Range Complexes

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
	44	44		44	-	Other AFTT Areas
	0	0		2	2	SINKEX Box
	6	6		6	-	Virginia Capes Range Complex
Electronic Warfare						
Counter Targeting Chaff Exercise - Aircraft	18	18		18	-	Gulf of Mexico Range Complex
	2990	2990		2990	-	Jacksonville Range Complex
	3000	3000		3000	-	Key West Range Complex
	1610	1610		1610	-	Navy Cherry Point Range Complex
	130	130		130	-	Virginia Capes Range Complex
Counter Targeting Chaff Exercise - Ship	5	5		5	-	Gulf of Mexico Range Complex
	5	5		5	-	Jacksonville Range Complex
	5	5		5	-	Navy Cherry Point Range Complex
	50	50		10	(40)	Virginia Capes Range Complex
Counter Targeting Flare Exercise	92	92		92	-	Gulf of Mexico Range Complex
	1900	1900		1900	-	Jacksonville Range Complex
	1550	1550		1550	-	Key West Range Complex
	1115	1115		1115	-	Navy Cherry Point Range Complex
	50	50		50	-	Virginia Capes Range Complex
Electronic Warfare Operations	181	181		21	(160)	Jacksonville Range Complex
	2620	2620		370	(2,250)	Navy Cherry Point Range Complex
	302	302		32	(270)	Virginia Capes Range Complex
High-Speed Anti-Radiation Missile Exercise	4	4		1	(3)	Jacksonville Range Complex
	10	10		2	(8)	Navy Cherry Point Range Complex
	11	11		3	(8)	Virginia Capes Range Complex
Expeditionary Warfare						
Dive and Salvage Operations	16	16		16	-	Gulf of Mexico Range Complex
	60	60		60	-	NS Mayport
	0	0		0	-	Jacksonville Range Complex Inshore

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
	8	8		8	-	Key West Range Complex
	16	16		16	-	Navy Cherry Point Range Complex
	0	0		0	-	Virginia Capes Range Complex
	30	30		145	115	Virginia Capes Range Complex Inshore
Maritime Security Operations – Anti-Swimmer Grenades	2	2		0	(2)	Gulf of Mexico Range Complex
	2	2		0	(2)	Jacksonville Range Complex
	2	2		0	(2)	Navy Cherry Point Range Complex
	4	4		0	(4)	Northeast Range Complexes
	5	5		0	(5)	Virginia Capes Range Complex
Personnel Insertion/Extraction – Air	0	0		50	50	Gulf of Mexico Range Complex Inshore
	0	0		0	-	Jacksonville Range Complex
	10	10		10	-	Jacksonville Range Complex Inshore
	10	10		0	(10)	Key West Range Complex
	2164	2164		74	(2,090)	Virginia Capes Range Complex
	0	0		104	104	Virginia Capes Range Complex Inshore
Personnel Insertion/Extraction – Surface and Subsurface	5	5		12	7	Gulf of Mexico Range Complex
	1	1		2	1	Jacksonville Range Complex
	2	2		0	(2)	Northeast Range Complexes
	0	0		48	48	Northeast Range Complexes Inshore
	360	360		175	(185)	Virginia Capes Range Complex
	0	0		216	216	Virginia Capes Range Complex Inshore
Personnel Insertion/Extraction – Swimmer/Diver	0	0		0	-	Virginia Capes Range Complex
	42	42		42	-	Virginia Capes Range Complex Inshore
Port Damage Repair	0	0		4	4	Gulf of Mexico Range Complex Inshore - Gulfport, MS
Underwater Construction Team Training	8	8		16	8	Gulf of Mexico Range Complex
	0	0		16	16	Gulf of Mexico Range Complex Inshore - Gulfport, MS
	0	0		0	-	Jacksonville Range Complex

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
	4	4		8	4	Jacksonville Range Complex Inshore
	4	4		16	12	Key West Range Complex
	8	8		0	(8)	Virginia Capes Range Complex
	0	0		1000	1,000	Virginia Capes Range Complex Inshore
Mine Warfare						
Airborne Mine Countermeasures - Mine Detection	310	310		290	(20)	Gulf of Mexico Range Complex
	317	317		275	(42)	Jacksonville Range Complex
	0	0		187	187	Key West Range Complex
	371	371		321	(50)	Navy Cherry Point Range Complex
	1540	1540		1420	(120)	Virginia Capes Range Complex
Airborne Mine Countermeasures - Towed Mine Neutralization	50	50		30	(20)	Gulf of Mexico Range Complex
	100	100		70	(30)	Jacksonville Range Complex
	0	0		15	15	Key West Range Complex
	108	108		96	(12)	Navy Cherry Point Range Complex
	510	510		375	(135)	Virginia Capes Range Complex Inshore
Airborne Mine Laying	1	1		1	-	Jacksonville Range Complex
	2	2		2	-	Navy Cherry Point Range Complex
	4	4		4	-	Virginia Capes Range Complex
Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises	0-1	0.5		1	1	Beaumont, TX
					-	Boston, MA
					-	Corpus Christi, TX
					-	Delaware Bay, DE
					-	Earle, NJ
					-	Hampton Roads, VA
					-	Kings Bay, GA
					-	Mayport, FL
					-	Morehead City, NC
					-	Port Canaveral, FL

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
					-	Savannah, GA
					-	Tampa, FL
					-	Wilmington, NC
Coordinated Unit Level Helicopter Airborne Mine Countermeasures Exercise	2	2		2	-	Gulf of Mexico Range Complex
	2	2		2	-	Jacksonville Range Complex
	0	0		2	2	Key West Range Complex
	2	2		2	-	Navy Cherry Point Range Complex
	2	2		2	-	Virginia Capes Range Complex
Installation and Maintenance of Mine Training Areas	0	0		1	1	Jacksonville Range Complex
	0	0		1	1	Key West Range Complex
	0	0		1	1	Navy Cherry Point Range Complex
	0	0		1	1	Virginia Capes Range Complex
	0	0		1	1	Virginia Capes Range Complex Inshore
Mine Countermeasures – Mine Neutralization – Remotely Operated Vehicles	132	132		66	(66)	Gulf of Mexico Range Complex
	71	71		36	(35)	Jacksonville Range Complex
	0	0		10	10	Key West Range Complex
	71	71		36	(35)	Navy Cherry Point Range Complex
	630	630		315	(315)	Virginia Capes Range Complex
Mine Countermeasures – Ship Sonar	22	22		22	-	Gulf of Mexico Range Complex
	53	53		53	-	Jacksonville Range Complex
	53	53		53	-	Virginia Capes Range Complex
Mine Neutralization Explosive Ordnance Disposal	16	16		56	40	Gulf of Mexico Range Complex
	20	20		60	40	Jacksonville Range Complex
	17	17		30	13	Key West Range Complex
	0	0		96	96	Key West Range Complex Inshore
	16	16		54	38	Navy Cherry Point Range Complex
	524	524		201	(323)	Virginia Capes Range Complex
	6	6		48	42	Virginia Capes Range Complex Inshore
Submarine Mine Laying	0	0		2	2	Jacksonville Range Complex

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
Surface Ship Object Detection	76	76		76	-	Jacksonville Range Complex
	0	0		0	-	Jacksonville Range Complex Inshore
	162	162		162	-	Virginia Capes Range Complex
	0	0		0	-	Virginia Capes Range Complex Inshore
Underwater Mine Countermeasure Raise, Tow, Beach and Exploitation Operations	56	56		24	(32)	Gulf of Mexico Range Complex
	78	78		20	(58)	Jacksonville Range Complex
	0	0		4	4	Jacksonville Range Complex Inshore
	8	8		40	32	Key West Range Complex
	24	24		16	(8)	Navy Cherry Point Range Complex
	446	446		20	(426)	Virginia Capes Range Complex
	0	0		100	100	Virginia Capes Range Complex Inshore
Surface Warfare						
Bombing Exercise Air-to-Surface	67	67		47	(20)	Gulf of Mexico Range Complex
	434	434		260	(174)	Jacksonville Range Complex
	108	108		73	(35)	Navy Cherry Point Range Complex
	329	329		272	(57)	Virginia Capes Range Complex
Gunnery Exercise Air-to-Surface Medium-Caliber	30	30		30	-	Gulf of Mexico Range Complex
	495	495		490	(5)	Jacksonville Range Complex
	395	395		395	-	Navy Cherry Point Range Complex
	720	720		720	-	Virginia Capes Range Complex
Gunnery Exercise Air-to-Surface Small- Caliber	200	200		108	(92)	Jacksonville Range Complex
	130	130		71	(59)	Navy Cherry Point Range Complex
	560	560		300	(260)	Virginia Capes Range Complex
Gunnery Exercise Surface-to-Surface Boat Medium-Caliber	6	6		6	-	Gulf of Mexico Range Complex
	26	26		26	-	Jacksonville Range Complex
	128	128		128	-	Navy Cherry Point Range Complex
	2	2		2	-	Northeast Range Complexes
	260	260		404	144	Virginia Capes Range Complex

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
Gunnery Exercise Surface-to-Surface Boat Small-Caliber	67	67		21	(46)	Gulf of Mexico Range Complex
	84	84		25	(59)	Jacksonville Range Complex
	92	92		28	(64)	Navy Cherry Point Range Complex
	18	18		6	(12)	Northeast Range Complexes
	330	330		213	(117)	Virginia Capes Range Complex
Gunnery Exercise Surface-to-Surface Ship Large-Caliber	9	9		8	(1)	Gulf of Mexico Range Complex
	51	51		46	(5)	Jacksonville Range Complex
	35	35		34	(1)	Navy Cherry Point Range Complex
	10	10		9	(1)	Other AFTT Areas
	75	75		63	(12)	Virginia Capes Range Complex
Gunnery Exercise Surface-to-Surface Ship Medium-Caliber	33	33		34	1	Gulf of Mexico Range Complex
	161	161		110	(51)	Jacksonville Range Complex
	72	72		70	(2)	Navy Cherry Point Range Complex
	41	41		40	(1)	Other AFTT Areas
	321	321		319	(2)	Virginia Capes Range Complex
Gunnery Exercise Surface-to-Surface Ship Small-Caliber	10	10		4	(6)	Gulf of Mexico Range Complex
	300	300		120	(180)	Jacksonville Range Complex
	20	20		12	(8)	Navy Cherry Point Range Complex
	50	50		20	(30)	Other AFTT Areas
	450	450		180	(270)	Virginia Capes Range Complex
Integrated Live Fire Exercise	2	2		2	-	Jacksonville Range Complex
	2	2		2	-	Virginia Capes Range Complex
Laser Targeting - Aircraft	315	315		330	15	Jacksonville Range Complex
	272	272		286	14	Virginia Capes Range Complex
Laser Targeting - Ship	4	4		4	-	Jacksonville Range Complex
	4	4		4	-	Virginia Capes Range Complex
Long Range Unmanned Surface Vessel Training	0	0		10	10	Jacksonville Range Complex
	0	0		10	10	Virginia Capes Range Complex

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
Maritime Security Operations	59	59		59	-	Gulf of Mexico Range Complex
	210	210		165	(45)	Jacksonville Range Complex
	0	0		45	45	Jacksonville Range Complex Inshore
	75	75		75	-	Navy Cherry Point Range Complex
	0	0		0	-	Northeast Range Complexes
	13	13		13	-	Northeast Range Complexes Inshore
	895	895		521	(374)	Virginia Capes Range Complex
	0	0		374	374	Virginia Capes Range Complex Inshore
Missile Exercise Air-to-Surface - Rocket	10	10		10	-	Gulf of Mexico Range Complex
	102	102		115	13	Jacksonville Range Complex
	10	10		15	5	Navy Cherry Point Range Complex
	92	92		100	8	Virginia Capes Range Complex
Missile Exercise Air-to-Surface	102	102		81	(21)	Jacksonville Range Complex
	0	0		8	8	Key West Range Complex
	52	52		72	20	Navy Cherry Point Range Complex
	88	88		83	(5)	Virginia Capes Range Complex
Missile Exercise Surface-to-Surface	16	16		19	3	Jacksonville Range Complex
	12	12		15	3	Virginia Capes Range Complex
Sinking Exercise	1	1		1	-	Other AFTT Areas - SINKEX Box
Small Boat Attack	25	25		15	(10)	Jacksonville Range Complex
	25	25		30	5	Virginia Capes Range Complex
Other Training Activities						
Elevated Causeway System	1	1		0	(1)	Navy Cherry Point Range Complex
	1	1		0	(1)	Virginia Capes Range Complex Inshore
Low-Frequency Active Anti-Submarine Warfare Training	0	0		102	102	Other AFTT Areas
Precision Anchoring	9	9		9	-	Gulf of Mexico Range Complex
	231	231		231	-	Jacksonville Range Complex

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
	710	710		710	-	Virginia Capes Range Complex
Search and Rescue	776	776		704	(72)	Jacksonville Range Complex
	0	0		30	30	Jacksonville Range Complex Inshore
	1176	1176		598	(578)	Virginia Capes Range Complex
	0	0		760	760	Virginia Capes Range Complex Inshore
Submarine Navigation	29	29		29	-	Jacksonville Range Complex
	0	0		0	-	Jacksonville Range Complex Inshore
	169	169		338	169	Northeast Range Complexes
	0	0		0	-	Northeast Range Complexes Inshore
	84	84		84	-	Virginia Capes Range Complex
	0	0		0	-	Virginia Capes Range Complex Inshore
Submarine Sonar Maintenance and Systems Checks	9	9		4	(5)	Jacksonville Range Complex
	4	4		2	(2)	Port Canaveral, FL
	0	0		2	2	NSB Kings Bay
	13	13		0	(13)	Navy Cherry Point Range Complex
	86	86		66	(20)	Northeast Range Complexes
	66	66		66	-	NSB New London
	12	12		12	-	Other AFTT Areas
	47	47		34	(13)	Virginia Capes Range Complex
Submarine Under Ice Certification	34	34		34	-	NS Norfolk, VA
	3	3		3	-	Jacksonville Range Complex
	3	3		3	-	Navy Cherry Point Range Complex
	9	9		9	-	Northeast Range Complexes
Surface Ship Sonar Maintenance and Systems Checks	9	9		9	-	Virginia Capes Range Complex
	0 - 18	9		50	41	Jacksonville Range Complex
					-	
	50	50		50	-	NS Mayport, FL
	120	120		120	-	Navy Cherry Point Range Complex

Table H-1: Current and Proposed Navy and Marine Corps Training Activities (continued)

<i>Activity Name</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹</i>	<i>2018 EIS/OEIS Annual # of Activities Alt 1¹ - Average</i>	<i>Annual # of Activities Alt 1</i>	<i>Phase IV Annual # of Activities Alt 1 = Alt 2 - rows 98-103</i>	<i>Change in # of Events Alt 1 = Alt 2</i>	<i>Location</i>
	235	235		175	(60)	NS Norfolk, VA
	0 - 18	9		18	9	Other AFTT Areas
	120	120		175	55	Virginia Capes Range Complex
SURTASS Low-Frequency Active Sonar Training	0	0		5	5	Other AFTT Areas
Unmanned Aerial System Training and Certification	0	0		50	50	Jacksonville Range Complex
	0	0		100	100	Navy Cherry Point Range Complex
	0	0		51	51	Virginia Capes Range Complex
Unmanned Underwater Vehicle Training - Certification and Development	0	0		10	10	Gulf of Mexico Range Complex
	0	0		22	22	Jacksonville Range Complex
	0	0		10	10	Navy Cherry Point Range Complex
	0	0		12	12	Northeast Range Complexes
	0	0		32	32	Virginia Capes Range Complex
	0	0		21	21	Virginia Capes Range Complex Inshore
	0	0		21	21	Virginia Capes Range Complex Inshore
Waterborne Training	42	42		42	-	Gulf of Mexico Range Complex
	55	55		69	14	Jacksonville Range Complex Inshore
	141	141		185	44	Northeast Range Complexes Inshore
	110	110		182	72	Virginia Capes Range Complex Inshore
Total Events		64,117	51,545	51,872	(12,244)	
Fraction P4/P3			0.804		0.809	
Notes: ¹ The Department of the Navy selected Alternative 1, the Preferred Alternative, in the Record of Decision signed October 18, 2018.						
² Location is proposed for this Supplemental EIS/OEIS, but was not proposed for the 2018 AFTT EIS/OEIS.						

Table H-2: Activity Factors for Ships, Boats, Aircraft, and Munitions - Combined Phase IV

	<i>Phase III</i>	<i>Alt 1</i>	<i>Alt 2</i>
Total Navy USFFC Training events with ships but no only sub events	13,967	14,294	
Total Navy NAVAIR Testing events with ships but no only sub events	428	428	
Total Navy NAVSEA Testing events with ships but no only sub events	2,415	2,485	
Total	16,810	17,207	
CG events with ships	2,641	2,802	
Fraction CG vs Navy ship events	0.157	0.163	
Navy Training events with boats in this sheet	6,126	6,453	
ORN Testing events with boats	12	15	
NAVSEA Testing events with boats	914	981	
Total Navy Training events with boats	7,052	7,449	
CG events with boats	1,744	1,756	
Fraction CG vs Navy ship events	0.25	0.24	
	<i>Phase III</i>	<i>Alt 1</i>	<i>Alt 2</i>
Navy Training events with aircraft in this sheet	49,463	35,918	36,245
ORN Testing events with aircraft	0	0	0
NAVAIR Testing events with aircraft	3,326	3,481	3,481
NAVSEA Testing events with aircraft	1,218	1,448	1,511
Total Navy Training events with aircraft	54,007	40,847	41,237
Fraction P4 vs P3 Navy aircraft events	0.756	0.764	
CG events with aircraft	2,257	2,353	
Fraction CG vs P4 Navy aircraft events	0.055	0.057	
	<i>Phase III</i>	<i>Alt 1</i>	<i>Alt 2</i>
Navy Training events with Munitions in this sheet	21,594	19,929	19,929
ORN Testing events with Munitions	0	0	0
NAVAIR Testing events with Munitions	672	690	690
NAVSEA Testing events with Munitions	789	946	1,009
Total Navy Training events with Munitions	23,055	21,565	21,628
Fraction P4 vs P3 Navy Munitions events	0.935	0.938	
CG events with Munitions	1,427	1,523	
Fraction CG vs P4 Navy Munitions events	0.066	0.070	
Combined Navy + CG Munitions events	22,992	23,151	
Fraction P4 vs P3 Navy Munitions events	0.997	1.004	

Table H-3: Current and Proposed U.S. Coast Guard Training Activities

Activity Name	2018 EIS/OEIS Annual # of Activities	Phase IV Annual # of Activities		Location
	Alt 1	Alt 1	Alt 2	
Air Warfare				
Gunnery Exercise	0	5		Jacksonville Range Complex
Surface-to-Air Large-Caliber	0	20		Virginia Capes Range Complex
Gunnery Exercise	0	2		Jacksonville Range Complex
Surface-to-Air Medium-Caliber	0	3		Virginia Capes Range Complex
Electronic Warfare				
Counter Targeting Chaff Exercise - Ship	0	3		Gulf of Mexico Range Complex
	0	3		Jacksonville Range Complex
	0	3		Navy Cherry Point Range Complex
	0	5		Virginia Capes Range Complex
Surface Warfare				
Gunnery Exercise Air-to-Surface Medium-Caliber	0	10		Gulf of Mexico Range Complex
	0	30		Jacksonville Range Complex
	0	10		Navy Cherry Point Range Complex
	0	25		Northeast Range Complexes
	0	10		Virginia Capes Range Complex
Gunnery Exercise Surface-to-Surface Boat Medium-Caliber	0	7		Gulf of Mexico Range Complex
	0	7		Jacksonville Range Complex
	0	7		Key West Range Complex
	0	7		Navy Cherry Point Range Complex
	0	11		Northeast Range Complexes
	0	11		Virginia Capes Range Complex
Gunnery Exercise Surface-to-Surface Boat Small-Caliber	0	1		Gulf of Mexico Range Complex
	0	6		Jacksonville Range Complex
	0	2		Navy Cherry Point Range Complex
	0	20		Virginia Capes Range Complex
Gunnery Exercise Surface-to-Surface Ship Large-Caliber	0	29		Gulf of Mexico Range Complex
	0	15		Jacksonville Range Complex
	0	10		Navy Cherry Point Range Complex
	0	15		Northeast Range Complexes
	0	20		Virginia Capes Range Complex
Gunnery Exercise Surface-to-Surface Ship Medium-Caliber	0	12		Gulf of Mexico Range Complex
	0	40		Jacksonville Range Complex
	0	20		Navy Cherry Point Range Complex
	0	100		Virginia Capes Range Complex
Gunnery Exercise Surface-to-Surface Ship Small-Caliber	0	4		Gulf of Mexico Range Complex
	0	1		Northeast Range Complexes
	0	1		Other AFTT Areas
Laser Targeting - Ship	0	4		Jacksonville Range Complex
	0	4		Virginia Capes Range Complex

Table H-3: Current and Proposed U.S. Coast Guard Training Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities	Phase IV Annual # of Activities		Location
	Alt 1	Alt 1	Alt 2	
Maritime Security Operations	0	89	98	Gulf of Mexico Range Complex
	0	149	164	Jacksonville Range Complex
	0	50	55	Key West Range Complex
	0	116	128	Navy Cherry Point Range Complex
	0	50	55	Northeast Range Complexes
	0	498	548	Virginia Capes Range Complex
Other Training Activities				
Precision Anchoring	0	100		Gulf of Mexico Range Complex
	0	200		Jacksonville Range Complex
	0	500		Virginia Capes Range Complex
Search and Rescue	0	100		Gulf of Mexico Range Complex
	0	100		Jacksonville Range Complex
	0	100		Navy Cherry Point Range Complex
	0	100		Other AFTT Areas
	0	100		Virginia Capes Range Complex
Unmanned Aerial System Training and Certification	0	200		Jacksonville Range Complex
	0	200		Navy Cherry Point Range Complex
	0	250		Virginia Capes Range Complex
Unmanned Underwater Vehicle Training - Certification and Development	0	10		Gulf of Mexico Range Complex
	0	10		Jacksonville Range Complex
	0	10		Navy Cherry Point Range Complex
	0	20		Virginia Capes Range Complex
	0	20		Virginia Capes Range Complex Inshore
Waterborne Training	0	138	152	Beaumont, TX
				Gulf of Mexico Range Complex
				Gulf of Mexico Range Complex Inshore
				Pascagoula, MS
				Tampa, FL
	0	60	66	Jacksonville Range Complex Inshore
	0	69	76	Key West Range Complex
	0	185	204	Northeast Range Complexes
				Northeast Range Complexes - Inshore
	0	9	10	Mayport, FL
	0	182	200	Virginia Capes Range Complex Inshore
Totals		4,098	4,259	

Table H-4: Activity Factors for Ships, Boats, Aircraft, and Munitions - USCG Training

	<i>Alt 1</i>	<i>Alt 2</i>
Events with ships	2,641	2,802
Total events with boats	1,744	1,756
events with boats - Total inshore	585	622
events with boats - VC RC Inshore	202	200
events with boats - GOMEX RC Inshore	138	152
events with boats - JAX RC Inshore	60	66
events with boats - NE RC Inshore	185	204
Total CG Training events with Aircraft	2,257	2,353
Total CG Training events with Munitions	1,427	1,523

Table H-5: DEIS Table 2.2-3 - Naval Air Systems Command Current and Proposed Testing Activities

Activity Name	2018 EIS/OEIS Annual # of Activities	2018 EIS/OEIS Annual # of Activities	Phase IV Annual # of Activities		Location
	Alt 1	Alt 1 - Average	Alt 1	Alt 2	
Acoustic and Oceanographic Science and Technology - Moved up from Other Testing Activities Category					
Acoustic and Oceanographic Research	1	1	1	1	GOMEX RC
	1	1	1	1	JAX RC
	1	1	1	1	Key West RC
	1	1	1	1	Northeast RC
	1	1	1	1	VACAPES RC
Air Warfare					
Air Combat Maneuvers Test	550	550	550	550	Virginia Capes Range Complex
Air Platform Vehicle Test	12	12	12	12	Gulf of Mexico Range Complex
	9	9	9	9	Jacksonville Range Complex
	9	9	9	9	Key West Range Complex
	9	9	9	9	Navy Cherry Point Range Complex
	190	190	190	190	Virginia Capes Range Complex
Air Platform Weapons Integration Test	-	-	2	2	Gulf of Mexico Range Complex
	40	40	40	40	Virginia Capes Range Complex
Air-to-Air Gunnery Test – Medium- Caliber	55	55	55	55	Virginia Capes Range Complex
Air-to-Air Missile Test	83	83	83	83	Virginia Capes Range Complex
Air-to-Air Weapons System Test	10	10	2	2	Gulf of Mexico Range Complex
Intelligence, Surveillance, and Reconnaissance Test	-	-	5	5	Gulf of Mexico Range Complex
	7	7	8	8	Jacksonville Range Complex
	9	9	10	10	Navy Cherry Point Range Complex
	406	406	233	233	Virginia Capes Range Complex
Anti-Submarine Warfare					
	10 to 15	13	15	15	Gulf of Mexico Range Complex

**Table H-5: Naval Air Systems Command Current and Proposed Testing Activities
(continued)**

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Location
			Alt 1	Alt 2	
Anti-Submarine Tracking Test - Fixed Wing	19	19	19	19	Jacksonville Range Complex
	10 to 12	11	12	12	Key West Range Complex
	14 - 15	15	15	15	Navy Cherry Point Range Complex
	36 - 45	41	45	45	Northeast Range Complexes
	-	-	25	25	SINKEX Box
	25	25	25	25	Virginia Capes Range Complex
Anti-Submarine Warfare Torpedo Test	20 - 43	32	43	43	Jacksonville Range Complex
	40 - 121	80	121	121	Virginia Capes Range Complex
Anti-Submarine Warfare Tracking Test - Rotary Wing	4 to 6	5	6	6	Gulf of Mexico Range Complex
	0 - 12	6	23	23	Jacksonville Range Complex
	2 to 27	15	27	27	Key West Range Complex
	28 - 110	69	110	110	Northeast Range Complexes
	137 - 280	209	280	280	Virginia Capes Range Complex
Kilo Dip Test	2 to 6	4	6	6	Gulf of Mexico Range Complex
	0 - 6	3	6	6	Jacksonville Range Complex
	0 - 6	3	6	6	Key West Range Complex
	0 - 4	2	4	4	Northeast Range Complexes
	20 - 40	30	40	40	Virginia Capes Range Complex
Sonobuoy Lot Acceptance Test	160	160	186	186	Key West Range Complex
Electronic Warfare					
Chaff Test	20	20	20	20	Gulf of Mexico Range Complex
	4	4	4	4	Jacksonville Range Complex
	24	24	24	24	Virginia Capes Range Complex
Electronic Systems Test	2	2	2	2	Jacksonville Range Complex
	61	61	61	61	Virginia Capes Range Complex
Flare Test	10	10	20	20	Gulf of Mexico Range Complex
	20	20	20	20	Virginia Capes Range Complex
Mine Warfare					
Airborne Dipping Sonar Minehunting Test	16 - 32	24	-	-	Gulf of Mexico Range Complex
	-	-	32	32	NSWC Panama City Testing Range
	6 to 18	12	40	40	Virginia Capes Range Complex
Airborne Laser Mine Detection System Test	40	40	-	-	Gulf of Mexico Range Complex
	-	-	40	40	NSWC Panama City Testing Range
	50	50	50	50	Virginia Capes Range Complex
Airborne Mine Neutralization System Test	20 - 27	24	-	-	Gulf of Mexico Range Complex
	-	-	27	27	NSWC Panama City Testing Range
	24	24	25	25	Virginia Capes Range Complex
Airborne Minehunting Test - Sonobuoy	52	52	26	26	NSWC Panama City Testing Range
	24	24	12	12	Virginia Capes Range Complex
Mine Laying Test	1	1	1	1	Jacksonville Range Complex
	2	2	2	2	Virginia Capes Range Complex

**Table H-5: Naval Air Systems Command Current and Proposed Testing Activities
(continued)**

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Location
			Alt 1	Alt 2	
Surface Warfare					
Air-to-Surface Bombing Test	20	20	20	20	Virginia Capes Range Complex
Air-to-Surface Gunnery Test	25 - 55	40	55	55	Jacksonville Range Complex
	110 - 140	125	140	140	Virginia Capes Range Complex
Air-to-Surface Missile Test	0 - 10	5	5	5	Gulf of Mexico Range Complex
	29 - 38	34	29	29	Jacksonville Range Complex
	117 - 148	133	117	117	Virginia Capes Range Complex
Air-to-Surface High-Energy Laser Test	108	108	108	108	Virginia Capes Range Complex
Laser Targeting Test	5	5	5	5	Virginia Capes Range Complex
Maritime Security Operations (NAVAIR)	12	12	12	12	Jacksonville Range Complex
	12	12	12	12	Navy Cherry Point Range Complex
	20	20	20	20	Virginia Capes Range Complex
Rocket Test	15 - 19	17	19	19	Jacksonville Range Complex
	31 - 35	33	35	35	Virginia Capes Range Complex
Other Testing Activities					
Air Platform Shipboard Integration Test	-	-	30	30	Gulf of Mexico Range Complex
	-	-	30	30	Jacksonville Range Complex
	-	-	30	30	Key West Range Complex
	126	126	152	152	Virginia Capes Range Complex
Shipboard Electronics Systems Evaluation	24	24	-	-	Gulf of Mexico Range Complex
	24	24	-	-	Jacksonville Range Complex
	24	24	-	-	Key West Range Complex
	26	26	-	-	Virginia Capes Range Complex
Undersea Range System Test	4 to 20	12	20	20	Jacksonville Range Complex
Total Events		3,326	3,481	3,481	

Table H-6: Activity Factors for Ships and Munitions - NAVAIR Testing

	<i>Phase III</i>	<i>Alt 1</i>	<i>Alt 2</i>
Total with Vessels		428	428
Total with Munitions	672	690	690
			Fraction Alt 1/Phase III
Northeast Range Complexes	113	160	1.42
Virginia Capes Range Complex	2,481	2,449	0.99
Navy Cherry Point Range Complex	45	46	1.03
Jacksonville Range Complex	222	281	1.27
Key West Range Complex	223	271	1.22
NSWC Panama City Testing Range	52	125	2.40
Gulf of Mexico Range Complex	191	124	0.65
SINKEX Box - Deep beyond VCRC	-	25	
Total	3,326	3,481	1.05

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
Acoustic and Oceanographic Science and Technology						
Acoustic and Oceanographic Research	0	0	0 - 1	1	1	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex
	0	0	3		3	Northeast Range Complexes
	0	0	0 - 1	0 - 1	1	Other AFTT Areas
Amphibious Warfare						
Amphibious Vessel Testing	0	0	0 - 1	0 - 1	1	GOMEX RC Inshore Mobile, AL New Orleans, LA
Anti-Submarine Warfare						
Anti-Submarine Warfare Mission Package Testing						
	0	0	1 - 2		2	Gulf of Mexico Range Complex
	42	42	2		2	Jacksonville Range Complex
	0	0	1-2	1-2	2	Northeast Range Complexes
	4	4	0		0	Newport, RI
	4	4	0		0	NUWC Newport Testing Range
	26	26	0		0	Virginia Capes Range Complex
At-Sea Sonar Testing	5	5	7-9	7-9	9	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
						SFOMF
						Virginia Capes Range Complex
	0	0	7-14		14	Gulf of Mexico Range Complex
	4	4	4	4	4	Jacksonville Range Complex
2	2	2	2	2	Navy Cherry Point Range Complex	
0	0	8-15		15	Northeast Range Complexes	

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
	8	8	0		0	NUWC Newport Testing Range
	12	12	16-22	16-22	22	Virginia Capes Range Complex
Countermeasure Testing	7-9	8	16-20		20	GOMEX RC JAX RC Key West RC Navy Cherry Point RC Northeast RC NUWC Newport Testing Range VACAPES RC JEB Little Creek Fort Story
	0	0	8-10		10	Gulf of Mexico Range Complex
	0	0	6		6	NUWC Newport Testing Range
	0	0	6-10		10	Virginia Capes Range Complex
Pierside Sonar Testing	13	13	5-10		10	NSB New London Gulf of Mexico Range Complex Inshore Jacksonville Range Complex
						NSB Kings Bay, GA ₂
						Newport, RI
						NS Norfolk, VA
						Northeast Range Complexes
						Port Canaveral, FL
						Virginia Capes Range Complex
	11	11	10 - 20		20	Bath, ME
	2	2	0		0	Gulf of Mexico Range Complex Inshore
	7	7	0		0	Jacksonville Range Complex Inshore
	8	8	0		0	Newport, RI

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
	0	0	10-18		18	NS Mayport, FL
	13	13	63-84		84	NS Norfolk, VA
	2	2	10-20		20	Pascagoula, MS
	2	2	16 - 24		24	Portsmouth Naval Shipyard
Submarine Sonar Testing/ Maintenance	24	24	0		0	Northeast Range Complexes Inshore
	16	16	0		0	Virginia Capes Range Complex Inshore
Surface Ship Sonar Testing/ Maintenance	1	1	1		1	Jacksonville Range Complex
	1	1	0		0	Jacksonville Range Complex Inshore
	3	3	4		4	Virginia Capes Range Complex
	3	3	0		0	Virginia Capes Range Complex Inshore
Torpedo (Explosive) Testing	6	6	1-5		5	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
						Virginia Capes Range Complex
Torpedo (Non- Explosive) Testing	46	46	13-17	13-17	17	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
						SFOMF
						Virginia Capes Range Complex
	Jacksonville Range Complex Inshore					
30	30	30		30	NUWC Newport Testing Range	
Electronic Warfare						
Radar and Other Systems Testing	6-13	9.5	5-15		15	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
						JEB Little Creek Fort Story, VA
						Navy Cherry Point Range Complex
						NS Norfolk, VA
						Northeast Range Complexes
						NSWC Panama City Testing Range
						NUWC Newport Testing Range
						SFOMF
						Virginia Capes Range Complex
0	0	17 - 34		34	Gulf of Mexico Range Complex	
2	2	5-10		10	Norfolk, VA	
2	2	17 - 34		34	Northeast Range Complexes	
4	4	0		0	SB New London	
21 - 45	33	33 - 65	37 - 65	65	Virginia Capes Range Complex	
0	0	0 - 1	1	1	Virginia Capes Range Complex Inshore	
Mine Warfare						
Mine Countermeasure and Neutralization Testing	13	13	18 - 45	18 - 45	45	Gulf of Mexico Range Complex
	6	6	24 - 48		48	Virginia Capes Range Complex
Mine Countermeasure Mission Package Testing	19	19	15		15	Gulf of Mexico Range Complex
	10	10	8		8	Jacksonville Range Complex
	11	11	11		11	NSWC Panama City Testing Range
	2	2	2		2	SFOMF
	5	5	3		3	Virginia Capes Range Complex
Mine Detection and Classification Testing	0	0	0 - 1		1	
						Jacksonville Range Complex
						NSWC Panama City Testing Range
	6	6	0		0	Gulf of Mexico Range Complex
	0	0	0 - 1		1	Jacksonville Range Complex

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
	7-12	9.5	0		0	Jacksonville Range Complex Inshore
	10	10	0		0	Navy Cherry Point Range Complex
	47-55	51	286 - 287		287	NSWC Panama City Testing Range
	4	51	0		0	SFOMF
	3	3	0		0	Virginia Capes Range Complex
Other Testing Activities						
Acoustic Component Testing	33	33	33	33	33	SFOMF
	0	0	1		1	Jacksonville Range Complex
Acoustic and Oceanographic Research	0	0	0 - 1	1	1	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex
	0	0	3		3	Northeast Range Complexes
	0	0	0 - 1		1	Key West Range Complex
	0	0	0 - 1		1	Other AFTT Areas
Simulant Testing	80	80	0		0	Jacksonville Range Complex
	80	80	0		0	Navy Cherry Point Range Complex
	80	80	0		0	Northeast Range Complexes
	80	80	0-5	5	5	Virginia Capes Range Complex
Energy and Intelligence, Surveillance, and Reconnaissance/In formation Operations Sensor Systems	0	0	2	2	2	SFOMF
Insertion/ Extraction	268	268	501-502		502	Key West Range Complex
						NSWC Panama City Testing Range
Intelligence, Surveillance, Reconnaissance	0	0	2		2	Jacksonville Range Complex
	0	0	1	1	1	Virginia Capes Range Complex

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
Line Charge Testing	4	4	4		4	NSWC Panama City Testing Range
Non-Acoustic Component Testing	0	0	0 - 3	3	3	Gulf of Mexico Range Complex
						Virginia Capes Range Complex
	4	4	0 - 3	3	3	Gulf of Mexico Range Complex
	0	0	0 - 1	1	1	Hampton Roads, VA
	4	4	0 - 1	1	1	Virginia Capes Range Complex
Payload Deployer Testing	1	1	1-2		2	Gulf of Mexico Range Complex
	1	1	1-2		2	Northeast Range Complexes
	39	39	39		39	NUWC Newport Testing Range
Semi-Stationary Equipment Testing	0	0	8-14	14	NSB New London	
					NS Mayport	
					NS Norfolk, VA	
					Port Canaveral, FL	
					Virginia Capes Range Complex Inshore	
						Key West Range Complex Inshore
	4	4	4	4	Newport, RI	
	11	11	0	0	Gulf of Mexico Range Complex	
0	0	30	30	NSWC Panama City Testing Range		
190	190	155-173	173	NUWC Newport Testing Range		
Towed Equipment Testing	36	36	43 - 49		49	NUWC Newport Testing Range
Surface Warfare						
Gun Testing - Large-Caliber	19	19	1-15	1-15	15	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
						Virginia Capes Range Complex
1	1	1-2		2	Gulf of Mexico Range Complex	

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
	1	1	2-4		4	Jacksonville Range Complex
	1	1	1-2		2	Northeast Range Complexes
	33	33	15	15	15	NSWC Panama City Testing Range
Gun Testing - Medium-Caliber	12	12	0		0	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
						Virginia Capes Range Complex
	0	0	1-2		2	Gulf of Mexico Range Complex
	0	0	1-2		2	Northeast Range Complexes
	102	102	102		102	NSWC Panama City Testing Range
	5	5	12-21	12-21	21	Virginia Capes Range Complex
Gun Testing - Small-Caliber	24	24	0 - 3		3	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
						Virginia Capes Range Complex
	13	13	0 - 1		1	Gulf of Mexico Range Complex
	7	7	8		8	NSWC Panama City Testing Range
	8	8	0 - 3		3	Virginia Capes Range Complex
Kinetic Energy Weapons Testing	61	61	0		0	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
						Virginia Capes Range Complex
Missile and Rocket Testing	21	21	6-18	6-18	18	Gulf of Mexico Range Complex
						Jacksonville Range Complex

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
						Key West Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
						Virginia Capes Range Complex
	22	22	20-30	21-30	30	Virginia Capes Range Complex
Unmanned Systems						
Underwater Search, Deployment, and Recovery	33	33	33		33	SFOMF
	0	0	0 - 5	5	5	Virginia Capes Range Complex
Unmanned Aerial System Testing	15	15	0		0	Northeast Range Complexes
	17	17	17		17	NUWC Newport Testing Range
	15	15	0		0	Virginia Capes Range Complex
Unmanned Surface Vehicle System Testing	0	0	8-14	14		Gulf of Mexico Range Complex
						Gulf of Mexico Range Complex Inshore
						Jacksonville Range Complex
						Key West Range Complex
						Mayport, FL
						Navy Cherry Point Range Complex
						Norfolk, VA
						Other AFTT Areas
						Pascagoula, MS
	132	132	4	4		Virginia Capes Range Complex
Unmanned Underwater Vehicle Testing	16	16	0	0		NUWC Newport Testing Range
	41	41	0	0		Gulf of Mexico Range Complex
						Jacksonville Range Complex
						NUWC Newport Testing Range
						Gulf of Mexico Range Complex
	25	25	0	0	0	Jacksonville Range Complex
	9	9	0	0	0	Jacksonville Range Complex Inshore

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
	145-146	145.5	208 - 209	208 - 209	209	NSWC Panama City Testing Range
	308-309	308.5	138	138	138	NUWC Newport Testing Range
	42	42	1		1	SFOMF
Vessel Evaluation						
Air Defense Testing	1	1	0		0	Gulf of Mexico Range Complex
	2	2	2		2	Jacksonville Range Complex
	1	1	0		0	Northeast Range Complexes
	5	5	18-31		31	Virginia Capes Range Complex
Aircraft Carrier Sea Trials – Propulsion Testing	2	2	0		0	Virginia Capes Range Complex
Hydrodynamic and Maneuverability Testing	2	2	0		0	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Key West Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
In-Port Maintenance Testing	24	24	2		2	NS Mayport, FL
	2	2	2		2	NS Norfolk, VA
	5	5	4		4	NS Mayport, FL
Large Ship Shock Trials	0 - 1	0.5	0		0	Gulf of Mexico Range Complex
						Jacksonville Range Complex
						Virginia Capes Range Complex
Propulsion Testing	42	42	13 - 73	47-73	73	Gulf of Mexico Range Complex
						Gulf of Mexico Range Complex Inshore
						Jacksonville Range Complex
						Key West Range Complex
						Navy Cherry Point Range Complex
Northeast Range Complexes						

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
						Virginia Capes Range Complex
	86	86	30 - 58	48 - 58	58	Gulf of Mexico Range Complex
	5	5	1-2		2	Northeast Range Complexes
	0	0	1-2		2	NSWC Panama City Testing Range
	7	7	15 - 74	29 - 74	74	Virginia Capes Range Complex
Signature Analysis Operations	0	0	0 - 1	1	1	Hampton Roads, VA
	1	1	0		0	Jacksonville Range Complex
	59	59	79 - 94		94	SFOMF
Small Ship Shock Trial	0 - 3	1.5	0 - 2	2	2	Jacksonville Range Complex
						Virginia Capes Range Complex
						Gulf of Mexico Range Complex
Submarine Sea Trials – Propulsion Testing	1	1	0		0	Jacksonville Range Complex
	1	1	2-4		4	Northeast Range Complexes
	1	1	2-4		4	Virginia Capes Range Complex
Submarine Sea Trials – Weapons System Testing	6	6	3-7	7	Gulf of Mexico Range Complex	
					Jacksonville Range Complex	
					Jacksonville Range Complex Inshore	
					NSB Kings Bay, GA	
					Northeast Range Complexes	
					Port Canaveral, FL	
					SFOMF	
	Virginia Capes Range Complex					
	4	4	2-4		4	Northeast Range Complexes
0	0	1		1	Northeast Range Complexes Inshore	
4	4	2-4		4	Virginia Capes Range Complex	
Surface Warfare Testing	0	0	17 - 76	29-76	76	Jacksonville Range Complex
						Virginia Capes Range Complex
	2	2	0 - 2	2	2	Gulf of Mexico Range Complex
	13	13	4-6		6	Jacksonville Range Complex
	1	1	0		0	Key West Range Complex

Table H-7: Naval Sea Systems Command Current and Proposed Testing Activities (continued)

Activity Name	2018 EIS/OEIS Annual # of Activities Alt 1	2018 EIS/OEIS Annual # of Activities Alt 1 - Average	Phase IV Annual # of Activities		Alt 2 Max	Location
			Alt 1	Alt 2		
	10	10	0		0	Northeast Range Complexes
	9	9	5-7	6-7	7	Virginia Capes Range Complex
Undersea Warfare Testing	4-6	5	6-24		24	
						Jacksonville Range Complex
						Navy Cherry Point Range Complex
						Northeast Range Complexes
						SFOMF
						Virginia Capes Range Complex
	2	2	0		0	Gulf of Mexico Range Complex
	6	6	4-6		6	Jacksonville Range Complex
Vessel Signature Evaluation	9	9	1-4	2-4	4	Jacksonville Range Complex
						Virginia Capes Range Complex
	2	2	0 - 1	1	1	Gulf of Mexico Range Complex
	0	0	1-3	2-3	3	Hampton Roads, VA
	16	16	0		0	Jacksonville Range Complex
	0	0	0 - 1	1	1	NUWC Newport Testing Range
	0	0	0 - 1		1	SFOMF
	18	18	0 - 1	1	1	Virginia Capes Range Complex
	5	5	0		0	JEB Little Creek Fort Story
Total		2,955			2,966	
			Fraction of 2018		1.004	
			Alt 1 ~83 < Alt 2		0.98	

Table H-8: Activity Factors for Ships, Boats, Aircraft, and Munitions - NAVSEA Testing

Total with Vessels		2,415	2,485
Total NAVSEA Testing events with boats		914	981
	Phase III	Alt 1	Alt 2
Total NAVSEA Testing Aircraft events with boats	1,218	1,448	1,511
Total NAVSEA Testing Munitions events with boats	789	946	1,009

Table H-9: DEIS Table 2.2-5 - Current and Proposed Office of Naval Research Testing Activities

Activity Name	2018 EIS/OEIS Annual # of Activities	Phase IV Annual # of Activities		Alt 2 Max	Location
	Alt 1	Alt 1	Alt 2		
Acoustic and Oceanographic Science and Technology					
Acoustic and Oceanographic Research	5	0		0	Gulf of Mexico Range Complex
	9	0		0	Northeast Range Complexes
	2	0		0	Other AFTT Areas
	2	0		0	Virginia Capes Range Complex
	0	12-15	15	15	Gulf of Mexico Range Complex
					Jacksonville Range Complex
					Northeast Range Complexes
					Virginia Capes Range Complex
Large Displacement Unmanned Undersea Vehicle Testing	4	0		0	Gulf of Mexico Range Complex
	12	0		0	Jacksonville Range Complex
	4	0		0	Navy Cherry Point Range Complex
	16	0		0	Northeast Range Complexes
	8	0		0	Virginia Capes Range Complex
	0	4-5	5	5	Gulf of Mexico Range Complex
					Jacksonville Range Complex
					Northeast Range Complexes
					Virginia Capes Range Complex
Mine Countermeasure Technology Research	1	0		0	Jacksonville Range Complex
	2	0		0	Northeast Range Complexes
	1	0		0	Virginia Capes Range Complex
	0	4-5	5	5	Gulf of Mexico Range Complex
					Jacksonville Range Complex
					Northeast Range Complexes
					Virginia Capes Range Complex
Total	66			25	
Fraction of 2018				0.38	

Table H-10: Activity Factors for Boats – ONR Testing Activities

Total ORN Testing events with boats	15
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Table H-11: Vessel Emissions by OPAREA - Outside of State Waters - Phase III

	Annual Totals in Tons per Year for Alternative 1						Metric Tons CO2e	Annual Totals in Tons per Year for Alternative 2						Metric Tons CO2e
	VOCs	CO	NOx	SOx	PM			VOCs	CO	NOx	SOx	PM		
Northeast	1.2	6.4	31.9	10.4	1.5		5,562	0.1	2.2	4.2	0.6	0.2		306
VACAPES	108.2	755.4	3405.0	932.5	107.6		502,660	101.8	727.4	3,649.0	1,011.1	118.4		520,997
Cherry Pt	34.7	284.4	802.7	155.7	25.0		71,511	24.0	121.6	705.7	177.9	27.2		82,995
JAX	33.1	348.9	972.3	291.3	26.8		156,452	44.4	460.5	1,887.4	522.9	54.1		273,108
Key West	2.6	8.3	75.1	12.3	1.6		6,215	0.6	8.2	26.5	9.4	0.8		4,906
GOMEX	7.3	106.7	404.1	104.7	14.4		54,137	0.7	11.9	47.7	15.8	1.8		9,430
Outside RCs	52.8	322.5	1672.1	380.0	49.1		215,403	158.8	530.0	4,084.2	641.6	80.4		325,203

Table H-12: Vessel Emissions by OPAREA - Inside of State Waters - Phase III

	Annual Totals in Tons per Year for Alternative 1						Metric Tons CO2e	Annual Totals in Tons per Year for Alternative 2						Metric Tons CO2e
	VOCs	CO	NOx	SOx	PM			VOCs	CO	NOx	SOx	PM		
Northeast	0.0	0.1	0.9	0.2	0.0		99	0.0	0.1	0.4	0.0	0.0		15
VACAPES	2.3	12.8	71.2	18.9	2.2		11,587	2.5	15.2	75.4	19.4	2.4		11,619
Cherry Pt	0.1	0.3	2.2	0.5	0.1		237	0.1	0.2	1.7	0.3	0.0		163
JAX	0.3	2.6	11.1	3.0	0.4		1,889	0.5	5.6	17.2	4.2	0.7		2,559
Key West	0.0	0.1	0.7	0.2	0.0		107	0.0	0.1	0.6	0.1	0.0		79
GOMEX	0.1	0.4	1.4	0.2	0.1		112	0.0	0.1	0.7	0.1	0.0		58
Outside RCs	0.1	0.4	2.4	0.5	0.1		273	2.6	28.4	66.3	11.7	2.6		6,865

Table H-13: Small Boat and Riverine Vessels by OPAREA, Alt 1 & Alt 2 - Phase III

	Annual Totals in Tons per Year					
	VOCs	CO	NOx	SOx	PM	CO2e
Northeast	4.1	10.1	98.4	14.7	2.4	5,552
VACAPES	8.8	61.8	270.3	9.5	6.4	39,185
Chesapeake Bay	49.7	208.0	1,194.0	103.4	29.2	128,155
Charleston	3.5	8.8	85.6	12.8	2.1	4,673
JAX	2.1	9.8	54.8	1.7	1.3	8,613
Cape Canaveral/ SE FL	3.8	9.5	92.7	13.8	2.2	5,359
Key West	0.0	0.0	0.0	0.0	0.0	0
Panama City	0.3	1.0	3.5	0.5	0.1	249
GOMEX	0.0	0.0	0.0	0.0	0.0	0

Table H-14: Aircraft Emissions by OPAREA - Phase III

Area	Annual Totals in Tons per Year for Alternative 1						Annual Totals in Tons per Year for Alternative 2					
	VOCs	CO	NOx	SOx	PM	CO2e	VOCs	CO	NOx	SOx	PM	CO2e
Northeast	0.8	7.7	12.1	3.0	4.7	4,339	1.3	13.2	17.8	5.0	8.4	7,184
VACAPES	7.8	88.6	159.0	22.8	39.5	47,176	10.0	110.2	181.2	30.5	54.0	58,316
Cherry Pt	5.5	39.3	28.2	3.7	4.9	7,693	5.5	39.3	28.2	3.7	4.9	7,693
JAX	15.1	96.0	73.6	10.5	12.8	18,961	15.4	98.5	76.1	11.4	14.5	20,236
Key West	0.1	0.9	1.0	0.3	0.6	496	0.3	3.1	3.2	1.1	2.1	1,603
GOMEX	1.0	11.8	11.0	3.7	6.6	5,408	1.0	12.0	11.2	3.8	6.8	5,501
Panama City	0.9	8.4	8.6	3.0	5.7	4,352	1.0	10.0	10.2	3.5	6.7	5,148

Table H-15: Aircraft Emissions within State Waters Boundaries by OPAREA - Phase III

Area	Annual Totals in Tons per Year for Alternative 1						Annual Totals in Tons per Year for Alternative 2					
	VOCs	CO	NOx	SOx	PM	CO2e	VOCs	CO	NOx	SOx	PM	CO2e
Northeast	0	0	0	0	0	0	0	0	0	0	0	0
VACAPES	1.0	11.1	28.0	3.3	6.4	7,797	1.0	11.1	28.0	3.3	6.4	7,797
Cherry Pt	11.8	193.6	101.9	40.8	77.1	59,064	11.8	193.6	101.9	40.8	77.1	59,064
JAX	0.1	0.6	0.6	0.2	0.4	307	0.1	0.6	0.6	0.2	0.4	307
Key West	0.0	0.0	0.0	0.0	0.0	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	0.9	8.4	8.6	3.0	5.7	4,352	1.0	10.0	10.2	3.5	6.7	5,148

Table H-16: Munition Emissions by OPAREA - Phase III

Location	Alternative 1								Alternative 2							
	VOC Ton/yr	CO Ton/yr	NOx Ton/yr	SOx Ton/yr	PM10 Ton/yr	PM2.5 Ton/yr	CO2e Mton/yr	Pb Ton/yr	VOC Ton/yr	CO Ton/yr	NOx Ton/yr	SOx Ton/yr	PM10 Ton/yr	PM2.5 Ton/yr	CO2e Mton/yr	Pb Ton/yr
Northeast / NUWC																
Newport	0.0	0.7	0.0	0.0	1.1	0.8	1.51	0.0	0.0	0.7	0.0	0.0	1.1	0.8	1.50	0.0
Virginia Capes	0.0	49.2	0.9	0.0	33.7	25.8	38.42	0.2	0.0	49.2	0.9	0.0	33.7	25.8	38.42	0.2
Cherry Pt	0.0	16.0	0.3	0.0	5.8	4.3	10.35	0.0	0.0	16.0	0.3	0.0	5.8	4.3	10.35	0.0
Jacksonville	0.0	34.8	0.6	0.0	19.1	14.3	31.03	0.2	0.0	34.8	0.6	0.0	19.1	14.3	31.03	0.2
Key West	0.0	2.9	0.1	0.0	0.8	0.5	3.02	0.0	0.0	2.9	0.1	0.0	0.8	0.5	3.02	0.0
GOMEX / Panama City	0.0	3.4	0.1	0.0	1.2	0.8	4.09	0.0	0.0	3.4	0.1	0.0	1.2	0.8	4.09	0.0
Other AFTT	0.0	1.4	0.0	0.0	0.4	0.3	0.65	0.0	0.0	1.4	0.0	0.0	0.4	0.3	0.65	0.0
Study Area Total	0.04	108.39	1.95	0.01	62.08	46.77	89.07	0.44	0.04	108.39	1.95	0.01	62.07	46.76	89.07	0.44

Table H-17: Emissions within State Water Boundaries - Phase III

Area	All Emissions in State Waters, Alternative 1 in tons/yr					All Emissions in State Waters, Alternative 2 in tons/yr				
	VOCs	CO	NOx	SOx	PM	VOCs	CO	NOx	SOx	PM
Northeast	4.1	10.2	99.4	14.9	3.4	4.1	10.1	98.7	14.7	3.3
VACAPES	12.1	85.7	369.5	31.7	15.0	12.3	88.1	373.6	32.2	15.2
Chesapeake Bay	50.4	208.0	1194.0	103.4	45.1	50.4	208.0	1194.0	103.4	45.1
Cherry Pt	0.1	0.3	2.2	0.5	0.1	11.9	193.7	103.4	41.1	77.2
Charleston	3.5	8.8	85.6	12.8	2.1	3.5	8.8	85.6	12.8	2.1
AX	2.5	13.0	66.4	4.8	2.1	2.6	16.0	72.5	6.0	2.4
Cape Canaveral/ SE FL	3.8	9.5	92.7	13.8	3.2	3.8	9.5	92.7	13.8	3.2
Key West	0.0	0.1	0.6	0.2	0.0	0.0	0.0	0.4	0.1	0.0
Panama City	1.1	9.5	12.2	3.5	5.8	1.3	11.0	13.8	4.0	6.9
GOMEX	0.1	0.5	1.5	0.3	0.1	0.0	0.1	0.4	0.1	0.1
Outside RCs	0.1	0.4	2.4	0.5	0.1	2.6	28.4	66.0	11.6	2.6

Table H-18: Grand Total Emissions Summary - Phase III

Area	VOCs Ton/yr	CO Ton/yr	NOx Ton/yr	SOx Ton/yr	PM Ton/yr	CO2e MTon/yr	VOCs Ton/yr	CO Ton/yr	NOx Ton/yr	SOx Ton/yr	PM Ton/yr	CO2e MTon/yr
Northeast	6.0	25.0	143.4	28.3	9.7	14,139	5.5	26.3	120.8	20.3	12.1	11,871
VACAPES	127.0	967.9	3906.4	983.7	189.5	546,042	123.1	963.9	4176.8	1070.5	215.0	572,868
Chesapeake Bay	49.7	208.0	1194.0	103.4	29.2	116,505	49.7	208.0	1194.0	103.4	29.2	116,505
Cherry Pt	40.2	340.0	833.4	159.9	35.7	72,229	29.5	177.1	735.9	181.9	37.9	82,601
Charleston	3.5	8.8	85.6	12.8	2.1	4,248	3.5	8.8	85.6	12.8	2.1	4,248
JAX	50.6	492.1	1112.3	306.5	60.4	169,042	62.4	609.2	2036.1	540.2	89.7	276,861
Cape Canaveral/ SE FL	3.8	9.5	92.7	13.8	2.2	4,872	3.8	9.5	92.7	13.8	2.2	4,872
Key West	2.8	12.2	76.8	12.9	3.1	6,201	0.9	14.3	30.3	10.6	3.7	5,992
GOMEX / Panama City	9.4	131.8	428.8	112.1	28.1	58,419	3.0	38.4	73.5	23.8	16.6	18,536
Outside RCs	52.8	324.3	1674.4	380.5	49.6	196,069	162.0	558.4	4150.5	654.7	83.1	301,880

Table H-19: Navy Vessel Emissions by OPAREA - Outside of State Waters - Phase IV

	Annual Totals in Tons/Year - Alternative 1						Metric Tons CO2e	Annual Totals in Tons/Year - Alternative 2						Metric Tons CO2e
	VOCs	CO	NOx	SOx	PM			VOCs	CO	NOx	SOx	PM		
Northeast	1.04	5.34	28.21	10.59	1.83		5,638	0.07	1.63	3.17	0.48	0.15		231
VACAPES	120.48	695.98	3,411.73	933.01	120.49		476,278	124.54	844.87	3,978.37	1,123.25	144.82		501,017
Cherry Pt	38.19	125.30	887.45	204.38	37.27		88,878	32.41	170.43	877.76	245.20	40.76		98,391
JAX	30.39	209.39	848.98	246.26	22.50		129,110	40.03	379.00	1,575.73	428.46	43.14		214,368
Key West	2.52	7.21	67.05	12.15	1.93		6,086	0.45	6.55	19.31	7.38	0.64		3,850
GOMEX	5.30	72.82	290.28	74.87	10.48		38,779	0.52	8.91	36.92	12.44	1.37		7,443
Outside RCs	55.52	232.86	1,574.49	360.90	52.31		201,761	167.76	423.47	3,830.36	588.65	78.65		295,667

Table H-20: Coast Guard Vessel Emissions by OPAREA - Outside of State Waters - Phase IV

	Annual Totals in Tons/Year - Alternative 1						Metric Tons CO2e	Annual Totals in Tons/Year - Alternative 2						Metric Tons CO2e
	VOCs	CO	NOx	SOx	PM			VOCs	CO	NOx	SOx	PM		
Northeast	0.02	0.11	0.59	0.22	0.04		118	0.00	0.03	0.06	0.01	0.00		5
VACAPES	2.53	14.62	71.65	19.59	2.53		10,002	2.49	16.90	79.57	22.46	2.90		10,020
Cherry Pt	0.80	2.63	18.64	4.29	0.78		1,866	0.65	3.41	17.56	4.90	0.82		1,968
JAX	0.64	4.40	17.83	5.17	0.47		2,711	0.80	7.58	31.51	8.57	0.86		4,287
Key West	0.05	0.15	1.41	0.26	0.04		128	0.01	0.13	0.39	0.15	0.01		77
GOMEX	0.11	1.53	6.10	1.57	0.22		814	0.01	0.18	0.74	0.25	0.03		149
Outside RCs	1.17	4.89	33.06	7.58	1.10		4,237	3.36	8.47	76.61	11.77	1.57		5,913

Table H-21: Navy Vessel Emissions by OPAREA - Inside of State Waters - Phase IV

	Annual Totals in Tons/Year - Alternative 1					Metric Tons CO ₂ e	Annual Totals in Tons/Year - Alternative 2					Metric Tons CO ₂ e
	VOCs	CO	NO _x	SO _x	PM		VOCs	CO	NO _x	SO _x	PM	
Northeast	0.02	0.06	0.53	0.15	0.02	77	0.00	0.01	0.03	0.00	0.00	1
VACAPES	2.49	11.58	75.17	20.05	2.40	11,656	2.92	14.52	92.79	25.06	3.03	14,417
Cherry Pt	0.43	0.98	12.11	2.94	0.38	1,430	0.44	1.45	13.18	3.32	0.43	1,709
JAX	0.24	1.74	8.64	2.38	0.26	1,536	0.41	4.20	14.55	3.66	0.53	2,258
Key West	0.03	0.08	0.87	0.27	0.06	131	0.04	0.13	1.34	0.42	0.11	218
GOMEX	0.10	1.14	2.44	0.38	0.11	186	0.03	0.15	0.56	0.10	0.01	65
Outside RCs	0.61	2.52	14.24	3.15	0.44	1,734	1.06	4.28	21.95	4.28	0.66	2,173

Table H-22: Coast Guard Vessel Emissions by OPAREA - Inside of State Waters - Phase IV

	Annual Totals in Tons/Year - Alternative 1					Metric Tons CO ₂ e	Annual Totals in Tons/Year - Alternative 2					Metric Tons CO ₂ e
	VOCs	CO	NO _x	SO _x	PM		VOCs	CO	NO _x	SO _x	PM	
Northeast	0.00	0.00	0.01	0.00	0.00	2	0.00	0.00	0.00	0.00	0.00	0
VACAPES	0.05	0.24	1.58	0.42	0.05	245	0.06	0.29	1.86	0.50	0.06	288
Cherry Pt	0.01	0.02	0.25	0.06	0.01	30	0.01	0.03	0.26	0.07	0.01	34
JAX	0.01	0.04	0.18	0.05	0.01	32	0.01	0.08	0.29	0.07	0.01	45
Key West	0.00	0.00	0.02	0.01	0.00	3	0.00	0.00	0.03	0.01	0.00	4
GOMEX	0.00	0.02	0.05	0.01	0.00	4	0.00	0.00	0.01	0.00	0.00	1
Outside RCs	0.01	0.05	0.30	0.07	0.01	36	0.02	0.09	0.44	0.09	0.01	43

Table H-23: Navy Small Boat and Riverine Vessels by OPAREA, Alt 1 & Alt 2 - Phase IV

Region	Annual Totals in Tons per Year					
	VOCs	CO	NO _x	SO _x	PM	CO ₂ e
Northeast	4.56	64.07	139.58	11.54	1.89	12,377
VACAPES	5.14	47.86	194.32	4.27	4.15	30,081
Virginia Capes Range Complex Inshore	28.75	409.14	1,044.31	32.91	16.50	144,631
Charleston	4.43	10.99	107.06	15.97	2.61	5,841
JAX	0.09	0.37	3.37	0.48	0.07	286
Cape Canaveral/SE FL	1.68	38.17	58.61	2.75	0.46	6,182
Key West	-	-	-	-	-	-
Panama City	0.00	0.02	0.38	0.05	0.01	47
GOMEX	-	-	-	-	-	-

Table H-24: Coast Guard Small Boat and Riverine Vessels by OPAREA, Alt 1 & Alt 2 - Phase IV

Region	Annual Totals in Tons per Year					
	VOCs	CO	NO _x	SO _x	PM	CO _{2e}
Northeast	0.50	7.05	15.35	1.27	0.21	1,361
VACAPES	0.57	5.26	21.38	0.47	0.46	3,309
Chesapeake Bay	3.16	45.01	114.87	3.62	1.82	15,909
Charleston	0.49	1.21	11.78	1.76	0.29	643
JAX	0.01	0.04	0.37	0.05	0.01	31
Cape Canaveral/SE FL	0.19	4.20	6.45	0.30	0.05	680
Key West	-	-	-	-	-	-
Panama City	0.00	0.00	0.04	0.01	0.00	5
GOMEX	-	-	-	-	-	-

Table H-25: Navy Aircraft Emissions by OPAREA - Phase IV

Area	Annual Totals in Tons/Year - Alternative 1						Metric Tons CO _{2e}	Annual Totals in Tons/Year - Alternative 2						Metric Tons CO _{2e}
	VOCs	CO	NO _x	SO _x	PM			VOCs	CO	NO _x	SO _x	PM		
Northeast	0.57	5.80	9.18	2.27	3.57		3,281	1.01	10.08	13.60	3.79	6.44		5,488
VACAPES	5.92	66.99	120.24	17.26	29.88		35,665	7.65	84.21	138.42	23.31	41.29		44,553
Cherry Pt	4.14	29.72	21.31	2.81	3.67		5,816	4.18	30.03	21.53	2.84	3.71		5,877
JAX	11.43	72.60	55.65	7.97	9.68		14,335	11.74	75.26	58.17	8.73	11.05		15,461
Key West	0.07	0.70	0.74	0.26	0.49		375	0.24	2.34	2.43	0.84	1.60		1,225
GOMEX	0.75	8.91	8.32	2.81	5.02		4,088	0.77	9.14	8.55	2.89	5.17		4,202
Panama City	0.65	6.38	6.54	2.27	4.29		3,290	0.77	7.63	7.81	2.71	5.13		3,933

Table H-26: Coast Guard Aircraft Emissions by OPAREA - Phase IV

Area	Annual Totals in Tons/Year - Alternative 1						Metric Tons CO _{2e}	Annual Totals in Tons/Year - Alternative 2						Metric Tons CO _{2e}
	VOCs	CO	NO _x	SO _x	PM			VOCs	CO	NO _x	SO _x	PM		
Northeast	0.03	0.32	0.51	0.12	0.20		180	0.06	0.57	0.78	0.22	0.37		313
VACAPES	0.33	3.68	6.61	0.95	1.64		1,962	0.44	4.80	7.89	1.33	2.35		2,540
Cherry Pt	0.23	1.63	1.17	0.15	0.20		320	0.24	1.71	1.23	0.16	0.21		335
JAX	0.63	3.99	3.06	0.44	0.53		788	0.67	4.29	3.32	0.50	0.63		881
Key West	0.00	0.04	0.04	0.01	0.03		21	0.01	0.13	0.14	0.05	0.09		70
GOMEX	0.04	0.49	0.46	0.15	0.28		225	0.04	0.52	0.49	0.16	0.29		240
Panama City	0.04	0.35	0.36	0.12	0.24		181	0.04	0.43	0.45	0.15	0.29		224

Table H-27: Navy Aircraft Emissions within State Waters Boundaries by OPAREA - Phase IV

Area	Annual Totals in Tons/Year - Alternative 1					Metric Tons CO2e	Annual Totals in Tons/Year - Alternative 2					Metric Tons CO2e
	VOCs	CO	NOx	SOx	PM		VOCs	CO	NOx	SOx	PM	
Northeast	-	-	-	-	-	-	-	-	-	-	-	-
VACAPES	0.78	8.42	21.13	2.51	4.84	5,895	0.79	8.51	21.36	2.53	4.89	5,957
Cherry Pt	8.94	146.34	77.06	30.82	58.31	44,653	9.04	147.89	77.88	31.15	58.93	45,125
JAX	0.05	0.45	0.46	0.16	0.30	232	0.05	0.46	0.47	0.16	0.31	235
Key West	-	-	-	-	-	-	-	-	-	-	-	-
GOMEX	0.01	0.06	0.06	0.02	0.04	29	0.01	0.06	0.06	0.02	0.04	30
Panama City	0.65	6.38	6.54	2.27	4.29	3,290	0.58	5.71	5.85	2.03	3.84	2,944

Table H-28: Coast Guard Aircraft Emissions within State Waters Boundaries by OPAREA - Phase IV

Area	Annual Totals in Tons/Year - Alternative 1					Metric Tons CO2e	Annual Totals in Tons/Year - Alternative 2					Metric Tons CO2e
	VOCs	CO	NOx	SOx	PM		VOCs	CO	NOx	SOx	PM	
Northeast	-	-	-	-	-	-	-	-	-	-	-	-
VACAPES	0.04	0.46	1.16	0.14	0.27	324	0.05	0.49	1.22	0.14	0.28	340
Cherry Pt	0.49	8.05	4.24	1.70	3.21	2,456	0.52	8.43	4.44	1.78	3.36	2,572
JAX	0.00	0.02	0.03	0.01	0.02	13	0.00	0.03	0.03	0.01	0.02	13
Key West	-	-	-	-	-	-	-	-	-	-	-	-
GOMEX	0.00	0.00	0.00	0.00	0.00	2	0.00	0.00	0.00	0.00	0.00	2
Panama City	0.04	0.35	0.36	0.12	0.24	181	0.03	0.33	0.33	0.12	0.22	168

Table H-29: Munition Emissions by OPAREA - Phase IV

Location	Alternative 1								Alternative 2							
	VOC Ton/yr	CO Ton/yr	NOx Ton/yr	SOx Ton/yr	PM10 Ton/yr	PM2.5 Ton/yr	CO2e Mton/yr	Pb Ton/yr	VOC Ton/yr	CO Ton/yr	NOx Ton/yr	SOx Ton/yr	PM10 Ton/yr	PM2.5 Ton/yr	CO2e Mton/yr	Pb Ton/yr
Northeast / NUWC Newport	0.00	0.70	0.02	0.00	1.07	0.79	1.43	0.00	0.00	0.71	0.02	0.00	1.08	0.79	1.45	0.00
Virginia Capes	0.02	46.78	0.81	0.00	32.06	24.47	36.50	0.20	0.02	47.27	0.82	0.00	32.39	24.73	36.88	0.20
Cherry Pt.	0.00	15.22	0.28	0.00	5.49	4.05	9.84	0.03	0.00	15.38	0.28	0.00	5.55	4.09	9.94	0.03
Jacksonville	0.01	33.04	0.59	0.00	18.14	13.57	29.48	0.17	0.01	33.39	0.60	0.00	18.33	13.72	29.79	0.18
Key West	0.00	2.71	0.06	0.00	0.72	0.48	2.87	0.00	0.00	2.74	0.06	0.00	0.73	0.49	2.90	0.00
GOMEX / Panama City	0.00	3.21	0.07	0.00	1.11	0.78	3.88	0.01	0.00	3.25	0.07	0.00	1.12	0.79	3.93	0.01
Other AFTT	0.00	1.30	0.02	0.00	0.39	0.29	0.61	0.00	0.00	1.32	0.02	0.00	0.40	0.29	0.62	0.00
Study Area Total	0.04	102.97	1.86	0.01	58.98	44.43	84.62	0.42	0.04	104.05	1.88	0.01	59.60	44.90	85.51	0.42

Table H-30: Emissions within State Water Boundaries - Phase IV

<i>Area</i>	<i>All Emissions in State Waters, Alternative 1 in tons/yr</i>					<i>All Emissions in State Waters Alternative 2 in tons/yr</i>				
	<i>VOCs</i>	<i>CO</i>	<i>NO_x</i>	<i>SO_x</i>	<i>PM</i>	<i>VOCs</i>	<i>CO</i>	<i>NO_x</i>	<i>SO_x</i>	<i>PM</i>
Northeast	5.12	71.18	155.47	12.96	3.08	5.10	71.12	154.96	12.81	3.06
VACAPES	9.07	73.83	314.74	27.85	12.17	9.51	76.93	332.92	32.98	12.88
Virginia Capes Range Complex Inshore	32.62	454.18	1,159.20	36.54	34.22	32.62	454.18	1,159.20	36.54	34.22
Cherry Pt	9.87	155.39	93.66	35.52	61.91	10.00	157.79	95.76	36.31	62.73
Charleston	4.92	12.20	118.84	17.73	2.90	4.92	12.20	118.84	17.73	2.90
JAX	0.40	2.66	13.05	3.14	0.67	0.57	5.17	19.07	4.44	0.94
Cape Canaveral/SE FL	1.91	42.37	65.06	3.05	1.47	1.91	42.37	65.06	3.05	1.47
Key West	0.03	0.08	0.89	0.27	0.06	0.04	0.13	1.37	0.43	0.11
Panama City	0.68	6.76	7.32	2.45	4.53	0.61	6.06	6.60	2.20	4.06
GOMEX	0.11	1.22	2.55	0.41	0.15	0.03	0.21	0.63	0.13	0.05
Outside RCs	0.62	2.57	14.54	3.21	0.45	1.08	4.37	22.38	4.36	0.68

Table H-31: Grand Total Emissions Summary - Phase IV

Area	Alternative 1						Alternative 2					
	VOCs	CO	NO _x	SO _x	PM	CO ₂ e	VOCs	CO	NO _x	SO _x	PM	CO ₂ e
	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Mton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Mton/yr
Northeast	6.75	83.45	193.98	26.17	8.81	20,941	6.20	84.15	172.59	17.31	10.14	17,979
VACAPES	137.53	893.00	3,903.49	996.03	193.66	517,486	143.82	1,065.99	4,515.41	1,200.66	231.46	551,148
VACAPES Inshore	31.91	454.14	1,159.19	36.53	18.32	145,946	31.91	454.14	1,159.19	36.53	18.32	145,946
Cherry Pt	43.79	175.51	941.21	214.64	47.82	89,410	37.93	222.44	931.80	256.50	51.49	98,477
Charleston	4.91	12.20	118.84	17.73	2.90	5,894	4.91	12.20	118.84	17.73	2.90	5,894
JAX	43.45	325.61	938.67	262.81	51.66	135,327	53.78	504.21	1,687.91	450.52	74.63	216,044
Cape Canaveral/SE FL	1.87	42.37	65.06	3.05	0.51	6,238	1.87	42.37	65.06	3.05	0.51	6,238
Key West	2.68	10.89	70.20	12.95	3.26	6,134	0.75	12.03	23.69	8.85	3.17	4,952
GOMEX/Panama City	6.99	94.88	315.04	82.25	21.74	43,294	2.20	30.24	56.02	18.77	13.42	14,830
Outside RCs	57.31	241.62	1,622.11	371.69	54.24	188,881	172.20	437.62	3,929.37	604.78	81.29	276,179
Total - Phase IV Alternative	337.20	2,333.68	9,327.77	2,023.85	402.93	1,159,551	455.58	2,865.39	12,659.86	2,614.69	487.32	1,337,687
Total - Phase III Alternative 1	345.98	2,519.60	9,547.94	2,113.79	409.63	1,187,766	345.98	2,519.60	9,547.94	2,113.79	409.63	1,187,766
Net Change - Phase IV - Phase III	(8.78)	(185.92)	(220.17)	(89.94)	(6.70)	(28,215)	109.60	345.79	3,111.93	500.90	77.70	149,921

Table H-32: Conformity Applicability Analyses - Phase IV minus Phase III Emissions

<i>Nonattainment/Maintenance Area</i>	<i>All Emissions in State Waters, Alternative 1 in tons/yr</i>					<i>All Emissions in State Waters, Alternative 2 in tons/yr</i>				
	<i>VOCs</i>	<i>CO</i>	<i>NOx</i>	<i>SOx</i>	<i>PM</i>	<i>VOCs</i>	<i>CO</i>	<i>NOx</i>	<i>SOx</i>	<i>PM</i>
Rhode Island Ozone Nonattainment¹										
Phase IV	4.86	67.62	147.70	12.31	2.92	4.84	67.57	147.21	12.17	2.90
Phase III	3.92	9.70	94.39	14.12	3.20	3.89	9.62	93.78	13.96	3.18
Net Change	0.95	57.93	53.31	(1.81)	(0.28)	0.95	57.94	53.44	(1.79)	(0.28)
Metropolitan Portland/Cumberland County Ozone Maintenance²										
Phase IV	0.26	3.56	7.77	0.65	0.15	0.25	3.56	7.75	0.64	0.15
Phase III	0.21	0.51	4.97	0.74	0.17	0.20	0.51	4.94	0.73	0.17
Net Change	0.05	3.05	2.81	(0.10)	(0.01)	0.05	3.05	2.81	(0.09)	(0.01)
Virginia - Hampton Roads Ozone Maintenance³										
VACAPES - Phase IV	6.80	55.38	236.06	20.89	9.13	7.14	57.70	249.69	24.73	9.66
VA Capes Range Complex Inshore - Phase IV	24.46	340.64	869.40	27.40	25.67	24.46	340.64	869.40	27.40	25.67
Total - Phase IV	31.27	396.01	1,105.46	48.29	34.79	31.60	398.33	1,119.09	52.13	35.32
VACAPES - Phase III	(9.05)	(64.28)	(277.15)	(23.81)	(11.24)	(9.21)	(66.08)	(280.16)	(24.11)	(11.40)
VA Capes Range Complex Inshore - Phase III	(37.78)	(156.00)	(895.52)	(77.55)	(33.84)	(37.78)	(156.00)	(895.52)	(77.55)	(33.84)
Total - Phase III	(46.83)	(220.28)	(1,172.67)	(101.36)	(45.08)	(47.00)	(222.08)	(1,175.69)	(101.67)	(45.25)
Net Change	(15.56)	175.73	(67.21)	(53.07)	(10.29)	(15.40)	176.26	(56.60)	(49.53)	(9.93)
Jacksonville, Florida Sulfur Dioxide Maintenance										
Phase IV	0.40	2.66	13.05	3.14	0.67	0.57	5.17	19.07	4.44	0.94
Phase III	2.46	13.04	66.45	4.84	2.08	2.64	15.99	72.47	6.03	2.38
Net Change	(2.06)	(10.39)	(53.40)	(1.70)	(1.41)	(2.07)	(10.82)	(53.40)	(1.59)	(1.44)

Notes: ¹ Equates to 95% of the emissions that occur within the Northeast Area state waters.

² Equates to 5% of the emissions that occur within the Northeast Area state waters.

³ Equates to 75% of the emissions that occur within the VACAPES and Virginia Capes Range Complex Inshore state waters.

Table H-33: Data Organization by Geographic Areas

<i>Designation</i> ⁽¹⁾	<i>Relationship to EPA Region (Coastal States)</i>	
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	

Note: ⁽¹⁾ The OPAREA designation includes adjacent state waters. Emissions in state waters separately delineated in the calculations.

Table H-34: Navy Vessel Steaming Days for the U.S. East Coast - 2016 thru 2023 Data

	Steaming Days - Navy							
Vessel Type	2016	2017	2018	2019	2020	2021	2022	2023
AUX	3	3	1	3				
CG	365	257	221	188	102	205	39	164
CGO								6
CVN	232	189	168	133	67	103	17	74
DDG	1,003	942	902	655	438	934	210	657
EXP	221	46						
LCC		2						
LCS	29	35	169	160	45	30	17	10
LHA							1	
LHD	161	294	127	105	111	217	22	46
LPD	158	258	147	96	56	157	36	104
LSD	163	274	153	140	128	128	5	133
MCM		1		9			3	
PC	5				2			
TACS		2	2					15
TAGS	28	13	6	1				
TAH	13	56	27	10	3			5
TAKR	174	40	6	4	1	4		
TAO	119	224	169	135	160	183	26	181
TAOE	85	59	113	92	16	2		37
TAOT	4	9		3				
TARS	36	14	61					3
TATF	8	9	3	3	2			
TUG			2	4	5	4		
TOTAL	2.807	2.727	2.277	1.741	1.136	1.967	376	1.435

Table H-35: Navy Vessel Steaming Hours for the U.S. East Coast - 2016 thru 2023 Data

Vessel Type		Steaming Hours - Navy								2016/2011-2015 Ave.	Max Year/2011-2015 Ave.
		2016	2017	2018	2019	2020	2021	2022	2023		
AUX		72	72	24	72	-	-	-	-		
CG	Guided missile cruiser	8,760	6,168	5,304	4,512	2,448	4,920	936	3,936	0.86	0.86
CGO		-	-	-	-	-	-	-	144	-	-
CVN		5,568	4,536	4,032	3,192	1,608	2,472	408	1,776	1.18	1.18
DDG		24,072	22,608	21,648	15,720	10,512	22,416	5,040	15,768	0.81	0.81
EXP	ESD or ESB	5,304	1,104	-	-	-	-	-	-		
LCC		-	48	-	-	-	-	-	-		
LCS		696	840	4,056	3,840	1,080	720	408	240	0.70	4.08
LHA		-	-	-	-	-	-	-	-	0.33	0.33
LHD	Amphibious assault ship, multi-purpose	3,864	7,056	3,048	2,520	2,664	5,208	528	1,104	0.92	1.68
LPD		3,792	6,192	3,528	2,304	1,344	3,768	864	2,496	0.87	1.41
LSD		3,912	6,576	3,672	3,360	3,072	3,072	120	3,192	0.77	1.29
MCM	Mine sweeper	-	24	-	216	-	-	72	-		
PC*		120	-	-	-	48	-	-	-	0.10	0.10
TACS	Aux crane ship	-	48	48	-	-	-	-	360		
TAGS	Survey ship	672	312	144	24	-	-	-	-		
TAH	Hospital ship	312	1,344	648	240	72	-	-	120	7.22	31.11
TAKR		4,176	960	144	96	24	96	-	-	1.31	1.31
TAO		2,856	5,376	4,056	3,240	3,840	4,392	624	4,344	0.49	0.93
TAOE		2,040	1,416	2,712	2,208	384	48	-	888	1.98	2.63
TAOT	Transport/storage oiler	96	216	-	72	-	-	-	-		-
TARS		864	336	1,464	-	-	-	-	72	0.38	0.65
TATF		192	216	72	72	48	-	-	-	0.20	0.23
TUG		-	-	48	96	120	96	-	-		-
TOTAL		67,368	65,448	54,648	41,784	27,264	47,208	9,024	34,440		

In 2018 SEIS calculations. 0.77 Fraction of max 2016-2023 vs 2011-2015 average.

Hours estimated by multiplying steaming days by 24 hours

* Exclude from calcs as in 2023 Navy de-commissioned all per Naval reg.

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Table H-36: Navy Vessel Steaming Hours for the U.S. East Coast - 2011 thru 2015 Data

Vessel Type		Steaming Hours - Navy					
		2011	2012	2013	2014	2015	5-Year Ave
CG Total	=EPF	10,416	11,112	11,664	10,416	7,344	10,190
CVN Total		3,648	5,712	5,592	2,928	5,712	4,718
DDG Total		31,488	29,712	27,648	25,320	34,560	29,746
FFG Total		20,952	10,608	14,784	5,928	1,752	10,805
JHSV Total		-	-	2,808	2,256	624	1,138
LCC Total		-	-	-	-	264	53
LCS Total		1,344	1,296	-	-	2,328	994
LHD Total		4,344	5,304	3,480	4,128	3,720	4,195
LPD Total		6,120	3,768	4,632	3,888	3,504	4,382
LSD Total		4,416	4,848	4,320	6,936	4,920	5,088
LHA Total		-	-	-	360	-	72
PC Total		24	480	1,296	1,032	2,904	1,147
TAKE Total		4,824	2,808	2,232	1,968	4,056	3,178
TAO Total		8,496	6,984	6,144	2,832	4,536	5,798
TAOE Total		3,216	144	240	600	960	1,032
TARS Total	240' rescue vessel	3,600	384	1,560	2,688	3,048	2,256
TATF Total		840	504	1,056	960	1,392	950
TAH Total		96	-	-	120	-	43
MV Total		2,568	3,432	744	1,824	-	1,714
HSV Total		-	-	-	-	-	-
TAK Total		-	-	-	-	-	-
Annual Total		106,392	87,096	88,200	74,184	81,624	87,499

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates

Vessel Type	P4/P3 Factor	OPAREA	Phase III Values				Phase IV Values			
			Alternative 1		Alternative 2		Alternative 1		Alternative 2	
			Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs
			Open Water	State Waters	Open Water	State Waters	Open Water	State Waters	Open Water	State Waters
CVN		Northeast	-	-	-	-	-	-	-	-
1.18		VACAPES	2,761	57	1,728	35	3,258	65	2,039	41
		Cherry Pt	46	1	-	-	54	1	-	-
		JAX	1,207	13	1,032	10	1,424	14	1,218	12
		Key West	86	1	96	1	101	1	113	1
		GOMEX	-	-	-	-	-	-	-	-
		Outside RCs	551	1	792	1	650	7	935	9
CG		Northeast	91	1	-	-	78	1	-	-
0.86		VACAPES	6,699	137	4,032	81	5,761	115	3,468	69
		Cherry Pt	1,122	2	552	1	965	10	475	5
		JAX	2,756	28	3,384	34	2,370	24	2,910	29
		Key West	47	1	120	1	40	0	103	1
		GOMEX	-	-	-	-	-	-	-	-
		Outside RCs	551	1	1,704	2	474	5	1,465	15
DDG -1000		Northeast	110	1	-	-	89	1	-	-
0.81		VACAPES	15,326	313	16,272	325	12,414	248	13,180	264
		Cherry Pt	47	1	1,368	1	38	0	1,108	11
		JAX	4,875	50	5,400	54	3,949	39	4,374	44
		Key West	86	1	96	1	70	1	78	1
		GOMEX	148	1	408	1	120	1	330	3
		Outside RCs	7,466	8	2,976	264	6,047	60	2,411	24
LCS		Northeast	-	-	-	-	-	-	-	-
0.70		VACAPES	-	-	3,240	65	-	-	2,268	45
		Cherry Pt	-	-	696	1	-	-	487	5
		JAX	756	14	9,000	90	529	5	6,300	63
		Key West	24	1	120	1	17	0	84	1
		GOMEX	3,858	7	120	1	2,701	27	84	1
		Outside RCs	314	1	8,592	536	220	2	6,014	60

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type P4/P3 Factor	OPAREA	Phase III Values				Phase IV Values			
		Alternative 1		Alternative 2		Alternative 1		Alternative 2	
		Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs
		Open Water	State Waters	Open Water	State Waters	Open Water	State Waters	Open Water	State Waters
LSD	Northeast	57	1	-	-	74	1	-	-
1.29	VACAPES	2,756	57	2,400	48	3,555	71	3,096	62
	Cherry Pt	1,093	2	840	1	1,410	14	1,084	11
	JAX	14	1	-	-	18	0	-	-
	Key West	-	-	-	-	-	-	-	-
	GOMEX	19	1	-	-	25	0	-	-
	Outside RCs	1,088	2	1,128	50	1,404	14	1,455	15
LHA	Northeast	-	-	-	-	-	-	-	-
0.33	VACAPES	-	-	16	1	-	-	5	0
	Cherry Pt	-	-	-	-	-	-	-	-
	JAX	-	-	-	-	-	-	-	-
	Key West	-	-	-	-	-	-	-	-
	GOMEX	-	-	2	1	-	-	1	0
	Outside RCs	62	1	22	1	20	0	7	0
LHD	Northeast	57	1	-	-	96	1	-	-
1.68	VACAPES	1,957	40	2,328	47	3,288	66	3,911	78
	Cherry Pt	1,155	2	1,056	1	1,940	19	1,774	18
	JAX	28	1	-	-	47	0	-	-
	Key West	47	1	-	-	79	1	-	-
	GOMEX	14	1	-	-	24	0	-	-
	Outside RCs	892	1	960	1	1,499	15	1,613	16
LPD	Northeast	67	1	-	-	94	1	-	-
1.41	VACAPES	1,839	38	3,216	64	2,593	52	4,535	91
	Cherry Pt	758	1	888	1	1,069	11	1,252	13
	JAX	157	2	48	1	221	2	68	1
	Key West	-	-	-	-	-	-	-	-
	GOMEX	86	1	168	1	121	1	237	2
	Outside RCs	1,160	2	1,800	3	1,636	16	2,538	25

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type P4/P3 Factor	OPAREA	Phase III Values				Phase IV Values			
		Alternative 1		Alternative 2		Alternative 1		Alternative 2	
		Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs
		Open Water	State Waters	Open Water	State Waters	Open Water	State Waters	Open Water	State Waters
PC	Northeast	-	-	-	-				
0.10	VACAPES	122	3	8	2				
	Cherry Pt	1,088	2	5	1				
	JAX	622	7	44	5				
	Key West	-	-	-	-				
	GOMEX	33	1	2	1				
	Outside RCs	311	1	22	1				
JHSV	Northeast	-	-	11	1	-	-	8	0
0.77	VACAPES	621	13	23	6	478	10	17	0
	Cherry Pt	9	1	1	1	7	0	1	0
	JAX	123	2	8	1	95	1	7	0
	Key West	-	-	-	-	-	-	-	-
	GOMEX	43	1	9	1	33	0	7	0
	Outside RCs	311	1	45	1	239	2	35	0
MV	Northeast	-	-	-	-	-	-	-	-
0.77	VACAPES	231	5	-	-	178	4	-	-
	Cherry Pt	-	-	-	-	-	-	-	-
	JAX	-	-	-	-	-	-	-	-
	Key West	1,026	2	2,256	2	790	8	1,737	17
	GOMEX	-	-	-	-	-	-	-	-
	Outside RCs	451	1	312	1	347	3	240	2
SSGN	Northeast	-	-	-	-	-	-	-	-
0.77	VACAPES	-	-	-	-	-	-	-	-
	Cherry Pt	-	-	-	-	-	-	-	-
	JAX	204	3	1,920	19	157	2	1,478	15
	Key West	566	1	888	1	436	4	684	7
	GOMEX	-	-	-	-	-	-	-	-
	Outside RCs	148	1	240	1	114	1	185	2

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type P4/P3 Factor	OPAREA	Phase III Values				Phase IV Values			
		Alternative 1		Alternative 2		Alternative 1		Alternative 2	
		Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs
		Open Water	State Waters	Open Water	State Waters	Open Water	State Waters	Open Water	State Waters
SSN	Northeast	10,050	11	-	-	7,739	77	-	-
0.77	VACAPES	3,871	80	6,888	138	2,981	60	5,304	106
	Cherry Pt	354	1	-	-	273	3	-	-
	JAX	1,397	15	1,920	19	1,076	11	1,478	15
	Key West	129	1	-	-	99	1	-	-
	GOMEX	23	1	-	-	18	0	-	-
	Outside RCs	11,458	12	20,424	7,340	8,823	88	15,726	157
T-AH	Northeast	-	-	-	-	-	-	-	-
1.00	VACAPES	38	1	72	1	38	1	72	1
	Cherry Pt	-	-	-	-	-	-	-	-
	JAX	-	-	-	-	-	-	-	-
	Key West	-	-	-	-	-	-	-	-
	GOMEX	-	-	-	-	-	-	-	-
	Outside RCs	4	1	24	-	4	0	24	0
T-AKE	Northeast	-	-	-	-	-	-	-	-
1.31	VACAPES	1,505	31	600	12	1,972	39	786	16
	Cherry Pt	331	1	144	1	434	4	189	2
	JAX	395	4	192	2	517	5	252	3
	Key West	19	1	-	-	25	0	-	-
	GOMEX	-	-	-	-	-	-	-	-
	Outside RCs	892	1	3,888	4	1,169	12	5,093	51
T-AO	Northeast	9	1	-	-	8	0	-	-
0.93	VACAPES	2,018	42	2,328	47	1,877	38	2,165	43
	Cherry Pt	1,098	2	624	1	1,021	10	580	6
	JAX	955	10	1,056	11	888	9	982	10
	Key West	139	1	-	-	129	1	-	-
	GOMEX	28	1	-	-	26	0	-	-
	Outside RCs	1,477	2	5,688	6	1,374	14	5,290	53

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type P4/P3 Factor	OPAREA	Phase III Values				Phase IV Values			
		Alternative 1		Alternative 2		Alternative 1		Alternative 2	
		Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs	Steaming Hrs
		Open Water	State Waters	Open Water	State Waters	Open Water	State Waters	Open Water	State Waters
T-AOE	Northeast	-	-	-	-	-	-	-	-
2.63	VACAPES	658	14	2,328	47	1,731	35	6,123	122
	Cherry Pt	283	1	624	1	744	7	1,641	16
	JAX	76	1	264	3	200	2	694	7
	Key West	-	-	-	-	-	-	-	-
	GOMEX	-	-	-	-	-	-	-	-
	Outside RCs	-	-	-	-	-	-	-	-
T-ARS	Northeast	4	1	-	-	3	0	-	-
0.65	VACAPES	555	12	720	14	361	7	468	9
	Cherry Pt	268	1	-	-	174	2	-	-
	JAX	142	2	96	1	92	1	62	1
	Key West	499	1	-	-	324	3	-	-
	GOMEX	-	-	-	-	-	-	-	-
	Outside RCs	758	1	2,784	3	493	5	1,810	18
T-ATF	Northeast	-	-	-	-	-	-	-	-
0.23	VACAPES	527	11	816	16	121	2	188	4
	Cherry Pt	148	1	24	1	34	0	6	0
	JAX	204	3	-	-	47	0	-	-
	Key West	-	-	-	-	-	-	-	-
	GOMEX	-	-	-	-	-	-	-	-
	Outside RCs	57	1	-	-	13	0	-	-
Total Hours		108,512	1,112	133,899	9,440	98,282	1,389	124,351	1,720

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

		Alternative 1						Alternative 1					
Vessel Type	OPAREA	Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons					
P4/P3 Factor		CO	NOx	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
CVN	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
1.18	VACAPES	2.01	27.31	0.51	2.27	0.20	1,116	0.00	0.05	0.00	0.00	0.00	2
	Cherry Pt	0.03	0.45	0.01	0.04	0.00	19	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.88	11.93	0.22	0.99	0.09	487	0.00	0.01	0.00	0.00	0.00	0
	Key West	0.06	0.85	0.02	0.07	0.01	35	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.40	5.44	0.10	0.45	0.04	222	0.00	0.01	0.00	0.00	0.00	0
CG	Northeast	2.42	3.23	0.17	2.18	0.09	974	0.01	0.11	0.00	0.04	0.00	27
0.86	VACAPES	178.78	245.69	12.59	163.33	7.06	73,707	1.60	16.45	0.14	6.34	0.58	4,023
	Cherry Pt	29.81	39.77	2.10	26.82	1.13	12,008	0.13	1.38	0.01	0.53	0.05	337
	JAX	73.22	97.69	5.15	65.89	2.79	29,496	0.33	3.38	0.03	1.30	0.12	828
	Key West	1.25	1.67	0.09	1.12	0.05	503	0.01	0.06	0.00	0.02	0.00	14
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	14.64	19.53	1.03	13.17	0.56	5,897	0.07	0.68	0.01	0.26	0.02	165
DDG -1000	Northeast	1.51	7.10	0.09	2.68	0.26	1,662	0.02	0.03	0.00	0.01	0.00	11
0.81	VACAPES	213.29	992.91	12.15	374.65	36.19	233,107	5.67	8.04	0.36	3.71	0.50	2,986
	Cherry Pt	0.65	3.03	0.04	1.14	0.11	710	0.01	0.01	0.00	0.01	0.00	5
	JAX	66.94	314.55	3.81	118.58	11.43	73,674	0.90	1.28	0.06	0.59	0.08	475
	Key West	1.18	5.55	0.07	2.09	0.20	1,300	0.02	0.02	0.00	0.01	0.00	8
	GOMEX	2.03	9.55	0.12	3.60	0.35	2,237	0.03	0.04	0.00	0.02	0.00	14
	Outside RCs	102.52	481.73	5.83	181.60	17.51	112,830	1.38	1.96	0.09	0.90	0.12	727
LCS	Northeast	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
0.70	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
	JAX	12.42	49.83	0.86	13.20	1.78	6,781	0.21	0.40	0.02	0.06	0.02	29
	Key West	0.39	1.58	0.03	0.42	0.06	215	0.01	0.01	0.00	0.00	0.00	1
	GOMEX	63.37	254.26	4.39	67.33	9.11	34,600	1.07	2.06	0.08	0.31	0.10	150
	Outside RCs	5.16	20.72	0.36	5.49	0.74	2,820	0.09	0.17	0.01	0.03	0.01	12

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

		Alternative 1						Alternative 1					
Vessel Type	OPAREA	Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons					
P4/P3 Factor		CO	NOx	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
LSD	Northeast	0.80	12.52	0.41	0.92	0.08	606	0.01	0.22	0.01	0.02	0.00	8
1.29	VACAPES	39.20	616.12	20.00	45.34	3.93	29,662	1.42	21.48	0.73	1.61	0.08	751
	Cherry Pt	15.26	240.08	7.79	17.66	1.55	11,615	0.28	4.26	0.14	0.32	0.02	149
	JAX	0.20	3.08	0.10	0.23	0.02	149	0.00	0.05	0.00	0.00	0.00	2
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.27	4.17	0.14	0.31	0.03	202	0.00	0.07	0.00	0.01	0.00	3
	Outside RCs	15.19	238.99	7.75	17.58	1.54	11,562	0.28	4.24	0.14	0.32	0.02	148
LHA	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.33	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.09	2.87	0.15	0.69	0.09	371	0.00	0.03	0.00	0.01	0.00	4
LHD	Northeast	0.39	2.31	0.28	4.61	1.38	2,303	0.00	0.02	0.00	0.06	0.01	23
1.68	VACAPES	13.53	79.95	9.65	160.33	47.76	79,864	0.25	1.32	0.17	3.97	0.80	1561
	Cherry Pt	7.91	46.79	5.65	93.46	27.95	46,674	0.07	0.39	0.05	1.17	0.24	461
	JAX	0.19	1.13	0.14	2.27	0.68	1,131	0.00	0.01	0.00	0.03	0.01	11
	Key West	0.32	1.90	0.23	3.80	1.14	1,899	0.00	0.02	0.00	0.05	0.01	19
	GOMEX	0.10	0.57	0.07	1.13	0.34	566	0.00	0.00	0.00	0.01	0.00	6
	Outside RCs	6.11	36.14	4.36	72.18	21.59	36,046	0.06	0.30	0.04	0.90	0.18	356
LPD	Northeast	1.51	12.99	0.80	1.79	0.16	799	0.01	0.12	0.01	0.02	0.00	7
1.41	VACAPES	41.71	359.85	22.25	49.53	4.34	22,128	0.73	6.84	0.39	0.86	0.07	390
	Cherry Pt	17.04	146.91	9.09	20.24	1.77	9,040	0.15	1.41	0.08	0.18	0.02	80
	JAX	3.53	30.43	1.88	4.19	0.37	1,873	0.03	0.29	0.02	0.04	0.00	17
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	1.93	16.67	1.03	2.30	0.20	1,026	0.02	0.16	0.01	0.02	0.00	9
	Outside RCs	26.08	224.83	13.91	30.97	2.71	13,835	0.23	2.16	0.12	0.27	0.02	123

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

		Alternative 1						Alternative 1					
Vessel Type	OPAREA	Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons					
P4/P3 Factor		CO	NOx	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
PC	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.10	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
JHSV	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.77	VACAPES	92.35	179.23	4.12	27.29	8.71	13,049	0.48	0.96	0.02	0.14	0.05	69
	Cherry Pt	1.33	2.59	0.06	0.39	0.13	189	0.00	0.01	0.00	0.00	0.00	1
	JAX	18.24	35.40	0.81	5.39	1.72	2,578	0.05	0.09	0.00	0.01	0.00	7
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	6.38	12.38	0.28	1.88	0.60	901	0.02	0.03	0.00	0.01	0.00	2
	Outside RCs	46.13	89.52	2.06	13.63	4.35	6,518	0.12	0.24	0.01	0.04	0.01	17
MV	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.77	VACAPES	0.62	12.05	0.34	1.10	0.20	484	0.01	0.15	0.00	0.06	0.02	32
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	2.71	53.17	1.48	4.73	0.85	2,076	0.02	0.34	0.01	0.14	0.04	72
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	1.19	23.37	0.65	2.08	0.37	912	0.01	0.15	0.00	0.06	0.02	32
SSGN	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.77	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

		Alternative 1						Alternative 1					
Vessel Type	OPAREA	Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons					
P4/P3 Factor		CO	NOx	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
SSN	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.77	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
T-AH	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
1.00	VACAPES	0.27	2.01	0.13	1.40	0.39	693	0.01	0.04	0.00	0.03	0.01	14
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.03	0.21	0.01	0.15	0.04	72	0.00	0.00	0.00	0.00	0.00	1
T-AKE	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
1.31	VACAPES	10.24	299.72	29.54	36.45	4.62	17,097	0.10	1.70	0.24	0.22	0.02	106
	Cherry Pt	2.24	65.73	6.47	7.99	1.01	3,749	0.01	0.19	0.03	0.02	0.00	12
	JAX	2.67	78.44	7.72	9.54	1.21	4,473	0.01	0.22	0.03	0.03	0.00	14
	Key West	0.13	3.77	0.37	0.46	0.06	215	0.00	0.01	0.00	0.00	0.00	1
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	6.04	177.14	17.44	21.54	2.73	10,102	0.03	0.51	0.07	0.07	0.01	31
T-AO	Northeast	0.22	3.01	0.10	0.20	0.02	88	0.00	0.02	0.00	0.00	0.00	1
0.93	VACAPES	49.01	679.27	22.16	45.02	3.99	19,884	0.67	10.11	0.34	0.73	0.06	291
	Cherry Pt	26.48	366.84	11.97	24.29	2.15	10,740	0.18	2.75	0.09	0.20	0.02	79
	JAX	23.03	319.07	10.41	21.13	1.87	9,341	0.16	2.39	0.08	0.17	0.02	69
	Key West	3.35	46.44	1.52	3.08	0.27	1,360	0.02	0.35	0.01	0.03	0.00	10
	GOMEX	0.68	9.35	0.31	0.62	0.05	274	0.00	0.07	0.00	0.01	0.00	2
	Outside RCs	35.62	493.47	16.10	32.68	2.89	14,447	0.25	3.70	0.12	0.27	0.02	106

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type	OPAREA	Alternative 1						Alternative 1					
		Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons					
		CO	NO _x	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
T-AOE	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
2.63	VACAPES	95.58	277.08	9.27	75.20	7.41	7,246	0.61	7.71	0.10	2.32	0.21	1,410
	Cherry Pt	40.98	117.51	3.97	31.84	3.14	2,813	0.13	1.66	0.02	0.50	0.05	303
	JAX	11.00	31.56	1.07	8.55	0.84	755	0.04	0.44	0.01	0.13	0.01	81
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
T-ARS	Northeast	0.00	0.04	0.00	0.01	0.00	4	0.00	0.00	0.00	0.00	0.00	0
0.65	VACAPES	0.59	5.95	0.23	1.25	0.16	630	0.01	0.14	0.00	0.03	0.00	14
	Cherry Pt	0.28	2.84	0.11	0.60	0.08	301	0.00	0.03	0.00	0.01	0.00	3
	JAX	0.15	1.50	0.06	0.32	0.04	159	0.00	0.02	0.00	0.00	0.00	2
	Key West	0.52	5.29	0.21	1.11	0.15	560	0.01	0.06	0.00	0.01	0.00	6
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.80	8.03	0.31	1.69	0.22	850	0.01	0.09	0.00	0.02	0.00	10
T-ATF	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.23	VACAPES	1.13	6.49	0.13	0.49	0.06	224	0.02	0.17	0.00	0.01	0.00	6
	Cherry Pt	0.32	1.80	0.04	0.13	0.02	62	0.00	0.02	0.00	0.00	0.00	1
	JAX	0.44	2.48	0.05	0.19	0.02	85	0.00	0.03	0.00	0.00	0.00	1
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.12	0.69	0.01	0.05	0.01	24	0.00	0.01	0.00	0.00	0.00	0

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type	P4/P3 Factor	OPAREA	Alternative 2						Alternative 2					
			Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons					
			CO	NO _x	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
CVN		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
1.18		VACAPES	1.26	17.09	0.32	1.42	0.12	698	0.00	0.03	0.00	0.00	0.00	1
		Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		JAX	0.75	10.20	0.19	0.85	0.07	417	0.00	0.01	0.00	0.00	0.00	0
		Key West	0.07	0.95	0.02	0.08	0.01	39	0.00	0.00	0.00	0.00	0.00	0
		GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Outside RCs	0.58	7.83	0.14	0.65	0.06	320	0.00	0.01	0.00	0.00	0.00	0
CG		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.86		VACAPES	107.61	147.87	7.58	98.30	4.25	44,363	0.96	9.90	0.09	3.81	0.35	2,422
		Cherry Pt	14.67	19.57	1.03	13.20	0.56	5,908	0.07	0.68	0.01	0.26	0.02	166
		JAX	89.91	119.95	6.32	80.90	3.42	36,217	0.40	4.15	0.04	1.60	0.15	1,016
		Key West	3.19	4.25	0.22	2.87	0.12	1,284	0.01	0.15	0.00	0.06	0.01	36
		GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Outside RCs	45.27	60.40	3.18	40.74	1.72	18,237	0.20	2.09	0.02	0.81	0.07	512
DDG -1000		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.81		VACAPES	226.46	1,054.20	12.90	397.77	38.43	247,496	6.02	8.54	0.38	3.94	0.53	3,170
		Cherry Pt	18.79	88.27	1.07	33.28	3.21	20,674	0.25	0.36	0.02	0.17	0.02	133
		JAX	74.15	348.43	4.22	131.35	12.66	81,608	1.00	1.42	0.06	0.65	0.09	526
		Key West	1.32	6.19	0.07	2.34	0.23	1,451	0.02	0.03	0.00	0.01	0.00	9
		GOMEX	5.60	26.33	0.32	9.92	0.96	6,166	0.08	0.11	0.00	0.05	0.01	40
		Outside RCs	40.87	192.02	2.32	72.39	6.98	44,975	0.55	0.78	0.03	0.36	0.05	290
LCS		Northeast	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.00	0
0.70		VACAPES	54.12	215.26	3.76	56.81	7.73	29,183	1.79	3.46	0.14	0.53	0.17	252
		Cherry Pt	11.43	45.87	0.79	12.15	1.64	6,242	0.19	0.37	0.01	0.06	0.02	27
		JAX	147.83	593.13	10.24	157.07	21.24	80,714	2.49	4.81	0.19	0.73	0.23	350
		Key West	1.97	7.91	0.14	2.09	0.28	1,076	0.03	0.06	0.00	0.01	0.00	5
		GOMEX	1.97	7.91	0.14	2.09	0.28	1,076	0.03	0.06	0.00	0.01	0.00	5
		Outside RCs	141.13	566.24	9.78	149.95	20.28	77,055	2.38	4.59	0.18	0.70	0.22	334
LSD		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type P4/P3 Factor	OPAREA	Alternative 2 Annual Emissions in Tons						Alternative 2 Restricted Waters Only Annual Emissions in Tons					
		CO	NO _x	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
1.29	VACAPES	34.13	536.53	17.41	39.49	3.43	25,831	1.24	18.71	0.63	1.41	0.07	654
	Cherry Pt	11.73	184.51	5.98	13.57	1.19	8,926	0.22	3.27	0.11	0.25	0.01	114
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	15.75	247.77	8.04	18.23	1.59	11,987	0.29	4.40	0.15	0.33	0.02	154
LHA	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.33	VACAPES	0.02	0.75	0.04	0.18	0.02	97	0.00	0.01	0.00	0.00	0.00	2
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.09	0.00	0.02	0.00	12	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.03	1.03	0.05	0.25	0.03	134	0.00	0.01	0.00	0.00	0.00	1
LHD	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
1.68	VACAPES	16.10	95.10	11.48	190.73	56.82	95,004	0.30	1.57	0.20	4.72	0.95	1,857
	Cherry Pt	7.24	42.78	5.16	85.45	25.56	42,673	0.07	0.36	0.05	1.07	0.21	421
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	6.58	38.89	4.69	77.68	23.23	38,794	0.06	0.32	0.04	0.97	0.20	383
LPD	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
1.41	VACAPES	72.94	629.29	38.90	86.61	7.59	38,697	1.27	11.96	0.68	1.50	0.13	681
	Cherry Pt	19.96	172.11	10.65	23.71	2.08	10,591	0.18	1.65	0.09	0.21	0.02	94
	JAX	1.08	9.30	0.58	1.28	0.11	572	0.01	0.09	0.01	0.01	0.00	5
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	3.78	32.56	2.01	4.49	0.39	2,004	0.03	0.31	0.02	0.04	0.00	18
	Outside RCs	40.47	348.87	21.59	48.06	4.21	21,468	0.36	3.35	0.19	0.42	0.04	191
PC	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.10	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type	P4/P3 Factor	OPAREA	Alternative 2						Alternative 2					
			Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons					
			CO	NO _x	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
		Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
JHSV		Northeast	1.63	3.17	0.07	0.48	0.15	231	0.00	0.01	0.00	0.00	0.00	1
	0.77	VACAPES	3.38	6.56	0.15	1.00	0.32	477	0.02	0.04	0.00	0.01	0.00	3
		Cherry Pt	0.15	0.29	0.01	0.04	0.01	21	0.00	0.00	0.00	0.00	0.00	0
		JAX	1.25	2.44	0.06	0.37	0.12	177	0.00	0.01	0.00	0.00	0.00	0
		Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		GOMEX	1.33	2.59	0.06	0.39	0.13	189	0.00	0.01	0.00	0.00	0.00	1
		Outside RCs	6.67	12.94	0.30	1.97	0.63	942	0.02	0.03	0.00	0.01	0.00	3
MV		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	0.77	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Key West	5.97	116.92	3.26	10.39	1.87	4,564	0.04	0.75	0.02	0.32	0.10	158
		GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Outside RCs	0.83	16.17	0.45	1.44	0.26	631	0.01	0.10	0.00	0.04	0.01	22
SSGN		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	0.77	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
SSN		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	0.77	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type	P4/P3 Factor	OPAREA	Alternative 2						Alternative 2					
			Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons					
			CO	NO _x	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
		JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Outside RCs	0.00	0.01	0.00	0.00	0.00	1	0.00	0.01	0.00	0.00	0.00	1
T-AH		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	1.00	VACAPES	0.50	3.81	0.25	2.65	0.74	1,314	0.01	0.07	0.00	0.05	0.01	26
		Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Outside RCs	0.17	1.26	0.08	0.88	0.25	434	0.00	0.01	0.00	0.01	0.00	4
T-AKE		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	1.31	VACAPES	4.08	119.49	11.78	14.53	1.84	6,816	0.04	0.68	0.09	0.09	0.01	42
		Cherry Pt	0.97	28.60	2.82	3.48	0.44	1,631	0.01	0.08	0.01	0.01	0.00	5
		JAX	1.30	38.13	3.75	4.64	0.59	2,174	0.01	0.11	0.02	0.01	0.00	7
		Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
		Outside RCs	26.31	772.10	76.02	93.88	11.92	44,031	0.14	2.20	0.31	0.29	0.03	137
T-AO		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.02	0.00	0.00	0.00	1
	0.93	VACAPES	56.54	783.62	25.57	51.93	4.60	22,939	0.67	10.11	0.34	0.73	0.06	291
		Cherry Pt	15.05	208.48	6.80	13.81	1.22	6,104	0.18	2.75	0.09	0.20	0.02	79
		JAX	25.47	352.81	11.51	23.36	2.07	10,329	0.16	2.39	0.08	0.17	0.02	69
		Key West	0.00	0.00	0.00	0.00	0.00	0	0.02	0.35	0.01	0.03	0.00	10
		GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.07	0.00	0.01	0.00	2
		Outside RCs	137.19	1,900.37	62.00	125.85	11.15	55,636	0.25	3.70	0.12	0.27	0.02	106
T-AOE		Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	2.63	VACAPES	338.16	980.31	32.81	266.06	26.22	25,636	2.15	27.26	0.36	8.21	0.75	4,989
		Cherry Pt	90.35	259.11	8.75	70.22	6.93	6,203	0.29	3.65	0.05	1.10	0.10	669
		JAX	38.23	109.62	3.70	29.71	2.93	2,624	0.12	1.55	0.02	0.47	0.04	283

Table H-37: Vessel Steaming Hours by State vs Open Waters and OPAREA and Emissions - Phase IV Estimates (continued)

Vessel Type P4/P3 Factor	OPAREA	Alternative 2						Alternative 2					
		Annual Emissions in Tons						Restricted Waters Only Annual Emissions in Tons					
		CO	NO _x	HC	SO _x	PM ₁₀	CO ₂	CO	NO _x	HC	SO _x	PM ₁₀	CO ₂
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
T-ARS	Northeast	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
0.65	VACAPES	0.76	7.72	0.30	1.62	0.21	817	0.02	0.18	0.00	0.04	0.00	19
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.10	1.02	0.04	0.21	0.03	108	0.00	0.01	0.00	0.00	0.00	1
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	2.93	29.49	1.16	6.20	0.81	3,122	0.03	0.34	0.01	0.07	0.01	36
T-ATF	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
0.23	VACAPES	1.75	10.05	0.20	0.75	0.09	346	0.03	0.26	0.00	0.02	0.00	9
	Cherry Pt	0.05	0.29	0.01	0.02	0.00	10	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0

Table H-38: Boat Annual Hours of Operation within State Waters Areas - Phase IV

Vessel Type	Total Annual Hours								
	NE RC and Narragansett Bay	VACAPES	Ches Bay + Trib	Charleston	JAX / St Johns/ Mayport	Cape Canaveral/ SE FL	St. Andrews Bay/Panama City	Key West	GOMEX/ Corpus Christie
RCB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	3,243	-	14,072	-	-	2,676	-	-	-
RAB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	4,603	-	17,486	-	-	2,676	-	-	-
RPB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	4,603	-	23,752	-	22	2,676	-	-	-
SEA ARK - 34 FT Patrol Boat (Dauntless Class)	11,067	-	18,917	15,814	283	2,676	-	-	-
LCAC	-	1,694	5,702	-	-	-	-	-	-
LCU/LCM	-	1,080	2,589	-	-	-	-	-	-
RIB (Zodiac)	403	2,393	10,369	-	272	-	75	-	-
Mark V/Mark VI (No Longer in Active Service) use 40 FT PB - Defiant Class EF)	-	660	2,987	-	-	200	-	75	-
CRRC	-	151	2,111	-	200	-	75	-	-
T-ATF	-	89	174	-	-	-	-	-	-
T-ARS	-	89	174	-	7	-	-	-	-
HSMST	-	-	55	-	-	-	-	-	-

Table H-39: Boat Annual Emissions within State Waters of NE OPAREA and Narragansett Bay, RI - Phase IV

Vessel Type	VOC	CO	NO _x	SO _x	PM ₁₀ /PM _{2.5}	CO ₂
RCB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	0.38	14.67	16.32	0.02	0.01	2,098
RAB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	0.54	20.82	23.25	0.03	0.01	2,978
RPB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	0.54	20.82	23.25	0.03	0.01	2,978
SEA ARK - 34 FT Patrol Boat (Dauntless Class)	3.10	7.69	74.92	11.18	1.83	4,088
LCAC (SSGTG/MPGT)(80/3955)	-	-	-	-	-	-
LCU/LCM	-	-	-	-	-	-
RIB (Zodiac)	0.01	0.07	1.84	0.29	0.03	235
Mark V/Mark VI (No Longer in Active Service) use 40 FT PB - Defiant Class EF)	-	-	-	-	-	-
CRRC	-	-	-	-	-	-
T-ATF	-	-	-	-	-	-
T-ARS	-	-	-	-	-	-
HSMST	-	-	-	-	-	-
Total Emissions in Tons	4.56	64.07	139.58	11.54	1.89	12,377

Table H-40: Boat Annual Emissions within State Waters of VACAPES OPAREA - Phase IV

<i>Vessel Type</i>	<i>VOC</i>	<i>CO</i>	<i>NO_x</i>	<i>SO_x</i>	<i>PM₁₀/PM_{2.5}</i>	<i>CO₂</i>
RCB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	-	-	-	-	-	-
RAB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	-	-	-	-	-	-
RPB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	-	-	-	-	-	-
SEA ARK - 34 FT Patrol Boat (Dauntless Class)	-	-	-	-	-	-
LCAC	4.56	23.93	149.63	0.21	3.04	27,033
LCU/LCM	0.28	19.55	24.27	1.68	0.85	909
RIB (Zodiac)	0.07	0.41	10.94	1.72	0.18	1,393
Mark V/Mark VI (No Longer in Active Service) use 40 FT PB - Defiant Class EF)	0.08	2.99	3.32	0.00	0.00	427
CRRC	0.00	0.02	0.07	0.00	0.00	7
T-ATF	0.09	0.82	4.66	0.35	0.04	160
T-ARS	0.06	0.14	1.44	0.30	0.04	152
HSMST	-	-	-	-	-	-
Total Emissions in Tons	5.14	47.86	194.32	4.27	4.15	30,081

Table H-41: Boat Annual Emissions within State Waters of Chesapeake Bay & Tributaries - Phase IV

<i>Vessel Type</i>	<i>VOC</i>	<i>CO</i>	<i>NO_x</i>	<i>SO_x</i>	<i>PM₁₀/PM_{2.5}</i>	<i>CO₂</i>
RCB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	1.64	63.65	70.81	0.08	0.04	9,104
RAB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	2.04	79.09	88.31	0.10	0.04	11,313
RPB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	2.77	107.43	119.95	0.13	0.06	15,366
SEA ARK - 34 FT Patrol Boat (Dauntless Class)	5.30	13.15	128.07	19.11	3.12	6,988
LCAC	15.34	80.56	503.64	0.72	10.24	90,994
LCU/LCM	0.67	46.87	58.19	4.03	2.03	2,180
RIB (Zodiac)	0.31	1.76	47.39	7.47	0.78	6,034
Mark V/Mark VI (No Longer in Active Service) use 40 FT PB - Defiant Class EF)	0.35	13.51	15.03	0.02	0.01	1,932
CRRC	0.01	0.24	1.01	0.00	0.03	92
T-ATF	0.18	1.60	9.09	0.68	0.08	313
T-ARS	0.11	0.28	2.81	0.59	0.08	297
HSMST	0.03	1.00	0.03	0.00	0.00	18
Total Emissions in Tons	28.75	409.14	1,044.31	32.91	16.50	144,631

**Table H-42: Boat Annual Emissions within State Waters of the Charleston
OPAREA – Phase IV**

Vessel Type	VOC	CO	NO _x	SO _x	PM10/PM2.5	CO ₂
RCB	-	-	-	-	-	-
RAB	-	-	-	-	-	-
RPB	-	-	-	-	-	-
SEA ARK	4.43	10.99	107.06	15.97	2.61	5,841
LCAC	-	-	-	-	-	-
LCU/LCM	-	-	-	-	-	-
RIB (Zodiac)	-	-	-	-	-	-
Mark V	-	-	-	-	-	-
CRRC	-	-	-	-	-	-
BW	-	-	-	-	-	-
T-ATF	-	-	-	-	-	-
T-ARS	-	-	-	-	-	-
HSMST	-	-	-	-	-	-
Total Emissions in Tons	4.43	10.99	107.06	15.97	2.61	5,841

**Table H-43: Boat Annual Emissions within State Waters of the Jacksonville OPAREA and
St John/Mayport- Phase IV**

Vessel Type	VOC	CO	NO _x	SO _x	PM ₁₀ / PM _{2.5}	CO ₂
RCB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	-	-	-	-	-	-
RAB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	-	-	-	-	-	-
RPB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	0.00	0.10	0.11	0.00	0.00	14.40
SEA ARK - 34 FT Patrol Boat (Dauntless Class)	0.08	0.20	1.92	0.29	0.05	105
LCAC	-	-	-	-	-	-
LCU/LCM	-	-	-	-	-	-
RIB (Zodiac)	0.01	0.05	1.24	0.20	0.02	158
Mark V/Mark VI (No Longer in Active Service) use 40 FT PB - Defiant Class EF)	-	-	-	-	-	-
CRRC	0.00	0.02	0.10	0.00	0.00	9
T-ATF	-	-	-	-	-	-
T-ARS	-	-	-	-	-	-
HSMST	-	-	-	-	-	-
Total Emissions in Tons	0.09	0.37	3.37	0.48	0.07	286

Table H-44: Boat Annual Emissions within State Waters of the Cape Canaveral OPAREA - Phase IV

<i>Vessel Type</i>	<i>VOC</i>	<i>CO</i>	<i>NO_x</i>	<i>SO_x</i>	<i>PM₁₀/PM_{2.5}</i>	<i>CO₂</i>
RCB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	0.31	12.10	13.47	0.01	0.01	1,731
RAB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	0.31	12.10	13.51	0.01	0.01	1,731
RPB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	0.31	12.10	13.51	0.01	0.01	1,731
SEA ARK - 34 FT Patrol Boat (Dauntless Class)	0.75	1.86	18.12	2.70	0.44	988
LCAC	-	-	-	-	-	-
LCU/LCM	-	-	-	-	-	-
RIB (Zodiac)	-	-	-	-	-	-
Mark V/Mark VI (No Longer in Active Service) use 40 FT PB - Defiant Class EF)	-	-	-	-	-	-
CRRC	-	-	-	-	-	-
T-ATF	-	-	-	-	-	-
T-ARS	-	-	-	-	-	-
HSMST	-	-	-	-	-	-
Total Emissions in Tons	1.68	38.17	58.61	2.75	0.46	6,182

Table H-45: Boat Annual Emissions within State Waters of the Panama City OPAREA St. Andrews Bay - Phase IV

<i>Vessel Type</i>	<i>VOC</i>	<i>CO</i>	<i>NO_x</i>	<i>SO_x</i>	<i>PM₁₀/PM_{2.5}</i>	<i>CO₂</i>
RCB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	-	-	-	-	-	-
RAB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	-	-	-	-	-	-
RPB (Replaced w/ 40 FT Patrol Boat - Defiant Class)	-	-	-	-	-	-
SEA ARK - 34 FT Patrol Boat (Dauntless Class)	-	-	-	-	-	-
LCAC	-	-	-	-	-	-
LCU/LCM	-	-	-	-	-	-
RIB (Zodiac)	0.00	0.01	0.34	0.05	0.01	44
Mark V/Mark VI (No Longer in Active Service) use 40 FT PB - Defiant Class EF)	-	-	-	-	-	-
CRRC	0.00	0.01	0.04	0.00	0.00	3
BW	-	-	-	-	-	-
T-ATF	-	-	-	-	-	-
T-ARS	-	-	-	-	-	-
HSMST	-	-	-	-	-	-
Total Emissions in Tons	0.00	0.02	0.38	0.05	0.01	47

Table H-46: Inland Waters Training Events and Locations - Boat Annual Hours - Phase IV

Amphibious Vehicle Maneuvers								
LCB	VA	2,589	LCU	1426	141	256	1.82	2,589
LCB	VA	14,548	LCAC	8013	141	256	1.82	14,548
LCB	VA	6,155	RHIB	3390	141	256	1.82	6,155
VACAPES		1,080	LCU	1080	46	46	1.00	1,080
VACAPES		3,278	LCAC	3278	46	46	1.00	3,278
VACAPES		228	RHIB	228	46	46	1.00	228
Dive and Salvage								
LCB	VA	780	RHIB	780	130	130	1.00	780
LCB	VA	780	CRRC	780	130	130	1.00	780
LCB	VA	780	40FTPB	780	130	130	1.00	780
JR & Tributaries	VA	30	RHIB	30	15	15	1.00	30
JR & Tributaries	VA	15	40FTPB	15	15	15	1.00	15
JAX RC - NS Mayport	FL	160	RHIB	160	1	1	1.00	160
JAX RC - NS Mayport	FL	160	40FTPB	160	1	1	1.00	160
JAX RC - NS Mayport	FL	160	CRRC	160	1	1	1.00	160
Personnel Insertion/Extraction - Air								
LCB	VA	358	CRRC	358	54	54	1.00	358
LCB	VA	701	RHIB	701	54	54	1.00	701
JR & Tributaries	VA	595	RHIB	595	46	46	1.00	595
JR & Tributaries	VA	595	CRRC	595	46	46	1.00	595
YR	VA	44	RHIB	44	4	4	1.00	44
YR	VA	12	CRRC	12	4	4	1.00	12
VA CAPES	VA	220	RHIB	220	74	74	1.00	220
VA CAPES	VA	108	CRRC	108	74	74	1.00	108
JAX RC - NS Mayport	FL	40	RHIB	40	10	10	1.00	40
JAX RC - NS Mayport	FL	40	CRRC	40	10	10	1.00	40
JAX RC - NS Mayport	FL	40	40FTPB	40	10	10	1.00	40
Panama City OPAREA - St Andrews Bay	FL	75	RHIB	75	50	50	1.00	75
Panama City OPAREA - St Andrews Bay	FL	75	40FTPB	75	50	50	1.00	75
Panama City OPAREA - St Andrews Bay	FL	75	CRRC	75	50	50	1.00	75
JAX RC- St Johns River	FL	-	RHIB	131				
JAX RC- St Johns River	FL	-	LCAC	750				
Personnel Insertion/Extraction - Surface and Subsurface								
NE RC Inshore		403	RHIB			48		
NE RC Inshore		2987	40FTPB			48		
NE RC Inshore		2987	40FTPB			48		
NE RC Inshore		1627	40FTPB			48		
NE RC Inshore		1224	SEA ARK			48		
LCB	VA	112	CRRC	112	144	144	1.00	112
LCB	VA	168	RHIB	168	144	144	1.00	168
LCB	VA	3,198	40FTPB	3,198	144	144	1.00	3,198
LCB	VA	11,178	40FTPB	11,178	144	144	1.00	11,178
LCB	VA	3,198	SEA ARK	3,198	144	144	1.00	3,198

**Table H-46: Inland Waters Training Events and Locations - Boat Annual Hours - Phase IV
(continued)**

LCB	VA	3,198	40FTPB	3,198	144	144	1.00	3,198
LCB	VA							
JR & Tributaries	VA	504	RHIB	504	60	60	1.00	504
JR & Tributaries	VA	3,734	40FTPB	3734	60	60	1.00	3,734
JR & Tributaries	VA	3,734	40FTPB	3734	60	60	1.00	3,734
JR & Tributaries	VA	2,034	40FTPB	2034	60	60	1.00	2,034
JR & Tributaries	VA	1,530	SEA ARK	1530	60	60	1.00	1,530
YR	VA	1,960	RPB	1960	12	12	1.00	1,960
YR	VA	1,960	40FTPB	1960	12	12	1.00	1,960
YR	VA	1,960	40FTPB	1960	12	12	1.00	1,960
YR	VA	1,960	SEA ARK	1960	12	12	1.00	1,960
U/W Mine Countermeasure								
LCB	VA	422	RHIB	1,647	296	75.9	0.26	422
LCB	VA	422	40FTPB	1,647	296	75.9	0.26	422
LCB	VA	422	40FTPB	1,647	296	75.9	0.26	422
LCB	VA	129	T-ATF	505	296	75.9	0.26	129
LCB	VA	129	T-ARS	505	296	75.9	0.26	129
JR & Tributaries	VA	140	RHIB	545	75	19.2	0.26	140
JR & Tributaries	VA	140	40FTPB	545	75	19.2	0.26	140
YR	VA	45	T-ATF	175	19	4.9	0.26	45
YR	VA	45	T-ARS	175	19	4.9	0.26	45
YR	VA	40	RHIB	156	19	4.9	0.26	40
VA CAPEs	VA	89	T-ATF	250	56	20	0.36	89
VA CAPEs	VA	89	T-ARS	250	56	20	0.36	89
VA CAPEs	VA	264	RHIB	740	56	20	0.36	264
VA CAPEs	VA	236	40FTPB	660	56	20	0.36	236
VA CAPEs	VA	43	CRRC	120	56	20	0.36	43
JAX RC Inshore		22	RHIB			4		
JAX RC Inshore		22	40FTPB			4		
JAX RC Inshore		22	40FTPB			4		
JAX RC Inshore		7	T-ATF			4		
JAX RC Inshore		7	T-ARS			4		
Maritime Security Operations								
LCB	VA	542	RHIB	351	38	58.7	1.55	542
LCB	VA	3,635	40FTPB	2352	38	58.7	1.55	3,635
LCB	VA	7,270	SEA ARK	4704	38	58.7	1.55	7,270
LCB	VA	55	HSMST	35.75	38	58.7	1.55	55
NSN	VA		RHIB	216				
NSN	VA		HSMST	28.75				
NSN	VA							
JR & Tributaries	VA	12,240	SEA ARK	7,920	204	315.3	1.55	12,240
VA CAPEs	VA	94	RHIB	162	27	16	0.58	94
NS Mayport	FL	50	RHIB	50	25	25	1.00	50
Narragansett Bay	RI	1,616	40FTPB	1616	1	1	1.00	1,616
Narragansett Bay	RI	1,616	40FTPB	1616	1	1	1.00	1,616
Narragansett Bay	RI	1,616	40FTPB	1616	1	1	1.00	1,616

**Table H-46: Inland Waters Training Events and Locations - Boat Annual Hours - Phase IV
(continued)**

Narragansett Bay	RI	1,616	SEA ARK	1616	1	1	1.00	1,616
Port Canaveral	FL	2,676	40FTPB	2676	20	20	1.00	2,676
Port Canaveral	FL	2,676	40FTPB	2676	20	20	1.00	2,676
Port Canaveral	FL	2,676	40FTPB	2676	20	20	1.00	2,676
Port Canaveral	FL	2,676	SEA ARK	2676	20	20	1.00	2,676
Precision Anchoring								
JR & Tributaries	VA	150	RHIB	150	25	25	1.00	150
Search and Rescue								
JR & Tributaries	VA	25	RHIB	25	760	760	1.00	25
VA CAPES	VA	1,587	RHIB	1560	588	598	1.02	1,587
NS Mayport	FL	28	RHIB	28	1	1	1.00	28
Waterborne Training								
JR & Tributaries	VA	2,880	40FTPB	2880	60	60.0	1.00	2,880
JR & Tributaries	VA	2,880	40FTPB	2880	60	60.0	1.00	2,880
JR & Tributaries	VA	2,880	40FTPB	2880	60	60.0	1.00	2,880
JR & Tributaries	VA	2,880	SEA ARK	2880	60	60.0	1.00	2,880
LCB	VA	74	RHIB	74	92	92.0	1.00	74
LCB	VA	266	CRRC	266	92	92.0	1.00	266
LCB	VA	3,040	40FTPB	3040	92	92.0	1.00	3,040
LCB	VA	1,120	40FTPB	1120	92	92.0	1.00	1,120
LCB	VA	1,120	40FTPB	1120	92	92.0	1.00	1,120
LCB	VA	1,120	SEA ARK	1120	92	92.0	1.00	1,120
YR		960	40FTPB	960	30	30.0	1.00	960
YR		960	40FTPB	960	30	30.0	1.00	960
YR		2,880	40FTPB	2880	30	30.0	1.00	2,880
YR		960	SEA ARK	960	30	30.0	1.00	960
NS Mayport	FL	283	SEA ARK	225	27	34	1.26	283
Narragansett Bay	RI	8,227	SEA ARK	6270	141	185	1.31	8,227
Cooper River	SC	15,814	SEA ARK	12651	28	35	1.25	15,814

Table H-47: Vessel and Boat Engine Specifics and Emission Factors

Ship/Boat Type	Acronym	Emissions Factors (lb/hr) ¹ Propulsion Engines + Generators						Engine model ¹	# ¹ Engines	Use ¹
		HC	CO	NOx	SO _x	PM _{10/2.5}	CO ₂			
Nuclear Aircraft Carrier - Nimitz Class	CVN-1	0.3	1.2	16.7	1.4	0.1	684	16-645E5	4	Emergency Diesel Generator
	CVN-R	0.0	0.1	1.7	0.1	0.0	68			
Guided Missile Cruiser - Ticonderoga	CG-68	4.3	61.5	79.6	54.5	2.3	24,191	501-K17 LM2500	3 4	Ship Service Gas Turbine Generator Gas Turbines
	CG-R	2.5	27.7	285.5	110.0	10.0	69,839			
Guided Missile Destroyer - Arleigh Burke Class	DDG-51	4.0	59.7	114.5	62.2	3.0	27,565	501-K34	3	Ship Service Gas Turbine Generator
	DDG-51R	2.4	30.6	374.8	134.5	12.3	85,141	LM2500	4	Gas Turbines
Guided Missile Destroyer - Zumwalt Class	DDG-1000	1.9	33.5	158.7	59.8	5.8	37,074	C-18 MT-5 MT-30	2 2 2	Emergency Diesel Generator Auxiliary Turbine Generator Main Turbine Generator
	DDG-1000R	2.9	45.7	64.8	29.9	4.1	24,051			
Littoral Combat Ship	LCS-1	3.2	46.1	186.8	49.6	6.7	25,512	16PA6B-STC MT-30 V1708	2 2 4	Main Propulsion Diesel Engine Main Turbine Generator Ship Service Diesel Generator
	LCS-1R	6.1	79.1	152.6	23.3	7.4	11,116			
Torpedo Retrieval Boats Replaced by Dock Landing Ship	LSD 44	10.8	21.3	334.5	24.6	2.2	16,264	38D8-1/8 PC2.5V	4 4	Ship Service Diesel Generator Main Propulsion Diesel Engine
	LSD 44R	20.4	40.0	604.3	45.4	2.2	21,126			
Amphibious Assault Ship - America Class	LHA-6	14.5	8.4	277.9	66.9	8.4	35,922	12PA6B LM2500+	6 2	Ship Service Diesel Generator Main Turbine Generator
	LHA-6R	15.2	18.7	200.0	48.0	5.8	28,059			
Amphibious Assault Ship - Wasp	LHD-5	5.8	8.1	47.8	95.1	28.6	47,633	Boiler 16-251C	2	Emergency Diesel Generator
	LHD-5R	5.1	7.7	40.1	120.7	24.2	47,490			
Landing Transport Dock - San Antonio Class	LPD-19	16.9	31.6	272.3	37.5	3.3	16,767	3608 (Tier I) PC2.5STC	5 4	Ship Service Diesel Generator Main Propulsion Diesel Engine
	LPD-19R	15.0	28.1	263.8	33.0	2.8	15,026			
Patrol Coastal	PC-14	6.0	337.4	74.2	16.4	2.2	7,677	16RP200M 3306B	4 2	Main Propulsion Diesel Engine Ship Service Diesel Generator
	PC-14R	7.2	43.2	78.4	17.5	2.4	8,054			

Table H-47: Vessel and Boat Engine Specifics and Emission Factors (continued)

Ship/Boat Type	Acronym	Emissions Factors (lb/hr) ¹ Propulsion Engines + Generators						Engine model ¹	# ¹ Engines	Use ¹
		HC	CO	NOx	SO _x	PM _{10/2.5}	CO ₂			
Joint High-Speed Vessel (JHSV) or Expeditionary Fast Transport (EPF)	JHSV-1	17.1	384.3	745.6	113.5	36.2	54,288	20V8000M71L 3406	4 4	Main Propulsion Diesel Engine Ship Service Diesel Generator
	JHSV-1R	4.7	100.8	200.6	30.3	9.8	14,531			
Amphibious Combat Command (LCC)	LCC 20	2.2	3.0	19.1	36.5	11.0	18,271	Boiler 38D8-1/8	2	Emergency Diesel Generator
	LCC 20R	2.2	3.0	17.4	36.4	11.0	18,217			
MV Deloros Chouest	MV DC	3.7	6.8	133.7	11.6	2.0	5,073	3306 3608TA	2 2	Ship Service Diesel Generator Main Propulsion Diesel Engine
	MV DCR	2.6	5.0	86.9	36.4	11.0	18,217			
SSGN	SSGN-728	0.07	0.11	4.05	0.23	0.02	132.35	38D8-1/8	1	Emergency Diesel Generator
	SSGN-728R	0.01	0.01	0.40	0.02	-	12.98			
SSN	SSN-774	0.1	0.1	0.9	0.2	0.0	81	3512B (Tier I)	1	Emergency Diesel Generator
	SSN-774R	-	0.0	0.1	0.0	-	8			
T-AH	AH-19	6.8	13.7	103.9	72.2	20.3	35,774	Boiler 12V 25/30 18V 20/27 3508	1 3 1	Ship Service Diesel Generator Auxiliary Diesel Generator Emergency Diesel Generator
	AH-19R	6.8	13.7	101.6	71.9	20.1	35,663			
TAKE	T-AKE-5	29.7	10.3	302.3	36.8	4.7	17,236	3516B HD 8L 48/60 9L 48/60	1 2 2	Emergency Diesel Generator IPG IPG
	T-AKE-5R	12.0	5.3	86.5	11.2	1.0	5,368			
TAO	T-AO-189	23.3	51.5	713.1	47.2	4.2	20,880	16V-92TA 8163- 7305 18-251F PC4.2V	1 2 2	Emergency Diesel Generator Ship Service Diesel Generator Main Propulsion Diesel Engine
	T-AO-189R	18.0	35.9	538.7	39.1	3.5	15,482			
TAOE	T-AOE-8+B17	10.6	109.8	311.3	84.2	8.3	6,745	3608 LM2500	5 4	Ship Service Diesel Generator Main Propulsion Gas Turbine
	T-AOE-8R	5.9	35.1	445.2	134.1	12.2	81,478			
T-ARS	T-ARS-52	1.3	3.2	32.2	6.8	0.9	3,411	D399(M) D399(S)	4 3	Main Propulsion Diesel Engine Ship Service Diesel Generator
	T-ARS-52R	0.8	3.4	38.1	8.1	0.7	3,975			

Table H-47: Vessel and Boat Engine Specifics and Emission Factors (continued)

Ship/Boat Type	Acronym	Emissions Factors (lb/hr) ¹ Propulsion Engines + Generators						Engine model ¹	# ¹ Engines	Use ¹	
		HC	CO	NOx	SO _x	PM _{10/2.5}	CO ₂				
T-ATF	T-ATF-172	2.1	18.4	104.3	7.8	0.9	3,594	16V-71T 7163-7305 20-645E7	3 2	Ship Service Diesel Generator Main Propulsion Diesel Engine	
	T-ATF-172R	2.6	13.4	139.8	10.2	1.1	4,846				
Landing Craft Air Cushion	LCAC Total Upgrade version	5.4	28.3	176.7	0.3	3.6	31,916.4		4	6100 HP	
Missing Primary Propulsion Engines EF - MDPE 3955 HP (4) same factors for Phase III (omitted in Final) and Phase IV which used Phase II calcs here		0.3	1.2	2.9	0.0	0.2	668	T-62T-60-7	2	80 HP	
		3.488	18.321	114.535	0.164	2.328	20693.346	TF40B	4	3955 HP	
Landing Craft Utility	LCU/LCM	0.5	36.2	45.0	3.1	1.6	1,683.9	2- Detroit 12V-71 Diesel engines, twin shaft, 680 hp sustained, used for both LCU and LCM data			
Amphibious Assault Vehicle - ACV new-700 HP engine	AAV-2	0.8	0.8	6.2	1.3	0.3		Detroit Diesel 8V-53T (P-7), Cummins VT 400 903 (P-7A1)			
Mark V / Mk VI (No Longer in Service) - Replaced by 40 Ft Metal Shark PB Emissions Factors		0.2	9.0	10.1	0.0	0.0	1,294	Twin Cummins QSB 6.7 diesel inboards	3 engines	550 HP	
Rigid Inflatable Boat (zodiac)	RIB-4	0.1	0.3	9.1	1.4	0.2	1,164	Dual Caterpillar 3126 DITA, 6 in-line cylinder diesel, turbocharged, aftercooled.			
Combat Rubber Raiding Craft	CRRC	0.0	0.2	1.0	0.0	0.0	87	55	HP 2-stroke engine TIER 0 Engine		gas or diesel
High Speed Maneuverable Surface Target	HSMST	1.2	36.2	1.0	0.0	0.1	643.7	225	HP - 2 Mercury Optimax outboards		24.6 lb/hr fuel use
River Command Boat- Replaced by 40 Ft Metal Shark PB Emissions Factors		0.2	9.0	10.1	0.0	0.0	1,294	40 Defiant is powered by twin Cummins QSB 6.7 diesel inboards, 550 HP Tier 3 engines			

Table H-47: Vessel and Boat Engine Specifics and Emission Factors (continued)

Ship/Boat Type	Acronym	Emissions Factors (lb/hr) ¹ Propulsion Engines + Generators						Engine model ¹	# ¹ Engines	Use ¹	
		HC	CO	NOx	SO _x	PM _{10/2.5}	CO ₂				
River Assault Boat - Replaced by 40 Ft Metal Shark PB Emissions Factors		0.2	9.0	10.1	0.0	0.0	1,294	40 Defiant is powered by twin Cummins QSB 6.7 diesel inboards, 550 HP Tier 3 engines			
River Patrol Boat Replaced by 40 Ft Metal Shark PB Emissions Factors		0.2	9.0	10.1	0.0	0.0	1,294	40 Defiant is powered by twin Cummins QSB 6.7 diesel inboards, 550 HP Tier 3 engines			
Sea Ark (34 FT' PB)	PB	0.6	1.4	13.5	2.0	0.3	739	420	HP X 2	20.2	lb/hr fuel use
USCG Sentinel Cutter 154'								Propulsion 2 × 4,300 kW (5,800 shp) MTU diesel engines, 1 × 75 kW (101 shp) bow thruster			
USCG Medium Endurance Cutter 210' and 270'								Installed power 2 × Caterpillar V12 diesel generators - Propulsion 2 × turbo- charged ALCO V-18 diesel engines - 4,500 hp each			

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

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

Table H-48: Aircraft Engine Specifics and Emission Factors

H-53													
Flight Operation	Fuel used lb	Emissions in lbs/1,000 lbs fuel						Total Pounds/op					
		HC	CO	NO _x	SO ₂	PM ₁₀	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂
LTO Total:	2,448.44				2.22			0.94	8.39	27.26	5.44	0.22	7,718
Cruise:													
Hourly	4,464	0.15	2.13	8.08	2.22	2.21	3,221	0.46	9.22	93.87		0.68	15,243

H-60																	
¹ Flight Operation	Total Number of Operations	Engine Power Setting	# Engines	Time in Mode (min)	Fuel Flow per engine lb/hr	Fuel used lb	Emissions in lbs/1,000 lbs fuel						Total Pounds/op				
							HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}
Departure:																	
APU Use		On	1	30	102	51	9.04	42.77	3.94	2.22	0.22	3,154.46	0.46	2.18	0.20	0.11	0.01
Start/Warm Up		15% Torque	2	10	274	91	0.77	18.65	4.6	2.22	4.20	3,182.96	0.07	1.70	0.42	0.20	0.38

H-60																		
¹ Flight Operation	Total Number of Operations	Engine Power Setting	# Engines	Time in Mode (min)	Fuel Flow per engine lb/hr	Fuel used lb	Emissions in lbs/1,000 lbs fuel						Total Pounds/op					
							HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO _{2e}
Unstick		25% Torque	2	0.25	341	3	0.61	14.04	5.07	2.22	4.20	3,204.69	0.00	0.04	0.01	0.01	0.01	9
Taxi Out		20% Torque	2	5	308	51	0.66	16.01	4.85	2.22	4.20	3,196.08	0.03	0.82	0.25	0.11	0.22	164
Hover		80% Torque	2	2	707	47	0.55	4.61	6.9	2.22	4.20	3,220.14	0.03	0.22	0.33	0.10	0.20	152
Climbout		90% Torque	2	2	786	52	0.55	3.74	7.27	2.22	4.20	3,218.61	0.03	0.20	0.38	0.12	0.22	169
Total	1																	
Arrival:																		
APU Use		On	1	35	102	60	9.04	42.77	3.94	2.22	0.22	3154	0.54	2.54	0.23	0.13	0.01	188
Approach		50% Torque	2	5	501	84	0.55	8.34	5.93	2.22	4.20	3220	0.05	0.70	0.50	0.19	0.35	269
Unstick		25% Torque	2	0.25	341	3	0.61	14.04	5.07	2.22	4.20	3205	0.00	0.04	0.01	0.01	0.01	9
Taxi in/shut down		20% Torque	2	8	308	82	0.66	16.01	4.85	2.22	4.20	3196	0.05	1.31	0.40	0.18	0.34	263
Total	1																	
LTO Total:													1.45	9.76	2.73	1.16	1.76	1,673
Cruise:																		
Hourly	1	65% Torque	2	60	599.85	1199.7	0.55	6.25	6.40	2.22	4.20	3,221.36	0.76	7.50	7.68	2.66	5.04	3,865

E-2C																		
Type of Operation	Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	Emissions in lbs/1,000 lbs fuel						Total Pounds/op					
							HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO _{2e}
Departure																		
Start/Warm up		L/S G Idle	2	12.0	599	240	22.32	30.11	3.53	2.22	3.97	3149.25	5.35	7.21	0.85	0.53	0.95	755
Taxi Out		H/S G Idle	2	5.0	756	126	1.42	5.65	6.35	2.22	3.97	3182.25	0.18	0.71	0.80	0.28	0.50	401
Engine Run-up		62% SHP	2	0.5	1,600	27	0.25	1.12	9.47	2.22	3.97	3225.67	0.01	0.03	0.25	0.06	0.11	86
Takeoff		Military	2	0.5	2,219	37	0.16	0.65	10.45	2.22	3.97	3229.32	0.01	0.02	0.39	0.08	0.15	119
Climbout		Military	2	2.0	2,219	148	0.16	0.65	10.45	2.22	3.97	3229.32	0.02	0.10	1.55	0.33	0.59	478
Total Straight In Arrival	1																	
Approach		30% SHP	2	5.0	1100	183	0.49	2.16	8.06	2.22	3.97	3211.71	0.09	0.40	1.48	0.41	0.73	588.81
On runway		Flight Idle	2	1.0	836	28	1.10	4.54	6.52	2.22	3.97	3192.41	0.03	0.13	0.18	0.06	0.11	88.96
Taxi		H/S G Idle	1	3.0	756	38	1.42	5.65	6.35	2.22	3.97	3182.25	0.05	0.21	0.24	0.08	0.15	120.29
Shut down		L/S G Idle	1	1.0	599	10	22.32	30.11	3.53	2.22	3.97	3149.25	0.22	0.30	0.04	0.02	0.04	31.44

E-2C																		
Type of Operation	Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	Emissions in lbs/1,000 lbs fuel						Total Pounds/op					
							HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO _{2e}
Total	1																	
LTO Total													6.85	9.11	5.77	1.86	3.32	2,668
Cruise																		
Hourly	1	30% SHP	2	60.0	1137	2,274	0.49	2.16	8.06	2.22	3.97	3211.71	1.28	4.91	18.33	5.05	9.03	7,303

FA-18E/F and EA-18G																		
Type of Operation	Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/ engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	Emissions in lbs/1,000 lbs fuel						Total Emissions in pounds/op					
							HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO _{2e}
Departure/ Taxi out/Idle																		
APU Use	1	ON	1	5.0	197	16	0.25	2.00	6.25	2.22	0.22	3,170	0.00	0.03	0.10	0.04	0.00	52
Start/Warm-up	1	G Idle	2	15.0	695	348	65.33	98.18	3.18	2.22	12.64	2,973	22.70	34.12	1.11	0.77	4.39	1,033
Unstick	1	75% N2	2	0.3	1720	17	1.98	15.20	5.58	2.22	10.73	3,190	0.03	0.26	0.10	0.04	0.18	55
Taxi Out	1	G Idle	2	5.0	695	116	65.33	98.18	3.18	2.22	12.64	2,973	7.57	11.37	0.37	0.26	1.46	344
Engine Run-up	1	80% N2	2	0.5	3079	51	0.14	1.86	8.98	2.22	8.78	3,205	0.01	0.10	0.46	0.11	0.45	164
Takeoff	1	Max AB	2	0.5	35763	596	4.87	274.97	9.67	2.22	0.00	2,712	2.90	163.90	5.76	1.32	0.00	1,617
Climbout	1	95% N2	2	1.0	11320	377	0.12	0.70	36.29	2.22	2.95	3,179	0.05	0.26	13.69	0.84	1.11	1,200
Straight In Arrival																		
Approach	1	85% N2	2	3.0	5169	517	0.12	0.72	14.75	2.22	6.56	3,191	0.06	0.37	7.62	1.15	3.39	1,650
On Runway (WOW)	1	G Idle	2	1.0	695	23	65.33	98.18	3.18	2.22	12.64	2,973	1.51	2.27	0.07	0.05	0.29	69
Unstick	1	75% N2	2	0.3	1720	17	1.98	15.20	5.58	2.22	10.73	3,190	0.03	0.26	0.10	0.04	0.18	55
Taxi in/Shut Down	1	G Idle	2	8.0	695	185	65.33	98.18	3.18	2.22	12.64	2,973	12.11	18.20	0.59	0.41	2.34	551
LTO Total													54.03	231.14	29.97	5.03	13.82	6,790
Cruise																		
Hourly	1	85% N2	2	60	3318	6636	0.51	2.44	6.74	2.22	6.36	3,154	3.89	16.19	44.73	14.73	42.20	20,930

P-3																		
Type of Operation	Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	Emissions in lbs/1,000 lbs fuel						Total Emissions in lb/op					
							HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂ e
Cruise																		
Hourly	1	37% shp	4	60	1200	4800	0.41	1.82	8.42	2.22	3.97	3216	2.26	8.74	40.42	10.66	19.06	15,437

P-8																		
¹Type of Operation	Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	Emissions in lbs/ lbs fuel						Total Emissions in lb/op					
							HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂ e
Cruise																		
Hourly	1	30	2	60	3400	6800	0.000	0.003	0.022	0.002	ND	3.154	1.56	21.76	146.88	15.10	ND	21,447

AV-8B																		
Type of Operation	Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/ engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	Emissions in lbs/1,000 lbs fuel						Total Emissions in lb/op					
							HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂ e
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	59% RPM	1	0.5	3321	27.7	1.26	25.5	4.5	2.22	6.4	3114.5	0.0	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	1.0	0.2	0.2	248
Climbout	1	95% RPM	1	0.5	7037	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	7.8	2.22	4.2	3141.2	0.1	1.3	1.1	0.3	0.6	454

AV-8B																		
Type of Operation	Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/ engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	Emissions in lbs/1,000 lbs fuel						Total Emissions in lb/op					
							HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO _{2e}
VL Landing	1	99% RPM	1	0.75	12258	153.2	0.26	2.2	16.5	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	19.66	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	0.3	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 In/Shut down	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													9.2	47.2	8.5	2.5	6.9	3,522
Cruise																		
Hourly	1	67% RPM	1	60	4313	4313.0	0.88	16	5.9	2.22	5.3	3130	4.4	69.0	25.4	9.6	22.9	13,499

MV-22													
Flight Mode	Fuel Used (lbs)	Emission Indices (lb per 1,000 lb fuel)						Total Emissions in lb/op					
		HC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	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	60	0.1	8.9	4.09	2.22	1.58	3,221	0.01	0.53	0.25	0.13	0.09	193
Warm up	220	0.02	3.33	6.02	2.22	1.58	3,219	0.00	0.73	1.32	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	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	3,215	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	3,214	0.00	0.05	0.45	0.10	0.07	140
Taxi to apron	66.0	0.02	3.33	6.02	2.22	1.58	3,219	0.00	0.22	0.40	0.15	0.10	212
Cool/Shut down	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	NO _x	SO ₂	PM _{10/2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂
Cruise - Hourly	1,476	0.07	1.62	16.08	2.22	0.085	3252.46	0.12	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	NO _x	SO ₂	PM _{10/2.5}	CO ₂
IPP Use	Main Engine Start	0.58	< 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	0.02	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	65
Total for 1 LTO	1		< 0.513	17.29	32.20	2.37	0.22	7,866
	Fuel Use							
*Cruise - 1 hour		60	12.60	979.86	448.54	124.16	69.99	188,608

UH-1														
Flight Operation	Fuel used lb	Emissions in lbs/1,000 lbs fuel							Flight Emissions (lb/operation)					
		HC	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂
Departure:														
Warm Up	74.0	6.21	28.36	3.13	2.22	4.20	4.20	3,145	0.46	2.10	0.23	0.16	0.31	233
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	0.00	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 Sdrn	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	0.02	0.01	0.02	16
Total in Pounds									0.59	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	Emissions in lbs/1,000 lbs fuel							Flight Emissions (lb/operation)					
		HC	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	CO ₂	VOC	CO	NO _x	SO ₂	PM _{10/2.5}	CO ₂
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 Sdrn	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									0.28	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	0.55	8.96	4.72	1.89	3.57	2,734

Table H-49: Aircraft Engine Emission Factors Sources

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/CH-53 - cruise	AESO Memorandum Report No. 2015-01 Revision B, September 2015.
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, 2007)
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	USAF Institute for Environment, Safety and Occupational Health Risk Analysis, October 2002.
HH-60 - LTO & Cruise	AESO Memorandum Report No. 9929 Revision C. January 2016
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
PM_{2.5} = PM₁₀ emissions, in accordance with AESO Memorandum Report No. 2013-04 Revision A, January 2014. <i>PM_{2.5} 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>	
VOC correction from US Environmental Protection Agency, Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet and Turboprop Engines - Version 1.0, Report No. EPA-420-R-09-901, May 2009.	

Table H-50: Munitions Emission Factors

Type	Study Area Category	DODEC ID	Emission Factor (lb/item)							
			CO ₂	CO	NO _x	VOC	SO ₂	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	Ill. Flare	L311	0.14	0.011	0.0031	0.00033	0.000073	0.12	0.12	0.0000023
2.75 In Rocket flechette	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)

Table H-51: Assumptions Used in the Estimation of Emissions for the AFTT Draft SEIS/OEIS - Phase IV

Ship Emissions	Steaming hours provided by the US Navy, AFTT Gray Ship Steaming Hours for Air Analysis.docx, 12 September 2016.
Training in State Waters	State water activities provided by US Navy, AFTT Inshore Events_08Feb2017_NAEMO WEB.xlsx.; Vessel and data updates by Dave Coffin david.e.coffin6.civ@us.navy.mil as identified on sheet August 2024
Inland Water Training Events and Locations	State water activities provided by US Navy, AFTT Inshore Events_08Feb2017_NAEMO WEB.xlsx. Vessel and data updates by Dave Coffin david.e.coffin6.civ@us.navy.mil as identified on sheet August 2024
Aircraft Emissions Munition Emissions Ship and Boat Emission Factors	Data from Navy and MSC Marine Engine Emissions Calculator, US Navy, October 2022; Vessel and data updates by Dave Coffin david.e.coffin6.civ@us.navy.mil as identified on sheet August 2024
Munition Emission Factors	Emission Factors from USEPA AP-42 Section 15 (various dates)
Aircraft Emission Factors and Profiles Aircraft Engine Emission Factor Sources	For information on aircraft references, see Tab O, Aircraft Engine Emission Factor Sources, except for F-35, Derived from Lemoore Op AQ Calcs May 2014 in Final Environmental Impact Statement US Navy F-35C West Coast Homebasing, Vol II, Appendix D.
Munition Activity Data	Munitions Usage Estimates provided by US Navy, AppendixF2_AFTT_U_MEM_1yr.xlsx (August 01, 2023), Appendix F, Draft AFTT EIS May 2023.
Baseline (Phase III Preferred Alternative) Munition Summary	Atlantic Fleet Forces Training and Testing Final Environmental Impact Statement/Overseas Environmental Impact Statement, November 2018.

H.2 NAVY RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY

H.2.1 RHODE ISLAND OZONE NONATTAINMENT AREA

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

Proposed Action

Action Proponent: United States (U.S.) Navy, Fleet Forces Command

Location: Rhode Island State Waters

Proposed Action Name: Atlantic Fleet Training and Testing (AFTT)

Proposed Action and Emissions Summary: The Proposed Action (Preferred Alternative, Alternative 1) involves operation of military vessels, small boats, and aircraft and munition usages to achieve requisite training and testing requirements. Small boats and vessels would operate within the nearshore and state waters of Rhode Island. These activities generate emissions primarily through fossil fuel combustion from engine operations. Emissions from the Proposed Action would replace those associated with the Phase III (Alternative 1) training and testing activities approved in the 2018 *Final Atlantic Fleet Training and Testing Environmental Impact Statement/Overseas Environmental Impact Statement* (EIS/OEIS). The entire state of Rhode Island and its state waters are an orphan nonattainment area for the 1997 ozone national ambient air quality standard. As a result, Proposed Action emissions were evaluated to assess compliance with the General Conformity Rule *de minimis* thresholds for ozone precursors (volatile organic compounds [VOCs] and nitrogen oxides [NO_x]). Table H-52 provides a summary of the evaluation.

Table H-52: Proposed Action Ozone Precursor Emissions Compared to General Conformity Rule *de Minimis* Thresholds (tons/year)

<i>Activity</i>	<i>VOC</i>	<i>NO_x</i>
Alternative 1	4.86	147.70
Phase III	3.92	94.39
Net Change Alternative 1 minus Phase III	0.95	53.31
<i>De Minimis</i> Thresholds	100	100
Exceed Threshold?	No	No

Affected Air Basin: Metropolitan Providence Interstate

Date RONA Prepared: September 10, 2024

RONA Prepared by: Navy Facilities Engineering Command Atlantic

Proposed Action Exemptions

The Proposed Action is exempt from General Conformity Rule requirements, based on the determination that emissions associated with the Proposed Action are below all *de minimis* thresholds.

Emissions Evaluation Conclusion

The U.S. Navy concludes that *de minimis* thresholds for ozone precursors would not be exceeded as a result of implementation of the Proposed Action. The emissions data supporting this conclusion is

shown in Table H-52 above. The calculations, methodology, data, and references contained in Section 3.1 (Air Quality and Climate Change) and Appendix H of the AFTT Supplemental EIS/OEIS. Therefore, the Navy concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA Approval

Signature: _____

Name: _____

Date: _____

Position: _____

H.2.2 METROPOLITAN PORTLAND/CUMBERLAND COUNTY, MAINE, OZONE MAINTENANCE AREA

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

Proposed Action

Action Proponent: United States (U.S.) Navy, Fleet Forces Command

Location: Rhode Island State Waters

Proposed Action Name: Atlantic Fleet Training and Testing (AFTT)

Proposed Action and Emissions Summary: The Proposed Action (Preferred Alternative, Alternative 1) involves operation of military vessels, small boats, and aircraft and munition usages to achieve requisite training and testing requirements. Small boats and vessels would operate within the nearshore and state waters of Cumberland County, Maine. These activities generate emissions primarily through fossil fuel combustion from engine operations. Emissions from the Proposed Action would replace those associated with the Phase III (Alternative 1) training and testing activities approved in the 2018 *Final Atlantic Fleet Training and Testing Environmental Impact Statement/Overseas Environmental Impact Statement* (EIS/OEIS). The Metropolitan Portland/Cumberland County region and its state waters are an orphan maintenance area for the 1997 ozone national ambient air quality standard. As a result, Proposed Action emissions were evaluated to assess compliance with the General Conformity Rule *de minimis* thresholds for ozone precursors (volatile organic compounds [VOCs] and nitrogen oxides [NO_x]). Table H-53 provides a summary of the evaluation.

Table H-53: Proposed Action Ozone Precursor Emissions Compared to General Conformity Rule *de Minimis* Thresholds (tons/year)

<i>Activity</i>	<i>VOC</i>	<i>NO_x</i>
Alternative 1	0.26	7.77
Phase III	0.21	4.97
Net Change Alternative 1 minus Phase III	0.05	2.81
<i>De Minimis</i> Thresholds	100	100
Exceed Threshold?	No	No

Affected Air Basin: Metropolitan Portland Intrastate

Date RONA Prepared: September 10, 2024

RONA Prepared by: Navy Facilities Engineering Command Atlantic

Proposed Action Exemptions

The Proposed Action is exempt from General Conformity Rule requirements, based on the determination that emissions associated with the Proposed Action are below all *de minimis* thresholds.

Emissions Evaluation Conclusion

The U.S. Navy concludes that *de minimis* thresholds for ozone precursors would not be exceeded as a result of implementation of the Proposed Action. The emissions data supporting this conclusion is shown in Table H-53 above. The calculations, methodology, data, and references contained in Section 3.1 (Air Quality and Climate Change) and Appendix H of the AFTT Supplemental EIS/OEIS.

Therefore, the Navy concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA Approval

Signature: _____

Name: _____

Date: _____

Position: _____

H.2.3 HAMPTON ROADS, VIRGINIA, OZONE MAINTENANCE AREA

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

Proposed Action

Action Proponent: United States (U.S.) Navy, Fleet Forces Command

Location: Chesapeake Bay, Virginia, State Waters

Proposed Action Name: Atlantic Fleet Training and Testing (AFTT)

Proposed Action and Emissions Summary: The Proposed Action (Preferred Alternative, Alternative 1) involves operation of military vessels, small boats, and aircraft and munition usages to achieve requisite training and testing requirements. Small boats, vessels, and aircraft would operate within the Chesapeake Bay and adjacent state waters of Virginia. These activities generate emissions primarily through fossil fuel combustion from engine operations. Emissions from the Proposed Action would replace those associated with the Phase III (Alternative 1) training and testing activities approved in the 2018 *Final Atlantic Fleet Training and Testing Environmental Impact Statement/Overseas Environmental Impact Statement* (EIS/OEIS). The Hampton Roads Area and its state waters are an orphan maintenance area for the 1997 ozone national ambient air quality standard. As a result, Proposed Action emissions were evaluated to assess compliance with the General Conformity Rule *de minimis* thresholds for ozone precursors (volatile organic compounds [VOCs] and nitrogen oxides [NO_x]). Table H-54 provides a summary of the evaluation.

Table H-54: Proposed Action Ozone Precursor Emissions Compared to General Conformity Rule *de Minimis* Thresholds (tons/year)

<i>Activity</i>	<i>VOC</i>	<i>NO_x</i>
Alternative 1	31.27	1,105.46
Phase III	46.83	1,172.67
Net Change Alternative 1 minus Phase III	-15.56	-67.21
<i>De Minimis</i> Thresholds	100	100
Exceed Threshold?	No	No

Affected Air Basin: Hampton Roads Intrastate

Date RONA Prepared: September 10, 2024

RONA Prepared by: Navy Facilities Engineering Command Atlantic

Proposed Action Exemptions

The Proposed Action is exempt from General Conformity Rule requirements, based on the determination that emissions associated with the Proposed Action are below all *de minimis* thresholds.

Emissions Evaluation Conclusion

The U.S. Navy concludes that *de minimis* thresholds for ozone precursors would not be exceeded as a result of implementation of the Proposed Action. The emissions data supporting this conclusion is shown in Table H-54 above. The calculations, methodology, data, and references contained in Section 3.1 (Air Quality and Climate Change) and Appendix H of the AFTT Supplemental EIS/OEIS.

Therefore, the Navy concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA Approval

Signature: _____

Name: _____

Date: _____

Position: _____

H.2.4 JACKSONVILLE, FLORIDA, SULFUR DIOXIDE MAINTENANCE AREA

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

Proposed Action

Action Proponent: United States (U.S.) Navy, Fleet Forces Command

Location: Jacksonville, Florida, and surrounding State Waters

Proposed Action Name: Atlantic Fleet Training and Testing (AFTT)

Proposed Action and Emissions Summary: The Proposed Action (Preferred Alternative, Alternative 1) involves operation of military vessels, small boats, and aircraft and munition usages to achieve requisite training and testing requirements. Small boats and vessels would operate within the riverine environment in the Jacksonville, Florida, locality. These nearshore activities generate emissions primarily through fossil fuel combustion from engine operations. Emissions from the Proposed Action would replace those associated with the Phase III (Alternative 1) training and testing activities approved in the 2018 *Final Atlantic Fleet Training and Testing Environmental Impact Statement/Overseas Environmental Impact Statement* (EIS/OEIS). Part of Nassau County, which is adjacent to Jacksonville, is nonattainment for the sulfur dioxide (SO₂) national ambient air quality standard. As a result, Proposed Action emissions were evaluated to assess compliance with the General Conformity Rule *de minimis* threshold for this pollutant. Table H-55 provides a summary of the evaluation.

Table H-55: Proposed Action Sulfur Dioxide Emissions Compared to General Conformity Rule *de Minimis* Thresholds (tons/year)

<i>Activity</i>	<i>SO₂</i>
Alternative 1	3.14
Phase III	4.84
Net Change Alternative 1 minus Phase III	-1.70
<i>De Minimis</i> Thresholds	100
Exceed Threshold?	No

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

Date RONA Prepared: September 10, 2024

RONA Prepared by: Navy Facilities Engineering Command Atlantic

Proposed Action Exemptions

The Proposed Action is exempt from General Conformity Rule requirements, based on the determination that emissions associated with the Proposed Action are below the *de minimis* threshold for SO₂.

Emissions Evaluation Conclusion

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. The emissions data supporting this conclusion is shown in Table H-55 above. The calculations, methodology, data, and references contained in Section 3.1 (Air Quality and Climate Change) and Appendix H of the AFTT Supplemental EIS/OEIS. Therefore, the Navy

concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA Approval

Signature: _____

Name: _____

Date: _____

Position: _____