Environmental Impact Statement/

Overseas Environmental Impact Statement

Point Mugu Sea Range

TABLE OF CONTENTS

List of Figures

There are no figures in this appendix.

List of Tables

This page intentionally left blank.

Appendix B Air Quality Emissions Calculations and Record of Non-Applicability

B.1 Summary Tables

B.1.1 Baseline

Total Environmental Baseline Emissions (Tons per Year)							
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**	**CO2 (Metric Tons)**
Aircraft	3.18	8.65	1.23	0.63	1.81	1.76	121797.41
Vessels	1096.57	350.03	428.52	117.71	11.81	11.81	51915.80
Ordnance	0.96	0.16	0.00	0.00	0.06	0.05	0.00
Total	**1100.71**	**358.84**	**429.75**	**118.35**	**13.69**	**13.62**	**173713.21**

Environmental Baseline (Tons per Year) 0-3 NM						
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**
Aircraft	0.05	0.14	0.02	0.01	0.03	0.03
Vessels	55.67	26.92	20.87	4.33	0.76	0.76
Ordnance	-	-	-	-	-	-
Total	**55.72**	**27.06**	**20.89**	**4.34**	**0.79**	**0.79**

Environmental Baseline (Tons per Year) 3-12 NM						
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**
Aircraft	0.16	0.43	0.06	0.03	0.09	0.09
Vessels	143.12	10.33	58.24	1.58	0.27	0.27
Ordnance	-	-	-	-	-	-
Total	**143.28**	**10.76**	**58.30**	**1.61**	**0.36**	**0.36**

Environmental Baseline (Tons per Year) >12 NM						
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**
Aircraft	2.97	8.07	1.14	0.59	1.69	1.64
Vessels	897.78	312.78	349.41	111.81	10.78	10.78
Ordnance	0.96	0.16	0.00	0.00	0.06	0.05
Total	**901.71**	**321.01**	**350.56**	**112.40**	**12.54**	**12.47**

B.1.2 Alternative 1 (Preferred Alternative)

Alternative 1 Emissions (Tons per Year)							
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**	**CO2 (Metric Tons)**
Aircraft	6.27	11.80	1.54	0.98	3.89	3.83	162893.66
Vessels	1823.62	389.83	724.15	125.54	13.79	13.79	51703.58
Ordnance	2.96	0.82	0.00	0.00	0.19	0.14	0.00
Total	**1832.85**	**402.46**	**725.69**	**126.53**	**17.87**	**17.76**	**214597.24**
Difference from Baseline	732.14	43.62	295.94	8.18	4.18	4.14	40884.03

Alternative 1 Emissions (Tons per Year) 0-3 NM						
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**
Aircraft	0.10	0.20	0.03	0.02	0.06	0.06
Vessels	88.93	27.73	34.51	4.42	0.78	0.78
Ordnance	-	-	-	-	-	-
Total	**89.03**	**27.92**	**34.54**	**4.44**	**0.84**	**0.84**
Difference from Baseline	33.31	0.86	13.65	0.10	0.05	0.05

Alternative 1 Emissions (Tons per Year) 3-12 NM						
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**
Aircraft	0.31	0.59	0.08	0.05	0.19	0.19
Vessels	242.80	12.46	99.16	1.82	0.31	0.31
Ordnance	-	-	-	-	-	-
Total	**243.11**	**13.05**	**99.24**	**1.87**	**0.51**	**0.50**
Difference from Baseline	99.83	2.29	40.94	0.26	0.15	0.15

Alternative 1 Emissions (Tons per Year) >12 NM						
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**
Aircraft	5.85	11.02	1.44	0.92	3.63	3.57
Vessels	1491.90	349.64	590.48	119.31	12.70	12.70
Ordnance	2.96	0.82	0.00	0.00	0.19	0.14
Total	**1500.70**	**361.48**	**591.91**	**120.22**	**16.52**	**16.41**
Difference from Baseline	599.00	40.47	241.35	7.82	3.98	3.95

B.1.3 Alternative 2

Alternative 2 Emissions (Tons per Year)							
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**	**CO2 (Metric Tons)**
Aircraft	5.90	11.43	1.50	0.92	3.64	3.58	146074.87
Vessels	498.67	363.84	180.02	122.50	13.28	13.28	50602.25
Ordnance	2.28	0.18	0.00	0.00	0.10	0.07	0.00
Total	**506.85**	**375.45**	**181.52**	**123.43**	**17.02**	**16.94**	**196677.12**
Difference from Baseline	**-593.86**	**16.61**	**-248.23**	**5.08**	**3.33**	**3.32**	**22963.92**

Alternative 2 Emissions (Tons per Year) 0-3 NM						
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**
Aircraft	0.10	0.19	0.03	0.02	0.06	0.06
Vessels	27.77	26.53	9.40	4.28	0.76	0.76
Ordnance	-	-	-	-	-	-
Total	**27.87**	**26.72**	**9.42**	**4.29**	**0.82**	**0.82**
Difference from Baseline	-27.85	-0.35	-11.47	-0.04	0.02	0.02

Alternative 2 Emissions (Tons per Year) 3-12 NM						
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**
Aircraft	0.29	0.57	0.08	0.05	0.18	0.18
Vessels	59.35	8.86	23.82	1.40	0.24	0.24
Ordnance	-	-	-	-	-	-
Total	**59.64**	**9.43**	**23.89**	**1.44**	**0.43**	**0.42**
Difference from Baseline	-83.64	-1.33	-34.41	-0.17	0.07	0.07

Alternative 2 Emissions (Tons per Year) >12 NM						
	CO	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**
Aircraft	5.51	10.66	1.40	0.86	3.40	3.34
Vessels	411.55	328.45	146.80	116.83	12.28	12.28
Ordnance	2.28	0.18	0.00	0.00	0.10	0.07
Total	**419.34**	**339.30**	**148.20**	**117.69**	**15.78**	**15.70**
Difference from Baseline	-482.37	18.29	-202.36	5.29	3.25	3.23

B.2 Aircraft Emissions

B.2.1 Emission Factors

	SOURCE	PMSR Aircraft	Engines (#)	EngineType	MODE	Fuel Flow per Engine (lbs/hour)	Fuel Flow (lbs/hour) - per platform	Emission Factor (lbs/hr)						Emission Factor (lb/1000lb fuel)						CO2 Emission Factor	
								CO	NOx	VOC	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5	CO2e (lb/1000lb fuel)	CO2 (lbs/hour)
	Air Emissions Guide for Air Force Mobile Sources	ACRO	1	O-320-E2A	CLIMBOUT	67.0	67.0													3233.87	
	AESO Memorandum Report No. 2014-03, Table 2	ASPHELO	1	RR 250-C20W	CRUISE	191	191													3151.78	
	Air Emissions Guide for Air Force Mobile Sources	B-1	4	F101-GE-102	INTERMEDIATE	6557.0	26228.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	B-2/B-21	4	F118-GE-100	INTERMEDIATE	6350.0	25400.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	B-52	8	TF33-P-3	INTERMEDIATE	6356.0	50848.0													3233.87	
	AESO Memorandum Report No. 9919 Revision D, Table 1	C-2/CMV-22	2	T56-A-425	CLIMBOUT	2230.0	4460.0													3251.78	
	Air Emissions Guide for Air Force Mobile Sources	C-12	2	PT6A-65	INTERMEDIATE	571.0	1142.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	C-5/C-17	4	TF39-GE-1C	INTERMEDIATE	12541.0	50164.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	C-135	4	J57-P/F-59W	INTERMEDIATE	3889.0	15556.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	UC-35D	2	JT15D-5A	CLIMBOUT	1371.0	2742.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	DC-10	3	CF6-50A	CLIMBOUT	14183.0	42549.0													3233.87	
	AESO Memorandum Report No. 9920 Revision E, Table 3	E-2	2	T56-A-427	CLIMBOUT	2471.0	4942.0													3251.78	
	Air Emissions Guide for Air Force Mobile Sources	E-3/E-6	4	TF33-P-3	CLIMBOUT	7323.0	29292.0													3233.87	
	AESO Memorandum Report No. 9815 Revision H, Table 5	EA-18G	2	F414-GE-400	CLIMBOUT	11320.0	22640.0													3179.00	
	Air Emissions Guide for Air Force Mobile Sources	F-15	2	F100-PW-220	INTERMEDIATE	5770.0	11540.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	F-16	1	F100-PW-220	INTERMEDIATE	5770.0	5770.0													3233.87	
	AESO Memorandum Report No. 9815 Revision H, Table 5	F/A-18	2	F414-GE-400	CLIMBOUT	11320.0	22640.0	NOT PRESENTED AS ALL AIRCRAFT OPERATE ABOVE 3,000 FEET AGL DURING TRAINING AND TESTING WHILE IN THE SEA RANGE						NOT PRESENTED AS ALL AIRCRAFT OPERATE ABOVE 3,000 FEET AGL DURING TRAINING AND TESTING WHILE IN THE SEA RANGE						3179.00	
	Air Emissions Guide for Air Force Mobile Sources	F-21	1	FE110-GE-129	INTERMEDIATE	6939.0	6939.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	F-22	2	F119-PW-100	INTERMEDIATE	10110.0	20220.0													3233.87	
	AESO Memorandum Report 2017-18	F-35	1	F135-PW-100	MILITARY TAKEOFF	1057	1057.0													3336.76	
	Air Emissions Guide for Air Force Mobile Sources	G-550	2	BR700-710C4-11	CLIMBOUT	4897.0	9794.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	KC-10	3	CF6-50C2	CLIMBOUT	15675.0	47025.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	KC-130	4	T56-A-16	INTERMEDIATE	1996.0	7984.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	KC-135/KC-46	2	PW-4062	CLIMBOUT	16865.0	33730.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	L-1011	3	RB211-22B	CLIMBOUT	12238.0	36714.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	L-35	2	TFE731-2-2B	CLIMBOUT	1373.0	2746.0													3233.87	
	AESO Memorandum Report No. 9911 Revision D, Table 1	P-3/NC-37	4	T56-A-14	CLIMBOUT	1800.0	3600.0													3228.30	
	AESO Memorandum Report No. 2017-09, Table 1	P-8	2	CFM56-7B27	CLIMBOUT	8278.0	16556.0													3161.00	
	Air Emissions Guide for Air Force Mobile Sources	P-68	2	IO 360-B	CLIMBOUT	72.0	144.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	PA-23	2	O-320-E2A	CLIMBOUT	67.0	134.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	T-38/45	2	J85-GE-5F	INTERMEDIATE	1297.0	2594.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	U-2	1	F118-GE-100	INTERMEDIATE	6350.0	6350.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	Other	1	O-320-E2A	CRUISE	67.0	67.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	707	4	P&W JT3D-7	CLIMBOUT	8191.0	32764.0													3233.87	
	Air Emissions Guide for Air Force Mobile Sources	727	3	JT8D-15, -15A	CLIMBOUT	7500.0	22500.0													3233.87	
	AESO Memorandum Report No. 9929 Revision C	MH-60	2	T700-GE-700	CRUISE	-	1200	7.50	7.68	0.76		5.04	5.04				1.05			3221.36	
	AESO Memorandum Report No. 9929 Revision C	MH-65	2	2C2-CG	CRUISE	-	661	7.50	7.68	0.76		5.04	5.04				1.05			3221.36	
	Air Emissions Guide for Air Force Mobile Sources	RQ-4	1	AE-3007	CLIMBOUT	2500	2500							0.92	17.47	0.33	1.05	0.06	0.05	3233.70	
	Air Emissions Guide for Air Force Mobile Sources	MQ-9	1	TPE331-3	CLIMBOUT	409	409							1.37	11.86	0.46	1.05	1.47	1.32	3233.87	
	Air Emissions Guide for Air Force Mobile Sources	QF-16	1	F100-PW-220	INTERMEDIATE	5770	5770							0.86	22.18	2.89	1.05	2.06	1.85	3233.87	
	AESO Memorandum Report No. 2019-13, Table 1	RQ-21	1	8 HP reciprocating engine with EFI	1 HOUR OPERATION	1.4	1.4	0.0001	0.02	0.02		0.0003	0.08				1.05				4.41
	AP-42, Chapter 3, Table 3.3.1	RQ-23	1	32 Hp Herbrandson 372cc two stroke	1 HOUR OPERATION	3.6	3.6	0.22	0.35	0.48	0.02	0.02	0.02								34.56
	AESO Memorandum Report No. 2013-02 Revision E, Table ES-2	MQ-4C	1	F137-AD-100	CRUISE	1856	1856	2.78	19.86	0.00		0.12	0.12				1.05				5866.82
	AESO Memorandum Report No. 2014-03, Table 2	MQ-8B/C	1	RR 250-C20W	CRUISE	191	191	9.54	5.12	2.29		0.10	0.10				1.05			3151.78	
	Air Emissions Guide for Air Force Mobile Sources	MQ-25	1	AE-3007	CLIMBOUT	2500	2500							0.92	17.47	0.33	1.05	0.06	0.05	3233.70	
	AESO Memorandum Report No. 2014-03	RVCHELO	1	RR 250-C20W	CRUISE	191	191	9.54	5.12	2.29		0.10	0.10				1.05			3151.78	
	AP-42, Chapter 3, Table 3.3.1	CU-162	1	32 Hp Herbrandson 372cc two stroke	1 HOUR OPERATION	3.6	3.6	0.22	0.35	0.48	0.02	0.02	0.02								34.56

	Assumptions:
	AESO assumed that CO2e emission is the same as CO2 while considering the emissions of CH4 and N2O negligible.
	Emissions were calculated for aircraft based on information on participation in individual activities, based on information in the DOPAA and Chapter 3.
	Aircraft emissions were calculated using emission factors from AESO for individual aircraft types. If AESO CRUISE emission factors were not available, CLIMBOUT, INTERMEDIATE, or TAKEOFF modes from the Air Emissions Guide for Air Force Mobile Sources were used, based on avalability of information
	Fixed-wing aircraft operations occur above 3,000 feet AGL unless information provided by the Navy indicating they are operating below 3,000 feet AGL.
	Rotary-wing aircraft operations occur below 3,000 feet AGL unless information provided by the Navy indicating they are operating above 3,000 feet AGL.
	Aircraft take-offs and landings are not included in the analysis and are assumed to be assigned to the bases that are their point of origin. Aircraft originating from carriers are not included in the analysis, as carriers are assumed to be at distances greater than 12 nm from shore
	LTO information is accounted for under previous environmental documents and not directly analyzed here
	Piper was used as surrogate fixed wing aircraft for ACRO and OTHER based on input from MILOPS specialist
	F/A-18 used as surrogate for EA-18 per Aircraft Reference List provided by NAVFAC SW and per AESO guidance
	MH-60 used as surrogate for MH-65, AESO Memorandum Report No. 9929 Revision C
	MQ-8 used as surrogate for RVC Helo and ASPHELO based on input from project MILOPS specialist
	RQ-23 and CU-162 modeled as 32 Hp two-stroke engine. AP-42 emissions factors used to estimate emissions based on horsepower.
	For E3/E6 combination, E-3 selected as it has a higher fuel flow than E-6 for conservative estimate. There is no additional level of detail that enables a split into separate lines.
	For KC-135/KC-46 combination, KC-46 selected as it has a higher platform fuel flow than KC-135 for conservative estimate. There is no additional level of detail that enables a split into separate lines.
	AESO provided data was used for all SOx calculations, AESO Memorandum Report No. 2012-01G, October 2019. AESO SOx calculation was used even if platform emissions for other pollutants originated from the Air Emissions Guide
	A default cruise speed of 90 knots was used for helicopter and drone transit. Transit times through 0-3nm are estimated to be 2 minutes, and transit through 3-12 nm is estimated to be 6 minutes. All remaining time on range is then considered to occur greater than 12nm from shore
	GHG calculated only for entire project and not split into distance regimes

B.2.2 Baseline Aircraft Emissions

PMSR Aircraft	Operations per Year						Baseline Annual Emissions (tons per year)						
	Current Baseline	No Action Alternative	Alternative 1	Alternative 2	Minutes On Range	Average Time Under 3,000 (not including LTO)	CO	NOx	VOC	SOx	PM10	PM2.5	CO2 (metric tons per year)
ACRO	2	0	2	2	120	0	NOT PRESENTED AS ALL AIRCRAFT OPERATE ABOVE 3,000 FEET AGL DURING TRAINING AND TESTING WHILE IN THE SEA RANGE						0.39
ASPHELO	25	0	25	25	120	0							13.63
B-1	12	0	12	12	120	0							923.35
B-2/B-21	90	0	130	113	120	0							6706.47
B-52	2	0	24	24	120	0							298.35
C-2/CMV-22	1	0	0	0	120	0							13.16
C-12	2	0	2	2	120	0							6.70
C-5/C-17	6	0	6	6	120	0							883.00
C-135	7	0	7	7	120	0							319.46
UC-35D	41	0	41	41	120	0							329.81
DC-10	11	0	11	11	120	0							1373.09
E-2	147	0	230	184	120	0							2143.07
E-3/E-6	9	0	9	9	120	0							773.41
EA-18G	130	0	188	163	120	0							8488.01
F-15	12	0	12	12	120	0							406.26
F-16	440	0	440	440	120	0							7448.12
F/A-18	948	0	1375	1185	120	0							61897.15
F-21	110	0	110	110	120	0							2239.28
F-22	1	0	0	0	120	0							59.32
F-35	472	0	684	590	120	0							1510.21
G-550	33	0	33	33	120	0							948.18
KC-10	12	0	12	12	120	0							1655.50
KC-130	9	0	9	9	120	0							210.81
KC-135/KC-46	139	0	139	139	120	0							13754.64
L-1011	6	0	6	6	120	0							646.25
L-35	64	0	64	64	120	0							515.58
P-3/NC-37	165	0	200	165	120	0							1739.63
P-8	0	0	0	0	120	0							0.00
P-68	15	0	15	15	120	0							6.34
PA-23	5	0	5	5	120	0							1.97
T-38/45	8	0	8	8	120	0							60.88
U-2	2	0	2	2	120	0							37.26
Other	289	0	357	347	120	0							56.81
707	11	0	11	11	120	0							1057.32
727	15	0	15	15	120	0							990.13
MH-60	247	0	358	309	120	120	1.85	1.90	0.19	0.31	1.24	1.24	865.97
MH-65	0	0	300	300	120	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RQ-4	3	0	3	3	120	30	0.00	0.03	0.00	0.00	0.00	0.00	22.00
MQ-9	5	0	5	5	120	30	0.00	0.01	0.00	0.00	0.00	0.00	6.00
QF-16	187	0	187	187	120	30	0.23	5.98	0.78	0.28	0.56	0.50	3165.45
RQ-21	100	0	100	100	120	30	0.00	0.00	0.00	0.00	0.00	0.00	0.40
RQ-23	1	0	1	1	120	30	0.00	0.00	0.00	0.00	0.00	0.00	0.03
MQ-4C	30	0	30	30	120	30	0.02	0.15	0.00	0.01	0.00	0.00	159.67
MQ-8B/C	111	0	111	111	120	120	1.06	0.57	0.25	0.02	0.01	0.01	60.50
MQ-25	0	0	0	0	120	30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RVCHELO	7	0	7	7	120	30	0.02	0.01	0.00	0.00	0.00	0.00	3.82
CU-162	2	0	2	2	120	30	0.00	0.00	0.00	0.00	0.00	0.00	0.06
						TOTAL	3.1835626	8.65	1.23	0.63	1.81	1.76	121797.41

Orange cell indicates that while number shown is 0.00 for display purposes, the actual value is greater than zero.

B.2.3 Alternative 1 (Preferred Alternative) Aircraft Emissions

PMSR Aircraft	Operations per Year						Alternative 1 Annual Emissions (tons per year)						
	Current Baseline	No Action Alternative	Alternative 1	Alternative 2	Minutes On Range	Average Time Under 3,000 (not including LTO)	CO	NOx	VOC	SOx	PM10	PM2.5	CO2 (metric tons per year)
ACRO	2	0	2	2	120	0	NOT PRESENTED AS ALL AIRCRAFT OPERATE ABOVE 3,000 FEET AGL DURING TRAINING AND TESTING WHILE IN THE SEA RANGE						0.39
ASPHELO	25	0	25	25	120	0							13.63
B-1	12	0	12	12	120	0							923.35
B-2/B-21	90	0	130	113	120	0							9687.13
B-52	2	0	24	24	120	0							3580.17
C-2/CMV-22	1	0	0	0	120	0							0.00
C-12	2	0	2	2	120	0							6.70
C-5/C-17	6	0	6	6	120	0							883.00
C-135	7	0	7	7	120	0							319.46
UC-35D	41	0	41	41	120	0							329.81
DC-10	11	0	11	11	120	0							1373.09
E-2	147	0	230	184	120	0							3353.10
E-3/E-6	9	0	9	9	120	0							773.41
EA-18G	130	0	188	163	120	0							12274.96
F-15	12	0	12	12	120	0							406.26
F-16	440	0	440	440	120	0							7448.12
F/A-18	948	0	1375	1185	120	0							89776.99
F-21	110	0	110	110	120	0							2239.28
F-22	1	0	0	0	120	0							0.00
F-35	472	0	684	590	120	0							2188.52
G-550	33	0	33	33	120	0							948.18
KC-10	12	0	12	12	120	0							1655.50
KC-130	9	0	9	9	120	0							210.81
KC-135/KC-46	139	0	139	139	120	0							13754.64
L-1011	6	0	6	6	120	0							646.25
L-35	64	0	64	64	120	0							515.58
P-3/NC-37	165	0	200	165	120	0							2108.64
P-8	0	0	0	0	120	0							0.00
P-68	15	0	15	15	120	0							6.34
PA-23	5	0	5	5	120	0							1.97
T-38/45	8	0	8	8	120	0							60.88
U-2	2	0	2	2	120	0							37.26
Other	289	0	357	347	120	0							70.17
707	11	0	11	11	120	0							1057.32
727	15	0	15	15	120	0							990.13
MH-60	247	0	358	309	120	120	2.69	2.75	0.27	0.45	1.80	1.80	1255.13
MH-65	0	0	300	300	120	120	2.25	2.30	0.23	0.21	1.51	1.51	579.58
RQ-4	3	0	3	3	120	30	0.00	0.03	0.00	0.00	0.00	0.00	22.00
MQ-9	5	0	5	5	120	30	0.00	0.01	0.00	0.00	0.00	0.00	6.00
QF-16	187	0	187	187	120	30	0.23	5.98	0.78	0.28	0.56	0.50	3165.45
RQ-21	100	0	100	100	120	30	0.00	0.00	0.00	0.00	0.00	0.00	0.40
RQ-23	1	0	1	1	120	30	0.00	0.00	0.00	0.00	0.00	0.00	0.03
MQ-4C	30	0	30	30	120	30	0.02	0.15	0.00	0.01	0.00	0.00	159.67
MQ-8B/C	111	0	111	111	120	120	1.06	0.57	0.25	0.02	0.01	0.01	60.50
MQ-25	0	0	0	0	120	30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RVCHELO	7	0	7	7	120	30	0.02	0.01	0.00	0.00	0.00	0.00	3.82
CU-162	2	0	2	2	120	30	0.00	0.00	0.00	0.00	0.00	0.00	0.06
						TOTAL	6.27	11.80	1.54	0.98	3.89	3.83	162893.66

Orange cell indicates that while number shown is 0.00 for display purposes, the actual value is greater than zero.

B.2.4 Alternative 2 Aircraft Emissions

ACRO	**2**	**0**	**2**	**2**	**120**	0	NOT PRESENTED AS ALL AIRCRAFT OPERATE ABOVE 3,000 FEET AGL DURING TRAINING AND TESTING WHILE IN THE SEA RANGE						0.39
ASPHELO	**25**	**0**	**25**	**25**	**120**	0							13.63
B-1	**12**	**0**	**12**	**12**	**120**	0							923.35
B-2/B-21	**90**	**0**	**130**	**113**	**120**	0							8420.35
B-52	**2**	**0**	**24**	**24**	**120**	0							3580.17
C-2/CMV-22	**1**	**0**	**0**	**0**	**120**	0							0.00
C-12	**2**	**0**	**2**	**2**	**120**	0							6.70
C-5/C-17	**6**	**0**	**6**	**6**	**120**	0							883.00
C-135	**7**	**0**	**7**	**7**	**120**	0							319.46
UC-35D	**41**	**0**	**41**	**41**	**120**	0							329.81
DC-10	**11**	**0**	**11**	**11**	**120**	0							1373.09
E-2	**147**	**0**	**230**	**184**	**120**	0							2682.48
E-3/E-6	**9**	**0**	**9**	**9**	**120**	0							773.41
EA-18G	**130**	**0**	**188**	**163**	**120**	0							10642.65
F-15	**12**	**0**	**12**	**12**	**120**	0							406.26
F-16	**440**	**0**	**440**	**440**	**120**	0							7448.12
F/A-18	**948**	**0**	**1375**	**1185**	**120**	0							77371.44
F-21	**110**	**0**	**110**	**110**	**120**	0							2239.28
F-22	**1**	**0**	**0**	**0**	**120**	0							0.00
F-35	**472**	**0**	**684**	**590**	**120**	0							1887.76
G-550	**33**	**0**	**33**	**33**	**120**	0							948.18
KC-10	**12**	**0**	**12**	**12**	**120**	0							1655.50
KC-130	**9**	**0**	**9**	**9**	**120**	0							210.81
KC-135/KC-46	**139**	**0**	**139**	**139**	**120**	0							13754.64
L-1011	**6**	**0**	**6**	**6**	**120**	0							646.25
L-35	**64**	**0**	**64**	**64**	**120**	0							515.58
P-3/NC-37	**165**	**0**	**200**	**165**	**120**	0							1739.63
P-8	**0**	**0**	**0**	**0**	**120**	0							0.00
P-68	**15**	**0**	**15**	**15**	**120**	0							6.34
PA-23	**5**	**0**	**5**	**5**	**120**	0							1.97
T-38/45	**8**	**0**	**8**	**8**	**120**	0							60.88
U-2	**2**	**0**	**2**	**2**	**120**	0							37.26
Other	**289**	**0**	**357**	**347**	**120**	0							68.21
707	**11**	**0**	**11**	**11**	**120**	0							1057.32
727	**15**	**0**	**15**	**15**	**120**	0							990.13
MH-60	**247**	**0**	**358**	**309**	**120**	120	2.32	2.37	0.23	0.39	1.56	1.56	1083.34
MH-65	**0**	**0**	**300**	**300**	**120**	120	2.25	2.30	0.23	0.21	1.51	1.51	579.58
RQ-4	**3**	**0**	**3**	**3**	**120**	30	0.00	0.03	0.00	0.00	0.00	0.00	22.00
MQ-9	**5**	**0**	**5**	**5**	**120**	**30**	0.00	0.01	0.00	0.00	0.00	0.00	6.00
QF-16	**187**	**0**	**187**	**187**	**120**	**30**	0.23	5.98	0.78	0.28	0.56	0.50	3165.45
RQ-21	**100**	**0**	**100**	**100**	**120**	30	0.00	0.00	0.00	0.00	0.00	0.00	0.40
RQ-23	**1**	**0**	**1**	**1**	**120**	**30**	0.00	0.00	0.00	0.00	0.00	0.00	0.03
MQ-4C	**30**	**0**	**30**	**30**	**120**	30	0.02	0.15	0.00	0.01	0.00	0.00	159.67
MQ-8B/C	**111**	**0**	**111**	**111**	**120**	120	1.06	0.57	0.25	0.02	0.01	0.01	60.50
MQ-25	**0**	**0**	**0**	**0**	**120**	**30**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RVCHELO	**7**	**0**	**7**	**7**	**120**	**30**	0.02	0.01	0.00	0.00	0.00	0.00	3.82
CU-162	**2**	**0**	**2**	**2**	**120**	**30**	0.00	0.00	0.00	0.00	0.00	0.00	0.06
						TOTAL	**5.90**	**11.43**	**1.50**	**0.92**	**3.64**	**3.58**	**146074.87**

Orange cell indicates that while number shown is 0.00 for display purposes, the actual value is greater than zero.

B.3 Vessel Emissions

B.3.1 Vessel Emission Factors

Representative Current and Proposed Annual Vessel Usage on the PMSR

Vessel/Class Type	Vessel Modeled	Source	Engine	Generator	Fuel Type	Underway: Emissions Factors (kg/hr) Propulsion Engines + Generators							Restricted Waters: Emissions Factors (kg/hr) Propulsion Engines + Generators						
						CO	NOx	HC	SOx	PM10	PM2.5	CO2	CO	NOx	HC	SOx	PM10	PM2.5	CO2
CG-47	CG-52 (BUNKER HILL)	U.S. Navy Vessel Engine Emission Report (12/5/2019)	MPGT LM2500	SSGTG 501-K17	MGO/F-76	40.00	166.00	3.00	80.00	6.00	6.00	42561.00	NO EMISSION FACTORS FOR RESTRICTED WATERS AS ALL OPERATIONS ARE ASSUMED TO BE >12 NM FROM SHORE						
DDG-51	DDG-51 (ARLEIGH BURKE)	U.S. Navy Vessel Engine Emission Report (10/25/2019)	MPGT LM2500	SSGTG 501-K34	MGO/F-76	41.00	222.00	3.00	96.00	7.00	7.00	51122.00							
LHA-6	LHA-6 (AMERICA)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MTG LM2500+	SSDG 12PA6B	MGO/F-76	12.00	217.00	13.00	56.00	7.00	7.00	29021.00							
SDTS	EDD-964	U.S. Navy Vessel Engine Emission Report (12/5/2019)	MPGT LM2500	SSGTG 501-K17	MGO/F-76	44.00	167.00	4.00	83.00	6.00	6.00	43786.00							
NSC (WMSL)-750	LCS-1 (FREEDOM)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MPDE 16PA6B-STC	MTG MT-30, SSDG V1708	F-76	21.00	85.00	1.00	32.00	4.00	4.00	11572.00							
LCS-1	LCS-1 (FREEDOM)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MPDE 16PA6B-STC	MTG MT-30, SSDG V1708	F-76	21.00	85.00	1.00	32.00	4.00	4.00	11572.00							
LCS-2	INDEPENDENCE	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MPDE 20V8000 M91, MPGT LM2500	SSDG 8V-396 TE54, BT 8V-396 TE54	F-76	35.00	85.00	1.00	29.00	4.00	4.00	11210.00							
FF-1096	LCS-1 (FREEDOM)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MPDE 16PA6B-STC	MTG MT-30, SSDG V1708	F-76	21.00	85.00	1.00	32.00	4.00	4.00	11572.00							
DDG 1000	DDG 1000 (ZUMWALT)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MTG MT-30, ATG MT-5	EDG C-18	F-76	15.00	72.00	1.00	39.00	3.00	3.00	16817.00							
LHD-1	LHD-1 (WASP)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	BOILER	EDG 16-251C	F-76	4.00	22.00	3.00	61.00	13.00	13.00	21606.00							
LPD-17	LPD-17 (SAN ANTONIO)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MPDE PC2.5STC	SSDG 3608 TIER 1	F-76	14.00	124.00	8.00	24.00	2.00	2.00	7605.00							
LSD-41	LSD-41 (WHIDBEY ISLAND)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MPDE PC2.5V	SSDG 38D8-1/8	F-76	10.00	152.00	5.00	16.00	1.00	1.00	7377.00							
CVN-68	CVN-68 (NIMITZ)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	NUCLEAR	EDG 16-645E5	F-76	1.00	8.00	0.00	1.00	0.00	0.00	310.00							
SSBN-726	SSBN-730 (HENRY M. JACKSON)	U.S. Navy Vessel Engine Emission Report (10/17/2019)	NUCLEAR	EDG 38D8-1/8	F-76	0.00	2.00	0.00	0.00	0.00	0.00	60.00							

Representative Annual Support Boat Usage on the PMSR

Vessel	Vessel Modeled	Source				Emissions Factors (kg/hr) Propulsion Engines + Generators							Emissions Factors (kg/hr) Propulsion Engines + Generators						
						CO	NOx	HC	SOx	PM10	PM2.5	CO2	CO	NOx	HC	SOx	PM10	PM2.5	CO2
ATLS-9701	12OMR8804	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MPDE 16V-92TA	SSDG 4-71	F-76	16.00	48.00	4.00	9.00	2.00	2.00	3086.00	16.00	48.00	4.00	9.00	2.00	2.00	3086.00
Contract Vessel	T-AGSE 4	U.S. Navy Vessel Engine Emission Report (12/5/2019)	MPDE 3516	SSDG C-18	F-76	10.00	32.00	1.00	4.00	0.32	0.32	1357.00	11.00	32.00	1.00	4.00	0.32	0.32	1366.00
Diane G	T-AGSE 4	U.S. Navy Vessel Engine Emission Report (12/5/2019)	MPDE 3516	SSDG C-18	F-76	10.00	32.00	1.00	4.00	0.32	0.32	1357.00	11.00	32.00	1.00	4.00	0.32	0.32	1366.00
SL-120	12OMR8804	U.S. Navy Vessel Engine Emission Report (10/17/2019)	MPDE 16V-92TA	SSDG 4-71	F-76	16.00	48.00	4.00	9.00	2.00	2.00	3086.00	16.00	48.00	4.00	9.00	2.00	2.00	3086.00

Representative Annual Target Boat Usage on the PMSR

Vessel	Vessel Modeled	Source				Emissions Factors (kg/hr) Propulsion Engines + Generators							Emissions Factors (kg/hr) Propulsion Engines + Generators						
						CO	NOx	HC	SOx	PM10	PM2.5	CO2	CO	NOx	HC	SOx	PM10	PM2.5	CO2
FACT/FAC	11MRX0804 (x2)	U.S. Navy Vessel Engine Emission Report (12/5/2019)	MPDE 6LY STP		F-76	2.00	14.00	0.00	2.00	0.00	0.00	796.00	2.00	14.00	0.00	2.00	0.00	0.00	796.00
HSMST		Draft Environmental Assessment for Naval Special Operations Training In Western Washington State. 2018	200 HP Outboard (2)		Gasoline	225.26	3.212	92.52	0.01	0.128	0.128	82.172	225.26	3.212	92.52	0.01	0.128	0.128	82.172
MST	40NS9101	U.S. Navy Vessel Engine Emission Report (10/31/19)	MPDE 3412	SSDG 3406	F-76	5.00	16.00	1.00	3.00	1.00	1.00	1035.00	5.00	16.00	1.00	3.00	1.00	1.00	1035.00
QST 35B	9MRX1001 (2)	U.S. Navy Vessel Engine Emission Report (12/5/2019)	MPGE VERADO 300		Gasoline	676.00	10.00	278.00	2.00	0.00	0.00	586.00	676.00	10.00	278.00	2.00	0.00	0.00	586.00
SDST		Draft Environmental Assessment for Naval Special Operations Training In Western Washington State. 2018	FX 2015 Cruiser SVHO		Gasoline	68.90	1.89	28.31	0.00	0.04	0.04	48.27	68.90	1.89	28.31	0.00	0.04	0.04	48.27

Ship Emissions Assumptions

Emissions were calculated for vessels based on information on participation in individual activities, based on information in the DOPAA and Chapter 3.
Ship emissions were calculated using emission factors from the NAVSEA EFC&EC Database. The database provides emission factors for Navy vessels operating within the ranges covered by PMSR.
Ship emissions for restricted and unrestricted waters were calculated using respective factors from the NAVSEA EFC&EC Database. If no restricted waters factors were available from the database, underway emissions factors were used.
Emissions from ships operating less than 12nm from shore are represented by individual training and testing activity numbers.
Emissions from ships operating greater than 12nm from shore are represented by ship steaming hours.
Vessel transit speed for operations between 3 and 12 nm from shore was assumed to be 10 knots for all support and target vessels
Vessel emissions for 0-3 nm and 3-12 nm was only calculated for support and target vessels transiting from the Port of Hueneme onto the target range
Time Spent by Support Boats for transit from port to 3nm (or 3nm to port) is assumed to be 1.5 hours in total, which includes engine/generator startup, shore power disconnect, and transit
Distance traveled was divided by the vessel speed to determine time in transit (e.g. for transit from shore to 3nm at a speed of 10 knots, the calculation is 3nm/10 knots). This calculation was used for all vessel transit between 3 and 12 NM as well for Target Boat transit between the port and 3 nm from shore
Diesel Fuel (F-76) was fuel type for diesels and generators, unless otherwise noted.
The CG-52 was used as the surrogate vessel for the CG-47 per OPNAV N452 instruction
The EDD-964 was used as a surrogate vessel for the SDTS per OPNAV N452 instruction
LCS-1 was used as a surrogate for the to be determined Future Frigate and NSC-750 per OPNAV N452 instruction
The SSBN-730 was used as a surrogate for the SSBN-726 per OPNAV N452 instruction
The SL-120 was used as a surrogate for the ATLS-9701 as the SL-120 has a similar propulsion and generator set, as well as fuel type and horsepower.
Two 11MRX0804 were used as the surrogate for the FACT/FAC as the 11MRX0804 uses 2 Yanmar 480 HP engines
Two 9MRX1001 were used as the surrogate for the QST-35A as the 9MRX1001 uses two V8 Mercury Marine 300 HP engines
This version is current as of 2/3/2020

B.3.2 Baseline Vessel Emissions

Representative Current and Proposed Annual Vessel Usage on the PMSR

Vessel	Current Baseline		Baseline Vessel Emissions 0-3 nm (tons per year)							Baseline Vessel Emissions 3-12 nm (tons per year)							Baseline Vessel Emissions >12 nm (tons per year)						
	Events	Total Hours	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
CG-47	66	410	NOT CALCULATED AS PART OF TRANSIT FROM PORT HUENEME							NOT CALCULATED AS PART OF TRANSIT FROM PORT HUENEME							18.08	75.02	1.36	36.16	2.71	2.71	17449.98
DDG-51	54	198															8.95	48.45	0.65	20.95	1.53	1.53	10122.14
LHA-6	41	202															2.67	48.32	2.89	12.47	1.56	1.56	5862.23
SDTS	51	190															9.22	34.98	0.84	17.38	1.26	1.26	8319.32
NSC (WMSL)-750	6	28															0.65	2.62	0.03	0.99	0.12	0.12	324.02
LCS-1	4	43															1.00	4.03	0.05	1.52	0.19	0.19	497.60
LCS-2	41	362															13.97	33.92	0.40	11.57	1.60	1.60	4058.01
FF-1096	0	0															0.00	0.00	0.00	0.00	0.00	0.00	0.00
DDG 1000	0	0															0.00	0.00	0.00	0.00	0.00	0.00	0.00
LHD-1	4	13															0.06	0.32	0.04	0.87	0.19	0.19	280.88
LPD-17	4	13															0.20	1.78	0.11	0.34	0.03	0.03	98.86
LSD-41	4	13															0.14	2.18	0.07	0.23	0.01	0.01	95.90
CVN-68	6	16															0.02	0.14	0.00	0.02	0.00	0.00	4.96
SSBN-726	19	93															0.00	0.21	0.00	0.00	0.00	0.00	5.58

Representative Annual Support Boat Usage on the PMSR

Vessel	Current Baseline		Baseline Vessel Emissions 0-3 nm (tons per year)							Baseline Vessel Emissions 3-12 nm (tons per year)							Baseline Vessel Emissions >12 nm(tons per year)						
	Events	Total Hours	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
ATLS-9701	23	121.9	1.2170	3.6509	0.3042	0.6845	0.1521	0.1521	212.93	0.37	1.10	0.09	0.21	0.05	0.05	63.88	2.15	6.45	0.54	1.21	0.27	0.27	376.18
Contract Vessel	36	190.8	1.3095	3.8096	0.1190	0.4762	0.0381	0.0381	147.53	0.36	1.14	0.04	0.14	0.01	0.01	43.97	2.10	6.73	0.21	0.84	0.07	0.07	258.92
Diane G	65	344.5	2.3645	6.8784	0.2150	0.8598	0.0688	0.0688	266.37	0.64	2.06	0.06	0.26	0.02	0.02	79.38	3.80	12.15	0.38	1.52	0.12	0.12	467.49
SL-120	74	392.2	3.9154	11.7462	0.9789	2.2024	0.4894	0.4894	685.09	1.17	3.52	0.29	0.66	0.15	0.15	205.53	6.92	20.75	1.73	3.89	0.86	0.86	1210.33

Representative Annual Target Usage on the PMSR

Vessel	Current Baseline		Baseline Vessel Emissions 0-3 nm (tons per year)							Baseline Vessel Emissions 3-12 nm (tons per year)							Baseline Vessel Emissions >12 nm(tons per year)						
	Events	Total Hours	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
FACT/FAC	20	106	0.01323	0.09259	0.00000	0.01323	0.00000	0.00000	4.78	0.04	0.28	0.00	0.04	0.00	0.00	14.33	0.23	1.64	0.00	0.23	0.00	0.00	84.38
HSMST	267	1415.1	19.88934	0.28360	8.16906	0.00088	0.01130	0.01130	6.58	59.67	0.85	24.51	0.00	0.03	0.03	19.75	351.38	5.01	144.32	0.02	0.20	0.20	116.28
MST	11	58.3	0.01819	0.05820	0.00364	0.01091	0.00364	0.00364	3.42	0.05	0.17	0.01	0.03	0.01	0.01	10.25	0.32	1.03	0.06	0.19	0.06	0.06	60.34
QST 35	120	636	26.82582	0.39683	11.03192	0.07937	0.00000	0.00000	21.10	80.48	1.19	33.10	0.24	0.00	0.00	63.29	473.92	7.01	194.90	1.40	0.00	0.00	372.70
SDST	5	26.5	0.11392	0.00312	0.04681	0.00001	0.00007	0.00007	0.07	0.34	0.01	0.14	0.00	0.00	0.00	0.22	2.01	0.06	0.83	0.00	0.00	0.00	1.28
		TOTAL	**55.67**	**26.92**	**20.87**	**4.33**	**0.76**	**0.76**	**1347.86**	**143.12**	**10.33**	**58.24**	**1.58**	**0.27**	**0.27**	**500.58**	**897.78**	**312.78**	**349.41**	**111.81**	**10.78**	**10.78**	**50067.35**

B.3.3 Alternative 1 (Preferred Alternative) Vessel Emissions

Representative Current and Proposed Annual Vessel Usage on the PMSR

Vessel	Alternative 1		Alternative 1 Vessel Emissions 0-3 nm (tons per year)							Alternative 1 Vessel Emissions 3-12 nm (tons per year)							Alternative 1 Vessel Emissions >12 nm (tons per year)						
	Events	Total Hours	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
CG-47	41	275	NOT CALCULATED AS PART OF TRANSIT FROM PORT HUENEME							NOT CALCULATED AS PART OF TRANSIT FROM PORT HUENEME							12.13	50.32	0.91	24.25	1.82	1.82	11704.25
DDG-51	36	132															5.97	32.30	0.44	13.97	1.02	1.02	6748.09
LHA-6	40	200															2.65	47.84	2.87	12.35	1.54	1.54	5804.19
SDTS	50	190															9.22	34.98	0.84	17.38	1.26	1.26	8319.32
NSC (WMSL)-750	6	28															0.65	2.62	0.03	0.99	0.12	0.12	324.02
LCS-1	40	360															8.33	33.73	0.40	12.70	1.59	1.59	4165.91
LCS-2	40	360															13.89	33.73	0.40	11.51	1.59	1.59	4035.59
FF-1096	40	360															8.33	33.73	0.40	12.70	1.59	1.59	4165.91
DDG 1000	3	30															0.50	2.38	0.03	1.29	0.10	0.10	504.51
LHD-1	4	13															0.06	0.32	0.04	0.87	0.19	0.19	280.88
LPD-17	4	13															0.20	1.78	0.11	0.34	0.03	0.03	98.86
LSD-41	4	13															0.14	2.18	0.07	0.23	0.01	0.01	95.90
CVN-68	6	16															0.02	0.14	0.00	0.02	0.00	0.00	4.96
SSBN-726	19	95															0.00	0.21	0.00	0.00	0.00	0.00	5.70

Representative Annual Support Boat Usage on the PMSR

Vessel	Alternative 1		Alternative 1 Vessel Emissions 0-3 nm (tons per year)							Alternative 1 Vessel Emissions 3-12 nm (tons per year)							Alternative 1 Vessel Emissions >12 nm (tons per year)						
	Events	Total Hours	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
ATLS-9701	23	121.9	1.22	3.65	0.30	0.68	0.15	0.15	212.93	0.37	1.10	0.09	0.21	0.05	0.05	63.88	2.15	6.45	0.54	1.21	0.27	0.27	376.18
Contract Vessel	24	127.2	0.87	2.54	0.08	0.32	0.03	0.03	98.35	0.24	0.76	0.02	0.10	0.01	0.01	29.31	1.40	4.49	0.14	0.56	0.04	0.04	172.61
Diane G	78	413.4	2.84	8.25	0.26	1.03	0.08	0.08	319.64	0.77	2.48	0.08	0.31	0.02	0.02	95.26	4.56	14.58	0.46	1.82	0.15	0.15	560.98
SL-120	74	392.2	3.92	11.75	0.98	2.20	0.49	0.49	685.09	1.17	3.52	0.29	0.66	0.15	0.15	205.53	6.92	20.75	1.73	3.89	0.86	0.86	1210.33

Representative Annual Target Usage on the PMSR

Vessel	Alternative 1		Alternative 1 Vessel Emissions 0-3 nm (tons per year)							Alternative 1 Vessel Emissions 3-12 nm (tons per year)							Alternative 1 Vessel Emissions >12 nm (tons per year)						
	Events	Total Hours	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
FACT/FAC	53	280.9	0.04	0.25	0.00	0.04	0.00	0.00	12.66	0.11	0.74	0.00	0.11	0.00	0.00	37.97	0.62	4.33	0.00	0.62	0.00	0.00	223.60
HSMST	511	2708.3	38.07	0.54	15.63	0.00	0.02	0.02	12.60	114.20	1.63	46.90	0.01	0.06	0.06	37.79	672.49	9.59	276.21	0.03	0.38	0.38	222.55
MST	23	121.9	0.04	0.12	0.01	0.02	0.01	0.01	7.14	0.11	0.37	0.02	0.07	0.02	0.02	21.42	0.67	2.15	0.13	0.40	0.13	0.13	126.17
QST 35	186	985.8	41.58	0.62	17.10	0.12	0.00	0.00	32.70	124.74	1.85	51.30	0.37	0.00	0.00	98.10	734.58	10.87	302.09	2.17	0.00	0.00	577.68
SDST	16	84.8	0.36	0.01	0.15	0.00	0.00	0.00	0.23	1.09	0.03	0.45	0.00	0.00	0.00	0.70	6.44	0.18	2.65	0.00	0.00	0.00	4.09
			88.93	**27.73**	**34.51**	**4.42**	**0.78**	**0.78**	**1381.34**	**242.80**	**12.46**	**99.16**	**1.82**	**0.31**	**0.31**	**589.96**	**1491.90**	**349.64**	**590.48**	**119.31**	**12.70**	**12.70**	**49732.28**

B.3.4 Alternative 2 Vessel Emissions

Representative Current and Proposed Annual Vessel Usage on the PMSR

Vessel	Alternative 2		Alternative 2 Vessel Emissions 0-3 nm (tons per year)							Alternative 2 Vessel Emissions 3-12 nm (tons per year)							Alternative 2 Vessel Emissions >12 nm (tons per year)						
	Events	Total Hours	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
CG-47	41	275	NOT CALCULATED AS PART OF TRANSIT FROM PORT HUENEME							NOT CALCULATED AS PART OF TRANSIT FROM PORT HUENEME							12.13	50.32	0.91	24.25	1.82	1.82	11704.25
DDG-51	36	132															5.97	32.30	0.44	13.97	1.02	1.02	6748.09
LHA-6	40	200															2.65	47.84	2.87	12.35	1.54	1.54	5804.19
SDTS	50	190															9.22	34.98	0.84	17.38	1.26	1.26	8319.32
NSC (WMSL)-750	6	28															0.65	2.62	0.03	0.99	0.12	0.12	324.02
LCS-1	40	360															8.33	33.73	0.40	12.70	1.59	1.59	4165.91
LCS-2	40	360															13.89	33.73	0.40	11.51	1.59	1.59	4035.59
FF-1096	40	360															8.33	33.73	0.40	12.70	1.59	1.59	4165.91
DDG 1000	3	30															0.50	2.38	0.03	1.29	0.10	0.10	504.51
LHD-1	4	13															0.06	0.32	0.04	0.87	0.19	0.19	280.88
LPD-17	4	13															0.20	1.78	0.11	0.34	0.03	0.03	98.86
LSD-41	4	13															0.14	2.18	0.07	0.23	0.01	0.01	95.90
CVN-68	6	16															0.02	0.14	0.00	0.02	0.00	0.00	4.96
SSBN-726	19	95															0.00	0.21	0.00	0.00	0.00	0.00	5.70

Representative Annual Support Boat Usage on the PMSR

Vessel	Alternative 2		Alternative 2 Vessel Emissions 0-3 nm (tons per year)							Alternative 2 Vessel Emissions 3-12 nm (tons per year)							Alternative 2 Vessel Emissions >12 nm (tons per year)						
	Events	Total Hours	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
ATLS-9701	23	121.9	1.22	3.65	0.30	0.68	0.15	0.15	212.93	0.37	1.10	0.09	0.21	0.05	0.05	63.88	2.15	6.45	0.54	1.21	0.27	0.27	376.18
Contract Vessel	24	127.2	0.87	2.54	0.08	0.32	0.03	0.03	98.35	0.24	0.76	0.02	0.10	0.01	0.01	29.31	1.40	4.49	0.14	0.56	0.04	0.04	172.61
Diane G	78	413.4	2.84	8.25	0.26	1.03	0.08	0.08	319.64	0.77	2.48	0.08	0.31	0.02	0.02	95.26	4.56	14.58	0.46	1.82	0.15	0.15	560.98
SL-120	74	392.2	3.92	11.75	0.98	2.20	0.49	0.49	685.09	1.17	3.52	0.29	0.66	0.15	0.15	205.53	6.92	20.75	1.73	3.89	0.86	0.86	1210.33

Representative Annual Target Usage on the PMSR

Vessel	Alternative 2		Alternative 2 Vessel Emissions 0-3 nm (tons per year)							Alternative 2 Vessel Emissions 3-12 nm (tons per year)							Alternative 2 Vessel Emissions >12 nm (tons per year)						
	Events	Total Hours	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NOx	HC	SOx	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
FACT/FAC	7	37.1	0.00	0.03	0.00	0.00	0.00	0.00	1.67	0.01	0.10	0.00	0.01	0.00	0.00	5.01	0.08	0.57	0.00	0.08	0.00	0.00	29.53
HSMST	106	561.8	7.90	0.11	3.24	0.00	0.00	0.00	2.61	23.69	0.34	9.73	0.00	0.01	0.01	7.84	139.50	1.99	57.30	0.01	0.08	0.08	46.16
MST	5	26.5	0.01	0.03	0.00	0.00	0.00	0.00	1.55	0.02	0.08	0.00	0.01	0.00	0.00	4.66	0.15	0.47	0.03	0.09	0.03	0.03	27.43
QST 35	49	259.7	10.95	0.16	4.50	0.03	0.00	0.00	8.61	32.86	0.49	13.51	0.10	0.00	0.00	25.84	193.52	2.86	79.58	0.57	0.00	0.00	152.18
SDST	3	15.9	0.07	0.00	0.03	0.00	0.00	0.00	0.04	0.21	0.01	0.08	0.00	0.00	0.00	0.13	1.21	0.03	0.50	0.00	0.00	0.00	0.77
	Total		27.77	26.53	9.40	4.28	0.76	0.76	1330.51	59.35	8.86	23.82	1.40	0.24	0.24	437.46	411.55	328.45	146.80	116.83	12.28	12.28	48834.27

B.4 Ordnance Emissions

	Emissions Factors (lbs/item)							Baseline Emissions (lbs/year)							Alternative 1 Emissions (lbs/year)							Alternative 2 Emissions (lbs/year)						
Ordnance Type	CO	NOx	VOC	SOx	PM10	PM2.5	Items Used in Baseline	CO	NOx	VOC	SOx	PM10	PM2.5	Items Used in Alternative 1	CO	NOx	VOC	SOx	PM10	PM2.5	Items Used in Alternative 2	CO	NOx	VOC	SOx	PM10	PM2.5
Bombs	61.1	0	0	0	0	0	22	1344.20	0.00	0.00	0.00	0.00	0.00	30.00	1833.00	0.00	0.00	0.00	0.00	0.00	55.00	3360.50	0.00	0.00	0.00	0.00	0.00
Small Caliber	0.0023	9.7E-05	0	0	5.2E-05	3.8E-05	8200	18.86	0.80	0.00	0.00	0.43	0.31	219230.00	504.23	21.31	0.00	0.00	11.42	8.31	23800.00	54.74	2.31	0.00	0.00	1.24	0.90
Medium Caliber	0.033	0.00045	0	0	0.0006	0.00045	1470	48.51	0.66	0.00	0.00	0.88	0.66	52000.00	1716.00	23.50	0.00	0.00	31.30	23.50	14200.00	468.60	6.42	0.00	0.00	8.55	6.42
Large Caliber	0.128	0.16	0	0	0.0095	0.00742	2000	256.00	320.00	0.00	0.00	19.00	14.84	10000.00	1280.00	1600.00	0.00	0.00	95.00	74.20	2230.00	285.44	356.80	0.00	0.00	21.19	16.55
Rockets	0.93	0.00526	0	0	0.4	0.289	261	242.73	1.37	0.00	0.00	104.40	75.43	624.00	580.32	3.28	0.00	0.00	249.60	180.34	427.00	397.11	2.25	0.00	0.00	170.80	123.40
							Totals (tons/year)	0.96	0.16	0.00	0.00	0.06	0.05	Totals (tons/year)	2.96	0.82	0.00	0.00	0.19	0.14	Totals (tons/year)	2.28	0.18	0.00	0.00	0.10	0.07

Assumptions:
Ordnance are grouped based on available emissions factors in the HSTT EIS.
Small caliber projectiles include cartridges up to 20mm caliber.
Medium caliber proectiles include cartridges between 30 mm and 50 mm in size.
Large caliber projectiles include cartridges larger than 50 mm in size.
All munitions are deployed at distances greater than 12nm

B.5 Record of Non-Applicability for Clean Air Act Conformity

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

B.5.1 Introduction

The United States (U.S.) Environmental Protection Agency (EPA) published Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule, in the November 30, 1993 Federal Register (40 Code of Federal Regulations [CFR] sections 6, 51, and 93). On April 5, 2010, the EPA finalized revisions to the General Conformity Rule (75 Federal Register 17253–17279). The U.S. Department of the Navy (Navy) published Navy Guidance for Compliance with the Clean Air Act (CAA) General Conformity Rule (July 30, 2013), as referenced in Chief of Naval Operations Manual M-5090.1, Environmental Readiness Program Manual dated September 3, 2019. These publications provide implementing guidance to document CAA Conformity Determination requirements. This RONA is provided to document compliance of the Proposed Action.

Federal regulations state that "no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity that does not conform to an applicable State Implementation Plan." It is the responsibility of the federal agency to determine whether a federal action conforms to the applicable State Implementation Plan before the action is taken (40 CFR part 51.850[a]).

Federal actions may be exempt from conformity determinations if their emissions do not exceed designated de minimis levels for the criteria pollutants of nonattainment or maintenance in the areas of the federal action (40 CFR part 51.853[b]). The applicable de minimis levels (in tons/year) for the South Central Coast Air Basin (SCCAB), which encompasses the region affected by the Proposed Action, are listed in Table B-1.

Table B-1: Nonattainment and Maintenance Criteria Pollutants for the SCCAB

Criteria Pollutant/Precursor	*de minimis levels (tons/year)*
Carbon Monoxide (CO)	100
Oxides of Nitrogen (NO_X)	50
Volatile Organic Carbons (VOC)	50
Oxides of Sulfur (SOx)	100
Particulate Matter ≤ 10 microns in diameter (PM10)	100
Particulate Matter ≤ 2.5 microns in diameter (PM2.5)	100

B.5.2 Proposed Action

Action Proponent: Commander, U.S. Fleet Forces Command

Location: Point Mugu Sea Range (PMSR), California

Proposed Action Name: Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS), PMSR

Proposed Action and Emissions Summary:

The Proposed Action is to conduct military readiness activities within the PMSR. The Proposed Action includes testing and training activities analyzed in the 2002 PMSR EIS/OEIS and other actions analyzed since 2002. The proposed tempo reflects a variation of tempo changes across platforms depending on current and future requirements. However, generally it represents an overall increase in activities above what was covered in the 2002 PMSR EIS/OEIS and subsequent Environmental Assessments since 2002. Proposed testing and training activities are similar to those that have occurred in the Study Area for decades.

Alternative 1 (Preferred Alternative) is based on the highest potential annual level of increased tempo for planned operations as identified during interviews with range test managers, test and scheduled training mission requirements, or existing National Environmental Policy Act documents for flight operations, vessel operations, aerial targets, surface targets, and ordnance. The majority of test and scheduled training activities proposed under Alternative 1 are the same as or similar to those currently conducted currently. This alternative includes activities subject to previous analysis that are currently ongoing and have historically occurred on the PMSR. Using the anticipated maximum level of potential testing and scheduled training ensures that Alternative 1 meets the purpose of and need for the Proposed Action, ensures adequate capacity to meet surge years to accommodate wartime conditions, and provides the Navy with the capacity to meet long-term testing and scheduled training requirements. Alternative 1 represents a varying level of changes in tempo over existing activities, where some activities have declined, while others increased. Alternative 1 allows for increased tempo in the northern half of the Sea Range (W-532), primarily increases in Electronic Warfare and Directed Energy events that are reasonably expected to occur over the long term. Alternative 1 covers operations and activities that were not reasonably foreseeable at the time of the 2002 PMSR EIS/OEIS, such as Electronic Warfare, Directed Energy, long-range weapons, and unmanned systems.

Emissions from existing proposed aircraft activities were based on data developed for the project noise analyses and special studies on aircraft operations from the Navy Aircraft Environmental Support Office, as well as the U.S. Air Force. To estimate aircraft emissions, the operating modes, number of hours of operation, and type of engine for each type of aircraft were evaluated. All fixed wing aircraft are assumed to travel to and from testing and training ranges at or above 3,000 feet above mean sea level. Activities or portions of those testing and training activities occurring below 3,000 feet are included in emissions estimates.

The methods for estimating military ship and boat emissions involve evaluating the type of activity and generating the average running hours for ships in each operational area, both within state waters and beyond state waters. The types of military ships and boats, as well as the numbers of activities for the alternatives, are derived from range records and Navy subject matter experts regarding ship participant data. For all alternatives, the hourly data was used in conjunction with emission factors data generated from the Naval Sea Systems Command Navy and Military Sealift Command Marine Engine Fuel

Consumption and Emission Calculator to calculate the emissions from the propulsion and onboard generation systems. Data from the calculator included emission factors for each type of propulsion engine and type of onboard electrical power generation system by ship type, as well as the fuel used by engine systems.

Based on the air quality analysis for the Proposed Action in the project's National Environmental Policy Act document (currently identified as Alternative 1, the maximum estimated emissions of applicable pollutants would be below the conformity de minimis levels for the SCCAB. Therefore, emissions from the Proposed Action would show conformity under the CAA. The estimated annual conformity emissions for operations and applicable conformity de minimis levels for the Proposed Action are shown in Table B-2.

Table B-2: Estimated Annual Air Pollutant Emissions from Testing and Training Activities between 0 and 3 NM from Shore in the South Central Coast Air Basin, Alternative 1 (Preferred Alternative)

Criteria Pollutant	Annual Emissions (tons per year)					
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$
Alternative 1 Emissions	89.03	27.92	34.54	4.44	0.84	0.84
Current Environmental Baseline Emissions	55.72	27.06	20.89	4.34	0.79	0.79
Difference From Baseline	33.31	0.86	13.65	0.10	0.05	0.05
De Minimis Threshold	100	50	50	100	100	100

Notes: Individual values may not add exactly to total values due to rounding. CO = carbon monoxide, NO_X = nitrogen oxides, NO_2 = nitrogen dioxide, PM_{10} = particulate matter ≤ 10 microns in diameter, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, SO_2 = sulfur dioxide, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compound

Affected Air Basin: South Central Coast Air Basin

Date RONA Prepared: February 3, 2020

RONA Prepared by: ManTech International

B.5.3 Proposed Action Exemption(s)

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

B.5.4 Attainment Area Status and Emissions Evaluation Conclusion

The Proposed Action would occur within the SCCAB, which is the same geographic area as Ventura County. The Navy concludes that the conformity *de minimis* levels for applicable criteria pollutants would not be exceeded as a result of implementing the Proposed Action. Therefore, the Proposed Action is exempt from a formal conformity determination. The Navy concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA Approval

Signature: Sarah J. Delisle

Name/Rank: Sarah Delisle NM05 Date: 2/6/2020

Position: Head, NAVAIR Range Sustainability

This page intentionally left blank.