DRAFT ENVIRONMENTAL ASSESSMENT
REGULATION OF UNITED STATES COAST GUARD VESSEL AND TRAINING DISCHARGES IN GREATER FARALLONES AND CORDELL BANK NATIONAL MARINE SANCTUARIES

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TABLE OF CONTENTS

FIGURES

TABLES

1.0 INTRODUCTION, PURPOSE OF, AND NEED FOR ACTION

1.1 Summary of Proposed Action

The National Oceanic and Atmospheric Administration (NOAA)'s proposed action would allow the United States Coast Guard (USCG) to continue to discharge in areas within Greater Farallones and Cordell Bank national marine sanctuaries (GFNMS and CBNMS) during routine vessel operations and training for "live fire" (also called "use of force" or "gunnery") and search and rescue (SAR) activities. NOAA proposes to amend the GFNMS and CBNMS regulations to allow these discharges. The USCG may need to discharge untreated sewage and graywater (galley, bath, and shower water) that does not meet the definition of "clean" in the GFNMS and CBNMS regulations[1] during routine operations when holding tank capacities are exceeded on USCG vessels. USCG live fire and SAR training exercises include discharge of ammunition and pyrotechnic materials. The National Marine Sanctuaries Act (NMSA; see below) directs NOAA to protect national marine sanctuary resources and habitats, reduce conflicts that may occur among user groups, and ensure enforcement of the sanctuaries' regulations.

1.2 Background

National Marine Sanctuaries

The NMSA charges NOAA with managing marine protected areas as part of the National Marine Sanctuary System (16 United States Code [U.S.C.] § 1431 (b)(1)). The Office of National Marine Sanctuaries (ONMS) is the federal office within NOAA that manages the National Marine Sanctuary System. The mission of ONMS is to identify, protect, conserve, and enhance the natural and cultural resources, values, and qualities of the National Marine Sanctuary System for this and future generations throughout the nation. ONMS serves as the trustee for 13 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments, among them Greater Farallones National Marine Sanctuary (GFNMS) and Cordell Bank National Marine Sanctuary (CBNMS) off the coast of California.

GFNMS was designated in 1981 and protects approximately 3,295 square miles (mi.) (2,488 square nautical miles [nm]). CBNMS was designated in 1989 and protects approximately 1,286 square mi. (971 square nm). NOAA expanded both sanctuaries in 2015 (80 FR 13078). Figure 1-1 depicts the existing sanctuaries' boundaries. It also depicts their previous, or pre-expansion, boundaries and the expansion area, added to the existing 1981 and 1989 boundaries for GFNMS and CBNMS in 2015, respectively.

Both sanctuaries' regulations prohibit discharging or depositing, from within or into the sanctuary, other than from a cruise ship, any material or other matter aside from specified exceptions (15 Code of Federal Regulations [CFR] §922.82(a)(2) and §922.112(a)(2)(i)). A separate prohibition specifically relates to cruise ship discharges (15 CFR §922.82(3) and §922.112(a)(2)(ii)). Both the GFNMS and CBNMS regulations also prohibit discharging or depositing, from beyond the boundary of the sanctuary, any material or other matter that subsequently enters the sanctuary and injures a sanctuary resource or quality (15 CFR §922.82(a)(4); 15 CFR §922.112(a)(iii)). The three other national marine sanctuaries on the West Coast have similar regulatory prohibitions on discharges.

The discharge prohibitions are aimed at maintaining and improving water quality within national marine sanctuaries to enhance conditions for their living marine resources.

[1] See Section 1.2 of this document for specific regulatory definitions and exceptions relevant to this proposed action.

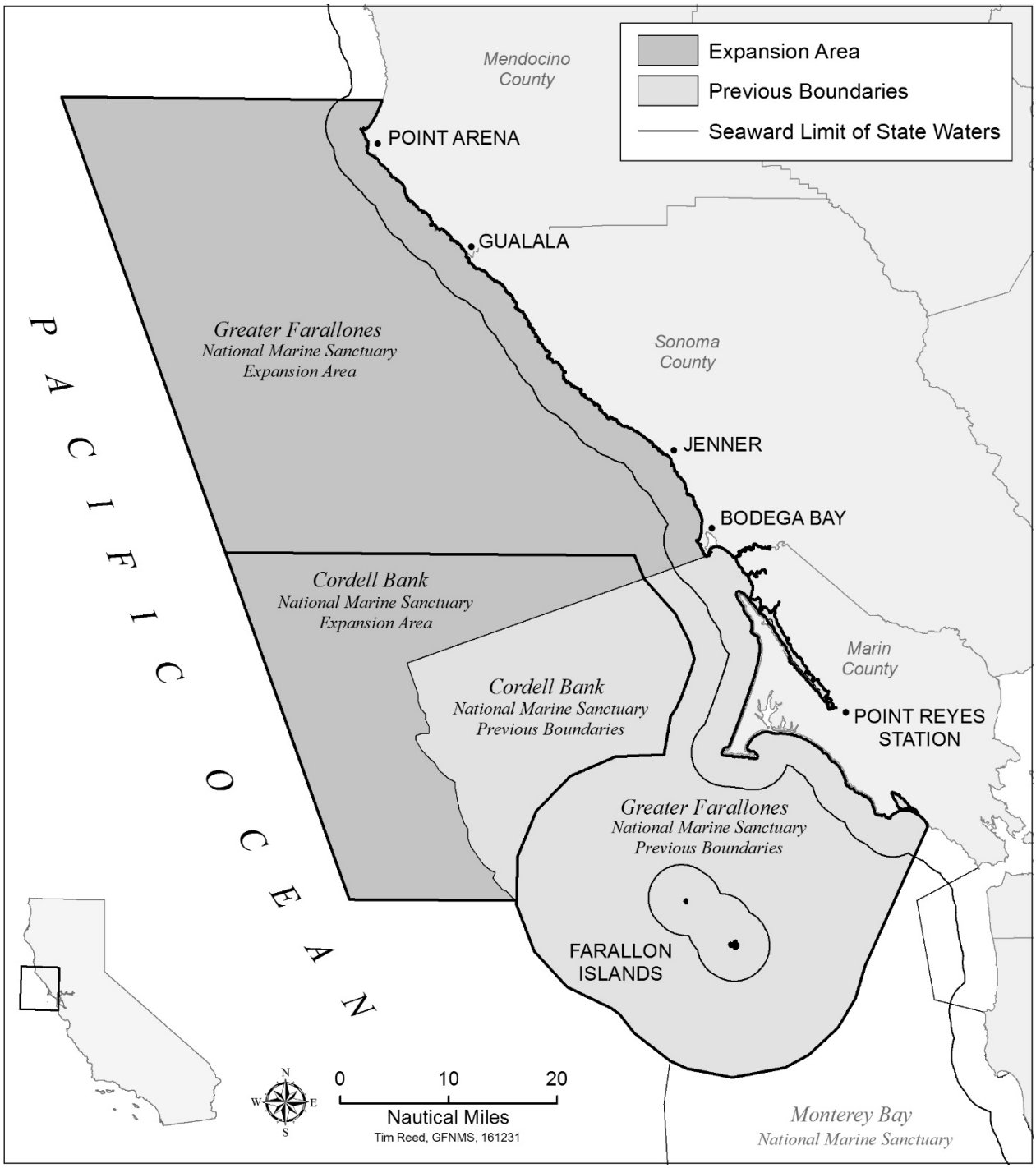


Figure 1-1. Greater Farallones and Cordell Bank National Marine Sanctuaries.

Specific definitions and exceptions in the GFNMS and CBNMS regulations and the Federal Water Pollution Control Act (FWPCA; more commonly referred to as the Clean Water Act) are relevant to the proposed action, excerpted as follows.

Definitions:

- "Clean" means not containing detectable levels of a harmful matter (15 CFR §922.81; and §922.111);
- "Graywater" means galley, bath, and shower water (33 U.S.C § 1322(a)(11);
- "Harmful matter" means any substance, or combination of substances, that because of the quantity, concentration, or physical, chemical, or infectious characteristics may pose a present or potential threat to sanctuary resources and qualities (15 CFR §922.81; and §922.111); and
- "Sewage" means human body wastes and the wastes from toilets and other receptacles intended to receive or retain body wastes (33 U.S.C. § 1322(a)(6)).

Exceptions to the GFNMS and CBNMS regulatory prohibitions on discharge:

- For a vessel less than 300 gross registered tons (GRT), or a vessel 300 GRT or greater without sufficient holding tank capacity to hold sewage while within the sanctuary, clean effluent generated incidental to vessel use by an operable Type I or II marine sanitation device that is approved in accordance with section 312 of the FWPCA, as amended; marine sanitation devices must be locked in a manner that prevents discharge or deposit of untreated sewage (15 CFR §922.82(a)(2)(ii) and §922.112(a)(2)(i)(B));
- For a vessel less than 300 GRT, or a vessel 300 GRT or greater without sufficient holding tank capacity to hold graywater while within the sanctuary, clean graywater as defined by section 312 of the FWPCA (15 CFR §922.82(a)(2)(iv) and §922.112(a)(2)(i)(D));
- Activities necessary to respond to an emergency threatening life, property or the environment (15 CFR §922.82(c) and §922.112(b)); and
- Activities allowed in accordance with national marine sanctuary permits (15 CFR §922.82(d) and §922.112(d)).

In addition, NOAA intends to refer to graywater that does not meet the definition of "clean," (15 CFR §922.81 and §922.111), as "non-clean graywater" hereafter in this document.

An overview of other legislative and regulatory requirements relevant to the proposed action is in section 3.1 of this document.

United States Coast Guard Missions

The USCG is one of the armed forces of the United States and a military service within the Department of Homeland Security (14 U.S.C. § 1). The USCG is charged with carrying out eleven maritime safety, security and stewardship missions. Upon declaration of war or when the President directs, the USCG operates under the authority of the U.S. Department of the Navy.

One of the missions of the USCG is to enforce or assist in the enforcement of all applicable federal laws on, under, and over the "high seas" and "waters subject to the jurisdiction of the United States" (which are defined at 33 CFR §2.32 and §2.38, respectively). As part of this mission, the USCG supports resource protection efforts within GFNMS and CBNMS by providing routine surveillance and enforcement of the NMSA and other environmental laws and their implementing regulations (14 U.S.C. §§ 2 and 89). Per Section 307(k) of the NMSA (16 USC 1437(k)), the area of application and enforceability includes the territorial sea of the United States and the exclusive economic zone.[2] Law enforcement activities for the two sanctuaries are also conducted by other agencies, primarily NOAA's Office of Law Enforcement, the California Department of Fish and Wildlife, the National Park Service (within GFNMS), and several local agencies.

In addition to enforcement, the USCG also supports resource protection in national marine sanctuaries and facilitates public and private uses[3], such as leading planning and response activities for oil spills and other incidents within its area of jurisdiction. Additionally, by conducting SAR missions, the USCG strives to minimize the loss of life, injury, and property damage or loss at sea by finding and rendering aid to those in distress (USCG 2012). When vessels are in distress, USCG frequently takes actions that prevent or minimize vessel damage or loss, thereby protecting sanctuary habitats and resources from marine debris and pollution. Other USCG missions that support national marine sanctuary management include: ports, waterways, and coastal security; aids to navigation, including tending buoys; living marine resources; marine safety; and marine environmental protection.

The USCG also conducts missions in GFNMS and CBNMS not related to sanctuary management, such as defense readiness, drug interdiction, migrant interdiction, and law enforcement related to these missions. The USCG maintains high states of readiness to enable immediate or rapid response to potential threats and challenges to the U.S. and its interests in the maritime domain (USCG 2012). The readiness training relevant to the proposed action include live fire training and SAR training. Live fire training is an exercise in which a realistic scenario is demonstrated with the use of specific equipment, weapons or weapons systems, and real ammunition. SAR training is conducted to create realistic scenarios that would be typical in the search for and provision of aid to vessels or people who are in distress or imminent danger.

Interagency Coordination

Discussions between USCG and GFNMS on potentially allowing discharges in GFNMS associated with the activities described above had been ongoing for several years, prior to the expansion of the sanctuaries. During the period from 2012 to 2014, USCG District 11 held a series of meetings with GFNMS focused on discharges of flares, ammunition, and targets related to live fire and SAR training. During this time, GFNMS and USCG identified several potential discrete, seasonal areas for training-related discharges near the entrance of San Francisco Bay in areas managed by GFNMS as well as possible operating protocols (Dunagan 2013a, Dunagan 2013b and Giammanco 2014a). The intention was to consider allowing discharges from USCG trainings via a national marine sanctuary permit if the discharges could be conducted in a way that would minimize potential impacts to marine mammals and

[2] "The territorial sea henceforth extends to 12 nautical miles from the baselines of the United States determined in accordance with international law." (Presidential Proclamation 5928, Dec. 27, 1988). The Exclusive Economic Zone (EEZ) of the U.S. extends 200 nm from the territorial sea baseline and is adjacent to the territorial sea of the U.S. (Presidential Proclamation 5030. Mar. 10, 1983). Under certain U.S. fisheries laws, the "exclusive economic zone" is defined as having an inner boundary coterminous with the seaward (or outer) boundary of each of the coastal states.

[3] One of the purposes and policies of the NMSA is "to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities" (16 U.S.C. § 1431 (b)(6).

other living marine resources (Giammanco 2014a and Giammanco 2014b). However, an application for a permit was never submitted by the USCG, and therefore a permit was not issued by NOAA.

In the course of the rulemaking to expand the boundaries of GFNMS and CBNMS, NOAA received a letter from the USCG stating the prohibitions proposed for the expansion areas had the potential to impair USCG surface and airborne use of force training activities, SAR training activities, and the ability of Coastal Patrol Boats to conduct any mission within the sanctuaries. Of specific concern to the USCG were the proposed discharge prohibitions that would be applicable to USCG during these training activities and vessel sewage discharges. These prohibitions could affect the ability of the USCG to operate and train to remain "mission ready." The USCG stated it would like to have a designated training area within sanctuary boundaries or a blanket exemption [from the sanctuaries' prohibitions] to negate impacts to USCG operations (Schultz 2013).

In 2014, USCG and NOAA re-initiated discussions to address USCG concerns about its discharges in both GFNMS and CBNMS. In January 2015, NOAA and the USCG entered into interagency consultations to address both agencies' concerns. USCG requested an exemption from the GFNMS and CBNMS regulations for discharges of untreated vessel sewage and non-clean graywater for all USCG vessels operating in GFNMS and CBNMS. The USCG also requested an exemption from the two sanctuaries' regulations for discharges of ammunition and pyrotechnic materials discharged from vessels and aircraft during live fire and SAR training exercises. The pyrotechnic materials would include warning projectiles, flares, smoke floats, and marine markers. NOAA and the USCG have been coordinating since the time of the request and during the preparation of this document and a proposed rule.

The final rule for the GFNMS and CBNMS boundary expansions was published in the *Federal Register* on March 12, 2015 (80 FR 13078) and became effective on June 9, 2015 (80 FR 34047). However, as a result of the interagency consultations to ensure the rule did not impair USCG operations necessary to fulfill its multi-purpose missions, the rule postponed the effective date for the discharge requirements in the expansion areas for both sanctuaries with regard to USCG activities. This time period was intended to give NOAA time to consider a proposal to allow certain USCG discharge activities in GFNMS and CBNMS upon finalizing the expansions. Four subsequent six-month postponements of the effectiveness of the discharge requirements were published in the *Federal Register* to provide adequate time for interagency consultation, completion of this environmental assessment, and determination of NOAA's final action following publication of a proposed rule and receipt of public comment. These were published December 1, 2015 (80 FR 74985), May 31, 2016 (81 FR 34268), December 6, 2016 (81 FR 87803), and June 7, 2017 (82 FR 26339). Without further NOAA action, the discharge prohibitions in the expansion areas would become effective with regard to USCG activities on December 9, 2017. If NOAA has not made a final decision on this action by that time, it may publish another *Federal Register* notice (separately from a proposed rule) to postpone the effectiveness of the discharge requirements.

United States Coast Guard Activities in GFNMS and CBNMS

Of primary concern to USCG is that certain USCG vessels have limited capacity to store sewage and graywater, and are without Type I or II marine sanitation devices onboard to treat the wastewater prior to discharge. Accordingly, these USCG vessels would not qualify for existing discharge exemptions in the two sanctuaries for clean effluent and clean graywater. The USCG provided information to support their request to exempt from the sanctuaries' prohibitions of vessel discharges of untreated sewage and graywater and discharges of ammunition and pyrotechnic materials from aircraft and vessels during training exercises for use of force (live fire) and SAR (McGuire 2015). The USCG also expressed general concern about impacts on all of its missions from the prohibitions. The USCG has recommended, due to the likely limited impact of the USCG actions, that NOAA consider establishing an exemption for USCG

actions similar to existing exemptions provided for Department of Defense (DoD) activities in the GFNMS and CBNMS regulations (McGuire 2016).

In meetings, the USCG indicated to NOAA that, prior to the expansion of GFNMS and CBNMS, it was able to comply with the sanctuaries' vessel discharge regulations by discharging untreated vessel sewage and non-clean graywater in ocean waters outside GFNMS and CBNMS or by pumping its vessel wastewater out at shoreside pump-out facilities. According to the USCG, the expansion of GFNMS and CBNMS, with the resulting larger sizes of the sanctuaries (see Figure 1-1) and extension of the discharge prohibitions to the expanded portions of the sanctuaries would make it difficult for the USCG to fulfill its missions while also complying with the vessel discharge prohibitions. Certain USCG vessels are unable to treat and hold sewage and graywater and may need to travel long distances to USCG shoreside sewage pump-out facilities in Bodega Bay and San Francisco Bay or the ocean waters where these discharges are allowed, which, in some circumstances, may negatively affect USCG missions due to increased transit time to make the discharges.

Similarly, with regard to training activities prior to the expansion, the USCG indicated to NOAA that planning and conducting these exercises outside the sanctuaries' boundaries was logistically and economically beneficial, given that they were able to train within relatively short distances from USCG stations without violating any sanctuary discharge regulations. The USCG states its maritime enforcement, defense readiness, and SAR capabilities are enhanced by conducting live fire and SAR exercises in the areas in which their personnel normally operate (McGuire 2016; Coito 2017a). SAR/pyrotechnics training is an annual requirement for all boat crew members (Coito 2017a).

Due to the delay of GFNMS and CBNMS discharge regulations taking effect with respect to USCG activities, at least four classes of USCG vessels are currently allowed to discharge untreated vessel sewage and graywater from their holding tanks within the expansion areas of GFNMS and CBNMS (see Table 1-1). Additional information related to the types and quantities of the USCG discharges is presented in Section 3.3, including the numbers of vessels in each vessel class operating in the sanctuaries and their holding tank types, and details about the ammunition and pyrotechnics components. The delayed effectiveness has also allowed the USCG to discharge materials during training activities within the expansion areas of GFNMS and CBNMS. The USCG proposes to conduct 3-5 live fire training events per year in the expansion areas (Coito 2017a), including discharging ammunition and pyrotechnic warning rounds during live fire training, and discharging pyrotechnic materials during SAR training (see Table 1-2). Each training is estimated to take less than one day (Coito 2016b).

Public Process

From April 21 to May 31, 2016, NOAA accepted public comments and information to determine the relevant scope of issues and range of alternatives for NOAA to address in this environmental assessment (81 FR 23445). NOAA accepted comments via the Federal e-Rulemaking Portal, by mail, and at three public meetings that were held in Sausalito, Bodega Bay and Gualala, California on May 10, 11 and 12, respectively. The USCG submitted comments (McGuire 2016) during this period. Comments received by NOAA from a variety of commenters are available at www.regulations.gov, under the docket number /NOAA-NOS-2016-0043. NOAA considered these comments in preparing this document. Comments on this document and a proposed rule will be accepted by NOAA, pursuant to a notice that will be published in the *Federal Register*.

Table 1-1. Summary of Types and Estimated Quantities of Proposed USCG Vessel Sewage and Graywater Discharges

Activity	Description of Discharge	Quantity (at Capacity) for Individual Vessels (by Class) *	Number of Events
Vessel Sewage Discharges from Holding Tanks	Untreated sewage	Coastal Patrol Boat – 381 gallons Seagoing Buoy Tender – 1,755 gallons Coastal Buoy Tender – 844 gallons National Security Cutter – 3,351 gallons	As needed throughout the year, per operational considerations
Vessel Graywater Discharges from Holding Tanks	Non-clean graywater (galley, bath and/or shower water)	Coastal Patrol Boat - 58 gallons	As needed throughout the year, per operational considerations

* Note that three Marine Protector Class Coastal Patrol Boats, one Seagoing Buoy Tender, one Coastal Buoy Tender, and three National Security Cutters operating in the GFNMS and CBNMS expansion areas may discharge untreated sewage; the Coastal Patrol Boats may also discharge non-clean graywater. Additional vessels in these classes may operate in or transit through the two sanctuaries short term. USCG told NOAA that National Security Cutters do not discharge untreated sewage in the sanctuaries. At least five other classes of USCG vessels, which do not discharge untreated sewage and non-clean graywater, operate in or transit through the GFNMS and CBNMS expansion areas. See Table 3-3.

Sources: Coito 2016a, Coito 2016b, USCG 2016a, and USCG 2015a.

Table 1-2. Summary of Types and Estimated Maximum Numbers of Proposed USCG Training Discharges

Activity	Description of Discharge	Estimated Numbers per Year	Number of Events
Live Fire Training Ammunition Discharges*	Ammunition from 4 weapon types: 1) copper-jacketed rounds from .50-caliber mounted machine guns 2) copper-jacketed rounds from M240 (7.62 mm) machine guns 3) 12-gauge Copper Sabot rounds from shotguns 4) M-16 rifle rounds (5.56 mm)	Average 1,200 rounds (total for all weapon types) (Maximum 18,000 rounds for all weapon types under a "worst case scenario"**)	3 to 5 days per year***
Live Fire Training Pyrotechnics Discharges	LA-51 aerial flash bang pyrotechnics (for warning)	180 rounds	3 to 5 days per year
SAR Training Pyrotechnics Discharges	L283 pyrotechnic flares (Mk 124 MOD 0 Marine Smoke and Illumination)	90 flares and/or smoke floats	3 to 5 days per year
	L312 white parachute flares (Mk 127)		3 to 5 days per year
	L553 smoke floats (Mk 25)		3 to 5 days per year
	L133 pencil flare kits (Mk 79)		3 to 5 days per year
	L580 Kilgore smoke float and flare (Mk 58)		3 to 5 days per year

* Ammunition discharges from all weapon types include cartridge case, bullet or shot, propellant powder, and primer.

** A "worst case scenario" describes when a serious national security event has happened and the USCG needs to expand its normal law enforcement training program to address the incident.

*** The USCG estimates it would conduct training exercises 3 to 5 days per year, involving live fire and SAR (USCG 2015a, Coito 2017a) in the expansion areas of GFNMS and CBNMS. Generally, each crew member must train at least two times per year to maintain their live fire training qualifications.

Sources: USCG 2015a, Coito 2016b, Coito 2016c, Coito 2017a, Coito 2017b, and U. S. Department of the Army 2017.

1.3 Purpose of Proposed Action

The purpose of the proposed action would be to enable the USCG to continue mission operations that entail certain discharges in the expanded portions of GFNMS and CBNMS, including missions to protect the sanctuaries' resources and enforce the sanctuaries' regulations, in a manner compatible with protection of the sanctuaries' resources. The purpose would be to enable the USCG to: 1) continue surveillance of activities in GFNMS and CBNMS; 2) conduct monitoring and enforcement activities to uphold the NMSA and its implementing regulations; and 3) conduct other USCG mission activities during non-emergency situations that support sanctuary management. The proposed action would also support the USCG in training its personnel to be ready for emergency SAR and use of force activities.

The proposed action would support the NMSA [16 USC 1437] section 301(b), "Purposes and Policies," particularly: "(2) to provide for comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner which complements existing authorities;…(6) to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of these marine areas not prohibited pursuant to other authorities; …[and] (7) to develop and implement coordinated plans for the protection and management of these areas with appropriate Federal agencies…."

NMSA [16 USC 1437] section 307(i) on enforcement, "Coast Guard Authority Not Limited," would also be supported by the proposed action. It states, "Nothing in this section shall be considered to limit the authority of the Coast Guard to enforce this or any other Federal law under section 89 of title 14."

Lastly, in the final rule to expand CBNMS and GFNMS, NOAA committed to considering ways for the USCG to continue to perform its mandated operations in the sanctuaries, including considering whether to allow certain discharges as described above in this section. The preamble of the final rule specifically mentioned that:

> "…NOAA will consider how to address Coast Guard's concerns and will consider, among other things, whether to exempt certain Coast Guard activities in both sanctuaries similar to existing exemptions provided for Department of Defense activities (15 CFR 922.82(b) and 922.112(c)). The 6-month postponement will begin at the time the regulations for the expansion areas become effective…The public, other federal agencies, and interested stakeholders will be given an opportunity to comment on various alternatives that are being considered. This will include the opportunity to review any proposed rule and related environmental analyses." (80 FR 13078).

1.4 Need for Proposed Action

As previously stated, according to the USCG, the expansion of GFNMS and CBNMS, with the resulting larger sizes of the sanctuaries and extension of the discharge prohibitions to the expanded portions of the sanctuaries, would make it difficult for the USCG to both fulfill its missions and comply with the discharge prohibitions in the expansion areas. Certain USCG vessels have constraints for treating and holding sewage and non-clean graywater and traveling to pump-out treatment facilities shoreside, or in ocean waters outside national marine sanctuary boundaries (where allowed by state and federal regulations). USCG vessels with these constraints are thus ineligible for existing discharge exemptions in the GFNMS and CBNMS regulations. The USCG maritime enforcement, defense readiness, and SAR capabilities, which support comprehensive and coordinated management of the sanctuaries, are enhanced by conducting live fire and SAR exercises in the areas in which their personnel normally operate. The USCG vessel discharges of untreated sewage and non-clean graywater and training-related live ammunition from vessels and pyrotechnic discharges from vessels and aircraft have been a part of USCG

operations in the GFNMS and CBNMS expansion areas since before the two sanctuaries expanded in 2015. In facilitating these USCG activities, NOAA's proposed action also needs to ensure the activities are conducted to the extent compatible with the primary objective of resource protection.

1.5 Content of the Environmental Assessment

This draft environmental assessment was prepared to consider the range of issues related to discharge regulations in both sanctuaries and the USCG's compliance with these regulations. NOAA presents various alternatives in this document that would address the USCG's request to allow for USCG's operational vessel and training discharges in GFNMS and CBNMS. NOAA also reviews the existing conditions in the affected area and evaluates the environmental impacts that may occur as a result of implementing each alternative.

2.0 DESCRIPTION OF ALTERNATIVES

In developing the preferred alternative and other alternatives for analysis in this environmental assessment, NOAA used the following criteria to determine a range of alternatives, including all reasonable alternatives and alternatives considered and eliminated from further consideration:

- Must be feasible;
- Must be consistent with the purposes and policies of the NMSA;
- Must achieve the overall purpose and need for action; and
- Must avoid, to the maximum extent possible, significant adverse effects on sanctuary resources and user groups of the sanctuary.

The National Environmental Policy Act (NEPA) has a requirement, among others, that a proposal for a federal action includes a description of alternatives to the action being proposed (42 U.S.C. § 4332(C)(iii)).

Section 2 of this environmental assessment describes the proposed alternatives NOAA is considering to implement the proposed action. Section 4 of this document contains the analyses of the environmental consequences of NOAA's proposed alternatives.

At this point, it is useful to explain two descriptive terms, "federal waters" and "state waters", below, used in this document when describing the proposed alternatives and in Sections 3 and 4:

- "federal waters" include all waters within CBNMS and portions of GFNMS from where California "state waters" end (definition below) to the seaward limit of the sanctuaries (refer to Figure 1-1); and

- "state waters" refer to the portion of GFNMS from the California shoreline (including around the Farallon Islands) to approximately 3.5 miles (3 [nautical miles] nm) from shore (California Harbors and Navigation Code 775.5[h]; California State Lands Commission 2016; and United States of America v. State of California (135 S.Ct. 563 (Mem) (2014)). CBNMS is not located within state waters (refer to Figure 1-1).

The proposed action pertains to two different components of USCG discharges: vessel discharges of untreated sewage and non-clean graywater, and USCG training-related discharges of ammunition and pyrotechnic materials. NOAA is considering three alternatives for each of the two types of discharge. In Section 2.1, NOAA presents its preferred alternative: Sewage/Graywater Alternative 1 and Training Alternative 1. Section 2.2, presents the other alternatives NOAA is considering as follows: Sewage/Graywater Alternative 2, Sewage/Graywater Alternative 3 (No Action), Training Alternative 2, and Training Alternative 3 (No Action). The two discharge types are not inherently connected; NOAA could select any of the three sewage/graywater discharge alternatives and pair it with any of the three training discharge alternatives.

2.1 Preferred Alternative

NOAA's preferred alternative for addressing the proposed action has two discharge components. The first component, described in Section 2.1.1, addresses USCG vessel discharges of untreated sewage and non-clean graywater, and the second component, described in Section 2.1.2, addresses USCG training-related discharges of ammunition and pyrotechnic materials. Under the preferred alternative, NOAA proposes to amend national marine sanctuary regulations to include exceptions to allow both types of discharges in the federal waters of the expansion areas of GFNMS and CBNMS.

2.1.1 Sewage/Graywater Alternative 1 (Preferred Alternative): Allow USCG Vessel Sewage and Graywater Discharges in the Federal Waters of the GFNMS and CBNMS Expansion Areas

Under this component of the proposed preferred alternative, NOAA would allow USCG vessels to discharge untreated sewage and non-clean graywater in the federal waters of the expansion areas of GFNMS and CBNMS, beyond about 3.5 miles (3 nm) from the shoreline (Figure 2-1). This exception, and the areas in which the discharges would be allowed, would be specified in amended GFNMS and CBNMS regulations. USCG discharges of untreated sewage and non-clean graywater would continue, as per the current status quo in those federal waters, where USCG vessel discharges have been part of routine USCG vessel operational practices since before the sanctuaries were expanded in 2015. These discharges have been allowed to continue because of NOAA's decision to temporarily delay the effective date of applying sanctuary discharge prohibitions to the USCG vessel discharges while NOAA assesses these activities and their potential environmental effects.

The discharges would not be allowed to take place in state waters within the GFNMS expansion area, consistent with other existing regulatory requirements and USCG practices. The Clean Water Act requires (in Section 312) that vessels with installed toilets must only discharge sewage through a Type I or II marine sanitation device within three miles of shore (33 U.S.C. 1322(h)(4); 33 U.S.C. 1362(7)-(8)). The California Harbors and Navigation Code sections 775 (a)(2) and (b) requires compliance with the Clean Water Act. There is also a U.S. Environmental Protection Agency (USEPA)-designated No Discharge Zone (NDZ) prohibiting sewage discharges in the marine waters of the state that applies to specified vessels of 300 gross tons or greater (USEPA and CalEPA 2012), which would apply to several classes of USCG vessels. Further, the USCG Vessel Environmental Manual includes a restriction on discharging raw sewage within 3.5 miles (3 nm) of land. Graywater generated on vessels in those classes with separate holding tanks for graywater would be considered clean under the GFNMS and CBNMS regulations, and their graywater discharges could be made under the existing regulatory exceptions for graywater.

Under the preferred alternative, the USCG would continue to abide by the existing prohibitions on these operational vessel discharges within the pre-expansion boundaries of the two sanctuaries; there would be no changes to the regulatory prohibitions or exceptions applicable to the pre-expansion boundaries of the two sanctuaries. In selecting a preferred alternative, NOAA considered the impact analysis (discussed in Section 4) and what alternative would best achieve the purpose and need identified above. The preferred alternative would propose no changes to the USCG's current practices for the discharges in the expansion area for GFNMS and CBNMS. Further, through discussions between the two agencies, the USCG stated it also preferred this alternative among those NOAA is considering for the proposed action.

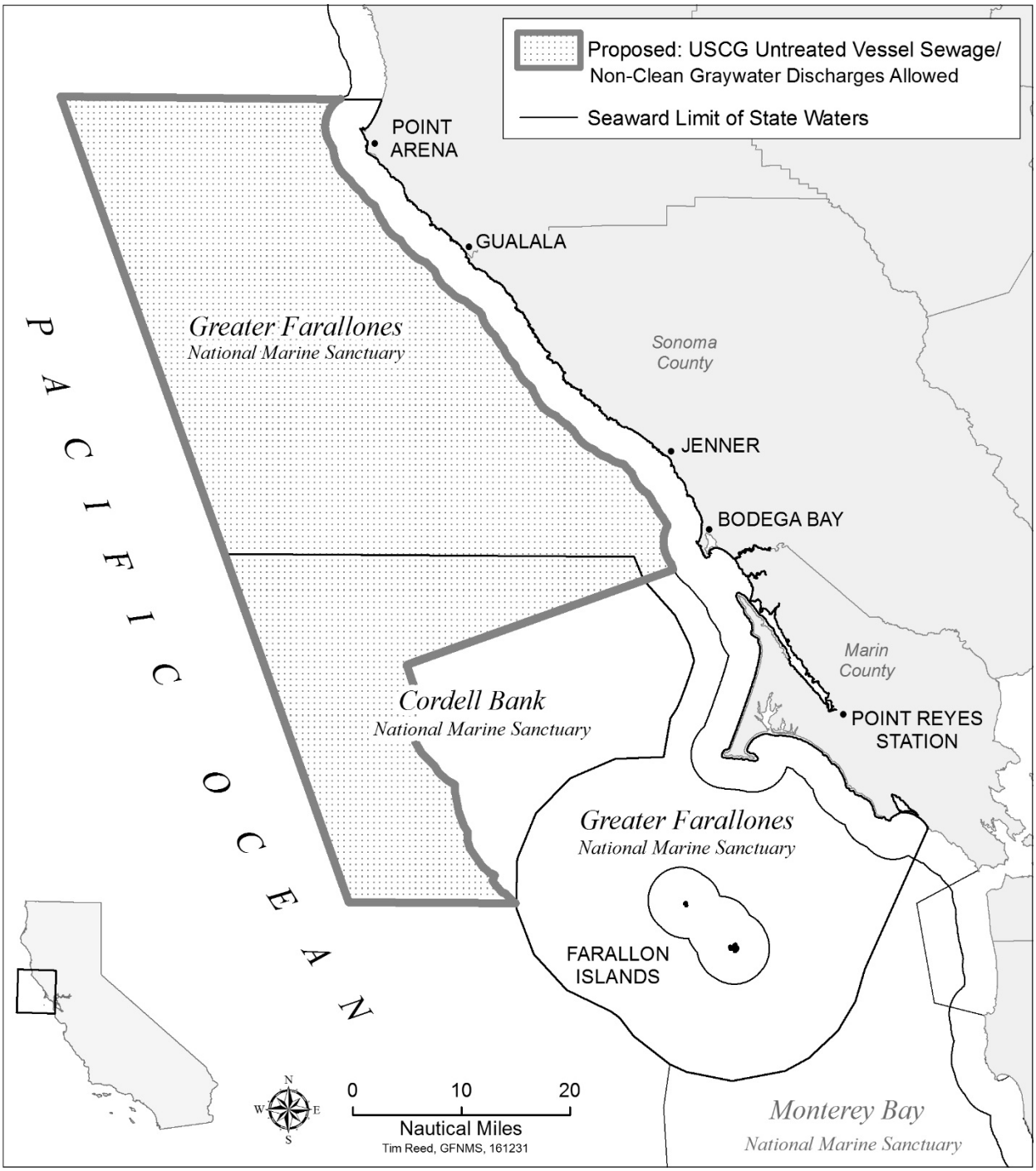


Figure 2-1. Sewage/Graywater Alternative 1 (Preferred Alternative)

2.1.2 Training Alternative 1 (Preferred Alternative): Allow Discharges of Ammunition and Pyrotechnic Materials in Federal Waters of the GFNMS and CBNMS Expansion Areas

For training discharges, NOAA would allow discharges of ammunition and pyrotechnic materials from USCG vessels and aircraft during live fire and SAR training exercises throughout the federal waters of the expansion areas of GFNMS and CBNMS (Figure 2-2). This exception and the areas in which the discharges would be allowed would be specified in the amended GFNMS and CBNMS regulations. This alternative would maintain the status quo in these waters with respect to USCG discharges of ammunition and pyrotechnic materials for training purposes, as, prior to expansion of GFNMS and CBNMS, the sanctuary prohibitions on discharges did not apply to the expansion areas, which are areas in which USCG conducts its live fire and SAR training exercises. These discharges have been allowed to continue because of NOAA's decision to temporarily delay the effective date of applying sanctuary discharge prohibitions to the USCG vessel discharges while NOAA assesses these activities and their potential environmental effects.

The USCG has stated that SAR and live fire exercises took place offshore in the GFNMS and CBNMS expansion areas in the past, prior to the sanctuaries' expansion in 2015. This alternative would allow the USCG to retain the ability to conduct the discharges related to such training there, at various times during the year when USCG personnel required training.

Under the preferred alternative, the USCG would continue to abide by the existing prohibitions on these operational vessel discharges within the pre-expansion boundaries of the two sanctuaries; there would be no changes to the regulations covering those portions of the sanctuaries. In selecting a preferred alternative, NOAA considered the impact analysis (discussed in Section 4) and what alternative would best achieve the purpose and need identified above. The preferred alternative would propose no changes to the USCG's current practices for the discharges in the expansion area for GFNMS and CBNMS. Further, through discussions between the two agencies, the USCG stated it also preferred this alternative among those NOAA is considering for the proposed action.

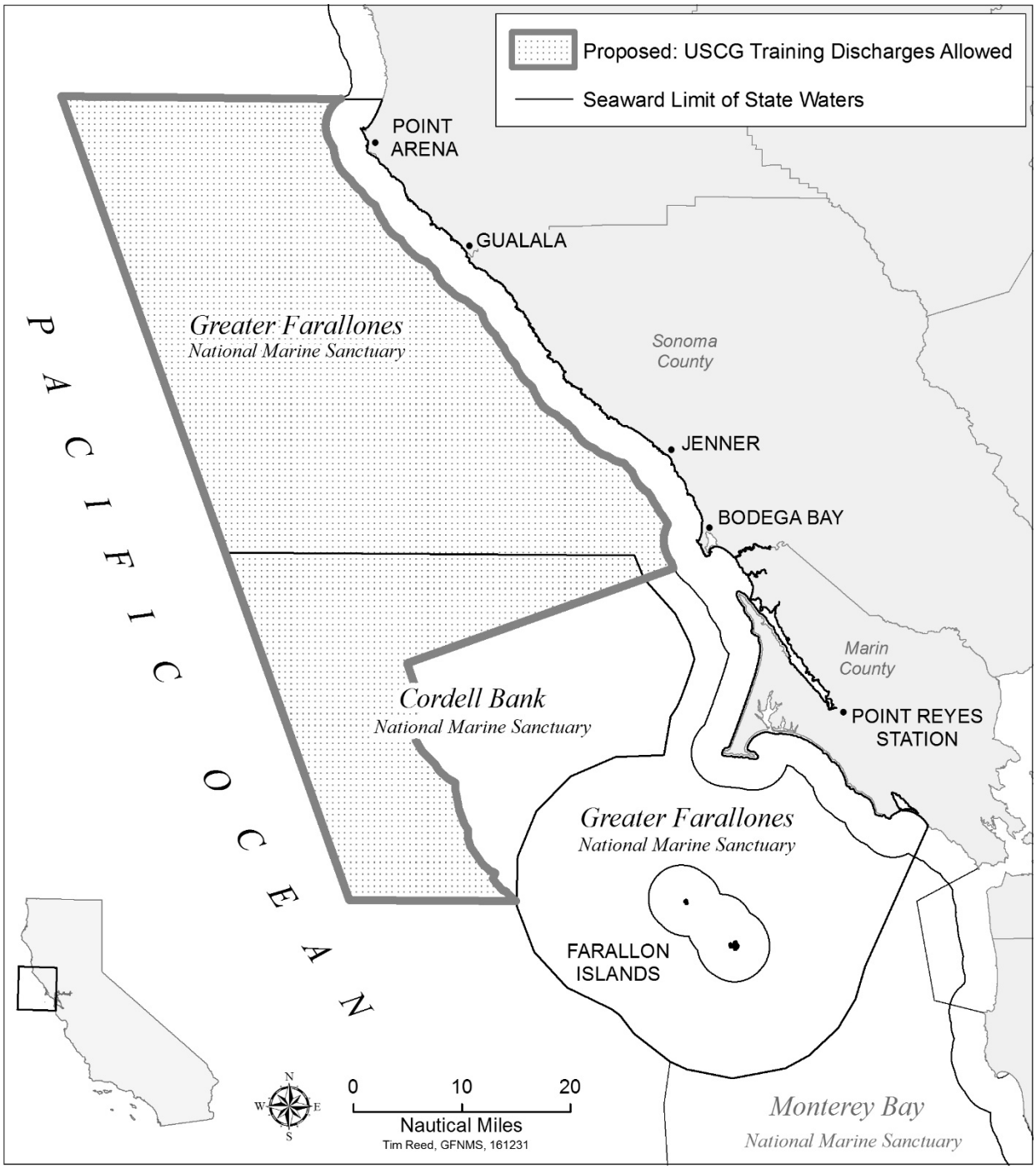


Figure 2-2. Training Alternative 1 (Preferred Alternative)

2.2 Other Proposed Alternatives

NOAA considered other possible alternatives in addition to the proposed preferred alternative. Accordingly, NOAA proposes one other alternative and a no-action alternative to address the USCG sewage and graywater discharges, and one other alternative and a no-action alternative to address the USCG training discharges. The descriptions of these alternatives are in Sections 2.2.1 – 2.2.4 below.

2.2.1 Sewage/Graywater Alternative 2: Allow USCG Vessel Sewage and Graywater Discharges in the Federal Waters of GFNMS and in CBNMS

In Sewage/Graywater Alternative 2, NOAA would allow discharges of untreated sewage and non-clean graywater from USCG vessels in all federal waters of GFNMS and CBNMS, including the pre- and post-expansion areas of both sanctuaries, via a regulatory exception (Figure 2-3). Discharges would be allowed only beyond state waters, (3.5 miles (3 nm) from the shoreline) in GFNMS (with coordinates of the area specified in the amended regulations), and throughout CBNMS. Because CBNMS boundaries are all in federal waters, USCG vessel discharges would be allowed throughout CBNMS. The USCG requested a broad exemption for USCG discharges throughout GFNMS and CBNMS (Schultz 2016); this alternative reflects a consideration of that request, while also remaining consistent with other existing discharge regulations in state waters.

2.2.2 Sewage/Graywater Alternative 3: No Action – Discharge Regulations Become Effective for USCG Discharges in the GFNMS and CBNMS Expansion Areas

Under Sewage/Graywater Alternative 3, NOAA would take no further action with respect to discharges of untreated sewage and non-clean graywater from USCG vessels in GFNMS and CBNMS. NOAA would not take steps to amend the regulations to allow these discharges. In this alternative, NOAA would take no further action to postpone the effectiveness of the discharge prohibitions for USCG. Consequently, the current discharge regulations contained in the final rule for the expansion of GFNMS and CBNMS (80 FR 13078) would go into effect December 9, 2017, and USCG would not be able to lawfully discharge untreated sewage or non-clean graywater from its vessels within the GFNMS and CBNMS expansion areas during routine, non-emergency operations (Figure 2-4). The USCG could pump out vessel sewage and non-clean graywater to vessel-based or shoreside wastewater facilities or discharge in ocean waters outside the sanctuaries' boundaries (where allowed by the Clean Water Act and other regulatory requirements).

As discussed below in Section 2.4, the USCG could choose to apply for a national marine sanctuary permit for their discharges at any time. For the purpose of the proposed action and alternatives, however, NOAA focuses on possible regulatory exceptions to the discharge prohibition in GFNMS and CBNMS regulations. Therefore, the no action alternative would mean that discharges would be prohibited.

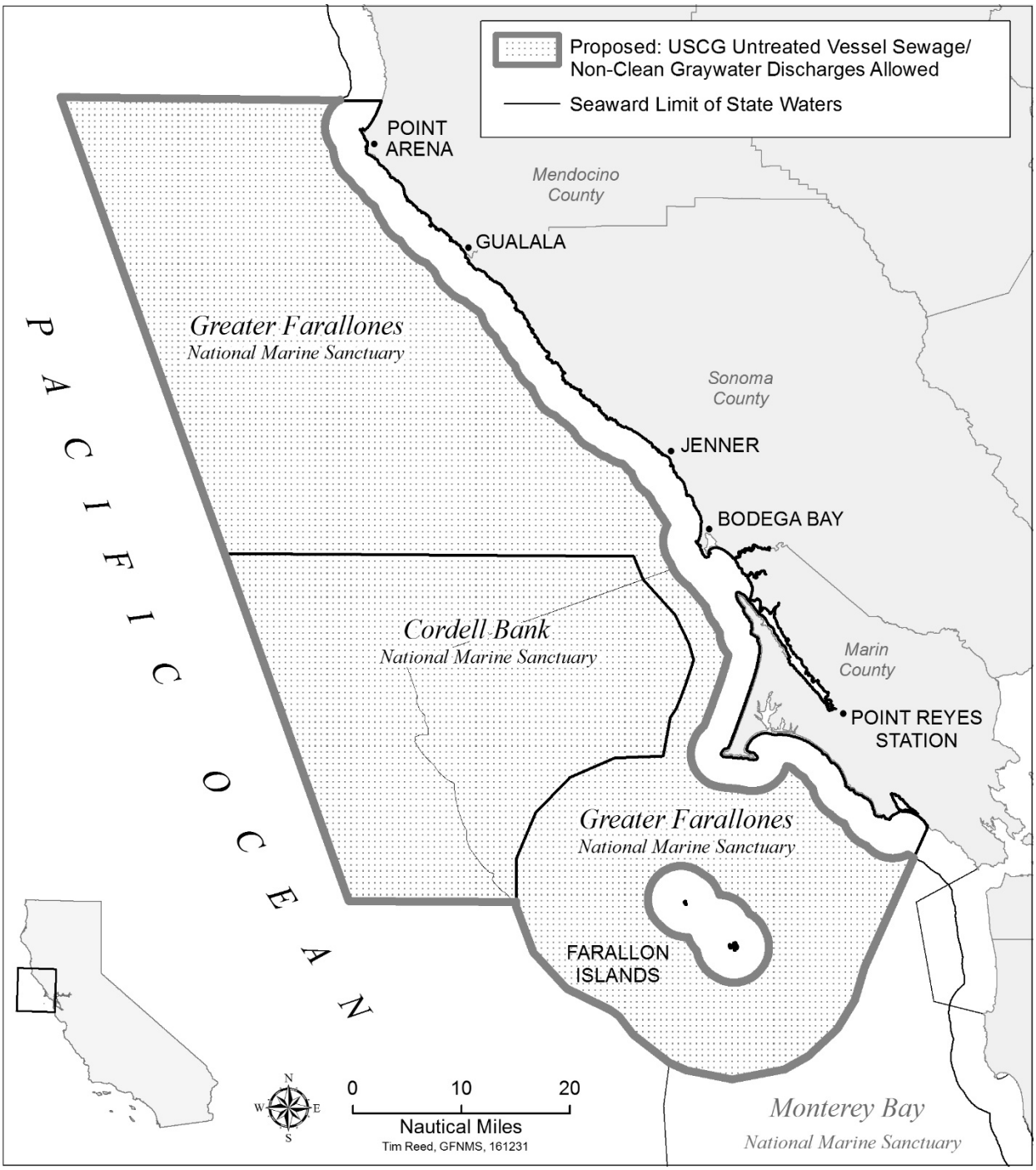


Figure 2-3. Sewage/Graywater Alternative 2

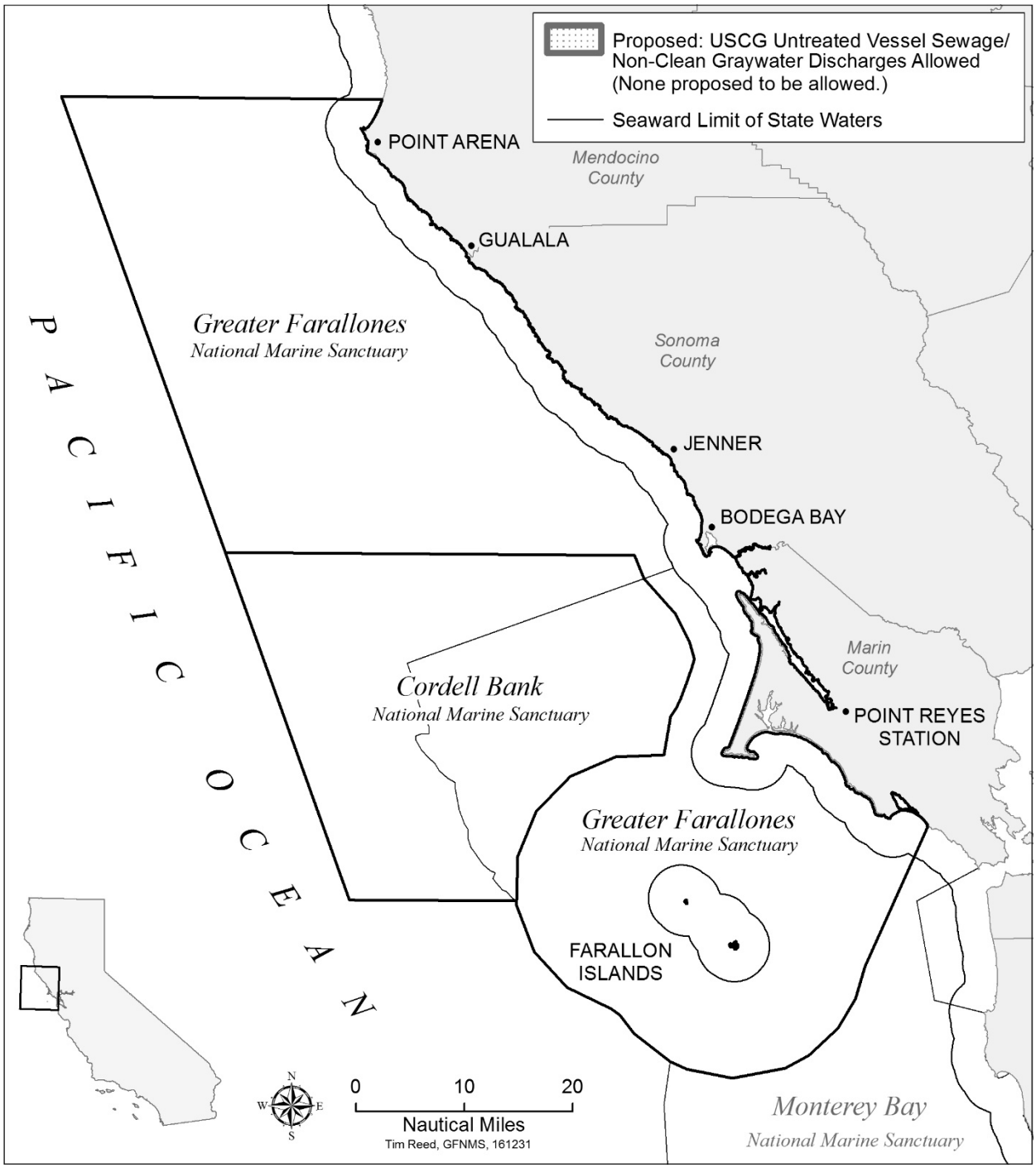


Figure 2-4. Sewage/Graywater Alternative 3

2.2.3 Training Alternative 2: Allow Discharges of Ammunition and Pyrotechnic Materials in a Portion of the Federal Waters of the GFNMS and CBNMS Expansion Areas

Under Training Alternative 2, NOAA would allow USCG discharges of ammunition and pyrotechnic materials during training exercises within a portion of the GFNMS and CBNMS expansion areas in federal waters, outside of the territorial sea (i.e., approximately 14 miles [12 nm] from shore out to approximately 23 miles [20 nm] from shore (Figure 2-5). These exceptions would be specified in amended GFNMS and CBNMS regulations, as would the areas in which the discharges would be allowed.

The geographic coordinates of this area would be listed in the amended GFNMS and CBNMS regulations. USCG training discharges would occur within smaller sectors (or "cells") of the larger approved area at various times during the year when USCG personnel required training. The USCG proposed this area to NOAA as one that would meet its operational needs for live fire and SAR training. As under Training Alternative 1 (the preferred alternative), this area has been and is currently available to the USCG to use for training activities and related discharges of ammunition and pyrotechnic materials.

Training-related discharges would not be allowed outside the specified area within GFNMS and CBNMS. There would be no changes to the regulations in the pre-expansion boundaries of the sanctuaries.

2.2.4 Training Alternative 3: No Action - Discharge Regulations Become Effective for USCG Discharges in the GFNMS and CBNMS Expansion Areas

In Training Alternative 3, NOAA would take no further action with respect to USCG discharges of ammunition and pyrotechnic materials from USCG vessels and aircraft during live fire and SAR training exercises conducted in GFNMS and CBNMS. NOAA would not take steps to amend the regulations to allow these discharges through an exception (Figure 2-6). The discharge requirements contained in the final rule for the expansion of GFNMS and CBNMS (80 FR 13078) would become effective on June 9, 2017, with regard to USCG training activities in the expansion areas of GFNMS and CBNMS.

As discussed below in Section 2.4, the USCG could choose to apply for a national marine sanctuary permit for their discharges at any time. For the purpose of the proposed action and alternatives, however, NOAA focuses on possible regulatory exceptions to the discharge prohibition in GFNMS and CBNMS regulations. Therefore, the no action alternative would mean that discharges would be prohibited.

2.3 Overview of Alternatives

Table 2-1 provides a summary of the alternatives NOAA is considering (see Sections 2.1 and 2.2), including implementation strategies and locations, for the USCG discharges in GFNMS and CBNMS.

As described in Section 1.2, the existing discharge regulations have broad exemptions, such as for emergencies and clean graywater; these would be applicable under each proposed alternative.

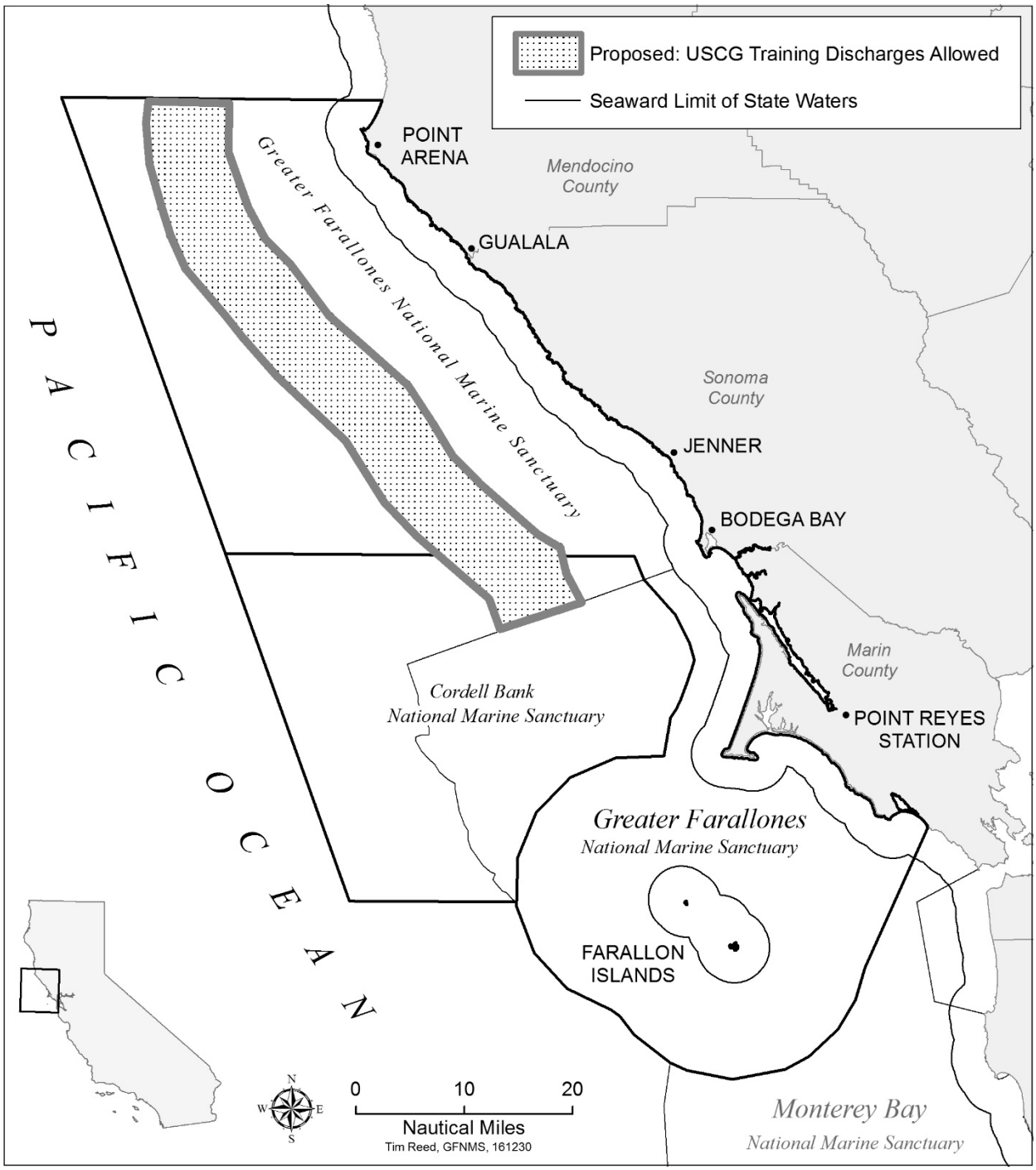


Figure 2-5. Training Alternative 2

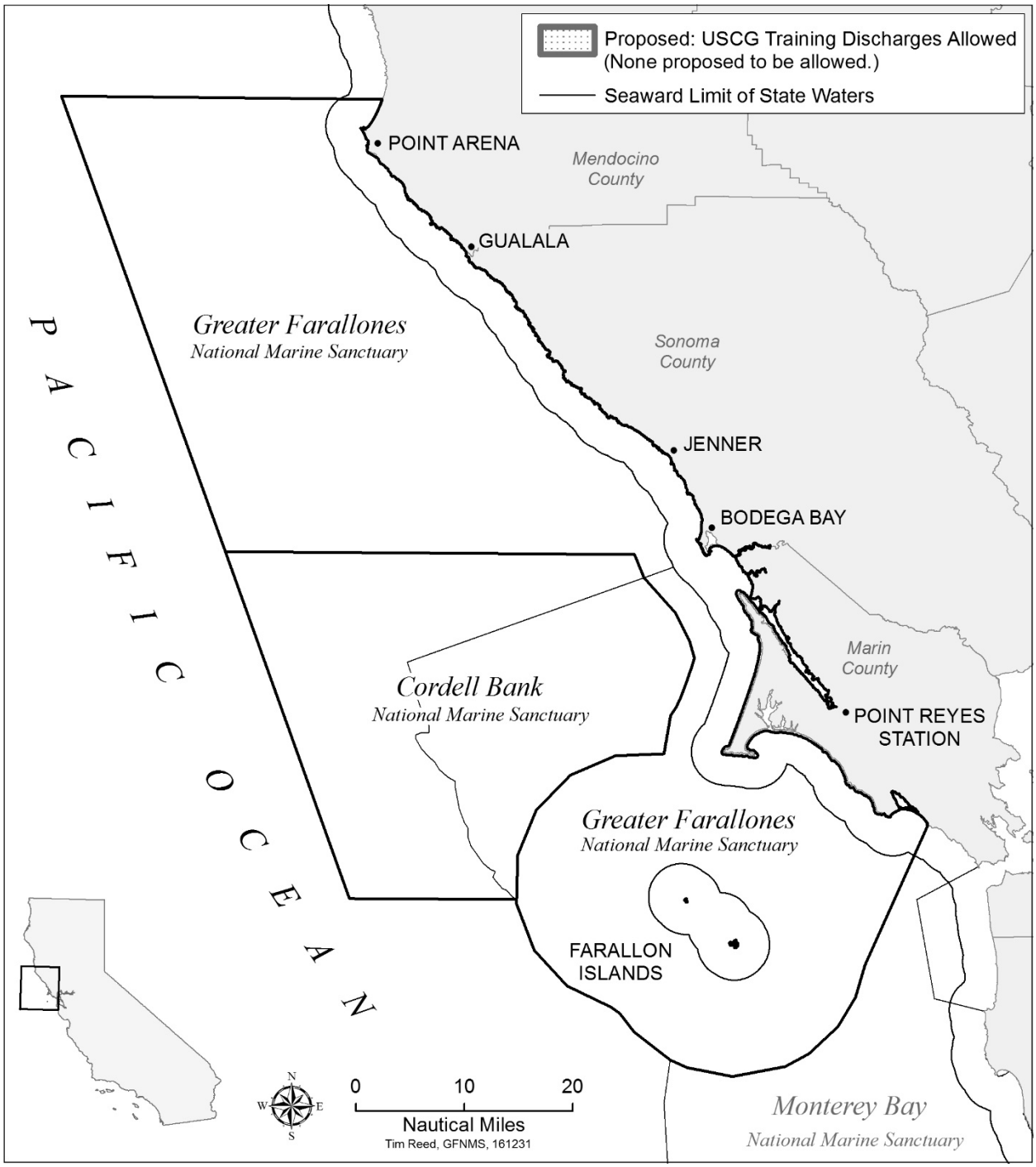


Figure 2-6. Training Alternative 3

Table 2-1. Overview of Alternatives for Proposed USCG Sewage/Graywater and Training Discharges in GFNMS and CBNMS

Alternative # - Implementation Strategy	Locations Where Proposed USCG Vessel and Training Discharges * Would Be Allowed				Figure #
	In Previous Boundaries of Sanctuaries	In Expansion Areas of Sanctuaries	In Federal Waters of Sanctuaries (> 3 nm from shore)	In State Waters of GFNMS (<3 nm from shore)	
Sewage/Graywater Alternative 1 (Preferred) - Amend Regulations	No	Yes	Yes	No	Figure 2-1
Training Alternative 1 (Preferred) - Amend Regulations	No	Yes	Yes	No	Figure 2-2
Sewage/Graywater Alt. 2 – Amend Regulations	Yes	Yes	Yes	No	Figure 2-3
Sewage/Graywater Alt. 3 - No-Action - Previously Delayed Discharge Regulations Take Effect	No	No	No	No	Figure 2-4
Training Alt. 2 – Amend Regulations	No	Yes	Yes – allowed in a specified area, approx. 14 miles [12 nm] from shore to approx. 23 miles [20 nm]	No	Figure 2-5
Training Alt. 3 No-Action - Previously Delayed Discharge Regulations Take Effect	No	No	No	No	Figure 2-6

* Under the proposed action, discharges would include untreated sewage and non-clean graywater from vessels and ammunition and pyrotechnic materials related to training activities.

2.4 Alternatives Considered and Eliminated

Other alternatives that were considered prior to selecting the proposed alternatives (described above), but which were eliminated from further consideration are discussed below.

Sewage and Graywater Discharges

NOAA considered an alternative to allow USCG vessel discharges of untreated sewage and graywater that would not meet the definition of clean throughout all waters (both state and federal) of GFNMS and CBNMS. However, NOAA eliminated this alternative from further consideration because untreated sewage may not be discharged within California's state waters under other statutes and regulations. Since the Clean Water Act (in Section 312) requires vessels with installed toilets to only discharge sewage through a Type I or II marine sanitation device within three miles of shore, the USCG would only be able to discharge untreated sewage in the federal waters of the two sanctuaries. Also, the California Harbors and Navigation Code sections 775 (a)(2) and (b) require compliance with the Clean Water Act. Furthermore, the USCG Vessel Environmental Manual also includes the restriction on discharging untreated sewage within 3.5 miles (3 nm) of land. Thus, functionally, the area in which USCG vessels could discharge would be the same as Sewage/Graywater Alternative 2. Therefore, NOAA removed this alternative from further consideration.

NOAA considered a variation of Sewage/Graywater Alternative 2 that would have excluded discharges from two small areas in GFNMS federal waters because of oceanographic conditions that sometimes affect onshore transport or mixing of ocean waters near shore. One small area considered was between Point Reyes and Bolinas Point, offshore of Drakes Bay (Marin County), and the other was west of the entrance to San Francisco Bay (offshore of Marin, San Francisco, and San Mateo counties). Both areas were within the pre-expansion boundaries of GFNMS. NOAA is not analyzing this further as a separate alternative as these two small areas are within the overall area analyzed as part of Sewage/Graywater Alternative 1.

NOAA considered an alternative of requiring the USCG to retrofit all its vessels used in GFNMS and CBNMS that are without Type I or II MSDs or without sufficient holding tank capacity to hold untreated sewage and non-clean graywater while in the two sanctuaries. Retrofitted vessels would then be able to prevent discharge of untreated sewage and graywater containing detectable levels of harmful matter within the two sanctuaries. Possible retrofit equipment could include Type I or II MSDs, larger holding tanks, portable toilets, marine incinerator toilets, or other equipment. While NOAA does not have detailed information about the designs and various uses of the USCG vessels in GFNMS and CBNMS or USCG funding for retrofitting vessels, the USCG has stated it cannot install marine sanitation devices or modify the tank capacities of its patrol boats (McGuire 2016). With no objective information on vessel structural designs and detailed information about the uses of the USCG vessels in GFNMS and CBNMS, analyzing such an alternative would be speculative. Moreover, the implementation of this alternative would be beyond the scope of NOAA's authority.

NOAA also considered an alternative of requiring the USCG to replace existing vessels used in GFNMS and CBNMS, and acquire vessels with equipment and technology installed to prevent discharge of untreated sewage and graywater that contains detectable levels of harmful matter while operating within the sanctuaries. NOAA's discussions with USCG on the lifecycles of their vessels indicate that the existing vessels used in GFNMS and CBNMS have at least another 20 years of lifespan before new vessels would replace them. Analyzing this alternative would be speculative in the absence of objective information on the status of USCG plans and funding for future vessel design and acquisition to replace its current fleet of vessels used in GFNMS and CBNMS, or on the feasibility of implementing this

alternative 20 years in the future. The implementation of this alternative would also be beyond the scope of NOAA's authority.

Training Discharges

One alternative NOAA considered but eliminated from further development would have allowed USCG training discharges of ammunition and pyrotechnic materials, via regulatory exceptions or national marine sanctuary permits, within several small, discrete, non-contiguous areas (or "boxes") that would have all been beyond about 14 miles (12 nm) from shore within the GFNMS and CBNMS expansion areas. After discussing this potential alternative, NOAA and the USCG subsequently agreed that a larger geographic area (such as those proposed in Training Alternatives 1 and 2, which encompass the locations of each of the formerly propose boxes) would provide far greater operational flexibility for the USCG in planning and conducting training exercises involving discharges, compared to the small boxes. NOAA and the USCG also recognized the USCG might not be able to avoid potential adverse seasonal or location-specific adverse impacts to sanctuary resources and user group activities (such as to rafting seabirds or commercial fishing) from training-related discharges under this alternative. For these reasons, NOAA is not further considering this alternative.

NOAA considered a variation of the preceding alternative, in which boxes allowing USCG training discharge would be located only in the GFNMS expansion area, with no boxes in the CBNMS expansion area. Since the analysis for Training Alternative 3 addresses the potential environmental consequences of not allowing training activity in the CBNMS expansion area, it would be duplicative to conduct further evaluation of this alternative.

An alternative evaluated in 2013 by GFNMS and USCG District 11 proposed to establish seasonal areas to use for training exercises (involving discharges of ammunition and pyrotechnic materials) within the previous boundaries of GFNMS; in the northern portion of Monterey Bay National Marine Sanctuary (MBNMS); and outside MBNMS boundaries in the San Francisco-Pacifica Exclusion Area. In a subsequent letter to NOAA, USCG determined that these proposed seasonal areas were no longer feasible to use due to user conflict issues, primarily the close proximity of other vessels using the shipping lanes and the Precautionary Area outside the Golden Gate Bridge, as well as the high density of other small vessels using this area (USCG 2015a). Further, USCG has stated that training beyond 23 miles (20 nm) from shore, which is where some of these areas had been proposed to be located, would be pose operational constraints due to the long transit times, fuel costs, and safety concerns of small boat operations and live fire exercises. NOAA and the USCG briefly discussed this option in 2016 and at that time, the USCG noted these areas no longer fit its training needs, which had changed since 2013. For these reasons, NOAA is not evaluating this alternative further.

In late 2016, the USCG expressed interest in discussing, in the future, the possibility of designating some areas allowing training-related discharges within the previous boundaries of GFNMS and CBNMS. NOAA indicated this might be possible in the future as part of a separate public process. Further discussion led to an agreement to focus this draft environmental assessment on the potential for USCG training discharges in the expansion areas. Considering allowing the USCG to make training-related discharge within the pre-expansion boundaries of GFNMS and CBNMS would require NOAA to reexamine the need for the potential action in those portions of the sanctuaries, environmental constraints, data on resources and uses, and other factors. NOAA is thus not evaluating this alternative as part of this environmental assessment.

Another alternative that NOAA considered, but eliminated from further analysis, was for USCG to conduct all live fire and SAR training for its personnel in areas other than the national marine sanctuaries, or to use terrestrial firing ranges or simulated training. For example, the DoD uses a training range in the

Pacific Ocean off San Diego outside sanctuary waters. The USCG also currently conducts live fire training in designated exercise boxes in the Southern California region, approximately 14 miles (12 nm) south of Anacapa Island and approximately 14 miles (12 nm) west of Pt. Vicente. However, due to the USCG's need to train in the areas in which they would have to conduct actual operations along with other logistical, budgetary, and operational challenges, they have stated that conducting all live fire and SAR trainings in other areas outside the sanctuary is not feasible. As an example, it takes the 87-foot Coastal Patrol boats based in San Francisco and farther north an average of two to three days to transit to the designated training areas off Southern California (USCG 2015a). NOAA eliminated simulated training from further consideration because this alternative would not allow USCG personnel to train in their region of responsibility or on the same vessels. In addition, the implementation of this alternative would be beyond the scope of NOAA's authority.

An additional alternative that NOAA considered, but eliminated from further analysis, was for the USCG to conduct alternative training methods, including the use of blanks, lasers, and dry fire (training with an unloaded weapon) to avoid having to discharge materials into sanctuary waters. NOAA did not consider this alternative further because NOAA does not have objective information on the use of blanks, lasers and dry fire as suitable substitutes for live fire ammunition and pyrotechnic rounds; thus, analyzing such alternative training methods would be speculative. The implementation of this alternative, too, would be beyond the scope of NOAA's authority.

All Discharges

At the USCG's request, NOAA considered an alternative to exempt all USCG discharges from the GFNMS and CBNMS regulations, similar to the exemptions provided in the regulations (15 CFR 922.82(b) and 15 CFR 922.112(c)) to the DoD for existing activities essential to, or necessary for, national defense. These existing DoD regulatory exemptions are not limited solely to DoD discharge activities. Of the eleven USCG missions, two are most closely associated with defense in GFNMS and CBNMS: the defense readiness mission and the ports, waterways, and coastal security mission.

NOAA understands USCG vessels may be required to switch at short notice from one mission to another (including for defense) while in the two sanctuaries, but that fact does not support a finding that all USCG vessel sewage and graywater discharges in GFNMS and CBNMS take place during a defense-related mission, or that the broad exemption would be a good fit for the USCG's stated need. U.S. Navy ships mostly transit through the two sanctuaries rather than conduct sustained operations within them. Unlike USCG vessels, U.S. Navy vessel Collecting Holding Transfer (CHT) tanks are generally designed to hold wastewater generated during a 12-hour period (Putnam 2013; Demboski et. al. undated); this allows transiting U.S. Navy vessels to hold untreated sewage and non-clean graywater during the time they are within the sanctuaries' boundaries. Moreover, there is not a standard exemption for DoD operations across the National Marine Sanctuary System. Rather, each site is governed by regulations tailored to DoD's operational needs for national security and other purposes in that location. Regarding USCG training-related discharges, NOAA is unaware of any additional training-related discharges that need to be exempted, beyond the live ammunition and pyrotechnic materials that could potentially be allowed under Training Alternatives 1 or 2. Because NOAA finds no clear nexus between the extension of GFNMS and CBNMS discharge regulations and the need for a separate DoD-like exemption for all USCG discharges, NOAA is not considering this alternative as part of this proposed action.

An additional alternative that NOAA considered, but eliminated from further analysis, was issuing national marine sanctuary permits for the proposed discharges, which are activities that are otherwise prohibited by national marine sanctuary regulations. At this time, the USCG has not applied for a permit to allow discharges in the two sanctuaries, and has not indicated its intention to do so. Thus, NOAA eliminated this alternative from consideration. The USCG could choose to submit a national marine

sanctuary permit application at any time to NOAA to allow the discharges, including prior to completion of this proposed action. NOAA would then evaluate the impacts of the proposal to issue a national marine sanctuary permit for USCG discharges in a separate process. After determining the appropriateness of the action, NOAA could allow the USCG to discharge sewage and non-clean graywater from USCG vessels and discharge live fire and pyrotechnic materials during training in GFNMS and CBNMS. As part of a permit, NOAA would likely include certain terms and conditions to protect sanctuary resources and qualities. These could include delineating boundaries for areas in which the discharges could be allowed, specifying best environmental management practices to avoid or mitigate any potential adverse impacts from the discharge activities on sanctuary resources and user groups, monitoring discharge effects on wildlife, and providing periodic reports to NOAA. National marine sanctuary permits have specified start and expiration dates, and sanctuary superintendents may, when appropriate, issue permits for a multi-year period. Prior to expiration of a given existing permit, an applicant may apply for a permit amendment or new permit to continue the activities. NOAA could issue a series of permits to the USCG as long as the need continued for the vessel and training discharges and NOAA continued to find that the permit issuance conditions were met. For further information regarding permits, refer to 15 CFR §§ 922.48, 922.83, and 922.113 and https://sanctuaries.noaa.gov/management/permits/. In addition to the fact that the USCG has not submitted a permit application to NOAA, it is likely the impacts to the environment and human uses of discharges allowed by a permit would be similar, and in some cases identical, to those that would be allowed by the regulatory exceptions proposed in Sewage/Graywater Alternatives 1 and 2 and Training Alternatives 1 and 2. It would therefore be duplicative for NOAA to analyze the impacts of issuing permits. Thus, NOAA is not including this as an alternative for further analysis.

3.0 AFFECTED ENVIRONMENT

The affected environment for the proposed action includes the area within and near the current boundaries of GFNMS and CBNMS (as shown in Figure 1-1). NOAA expanded both sanctuaries in 2015 (Figure 1-1 differentiates between the pre- and post-expansion boundaries). The expansion resulted in the sanctuaries' combined coastal and offshore ocean areas extending from southern Mendocino County in the north to offshore of northern San Mateo County in the south. Both waters and submerged lands are included in the sanctuaries. GFNMS's boundary at the shoreline extends to the mean high water line, while CBNMS does not have any boundaries that are contiguous with a shoreline. The sanctuaries' westward boundaries extend close to the base of the continental slope, where the water depths range from 9,000 to 11,400 feet. The precise boundaries for GFNMS and CBNMS are set forth in the regulations at 15 CFR § 922.80 and 15 CFR § 922.110, respectively.

Descriptions of the resources and habitats within GFNMS and CBNMS, as well as human uses of the sanctuaries, are included in the following ONMS publications and are incorporated by reference in this document: Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuaries Final Environmental Impact Statement (EIS), prepared as part of the Joint Management Plan Review (NOAA 2008); Cordell Bank National Marine Sanctuary Condition Report 2009 (ONMS 2009); Gulf of the Farallones National Marine Sanctuary Condition Report 2010 (ONMS 2010); Cordell Bank and Gulf of the Farallones National Marine Sanctuaries Expansion EIS (ONMS 2014a); Cordell Bank National Marine Sanctuary Final Management Plan (ONMS 2014b); and Gulf of the Farallones National Marine Sanctuary Final Management Plan (ONMS 2014c). Therefore, this section mainly focuses on presenting summary information on current conditions as well as information not already presented in those publications for the resources and uses that may be affected by the proposed action. Supplementary information on the existing regulatory framework for the study area is presented first, followed by supplementary information on resources and uses (in the Natural Environment and the Human Uses and Cultural Resources sections, respectively). The following section, Section 4 (Environmental Consequences), provides an analysis of the potential effects of the alternatives. Appendix B covers required agency consultations.

3.1 Regulatory Overview

Both sanctuaries' regulations prohibit discharging or depositing any material or other matter into the sanctuaries, with specified exceptions, as described in the background section of Section 1 (15 CFR §922.82(a)(2) and 15 CFR §922.112(a)(2)(i)). Both sanctuaries' regulations also prohibit discharging or depositing, from beyond the boundary of the sanctuary, any material or other matter that subsequently enters the sanctuary and injures a sanctuary resource or quality (15 CFR §922.82(a)(4); 15 CFR §922.112(a)(iii)). This section provides an overview of other relevant legislative and regulatory requirements specific to USCG vessel sewage, graywater and training-related discharges in the affected environment. The regulatory overview is intended to provide context of the regulatory environment covering all the areas within the GFNMS and CBNMS boundaries for readers of this document. This overview also helps NOAA decision makers understand how parts of the regulatory regime apply (or do not apply) to the proposed action and the alternatives presented in Section 2.

The USCG also has many overarching guiding documents for its personnel, and one relevant document broadly applicable to USCG involvement with federal marine protection agencies: the "Commandant Instruction 16004.4 Coast Guard Operations and Federal Marine Protected Area Programs" (USCG 2016b). Among other matters, this USCG document describes communication and collaboration with NOAA, and the need for consultation under the NMSA when federal agencies are considering actions likely to affect resources within national marine sanctuaries.

3.1.1 Sewage and Graywater Discharges

The final EIS for the expansion of GFNMS and CBNMS (ONMS 2014a) presented the regulatory framework related to discharges of vessel sewage and graywater. A summary of that framework and additional information pertinent to USCG vessel discharges of sewage and graywater are provided below.

International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 Annex IV

The International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (MARPOL 73/78) addresses pollution generated by normal vessel operations. MARPOL consists of six annexes: Annex I, oil discharge; Annex II, hazardous liquid control; Annex III, hazardous material transport; Annex IV, sewage discharge; Annex V, plastic and garbage disposal; and Annex VI, air pollution. Currently, the U.S. is signatory to Annexes I, II, III, V and VI. The U.S. has not ratified, and is not a party to, Annex IV of MARPOL 73/78, on sewage from ships. Instead, the U.S. regulates sewage under the Federal Water Pollution Control Act (Clean Water Act; CWA) section 312 (see below) and its associated regulations, related laws and treaties (USEPA 2015a), and state water pollution regulations. By MARPOL 73/78 definitions (see MARPOL Article 3), the act does not apply to state-owned or operated ships in non-commercial service such as military vessels. Nevertheless, the parties to MARPOL 73/78 have agreed to ensure the adoption of appropriate measures that do not impair the operation of these ships (Quinn 1994).

Federal Water Pollution Control Act (Clean Water Act; CWA) section 312

Section 312 of the Federal Water Pollution Control Act (Clean Water Act; CWA), Marine Sanitation Devices (33 U.S.C. § 1322(a) – (m)), sets out the statutory framework under which the United States Environmental Protection Agency (USEPA) and the USCG regulate sewage discharges from vessels; (USEPA 2015[a]). “Sewage” is defined under the CWA as “human body wastes and the waste from toilets and other receptacles intended to receive or retain body wastes,” and includes “graywater” discharges (i.e., galley, bath and shower water) from commercial vessels (as defined at 33 U.S.C. 1322(a)(10)). The provisions of Section 312 apply to any USCG vessel when it is operating as a “vessel of the Armed Forces.”

Section 312 regulates the discharge of vessel sewage to prevent the discharge of untreated or inadequately treated sewage within navigable waters of the United States (33 USC 1362(7)), including the territorial seas (33 USC 1362(8)) - within three miles[4] of the coastline. Under Section 312, vessel sewage is generally controlled by utilization of marine sanitation devices (MSDs) for vessels with installed toilets, or by state designation of a NDZ. The Clean Water Act requires (in Section 312) that vessels with installed toilets must only discharge sewage through a Type I or II marine sanitation device within three miles of shore (33 U.S.C. 1322(h)(4); 33 U.S.C. 1362(7)-(8)).

The term “MSD” includes any equipment installed aboard a vessel that is designed to receive, retain, treat, or discharge sewage (33 CFR § 159.3). It does not include portable devices (i.e., those that can be carried on and off the vessel). A Type I MSD is a device that (under test conditions described in the regulations) produces an effluent having a fecal coliform bacteria count not greater than 1,000 per 100 milliliters and no visible floating solids. A Type II marine sanitation device is a device that (under test conditions described in the regulations) produces an effluent having a fecal coliform bacteria count not greater than 200 per 100 milliliters and suspended solids not greater than 150 milligrams per liter. A Type

[4] The CWA refers to “miles” and though this term is undefined in the CWA, the common understanding is this term refers to “nautical miles” (http://www.gc.noaa.gov/gcil_seaward.html). Statute miles are not used by mariners, and many states use a 3 nm from shore boundary.

III MSD means a device that is designed to prevent the overboard discharge of treated or untreated sewage or any waste derived from sewage (33 CFR § 159.3).

Vessels 65 feet and under may use a Type I, II, or III MSD (33 CFR § 159.7). Vessels over 65 feet in length must have a Type II or Type III MSD (33 CFR 159.7). Smaller vessels may have MSDs (but are not required to), or may have portable toilets, portable sewage receptacles, or no toilet facilities. Section 312(d) applies these provisions to vessels owned and operated by the United States unless the Secretary of Defense finds that compliance would not be in the interest of national security (40 CFR § 140.2).

In 2012, the USEPA established a NDZ for all California marine waters that prohibits sewage discharges from all passenger vessels of 300 gross tons or greater, and from large ocean-going vessels of 300 gross tons or greater with available holding tank capacity or containing sewage generated while the vessel was outside of the marine waters of the state. The USEPA established the NDZ under the CWA in response to an application from the California State Water Resources Control Board (USEPA and CalEPA 2012).

The USEPA also administers the National Pollutant Discharge Elimination System (NPDES) Vessel General Permit (VGP), which contains standards for specified discharges incidental to the operation of vessels greater than 79 feet in length with VGPs, including graywater discharges. However, the 2013 VGP and the related 2014 Small Vessel General Permit (sVGP) for vessels less than 79 feet do not apply to U.S. armed forces vessels, which include USCG vessels (ONMS 2014a and USEPA 2016a).

Marine Mammal Protection Act (MMPA)

The MMPA of 1972 (16 U.S.C. 1361 et seq.), as amended, prohibits harassing, hunting, capturing, collecting, or killing marine mammals or attempting such actions. The MMPA requires permits or authorizations under 50 CFR § 216 for the take of marine mammals. Section 101(a)(5)(A-D) of the MMPA provides a mechanism for allowing, upon request, the "incidental" but not intentional take of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing or directed research on marine mammals) within a specified geographic region.

“Take” includes activities that harass or attempt to harass any marine mammal, which could occur through the intentional operation of a vessel. Specifically, the MMPA defines take as: “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal" (16 U.S.C. § 1362). Harassment means any act of pursuit, torment, or annoyance which, 1) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment); or 2) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B Harassment) (16 U.S.C. § 1362)(NMFS 2017a). The relevant definition of harassment is any act that:

- Injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (“Level A harassment”) or

- Disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered (“Level B harassment”) (16 U.S.C. § 1362(18)(B)(i) and (ii)).

Endangered Species Act (ESA)

The Endangered Species Act (ESA) of 1973 as amended (16 USC 1531, et seq.), provides for the conservation of endangered and threatened species of fish, wildlife, and plants. Federal agencies have an

affirmative mandate to conserve listed species. Section 7(a)(2) of the ESA requires federal agencies to, in consultation with the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (USFWS), ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

The regulations of 50 CFR Part 424 govern listing endangered or threatened species, and those of 50 CFR Part 402 govern interagency section 7 consultations. Under the ESA, a species is considered an "endangered species" if it is in danger of extinction throughout all or a significant portion of its range. A species is considered a "threatened species" if it is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

"Critical habitat" can also be designated under the ESA to the maximum extent prudent and determinable, under 16 USC 1533(a)(3). Critical habitat in Section 3 of the ESA is defined as,

"(i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of this Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and

(ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of this Act, upon a determination by the Secretary that such areas are essential for the conservation of the species."

Both the USFWS and NMFS administer the ESA. Generally, NMFS manages marine species, while USFWS manages land and freshwater species. When a federal agency's action "may affect" a listed species, that agency is required to consult formally with NMFS or USFWS, depending on the jurisdiction (50 C.F.R. § 402.14(a)). Federal agencies are exempt from this general requirement if they have concluded that an action "may affect, but is not likely to adversely affect" endangered species, threatened species, or designated critical habitat and NMFS or the USFWS concurs with that conclusion (50 CFR § 402.14 (b)).

Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.) (Essential Fish Habitat Provisions)

The Magnuson-Stevens Fishery Conservation and Management Act mandates identification and conservation of essential fish habitat (EFH; 16 U.S.C. § 1801 et seq.), which is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity (i.e., full life cycle). EFH includes aquatic areas and their associated physical, chemical, and biological properties used by fish. Substrate types include sediment, hard bottom, structures underlying the waters, and associated biological communities. Federal agencies are required to consult with NMFS when they propose to permit, fund, or undertake any activity that may have adverse impacts on EFH. The EFH regulations define an adverse effect as "any impact which reduces quality and/or quantity of EFH…[and] may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions." (50 CFR 600.810) The Pacific Fishery Management Council (PFMC) is the regional entity responsible for the development of fishery management plans, plan amendments, and regulatory measures for ocean fisheries off the coasts of Washington, Oregon, and California. The PFMC describes and maps EFH, and suggests management measures to reduce impacts from fishing and non-fishing activities to EFH, for coastal pelagic species, salmon, groundfish, and highly migratory species.

National Historic Preservation Act of 1966, 16 U.S.C. §§ 470 470x 6

Section 106 of the National Historic Preservation Act of 1966 (NHPA) (54 U.S.C. § 300101 et seq.) requires federal agencies to identify and evaluate the effects of their undertakings (actions) on historic properties listed in, or eligible for listing in, the National Register of Historic Places in accordance with regulations issued by the Advisory Council on Historic Preservation (ACHP) at 36 C.F.R. Part 800. The regulations require that federal agencies consult with states, tribes, and other interested parties (consulting parties) when making their effect determinations.

The regulations establish four basic steps in the NHPA 106 process: determine if the undertaking is the type of activity that could affect historic properties, identify historic properties in the area of potential effects, assess potential adverse effects, and resolve adverse effects.

If the agency's undertaking could affect historic properties, the agency must identify historic properties in the area of potential effects. ‘‘Historic property’’ means any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register, including artifacts, records, and material remains relating to the district, site, building, structure, or object (54 U.S.C. § 300308). To be protected under the NHPA, a property must meet specific criteria of significance established under the NHPA’s regulations at 36 CFR Part 60.

If the agency finds that no historic properties are present or affected, it provides documentation to the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO) and, barring any objection in 30 days, proceeds with its undertaking.

If the agency finds that historic properties are present, it proceeds to assess possible adverse effects, in consultation with the SHPO/THPO. If the parties agree that there will be no adverse effect, the agency proceeds with the undertaking and any agreed-upon conditions. If a) they find that there is an adverse effect, or if the parties cannot agree and ACHP determines within 15 days that there is an adverse effect, the agency begins consultation to seek ways to avoid, minimize, or mitigate the adverse effects.

The agency consults to resolve adverse effects with the SHPO/THPO and others, who may include Indian tribes and Native Hawaiian organizations, local governments, permit or license applicants, and members of the public. ACHP may participate in consultation when there are substantial impacts to important historic properties, when a case presents important questions of policy or interpretation, when there is a potential for procedural problems, or when there are issues of concern to Indian tribes or Native Hawaiian organizations.

USCG Vessel Environmental Manual

The USCG Vessel Environmental Manual applies to USCG vessels worldwide (USCG 2015b). All USCG units are to comply with its requirements unless otherwise authorized by the Office of the Judge Advocate General or the Office of Naval Engineering Commandant. Temporary waivers may be authorized only when required to meet operational requirements. In addition, the manual states in Chapter 2 that USCG vessels must “[a]lways comply with all applicable international, Federal, State, and local requirements”.

The manual lists USCG policies relevant to sewage and graywater discharge to ensure compliance with federal regulations in Chapter 3, including: 1) USCG vessels shall be equipped with MSDs to prevent the discharge of untreated or inadequately treated sewage, or any waste from sewage within the territorial

seas of the United States[5]; 2) MSD installations must be capable of being pumped out to shoreside reception facilities; and 3) industrial wastewater shall not be disposed through the vessels' sewage or graywater collection and transfer systems. Following use, industrial wastewater shall be delivered to a shore activity for processing to determine if it has further use and, if not, to be disposed as waste. Direct discharge of sewage and graywater is allowed by the manual when the vessel is farther than three nautical miles from land (USCG 2015b).

Table 3-1 presents information, excerpted and summarized from Chapter 3 of the manual, about USCG sewage and graywater vessel discharge restrictions relevant to the study area.

Table 3-1. USCG Summary of Vessel Pollution Control Discharge Restrictions for Sewage and Graywater *

Area	Sewage	Graywater
U.S. Ports, 0 - 3 nm from land, and U.S. Internal waters [except Great Lakes]	No discharge of raw sewage (from Collecting, Holding and Transfer [CHT] system). Discharge of Type I or II MSD-treated effluent allowed except in EPA-designated "no-discharge" zones. Direct discharge allowed within 3 nm under emergency conditions.	[Refer to detailed guidance in text below, excerpted from Section 3 of the USCG Vessel Environmental Manual].
>3 nm from land	Direct discharge permitted[6].	Direct discharge permitted.
EPA designated "no-discharge" zones	No discharge.	Direct discharge permitted.
Comments	Direct discharge allowed within 3 nm under emergency conditions.	Comply with state and local regulations regarding discharge of graywater.

* Federal standards. State and local standards may differ. See cutter-specific Unit Environmental Guides for additional information.

Source: USCG 2015b. Notes: The information in the table is excerpted from the manual. Bracketed information added by editor for clarity and USCG information on Great Lakes and foreign countries restrictions have been omitted here, since they are not applicable to the study area.

[5] The manual's glossary uses the CWA definition (33 CFR§ 159): the belt of the seas measured from the line of ordinary low water along that portion of the coast that is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending a seaward distance of 3 miles.

[6] This table is excerpted from a USCG document. "Direct discharge" refers to making a vessel discharge directly overboard into a waterbody.

USCG vessels may have installed MSDs with tanks or portable/removable toilets. The manual provides further procedures regarding vessel discharges of sewage and graywater via MSDs, as follows:

General procedures (excerpted from the Manual Sec. 3(B)(2))(USCG 2015b):

"a. […]" Except while in the Great Lakes, U.S. territorial seas or a MARPOL Annex IV special area, while operating beyond [3.5 mi. or] 3 nm from shore vessels may discharge all sewage and graywater directly overboard. Vessels equipped with a USCG-approved Type I or II MSD shall treat all sewage prior to discharge.

b. Personnel shall not dispose of new or used oil of any kind, oily wastes, oily mixtures, solvents, petroleum products, or other industrial wastes to MSDs or graywater collection systems or dump them down sinks or deck drains. Industrial wastes and used solvents shall be containerized and labeled appropriately in accordance with existing regulations for disposal ashore.

c. If configured to do so, while in port vessels shall collect graywater in installed MSDs or graywater collection systems and discharge to a shore facility."

Within U.S. territorial seas (excerpted from Sec. 3(B)(3) of the Manual) (USCG 2015b) (also applicable to the Great Lakes and internal waters):

"…untreated sewage whether commingled with graywater or not shall not be discharged except in an emergency. If untreated sewage must be discharged, the release must be the absolute minimum required and reports shall be made to the same contacts as for a spill…Detailed sewage and graywater guidance is as follows:

a. Vessels with Type I or Type II MSDs: Vessels equipped with Type I or Type II MSD (includes select WLB [a USCG designation; signifies "Buoy Tender Class Coast Guard Cutters" or seagoing] buoy tenders and ANB Aids-To-Navigation Boats) may discharge treated commingled effluent except when in an EPA approved State NDZs. EPA approved State NDZs apply only to untreated and treated sewage and commingled sewage/graywater discharges; they do not apply to graywater-only discharges. A list of the state [NDZs] can be found at http://water.epa.gov/polwaste/vwd/vsdnozone.cfm.

b. Vessels with Type III MSDs and segregated graywater tanks: Type III MSDs do not treat sewage or graywater. A Type III MSD simply allows vessels to collect, hold, and transfer untreated waste. Most vessels are configured with a Type III MSD. Vessels equipped with a Type III MSD and segregated graywater tanks shall segregate graywater and only discharge it when operationally unavoidable.

c. Vessels with Type III MSDs but no segregated graywater tanks: Vessels with a Type III MSD that are configured only with a sewage tank (i.e. graywater is either discharged directly overboard or commingled with sewage in the single tank) shall retain graywater only if there is enough tank holding capacity for the expected operational period. If there is not enough capacity in the single tank for the expected operational period, graywater shall be isolated from sewage if configured to do so and discharged overboard. In this situation, graywater production shall be minimized.

d. Vessels configured to only discharge untreated graywater directly overboard shall minimize the production and discharge of graywater in port."

USCG Ocean Steward

Ocean Steward is the USCG's framework to protect and recover marine protected species and enforce federal marine protected area regulations. It guides the USCG's contributions to these national objectives by sustaining excellence in maritime operations and law enforcement. The USCG is advancing the following three Ocean Steward goals: 1) Enforcing marine protected resource laws and regulations; 2) Leveraging the expertise and capabilities of partner agencies to craft sound, enforceable regulations and provide consistent, assertive external messaging; and 3) Supporting at-sea conservation activities and maintaining best practices to avoid adverse impacts to protected resources resulting from at-sea operations (USCG 2014).

California Clean Coast Act

The California Clean Coast Act ([Public Resources Code] PRC Sections 72400-72442) regulates oceangoing ships and large passenger ships while operating in the marine waters of the state. "Oceangoing ship" means a private, commercial, government, or military vessel of 300 gross registered tons or more calling on California ports or places (PRC Section 72410(j)). Among its provisions, this act prohibits oceangoing ships from releasing oily bilge water, sewage sludge, hazardous waste or other waste, and prohibits oceangoing ships with sufficient holding tank capacity from releasing sewage or graywater, within the marine waters of the state (PRC Section 72410(g); within three miles of the mean high tide line) and marine sanctuary waters (PRC Section 72420.2(c)).

California Code

California Harbors and Navigation Code Section 775 (a)(2) and (b) requires the use of MSDs to conform with the CWA, and states it is the intent of the Legislature that every vessel with a toilet shall comply with federal MSD standards.

Also, according to California Public Resources Code Section 30230, in the coastal zone (generally extending seaward from the shoreline to the state's outer limit of jurisdiction about 3.5 mi. or 3 nm from shore; see California Public Resources Code Section 30103 for precise definition), "Marine resources shall be maintained, enhanced, and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes." California Public Resources Code Section 30231 also states that "[t]he biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of wastewater discharges and entrainment, controlling runoff, preventing depletion of groundwater supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams."

California Ocean Plan

The California Ocean Plan under California Water Code Section 13170, contains objectives intended to ensure the "reasonable protection of beneficial uses and the prevention of nuisance" to ocean waters of the state (CalEPA 2012). "Ocean waters of the state" are the territorial marine waters of the state as

defined by California law[7] (CalEPA 2012). The water quality objectives are extensive, and include bacterial, physical, chemical, and biological characteristics. The plan also has an implementation program; relevant to this assessment are the following directives: vessel discharges must not result in violations of the water quality objectives in the plan; discharges of hazardous waste (not including sewage) are prohibited; and discharges of sewage and sewage sludge from vessels are prohibited in NDZs promulgated by the USEPA.

3.1.2 Training Discharges

The following regulatory framework governs the USCG's live fire and SAR training activities.

International Convention for the Prevention of Air Pollution from Ships (MARPOL 73/78; (Annexes V and VI)

As described previously, MARPOL 73/78 is concerned with preventing marine pollution from ships. Specifically, Annex V of MARPOL, addresses the prevention of pollution by garbage from ships, and Annex VI of MARPOL addresses air pollution from ocean-going ships. Annex V of MARPOL entered into force on December 31, 1988; subsequent revisions entered into force on January 1 2013. Annex VI of MARPOL entered into force on May 19, 2005.

Regulations for the prevention of pollution by garbage from ships are contained in the revised MARPOL Annex V. The discharge of most garbage is prohibited, except under specific circumstances. Garbage includes all kinds of food, domestic and operational waste, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically. Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities (IMO 2017).

The international air pollution requirements of Annex VI establish limits on nitrogen oxides (NOx) emissions and require the use of fuel with lower sulfur content, protecting people's health and the environment by reducing ozone-producing pollution, which can cause smog and aggravate asthma. The requirements apply to vessels operating in U.S. waters as well as ships operating within 200 nautical miles of the coast of North America, also known as the North American Emission Control Area. It sets limits on sulphur oxide (SOx) and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances; designated emission control areas set more stringent standards for SOx, NOx and particulate matter.

In 2011, the International Maritime Organization (IMO) adopted more stringent measures to significantly reduce the amount of greenhouse gas emissions from ships; these measures went into effect on January 1, 2013 (IMO 2013).

Act to Prevent Pollution from Ships (APPS)

The discharge of solid wastes is regulated under the "Act to Prevent Pollution from Ships" (APPS) (33 U.S.C. § 1901 et seq.), as amended by the Marine Plastic Pollution Research and Control Act of 1987, and the CWA. The APPS regulates the disposal of plastics and garbage for the United States, implementing Annex V of MARPOL. Under these regulations, the disposal of plastics is prohibited in all

[7] These are waters within approximately 3.5 mi. (approximately 3 nm) of the California shoreline (California Harbors and Navigation Code 775.5(h); California State Lands Commission 2016; and United States of America v. State of California 2014).

waters, and other garbage, including paper, glass, rags, metal, and similar materials, is prohibited within 14 miles (12 nm) from shore (unless macerated) (ONMS2014a).

Clean Air Act (CAA)

The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes the USEPA to establish National Ambient Air Quality Standards to protect public health and public welfare and to regulate emissions of hazardous air pollutants. These commonly found air pollutants (also known as "criteria pollutants") are particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. These pollutants are called "criteria" air pollutants because they are regulated by developing human health-based and/or environmentally based criteria (science-based guidelines) for setting permissible levels (40 CFR 50-99).

The USEPA's general conformity rule applies to federal actions occurring in nonattainment or in certain designated maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds (43 CFR 93.153). Emissions associated with stationary sources that are subject to permit programs are incorporated into the State implementation plan and are not counted against the *de minimis* threshold. The federal agency providing the funding for the proposed action is responsible for submitting conformity determination documentation to the USEPA.

Section 176(c) of the CAA contains provisions that apply specifically to federal agency actions, including actions that receive federal funding. This section of the CAA requires federal agencies to ensure that their actions are consistent with the CAA and with applicable State air quality management plans.

Federal Water Pollution Control Act (Clean Water Act; CWA) Sections 301 and 403

Section 301 of the CWA regulates discharge of pollutants to within navigable waters of the U.S. (33 USC § 1362(7)), within three [nautical] miles of the shore and in inland waters. A point source is any discernible, confined and discrete conveyance, including but not limited to any vessel or other floating craft, from which pollutants are or may be discharged (33 USC § 1362(14)). "Pollutants" include substances that are potentially or routinely discharged from ships, including solid wastes, biological materials, chemical wastes and heat (33 USC § 1362(6)). It is unlawful under section 301 for any person to discharge any pollutant into navigable waters without an authorization (33 USC 1311(a)).

Section 403 of the CWA provides for the protection of ocean waters (waters of the territorial seas, the contiguous zone, and the high seas beyond the contiguous zone out to 200 nautical miles) from point source discharges. Under Section 403(a), the USEPA or an authorized state agency may issue a permit for an ocean discharge only if the discharge complies with CWA guidelines for protection of marine waters (33 USC § 1343(a)).

Section 502(12) of the CWA states that "[t]he term 'discharge of a pollutant' and the term 'discharge of pollutants' each means (A) any addition of any pollutant to the navigable waters from any point source, (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft." (33 USC § 1362(12)). The contiguous zone" is defined as "the entire zone established or to be established by the United States under article 24 of the [1958] Convention on the Territorial Sea and the Contiguous Zone" (33 U.S.C. § 1362(9)). Under this Convention, "[t]he contiguous zone may not extend beyond twelve miles from the baseline from which the breadth of the territorial sea is measured" (1958 Convention on the Territorial Sea and the Contiguous Zone art. 24, Apr. 29, 1958, 15 U.S.T. 1606, 516 U.N.T.S. 205).

Marine Mammal Protection Act (MMPA)

As stated under 3.1.1, the MMPA of 1972 (16 U.S.C. 1361 et seq.), as amended, prohibits harassing, hunting, capturing, collecting, or killing marine mammals or attempting such actions. The MMPA requires permits under 50 CFR § 216 for taking marine mammals. Section 101(a)(5)(A-D) of the MMPA provides a mechanism for allowing, upon request, the "incidental," but not intentional take of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing or directed research on marine mammals) within a specified geographic region.

"Take" includes activities that harass or attempt to harass any marine mammal, which could occur through the intentional operation of a vessel. Specifically, the MMPA defines take as: "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal" (16 U.S.C. § 1362). Harassment means any act of pursuit, torment, or annoyance which, 1) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment); or 2) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B Harassment)(16 U.S.C. § 1362) (NMFS 2017a). In 2004, the National Defense Authorization Act (Public Law 108-136) amended the definition of harassment and removed other provisions as applied to military readiness activities or scientific research activities conducted by or on behalf of the federal government consistent with Section 104(c)(3) of the MMPA (16 U.S.C. § 1374(c)(3)). A "military readiness activity" is defined as "all training and operations of the Armed Forces that relate to combat" and the "adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use" (16 U.S.C. 1371(a)(5)(A)(ii) as defined in section 315(f) of Public Law 107–314; 16 U.S.C. 703 note). For live fire and SAR training activities, the relevant definition of harassment is any act that:

- Injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild ("Level A harassment") or

- Disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered ("Level B harassment") (16 U.S.C. § 1362(18)(B)(i) and (ii)).

Endangered Species Act (ESA)

As stated under 3.1.1, Section 7(a)(2) of the ESA requires each federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency's action "may affect" a listed species, that agency is required to consult formally with NMFS or USFWS, depending on the jurisdiction (50 C.F.R. § 402.14(a)). Federal agencies are exempt from this general requirement if they have concluded that an action "may affect, but is not likely to adversely affect" endangered species, threatened species, or designated critical habitat and NMFS or the USFWS concurs with that conclusion (50 CFR § 402.14 (b)). Generally, NMFS manages marine species, while USFWS manages land and freshwater species.

Magnuson-Stevens Fishery Conservation and Management Act

As stated under 3.1.1, federal agencies are required to consult with NMFS when they propose to permit, fund, or undertake any activity that may have adverse impacts on EFH.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 U.S.C. §§ 703-712) makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations. The migratory bird species protected by the Act are listed in 50 CFR § 10.13.

The 2003 National Defense Authorization Act provides that the armed forces may take migratory birds incidental to military readiness activities. This means that if any of the armed forces determine that a proposed or an ongoing military readiness activity may result in a significant adverse effect on a population of a migratory bird species, then they must confer and cooperate with the USFWS to develop appropriate conservation measures to minimize or mitigate identified significant adverse effects (50 C.F.R. § 21.15).

Responsibilities of Federal Agencies to Protect Migratory Birds

Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (issued January 10, 2001; 66 FR 3853) requires each agency to ensure that environmental analyses of federal actions (required by NEPA or other established environmental review processes) evaluate the effects of actions and agency plans on migratory birds, emphasizing species of concern. The Executive Order helped to create a more comprehensive strategy for the conservation of migratory birds by the federal government, thereby fulfilling the government's duty to lead in the protection of this international resource. In October 2014, the USCG and USFWS signed a MOU in accordance with Executive Order 13186, to address migratory bird conservation relative to USCG activities other than military readiness.

National Historic Preservation Act of 1966, 16 U.S.C. §§ 470 470x 6

As stated in 3.1.1, Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings (actions) on historic properties, listed in, or eligible for listing in, the National Register of Historic Places, in accordance with regulations issued by the ACHP. The regulations require that federal agencies consult with states, tribes, and other interested parties (consulting parties) when making their effect determinations.

USCG Vessel Environmental Manual

The USCG Vessel Environmental Manual applies to USCG vessels (waterborne assets) worldwide (USCG 2015b), as stated previously. It contains summary information and reference on environmental compliance, as well as environmental policies for USCG waterborne assets.

Chapter 11 of the manual, "Marine Wildlife Protection," lists policies, procedures and other information to protect wildlife (some excerpted below):

"3. Marine Mammals. Whales, dolphins, porpoises, manatees, dugong, seals, sea lions, walruses, sea otters and polar bears. All marine mammals are protected under the Marine Mammal Protection Act (MMPA) and protected under the Endangered Species Act (ESA) if listed as threatened or endangered. Coast Guard vessels shall not deliberately disturb any marine mammal. Commanding Officers and Officers in Charge shall plan and act to avoid take or harassment of marine mammals during operations and planning. For local and seasonal occurrence of marine mammals, refer to U.S. Coast Pilot publications.

a. Whales.

(1) Lookouts shall be especially alert to whales unexpectedly surfacing within 100 yards of the vessel.

(2) In the event of a whale unexpectedly surfacing within 100 yards of the vessel, take action as prudent and appropriate to ensure the safety of both the crew and the whale and to minimize damage to the vessel.

(3) In areas of known whale migration routes or high animal density be aware of local conditions and especially alert for activity. Units should contact their District or Area for a copy of their Protected Living Marine Resources Plan, which identifies whale habitats.

(4) Do not approach whales head on during non-emergency maneuvering. Avoid North Atlantic or North Pacific Right Whales by 500 yards and all other whale species by 100 yards, except when assisting in an animal rescue effort or enforcing the Marine Mammal or Endangered Species Act.

(5) Operators shall employ all possible precautions to avoid interactions or collisions with whales, including:

(a) Checking latest whale sighting info (if available).

(b) Reducing vessel speed as appropriate, yet navigationally prudent, and adjusting course.

(c) Posting additional dedicated, trained lookouts to assist in monitoring whale locations, and

(d) Ensuring navigation planning takes into account waterways management efforts (e.g. areas to be avoided, traffic separation schemes, recommended routes, etc.) to reduce whale strikes…"

Item 10 of the marine mammal policy further instructs that USCG units have a Whale Wheel Field Guide on board if operating in areas where they are likely to encounter whales, and notes lookouts are required to be familiar with the proper use of the field guide (USCG 2015b). The Whale Wheel Field Guide contains summary descriptions of whale species and behavior, photos and graphics to aid in whale species identification, procedures for reporting and recording whale incidents, and protective measures to be employed if a whale is encountered.

Item 11 of the marine mammal policy states units shall also incorporate approach guidance for specified marine mammals [and for sea turtles]. The approach guidance is 50 yards for dolphins and porpoises, seals and sea lions, sea turtles, and sea otters (USCG 2015b).

Regarding policy 4, "Birds", the manual states "Extra precautions shall be taken to avoid disturbing large colonies of sea birds for their protection…" and provides further guidance when ESA-listed species may be present (USCG 2015a).

USCG Ocean Steward

Ocean Steward is the USCG's framework to protect and recover marine protected species and enforce federal marine protected area regulations. It guides the USCG's contributions to these national objectives

by sustaining excellence in maritime operations and law enforcement. The USCG advances the following three Ocean Steward goals: 1) Enforcing marine protected resource laws and regulations; 2) Leveraging the expertise and capabilities of partner agencies to craft sound, enforceable regulations and provide consistent, assertive external messaging; and 3) Supporting at-sea conservation activities and maintaining best practices to avoid adverse impacts to protected resources resulting from at-sea operations (USCG 2014).

3.2 Natural Environment

Physical Resources – Air Quality

The main sources of air pollution in the marine environment come from diesel exhaust from ship engines and from the incineration of garbage on vessels. Vessel traffic within the sanctuaries contributes to the degradation of air quality. Diesel exhaust [can have] a high sulfur content, producing sulfur dioxide, nitrogen dioxide, and particulate matter in addition to common products of combustion such as carbon monoxide, carbon dioxide, and hydrocarbons (ONMS 2014a). Larger ships tend to use diesel engines, while smaller boats may use gas-powered engines. Pollution emissions that are released when vessels are underway are influenced by a variety of factors including power source, engine size, fuel use, operating speed, and load (ONMS 2010).

The coastal zones around the Bay Area tend to be more windy and cooler in the summer than the hotter, drier interior regions with a reversal in the winter months. Precipitation is more typical of a Mediterranean climate type with dry summers and wet winters (ONMS 2014a). Marine breezes from off the Pacific Ocean dominate the climate of the North Coast Air Basin (NCAB), which has a southern boundary that coincides with the Sonoma/Marin County boundary at Estero Americano and extends north to the Oregon border (ONMS 2014a). Northwesterly winds predominate in this area during all seasons but are strongest and most persistent during the spring and summer months.

The potential for high pollutant concentrations in a given location depends upon the quantity of pollutants emitted in the surrounding area and the ability of the atmosphere to disperse them (Bay Area Air Quality Management District [BAAQMD] 1998). Factors such as wind, sunlight, temperature, humidity, rainfall, topography, and as well as human-created influences (development patterns and lifestyle) all affect the accumulation and/or dispersion of pollutants.

In general, the air pollution potential of the coastal areas of the NCAB is relatively low due to persistent winds (BAAQMD 1998 and ONMS 2014a). The San Francisco Bay Area is also generally subject to a combination of physiographic and climatic factors, such as its prevailing westerly winds, which result in a low potential for pollutant build-ups near the coast and a high potential in sheltered inland valleys (BAAQMD 1998).

The USEPA has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO2), carbon monoxide (CO), sulfur dioxide (SO2), 10-micron particulate matter (PM10), 2.5-micron particulate matter (PM2.5), and airborne lead. Areas with air pollution levels above these standards are considered “nonattainment areas” and are subject to planning and pollution control requirements that are more stringent than normal requirements. In addition, the California Air Resources Board (CARB) has established standards for ozone, CO, NO2, SO2, sulfates, PM10, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population (ONMS 2014a). Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation. Averaging times are based on whether the damage caused by the pollutant is more likely

to occur during exposures to a high concentration for a short time (one hour, for instance) or to a relatively lower average concentration over a longer period (eight hours, 24 hours, or one month). For some pollutants there is more than one air quality standard, reflecting both its short-term and long-term effects. The California ambient air quality standards are generally set at concentrations that are lower than the federal standards and in some cases have shorter averaging periods (ONMS 2014a). Some pollutants also have different primary standards (to protect public health) and secondary standards (to protect public welfare, including visibility and protection of animals and crops).

The San Francisco Bay Area currently attains the national annual average and 24-hour standards for PM10, and the national annual average standard for PM2.5. Since 2006, Bay Area PM2.5 levels have declined (BAAQMD 2013). Particulate matter has gradually declined since the 1980s in the Mendocino County Air Quality Management District, primarily due to a changing industrial base, enhanced regulations and enforcement of regulations and increased enforcement (Mendocino County Air Quality Management District 2005).

Physical Resources – Water Quality

The 2010 GFNMS Condition Report assessed the water quality in the sanctuary's coastal and offshore environment within the GFNMS boundaries prior to expansion as ranging from fair to good, and water quality in the sanctuary's estuarine and lagoon environment as ranging from good/fair to fair/poor. These findings are based on an evaluation of status and trends of stressors on water quality, for eutrophic condition, human health, and human activities (ONMS 2010). Though there are no known eutrophication[8] problems, certain water quality parameters are of some concern, primarily due to impacts of outflow from San Francisco Bay and agricultural runoff from surrounding rural areas (ONMS 2010). The 2009 CBNMS Condition Report also evaluated water quality within the CBNMS boundaries prior to expansion and found the status and trends for the same parameters of water quality to range from good to good/fair for the same issues (ONMS 2009). As of 2014, marine water quality in the then-proposed expansion areas of GFNMS and CBNMS was considered to be relatively good (ONMS 2014a). Since June 9, 2015, the GFNMS and CBNMS discharge regulations have been in effect in the newly expanded areas of each sanctuary, except with respect to USCG discharges. Therefore, NOAA expects the water quality in these areas to have remained relatively good.

While water quality parameters of GFNMS and CBNMS seem to be unchanged since publication of the sanctuary condition reports prior to the sanctuary expansion, there have been recent changes in factors affecting these parameters. Notably, water quality in GFNMS and CBNMS can be affected by climatic conditions in California (such as precipitation, air temperature, and surface temperature). California has experienced well below average precipitation in recent years (2012, 2013, 2014, and 2015), record high surface air temperatures the past two years (2014 and 2015), and record low snowpack in 2015 (NMFS 2016). Anomalously high surface temperatures created a "hot drought," in which high surface temperatures substantially amplified annual water deficits during the period of below average precipitation (NMFS 2016). Similar conditions persisted in 2016. As of early 2017, most of California was no longer in drought, in terms of surface water. Additionally, a persistent bloom of a phytoplankton, *Pseudo-nitzschia*, began in May 2015, coinciding with warm temperatures all along the North Pacific and off the West Coast. The phytoplankton bloom resulted in domoic acid buildup in marine life and the closures of recreational and commercial fishing for Dungeness and rock crab (California Department of Public Health [CDPH] 2016a and California Cooperative Oceanic Fisheries Investigations [CalCOFI] 2016).

[8] Eutrophication is a bloom of algae (some of which can also be harmful), primarily due to nitrogen and phosphorus in the water; the algae decomposes and depletes the water's oxygen, which can result in injury or death to other organisms (Pew Oceans Commission 2001; European Commission 2016).

Current Monitoring Efforts

Ocean water quality monitoring to determine the bacterial, physical, chemical, and biological status of the water in connection with vessel sewage and graywater discharges is not conducted by any agency or group in any systematic way in federal waters of GFNMS and CBNMS. Much of the work to monitor those parameters is done in nearshore waters, or at point sources of discharges; such monitoring has often been conducted by counties, nonprofit groups, or dischargers. Applied California Current Ecosystem Studies (ACCESS) scientists regularly collect some ocean water data in the region, including sea surface temperature and salinity, for scientific characterization purposes. Key partners who work on water quality issues in the state and federal waters of GFNMS are listed in the GFNMS Management Plan (ONMS 2014c) and key partners who work with CBNMS on conservation science issues are listed in the CBNMS Management Plan (ONMS 2014b). NOAA did not find any published studies, reports or data sets specifically focused on the quantity, sources, fate or effects of vessel sewage or graywater in the federal waters of GFNMS and CBNMS.

The nearshore water quality in the region is considered good. The winter wet weather season typically degrades ocean water quality more than during the summer months due to storm drain runoff, which can be contaminated with motor oil, animal and yard waste, pesticides and trash, thus raising bacteria levels above state health standards. In California coastal counties, ocean water samples are collected at beaches that are visited by 50,000 people per year and are adjacent to storm drains, creeks or rivers. In Marin, Sonoma and Mendocino counties, the counties adjacent to GFNMS, several beaches meet these criteria and their water quality is regularly monitored. Marin County monitors 26 ocean, bay and freshwater sites weekly from April 1 through October 31 (which corresponds to the dry season) to determine if they meet California water quality standards for recreational water contact. In one representative five-week sampling period in July and August 2016, two (or 4%) of the 55 samples taken from the ocean sites of Dillon, Bolinas, Stinson, Muir and Rodeo beaches did not meet state standards (County of Marin 2016). Between April 2015 and March 2016, three sewage spills in the Richardson Bay/Sausalito area led to a beach closure. Another 16 sewage spills occurred that reached receiving water bodies such as creeks, rivers, streams, sloughs, and bays that can discharge into the ocean, nine of which resulted in non-beach related health warnings (Heal The Bay 2016). In Sonoma County, seven beaches are tested regularly. During a 17-week sampling period from early April to July 2016, none of the samples exceeded water quality standards (County of Sonoma 2016). Neither were there any reported sewage spills in Sonoma County that led to beach closures from April 2015 to March 2016, although there were five sewage spills that reached receiving waterbodies (creeks, rivers, streams, sloughs, and bays) (Heal The Bay 2016). Mendocino County monitors six beach locations weekly, from Mackerricher State Park at Virgin Creek to Van Damme State Park Beach at the Little River. During the summer dry weather period in Mendocino County from April to October 2015, water quality at these six monitoring locations met state water quality standards. There were no reported sewage spills in Mendocino County that led to a beach closure, but there was one sewage spill that reached a receiving waterbody between April 2015 and March 2016 (Heal The Bay 2016). Water quality information pertinent to swimming in California waters may be found at http://www.mywaterquality.ca.gov/safe_to_swim/.

Threats to Water Quality

Treated and untreated human sewage discharges to the GFNMS and CBNMS region may come from various sources. These sources include vessels and inland point and nonpoint sources that eventually reach the ocean (such as from discharges from wastewater treatment plants, runoff from leaking septic systems and leaking sewer lines). Vessel sewage primarily contains human excrement, urine and water, and [apart from toilet paper], also contains bacteria, viruses and parasites that can cause illness or disease in humans and create environmental problems (California State Parks 2015). In general, environmental impacts related to wastewater discharge are related to organic pollution (nutrients and related biological

oxygen demand), pathogen pollution, and toxic contaminants (Largier 2016). The nutrients in sewage can stimulate biological growth in the pelagic food web, as can the nutrients from ocean animal waste, notably whales (Katona 2015). In addition, depending on the type of vessel (commercial shipping, recreational, cruise, research, armed forces, etc.) and the activities occurring on board, vessel sewage can contain metals, hazardous and toxic substances, and pharmaceuticals, including endocrine disrupters (USEPA 2015b). Sewage can also cause shellfish contamination; health problems for people engaging in ocean recreation; odors; unsightliness; impacts to water clarity, and deposit of solids on the seafloor (California State Parks 2015, Katona 2015, and Pew Oceans Commission 2001). Particularly in estuaries or enclosed water bodies, the nutrients in sewage contribute to accelerated eutrophication of water bodies (National Research Council 1972).

Marine debris is also a threat to water quality. Land-based sources of marine debris include litter washed into San Francisco Bay through storm drains and outflow from combined sewer treatment systems; garbage from landfills; litter from shoreline recreational activities; improper handling of garbage in transport and on-site storage; and plastic resin pellets discharged from plastics manufacturing facilities into storm drains and nearby waterways (NOAA, 2010). Ocean-based sources generally include lost fishing gear and dumping of garbage at sea by vessels (NOAA 2010). Plastic waste can remain in the marine environment for a very long time before fully degrading. Small plastic fragments have been found to adsorb pollutants and can be ingested by marine organisms (NOAA 2010).

Vessel Discharge Management

The type of MSD that may be installed on a vessel affects the elements in the sewage ultimately discharged to the ocean or at a pump-out station of mobile facility (pump-out boat or truck). Vessel sewage is generally more concentrated than domestic sewage because less water is used per flush (Harrington 2005). Type I MSDs rely on maceration, or reduction into smaller pieces, and disinfection prior to discharge of the waste into the water. Type II MSDs provide an advanced form of the same type of treatment used by Type I devices and discharge wastes with lower fecal coliform counts and reduced suspended solids. A Type II MSD must meet a water quality standard of 200 fecal coliform per 100 ml of water, for sewage treatment. Type III MSDs, commonly called holding tanks, flush sewage from a marine toilet (head) into a tank that may contain deodorizers and other chemicals (USEPA 2013b). They may also be used to contain untreated (raw) sewage, without any additives. The contents of a holding tank are stored until the contents can be properly disposed of (at a shore-side pump-out facility or dump station, into a mobile pump-out unit, or into ocean waters where sewage discharge is permitted). Type III MSDs can be equipped with a discharge option, usually called a Y-valve, which allows the boater to direct the sewage from the marine toilet either into the holding tank or directly overboard. Chemicals and deodorants often used in MSDs include chlorine, ammonia, or formaldehyde; enzyme and bioactive treatments may also be used in MSDs. Some holding tank treatments degrade biological solids, soaps or detergents and some help control odor.

Graywater from vessels, which is different from sewage (though may be combined with it), may include wastewater from galleys, baths and showers (USEPA 2013a). As defined by the Clean Water Act, the term “graywater” means galley, bath, and shower water (33 U.S. C. § 1322(a)(11), and in many cases, may be commonly comprised of only soap, food waste and/or small amounts of human skin cells/hair. Depending on the type of vessel and the activities occurring on board, graywater may contain various pollutants, including suspended solids, oil, grease, ammonia, nitrogen, phosphates, detergents, cleaners, oil and grease, metals, pesticides, and/or medical and dental wastes (USEPA 2013a).

Once a vessel discharges sewage and/or graywater into a waterbody (the Pacific Ocean for this proposed action), the initial plume of discharged wastewater mixes with the ocean waters. The fate and persistence of plume components, as the mixing continues over time, depends on a variety of complex factors,

including, but not limited to: the volume of discharge; the composition of pollutants (including nutrients, pathogens and toxic contaminants) in a given discharge and their concentrations; whether the vessel was stationary or moving, and vessel speed; local and regional oceanic conditions (depth, surface and subsurface currents, tides temperature, salinity, dissolved oxygen, etc.); ingestion by organisms within the marine food web; accumulation in sediments; light; and weather.

There are 64 boating pump-out facilities open to the public in counties near GFNMS and CBNMS: Sonoma, Marin, San Francisco, San Mateo, Napa, Solano, Contra Costa, and Alameda (California State Parks 2016). The USCG has its own, non-public shoreside pump-out facilities at USCG Coastal Patrol Boat homeports in Bodega Bay and San Francisco Bay. The USCG buoy tender, which cannot use those facilities, uses a non-public pump-out facility in Eureka (USCG 2015a). Pump-out facilities are most commonly used to pump vessel sewage from holding tanks, but some localities also encourage use of pump-outs for graywater. The use of pump-outs reduces the volume of direct discharges from vessels to waterways.

Biological Resources

Biological resources considered in this environmental assessment include species and habitats such as marine mammals, seabirds, fish and deep sea corals. The status, general ecology, general distribution, migratory movements and abundance of marine mammals, pinnipeds, birds and fishes are discussed in greater detail in the Cordell Bank and Gulf of the Farallones National Marine Sanctuaries Expansion Final Environmental Impact Statement (ONMS 2014a). Because the proposed action and potential alternatives are proposed to occur at least 3.5 miles (3 nm) miles from the shoreline or farther, this section focuses mainly on offshore marine animals and their habitats.

Offshore Ecosystems

The potentially affected pelagic environment area is highly heterogeneous and dynamic, and extends from the sea surface to the seabed. Oceanographic patterns, light, and nutrient availability are the principal factors that determine the abundance and distribution of organisms in this area. Biological activity is controlled by a balance between wind-driven upwelling and stratification of the water column. This is a bottom-up driven system, where krill are considered keystone species and large changes in population size are related to changing oceanic conditions. Therefore, declines in krill abundance result in negative impacts on the higher trophic levels that depend upon them (Hutto et al. 2015).

The most intense and persistent upwelling along the North-central California coast and ocean region generally occurs from March through July (Garcia-Reyes and Largier 2010) when the atmospheric North Pacific High shifts northward. During relaxation periods in the upwelling season, and during the fall transition season, the prevailing equator-ward winds weaken, sometimes causing ocean currents to flow to the north and halt upwelling. Offshore pelagic ecosystems are located seaward of the 100-ft bottom contour, and encompass the entire water column over the continental shelf and slope, from the surface to depths greater than 650 ft. Shallow offshore pelagic ecosystems often contain newly-upwelled water, and can be influenced by the outflow of water from San Francisco Bay (Duncan *et al.* 2013).

The constant food supply from upwelling combined with hard substrate for attachment provide ideal conditions in the offshore ecosystems to support rich and biologically diverse communities consisting of clams, mollusks, shrimp, crabs, sea urchins, deep sea corals, sponges and a variety of fishes (Etnoyer *et al*. 2014 and Duncan *et al.* 2013). The high light penetration allows for algal photosynthesis far deeper than in nearshore coastal waters (USCG 2010a).

In the northeastern Pacific Ocean, temperate corals commonly occur along the shelf break of Northern California (USCG 2014a). Temperate corals refer to a variety of hexacoral (sea anemones and hard corals), octacoral (soft coral, including gorgonians), and hydrocoral (hydrozoans) families that live in cooler, mid-latitude waters. Until recently, temperate corals were poorly documented in the Pacific Ocean. However, as additional deep sea areas are explored, new occurrences of temperate corals have been discovered and recorded. Coral communities have been identified around Bodega Canyon and Cordell Bank (NOAA 2016) and studies indicate that this deep water environment is diverse and productive (Etnoyer *et al*. 2014). Temperate corals can occur in waters ranging from 150 to 3,300 feet in depth (ONMS 2014a, Etherington *et al.* 2011). Because of their three-dimensional structure, corals provide important habitat for fish and invertebrates, including many commercially important species that use coral habitats for shelter, feeding, spawning, and nursery areas.

Both sunflower stars (*Pycnopodia helianthoides*) and ochre stars (*Pisaster* sp.) are considered keystone species in Pacific coastal waters because they have a disproportionately large influence on other species in their ecosystem. In 2012 and 2013, a mysterious disease, called sea star wasting syndrome (SSWS), killed large numbers of sea stars along the North American coast. This became the largest documented case of a marine disease of a non-commercial species. Critically, SSWS impacted this keystone sunflower star, which is also an important sea urchin predator. One study published in early 2016 determined that temperature contributed to the prevalence of SSWS. While this study explained some factors that lead to SSWS, their models indicate that other unknown factors are likely playing a role as well (Eisenlord *et al.* 2016).

Marine Mammals

Thirty-five species of resident and migratory cetaceans (whales, dolphins and porpoises) and pinnipeds have been observed in the offshore waters of GFNMS and CBNMS including frequently sighted blue (*Balaenoptera musculus*), gray (*Eschrichtius robustus*), and humpback (*Megaptera novaeangliae*) whales as well as one of the southernmost U.S. populations of Steller sea lions (*Eumetopias jubatus*), which breed on the Farallon Islands (Sanctuary Integrated Monitoring Network [SIMoN] 2016a) and killer whales (*Orcinus orca*) (ONMS 2014c). Cetacean species protected under the ESA are shown in Table 3-2. Although there have been rare reported sightings of the threatened Guadalupe fur seal (*Arctocephalus townsendi*), as far north as Point Reyes (SIMoN 2016b), they are unlikely to occur here; thus, this document does not analyze impacts to listed pinniped species in the area. All marine mammals, however, are still protected under the MMPA.

The odontocetes that are most likely to be encountered in the region are Dall's porpoise, (*Phocoenoides dalli*), Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), and northern right whale dolphins (*Lissodelphis borealis*). Dall's porpoise is one of the most frequently sighted marine mammals in the sanctuaries. It can be found farther offshore, along the seaward edge of the continental shelf and along the slope, but it may also migrate seasonally, occurring onshore during the summer months. Dall's porpoise is primarily a nocturnal feeder, seeking prey such as anchovies, squid, crustaceans and deep-water fishes (SIMoN 2016a). Pacific white-sided dolphins are also abundant in the Gulf of the Farallones, occurring from July through October over the continental slope and deeper waters; calves are seen during the spring and summer months (SIMoN 2016a).

Among the mysticetes, the gray whale is common during its southward and northward migrations between Mexican breeding areas and Arctic feeding grounds in winter and spring, respectively. The gray whale begins the southward migration in November with peak sightings during January and March. Males, newly impregnated females, and juveniles migrate northward from February through April.

Table 3-2. List of ESA Protected Species in Offshore Waters of GFNMS and CBNMS

Common Name	Scientific Name	Spatial and Temporal Distribution in Area	Endangered Species Act Status
Cetaceans			
Blue Whale	*Balaenoptera musculus*	Frequent from June through November near the continental shelf	Endangered
Fin Whale	*Balaenoptera physalus*	Uncommon	Endangered
Humpback Whale	*Megaptera novaeangliae* (Mexico / Central America Distinct Population Segments)	Common from May through September throughout the sanctuaries	Threatened / Endangered
Killer Whale*	*Orcinus orca*	Uncommon	Endangered
North Pacific Right Whale	*Eubalaena japonica*	Uncommon	Endangered
Sei Whale	*Balaenoptera borealis*	Uncommon	Endangered
Sperm Whale	*Physeter macrocephalus*	Occasionally seen feeding near the continental shelf	Endangered
Pinnipeds			
Guadalupe Fur Seal	*Arctocephalus townsendi*	Uncommon	Threatened
Seabirds			
Marbled Murrelet	*Brachyrampus marmoratus*	Peak offshore activity occurs at dusk or dawn from mid-June to late July	Threatened/critical habitat (i.e., old growth forests)
Short-tailed Albatross	*Phoebastria albatrus*	Uncommon	Endangered
Fish			
Chinook Salmon	*Oncorhynchus tshawytscha* (Sacramento River and California Coastal Evolutionarily Significant Units)	All offshore marine waters	Endangered (Sacramento River ESU); Threatened (California Coastal ESU)
Chum Salmon	*Oncorhynchus keta*	All offshore marine waters	Threatened
Coho Salmon	*Oncorhynchus kisutch* (Central California Coast Evolutionarily Significant Unit)	All offshore marine waters	Endangered
Steelhead Trout	*Oncorhynchus mykiss irideus* (Central California Coast Distinct Population Segment)	All offshore marine waters	Threatened
Sea Turtles			
Green	(*Chelonia mydas*) (Central North Pacific Distinct Population Segment)	Uncommon	Endangered
Leatherback	(*Dermochelys coriacea*)	All offshore marine waters	Endangered
Loggerhead	*Caretta*	Uncommon	Endangered
Olive Ridley	*Lepidochelys olivacea*	Uncommon	Threatened/ Endangered

* In 2006, the Distinct Population Segment (DPS) of southern killer whales (*Orcinus orca*) was designated as endangered under the ESA. Recent anecdotal information suggests that some of the migratory and feeding killer whales within the existing GFNMS and CBNMS may be part of this DPS and have therefore been included in this document.

Sources: Marine Mammal Commission 2016, ONMS 2014c, NMFS 2017b, NMFS 2017c, NMFS 2017d, NMFS 2017e, and SIMoN 2016c.

Females with their newborn calves follow along from April through June. A few juveniles may appear in the gulf year-round off the Farallon Islands and in Bodega Bay (SIMoN 2016a). Between early summer and late fall, large numbers of federally endangered eastern Pacific humpback use the Gulf of the Farallones and Cordell Bank, feeding primarily over the continental shelf and slope break (SIMON 2016a). Blue whales feed regularly throughout the sanctuaries, particularly in the Cordell Bank-Bodega Canyon area. Blue whales typically occur within the Central California region in late summer and throughout the fall, but it appears they are dependent upon the timing and intensity of oceanographic upwelling conditions, which influence euphausiids (krill) production within the area (SIMoN 2016a).

Cordell Bank is also an important feeding area for Steller sea lions and their winter haul out grounds include Point Reyes and offshore rocks along the Sonoma County coast (USCG 2010a).

Similar to blue whales, numbers of many of the animals that occur in GFNMS and CBNMS are linked to krill abundance. For example, the humpback whale, a main predator of krill, follows this pattern. Years of lower krill abundance (2004-08) have corresponded to low abundance of humpback whales in the region.

A rise in humpback whale abundance that started in late 2009, with almost five times as many whales sighted in the summer and fall of 2010 compared to previous years, coincided with a period of significant krill biomass. Humpback whale abundance declined for a few years following a corresponding decline of krill biomass in the region (Elliott and Jahncke 2015). In 2016 and 2017, humpback whale abundance has been higher than in the previous couple of years.

Seabirds

The region supports a diverse avifauna and includes a variety of coastal habitats that are important to the ecology of coastal and marine bird species. Seabirds are classified as coastal, pelagic, or neritic, depending on their foraging habitat. A broad range of habitats are used at different life and migratory stages with open-water offshore areas primarily used for foraging and resting. Some seabirds forage for food on the sea surface, whereas others dive to variable depths to obtain prey (Burger 2001). Large offshore rocks and coastal bluffs provide nesting areas for seabirds such as cormorants, Western Gulls (*Larus occidentalis*), and Pigeon Guillemots (*Cepphus columba*). Fish Rocks is one of the top breeding colonies along the Sonoma Coast, supporting nine breeding seabird species (NOAA National Centers for Coastal Ocean Science 2007). Other areas nearby that are significant to breeding seabirds include Gualala Point Island, Russian Gulch, and Arched Rock located along the Sonoma Coast State Beaches.

Time periods of vulnerability vary across species and families. Some species breed within GFNMS while other species migrate great distances to spend their non-breeding season in other areas. Many seabirds spend most of their lives at sea and come to land only to breed, nest, and occasionally rest (Schreiber and Chovan 1986). The abundances and distributions of marine birds have been linked to bathymetric and hydrographic features, which aggregate prey. Many seabirds live in or travel to GFNMS and CBNMS because of the highly productive waters common to the region (Elliott and Jahncke 2015).

Marbled Murrelet (*Brachyramphus marmoratus*) and Short-tailed Albatross (*Phoebastria albatrus*) are the two bird species listed under the ESA that are known to occur in GFNMS and CBNMS (Table 3-2). All migratory species that occur in the sanctuaries are also protected under the Migratory Bird Treaty Act (50 CFR § 10.13).

The Marbled Murrelet is federally-listed as threatened. This seabird spends most of its time foraging offshore the northeastern Pacific Ocean from Alaska to Central California, then it nests in old-growth forests from April through September. In California, nests are typically found in coastal redwood and

Douglas-fir forests. These forests are located close enough to the marine environment for the birds to fly to and from nest sites (USFWS 2011).

The Short-Tailed albatross, the largest seabird in the North Pacific, is listed as endangered throughout its range. The remaining two breeding colonies are in Japan, and while they forage widely across the temperate and subarctic North Pacific, they are extremely rare over California waters. CBNMS is known as the "albatross capital of the northern hemisphere" because five of the 14 albatross species have been documented there (NOAA 2010). Among the important keystone species in the area is the Cassin's Auklet, a zooplanktivorous seabird that mainly eats krill. During years of poor ocean conditions, mysids become the dominant prey during which the Cassin's Auklet experiences high levels of breeding failure. The die-off event that occurred to young-of-the-year Cassin's Auklet in 2013 is believed to have been caused by high proportion of juvenile krill in their diets, which contain fewer calories than the adult krill (Elliott and Jahncke 2015). For the Common Murre, another omnivorous seabird species, poor ocean conditions generally correspond to a lower percentage of rockfish in their diet and reduced productivity (Elliott and Jahncke 2015).

General human-caused threats to bird populations include competition for food with commercial and recreational fisheries, entanglement in fishing gear, ingestion of marine debris, disturbance of roosting and breeding birds by watercraft, aircraft and human visitors, and oil spills. In addition to human impacts, changes in climate and oceanographic conditions affect bird populations (ONMS 2010).

Sea Turtles

All sea turtles occurring in U.S. waters are listed under the ESA and are under the joint jurisdiction of NMFS and USFWS (NMFS, 2017b). Both the green and leatherback turtles are known to occur near the Farallon Islands (USFWS 2009). Loggerhead and olive ridley turtles are only very rarely known to occur in the study area for this proposed action.

The leatherback is the largest turtle, as well as the largest living reptile in the world, and the more likely species to be found in GFNMS and CBNMS. Although they are commonly known as open ocean animals, they also forage in coastal waters (NMFS 2017b). Current research has shown that leatherbacks clearly target dense aggregations of brown sea nettle (*Chrysaora fuscescens*) that occur near the Central California coast and north through Washington during summer and fall, but this timing may vary due to oceanographic conditions (75 FR 319). In January 2012, NMFS published a final rule that revised critical habitat designation for leatherback turtles, which included a large nearshore area from Point Arena to Point Arguello east of the 3,000-meter (9,843-foot) depth contour (77 FR 4170).

In the northeastern Pacific, green turtles have been sighted from Baja California to southern Alaska, but are most common from San Diego and southward. Green turtles can be present in the northeastern Pacific in El Niño years, but this occurrence is rare as opposed to leatherbacks, which are present every year (NMFS 2017b). Olive ridley and loggerhead turtles are also rare and only observed during certain El Niño years.

Fish

Fish communities are best described in the sanctuaries' respective condition reports (ONMS 2009, ONMS 2010), and the Final Environmental Impact Statement (FEIS) for the Joint Management Plan Review (NOAA 2008).

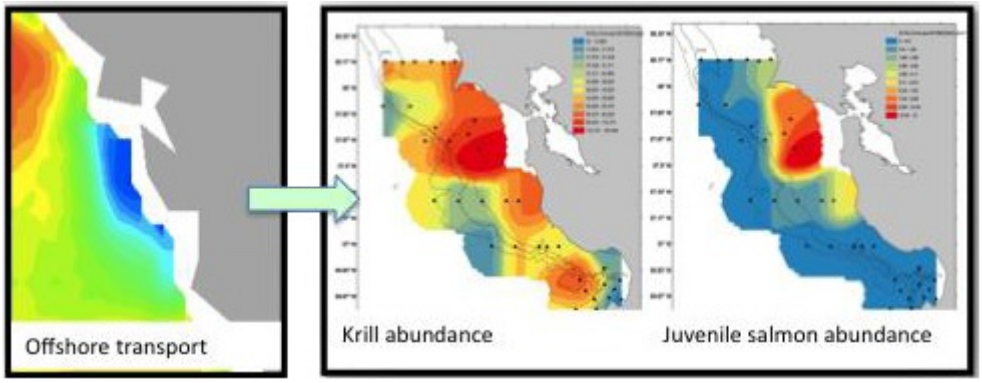
Rockfish species (*Sebastes* spp.) are probably the most dominant on deep reef areas in terms of numbers and biomass. Areas with rocky structure on the shelf are likely important recruitment areas for first year

rockfish settling out of the water column as they move from a pelagic to benthic phase in their early life history. Lingcod are especially numerous on the offshore reefs in the wintertime when they spawn.

Fish species that occupy the epipelagic zone (depths to 650 feet) are a mixed group that includes Blue Shark (*Prionace glauca*), White Shark (*Carcharodon carcharias*), Thresher Shark (*Alopias vulpinus),* Jack Mackerel *(Trachurus symmetuicus),* Pacific Mackerel *(Scomber japonicus)* and Pacific Hake *(Merluccius productus).* The epipelagic zone is composed of early life history stages of many recreational fishes (including Lingcod, rockfishes and many flatfish species) as well as the commercially important Northern Anchovy *(Engraulis mordax)* and Pacific Sardine *(Sardinops sagax).* Anchovies and sardines, which are important prey for many coastal predators and provide a critical link in the coastal food web, have alternated as the most abundant fishes of the coastal pelagic realm off California throughout recent history. Other fish that inhabit the epipelagic zone include species that frequent the sanctuaries on a seasonal basis, such as Albacore Tuna *(Thunnus alalunga*), Chinook Salmon (*Oncorhynchus tshawytscha*), Chum Salmon *(O. keta)* and Coho Salmon (*O. kisutch*)(ONMS 2014a).

Currently in the study area, there are two ESA listed Chinook Salmon stocks (Sacramento River winter and Central Valley spring, California Coastal), one Coho stock (Northern California, Central California Coast), and one Distinct Population Segment (DPS) of Steelhead Trout (*O. mykiss irideus*; Table 3-2). In estuaries and marine areas of California, salmon habitat can extend many miles inland (since salmon migrate upstream into coastal river systems to spawn) out to the 200-mile limit of the Exclusive Economic Zone (EEZ) and beyond. Critical habitat that has been designated for these species in Central California ranges from Redwood Creek in Humboldt County to the Russian River in Sonoma County (NMFS 2015).

Steelhead, Chinook, and Coho Salmon spend much of their lives in the ocean. When ocean conditions are favorable, the sub-adult and adult survival rates appear relatively high (NMFS 2015), but temporal and spatial distribution of salmon stocks are affected by oceanic conditions and the abundance of krill (Figure 3-1).



Source: NOAA Integrated Ecosystem Assessment Program 2016.

Figure 3-1. Spatial Patterns of Offshore Transport, Krill and Juvenile Salmon in Coastal Central California, May-June

In Figure 3-1, abundance of krill is measured as the long-term mean number of individuals collected per net haul (black dots) 1990-2010. Abundance of salmon is measured as total number of individuals collected during 1990-2010. The offshore transport values 2000-2010 were estimated from the QuickSCAT satellite (Source: NOAA Integrated Ecosystem Assessment Program 2016).

Sharp declines of Coho and Chinook in California in 2007 and 2008 are believed to have been caused by poor ocean productivity in 2005 and 2006 (NMFS 2015). The patterns of ocean migration for Chinook and Steelhead vary and are poorly understood. Based on limited tag data, it appears that most Steelhead migrate north and south along the continental shelf (NMFS 2015). Chinook also tend to stay along the continental shelf of the California and Oregon coasts, but migration may continue to higher latitudes if oceanic conditions are appropriate (NMFS 2015). Compared to Chinook and Steelhead, there are relatively few Coho in California today. Commercial and sport ocean harvest of Coho Salmon were banned along the entire California coast in 1995, yet a small proportion of Coho Salmon are incidentally captured and killed as bycatch in other fisheries (NMFS 2016).

EFH for groundfish species, such as rockfish, sablefish, flatfish, and Pacific Whiting, includes all waters from the high tide line to approximately 11,500 feet in depth. Habitat Areas of Particular Concern (HAPCs), which are a subset of EFH, are used by NMFS to focus management and restoration efforts. The current HAPC types are: estuaries, canopy kelp, seagrass, rocky reefs, and "areas of interest," which include a variety of submarine features, such as banks, seamounts, and canyons (PFMC 2016a).

The coastal pelagic species (CPS) fishery includes four finfish (Pacific Sardine, Pacific (chub) Mackerel, Northern Anchovy, and Jack Mackerel), and market squid. CPS finfish generally live nearer to the surface than the sea floor. EFH for CPS is defined by the prevalent temperature range where CPS are found, and on the geographic area where CPS occur at any life stage. This range varies widely according to ocean temperatures. The definition of EFH for CPS also takes into account where these species have been found in the past, and where they may be found in the future.

The east-west boundary of CPS EFH includes all marine and estuary waters from the coasts of California, Oregon, and Washington to the limits of the EEZ (the 200-mile limit) and above the thermocline where sea surface temperatures range between 50° and 79° Fahrenheit (F) (10° and 26° centigrade [C]). The southern boundary is the U.S./Mexico maritime boundary. The northern boundary is more changeable and is defined as the position of the 50° F isotherm, which varies seasonally and annually. (The 50° F isotherm is a rough estimate of the lowest temperature where finfish are found, and represents their northern boundary). In years with cold winter sea surface temperatures, the 50° F isotherm during February is around 43° N latitude offshore, and slightly further south along the coast. In August, this northern boundary moves up to Canada or Alaska (PFMC 2016a).

EFH has not been designated for highly mobile species such as tuna, swordfish, and sharks because these species range widely in the ocean, both in terms of area and depth. Highly migratory species are usually not associated with features that are typically considered fish habitat (such as seagrass beds, rocky bottoms, or estuaries). Their habitat may be defined by temperature ranges, salinity, oxygen levels, currents, shelf edges, and seamounts. Little is known about why highly migratory fish species frequent particular areas. Nevertheless, these species may be affected by actions close to shore or on land, such as fishing, dredging, wastewater discharge, and coastal development (PFMC 2016b).

Changing oceanic conditions are also altering ranges and occurrences of marine species. The 2015-2016 El Niño system, one of the three strongest on record, resulted in unprecedented warm water in the region, which peaked on November 18, 2015 at 37.6° F (3.1° C) above normal (Erdman 2016). This provided a corridor for marine organisms of all types to head north, including a green sea turtle typically found in Mexico that floated into San Francisco Bay and up the San Joaquin River, as well as a porcupine fish and fine-scaled triggerfish spotted in Monterey Bay (West 2016), which are typically Southern California species. El Niño conditions also led to a massive bloom of toxic algae that traveled up the food chain and eventually closed valuable fisheries (refer to the next section related to toxic effects of the marine algae on commercial fishing).

3.3 Human Uses and Cultural Resources

Cultural and Maritime Heritage Resources

Cultural and maritime heritage resources are described in the documents prepared for the expansion effort (ONMS 2014a, 2014b, and 2014c) and the National Register of Historic Places. A cultural resource is defined as any historical or cultural feature, including archaeological sites, historic structures, shipwrecks, and artifacts. Historical resources are defined as any resources possessing historical, cultural, archaeological or paleontological significance, including sites, contextual information, structures, districts, and objects significantly associated with or representative of earlier people, cultures, maritime heritage, and human activities and events. Historical resources include "submerged cultural resources," and also include "historical properties," as defined in the National Historic Preservation Act (NHPA), as amended, and its implementing regulations, as amended. Submerged cultural resources are defined loosely as archaeological or culturally significant sites over fifty years old that are located underwater. These sites may include shipwrecks, downed airplanes, or submerged structures within the more recent historic period, or may include sites dating to the prehistoric period consisting of campsites with stone tools or stones used for grinding (ONMS 2014a).

These sources indicate that the majority of the submerged historic maritime heritage resources in GFNMS and CBNMS are in coastal waters, while only a few are thought to be in Federal waters. Often, last known positions of these resources are general in nature. Since San Francisco has been a major shipping port for more than 150 years, there is a high probability of additional shipwrecks lost in the region, but their last positions went unreported.

The following eleven historic shipwrecks and one aircraft are in the area approximately 3.5 – 14 mi (3 - 12 nm) from shore in GFNMS, including from the shorelines of the Farallon Islands (locations verified): a U.S. Navy tugboat, *USS Conestoga*, 3.5 miles (3.1 nm) off Southeast Farallon Island; a fuel barge, 9.5 miles (8.2 nm) off Southeast Farallon Island; a steamship, *Ituna*, 10.6 miles (9.2 nm) off Bolinas Point; a tramp steamer, *Selja*, 3.5 miles (3.3 nm) off Point Reyes; (last reported); a fishing vessel, *Star of the Sea*, 4 miles off Point Arena; a schooner, *John D. Spreckels*, 5-7 miles off Point Reyes; a schooner, *J. P. Haven*, 10 miles north of Tomales Point; a schooner, *Bonita*, 6 miles southeast of Farallon Islands; a schooner, *A. J. Burr*, 5 miles northwest of the Farallon Islands; a U.S. military aircraft Ventura PV-1, 11 miles west northwest of Point Reyes; a gas fishing vessel, *Xilda*, 10 miles south of Farallon Islands; a schooner, *Emily Stephens*, 4.5 miles off Bowens Landing; and a schooner, *Napa City*, 8 miles west northwest of Point Reyes.

Within GFNMS, nine historic shipwrecks are reported beyond 14 mi (12 nm) from shore: a purse seiner, *Nordic Pride*, 20 miles (17 nm) off Point Arena; a bark, *Albert*, 12 miles (10 nm) north of Point Reyes; a bark, *Bella Vista*, 20 miles (17 nm) off Point Reyes; a schooner, *Ellen Adelia*, 14 miles (12 nm) off Point Reyes; a schooner, *Kosta*, 15 miles (13 nm) off Point Reyes; a schooner, *Lulu*, 14 miles (12 nm) off Point Reyes; a bark, *Helen W. Almy*, and a side-wheel steamer, *Labouchere*, reported lost between the Golden Gate and Point Reyes; and a C-3 freighter, *Jacob Luckenbach*, 17 miles (15 nm) off Point Lobos in San Francisco. Also within this region of GFNMS are three sunken U.S. military aircraft: a Helldiver, 15 miles (13 nm) off Point Arena; an Avenger, 15 miles (13 nm) off the Russian River; and another Helldiver, 12 miles (10 nm) off Bodega Head.

Within CBNMS is the ex-USS Stewart, approximately 38 miles (approximately 33 nm) west of Bodega head, based on its last reported position.

Commercial and Recreational Fishing

The latest data on commercial fishing in the sanctuaries prior to expansion show that the principal commercial species caught in GFNMS and CBNMS was Dungeness crab (*Metacarcinus magister*) by weight (4,146,874 and 114,708 pounds, respectively) and value ($13,426,125 and $393,576, respectively). This represents more than 83% of the total value for harvest revenue from the GFNMS and almost 52% of the total value for revenue harvest in CBNMS (ONMS 2014d and Vernon, Jerome, and Schueler 2014). Dungeness crab has a preference for sandy to sandy-mud bottoms, but may be found on almost any bottom type. Commercial crabbing operations typically use crab pots. An efficient commercial Dungeness crew can hoist and re-bait as many as 400 pots per day. Pots are predominantly set between 60 and 300 feet, although Dungeness crab commonly occur from intertidal areas to 1200-foot water depth (Pacific States Marine Fisheries Commission 2012).

In fall 2015, high levels of the neurotoxin domoic acid, were found in Dungeness crab and California rock crab (*Cancer* spp.) causing dramatic statewide economic impacts due to the closure of both fisheries for more than five months. Domoic acid is a naturally occurring neurotoxin produced by the diatom of the genus *Pseudo-nitzschia*. This diatom was a constituent of the largest and longest-lasting harmful algal bloom (HAB) ever recorded on the West Coast stretching from Central California to Washington and possibly all the way north to Alaska. This led to record levels of domoic acid in species such as anchovies, razor clams, and crabs.

Both shellfish and fish can accumulate this toxin without apparent ill effects; however, in humans the toxin interferes with nerve signal transmission in the brain. Very high doses of the toxin can be fatal to humans, while lower doses can cause permanent brain damage (i.e., short-term memory loss). When this toxin was discovered in certain West Coast fish and shellfish, both recreational and commercial fisheries were closed, which caused serious economic impacts on communities that are dependent on these fisheries (NOAA Northwest Fisheries Science Center 2016).

The prolonged bloom probably allowed the toxin to build up in sediments on the seafloor, which would explain why Dungeness crabs showed high levels of toxin for months after the algal bloom went away (Stephens 2015). In response to the public health concern associated with domoic acid, the California Department of Fish & Wildlife (CDFW) delayed the normal opening of the commercial Dungeness crabbing season, which usually begins on November 15 in District 10 (south of the Gualala River) and on December 1 in the northern districts 6-9 (north of the Gualala). Crabbing opened in District 10 at the end of March after that area was deemed clean by the public health agencies. The northern districts remained closed at that time, which caused several crabbers from those areas that would normally have remained nearer to their home ports to fish and land in District 10, shifting some of the fishing pressure to District 10 (Sloane 2016).

The northern districts eventually opened in May 2016, but under the “fair start” rules (California Code Section 8279.1(a)), which are designed to protect commercial fishing operations in the northern districts that have a later opening in a normal year. These rules prohibited any fisherman who had landed crab in an open district from fishing in a district with a later starting date until 30 days after that later-opening district opens. Thus, the corresponding effort shift to the south was delayed for 30 days after the northern districts opened (Sloane 2016).

Salmon, the second most valuable caught species in GFNMS and CBNMS, represented almost 13% and 26% of total value of harvest revenue, respectively, in 2012. More than 410,000 and 30,000 pounds of salmon were harvested at a value of $2,072,072 and $196,531, respectively in these sanctuaries prior to expansion (ONMS 2014a and ONMS 2014b). Preliminary totals for California in 2015 indicate however, that the current harvest is probably half as much as had been reported in 2012 (PFMC 2015).

Commercial ocean fishing for Chinook Salmon from Point Arena to Pigeon Point occurs from May through the end of September with landings peaking in May in the Bodega area and in July in the Fort Bragg area (CDFW 2016). The recreational salmon season runs from April 2 through the end of September (PFMC 2015). The Sacramento River fall Chinook Salmon have historically been the largest contributor to ocean salmon harvest off California (O'Farrell, et al. 2013).

The offshore waters of GFNMS and CBNMS are utilized by recreational fishermen and recreational boaters. The main boat-based modes of recreational fishing include commercial passenger fishing vessels, private and rental skiffs, and kayaks (angling, diving or free diving). A number of commercial charter fishing companies operate out of San Francisco Bay. In the expanded portions of the sanctuaries, most of the commercial passenger fishing activity is out of Bodega Bay and targets salmon, crab and rockfish. Closures in specified depths for federally-managed groundfish (including many species of rockfish) have been in place since 2001, and have redirected most recreational fishing for groundfish from deeper offshore reefs to shallower nearshore areas (ONMS 2015a). In GFNMS, people also recreationally fish from shore. A variety of additional recreational uses, such as SCUBA diving and surfing, mainly take place in the nearshore waters of GFNMS (ONMS 2014a).

Marine Transportation

The San Francisco Bay area is among the largest commercial shipping destinations in the world. The Port of Oakland is the fourth largest in the U.S., delivering 99% of the ocean containers passing through Northern California to the rest of the nation. There are also five smaller ports in the San Francisco Bay area (Redwood City, Richmond, West Sacramento, San Francisco, and Stockton); and one private port (Benicia). Another small port is located at Humboldt Bay (California Department of Transportation 2016).

A Vessel Traffic Service (VTS) is a USCG-regulated navigation service, designed to monitor and coordinate vessel traffic in a specified area. VTS applies to commercial ships, other than fishing vessels, weighing 300 gross tons or more. The VTS in the San Francisco area includes the Pacific Ocean in a 44-mile (38-nm) radius around Mount Tamalpais, which is ten miles north of the Golden Gate Bridge. Within the San Francisco VTS area is a Traffic Separation Scheme (TSS), consisting of three approaches, to coordinate entrance and exit of ship traffic to the ports of San Francisco and Oakland. The northern approach of the TSS is 3.5 mi (3 nm) in width, which includes a 1.2-mi-(1-nm)-wide separation zone and two, 1.2-mi-(1-nm)-wide traffic lanes. Since the area where USCG training activities are proposed to occur would be located north of San Francisco Bay, only information on vessels transiting the northern approach of the TSS is summarized here. In 2013, a total of 2,026 transits occurred in the traffic lanes along the northern approach. These transits involved cargo vessels, large passenger ships, and tankers, all greater than 300 gross tons (ONMS 2014a).

The northern approach of the TSS is approximately 41 miles (36 nm) in length. Once the ships leave the TSS, they travel to destinations throughout the world. Information on vessels transits may be obtained from several sources, including the Marine Exchange of the San Francisco Bay Area and VesselFinder. To provide an example of the types of vessels traveling in or near the northern approach of the TSS, on August 7, 2016, there were three ships: the 732-foot bulk cargo ship, *London 2012*, which had made recent port of calls in Brazil and Europe; the 1100-foot container ship, *Ever Lively*, which had made recent port of calls between China and Los Angeles; and the 561-foot bulk carrier, *Bright Ocean*, which had been in several ports of China, Japan and Australia (VesselFinder 2016). No information was available on these ships' destinations, but it is assumed that they typically travel the same routes. These three ships also represent the types of vessels that transit to and from the ports of San Francisco on a typical day.

Homeland Security and Military Uses

All homeland security and military uses of the region were reviewed in the Cordell Bank and Gulf of the Farallones National Marine Sanctuaries Expansion Final Environmental Impact Statement (ONMS 2014a). Apart from the USCG, other armed forces training uses of the area include U.S. Army and U.S. Navy use the airspace over GFNMS and CBNMS for flight training, practice missions, and tests (ONMS 2014a). In the waters of GFNMS and CBNMS, there is a designated Navy Test Area off Point Reyes, as depicted on NOAA chart 18640. NOAA has not been able to determine to date, however, if the Navy Test Area is still being actively used by the U.S. Navy, and if so, what tests are performed there.

The USCG is responsible for carrying out eleven missions, as summarized in Section 1.2 of this document. The USCG District 11 area of responsibility encompasses the states of California, Arizona, Nevada, and Utah, and includes the coastal and offshore waters out to a thousand miles and the offshore waters of Mexico and Central America down to South America. USCG District 11 conducts air use of force, surface use of force, and SAR activities in the area, including the use of weapons and pyrotechnics as part of their training (ONMS 2015a). When there are important marine safety issues or other information that may affect commercial shippers, fishermen, recreational boaters and other mariners in the local area, the USCG notifies them via "Local Notice to Mariners" bulletins. The USCG also broadcasts additional alerts regarding coastal maritime weather, navigation and safety ("Sécurité" messages) from the USCG Navigation Center on VHF simplex radio channels 16 and 22A.

Use of force and SAR mission-related discharges, except during training situations, are exempt from the GFNMS and CBNMS discharge prohibitions, as previously noted, as they are conducted during emergencies. Use of force, involving firing live ammunition, may be used in GFNMS and CBNMS during enforcement actions or defense actions in response to threats to homeland security. USCG cutters and patrol boats and their crews have the authority to board, search, detain, arrest, and seize violators; prevent illicit drug and migrant trafficking; conduct SAR operations when people are in danger, injured or missing; protect homeland security, including ensuring the safe operation of U.S. flagged vessels; respond to the release of oil and hazardous materials; protect endangered species; and prevent illegal taking of marine mammals and fish.

To conduct its missions in GFNMS and CBNMS, the USCG uses at least nine classes of vessels. Some of these conduct only short term operations or transit through the region. To provide an overall picture for readers of this document and set the context for the environmental consequences analysis (in Section 4), a Table 3-3 presents a list of the USCG vessel classes and numbers of vessels presently used throughout GFNMS and CBNMS, and the vessels' sewage and graywater equipment and holding tank capacities. All of these vessels may operate in or transit through the expanded portion of the sanctuaries, though some have maximum offshore distances in which they operate, or have sea keeping operational limits. The vessel classes that most commonly operate in the expanded portions of GFNMS and CBNMS are the Marine Protector Class Coastal Patrol Boat, the Coastal Buoy Tender (on a short term basis), and the Seagoing Buoy Tender (Coito 2016d). There may be an additional number of vessels in other classes that transit on rare occasion through GFNMS and CBNMS; however, NOAA was not able to obtain information on numbers of any such vessels or their holding tank capacities.

Normal use of USCG vessels in GFNMS and CBNMS, including when training or transiting, results in the generation of sewage and graywater for the Coastal Patrol Boats, the Seagoing Buoy Tender, the Coastal Buoy Tender, and the National Security Cutters. The USCG does not add any substances to Type III holding tanks for treatment or odor control (Coito 2016a). In vessels with separate, non-connected sewage and graywater tanks, there is no mixing (commingling) of the wastewater prior to discharge. Other vessel types have cross-connected sewage and graywater holding tanks that mix the two types of

Table 3-3. Summary of USCG Vessels Operating in GFNMS and CBNMS and Proposed Discharges

Vessel Type, Length and USCG Acronym	# Assigned to Operate in GFNMS and CBNMS	Additional # Transiting &/or Conducting Short Term Training/Other Operations in GFNMS & CBNMS *	Less than 300 Gross Registered Tons? Yes/No	MSD Type and Sewage Holding Capacity in Gals.	Graywater Holding Tank Type and Capacity in Gals.	Holding Capacity Reached in Hrs. and Notes
Marine Protector Class Coastal Patrol Boat – 87' (WPD)	3	9	yes	Type III MSD 381 gals.	Type III MSD 58 gals.	Cross-connected holding tanks; approx. 48 hrs.
Seagoing Buoy Tender – 225'(WLB)	1	none	no	Type III MSD 1,755 gals.	Type III MSD 2,780 gals.	Sewage - 120 hrs.; graywater - 48 hrs. with water conservation
Defender Class Response Boats - 25' (RBS)	6	20	yes	none	none	N/A
Response Boats Medium - 45' (RBM)	2	4	yes	none	none	N/A
Motor Life Boats - 47' (MLB)	6	1	yes	none	none	N/A
Coastal Buoy Tender - 175' (WLM)	none	1	no	Type III MSD 844 gals.	Type III MSD 5,362 gals.	Sewage - 180 hrs. of regular use; graywater - 360 hrs. of regular use
Trailerable Aid to Navigation Boat – 26' (TANB)	2	none	yes	none	none	N/A
RBS II Response Boats - 29' (RBS)	8	none	yes	none	none	N/A
National Security Cutters - 418' (WMSL)	3 **	none	no	Type III MSD 3,351 gals.	Type III MSD 26,123 gals.	Sewage and graywater - as little as 8 hrs. while underway, 24 hrs. while in port

Sources: Coito 2016a and Coito 2016d.

* In order to not double count vessels, vessels assigned to GFNMS & CBNMS (meaning they are stationed or have their home ports in the approximate geographic area of the two sanctuaries) are not included again in the Additional # column (third column from left) if they are also used in short term transit, training, or other short term activity.

** While some larger classes of vessels, such as the National Security Cutters, may transit through CBNMS and GFNMS, National Security Cutters do not currently perform sustained operations in the NMS as an enforcement asset. According the USCG, NSCs do not discharge untreated sewage and do not engage in live fire training in the sanctuaries.

wastewater prior to discharge (Coito 2016a). None of the vessels listed in Table 3-3 are designed to directly discharge wastewater overboard without first being collected in a holding tank (Coito 2016e).

NOAA has no further details regarding the designs of the smaller USCG vessels (25 – 47' in length) listed in Table 3-3 as having no MSDs or holding tanks[9].

To maintain personnel readiness to perform assigned missions and be prepared when circumstances dictate, the USCG conducts various planned training exercises periodically throughout the year. While there are many types of training the USCG conducts, this environmental assessment focuses solely on describing live fire and SAR training and associated discharges. The USCG conducts on-water live fire and SAR training to ensure that its fleet and personnel are capable for immediate or rapid response to threats or incidents. Specific to USCG live fire training, each exercise could utilize four 87-foot Coastal Patrol Boats and four 45-foot Response Boats Medium. For SAR training exercises, the USCG could utilize one 87-foot Coastal Patrol Boat, one 47-foot Motor Life Boat, one HH-65 Helicopter, and one C-130 Aircraft (McGuire 2015 and USCG 2015a, Coito 2017a). The total number of each type of asset used at any given training event could be fewer because these are estimated maximums.

Generally, each USCG crew member must train at least two times per year to maintain their live fire training qualifications; SAR/pyrotechnics training is an annual requirement (Coito 2017a). Live fire and SAR training are conducted on separate days or combined into a single day, depending on training objectives and mission needs, and could include activities such as the launching of flares, tactical vessel movements, and the firing of weapons. Generally, training on a given day does not take more than 12 hours, including transit times, and is completed in the same day. However, the length of a training day can vary, based on the type of training, the number of personnel completing a given training objective, and the distance offshore of the training (Coito 2016b).

As noted, live fire and SAR training exercises, involving discharges of ammunition and pyrotechnic materials, are currently not exempt from sanctuary regulations within the pre-expansion boundaries of GFNMS and CBNMS (prior to the sanctuaries' expansion in 2015), and thus, the USCG has not made training-related discharges there. It is NOAA's understanding that the USCG has historically conducted live fire and SAR training within the expansion areas; however, the USCG has not kept detailed records on these trainings and has not provided any information to NOAA documenting where and when trainings have occurred (USCG 2015a). Currently, the USCG can continue to make training-related discharges of ammunition and pyrotechnics in the expansion areas of GFNMS and CBNMS due to the delay of discharge requirements approved by NOAA's final rule for the expansion project published in the *Federal Register* on March 12, 2015 (80 FR 13078) and the three subsequent six-month postponements of the effectiveness of the discharge requirements published on December 1, 2015 (80 FR 74985) May 31, 2016 (81 FR 34268), and December 6, 2016 (81 FR 87803).

Elsewhere along the coast of California, the USCG conducts on-water live fire training exercises in Southern California, in designated exercise boxes, approximately 14 miles (12 nm) south of Anacapa Island and 14 miles (12 nm) west of Pt. Vicente (USCG 2015a). USCG District 11 has informed NOAA they sometimes send personnel that normally operate in GFNMS and CBNMS to train in this area offshore of Southern California (USCG 2015a).

During planned live fire trainings, the USCG may discharge approximately 1,200 rounds of ammunition (among all weapon types) and approximately 180 rounds of aerial flash bang pyrotechnics per year.

[9] As a general observation, not specific to the USCG, some small vessels designs do not include toilet or water facilities.

Under a "worst case scenario", in which a serious national security event has occurred and the USCG needs to expand its normal training program to address the threat, up to 18,000 rounds of ammunition may be discharged per year (Coito 2017a). For SAR trainings, the USCG may discharge approximately 90 flares and/or smoke floats per year for all types of marine markers (Coito 2017a).

The USCG typically trains with four weapon classes: .50-caliber mounted machine guns, M240 machine guns, 12-gauge shotguns and M-16 rifles (USCG 2015a, Coito 2017a). Ammunition discharged from each weapon includes the cartridge case, bullet or shot, propellant powder, and primer; ammunition weight varies depending on the type of ammunition. In addition, the USCG uses LA51 flash bang pyrotechnics warning devices during live fire training exercises (USCG 2015a, Coito 2017a). The LA51 fires non-lethal warning projectiles (either 12-gauge or 40 mm); during non-training situations, the USCG mainly uses the LA51 in situations involving non-compliant vessels. The LA51 fires a projectile which bursts at a fixed point 100 meters (328 feet) downrange, causing a bright flash of approximately 50,000 candlepower, (similar in light intensity to a strong flashlight) and then a loud bang (USCG 2011). The programmatic environmental assessment for use of the LA-51 states, “Wherever training with the LA51 takes place, current training protocol requires that boats conduct a visual and radar search to ensure no surface or aircraft are within a 500 yard radius prior to commencing the training exercise. A cease fire will be called at any point a vessel or aircraft enters the training area” (USCG 2011).

Table 3-4 contains a summary of the types of ammunition typically used and the ranges the projectiles can travel.

Table 3-4. Types of Ammunition and Pyrotechnic Materials Used during Live Fire Trainings

Type of Ammunition	Maximum Range (Distance) Projectile Can Travel
Copper-jacketed rounds from .50-caliber mounted machine guns	4.3 mi. (3.7 nm)
Copper-jacketed rounds from M240 (7.62 mm) machine guns	2.3 mi. (2 nm)
12-gauge Copper Sabot rounds from shotguns	Information not obtained
M-16 rifle rounds (5.56 mm)	Information not obtained
LA-51A – aerial flash bang pyrotechnic (non-lethal) projectiles	1,000 feet

Sources: Coito 2016c, Coito 2017a, USCG 2015a, and USCG 2011.

The chemical constituents associated with small arms ammunition commonly used at operational ranges include lead, antimony, copper, and zinc. The primary constituent of concern at small arms ranges is lead because it is the most prevalent (by weight) potentially hazardous constituent. Since the mobility of lead is dependent on the environment’s geochemical properties, site-specific conditions must be known to quantitatively assess how lead may disperse at a given location. The chemical contents of the LA51 projectiles include aluminum powder, magnesium powder, and potassium perchlorate (USCG 2011).

Typically, personnel on patrol boats do not use targets during live fire training exercises. A target made of foam is undesirable for USCG use as they often break apart, is difficult to recover, and is not biodegradable (Coito 2016b).

During SAR training exercises, the USCG may utilize five different types of marine markers (which are devices that discharge flares and/or smoke floats). Table 3-5 provides a summary of these different types of marine markers and typical approximate weights for each.

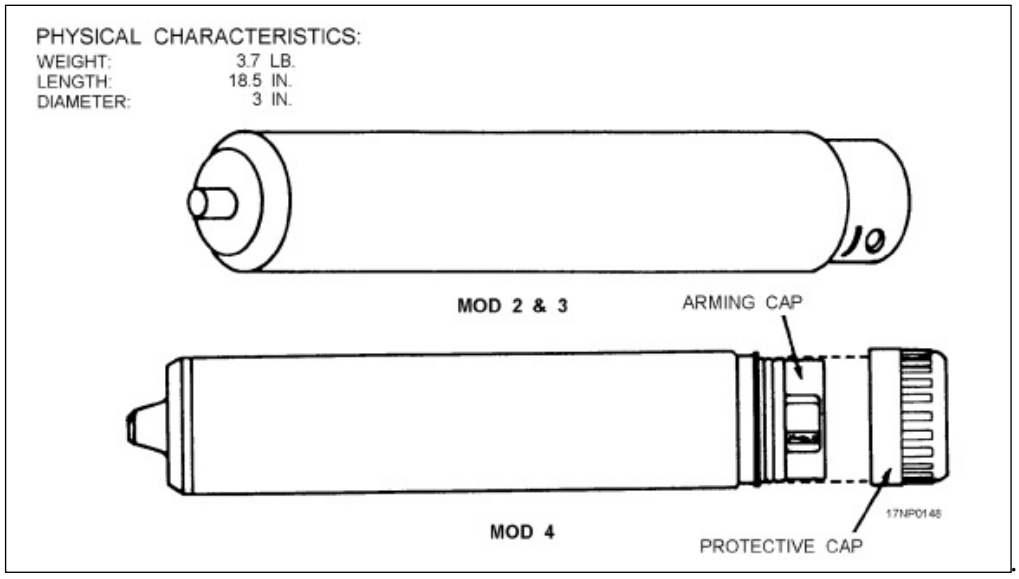
Table 3-5. Types of Marine Markers Discharged during SAR Trainings

Type of Marine Marker (Flare and/or Smoke Float)	Description
DODIC L283 (MK 124) Signal, Smoke and Illumination Marine day/night flare (includes aluminum case and chemical contents)	Emits orange smoke (lasting 15 seconds) and aerial flare (lasting 15-20 seconds); brightness is 50,000 candlepower (similar to a strong flashlight)
DODIC L312 (MK 127) white parachute flare (includes parachute, rocket motor, aluminum launching tube and chemical contents)	Emits aerial flare with white star illumination (lasting 30 seconds) suspended from a parachute; brightness is 125,000 candlepower
DODIC L553 (MK 25) aerial-to-sea marker and smoke float (includes seawater-activated battery, electric squib and chemical contents)	Emits yellow flame and white smoke while floating on sea surface (lasting 10-20 minutes)
DODIC L133 (MK 79) pencil flare kit (includes launch case and chemical contents)	Emits seven aerial flares (each lasting a minimum of 4.5 seconds)
DODIC L580 (Mk58) aerial-to-sea marker and smoke float (includes seawater-activated battery, electric squib and chemical contents)	Emits yellow flame and white smoke while floating on sea surface (lasting 40-60 minutes)

Sources: Coito 2016c, Coito 2017a, USCG 2015a, and U.S. Department of the Army 2017.

These marine markers (which shoot pyrotechnic flares and/or smoke floats) (see Figure 3-2) are used to provide a visual reference both in the air and on the ocean's surface to mark a craft or vessel in distress or a survivor in the water. They often produce a loud bang and then create a continuous light (either flare or flame) and/or smoke. Markers can last anywhere from a matter of minutes up to 60 minutes, depending on the type of device used, and can be visible for up to three miles under normal operating conditions (U.S. Department of the Navy 2001).

Flares are designed to produce light or smoke without an explosion; they produce this effect by burning, and are generally consumed in the process. When ignited, the pyrotechnic chemicals used in these devices generate a bright light for illumination and may also produce colored lights or smoke for the purpose of visual signaling and area and target illumination. Hazardous materials include magnesium and white and red phosphorus, which do not explode, but burn at high temperatures once ignited (Coito 2016c, Coito 2017b, USCG 2016c). Metals such as barium, sodium, nickel, and titanium are often incorporated into pyrotechnic materials to produce specific visual characteristics, such as color, smoke, or both (U.S. Department of the Navy 2011). Perchlorates may be used as oxidizers and to enhance the visual characteristics of the item. Pyrotechnic items also may include igniters and fuses (U.S. Department of the Navy 2011). Other chemical constituents commonly found in the types of marine marker may include iron, aluminum, magnesium powder, zinc oxide, potassium chlorate, nitrocellulose, nitroglycerin, sodium nitrate, strontium nitrate and potassium nitrate. Flares may also contain a primer such as trinitrotoluene (TNT), propellant (ammonium perchlorate), red lead ignition material and other explosives (Coito 2016c,



Source: U.S. Navy 2001.

Figure 3-2. Physical Characteristics of a Marine Location Marker

Coito 2017b, USCG 2016c, U.S. Department of the Navy 2011). These materials are present in small quantities (e.g., each flare may contain 10-ounces [oz.] of ammonium perchlorate and 10-oz. of explosives). Small amounts of metals are used to give flares and other pyrotechnic materials bright and distinctive colors. Combustion products from flares include magnesium oxide, sodium carbonate, carbon dioxide, and water (U.S. Department of the Navy 2013). Residues from pyrotechnic items that function as designed include metallic compounds and residual perchlorate compounds. Most of the contents of a marine marker are almost entirely consumed during use, however, some materials would enter the water such as aluminum launching tubes and small, plastic or rubber end caps that contain the pyrotechnics materials inside the flares (i.e., the "protective cap" shown in Figure 3-2; U.S. Department of the Navy 2001). In addition, the MK 127 marine marker is deployed along with a small, nylon parachute and motor-propelled rocket that are not recovered after use.

When conducting live fire and SAR training, USCG personnel on board scan for marine species, including protected species and follow look-out procedures. Prior to training, they receive required and recommended training related to marine mammal identification, and have tools to help identify whale species while underway. Some boarding officers also receive training on marine mammal identification, the ESA, and national marine sanctuaries (Coito 2016c).

Research and Education Uses

Research

Research activities have the potential to be affected by the proposed action and alternatives. Research in GFNMS and CBNMS is conducted both by ONMS staff members and by researchers from various agencies, organizations, and institutions. Table 3-6 contains a list of research and monitoring activities/topics, covered by active national marine sanctuary research permits in GFNMS and CBNMS (as of June 3, 2016) along with a few, illustrative research activities not currently under national marine sanctuary research permits. The table also indicates the general location where the research activities may occur (when known).

Table 3-6. Research in GFNMS and CBNMS

	In Previous Boundaries of Sanctuary	In Expansion Area of Sanctuary	In Federal Waters	In State Waters
GFNMS				
Studies of ocean processes to determine the bottom-up regulation of rocky shore communities along an upwelling coast	Yes	Yes	No	Yes
Aerial surveys for seabirds and waterfowl	Yes (airspace above)	Yes (airspace above)	Yes (airspace above)	Yes (airspace above)
Ecology and population dynamics of White Sharks research and filming	Yes	No	No	Yes
Research into the context and scale of seagrass effects on estuarine acidification	Yes	No	No	Yes
Aerial photographic surveys of Northern fur seals at the Farallon Islands	Yes	No	No	Yes
Research on interactive effects of biological invasions and climate change on trophic cascades	Yes	No	No	Yes
Buoys for measuring water quality in Tomales Bay	Yes	No	No	Yes
Long-term Monitoring Program and Experiential Training for Students	Yes	Yes	No	Yes
Downscaling climate change models to local site conditions, for determining effects to coastal habitats of sea level rise and extreme events	Yes	No	No	Yes
Aerial photographic surveys of breeding colonies of surface-nesting seabirds	Yes	Yes	No	Yes
Collection of marine substrates	Yes	No	No	Yes
Buoys for gathering weather data	Yes	No	No	Yes
Groundfish bottom trawl surveys	Yes	Yes	Yes	Yes
Marine mammal and sea turtle assessment and ecosystem research	Yes	Yes	Yes	Yes
Autonomous underwater vehicle oceanographic research	Yes	Yes	Yes	Yes
Southwest Ocean Outfall Regional Monitoring Program	Yes	No	No	Yes
pH levels in tidepools research	No	Yes	No	Yes
Maritime heritage research*	Yes	Yes	Yes	Yes
BeachWatch*	Yes	Yes	No	Yes
Research projects in the Bodega Marine Life Refuge and a nearby buoy with research instruments*	No	Yes	No	Yes
Reef Check shallow subtidal reef surveys*	No	Yes	No	Yes
Annual juvenile rockfish surveys *	Yes	Yes	Yes	Yes
Applied California Current Ecosystem Studies (ACCESS) project*	Yes	Yes	Yes	Yes

Table 3-6 cont. Research in GFNMS and CBNMS

	In Previous Boundaries of Sanctuary	In Expansion Area of Sanctuary	In Federal Waters	In State Waters
CBNMS				
Buoy for gathering wave data	Yes	No	Yes	N/A
Exploration and monitoring of Cordell Bank by technical divers	Yes	No	Yes	N/A
Acoustic buoy for characterizing sound	Yes	No	Yes	N/A
Moorings for characterizing hypoxia	Yes	No	Yes	N/A
Buoy for gathering weather data	Yes	No	Yes	N/A
Groundfish bottom trawl surveys	Yes	Yes	Yes	N/A
Marine mammal and sea turtle assessment and ecosystem research	Yes	Yes	Yes	N/A
Autonomous underwater vehicle oceanographic research	Yes	Yes	Yes	N/A
Annual juvenile rockfish surveys *	Yes	Yes	Yes	N/A
ACCESS project*	Yes	Yes	Yes	N/A

* There are a number of research activities in GFNMS and CBNMS not covered by national marine sanctuary permits (depending on the nature of the activities and the sanctuaries regulations). A few select research activities are included here for illustrative purposes only, and do not comprise a comprehensive list. For a more detailed list of research activities, see the central portal for information about monitoring in California national marine sanctuaries at http://www.sanctuarysimon.org/.

Education

Educational boat trips[10] that occur in the sanctuaries' waters may also be affected by the proposed action and alternatives. These trips, in which participants may see a variety of wildlife and fish, are led by experienced naturalists and marine biologists. In the past, each August, a field seminar has been offered through the Point Reyes National Seashore Association as a day trip to areas offshore of Bodega Bay, including to Cordell Bank, Bodega Canyon, and the continental shelf break, to view marine mammals and birds. In the fall, one or more commercial operators may offer educational wildlife watching trips in the Cordell Bank/Bodega Canyon region. Similar boat expeditions to the Farallon Islands are offered by several non-profit organizations and commercial operators, from May to November. Finally, commercially-operated White Shark viewing and cage diving expeditions may be offered to the Farallon Islands in the fall.

[10] This activity could also be categorized as recreational wildlife watching (with an education component), ecotourism, or simply tourism.

4.0 ENVIRONMENTAL CONSEQUENCES

This section presents the analysis of anticipated environmental consequences, or effects, for each of the alternatives described in Section 2 to implement the proposed action. The analyses of the effects of the alternatives are organized in this order and format:

- NOAA's proposed preferred alternative (which covers two discharge components, Sewage/Graywater Alternative 1 and Training Alternative 1);
- Sewage/Graywater Alternative 2;
- Training Alternative 2; and
- No Action alternative (which covers two discharge components, Sewage/Graywater Alternative 3 and Training Alternative 3).

In this section, NOAA paired some of the alternatives in order to fully analyze the effects of a combined action that would allow discharges of sewage and graywater as well as discharges from training activities. However, NOAA could choose to pair any one of the three Sewage/Graywater alternatives with any one of the three Training alternatives in its final action. As described in the analysis below, NOAA does not expect that the combined effect of these alternatives would result in a substantively different level of effects compared to each individual alternative analyzed separately. Therefore, NOAA would not anticipate a significant difference in the combined effects even if the final action pairs alternatives not analyzed together in this document. If NOAA were to select a different preferred alternative in the final action and if that change resulted in substantive changes to this analysis, NOAA would alter this section accordingly.

The term "effects" (which is synonymous with "impacts" in the Council on Environmental Quality [CEQ] regulations [40 CFR 1508.8]) includes ecological, aesthetic, historic, cultural, economic, social, or public health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that have both beneficial and adverse effects, even if on balance the agency believes that the effect will be beneficial. An agency action may also have no impact on a particular resource or human use.

This section contains analyses of the anticipated effects of each alternative on the natural resources and human use and cultural resources topics covered in Section 3: air quality, water quality, marine mammals, seabirds, fishes, cultural and maritime heritage resources, commercial fishing, recreational fishing and other recreational uses, marine transportation, homeland security and military uses, and research and education. Potential cumulative effects are discussed in section 4.5 of this document. NOAA will also fulfill its responsibilities to complete required consultations and/or receive necessary authorizations under applicable natural and cultural resource statutes, as described in Appendix B, prior to taking final action.

To determine whether an effect is significant, CEQ regulations (40 CFR 1508.27) and NOAA procedures (NOAA Administrative Order [NAO] 216-6) require the consideration of context and intensity of potential effects. The criteria used to determine the significance of impacts on the environment and human uses are included in the effects analysis for the preferred alternative; the same criteria are also used for the other alternatives. The context of a proposed action refers to the affected environment and interests (refer to Section 3), which could be local, regional, national, or all three, depending upon the circumstances of the proposed action. Intensity refers, among other factors, to the severity of the effect, which may be long-term or short-term; none; negligible, minor, or moderate (less than significant), or significant; adverse or beneficial; and direct or indirect. As used in this analysis, these characteristics are defined below.

Long-Term or Short-Term

These characteristics are determined on a case-by-case basis and do not refer to a rigid time period. In general, long-term impacts would occur when either the action is continuous or recurring, or the impacts of an activity would last for years after an activity has occurred. Short-term impacts are those that would occur only briefly during or following a phase of the action.

Negligible, Minor, Moderate, or Significant

These relative terms are used to characterize the magnitude of an impact. Negligible impacts are generally impacts that are immeasurable and unnoticeable, or if they are noticeable, they are at the lower level of detection and considered discountable. A minor impact is slight, but detectable, although it may be too low to be measurable. Moderate impacts are those that are more perceptible, typically are more amenable to quantification or measurement, and may approach but are still below significant thresholds. Significant impacts are those that, in their context, and due to their intensity (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27). Such impacts warrant heightened attention and examination for potential means for mitigation in order to fulfill the policies set forth in NEPA and may require additional levels of NEPA review.

Adverse or Beneficial

An adverse impact would cause unfavorable or undesirable outcomes on the natural or human environment. A beneficial impact would cause positive outcomes on the natural or human environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource. For example, sediment disturbance could expose benthic invertebrates to predation, which would adversely impact the benthic community, but would result in a beneficial impact on fish by increasing prey availability.

Direct or Indirect

Direct impacts can be identified and assessed with more certainty than indirect impacts because they are caused by the action and occur at the same time and the same place. Direct impacts can be short-term or long-term. Indirect impacts are more difficult to identify and assess because they occur in the near and distant future and involve dynamic variables. Indirect impacts are caused by the action and are later in time or farther removed in distance. In this document, all impacts are considered to be direct impacts unless stated otherwise.

Cumulative

A cumulative impact results from the incremental impact of an action on the environment when added to other past, present and reasonably foreseeable future actions regardless of the agency or person undertaking the action; described in CEQ regulations (40 CFR 1508.7).

4.1 Effects Analysis of Preferred Alternative (Sewage/Graywater Alternative 1 and Training Alternative 1): Allow USCG Vessel Sewage and Graywater Discharges and Discharges of Ammunition and Pyrotechnic Materials in the Federal Waters of the GFNMS and CBNMS Expansion Areas

The proposed preferred alternative, which NOAA would implement by including exceptions in the GFNMS and CBNMS regulatory prohibitions, would allow the current state of affairs, or status quo, for

USCG vessel discharges of untreated sewage and non-clean graywater and USCG training-related discharges of ammunition and pyrotechnic materials to continue within the federal waters of the GFNMS and CBNMS expansion areas (refer to Figures 2-1 and 2-2). These discharges were not prohibited in this area prior to the sanctuaries' expansion in 2015, and NOAA has postponed its discharge regulations from taking effect with respect to USCG discharges in the expansion area (as described in Section 1-2 under "Interagency Coordination"). There would be no change to the regulatory prohibitions within the pre-expansion areas of GFNMS and CBNMS as a result of implementing this alternative.

Existing conditions for all sanctuary resources and compatible uses in the federal waters of the GFNMS and CBNMS expansion areas would not change, either adversely or beneficially, as a result of implementing this alternative. The USCG would be able to continue to operate its vessels and conduct its missions without having to divert vessels with limited holding tank capacity elsewhere to make necessary discharges, and could make the training-related discharges in the same areas as was previously utilized. This is in contrast to the No Action alternative, in which USCG discharges in the expansion area would be prohibited once the March 2015 final regulations became effective.

4.1.1 Natural Environment

Air Quality

Sewage/Graywater Alternative 1

Compared to the No Action alternative (which would prohibit USCG vessel discharges once the March 2015 regulations became effective), under the preferred alternative NOAA would expect indirect, short term, localized, effects on air quality, by causing adverse odors in minute quantities in the air above the discharges in the expansion areas. Any such odors would normally disperse within minutes. There would be no additional impact on air quality, compared to current conditions[11], upon implementation of the preferred alternative for sewage/graywater, since the status quo for USCG vessel discharges of untreated sewage and non-clean graywater discharges would be maintained, without change, in the federal waters of the GFNMS and CBNMS expansion areas. There is no USCG documentation of any such effects having occurred under current conditions.

An air quality impact would be considered significant if state or federal air quality standards were exceeded as a result of this alternative and could not be mitigated. No agencies in California and no federal agencies, including the USEPA, regulate the indirect effects on air quality that may result from USCG vessel (or other types of vessels') discharges of untreated sewage and non-clean graywater. The state agencies regulating air quality are county or regional governing authorities that have primary responsibility for controlling air pollution from stationary sources – and thus do not regulate odors from USCG vessel discharges to ocean waters. The Clean Air Act, with respect to ocean-going vessels and large ships, regulates marine diesel engines, vessels containing such engines, emissions from such engines, sulfur content of marine fuel, and international standards for marine engines and their fuels. The Clean Air Act does not regulate air emissions from discharged vessel sewage and graywater. Similarly, MARPOL regulates air pollution and greenhouse gas emissions from fuel and engine exhaust of ocean-going ships, but does not regulate discharge of untreated sewage and non-clean graywater. The GFNMS and CBNMS regulations do not prohibit air emissions from any source.

[11] "Current conditions" refers to the existing environmental and human use conditions as of the publication of this document, including the USCG's current discharge practices, relative to the temporary stay of regulatory applicability of the GFNMS and CBNMS discharge prohibitions affecting USCG activities in the two sanctuaries.

No significant adverse impacts on air quality have been demonstrated to occur or would be expected from the USCG vessel discharges of untreated sewage and non-clean graywater in this area if Sewage/ Graywater Alternative 1 were implemented.

Training Alternative 1

During both live fire and SAR training exercises, trace amounts of chemical constituents are discharged from weapons and pyrotechnic devices. These constituents are initially discharged to the air and mostly burn up above the surface of the water (Coito 2016c, USCG 2011). These discharges have the potential to cause short term, localized, less than significant impacts on air quality through the release of carbon dioxide (CO_2), carbon monoxide (CO), and particulate matter (USEPA 2016b). Chromium, lead and other metals are sometimes released into the air from certain types of cartridges and initiators of the flares. Emissions of all of these types of hazardous air pollutants are intermittent, released in very small quantities, and would disperse over a large area. They normally would disperse within minutes or sooner under typical prevailing wind conditions. Therefore, compared to the No Action alternative (which would prohibit USCG training discharges once the March 2015 regulations became effective), under the preferred alternative NOAA would not expect significant adverse impacts. If NOAA implemented the preferred training alternative, the status quo for USCG discharges of ammunition and pyrotechnics materials during live fire and SAR training activities would be maintained, without change, in the federal waters of the GFNMS and CBNMS expansion areas.

Impacts to air quality would be considered significant if state or federal air quality standards were exceeded as a result of this alternative and could not be mitigated. Currently, discharges of ammunition and pyrotechnics materials by the USCG during live fire and SAR training exercises have not been documented as exceeding any air quality standards within the two sanctuaries and no significant impacts on air quality have been demonstrated to occur or are expected as a result of the USCG training discharges in this area.

Combined Findings

When the sewage/graywater and training discharge effects are considered together (i.e., the effects of the two components of the preferred alternative are combined), NOAA continues to find that no significant adverse impacts on air quality would be expected to occur. Individually, NOAA did not find the effects on air quality of the two discharge components to be significant, and NOAA is not aware of factors that would raise the intensity of the effects to significant levels upon combining the discharge components.

Water Quality

Sewage/Graywater Alternative 1

If NOAA selected this alternative, the USCG vessel discharges to the federal waters of the GFNMS and CBNMS expansion areas would result in continued inputs of untreated vessel sewage, consisting of nutrients, water, pathogens and paper; and vessel graywater, consisting of soap, water, skin, and hair. Both types of discharge may contain unknown small amounts of other substances (e.g., bathroom cleaning product). These existing USCG vessel discharges, though not thought to be a benefit to water quality in the sanctuaries, are currently taking place, and have taken place in the past, without any known significant adverse impacts on water quality and no adverse effects on water quality as a result of the existing vessel discharges have been recorded. The overall water quality is considered relatively good in the GFNMS and CBNMS expansion areas (ONMS 2014a). Compared to the No Action alternative (which would prohibit USCG vessel discharges once the March 2015 regulations became effective),

under the preferred alternative NOAA would expect minor, direct adverse impacts that are not significant. An overview of the relevant USCG vessel discharges and effects on water quality follows.

The amount and composition of untreated sewage and non-clean graywater USCG vessels are generating in the area depend on factors, such as the number of people on board a vessel, their health and diet, the facilities on the vessel, the length of a mission, and the activities taking place during a given voyage. The USCG has provided information to NOAA about the vessels operating in GFNMS and CBNMS, the total amounts of sewage and graywater the vessels may hold, and has estimated approximately how often the vessels' tanks reach capacity (see Table 3-3). The locations of the USCG vessel discharges in the sanctuaries' expansion areas could occur anywhere seaward of state waters.

Out of a total of nine vessel classes, vessels in four classes discharge untreated sewage and also discharge graywater: Marine Protector Class Coastal Patrol Boat, Seagoing Buoy Tender, Coastal Buoy Tender, and National Security Cutter. Among these, eight vessels (including four National Security Cutters) are stationed in or have their home ports in the vicinity of GFNMS, and an additional ten vessels may conduct short term operations in or transit through GFNMS and CBNMS. National Security Cutters do not currently perform sustained operations within the sanctuaries and generally do not discharge untreated sewage in sanctuaries.

Among these four vessel classes, only Coastal Patrol Boats have cross-connected sewage and graywater holding tanks that mix the contents of the tanks prior to discharge (graywater mixed with untreated sewage would be considered non-clean graywater). For the other three vessel classes, the vessels have separate sewage and graywater holding tanks, and graywater is not mixed with untreated sewage prior to discharge. While NOAA does not have information about the composition of the graywater generated by vessels in those three classes, assuming USCG personnel on those vessels generate graywater only from routine galley, bath and shower uses, such as cooking, cleanup, washing, and bathing, NOAA would anticipate those graywater discharges would not contain detectable quantities of harmful matter.

NOAA is unable to determine the exact total volume of untreated sewage and non-clean graywater currently discharged from all USCG vessels utilizing the expansion areas of GFNMS and CBNMS per year based on available information. However, using the information from Table 3-3, NOAA is able to estimate theoretical maximum discharge volumes.

A Coastal Patrol Boat is the USCG vessel that most commonly operates within the two sanctuaries. The theoretical maximum discharges from this type of vessel could be up to 439 gallons of combined untreated sewage and graywater every two days each year (182 times/year), if the vessel never pumped out to shoreside facilities or always discharged within the areas that would be allowed under this alternative. This would equate to about 79,898 gallons/year per Coastal Patrol Boat, which would be a little more than 1/8 the volume of an Olympic-size swimming pool (which holds approximately 660,253 gallons of water [Livestrong 2016]). While this is the maximum possible volume of discharge from these vessels, the USCG states most patrols involve minimal or no discharges (USCG 2015a). For the Seagoing Buoy Tender, which also commonly operates in the two sanctuaries, the theoretical maximum untreated sewage discharges could be up to 1,755 gallons every five days each year (73 times/year), if the vessel never pumped out to shoreside facilities or always discharged within the areas that would be allowed under this alternative. This would equate to about 128,115 gallons/year for a Seagoing Buoy Tender, which would be a little over 1/5 the volume of an Olympic-size swimming pool. The Coastal Buoy Tender and National Security Cutters only operate short term or transit through the two sanctuaries per the USCG, so their theoretical maximum discharges have not been calculated, though NOAA acknowledges vessels in these classes may make some discharges within this area. These estimates of theoretical maximum discharges (by vessel class) are greater than the volumes that are actually being discharged by the USCG vessels in the GFNMS and CBNMS expansion areas, as the vessels in each class

also operate in other parts of the region outside of GFNMS and CBNMS (not just in the expanded portions of GFNMS and CBNMS). Also, the USCG pumps out its vessels' holding tanks at its shoreside facilities in Eureka, Bodega Bay and San Francisco Bay when the vessels are in port, which also lowers the actual volume of discharges at sea. Finally, these vessels may also discharge in the ocean outside the GFNMS and CBNMS boundaries, where allowed.

Once discharged, the effect of the USCG discharges of untreated sewage and non-clean graywater on water quality, if any, is a function of the fate and persistence of plume components as mixing continues over time. The mixing depends on a variety of complex factors, including, but not limited to: the volume of discharge, the composition and concentrations of pollutants, vessel speed, oceanic conditions, ingestion by organisms, accumulation in sediments, light, and weather.

In the Record of Decision for the USCG Pacific Area Operations project (which covered a much broader geographic area and additional activities than this environmental assessment), the USCG concluded minor, direct, short and long-term adverse impacts to water quality could occur as a result of routine discharges (including sanitary and domestic wastes) from its vessels. The USCG further noted that while localized decreases in water quality could possibly affect water and sediment quality resources, the discharges would dilute rapidly and significant effects on marine organisms and habitats would be minimal (USCG 2010b). The International Maritime Organization (IMO) generally considers that on the high seas the oceans are capable of assimilating and dealing with sewage through natural bacterial action (IMO 2015); (note "high seas" was not defined in that text). The United Nations Environment Programme Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP 2009) also concluded that, for open ocean (water depth exceeding approx. 656 ft. or 200 m), the impact of sewage with high rates of dilution is considerably reduced when compared with nearshore areas.

In the context of wastewater discharge from USCG vessels in GFNMS and CBNMS, organic pollution typically requires 100-fold dilution; pathogen pollution requires a higher level of dilution. Toxic effects are not of concern if there are no toxic constituents in the discharged wastewater; if there are, the potential for impact depends on the nature of the contaminant (Largier 2016). In general, once beyond state waters, the dynamic oceanic conditions in the expansion areas of GFNMS and CBNMS would be expected to disperse the existing volumes of USCG discharges of untreated sewage and non-clean graywater. Relative to the proposed discharge area, the number of USCG vessels that discharge and their annual volumes discharged are relatively small. There are no known cases of algal blooms or eutrophication being caused in the area covered by this alternative as a result of USCG vessel discharges (or any type of vessel discharges) of untreated sewage and non-clean graywater, and none are anticipated if this alternative were implemented.

Specific to graywater discharges from vessels with Type III MSDs, the USCG Vessel Environmental Manual states vessels with segregated graywater tanks shall segregate graywater and only discharge it when operationally unavoidable when within the U.S. territorial sea. Vessels with no segregated graywater tanks shall retain graywater only if there is enough tank holding capacity for the expected operational period; when there is not enough capacity on these vessels, graywater shall be isolated from sewage if configured to do so and discharged overboard and graywater production shall be minimized (USCG 2015b). These policies limit the situations in which USCG vessels with these configurations discharge graywater in GFNMS and CBNMS.

The criteria that were used to determine the significance of water quality impacts are based on federal, state, and local water quality standards and regulations and USCG guidance. Impacts would be considered significant if they violated the Clean Water Act, state water quality regulations, or alter the bacterial, physical, or chemical characteristics of nearshore ocean waters such that they exceeded effluent limitations established under the California Ocean Plan. As stated, in this alternative, there would be no

change from existing, good water quality conditions, and thus no impact beyond the status quo in these portions of the sanctuaries, since the USCG vessel discharges are already occurring. These existing USCG vessel discharges are currently taking place, and have taken place historically, without any known significant adverse impacts on water quality. Any potential adverse impacts on water quality (or other resources and uses) might be lessened or avoided by use of best environmental management practices at the discretion of USCG, such as discharging while the vessels are underway.

Training Alternative 1

NOAA expects no significant adverse impact on water quality would occur if the preferred alternative for training were implemented, since USCG discharges of ammunition and pyrotechnics materials during live fire and SAR trainings would continue to be allowed in the federal waters of the GFNMS and CBNMS expansion areas. These discharges have taken place in this area without any known significant adverse impacts on water quality, and overall water quality is relatively good in the GFNMS and CBNMS expansion areas (ONMS 2014a). Therefore, compared to the No Action alternative (which would prohibit USCG training discharges once the March 2015 regulations became effective), under the preferred alternative NOAA would expect minor, direct adverse impacts that are not significant.

Under Training Alternative 1, the USCG estimates as a part of its continued live fire training activities, it would discharge a maximum of approximately 1,200 rounds of ammunition (among all weapon types) and 180 rounds of aerial flash bang pyrotechnics per year. Under a "worst case scenario", (a serious national security event), the USCG could discharge a maximum of 18,000 rounds of ammunition per year (Coito 2017a); however, this scenario is expected to be rare. For SAR trainings, the USCG could continue to discharge 90 flares and/or smoke floats per year for all types of marine markers (Coito 2017a).

The chemical and physical constituents of the ammunition and pyrotechnic materials the USCG uses during training in this area were described in Section 3.3, under “Homeland Security and Military Uses.” As discussed in that section, all of the chemical constituents are present upon discharge in small quantities. While trace amounts of chemical constituents discharged from weapons and pyrotechnic devices mostly burn up above the surface of the water (Coito 2016c, USCG 2011), some constituents (either combusted or non-combusted) may fall into the water. In general, in the area within GFNMS and CBNMS proposed for training discharges in this alternative, the dynamic oceanic conditions would be expected to disperse these trace amounts of any residual chemical constituents that enter the water as they sink through the water column.

Metals are present in all types of marine markers and other pyrotechnics devices as well as in ammunition. For ammunition discharges, generally the primary constituent of concern at terrestrial small arms ranges is lead, because it is the most prevalent (by weight) potentially hazardous constituent. Once discharged and ignited, combustion products typically consist of oxidized forms of these trace metals, other metallic compounds, and residual perchlorate compounds (USCG 2011, USEPA 2009, USC 2011). Red phosphorus, which is a common constituent in flares, slowly degrades by chemical reactions to phosphine and phosphorus acid. Phosphine is very reactive and usually undergoes rapid oxidation resulting in final by-products, phosphates (U.S. Department of the Navy 2010). Phosphates can contribute to eutrophication in shallower, enclosed bodies of water but typically have little or no effect on water quality in offshore marine environments. Combustion of red phosphorus produces phosphorus oxides, which have a low toxicity to aquatic organisms. Phosphorus contained in the marker settles to the sea floor, where it reacts with the water to produce phosphoric acid until all phosphorus is burned up by the reaction. Phosphoric acid is a variable, but normal, component of seawater and the phosphoric acid produced as a byproduct of these pyrotechnic discharges would not be expected to produce any imbalance in water chemistry that could adversely affect water quality (U.S. Department of the Navy 2011). As noted above, while the majority of chemical and trace metal constituents discharged from marine markers

and other pyrotechnics devices would be expected to combust either in the air or water, some residual constituents could sink and persist in marine sediments. However, given the small number of training days and limited number of discharges, no significant effects to benthic habitat would be expected to occur.

During live fire trainings, some ammunition casings fall onto the deck of the vessel, which means they could be captured for proper disposal onshore. However, some casings might be lost to the marine environment when ejected from a weapon. Once bullets and bullet casings have entered the marine environment, they would be expected to sink immediately. In addition to bullets (or slugs) and bullet casings, other remnant materials that may be discharged include miscellaneous debris from pyrotechnics devices including rubber or plastic endcaps, tubes and cartridges. For some types of marine markers (see Table 3-4), small batteries, rocket motors, and nylon parachutes are also discharged as debris. Materials used for the marine marker tubes and cartridges containing the chemical contents of flares are made mainly of non-reactive or slowly reactive materials (e.g., aluminum, carbon fibers, and plastics) or they break down or decompose into benign byproducts (e.g., rubber, steel, iron, and concrete) (U.S. Department of the Army 2017, U.S. Department of Navy 2011). The remnant materials typically sink after being fired and release their flare or smoke float contents due to either the weight of the materials or built-in scuttling charges (Coito 2016c, U.S. Department of the Army 2017). In the rare instance that a fired cartridge does not activate, the cartridge may float (Coito 2016c). NOAA does not have information as to whether the parachute and rocket assembly parts of the MK127 marine marker would sink fairly quickly or float after deployment. In general, discharged ammunition and pyrotechnic debris that end up on the seafloor would be expected to become lodged in or covered by sea floor sediments, or possibly become encrusted by marine biota, and ultimately would slowly degrade over time, with less than significant adverse effects on water quality (Department of the Navy 2011, USCG 2011).

The criteria that were used to determine the significance of water quality impacts are the same as those for the preferred Sewage/Graywater alternative, and are based on federal, state, and local water quality standards and regulations and USCG guidance. Impacts would be considered significant if they violate the Clean Water Act or state water quality regulations. To recap, NOAA expects there would be no change from current water quality conditions in the area in which the training-related discharges would be allowed to occur under the preferred alternative. These USCG training discharges are already allowed there, and no significant impacts on water quality have been demonstrated. Thus, NOAA assesses there would be no additional significant adverse impacts on water quality in these portions of the sanctuaries.

Combined Findings

Water quality in the area covered by this alternative are currently good. When the effects of the two components of the preferred alternative are combined (sewage/graywater and training discharges), NOAA finds there would be no change in water quality when compared with current conditions and that no significant adverse impacts on water quality would be expected to occur in the future. Compared to the No Action alternative (which would prohibit USCG sewage/graywater and training discharges once the March 2015 regulations became effective), under the preferred alternative, NOAA is not aware of any synergistic effects that might occur among the discharge components that would make impacts to water quality significant. Each discharge would be of a limited volume or quantity and would be expected to disperse quickly due to the dynamic ocean conditions in the area. In addition, the USCG training-related discharges would occur only 3-5 days per year, and those would not necessarily take place at the same time as a USCG vessel discharge of untreated sewage or non-clean graywater.

Marine Mammals, Seabirds, Sea Turtles and Fish

Sewage/Graywater Alternative 1

Marine mammals and seabirds are highly mobile and seasonally abundant in the federal waters of the expansion areas of GFNMS and CBNMS. Sea turtles and fish may be located throughout the area, depending on the species, seasons, and migratory patterns. These animals and fish swim in or on the surface of these waters, and ingest the water and food from within it. Given the oceanographic conditions that lead to effluent dispersion and the limited quantities of existing untreated sewage and non-clean graywater discharges from USCG vessels, limited adverse effects to marine mammals, seabirds, turtles and fish, would be expected if NOAA implemented the preferred alternative for sewage/graywater. Compared to the No Action alternative (which would prohibit USCG vessel discharges once the March 2015 regulations became effective), under the preferred alternative, NOAA would expect indirect, short term, localized effects on marine mammals, seabirds, sea turtles and fish, by causing quickly dispersed effluent plumes in the proposed area.

The Record of Decision for the USCG Pacific Area Operations project did not specifically address any impacts from USCG vessels discharging untreated sewage and non-clean graywater on marine mammals, seabirds, sea turtles or fish, beyond the statements already noted for water quality (USCG 2010b). Point Blue Conservation Science representatives, who conduct research within GFNMS and the broader region, stated they expect the discharge of small amounts of untreated sewage by the USCG to have minimal effects on the sanctuaries' wildlife (though recommended the USCG minimize such discharge) (Point Blue Conservation Science 2016). While a coalition of other nonprofit organization representatives opposed allowing the USCG to discharge untreated sewage and non-clean graywater in GFNMS and CBNMS, and listed a variety of risks to protected wildlife and the marine ecosystem in general (Center for Biological Diversity et al 2016), NOAA did not find evidence that the existing USCG vessel discharges in the federal waters of the GFNMS and CBNMS expansion areas have caused significant impacts on marine mammals, seabirds, sea turtles, fish or other components of the marine ecosystem in this region. NOAA is not aware of any USCG lack of compliance with any state or federal standards and regulations related to vessel discharges and wildlife and fish protection in the area covered by this alternative. NOAA acknowledges there is some level of risk of these animals and fish ingesting untreated sewage or non-clean graywater from USCG vessel discharges and that there is some risk of adverse impacts from implementation of this alternative on wildlife or fish. NOAA assesses that any such effects would likely be limited and less than significant, based on the relatively small volumes of anticipated discharges, the large overall potential discharge area, and the oceanographic conditions that would promote rapid dispersion of the discharges, as discussed in more detail above.

Criteria to assess the significance of impacts on biological resources (including marine mammals, seabirds, sea turtles and fish and their habitat) for this action are as follows: compliance with federal and state standards and regulations; if a population of a threatened, endangered, regulated, or other sensitive species would be noticeably adversely affected by changes in population size, by alteration in reproduction or feeding, or by loss or disturbance of habitat; if any fish or wildlife migration routes would be impeded for a period that would significantly disrupt that migration; or if habitat would be altered or destroyed in such a way that would noticeably compromise or prevent biological communities that inhabited the area prior to the action from reestablishing themselves. "Take" of a listed or sensitive species may result in significant effects, depending on the status of the species, the status of a population of the species, as well as the nature, context, and intensity of the adverse effects. This analysis will be amended, if needed, if informal consultation with NMFS OPR results in additional pertinent information on endangered species or marine mammals that would require us to amend how we apply our significance criteria.

Training Alternative 1

Since discharges from live fire and SAR trainings would be allowed to continue to occur throughout the federal waters of the expansion areas of GFNMS and CBNMS, no changes in impacts to marine mammals, seabirds, sea turtles and fish, as compared to current conditions, would be expected if NOAA selected Training Alternative 1. Compared to the No Action alternative (which would prohibit USCG training discharges once the March 2015 regulations became effective), under the preferred alternative NOAA would expect minor, direct adverse impacts that are not significant.

Marine mammals and seabirds are highly mobile and seasonally abundant in the federal waters of the expansion areas of GFNMS and CBNMS. Concentrations of wildlife, especially marine mammals and seabirds, are expected to be higher in the nearshore environment. Sea turtles and fish may be located throughout the area, depending on the species, seasons, and migratory patterns. These animals and fish swim in or on the surface of these waters, and ingest seawater and/or take food from these waters. In general, sea turtles are uncommon in GFNMS and CBNMS. Leatherback is the species of sea turtle that has been observed most often, utilizing the area between Año Nuevo and the Russian River (Benson et al. 2007). The likelihood for any interaction between USCG training activities (and resulting training-related discharges) and sea turtles is present, but expected to be low.

While acknowledging there is some level of risk of these animals and fish ingesting floating debris (such as remnant plastic or nylon pieces from pyrotechnic discharges) from USCG training discharges if this alternative is implemented, NOAA assesses that any such adverse effects would likely be limited and less than significant. This finding is based on the limited quantities of materials to be discharged, the fact that oceanographic conditions would lead to rapid dispersion of the discharged materials, and the small number of training days (3-5 days planned per year). If the previously-described “worst case scenario” were to occur, in which the USCG needed to intensify its live fire and SAR training activities, then the quantity and duration of the discharge of ammunitions and training materials could increase significantly. Implementation of the “worst case scenario” could increase the possibility of some adverse effects to wildlife and fish in the area. However, NOAA is not aware of any significant adverse effects resulting to marine mammals, seabirds, sea turtles or fish from current or historic USCG training discharges in the expansion area. This analysis may be supplemented or amended if the number of proposed training days or volume of ammunition and pyrotechnics discharges significantly increase.

Generally, noise from the firing of weapons and pyrotechnics devices during live fire and SAR trainings has the potential to disturb marine mammals, especially when pupping or hauled out. Noise can also have adverse impacts on seabirds, especially when they are nesting or breeding. These sensitive areas for both marine mammals and seabirds are typically found along shorelines, beaches, and rocky outcroppings in nearshore waters, situated well within the boundaries of state waters. Table 4-1 provides the expected airborne sound level for a couple of the weapons and pyrotechnic devices currently used during USCG training operations in the area. In order for the sound to reach a haulout area at the thresholds considered as Level B (which is a level considered to be “harassment” under the Marine Mammal Protection Act), concussive sound would have to be fired closer than 496 feet (0.081 nm) from a haulout for most pinnipeds, and closer than 956 feet (0.157 nm) from a haulout for harbor seals (USCG 2011).

Since training-related discharges would occur beyond state waters under Training Alternative 1, and well beyond the distances for the airborne sound thresholds described above, Level B harassment would not be expected to occur under the preferred alternative for training on marine mammals at pupping or haulout sites. Further, NOAA does not have any evidence that past USCG training discharges of ammunition or pyrotechnic materials in the expanded portions of GFNMS and CBNMS have disturbed either marine mammals or seabirds at these sensitive sites.

Table 4-1. Sound Levels for Munitions Used During Live Fire Trainings

Noise Source	Airborne Sound Level[12]
0.50-caliber machine gun	98 dBA re 20 µPa at 50 ft. (at 49.2 ft. or 15 m).
LA51 pyrotechnic device	170 dB peak

Sources: Coito 2016b and USCG 2011.

Noise effects could also potentially adversely impact, to some degree, marine mammals, sea turtles, seabirds, and/or fish swimming in or, in the case of birds, rafting upon, the offshore waters in the vicinity of the live fire and SAR training exercises. The LA51 for example, can reach 170 dB peak (177 dB maximum) in the air at the source, which is a sound level similar to a 0.357 caliber revolver, but attenuates rapidly over relatively short distances (USCG 2011, U.S. Department of Navy 2013). The amount of sound energy that enters the ocean when guns and pyrotechnic devices are fired is very small. Bullets entering the water would also produce a sound. Sound waves from a projectile in flight enter the water primarily in a narrow cone beneath the sound source, affecting only a narrow region of the water column, and diminishing quickly as the shell gains altitude and loses speed (U.S. Department of the Navy 2013). Underwater sound may result in marine mammals, sea turtles or fish reacting and changing their behavior or moving away from the source of the sound. Information on noise impacts below the water's surface from the firing of USCG ammunition and pyrotechnic materials during training or other similar sources of noise above the water's surface is not well documented. However, given that the USCG would discharge all training-related pyrotechnic materials and ammunition above the water surface, and the noise levels from ammunition entering the water would be expected to be minimal, noise would not be expected to have a significant adverse effect on marine mammals or other wildlife in the area. This analysis will be amended, if needed, if informal consultation with the NMFS Office of Protected Resources results in additional pertinent information on how underwater noise generated as a result of the discharges of ammunition and pyrotechnic materials during USCG training may affect endangered species or marine mammals.

The USCG trains its personnel to avoid impacts on marine mammals, including on marine mammal identification and avoidance techniques, as well as providing guidance on avoiding adverse impacts to other wildlife and marine habitats (see Sections 3.1.2 and 3.3). Specifically, the USCG Vessel Environmental Manual states that commanding officers and officers in charge shall plan and act to avoid take or harassment of marine mammals during operations and planning. Further, the manual states that vessel operators shall employ all possible precautions to avoid interactions or collisions with whales. This includes checking the latest whale sighting information; reducing vessel speed and adjusting course if a whale is encountered; posting dedicated, trained lookouts to assist in monitoring whale locations; requiring that a Whale Wheel Field Guide is on board all assets operating in areas likely to encounter whales; and having lookouts be familiar with the proper use of this field guide (USCG 2015b). The manual also specifies vessel buffer distances to avoid disturbance to various species of marine mammals and sea turtles and that extra precautions be taken to avoid disturbing large colonies of sea birds. Thus, these mitigation measures would help to reduce the potential for adverse impacts to wildlife when employed during USCG live fire and SAR training activities.

Criteria to assess the significance of impacts on these biological resources are the same as those listed for Sewage/Graywater Alternative 1: compliance with federal and state standards and regulations; if a population of a threatened, endangered, regulated, or other sensitive species would be adversely affected by reduction in numbers, by alteration in behavior, reproduction, or survival, or by loss or disturbance of

[12] dB = decibel; dBA = decibel, A-weighted; µPa = micro Pascal; and re = referenced to

habitat; if any fish or wildlife migration routes would be impeded for a period that would significantly disrupt that migration; or if habitat would be altered or destroyed in such a way that would noticeably compromise or prevent biological communities that inhabited the area prior to the action from reestablishing themselves.

Combined Findings

Individually, the sewage/graywater and training discharges expected under the preferred alternative may have adverse impacts on sanctuary resources including marine mammals, seabirds, sea turtles, and fish, but those effects are expected to be less than significant. Even when considered in combination, NOAA's assessment is that there would be no synergistic adverse impacts on these populations of animals or their habitats that would be considered significant if NOAA selected this alternative. This is based on the short term nature of the discharges, the large area in which the USCG could choose to discharge, the USCG's utilization of best management practices from the USCG Vessel Environmental Manual and Whale Wheel Field Guide, and the fact that the USCG would make its discharges at various times throughout the year. NOAA acknowledges the possibility that one or more individual mammals, seabirds sea turtle or fish could ingest more than one substance or be affected by noise (i.e., ingest some discharged sewage discharge and a spent casing or, hear the splash of graywater and bang of a shell being fired). Based on the available information, the risk of such adverse occurrences is expected to be low and discountable.

4.1.2 Human Uses and Cultural Resources

Cultural and Maritime Heritage Resources

Sewage/Graywater Alternative 1

NOAA does not foresee any adverse impacts on cultural resources and maritime heritage resources from implementation of the preferred alternative for sewage/graywater. Currently, the USCG discharges untreated sewage and graywater in the federal waters of the expansion areas of GFNMS and CBNMS, and these would continue under this alternative. NOAA has no evidence that these discharges have adversely impacted historic properties (22 submerged ships and aircraft; see Section 3.3) there. There are no known prehistoric archaeological sites or artifacts in the federal waters of the expansion area. Therefore, NOAA would not expect any adverse impacts from this alternative compared to the No Action alternative (which would prohibit USCG vessel discharges once the March 2015 regulations became effective).

Cultural and maritime heritage resources must meet certain federal criteria to be considered significant historic resources and be included in the National Register of Historic Places (36 CFR 60.4). Pursuant to the NHPA and its implementing regulations, an undertaking has an effect on a historic property when it alters those characteristics of the property that qualify it for inclusion in the national register (36 CFR Part 800). An undertaking is considered to have an adverse effect on a historic property when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. For example, adverse effects could include physical destruction, damage, or alteration of all or part of a historic resource. NOAA does not anticipate that the continued USCG vessel discharges within this area would alter the characteristics of known historic shipwrecks and aircraft (see Section 3.3), such that they would no longer qualify for inclusion in the National Register of Historic Places.

Training Alternative 1

NOAA does not foresee that impacts on the historic properties (see Section 3.3) would occur from implementation of Training Alternative 1. Currently, the USCG is allowed to discharge ammunition and

pyrotechnics materials throughout the federal waters of the expansion areas of GFNMS and CBNMS during training activities, and these discharges would be allowed to continue under this alternative. NOAA has no evidence that these discharges have adversely impacted the 22 historic properties in the federal waters of the expansion areas of the sanctuaries, and there are no known pre-historic archaeological site or artifacts in the area proposed under this alternative. NOAA does not anticipate that future USCG SAR and live fire training-related discharges would result in adverse impacts on historic properties compared to the No Action alternative (which would prohibit USCG vessel discharges once the March 2015 regulations became effective).

NOAA is utilizing the same criteria to assess impacts on cultural and maritime heritage resources as described for the sewage/graywater component of the preferred alternative. Pursuant to the NHPA and its implementing regulations, an undertaking has an effect on a historic property when it alters those characteristics of the property that qualify it for inclusion in the national register. An undertaking is considered to have an adverse effect on a historic property when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. NOAA does not anticipate that the continued USCG training-related discharges within this area would alter the characteristics of known historic shipwrecks and aircraft (see Section 3.3), such that they would no longer qualify for inclusion in the National Register of Historic Places.

Combined Findings

When the sewage/graywater and training discharge effects of the preferred alternative are considered together, NOAA finds that no significant adverse impacts on cultural and maritime heritage resources would be expected to occur. In the unlikely event a USGC vessel sewage/graywater and training discharge occurred at the same time and place in sanctuary waters over a submerged historic resource, NOAA expects there would be no additive adverse effect on the historic resource. Neither type of discharge is expected to have significant adverse effects on historic resources alone, and sewage and graywater would have dispersed long before the surface waters in which they were dispersed might reach the historic resource on the seafloor.

Commercial and Recreational Fishing

Sewage/Graywater Alternative 1

Because of continuation of the status quo with respect to USCG vessel discharges of untreated sewage and non-clean graywater in the GFNMS and CBNMS expansion areas, NOAA would not expect a significant adverse impact on commercial or recreational fishing compared to the current conditions. Moreover, NOAA assesses that the preferred alternative would not have a significant adverse impact on commercial or recreational fishing (or other recreational uses), compared to the No Action alternative (which would prohibit USCG vessel discharges once the March 2015 regulations became effective), since there is no documentation of such impacts or expectation that they will occur in the future. The small number of USCG vessels that this alternative would allow to discharge untreated sewage and non-clean graywater and the large geographic area in which they would be allowed to do so makes any adverse impact unlikely.

An impact to commercial fishing would be considered significant if the number of fishing vessels allowed to fish in the area was reduced; a substantial positive or negative population trend in one or more of the harvested species occurred; a population below sustainable fishing levels (as defined by fishery management plans) for a given harvested species occurred; a substantial economic gain or loss to commercial fisheries resulted; or if there was a conflict with the policies and regulations established by

the MSA. Similar impacts would also be considered significant with respect to recreational fishing, along with any long-term or peak-season preemption of a recreational fishing use.

There is the potential that a future discharge of untreated sewage or non-clean graywater from a USCG vessel in very close proximity to commercial or recreational fishing or other recreational vessels could result in less than-significant, short-term, adverse impacts on fishing operations (i.e., by temporarily changing the water quality in the locality being fished). Any such potential impacts might be lessened or avoided by USCG use of best environmental management practices for vessel discharges of untreated sewage and non-clean graywater, by temporary suspension of fishing activities, or by the vessels transiting away from the immediate discharge areas temporarily, until the wastewater dispersed.

Training Alternative 1

Training Alternative 1 is a continuation of the status quo with respect to USCG training discharges in the federal waters of the GFNMS and CBNMS expansion areas, and there is no documentation of that any significant impacts on commercial or recreational fishing or other recreational uses have occurred. NOAA assesses that the preferred alternative would not have a significant adverse impact on commercial or recreational fishing (or other recreational uses), compared to the No Action alternative (which would prohibit USCG training discharges once the March 2015 regulations became effective), because of the small number of days training would take place (3-5 days per year) and the large geographic area in which they would be allowed to do so.

An impact to commercial fishing would be considered significant, as listed under Sewage/Graywater Alternative 1, if the number of fishing vessels allowed to fish in the area was reduced; a substantial positive or negative population trend in one or more of the harvested species occurred; a population below sustainable fishing levels (as defined by fishery management plans) for a given harvested species occurred; a substantial economic gain or loss to commercial fisheries resulted; or if there was a conflict with the policies and regulations established by the MSA. Similar impacts would also be considered significant with respect to recreational fishing, along with any long-term or peak-season preemption of a recreational fishing use.

There is the potential that USCG training discharges in very close proximity to commercial or recreational fishing vessels could result in less than-significant, short-term, adverse impacts on these groups and other recreational user groups (i.e., by temporarily disturbing their use of the area, up to 3 to 5 days per year). For example, when the season for commercial fishing for Dungeness Crab is open, hundreds of crab pots with surface floats may be deployed in close proximity to each other. However, any potential adverse impacts on these groups' activities would be lessened or avoided by the USCG providing notice to vessel operators in the area, by use of Sécurité messages broadcast over VHF Channel 16 one hour prior to the start of any training exercise and every 15 minutes until the conclusion of the exercise (Coito 2017a). Vessels could temporarily transit away from the live fire and/or SAR training discharge area until the training discharges were completed.

Combined Findings

No significant adverse impacts on commercial or recreational fishing or other recreational uses are documented or expected separately from either the USCG discharges of untreated sewage and non-clean graywater or from the training-related discharges of ammunition and pyrotechnics under the preferred alternative. When the effects of both types of discharges are considered together, NOAA's overall assessment is that there is nothing about the combined effects that would raise the level of adverse impact on these uses of the sanctuaries to be significant. An odor smelled for few seconds or minutes from a USCG vessel discharge combined with temporary avoidance of an area in accordance with a Sécurité

message about USCG training would be adverse for anyone on a vessel that experienced those effects, but such adverse effects would be short term and less than significant. Any additional pertinent information received from NMFS in EFH consultations may be added to this analysis.

Marine Transportation

Sewage/Graywater Alternative 1

No impacts on the marine transportation industry are expected as a result of implementation of the preferred alternative for sewage/graywater. An impact would be considered significant if it resulted in substantial delay of commercial vessel traffic or a spill of hazardous materials from commercial vessel traffic. USCG vessel discharges of untreated sewage and non-clean graywater would continue in the GFNMS and CBNMS expansion areas. These discharges have not delayed commercial vessel traffic or created a risk of those vessels spilling hazardous materials, and NOAA would not expect changes in commercial vessel traffic operations in the future if this alternative was implemented. NOAA expects these effects whether the preferred alternative is compared with current conditions or with the No Action alternative (which would prohibit USCG vessel discharges once the March 2015 regulations became effective), due to the small number of USCG vessels that this alternative would allow to discharge untreated sewage and non-clean graywater and the large geographic area in which they would be allowed to do so.

Training Alternative 1

No impacts to the marine transportation industry are known to have occurred in the past from training-related discharges in this area. Since this alternative would enable the USCG to make training-related discharges as it has in the past, no impacts on the marine transportation industry are expected as a result of implementation of this alternative for training (the preferred alternative). Also, as stated previously, the USCG would broadcast Sécurité messages over VHF Channel 16 before and during training exercises, (Coito 2017a) to make all commercial vessel traffic in the region aware that hazardous operations were being conducted in the area, which could enable vessels to make minor adjustments to their courses as needed. NOAA expects these effects whether the preferred alternative is compared with current conditions or with the No Action alternative (which would prohibit USCG training discharges once the March 2015 regulations became effective), because of the small number of days training would take place (3-5 days per year) and the large geographic area in which they would be allowed to do so.

An impact would be considered significant if it resulted in substantial delay of commercial vessel traffic or a spill of hazardous materials from commercial vessel traffic. USCG training discharges were allowed to continue in the GFNMS and CBNMS expansion areas.

Combined Findings

Since no impacts on the marine transportation industry are expected from implementation of either component of the preferred alternative, NOAA's overall finding is there would be no effect on transportation uses in the sanctuaries.

Homeland Security and Military Uses

Sewage/Graywater Alternative 1

Under the preferred alternative for sewage/graywater, compared to the current conditions, there would be no impact to the USCG to continue to operate in this part of their area of operation (or responsibility) as

they have been doing up until the present. Continuation of the status quo in this area would allow the USCG to choose where to discharge untreated sewage and non-clean graywater in federal waters, based on operational needs – at pump-out facilities, seaward of state waters in the expansion areas, or outside the sanctuaries' boundaries (where allowed). Untreated sewage discharge is already precluded within state waters by other existing regulatory requirements and USCG practices, and NOAA is unaware of any existing USCG discharges of non-clean graywater within state waters in this area. Therefore, under this alternative, there would be little or no change to USCG operations and homeland security.

The USCG was already operating in this region prior to GFNMS and CBNMS expanding on June 9, 2015. The USCG stated the implementation of the GFNMS and CBNMS discharge prohibitions as part of the expansion of the two sanctuaries will "... restrict the ability of our Coastal Patrol Boats to conduct any mission with[in] the sanctuaries, in particular law enforcement and SAR. The Coast Guard 87 foot Coastal Patrol Boat's sewage holding capacity is limited, requiring discharge every 24-48 hours. Prohibiting sewage discharge within the sanctuaries would force the units tasked with patrolling the sanctuaries to transit seaward of the sanctuaries or return to port to moor at a sewage pumping equipped marina, potentially on a daily basis. Such logistical burdens would significantly limit the effectiveness of the Sanctuary's primary on-the-water enforcement agency" (Schultz 2013).

The USCG has requested regulatory exceptions within the sanctuaries' boundaries from the prohibitions on vessel discharges of sewage and graywater (Schultz 2013; McGuire 2016). The USCG prefers exceptions in the GFNMS and CBNMS regulations to allow them to make such discharges. Also, the USCG informed NOAA it is not technologically possible currently to modify its existing boats' marine sanitation devices or holding tank capacities (McGuire 2016). Compared to the No Action alternative, (which would prohibit USCG vessel discharges once the March 2015 regulations became effective), NOAA would expect that the preferred alternative would result in a decrease in the ability of USCG to continue conducting missions with the same footprint as it has in the past.

Implementation of this alternative would not affect the regulatory prohibitions on these discharges within the portions of GFNMS and CBNMS that existed prior to the sanctuaries' expansion, and thus there would be no effect on current baseline USCG operating conditions there as well.

No effect is anticipated on existing or future DoD uses as a result of implementation of this alternative.

An impact on homeland security or other military uses would be considered significant if it substantially restricted existing operations. As this alternative would allow USCG vessel discharges of untreated sewage and non-clean graywater to continue in the federal waters of the GFNMS and CBNMS expansion areas, there would be no significant adverse impact on existing USCG uses; the result would instead be a neutral outcome for the USCG. As a result, the USCG would be able to continue, without change, to fulfill all of its missions that assist in or complement effective management of the sanctuaries and resource protection.

Training Alternative 1

Under Training Alternative 1 (the preferred alternative), compared to current conditions, there would be no impact on the USCG, as training discharges for live fire and SAR exercises could continue to occur anywhere in the federal waters of the expansion areas of GFNMS and CBNMS. The outcome would be beneficial for the USCG, to continue to have personnel conduct training discharges in their normal area of responsibility, where they have historically trained. While this alternative would not allow the USCG to discharge training-related materials in state waters of the GFNMS expansion area, the USCG has not stated that they have historically conducted live fire or SAR training there or have any future plans to do so, so there should be no resulting impact on USCG training discharges. Compared to the No Action

alternative, (which would prohibit USCG training discharges once the March 2015 regulations became effective), NOAA would expect that the preferred alternative would result in a decrease in the ability of USCG to continue conducting missions with the same footprint as it has in the past.

No effect is anticipated on other military (DoD) uses as a result of implementation of this alternative.

Combined Findings

There would be no effect on USCG discharges of untreated vessel sewage/non-clean graywater and training-related ammunition and pyrotechnics, either when the effects are considered individually or together, from NOAA's implementation of the preferred alternative. The preferred alternative would allow the USCG to continue to make these discharges in the federal waters of the expansion areas of GFNMS and CBNMS, and meets the purpose of, and need for the proposed action. Compared to the status quo, implementation of the preferred alternative would be a beneficial outcome for the USCG, as USCG personnel would not have to make any changes in its practices for those discharges. Compared to the No Action alternative (which would prohibit USCG untreated vessel sewage, non-clean vessel graywater, and training discharges once the March 2015 regulations became effective), this alternative would also be a beneficial outcome for the USCG, as it would allow USCG personnel to continue their current practices and would not preclude them from continuing to train in the GFNMS and CBNMS expansion areas. The USCG has stated to NOAA it prefers this alternative to the other possible alternatives NOAA is considering.

NOAA also finds there would be no effect on other DoD uses from implementation of both components of this alternative.

Research and Education

Sewage/Graywater Alternative 1

Since the status quo with respect to USCG vessel discharges of untreated sewage and non-clean graywater would continue under this alternative, no effects to research and education in the expansion areas of GFNMS and CBNMS are expected. An impact would be considered significant if, for example, the USCG actions conflicted with objectives, policies and guidance of federal or state land or water use plans; substantially changed the income or employment rate of researchers or educators; or interfered with or preempted use over the long term of the sea in the expansion area for research and education uses. No such impacts have been recorded to date or are expected as a result of this alternative.

Discharges of untreated sewage or non-clean graywater from a USCG vessel in very close proximity to on-water researchers or educators have the potential to result in less than-significant, short-term, adverse impacts on these groups (i.e., by changing water quality sampling results or viewer aesthetic experience). Any such potential impacts might be lessened or avoided by USCG use of best environmental management practices for vessel discharges, or by the researchers or educators temporarily suspending research or education activities, or by research or education vessels transiting away from the immediate discharge areas temporarily, until effluent dispersed. Compared to the No Action alternative, (which would prohibit USCG vessel discharges once the March 2015 regulations became effective), NOAA would expect that the preferred alternative would result in negligible adverse impacts on research and education. The cessation of discharges in the vicinity of those activities would only have negligible effects due to the small number of USCG vessels that this alternative would allow to discharge untreated sewage and non-clean graywater and the large geographic area in which they would be allowed to do so.

Training Alternative 1

Since USCG training discharges would continue to be allowed under Training Alternative 1, no effects to research and education in the expansion areas of GFNMS and CBNMS are expected compared to the current conditions. No impacts on these groups have been recorded to date or are anticipated as a result of this alternative. Compared to the No Action alternative, (which would prohibit USCG training discharges once the March 2015 regulations became effective), NOAA would expect that the preferred alternative would result in negligible beneficial impacts on research and education. The cessation of training discharges in the vicinity of those activities would only have negligible effects due to the small number of days training would take place (3-5 days per year) and the large geographic area in which they would be allowed to do so.

An impact would be considered significant if, for example, the USCG actions conflicted with objectives, policies and guidance of federal or state land or water use plans; substantially changed the income or employment rate of researchers or educators; or interfered with or preempted use over the long term of the sea in the expansion area for research and education uses.

As described previously for some other sanctuary user groups, there is the potential that future USCG training discharges in very close proximity to research or education vessels could result in less than-significant, short-term, adverse impacts on these groups (i.e., by temporarily disturbing their activities, up to 3 to 5 days per year). As before, under the preferred training alternative, any such potential adverse impacts would be lessened or avoided by the USCG use of best management practices for training discharges, including providing notice to vessel operators in the area by use of Sécurité messages broadcast over VHF Channel 16 prior to and during the exercises (Coito 2017a). Vessels could temporarily transit away from the live fire and/or SAR training discharge area until the training discharges were completed.

Combined Findings

NOAA assesses that no significant adverse impacts on research or education uses would be expected to occur from either discharge component of the preferred alternative, or from the combination of the discharge components. An odor smelled for few seconds or minutes from a USCG vessel wastewater discharge combined with temporary avoidance of an area in accordance with a Sécurité message about USCG training would be an adverse effect for researchers or educators that experienced such effects, but these adverse effects would be short term and less than significant.

4.2 Effects Analysis of Sewage/Graywater Alternative 2: Allow USCG Vessel Sewage and Graywater Discharges in the Federal Waters of GFNMS and in CBNMS

Sewage/Graywater Alternative 2 would allow the status quo for USCG vessel discharges of untreated sewage and non-clean graywater to continue within the federal waters of the GFNMS and CBNMS expansion areas, and would also allow USCG vessels to make these discharges within the federal waters of the pre-expansion areas of GFNMS and CBNMS (refer to Figure 2-3). Vessel discharges of untreated sewage and non-clean graywater have been prohibited since the sanctuaries were designated in 1981 and 1989 (respectively). NOAA would implement Sewage/Graywater Alternative 2 by creating exceptions in the GFNMS and CBNMS regulations from the prohibitions on discharging these substances in federal waters of both sanctuaries.

Existing conditions of most sanctuary resources and for some compatible uses within the GFNMS and CBNMS pre-expansion areas would be expected to experience adverse impacts if this alternative were implemented. The USCG would be able to continue to operate its vessels and conduct its missions within

the expansion areas of GFNMS and CBNMS as per the status quo. Within the pre-expansion boundaries of the two sanctuaries, the USCG would have the new ability to operate its vessels without having to divert elsewhere to make necessary discharges (a beneficial outcome for the USCG). This is in contrast to the No Action alternative, in which USCG discharges in the expansion area would be prohibited once the March 2015 final regulations became effective. As discussed below, the main difference between alternatives 1 and 2 is the size of the geographical area where USCG discharges would be allowed.

While Sewage/Graywater Alternative 2 meets the purpose of, and need for, the proposed action, NOAA does not prefer it to Sewage/Graywater Alternative 1. Implementation of Sewage/Graywater Alternative 2 would remove an existing level of protection for water quality and sanctuary resources and uses within the pre-expansion boundaries of the two sanctuaries, which has been in place since the sanctuaries were designated. Also, the USCG has stated that, prior to the expansion of the two sanctuaries, it was able to comply with the discharge regulations, which indicates that the larger geographic scope of this alternative is not required to meet the purpose of and need for this action.

4.2.1 Natural Environment

Air Quality

Under Sewage/Graywater Alternative 2, there would be no additional impact on air quality, compared to current conditions, over the GFNMS and CBNMS expansion areas, since the status quo for USCG vessel discharges of untreated sewage and non-clean graywater would be maintained there, as described in Sewage/Graywater Alternative 1. USCG vessels already use the pre-expansion boundaries of GFNMS and CBNMS and have some level of air emissions while in those parts of the sanctuaries. However, under Sewage/Graywater Alternative 2, since USCG untreated sewage and non-clean graywater vessel discharges would be allowed in the federal waters within the pre-expansion boundaries of the two sanctuaries, such discharges have the potential to cause indirect, short term, localized, effects on air quality, and vessel movements in those portions of the sanctuary could change. Compared to the No Action alternative (which would prohibit USCG vessel discharges in federal waters of the expansion areas once the March 2015 regulations became effective in addition to the existing prohibition in the pre-expansion boundaries), under Sewage/Graywater Alternative 2 NOAA would expect indirect, short term, localized, effects on air quality, by causing adverse odors in minute quantities in the air above the discharges in both expansion and pre-expansion boundaries of GFNMS and CBNMS. The vessel discharges of untreated sewage and non-clean graywater might cause adverse odors in minute quantities in the air above the discharges in the area covered by this alternative. Such odors would normally disperse within minutes. Vessel movements within those portions of the sanctuaries could change, and there could be minor, transitory changes to the ambient air quality.

As noted under Sewage/Graywater Alternative 1, the GFNMS and CBNMS regulations do not prohibit indirect air emissions and any odors that may result from USCG sewage and graywater discharges, and there are no state or federal agencies that regulate this for USCG or other vessels. Any short-term odors that may result from USCG vessel sewage and graywater discharges or vessel engine exhaust would normally be expected to disperse within minutes in the area covered by Sewage/Graywater Alternative 2, and would not cause any state or federal air quality standards to be exceeded. Thus, any impacts on air quality would be considered adverse, but less than significant.

Water Quality

If Sewage/Graywater Alternative 2 were implemented, USCG vessel discharges of untreated sewage and non-clean graywater would be allowed in a more widespread area within GFNMS and CBNMS waters compared to current conditions, and in an even more widespread area compared to the No Action

alternative, which would prohibit USCG vessel discharges in federal waters of the expansion areas once the March 2015 regulations became effective in addition to the existing prohibition in the pre-expansion boundaries. However, the classes and numbers of vessels making the discharges and their approximate discharge volumes would be the same as described in Sewage/Graywater Alternative 1, under "Water Quality."

USCG vessel discharges in federal waters of the expansion areas of GFNMS and CBNMS would be a continuation of status quo practices, as previously described, and, though not thought to be a benefit to water quality in the sanctuaries, USCG discharges there would not constitute new inputs to those portions of the sanctuaries. No change from current water quality conditions would be expected in those portions of the sanctuaries, where water quality is relatively good (ONMS 2014a), and no adverse impacts have been documented. In addition to allowing those discharges to continue, under this alternative, new USCG vessel discharges of untreated sewage and non-clean graywater would be allowed within the federal waters of the pre-expansion boundaries of GFNMS and CBNMS. When the sanctuaries' regulations took effect after GFNMS was designated in 1981 and CBNMS was designated in 1989, USCG vessel discharges of untreated sewage and non-clean graywater were prohibited. Water quality ranges from fair to good in the offshore waters of those portions of GFNMS and CBNMS (ONMS 2009 and ONMS 2010). NOAA anticipates the overall effect on water quality under this alternative within the pre-expansion boundaries of GFNMS and CBNMS would be adverse, but, on the whole, less than significant.

As stated, the area potentially affected by these USCG discharges of untreated sewage and non-clean graywater would be broader under this alternative than under Sewage/Graywater Alternative 1. However, data were not available for NOAA to assess specifics regarding where, within this overall area, USCG vessels would make the discharges. As such, NOAA could not make an assessment on whether discharges might be fairly well distributed throughout the overall area or whether some parts of it might be subject to more frequent discharges than others. Regardless, since the oceanic conditions are dynamic throughout all waters of GFNMS and CBNMS, the USCG vessel discharges are limited in quantity, and offshore ocean conditions would be expected to promote diffusion of the discharges (USCG 2010b; IMO 2015; GESAMP 2009), NOAA would not expect significant adverse impacts on water quality to occur.

Beyond state waters in the sanctuaries, the main regions of concern for pathogen pollution from USCG vessel discharges are where there is potential for retention or onshore transport with weak mixing (dilution). There are two small areas within GFNMS federal waters that could be of concern for adverse impacts on water quality if USCG discharged untreated sewage and non-clean graywater: near Drake's Bay and near the mouth of San Francisco Bay (west and north of an area off San Francisco and Pacifica). Pathogen pollution typically requires a higher level of dilution and there is some low-level concern that human-contact standards (related to human health) may be exceeded if wastewater is discharged in quiet or retentive regions near human recreation or concentrations of birds or mammals, which share some pathogens with humans. Although it is unlikely that sufficient dilution of USCG wastewater would not happen along a three mile path to shore, in Drake's Bay, mixing may be weak (due to wind shelter and shallow thermocline), surface waters are retained, and onshore flow occurs as part of a weak anti-clockwise circulation. Near the mouth of San Francisco Bay, surface waters are transported by tidal currents onshore and there is potential for transport into the bay (Largier 2016).

As with Sewage/Graywater Alternative 1, there are no known cases of algal blooms or eutrophication being caused in the area covered by this alternative as a result of USCG vessel discharges (or any type of vessel discharges) of untreated sewage and non-clean graywater, and none are anticipated if this alternative were implemented.

If this alternative were implemented by including exceptions in the GFNMS and CBNMS regulations for these USCG discharges in the federal waters of GFNMS and CBNMS, there are no other laws or

regulations that would prohibit those discharges. As stated, in this alternative, there would be no change from current water quality conditions in the expansion portions of the sanctuaries, and any impacts are anticipated to be less than significant. There would be new inputs in pollutants from the vessel discharges within the previous boundaries of GFNMS and CBNMS. Relative to the proposed discharge area, the number of USCG vessels that would discharge and their annual volumes discharged would be relatively small. The USCG vessel discharges would be expected to result in adverse, less than significant impacts on water quality, which could vary in degree depending on actual discharge locations and how frequently discharges occurred in a given location.

As with Sewage/Graywater Alternative 1, the USCG could utilize best management practices to lessen or avoid any adverse effects on the sanctuaries' water quality (and other resources and uses) from USCG discharges of untreated sewage and non-clean graywater, such as discharging while the vessels are underway.

Marine Mammals, Seabirds, Sea Turtles and Fish

No significant adverse impacts to marine mammals, seabirds, sea turtles and fish would be expected in the federal waters of the expansion areas of GFNMS and CBNMS if Sewage/Graywater Alternative 2 was implemented and USCG vessel discharges were allowed to continue, as with Sewage/Graywater Alternative 1 (the preferred alternative). Due to new inputs of untreated vessel sewage and non-clean vessel graywater in the federal waters of the pre-expansion portions of GFNMS and CBNMS, some minor adverse impacts on marine mammals, seabirds, sea turtles and fish in those areas of the two sanctuaries, though unlikely to be measurable, might be expected. Since the area covered in this alternative would be larger than in Sewage/Graywater Alternative 1 and even larger than the No Action alternative, which would prohibit USCG vessel discharges in federal waters of the expansion areas once the March 2015 regulations became effective in addition to the existing prohibition in the pre-expansion boundaries, the numbers of potentially affected wildlife and fish would also be higher. For those species that migrate, or move locations seasonally, it is possible some animals or fish could have increased risk of encountering the discharges due to more time spent transiting a larger area (when compared to Sewage/Graywater Alternative 1) where the discharges would be allowed. However, no data is available on USCG vessel movements within the expanded GFNMS and CBNMS, nor can a prediction be made regarding where USCG vessel discharges would be made in the federal waters under this alternative, on an as-needed basis (after the vessels' holding tank capacities were reached). NOAA cannot thus quantitatively determine how much more exposure individuals or populations of animals and fish might have to the discharged substances than under Sewage/Graywater Alternative 1.

NOAA acknowledges there is a risk under Sewage/Graywater Alternative 2 of marine mammals, seabirds, sea turtles and fish encountering or ingesting untreated USCG vessel sewage and non-clean graywater. As a result, these fish and animals could experience some adverse impacts. Although the area in this alternative would be larger than that under Sewage/Graywater Alternative 1, just as under that alternative, the dynamic oceanographic conditions in the majority of the area would be expected to disperse the USCG vessel sewage discharges rapidly. NOAA would not expect any impacts from this alternative that would conflict with federal or state standards and regulations; cause take or adversely affect the population of a threatened, endangered, regulated, or other sensitive species; or cause habitat loss, or exceed any of the other significance criteria for wildlife and fish. As such, NOAA would not expect the overall impacts on wildlife and fish to be significant under Sewage/Graywater Alternative 2.

4.2.2 Human Uses and Cultural Resources

Maritime Heritage and Cultural Resources

NOAA does not anticipate that implementation of Sewage/Graywater Alternative 2 would cause impacts on historic properties (see Section 3.3) in the area covered by this alternative. Current USCG vessel discharges of untreated sewage and non-clean graywater in the federal waters of the expansion areas of GFNMS and CBNMS would continue, and new USCG vessel discharges of untreated sewage and non-clean graywater in the pre-expansion federal waters of the two sanctuaries would occur. NOAA does not have evidence that such discharges have adversely impacted the historic shipwrecks and aircraft in the expansion areas of the sanctuaries, and would also not expect these discharges to adversely impact any in the federal waters within the previous boundaries the two sanctuaries. The ocean conditions are dynamic there, which would promote mixing of discharge constituents to background levels prior to reaching any submerged historic resources. There are no known pre-historic archaeological sites or artifacts within the area covered by this alternative. Therefore, NOAA would not expect any adverse impacts from this alternative compared to the No Action alternative, which would prohibit USCG vessel discharges in federal waters of the expansion areas once the March 2015 regulations became effective in addition to the existing prohibition in the pre-expansion boundaries.

As with Sewage/Graywater Alternative 1 (the preferred alternative), NOAA does not anticipate that the USCG vessel discharges within this area have any effect on the characteristics of any cultural or maritime heritage resource, so the qualities that enable them to qualify for inclusion in the National Register of Historic Places would be unaltered.

Commercial and Recreational Fishing

In the federal waters of the expansion areas of GFNMS and CBNMS, the status quo with respect to USCG vessel discharges of untreated sewage and non-clean graywater would continue under Sewage/Graywater Alternative 2. In those portions of the sanctuaries, no effects to commercial and recreational fishermen or other recreational uses have been reported, and none are expected as a result of this alternative. Within the federal waters of the previous boundaries of GFNMS and CBNMS, new USCG vessel discharges of untreated sewage and non-clean graywater would occur; these waters are also used by fishermen. Discharges of untreated sewage or non-clean graywater from a USCG vessel in very close proximity to commercial and recreational fishermen have the potential to result in less than-significant, short-term, adverse impacts on them (i.e., by temporarily changing water quality in the location being fished). Because the area covered in this alternative is larger, the numbers of potentially affected fishermen would also be greater, as compared to Sewage/Graywater Alternative 1. However, overall NOAA does not expect that the number of fishing vessels allowed to fish in the area or other recreational vessels would be reduced, that there would be any impacts on the populations of fished species, or that any other significant impacts on commercial and recreational fishing or other recreational uses would occur because of the small number of USCG vessels that this alternative would allow to discharge untreated sewage and non-clean graywater.

Moreover, NOAA assesses that this alternative would not have a significant adverse impact on commercial or recreational fishing (or other recreational uses), compared to the No Action alternative (which would prohibit USCG vessel discharges in federal waters of the expansion areas once the March 2015 regulations became effective in addition to the existing prohibition in the pre-expansion boundaries), since there is no documentation of such impacts or expectation that they will occur in the future.

As in Sewage/Graywater Alternative 1, any potential impacts on commercial and recreational fishermen and other recreational uses might be lessened or avoided by USCG use of best environmental

management practices for vessel discharges of untreated sewage and non-clean graywater, or by temporary suspension or fishing activities, or by vessels transiting away from the immediate discharge areas temporarily, until the wastewater dispersed.

Marine Transportation

No impacts on the marine transportation industry are expected as a result of implementation of Sewage/Graywater Alternative 2, though the area within the sanctuaries included in this alternative would be larger than that included under the preferred alternative (Sewage/Graywater Alternative 1). USCG vessel discharges of untreated sewage and non-clean graywater would continue in the GFNMS and CBNMS expansion areas, and new USCG discharges would occur in the federal waters within the previous boundaries of GFNMS and CBNMS. These discharges have not previously substantially delayed commercial vessel traffic or created a risk of those vessels spilling hazardous materials in the expanded portions of the two sanctuaries, and NOAA would also not expect any adverse effects on commercial vessel traffic within the federal waters of the previous boundaries of the two sanctuaries, if this alternative were implemented. NOAA expects these effects whether the preferred alternative is compared with current conditions or with the No Action alternative (which would prohibit USCG vessel discharges in federal waters of the expansion areas once the March 2015 regulations became effective in addition to the existing prohibition in the pre-expansion boundaries), due to the small number of USCG vessels that this alternative would allow to discharge untreated sewage and non-clean graywater.

Homeland Security and Military Uses

If Sewage/Graywater Alternative 2 were implemented, there would be more options for the USCG for where and when vessel discharge of untreated sewage and non-clean graywater could be made. The vessels could discharge anywhere in the federal waters of the sanctuaries, at USCG onshore facilities, or outside national marine sanctuary waters (beyond state waters), where allowed. There would be no impact on USCG vessel operations within the federal waters of the expanded portions of GFNMS and CBNMS, since the status quo for the vessel discharges would continue there, while within the federal waters of the previous boundaries of GFNMS and CBNMS, USCG vessels would have the new ability to discharge untreated sewage and non-clean graywater, which would have a beneficial effect on USCG vessel uses.

Implementation of Sewage/Graywater Alternative 2 would be expected to extend the amount of time four classes of USCG vessels could operate in GFNMS and CBNMS waters, as the USCG would not be constrained in making discharges in the majority of the sanctuaries' waters from these vessel classes The vessel classes affected under Sewage/Graywater Alternative 2 are: Marine Protector Class Coastal Patrol Boat, Seagoing Buoy Tender, Coastal Buoy Tender, and National Security Cutter. Likely USCG vessel classes that only transit through the area would not be affected, and the same would likely be true when vessels in those classes were only conducting short term operations. The only portion of sanctuary waters in which the USCG vessels would not be able to make the discharges would be within state waters. The USCG is already refraining from making such discharges in state waters, in accordance with existing regulatory requirements and USCG guidance. Though no quantitative estimates have been provided to NOAA, with the ability to discharge within larger portions of GFNMS and CBNMS, the USCG would have the opportunity to spend additional vessel time conducting its various missions within the sanctuaries, which could result in better protection of the sanctuaries' resources and habitats. Compared to the No Action alternative, (which would prohibit USCG vessel discharges in federal waters of the expansion areas once the March 2015 regulations became effective in addition to the existing prohibition in the pre-expansion boundaries), NOAA would expect that the preferred alternative would result in an increase in the area in which USCG can conduct missions.

Sewage/Graywater Alternative 2, if implemented, would allow USCG vessel discharges of untreated sewage and non-clean graywater to continue in the federal waters of the GFNMS and CBNMS expansion areas and would allow the vessels to discharge in the rest of the federal waters of the two sanctuaries. The overall result would be a beneficial outcome for USCG operations. The USCG would be able to continue to fulfill all of its missions that assist in or complement effective management of the sanctuaries and resource protection, and might be able to spend additional time on those missions. NOAA notes, however, that the USCG stated its vessels were able to comply with the discharge prohibitions in GFNMS and CBNMS prior to their expansion. It was the addition of the GFNMS and CBNMS expansion areas in 2015, and resulting larger overall sizes of the two sanctuaries, that was the trigger for the USCG to request the discharge exceptions.

No effect is anticipated on existing or future DoD uses as a result of implementation of this alternative.

Research and Education

In the federal waters of the expansion areas of GFNMS and CBNMS, the status quo with respect to USCG vessel discharges of untreated sewage and non-clean graywater would continue under Sewage/Graywater Alternative 2. In those portions of the sanctuaries, no effects to research and education in the expansion areas of GFNMS and CBNMS have been reported, and none are expected as a result of this alternative. Within the federal waters of the previous boundaries of GFNMS and CBNMS, new USCG vessel discharges of untreated sewage and non-clean graywater would occur; these waters are also used by researchers and educators who have not experienced any such USCG vessel discharges since GFNMS and CBNMS were designated in 1981 and 1989 respectively. Discharges of untreated sewage or non-clean graywater from a USCG vessel in very close proximity to on-water researchers or educators have the potential to result in less than-significant, short-term, adverse impacts to research and education activities (i.e., by changing water quality sampling results or viewer aesthetic experience). Because the area covered in this alternative would be larger, the numbers of potentially affected researchers and educators would also be greater, as compared to Sewage/Graywater Alternative 1. Compared to the No Action alternative, (which would prohibit USCG vessel discharges in federal waters of the expansion areas once the March 2015 regulations became effective in addition to the existing prohibition in the pre-expansion boundaries), NOAA would expect that the preferred alternative would result in negligible adverse impacts on research and education. The increase in the area where discharges can occur in the vicinity of those research and education activities would only have negligible effects due to the small number of USCG vessels that this alternative would allow to discharge untreated sewage and non-clean graywater and the large geographic area in which they would be allowed to do so.

The USCG could work to lessen or avoid any potential impacts on researchers and educators by using best environmental management practices for vessel discharges, or researchers or educators could temporarily suspend their activities or transit away from the immediate discharge areas temporarily, until the discharges dispersed.

4.3 Effects Analysis of Training Alternative 2: Allow Discharges of Ammunition and Pyrotechnic Materials in a Portion of the Federal Waters of the GFNMS and CBNMS Expansion Areas

Training Alternative 2, if implemented by NOAA, would allow discharges of ammunition and pyrotechnic materials during live fire and SAR trainings to continue within a portion of the GFNMS and CBNMS expansion areas (refer to Figure 2-5). NOAA would implement the alternative by including exceptions in the GFNMS and CBNMS regulatory prohibitions. Currently, NOAA’s postponement of the effective date for the discharge regulations allows the USCG to conduct training-related discharges anywhere in the expansion areas of GFNMS and CBNMS. In contrast to the preferred alternative

(Training Alternative 1), this alternative would specify a designated area in federal waters between approximately 14-23 miles (12-20 nm) from shore in the expansion areas in which these live fire and SAR training discharges could continue. There would be no change to the regulatory prohibitions elsewhere within GFNMS and CBNMS.

Existing conditions would not significantly change, adversely or beneficially, for sanctuary resources and other compatible uses in the designated area of the GFNMS and CBNMS expansion areas where training discharges would be allowed. The risk of adverse impacts within the remainder of the expansion areas would be greatly reduced or eliminated as no training discharges would occur there. While this alternative would not allow the same level of operational flexibility as the preferred alternative, the USCG would still benefit by being able to continue discharging ammunition and pyrotechnics materials in the specified portion of GFNMS and CBNMS, thus maintaining its ability to train USCG personnel within their own area of responsibility. This is in contrast to the No Action alternative, in which USCG discharges in the expansion area would be prohibited once the March 2015 final regulations became effective. As discussed below, the main difference between Training Alternatives 1 and 2 is the size of the geographical area where USCG training discharges would be allowed.

4.3.1 Natural Environment

Air Quality

Under Training Alternative 2, training discharges by the USCG would continue to be allowed in a smaller area than Training Alternative 1, specifically, within designated portions of the GFNMS and CBNMS expansion areas between approximately 14-23 miles (12-20 nm). USCG vessels would continue to use the sanctuaries' expansion area waters outside the designated areas for other missions and transits, thus those uses would have some level of air emissions. Air emissions from vessels are not prohibited by the GFNMS and CBNMS regulations. Further, any short-term odors or particulates that may result from USCG vessel engine exhaust would normally be expected to disperse within minutes and would not cause any state or federal air quality standards to be exceeded.

As described under Training Alternative 1, during both live fire and SAR training exercises, trace amounts of chemical constituents are discharged from weapons and pyrotechnic devices. These constituents are initially discharged to the air and mostly burn up above the surface of the water (Coito 2016c, USCG 2011). These discharges have the potential to cause short term, localized, less than significant impacts on air quality through the release of carbon dioxide (CO2), carbon monoxide (CO), and particulate matter (USEPA 2016b). Chromium, lead and other metals are sometimes released into the air from certain types of cartridges and initiators of the flares. Emissions of all of these types of hazardous air pollutants are intermittent, released in very small quantities, and dispersed over a large area throughout the year. They normally disperse within minutes or sooner under typical prevailing wind conditions. Given the small number of training days on which discharges would occur (3-5 days) and the fact that training emissions would be expected to disperse quickly, though the area in which the training-related discharged is smaller in Training Alternative 2 than in training Alternative 1, NOAA expects there would be no significant change to impacts on air quality, compared to current conditions. Any impacts on air quality that occurred would be considered adverse, but less than significant.

Water Quality

NOAA expects no significant change to impacts on water quality, compared to Training Alternative 1 (preferred alternative), if Training Alternative 2 were implemented, though the area in which the discharges would be allowed is smaller under Training Alternative 2. USCG discharges of ammunition and pyrotechnics materials during live fire and SAR trainings would continue to be allowed to occur in

the federal waters of the GFNMS and CBNMS expansion areas, but in a smaller designated area between approximately 14-23 miles (12-20 nm). These training discharges have taken place in this designated area without any known significant adverse impacts on water quality, and overall water quality is relatively good in the GFNMS and CBNMS expansion areas (ONMS 2014a).

As noted under Training Alternative 1, in general, discharged ammunition and pyrotechnic debris that end up on the seafloor would be expected to become lodged in or covered by sea floor sediments, or possibly become encrusted by marine biota, and ultimately would slowly degrade over time, with less than significant adverse effects on water quality (Department of the Navy 2011, USCG 2011). Given this finding, and given that the number of training-related discharges would be limited (they are estimated to occur for just 3-5 days annually), and that dynamic oceanic conditions would be expected to disperse the trace amounts of residual debris and constituents that are discharged, NOAA expects any impacts on water quality would be considered adverse, but less than significant in this area.

The USCG could use the same best management practices described for the preferred alternative (Training Alternative 1) to minimize any adverse effects on the sanctuaries' water quality (and other resources and uses) from USCG discharges of pyrotechnics materials and ammunition.

Marine Mammals, Seabirds, Sea Turtles and Fish

Under Training Alternative 2, training discharges would continue to occur in the sanctuaries, only in the designated area between approximately 14-23 miles (12- 20 nm) from shore. Because training-related discharges would not occur closer than 14 miles from shore (12 nm), the risk of impacts to wildlife in nearshore waters and at sensitive coastal sites, such as marine mammal haulout sites, rookeries or seabird nesting or breeding sites, would be further reduced compared to Alternative 1. Trainings discharges would occur within a smaller geographic area in the federal waters of the expansion area, which could increase the potential exposure of remnant debris and discharged residuals to wildlife that spend more time with the designated area. NOAA acknowledges there is some level of risk of these animals and fish ingesting floating debris (such as remnant plastic or nylon pieces from pyrotechnic discharges) from USCG training discharges if this alternative were implemented.

NOAA has no evidence that the existing USCG training discharges in this portion of the federal waters of the GFNMS and CBNMS expansion areas have caused significant adverse impacts on marine mammals, seabirds, sea turtles, fish or other components of the marine ecosystem in this region. Further, NOAA is not aware of any USCG lack of compliance with any state or federal standards and regulations related to discharges of training materials. In addition, as is true for the preferred training alternative (Training Alternative 1), the USCG trains its personnel to avoid impacts on marine mammals, including on marine mammal identification and avoidance, as well as providing guidance on avoiding other impacts to other wildlife and marine habitats (see Sections 3.1.2 and 3.3 and 4.1). Use of these and other best management practices for the USCG training-related discharges of ammunition and pyrotechnic materials would decrease the likelihood of any adverse impacts on marine wildlife.

In summary, while acknowledging there is some small amount of risk of adverse impacts from implementation of the Training Alternative 2 for training on wildlife, NOAA anticipates any such effects would be limited and less than significant. NOAA's assessment is based on the fact that the training-related discharges would occur just 3-5 days per year and the fact that the dynamic oceanic conditions would be expected to disperse the trace amounts of discharged residual debris and constituents.

4.3.2 Human Uses and Cultural Resources

Cultural and Maritime Heritage Resources

Under this alternative, training discharges would only occur in a designated portion of the federal waters of the expansion areas of GFNMS and CBNMS. Thus, compared to the preferred alternative, the potential for impacts to occur to maritime heritage sites or other historic properties would be reduced, since fewer (9 vs. 22) are located within the designated area. However, NOAA has no evidence that these training discharges have had any adverse impact on historic resources in the two sanctuaries' expansion areas and does not believe any adverse impact would occur in future. Further, there are no known pre-historic archaeological sites or artifacts in the proposed training area or in any federal waters of the expansion areas. Therefore, no impacts on maritime heritage sites and cultural resources are expected as a result of implementation of Training Alternative 2.

Commercial and Recreational Fishing

Under Training Alternative 2, training discharges would continue to occur within a designated area within the expansion areas of GFNMS and CBNMS. There is no documentation of any adverse impacts to commercial or recreational fishing or other recreational uses either occurring now in this area or expected to occur in the future from these discharges. Outside the designated area, the potential for any adverse impact on these uses would be removed, as the discharges would no longer be allowed. Thus, compared to Alternative 1, the potential for adverse impacts on commercial and recreational fishing and other recreational uses would apply to a smaller area.

Due to the remote location of the area, discharges of ammunition and pyrotechnics from live fire and SAR training activities would be expected to occur only very rarely in proximity to on-water commercial or recreational fishing or other recreational uses, and training discharges would only occur during a limited number of days (3 to 5) per year. While some commercial or recreational fishing or other recreational uses could potentially be adversely impacted by having to temporarily avoid the training activity region while training-related discharges were taking place, such instances would likely be rare. Thus, the implementation of this alternative would not be expected to result in a significant adverse impacts on commercial fishing or recreational activities.

As with Training Alternative 1, NOAA and the USCG could use best management practices, including broadcasting Sécurité messages over VHF Channel 16 (one hour prior to the start of any training exercise and every 15 minutes until the conclusion of the exercise (Coito 2017a)), to notify fishermen that training exercises were about to commence in specific areas and to avoid those areas. This would further minimize any adverse effects on commercial and recreational fishing or other recreational uses from the USCG discharges.

Marine Transportation

There is no documentation of any adverse impacts to marine transportation occurring up until the present in the area in which training discharges would take place under Training Alternative 2, and none are expected to occur in the future from these discharges. The designated training discharge area would be smaller when compared to the area that which would be designated under Training Alternative 1 (the preferred training alternative). The potential for any adverse impact on marine transportation would be removed in the waters of the GFNMS and CBNMS expansion areas that were not within the designated areas, as these discharges would no longer be allowed.

As with Training Alternative 1, NOAA and the USCG could use best management practices to further minimize any adverse effects on marine transportation from USCG discharges of pyrotechnics materials and ammunition, such as by broadcasting Sécurité messages over VHF Channel 16 to notify mariners that training exercises were about to commence in specific areas and to avoid those areas (Coito 2017a).

Homeland Security and Military Uses

Currently, the USCG is able, and has been able historically, to make discharges of ammunition and pyrotechnic materials from training exercises in this portion of the expansions areas of GFNMS and CBNMS. Just prior to the sanctuaries expanding on June 9, 2015, the USCG informed NOAA that the implementation of prohibitions on training discharges in these expansion areas would "…potentially jeopardize the USCG's ability to stay 'mission-ready'" and that "such logistical burdens would significantly limit the effectiveness of the Sanctuary's primary on-the-water enforcement agency" (Schultz 2013). As noted previously, the USCG requested regulatory exceptions within the sanctuaries' boundaries from the prohibitions on discharges of ammunition and pyrotechnics materials during live fire (a.k.a. use of force) and SAR training exercises (Schultz 2013; McGuire 2016). The area that would be designated under this alternative was proposed by the USCG to NOAA as one that would meet USCG operational needs for live fire and SAR training discharges and could avoid potential impacts to sanctuary resources and user groups. However, the implementation of Training Alternative 2 could have an adverse impact on the USCG in that it would not allow for the same level of operational flexibility as the preferred alternative would, since training discharges would be confined to a smaller geographic area, between approximately 14-23 miles (12-20 nm) from shore.

Within the pre-expansion portions of GFNMS and CBNMS, the effect of Training Alternative 2 on USCG training discharges would be neutral, as the regulations would only change with respect to areas specified within the expanded portions of the two sanctuaries.

Regarding other existing or future DoD uses, no effect is anticipated as a result of implementation of Training Alternative 2.

Research and Education

Under Training Alternative 2, training-related discharges would be conducted in a smaller designated area within the federal waters of the expansion areas of GFNMS and CBNMS than under the preferred alternative. There is no documentation of any adverse impacts to researchers or educators occurring in this area or experienced by these groups in the past. NOAA thus does not expect significant adverse effects on these uses in the future from these discharges. Any short-term adverse effects these groups might experience would occur in a smaller geographic area as compared to the area in which the impacts might potentially occur under Training Alternative 1.

Outside the designated training discharge area, the potential for any adverse impact on these uses in the remainder of the GFNMS and CBNMS expansion areas would be removed, as the training discharges would no longer be allowed.

As with Training Alternative 1, NOAA and the USCG could use best management practices to further minimize any adverse effects on researchers and educators from USCG discharges of pyrotechnics materials and ammunition, such as by broadcasting Sécurité messages over VHF Channel 16 to notify researchers and educators that training exercises were about to commence in specific areas and to avoid those areas (Coito 2017a).

4.4 Effects Analysis of No Action Alternative (Sewage/Graywater Alternative 3 and Training Alternative 3): Discharge Regulations Become Effective for USCG Discharges in the GFNMS and CBNMS Expansion Areas

Both discharge components of the no action alternative (Sewage/Graywater Alternative 3 and Training Alternative 3) are assessed in accordance with NEPA, which requires federal agencies to analyze the environmental consequences of taking no action. Implementation of the no action alternative would allow the GFNMS and CBNMS discharge regulations to go into effect in the expansion areas of the two sanctuaries (refer to Figures 2-4 and 2-6), with respect to USCG discharges, upon expiration of the current postponement of the effective date for these discharge regulations. Thus, USCG discharge or deposit of untreated vessel sewage, non-clean vessel graywater, and ammunition and pyrotechnics materials from USCG live fire and SAR training exercises would be prohibited. The regulatory prohibition against discharge/deposit originating outside the sanctuaries' boundaries that subsequently enter and injure a sanctuary resource and quality would also apply to USCG discharges in the expansion areas. NOAA would not plan to take any other action to exempt these discharges, although the USCG could submit a national marine sanctuary permit application to NOAA for the discharges at any time. The existing exceptions to the discharge prohibitions, such as for emergencies (including SAR and law enforcement missions), would also be effective.

Existing conditions of most sanctuary resources and for some compatible uses within the GFNMS and CBNMS pre-expansion areas would be expected to be beneficially impacted if this alternative were implemented, which would support the primary ONMS mandate of protection of sanctuaries' resources. In contrast, the USCG would experience some level of adverse impacts, as some of its vessels operating within the expanded portions of GFNMS and CBNMS would be required to divert elsewhere to make necessary discharges of untreated sewage and non-clean graywater. In addition, the USCG would need to transit farther, outside the boundaries of the two sanctuaries, to make training-related discharges (where allowed). This alternative, if selected, could thus impair the USCG's ability to train its personnel on SAR and missions involving live fire, and to some degree could affect the USCG's ability to meet annual training requirements and maintain "mission-readiness." While the USCG would still be able to conduct missions within the two sanctuaries, the need for the action would not be met.

4.4.1 Natural Environment

Air Quality

Sewage/Graywater Alternative 3 (No Action)

Since the existing USCG vessel discharges of untreated sewage and non-clean graywater, and any associated indirect effects to air quality that may result (such as short-term, localized odors) would no longer take place within these parts of the sanctuaries, a minor beneficial impact on air quality could occur if Sewage/Graywater Alternative 3 were implemented. The beneficial impact on air quality would likely be negligible and less than significant, however, with no discernable change expected to result to ambient air quality in the region. As previously noted under Sewage/Graywater alternatives 1 and 2, no agencies in California and no federal agencies, including GFNMS and CBNMS, regulate the air quality effects of USCG vessel [or any type of vessel] discharges of untreated sewage and non-clean graywater.

USCG vessel movements and resulting engine exhaust emission within the two sanctuaries could change for some vessel classes under Sewage/Graywater Alternative 3, but data on existing or future USCG vessel movements and the effect on vessel air emission in GFNMS and CBNMS was not available to NOAA. Without any estimates regarding increases or decreases of vessel engine emissions under this

alternative, NOAA can only provide a qualitative assessment regarding the effect this alternative could have on air quality.

Training Alternative 3 (No Action)

The No Action alternative would lead to a beneficial impact on air quality over the expanded portions of GFNMS and CBNMS. The existing USCG training discharges, and any associated minor, adverse, short-term, impacts on air quality that currently may result from those would no longer take place within the sanctuaries. The beneficial impact on air quality would likely be incremental, however, with no significant change expected to ambient air quality in the region.

Combined Findings

When the effects of the two components of the No Action alternative are combined (sewage/graywater and training discharges), NOAA expects a beneficial, below significant, impact on air quality could occur if this alternative were selected. Under this alternative, there would no longer be any odors released from untreated USCG vessel sewage and non-clean vessel graywater, or trace amounts of chemicals and particulates from ammunition and pyrotechnic materials added to the air.

In contrast, some adverse, less than significant air quality impacts would be anticipated to occur from implementation of the preferred alternative (Sewage Graywater Alternative 1 and Training Alternative 1), Sewage/Graywater Alternative 2, or Training Alternative 2, as described under those alternatives.

Water Quality

Sewage/Graywater Alternative 3 (No Action)

The impact of Sewage/Graywater Alternative 3 on water quality would be beneficial compared to the current conditions and Sewage/Graywater Alternatives 1 and 2, as all USCG vessel discharges of untreated sewage and non-clean graywater would no longer be made in the GFNMS and CBNMS expansion areas, thus removing the potential for any adverse impacts in the future that might occur in that area from such discharges. It is likely the incremental benefit to water quality would be less than significant due to the fact that there the amounts discharged currently are limited in volume, and the changes would be unlikely to be detected by current water quality sampling efforts in the region.

Though it is not possible to quantify the exact volume of discharges that would cease to be made from the four USCG vessel classes that make such discharges (Marine Protector Class Coastal Patrol Boat, Seagoing Buoy Tender, Coastal Buoy Tender, and National Security Cutter), it is certain there would be a reduction in the pollutants input to the expanded portions of the sanctuaries, when compared to the several thousands of gallons per year of untreated vessel sewage (some mixed with graywater) that the USCG may currently discharge. The USCG discharges would instead be made outside the national marine sanctuaries' boundaries (where allowed), or the vessels would have their tanks pumped out at shoreside facilities in Bodega Bay, San Francisco Bay and Eureka when the vessels were in port. Removing these sources of wastewater, though the amounts are relatively small, would result in an overall reduction in water pollution in those portions of the sanctuaries. Though there are no known cases of algal bloom outbreaks or eutrophication being caused in the area covered by this alternative as a result of USCG vessel discharges (or any type of vessel discharges) of untreated sewage and non-clean graywater. Implementation of this alternative would reduce the discharge of nutrients from USCG vessels into GFNMS and CBNMS, thus further reducing any possibility of any localized algal bloom or eutrophication occurring in the sanctuaries as a result.

Training Alternative 3 (No Action)

The impact of Training Alternative 3 on water quality would be beneficial compared to current conditions and Training Alternatives 1 and 2, as all USCG training-related discharges of ammunition and pyrotechnics materials would no longer be made in the GFNMS and CBNMS expansion areas, thus removing the potential for any adverse impacts from either discharged chemical constituents or training-related residual debris in the sanctuaries in the future. Life fire and SAR-related training discharges would instead need to be done outside the national marine sanctuaries' boundaries (where allowed). Removing these sources of discharges, though the amounts are relatively limited, would result in an overall reduction in water pollution in those portions of the sanctuaries.

Combined Findings

When the effects of the two components of the no action alternative are combined (sewage/graywater and training discharges), NOAA finds a less than significant, beneficial impact on water quality would be expected to occur.

When compared to this No Action alternative, implementation of the preferred alternative (Sewage Graywater Alternative 1 and Training Alternative 1), Sewage/Graywater Alternative 2, or Training Alternative 2, as described under those alternatives, would potentially result in some adverse water quality impacts, though none are estimated to be significant.

Marine Mammals. Seabirds, Sea Turtles and Fish

Sewage/Graywater Alternative 3 (No Action)

There is no data that indicates adverse impacts on marine mammals, seabirds, sea turtles or fish occur as a result of the current vessel USCG discharges of untreated sewage and non-clean graywater in the expanded portions of GFNMS and CBNMS. However, these animals swim in, float on, and feed within GFNMS and CBNMS marine waters. Any incremental increase in water quality within the GFNMS and CBNMS expansion areas that would result from ceasing the input of USCG vessel untreated sewage and non-clean graywater would be expected to incrementally benefit the overall health of wildlife and fish, their habitats, and their food sources. In comparison, in the preferred alternative, although there are no known documented adverse effects from existing conditions to marine mammals and other protected species from these discharges, as discussed above, the risk of a minor adverse effect is present.

Training Alternative 3 (No Action)

While no impacts to marine mammals, seabirds, sea turtles or fish are known from the current USCG training discharges, these animals swim in, float on, and feed in marine waters. Under Training Alternative 3, a beneficial impact on wildlife and fish would be expected within the GFNMS and CBNMS expansion areas as a result of the input of chemical constituents and residual debris from USCG training discharges ceasing. The risk of training-related hazards to wildlife and fish in GFNMS and CBNMS, from ingestion of chemicals, metals, debris, noise disturbance, or being struck by projectiles would be removed.

Combined Findings

When the effects of the two components of the no action alternative are combined (sewage/graywater and training discharges), NOAA finds a beneficial impact on marine mammals, seabirds, sea turtles, fish and their food sources could take place. Though the impact would be less than significant, having the USCG

discharges cease would mean that any adverse impacts on marine mammals, seabirds or fish that could occur from the discharges would also cease.

When compared to the preferred alternative (Sewage/Graywater Alternative 1 and Training Alternative 1), Sewage/Graywater Alternative 2 or Training Alternative 2, effects from Alternative 3 on marine mammals, seabirds, sea turtles and fish would be beneficial, but the effects are expected to be less than significant.

4.4.2 Human Uses and Cultural Resources

Cultural and Maritime Heritage Resources

Sewage/Graywater Alternative 3 (No Action)

Under Sewage/Graywater Alternative 3, USCG vessel discharges of untreated sewage and non-clean graywater would no longer occur in the expansion areas of GFNMS and CBNMS. NOAA's assessment is that this alternative would have no impact on the historic properties located in those portions of the sanctuaries (see Section 3.3), based on the fact there no known impact now or in the past from the existing and past USCG vessel discharges. As there are no known pre-historic archaeological sites or artifacts within the area, there would also be no impact on them. The overall result would be neutral with respect to impacts.

Training Alternative 3 (No Action)

NOAA's assessment is that Training Alternative 3, if implemented, would likely have no impact on historic properties located in the expansion areas of the sanctuaries, because no impact on them is known from previous or existing USCG training-related discharges.

NOAA notes that implementing this alternative would eliminate the future risk of any adverse impacts occurring to cultural and maritime heritage resources (either known or yet-to-be-discovered) from USCG training-related discharge of ammunition and pyrotechnic materials in the expanded portions of GFNMS and CBNMS, which would be a beneficial outcome.

Combined Findings

When the effects of the two components of the No Action alternative are combined (sewage/graywater and training discharges), NOAA finds the outcome would be no impact with respect to cultural and maritime heritage resources and sewage/graywater discharges and that the outcome could be beneficial with respect to risk of any adverse impacts from training-related discharges.

In comparison, no impacts on cultural or historic resources are known or anticipated as a result of the USCG vessel discharges of untreated sewage and non-clean graywater under Sewage/Graywater Alternative 1 (preferred) or 2, same as for the No Action alternative. No impacts from USCG discharges of ammunition and pyrotechnic materials during live fire and SAR training activities are known are expected in the expanded portions of GFNMS and CBNMS if Training Alternative 1 (preferred) or 2 were chosen by NOAA. However, risk of adverse impacts on any yet-to-be-discovered cultural and maritime heritage resources in the areas covered by those alternatives is unknown.

Commercial and Recreational Fishing

Sewage/Graywater Alternative 3 (No Action)

The effects on commercial and recreational fishing (and other recreational uses), if Sewage/Graywater Alternative 3 were implemented, would be expected to be either none or to be a negligible benefit to these groups. Any existing short-term, adverse impacts these groups may currently experience as a result of localized, temporary water quality impacts in the area of USCG vessel discharges of untreated sewage and non-clean graywater would no longer occur, since the discharges would cease. This would mean that there would be no need for any temporary suspension of fishing activities or for vessels to temporarily transit away from USCG vessel discharges of untreated sewage or non-clean graywater.

Training Alternative 3 (No Action)

There currently are no known adverse impacts on the commercial and recreational fishing or other recreational uses as a result of USCG training discharges in the expansion areas of GFNMS and CBNMS, consequently, the cessation of these discharges under Training Alternative 3 would be expected to have no effect, or a negligible beneficial effect, on commercial and recreational fishing.

Any existing short-term, adverse impacts these groups could experience in the future as a result of occasional interaction with or disturbances by USCG live fire and SAR training discharges would not occur, since the discharges would cease. This would mean that there would be no need for any temporary suspension of fishing activities or for vessels to temporarily transit away from USCG training exercise areas.

Combined Findings

When the effects of the two components of the no action alternative are taken together (sewage/graywater and training discharges), NOAA assesses that there would be no change or a negligible beneficial effect due to the risk of short term changes to commercial and recreational fishing or other recreational activities being removed. Such potential adverse impacts could occur if NOAA implemented the preferred alternative (Sewage/Graywater Alternative 1 and Training Alternative 1), Sewage/Graywater Alternative 2 or Training Alternative 2, as described in the analysis presented for those alternatives.

Marine Transportation

Sewage/Graywater Alternative 3 (No Action)

Because there currently is no impact on the marine transportation industry as a result of USCG vessel discharges of untreated sewage and non-clean graywater in the expansion areas of GFNMS and CBNMS, the cessation of these discharges under the Sewage/Graywater Alternative 3 would also be expected to have no effect on marine transportation.

Training Alternative 3 (No Action)

There currently are no known impacts on the marine transportation industry as a result of USCG training discharges in the expansion areas of GFNMS and CBNMS. Therefore, the fact that these discharges would no longer occur under Training Alternative 3 would also be expected to have no impact on marine transportation.

Combined Findings

When the effects of the two components of the No Action alternative are combined (sewage/graywater and training discharges), because there are no impacts individually, NOAA continues to find that no impacts on marine transportation would be expected to occur.

NOAA also made the same finding of no impacts on marine transportation if the other alternatives were to be implemented: the preferred alternative (Sewage/Graywater Alternative 1 and Training Alternative 1), Sewage/Graywater Alternative 2 and Training Alternative 2, as noted in the analysis under those alternatives.

Homeland Security and Military Uses

Sewage/Graywater Alternative 3 (No Action)

Sewage/Graywater Alternative 3, if implemented, could result in less USCG vessel time spent within the GFNMS and CBNMS expansion areas on law enforcement, surveillance, and other missions, for the vessels that currently may make discharges of untreated sewage and non-clean graywater there (refer to Table 3-3 and to the Water Quality analysis in Sewage/Graywater Alternative 1). The affected USCG vessels would instead hold this waste for subsequent discharge at shoreside facilities, or would transit seaward, outside national marine sanctuary boundaries (and beyond state waters), to discharge it. This would increase USCG vessel time spent traveling to places where the vessel discharges could be made or pumped out, decreasing time that the vessels could otherwise spend on mission activities, including those that support management of the sanctuaries.

Out of the nine USCG vessel classes that utilize GFNMS and CBNMS waters, vessels in four classes would potentially be affected: Marine Protector Class Coastal Patrol Boat, Seagoing Buoy Tender, Coastal Buoy Tender, and National Security Cutter. Likely USCG vessels in these classes that only transit through the area would not be affected, and the same would likely be true when vessels in those classes were only conducting short term operations (if activities could be done prior to the holding tanks reaching capacity). Based on the information provided by the USCG, Coastal Patrol Boats and the Seagoing Buoy Tender would be the most likely to experience adverse effects on mission time spent in the GFNMS and CBNMS expansion areas. This is because the cross-connected holding tanks of the Coastal Patrol Boats reach capacity in about two days and the graywater holding tank of the Seagoing Buoy tender, with water conservation, reaches capacity in about two days (its sewage tank reaches capacity in about five days).

Implementation of this alternative would not address the difficulty the USCG expressed that it would have in both complying with sanctuary discharge regulations and fulfilling its missions in expanded sanctuaries (Schultz 2013; McGuire 2016). NOAA anticipates the USCG would experience, on the whole, some level of adverse, less than significant impacts under this alternative. Some USCG missions supporting sanctuary management could also shortened. However, NOAA is unable to judge how many USCG missions utilizing these vessel classes in the GFNMS and CBNMS expansion areas might be shortened or determine specifically what mission activities would take longer or would not occur, due to a lack of data. There would be no effect on discharges from USCG vessels in the vessel five classes that do not currently discharge untreated sewage or non-clean graywater. Implementation of this alternative would affect USCG vessels in the four classes mentioned, when their holding tank capacity would be reached within the GFNMS and CBNMS expansion areas prior to mission completion. Although NOAA's purpose of resource protection would be met by removing the limited volumes of USCG vessel wastewater from the expansion areas of GFNMS and CBNMS, the need for the action would not be met with respect to these four classes of USCG vessels, if Sewage/Graywater Alternative 3 were selected, and, as stated, the amount of time those vessels spend in the sanctuaries' expanded areas conducting various

missions could be shortened. However, the USCG could choose to submit a national marine sanctuary permit application in the future to NOAA, requesting NOAA to allow the vessel discharges of untreated sewage and non-clean graywater; which could mitigate any adverse effects on USCG missions that necessitate discharge of untreated vessel and non-clean graywater in the expanded portions of GFNMS and CBNMS, including missions that support the sanctuaries' management.

Regarding other, non-USCG homeland security and military (DoD) uses, NOAA does not foresee any impact on these uses from implementation of Sewage/Graywater Alternative 3.

Training Alternative 3 (No Action)

Training Alternative 3, if implemented, would have an adverse impact on the USCG District 11 live fire and SAR training practices and budgets. Live fire and SAR training discharges of ammunition and pyrotechnic materials, as historically or currently conducted, would no longer be able to continue in the expansion areas of GFNMS and CBNMS. There would be no change under this alternative to USCG training activities that do not involve discharges in the two sanctuaries' expansion areas. There would also be no change within the pre-expansion boundaries of GFNMS and CBNMS, where no USCG training-related discharges are allowed.

If NOAA selected this alternative, USCG assets could continue to send personnel to the training area offshore of Southern California. For 87-foot Coastal Patrol Boats, for example, whose crews normally train within the GFNMS and CBNMS expansion areas, transiting to Southern California would mean a 2-3 day average transit. In some cases, personnel might need to fly to Southern California and train on vessels other than the ones assigned to them (USCG 2015a). USCG vessels could also travel more than 69 miles (60 nm) offshore to the west or a comparable distance to the north to train outside the boundaries of the sanctuaries. The USCG has stated prohibiting boat crews from training locally within their area of responsibility could jeopardize their ability to meet certain minimum training requirements each year as well as have an adverse impact on their abilities to conduct law enforcement, surveillance, and other missions related to that training within the sanctuaries (USCG 2015a).

The USCG has considered the use of alternative training methods (such as with simulators or blanks) but determined that its personnel need the ability to conduct their live fire and SAR training in real-life conditions in the two sanctuaries. Because of the growing threat of trans-national criminal organizations smuggling illegal drugs and transporting migrants to Northern California, the USCG asserts that training personnel assigned to work in GFNMS and CBNMS in their own area of responsibility is critical for mission-readiness. The USCG has not provided data to indicate how feasible it would be, or fully quantify the impacts, of having the affected boat crews complete the live fire and SAR training-related discharges outside GFNMS and CBNMS boundaries (where allowed).

Implementation of this alternative would not address the difficulty the USCG expressed that it would have in both complying with sanctuary discharge regulations and fulfilling its missions in the expanded sanctuaries (Schultz 2013; McGuire 2016).

NOAA anticipates the USCG would experience adverse effects if this alternative were implemented. NOAA acknowledges the concerns the USCG has expressed, if NOAA selected Training Alternative 3, of not being able to make training-related discharges 3-5 days per year during training exercises in the expansion areas of CBNMS and GFNMS. The USCG could choose to submit a national marine sanctuary permit application in the future to NOAA, requesting NOAA to allow the training-related discharges of live ammunition and pyrotechnic materials. A permit granted by NOAA for this purpose could mitigate any adverse effects on USCG live fire and SAR training exercises in District 11, thus supporting having USCG crews be ready for those missions wherever they might occur, including within GFNMS and

CBNMS. However, because USCG has indicated it is unlikely to apply for a permit for those activities, NOAA focused the analysis for Training Alternative 3 (No Action) on the effects of USCG not conducting training in those areas.

Regarding other, non-USCG homeland security and military (DoD) uses, NOAA does not foresee any impact on them if Training Alternative 3 were selected.

Combined Findings

When the effects of the no action alternative on USCG vessel discharges of untreated sewage and non-clean graywater are considered with the effects on USCG training-related discharges, NOAA finds there would be an adverse, less than significant impact on the USCG in the expanded portions of GFNMS and CBNMS. NOAA also finds there would be no impacts on other homeland security and military uses in those areas.

In contrast to the findings under the no action alternative, NOAA found under the preferred alternative (Sewage/Graywater Alternative 1 and Training Alternative 1), Sewage/Graywater Alternative 2, and Training Alternative 2 that there would be beneficial effects for the USCG, as some discharges of untreated sewage, non-clean graywater, and training-related discharges of ammunition and pyrotechnic materials would be allowed, as described under those alternatives.

Research and Education

Sewage/Graywater Alternative 3 (No Action)

The effects on researchers and educators, if Sewage/Graywater Alternative 3 were implemented, would be expected to be either none, or to be a negligible benefit. Any existing negligible, short-term, adverse impacts these groups may currently experience as a result of localized, temporary water quality impacts in the area of USCG vessel discharges of untreated sewage and non-clean graywater would no longer occur, since the discharges would cease. This would mean that there would be no need for any temporary suspension of research or education activities or for research and education vessels to temporarily transit away from USCG vessel discharge plumes.

Training Alternative 3 (No Action)

The effects on researchers and educators, if NOAA implemented Training Alternative 3, would be expected to be either none (since no impacts on these groups as a result of USCG training discharges in the GFNMS and CBNMS expansion areas are known now), or, with respect to the future, to be a minor benefit to them. Any existing short-term, adverse impacts these groups might experience as a result of occasional interaction with or disturbances by USCG live fire and SAR trainings would not occur, since the USCG would not be making training-related discharges. This would mean that there would be no need under this alternative for any temporary suspension of research or education activities or for research and education vessels to temporarily transit away from USCG live fire and SAR training exercises.

Combined Findings

The combined effects of the sewage/graywater and training discharges under the no action alternative on research and education uses are expected to be none (since no impacts are known now on these uses) or to be a negligible benefit to these uses, as there would not longer be any risk of disruption of their activities from the USCG discharges. Potential short term, less than significant adverse impacts could occur if NOAA implemented the preferred alternative (Sewage/Graywater Alternative 1 and Training Alternative

1), Sewage/Graywater Alternative 2 or Training Alternative 2, as described in the analysis presented for those alternatives.

4.5 Cumulative Impacts

NEPA requires an analysis of the incremental effects of an action that are cumulatively considered when viewed in connection with other recent past, present, planned, and reasonably foreseeable future actions. Cumulative impacts analysis generally focuses on the resource(s) that have been found throughout the analysis of impacts that have the potential to sustain adverse impacts. As described earlier, CEQ defines cumulative impacts as "impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). In general, although individual impacts of various past, present, and reasonably foreseeable future actions might be minor, taken together, their effects could be significant.

All of the alternatives presented in this environmental assessment would have relatively minor, less than significant effects on GFNMS and CBNMS resources and uses (or on some of these, no effects).. In addition, NOAA has determined that the consideration of cumulative impacts for each of the alternatives would result in cumulative impacts findings that are nearly identical for each alternative. Accordingly, to avoid repetitive and overly long analyses in this section, NOAA opted to present a single cumulative impacts analysis that is applicable to all the alternatives considered.

4.5.1 Projects with Potential to Contribute to Cumulative Impacts

The proposed action would not involve construction, additional vessels, additional missions, or augmentation of USCG operations within GFNMS and CBNMS, but rather describes a continuation of current discharge practices for missions within USCG District 11, for which cumulative effects have not been documented. This section compares the magnitude and level of significance of impacts associated with the proposed action with the impacts of other projects with potential to contribute to cumulative impacts that indirectly cause effects in the environment. The projects being considered for their contribution to cumulative impacts are presented in Table 4-2. Moreover, the proposed action occurs in the context of broader vessel activity from a variety of users in the study area.

4.5.2 Natural Environment

Air Quality, Water Quality and Biological Resources

The combination of the implementation of the MBNMS expansion by ONMS (if implemented), NPDES VGP and sVGP by the USEPA, and the UNDS by DoD (see Table 4.2) actions with the proposed action (as described in the preferred alternatives), is not expected to have significant adverse impacts on air quality, water quality and biological resources. The resource protection afforded by application of the regulations, permits and standards that would be in place as a result of each these projects would result in positive influences on marine habitats and the organisms living in them. Any change in the untreated sewage and non-clean graywater discharges or training discharges from USCG vessels and aircraft is unlikely to have any effect on the intensity or location of vessel activity from all other users in the study area. Therefore, NOAA does not expect significant cumulative effects from this proposed action on other vessel uses, which could then have effects on air quality, water quality, and biological resources.

Accidental releases of hydrocarbons (gas and oil), marine debris, vessel air emissions, and vessel effluent already have in the past, and can in the future, compromise air, water and sediment quality in the coastal and marine environments. However, the proposed action, when combined with these risks is not expected

Table 4-2. Projects with Potential to Contribute to Cumulative Impacts

Project	Project Location	Project Sponsor	Project Description	Projected Completion
San Francisco-Pacifica Exclusion Area	San Francisco Area	NOAA ONMS	Proposed assessment of potential expansion of MBNMS to include the existing San Francisco-Pacifica Exclusion Area, adding 101 square mi. (77 square nm) as part of the National Marine Sanctuary System.	On hold
National Pollution Discharge Elimination System (NPDES) Vessel and Small Vessel General Permits (VGP and sVGP)	Territorial Sea (out to 3 miles from shore)	USEPA	The VGP and sVGP are administered by the USEPA. All vessels (except recreational vessels and armed forces vessels) are eligible for coverage under these permits, for specified discharges incidental to normal operations of vessels. As the result of legislation in 2014 (S,2444) all vessels less than 79 feet in length and all commercial fishing vessels are exempted from having to obtain NPDES coverage until Dec. 18, 2017, except for ballast water discharges.	Dec. 18, 2017
Uniform National Discharge Standards (UNDS)	Out to approx. 14 miles (12 nm) from coastline	USEPA and DOD	CWA Section 312(n) requires the USEPA and DOD to identify and evaluate discharges of armed forces vessels to determine which discharges require control for protection of the environment and to set standards. USEPA and DOD, in consultation with the USCG, have been working on standards for the use of marine pollution control devices (MPCDs) to control discharges incidental to the normal operation of most armed forces vessels, to apply out to 14 miles (12 nm) from the coastline. The final rule to identify and characterize discharges was published May 10, 1999. The standards will be established in three batches. January 11, 2017, a final rule established MPCD performance standards for the first batch. Within one year after standards are established, the DOD will complete implementing instructions.	Ongoing

Sources: ONMS 2014a and USEPA 2016b.

to have significant cumulative adverse effects. The implementation of the MBNMS expansion, NPDES VGP and sVGP by the USEPA, and the UNDS by DoD proposed projects, with appropriate control of discharge sources and amounts, along with the application of best management environmental practices, would have a cumulative beneficial impact on the natural environment. By contrast, this proposed action may result in less than significant adverse impacts on the natural environment. Therefore, NOAA concludes that the overall cumulative impact on the natural environment would be slightly less adverse than the impact of the proposed action alone.

4.5.3 Human Uses and Cultural Resources

Cultural and Maritime Heritage Resources

NOAA does not anticipate the projects listed in Table 4-2, when considered with the proposed action, would have significant adverse impacts on cultural and maritime heritage resources. If the MBNMS expansion were implemented and included regulations to protect submerged cultural and historic resources, the impact on those resources would be beneficial impact on such resources.

Commercial and Recreational Fishing

None of the alternatives considered for the proposed action would regulate commercial or recreational fishing, though under Sewage/Graywater and Training Alternatives 1 and 2 these groups might experience minor, discountable adverse effects from temporary disruption of their activities from USCG discharges. Considered separately from the proposed action, the combined expansion of MBNMS (if it occurred) and implementation of the NPDES VGP and sVGP by the USEPA might have some adverse impact on commercial fishing operators and recreational fishermen, as there would be a wider area in which the fishermen would need to comply with the permit and regulatory requirements (such as discharging effluent or other materials). Any change in the untreated sewage and non-clean graywater discharges or training discharges from USCG vessels and aircraft is unlikely to have any effect on the intensity or location of vessel activity from all other users in the study area, including commercial and recreational fishing activities. Therefore, NOAA does not expect significant cumulative effects from this proposed action on such vessel uses.

Marine Transportation

The proposed action would not regulate marine transportation, and none of the alternatives under consideration for this action would have any adverse impacts on marine transportation. As with commercial and recreational fishing, considered separately from the proposed action, the combined expansion of MBNMS (if MBNMS regulations were extended to the proposed new area) and implementation of the NPDES VGP and sVGP might have some adverse impact on marine transportation, as there would be a wider area in which operators would need to comply with the permit and regulatory requirements, such as discharging effluents and other materials. The UNDS does not apply to non-armed forces vessels. Any change in the untreated sewage and non-clean graywater discharges or training discharges from USCG vessels and aircraft is unlikely to have any effect on the intensity and location of vessel activity from all other users in the study area, including marine transportation activities. Therefore, NOAA does not expect significant cumulative effects from this proposed action on such vessel uses.

Homeland Security and Military Uses

Selection of the preferred alternative or Sewage/Graywater Alternative 2 or Training Alternative 2 would have beneficial impacts on homeland security. The proposed allowance of both vessel and training and training discharges in certain areas within the GFNMS and CBNMS would ensure that USCG assets

could continue to conduct their missions and train personnel and make live fire and pyrotechnic material discharges within their area of operation while complying with the sanctuaries' regulatory and standards requirements for discharges of untreated sewage, non-clean graywater, ammunition, flares, and other materials. Implementation of the no action alternative would mean the USCG would have to plan in advance for its vessel discharges of untreated sewage and non-clean graywater, to make those discharges outside of GFNMS and CBNMS, which would result in some adverse impact on USCG personnel, budget and mission activities. NOAA does not anticipate there would be any effect on other non-USCG military uses the proposed action. Any change in the untreated sewage and non-clean graywater discharges or training discharges from USCG vessels and aircraft is unlikely to have any effect on the intensity and location of vessel activity from all other users in the study area, including homeland security and military uses. NOAA is not aware of any training or military exercises conducted by DOD in the study area. Therefore, NOAA does not expect significant cumulative effects from this proposed action on such uses.

When considered with any alternative chosen to implement the proposed action, the MBNMS expansion and the UNDS, if implemented, could result in homeland security and military staff and operational costs in planning for and ensuring vessels and personnel compliance with regulatory requirements in a broader area than they currently do.

The NPDES VGP and sVGP do not apply to armed forces vessels and thus have no impact individually or when considered with other projects on homeland security and military uses.

Research and Education

The proposed action would not regulate research and education uses, though in Sewage/Graywater and Training Alternatives 1 and 2 researchers and educators might experience minor, discountable adverse effects from temporary disruption of their activities due to USCG discharges. The combined expansion of MBNMS (if it occurred) and implementation of the NPDES VGP and sVGP, separate from the proposed action, may have some adverse impact on research and educational uses of vessels, as there would be a wider area in which operators would need to comply with requirements, such as for discharges. The expansion of MBNMS and associated extension of sanctuary programs to the area would be expected to promote research and education, resulting in a beneficial impact on those uses; this effect would occur separately from the proposed action.

Climate Change

Given the current lack of known significant adverse impacts to the resources discussed above from the existing levels of discharge, and given that the prior years of observing these conditions include a variety of climate and meteorological conditions, NOAA has determined that the proposed action, analyzed in conjunction with climate change, would not be likely to result in cumulatively significant impacts to these resources. The largest potential sources of greenhouse gas emissions for climate change are the munitions from pyrotechnics and munitions from discharges, and vessel operations. This determination is premised on an assessment of possible climate change in the foreseeable future, but this analysis may be supplemented or amended as needed if additional pertinent information becomes available prior to NOAA's selection of a final action.

4.6 Summary

Based on the analysis conducted, NOAA proposes to amend the GFNMS and CBNMS regulations, as described in the preferred alternative for sewage/graywater (Sewage/Graywater Alternative 1), to allow USCG vessels to discharge untreated sewage and non-clean graywater in the federal waters of the expansion areas of GFNMS and CBNMS. This would maintain the current state of affairs, or status quo,

for USCG vessel discharges, which would be beneficial to the USCG and to NOAA as USCG missions in the region could continue without the need to divert elsewhere once holding tank capacities are reached. Such USCG vessel discharges been a part of USCG operations in the GFNMS and CBNMS expansion areas since before the two sanctuaries expanded in 2015.

NOAA also proposes to amend the GFNMS and CBNMS regulations, as described in the preferred alternative for training (Training Alternative 1), to allow the USCG to continue to discharge ammunition and pyrotechnics materials during live fire and SAR training activities conducted within the federal waters of the GFNMS and CBNMS expansion areas. This would maintain the area in which the USCG has been allowed by the regulatory framework to conduct such discharges. Implementation of this alternative would be beneficial to the USCG and to NOAA as the USCG would be able to maintain mission-readiness due to being able to train its personnel in their normal area of operation. Such USCG training-related discharges of live ammunition from vessels and pyrotechnic discharges from vessels and aircraft also were a part of USCG operations in the GFNMS and CBNMS expansion areas, prior to the two sanctuaries expanding in 2015.

NOAA does not foresee that any significant adverse impacts on the sanctuaries' resources and uses would occur as a result of implementing the proposed preferred alternative. No adverse impacts have been documented historically and up to the present on any sanctuary resources or uses from USCG untreated vessel sewage, non-clean vessel graywater, or discharges of ammunition or pyrotechnic materials from live fire and SAR training activities in the expanded portions of GFNMS and CBNMS. Though some adverse impacts on natural resources (air quality; water quality; and marine mammals, seabirds, sea turtles and fish), historic resources (submerged maritime heritage resources), and human uses (commercial and recreational fishing, research, and education) might occur in the future, NOAA does not anticipate any impacts will be significant, based on the information the USCG has provided. Importantly, the USCG and its missions in GFNMS and CBNMS, including those that support enforcement in and management of the sanctuaries, would benefit if NOAA implemented the proposed preferred alternative, because the specified discharges would be allowed to continue.

NOAA concludes that selection of the proposed preferred alternative would meet the purpose for this proposed action. If NOAA implemented the preferred alternative, the USCG could continue to conduct enforcement and other missions that support management of the GFNMS and CBNMS, and to train its personnel to be ready for missions involving live fire and SAR in their area of operation, without having to change its discharge practices. NOAA assesses that the USCG activities can be conducted in a manner compatible with protection of GFNMS and CBNMS resources.

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6.0 APPENDICES

APPENDIX A: LIST OF PREPARERS

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APPENDIX B: REQUIRED CONSULTATIONS

Coastal Zone Management Act

The Coastal Zone Management Act (CZMA, 16 U.S.C. § 1451) was enacted in 1972 to encourage coastal states, Great Lake states, and U.S. Territories and Commonwealths (collectively referred to as "coastal states" or "states") to preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone. The CZMA is a voluntary program for states; currently, thirty-four coastal states have a federally approved coastal management program. Section 307 of the CZMA is known as the "federal consistency" provision.

The federal consistency provision requires federal actions (inside or outside a state's coastal zone [see https://coast.noaa.gov/czm/media/StateCZBoundaries.pdf]) that affect any land or water use or natural resource of a state's coastal zone, to be consistent with the enforceable policies of the state coastal management program (CMP). The term "effect on any coastal use or resource" means any reasonably foreseeable effect on any coastal use or resource resulting from the activity, including direct and indirect (cumulative and secondary) effects. The federal consistency regulations at 15 C.F.R. part 930 set forth detailed timeframes and procedures that must be followed carefully.

The two types of federal actions addressed in the federal consistency regulations that NOAA programs most frequently encounter are federal agency activities (15 C.F.R. part 930, subpart C), and federal license or permit activities (subpart D). In addition, subpart E of the regulations addresses outer continental shelf plans and subpart F applies to federal financial assistance provided to state and local governments. A federal action that will have reasonably foreseeable coastal effects, but which does not fall under 15 C.F.R. subpart D, subpart E, or subpart F should be treated as a federal agency activity under subpart C.

Federal agency activities (subpart C) are activities and development projects performed by a federal agency, or a contractor for the benefit of a federal agency. For federal agency development projects occurring inside a state's coastal zone, the federal agency must submit a Consistency Determination to the state. For all other federal agency activities, inside or outside the coastal zone, the federal agency must submit a Consistency Determination to the state if the federal agency determines the activity may have reasonably foreseeable effects on the state's coastal uses or resources. Federal agencies need only prepare one Consistency Determination for the proposed action and not for individual authorizations or reviews associated with the proposed action, such as NEPA documents, ESA consultations, federal permits the agency may need, etc. Federal agency activities must be consistent to the maximum practicable with the enforceable policies of the state's CMP. If there are no reasonably foreseeable effects, the federal agency may be required to provide a Negative Determination to the state (see 15 C.F.R. § 930.35).

NOAA will provide a copy of the proposed rule, this draft environmental assessment, and a consistency determination to the California Coastal Commission (Commission) upon publication. NOAA will wait for concurrence from the Commission prior to publication of the final rule.

Consultation requirements for the effects of the actual USCG training activities and vessel discharges on land or water uses or natural resources of California's coastal zone remain the responsibility of USCG, as USCG would be the lead agency performing these activities.

Endangered Species Act

The Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. § 1531, et seq.), provides for the conservation of species that are endangered or threatened (for information on endangered and threatened

marine species, (see http://www.nmfs.noaa.gov/pr/species/esa/) throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. The ESA directs all Federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the Act. The National Marine Fisheries Service (NMFS) works with U.S. Fish and Wildlife Service (USFWS) to manage ESA-listed species. Generally, NMFS manages marine species, while USFWS manages land and freshwater species.

A species is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered threatened if it is likely to become an endangered species within the foreseeable future. When listing a species as threatened or endangered, NMFS or USFWS also designate critical habitat for the species to the maximum extent prudent and determinable (16 USC § 1533(a)(3)).

Section 7(a)(2) of the ESA states that each Federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. In fulfilling these requirements, each agency must use the best scientific and commercial data available. The consultation process is further developed in regulations promulgated at 50 CFR §402.

The ESA requires action agencies to consult or confer with the Services when there is discretionary Federal involvement or control over the action. When a Federal agency's action "may affect" a protected species, that agency is required to consult with NMFS or USFWS, depending upon the endangered species, threatened species, or designated critical habitat that may be affected by the action (50 CFR §402.14 (a)). If a Federal agency determines that an action "may affect, but is not likely to adversely affect" endangered species, threatened species, or designated critical habitat it informally consults with NMFS or the USFWS (50 CFR §402.14 (b)). This finding can be made only if ALL of the reasonably expected effects of the proposed action will be beneficial, insignificant, or discountable. An action agency is required to formally consult with the Services if it reaches an adverse effect determination.

Most consultations are conducted informally with the Federal agency or a designated non-Federal representative. When the biological assessment or other information indicates that the action has no likelihood of adverse effect (including evaluation of effects that may be beneficial, insignificant, or discountable), the Services provide a letter of concurrence, which completes informal consultation. To comply with the section 7 regulations, the initiation package is submitted with the request for formal consultation and must include the materials listed in 50 CFR §402.14(c). If a biological assessment is required, formal consultation cannot be initiated until the biological assessment is completed. The contents of biological assessments prepared pursuant to the Act are largely at the discretion of the action agency although the regulations provide recommended contents (50 CFR §402.12(f)). Formal consultations determine whether a proposed agency action(s) is likely to jeopardize the continued existence of a listed species (jeopardy) or destroy or adversely modify critical habitat (adverse modification), and they are documented by a biological opinion (BiOp). They also determine and authorize the amount or extent of anticipated incidental take in an incidental take statement, identify reasonable and prudent alternatives, if any, when an action is likely to result in jeopardy or adverse modification, and identify ways the action agencies can help conserve listed species or critical habitat when they undertake an action.

NOAA's ONMS intends to begin informal consultation under the ESA with NOAA's NMFS Office of Protected Resources (OPR) upon publication of this proposed rule and complete consultation prior to the publication of the final rule or finalization of the NEPA analysis. NOAA's consultation will focus on any potential adverse effects of providing a regulatory exception to its discharge prohibition in CBNMS and GFNMS on threatened and endangered species. NOAA will complete ESA consultation before finalizing its NEPA analysis.

Consultation requirements for the effects of the actual USCG training activities and vessel discharges on threatened and endangered species remain the responsibility of USCG, as USCG would be the lead agency performing the training activities. USCG communicated to NOAA its intent to fulfill the consultation requirements under the ESA, specific to their training activities and vessel discharges, with NMFS Office of Protected Species (OPR).

Magnuson-Stevens Act

In 1976, Congress passed the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, et seq.). The MSA fosters long-term biological and economic sustainability of the nation's marine fisheries out to 200 nautical miles from shore. Key objectives of the MSA are to prevent overfishing, rebuild overfished stocks, increase long-term economic and social benefits, and ensure a safe and sustainable supply of seafood. The MSA promotes domestic commercial and recreational fishing under sound conservation and management principles and provides for the preparation and implementation, in accordance with national standards, of fishery management plans (FMPs).

Essential fish habitat (EFH [50 CFR 600.10]) describes all waters and substrate necessary for fish for spawning, breeding, feeding, or growth to maturity. The consultation requirements of Section 305(b) of the MSA (16 U.S.C. 1855(b)) provide that:

- Federal agencies must consult with the Secretary on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;

- the Secretary shall provide recommendations (which may include measures to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH) to conserve EFH to Federal or state agencies for activities that would adversely affect EFH; and

- the Federal action agency must provide a detailed response in writing to the National Marine Fisheries Service (NMFS) and to any Council commenting under §305(b)(3) of the MSA within 30 days after receiving an EFH Conservation Recommendation.

"Adverse effect" is defined in the regulations (50 CFR 600.910) as: "any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions."

The trigger for EFH consultation is a Federal action agency's determination that an action or proposed action, funded, authorized or undertaken by that agency may adversely affect EFH. If a Federal agency makes such a determination, then EFH consultation is required. If a Federal action agency determines that an action does not meet the may adversely affect EFH test (i.e., the action will not adversely affect EFH), no consultation is required.

The Department of Commerce's guidelines for implementing the EFH coordination and consultation provisions of the MSA are at 50 CFR 600.905 - 930. These guidelines provide definitions and procedures for satisfying the EFH consultation requirements, that include the use of existing environmental review processes, General Concurrences, programmatic consultations or individual EFH consultations (i.e., abbreviated, expanded) when an existing process is not available. The EFH guidelines also address coordination with the Fishery Management Councils (Councils), NOAA Fisheries EFH Conservation

Recommendations to Federal and state agencies, and Council comments and recommendations to Federal and state agencies.

NOAA will initiate consultation with NMFS upon publication of the draft environmental assessment and accompanying proposed rule, and will provide documentation of the process in the final environmental assessment. NOAA's consultation will focus on the effects of providing a regulatory exception to its discharge prohibition in CBNMS and GFNMS on EFH. Consultation requirements for the effects of the specific training activities on EFH remain the responsibility of USCG, as USCG would be the lead agency performing the training activities.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1361 et seq.), as amended, prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. The MMPA defines "take" as: "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal" (16 U.S.C. § 1362).

Harassment means any act of pursuit, torment, or annoyance that has the *potential to injure* a marine mammal or marine mammal stock in the wild (Level A harassment); or that has the *potential to disturb* a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering, but does not have the potential to injure a marine mammal or marine mammal stock in the wild (Level B harassment) (16 U.S.C. § 1362[13])[14]).

Section 101(a)(5)(A-D) of the MMPA provides a mechanism for allowing, upon request, the "incidental," but not intentional, taking, of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing or directed research on marine mammals) within a specified geographic region. The NMFS Office of Protected Resources (OPR) processes applications for incidental takes of small numbers of marine mammals. Authorization for incidental takes may be granted if NMFS finds that the taking would be of small numbers, have no more than a "negligible impact" on those marine mammal species or stocks, and not have an "unmitigable adverse impact" on the availability of the species or stock for "subsistence" uses. NMFS' issuance of an incidental take authorization also requires NMFS to make determinations under NEPA and Section 7 of the ESA[15].

The purpose of issuing incidental take authorizations (ITAs) is to provide an exemption to the take prohibition in the MMPA, and to ensure that the action complies with the MMPA and NMFS's implementing regulations. ITAs may be issued as either: 1) regulations and associated Letters of Authorization (LOAs); or 2) Incidental Harassment Authorizations (IHAs). An IHA can only be valid for 1 year and LOAs can be valid for up to 5 consecutive years. An IHA may be issued when the action has the potential to result in harassment only (Level B Harassment, i.e., injury or disturbance). If the action has the potential to result in serious injury or mortality, or to result in harassment only and is planned for multiple years, then an IHA may not be issued, but an LOA and regulations may be issued if NMFS makes the required findings.

[13] "Harassment" is defined by Level A Harassment, which has the potential to injure a marine mammal or marine mammal stock in the wild; and Level B Harassment which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

[14] Source: http://www.nmfs.noaa.gov/pr/dontfeedorharass.htm.

[15] See http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/mmpa_esa.html.

ONMS intends to request technical assistance from NMFS upon publication of this proposed rule on ONMS's preliminary assessment that this action is not likely to result in take of marine mammals. If NMFS recommends that ONMS seek an Incidental Harassment Authorization or Letter of Authorization, then ONMS will submit an application for any incidental taking of small numbers of marine mammals that ONMS and NMFS conclude could occur as a result of the discharges allowed by this proposed rulemaking. NOAA's request for technical assistance will focus on the effects of providing a regulatory exception to its discharge prohibitions in CBNMS and GFNMS on marine mammals. NOAA will complete any MMPA requirements before finalizing its NEPA analysis.

Satisfying MMPA requirements for the effects of the specific training activities and vessel discharges on marine mammals remain the responsibility of USCG, as USCG would be the federal agency performing these activities. Moreover, USCG communicated to NOAA its intent to fulfill the consultation requirements under the MMPA, specific to their training activities and vessel discharges, with OPR.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 (NHPA) (54 U.S.C. § 300101 et. seq.) requires federal agencies to take into account the effects of their undertakings on historic properties in accordance with regulations issued by the Advisory Council on Historic Preservation (ACHP) at 36 C.F.R. Part 800.

The regulations require that federal agencies consult with states, tribes, and other interested parties (consulting parties) when making their effect determinations. The regulations establish four basic steps in the NHPA 106 process: determine if the undertaking is the type of activity that could affect historic properties, identify historic properties in the area of potential effects, assess potential adverse effects, and resolve adverse effects.

The first step in the process is for the responsible federal agency to determine whether the undertaking is a type of activity that could affect historic properties. Undertakings consist of any project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; those requiring a federal permit, license or approval; and those subject to State or local regulation administered pursuant to a delegation or approval by a federal agency. Historic properties are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register. If so, the agency must identify the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO) to consult with during the process[16]. It should also plan to involve the public, and identify other potential consulting parties. Consulting parties may include Indian tribes and Native Hawaiian organizations, local governments, permit or license applicants, and interested members of the public. If it determines that it has no undertaking, or that its undertaking is a type of activity that has no potential to affect historic properties, the agency has no further Section 106 obligations. If the agency's undertaking could affect historic properties, the agency must identify historic properties in the area of potential effects. If the agency finds that no historic properties are present or affected, it provides documentation to the appropriate SHPO/THPO and, barring any objection in 30 days, proceeds with its undertaking.

If the agency finds that historic properties are present, it proceeds to assess possible adverse effects, in consultation with the SHPO/THPO. If the parties agree that there will be no adverse effect, the agency proceeds with the undertaking and any agreed-upon conditions. If a) they find that there is an adverse

[16] See http://www.achp.gov/shpo.html.

effect, or if the parties cannot agree and ACHP determines within 15 days that there is an adverse effect, the agency begins consultation to seek ways to avoid, minimize, or mitigate the adverse effects.

The agency consults to resolve adverse effects with the SHPO/THPO and others, who may include Indian tribes and Native Hawaiian organizations, local governments, permit or license applicants, and members of the public. ACHP may participate in consultation when there are substantial impacts to important historic properties, when a case presents important questions of policy or interpretation, when there is a potential for procedural problems, or when there are issues of concern to Indian tribes or Native Hawaiian organizations.

Consultation usually results in a Memorandum of Agreement (MOA), which outlines agreed-upon measures that the agency will take to avoid, minimize, or mitigate the adverse effects. In some cases, the consulting parties may agree that no such measures are possible, but that the adverse effects must be accepted in the public interest. The ACHP provides helpful checklists on its website for drafting and reviewing agreements.

If consultation proves unproductive, the agency or the SHPO/THPO, or ACHP itself, may terminate consultation. If a SHPO terminates consultation, the agency and ACHP may conclude an MOA without SHPO involvement. However, if a THPO terminates consultation and the undertaking is on or affecting historic properties on tribal lands, ACHP must provide its comments. The agency head must take into account ACHP's written comments in deciding how to proceed.

NOAA will initiate consultation with the California SHPO upon publication of the draft environmental assessment and accompanying proposed rule, and will provide documentation of the process in the final environmental assessment. NOAA’s consultation will focus on the effects of providing a regulatory exception to its discharge prohibition in CBNMS and GFNMS on historic properties. Consultation requirements for the effects of the specific USCG training activities and vessel discharges on historic properties remain the responsibility of USCG, as USCG would be the lead agency performing these activities.

APPENDIX C: LIST AGENCIES CONSULTED

To be included in final Environmental Assessment.