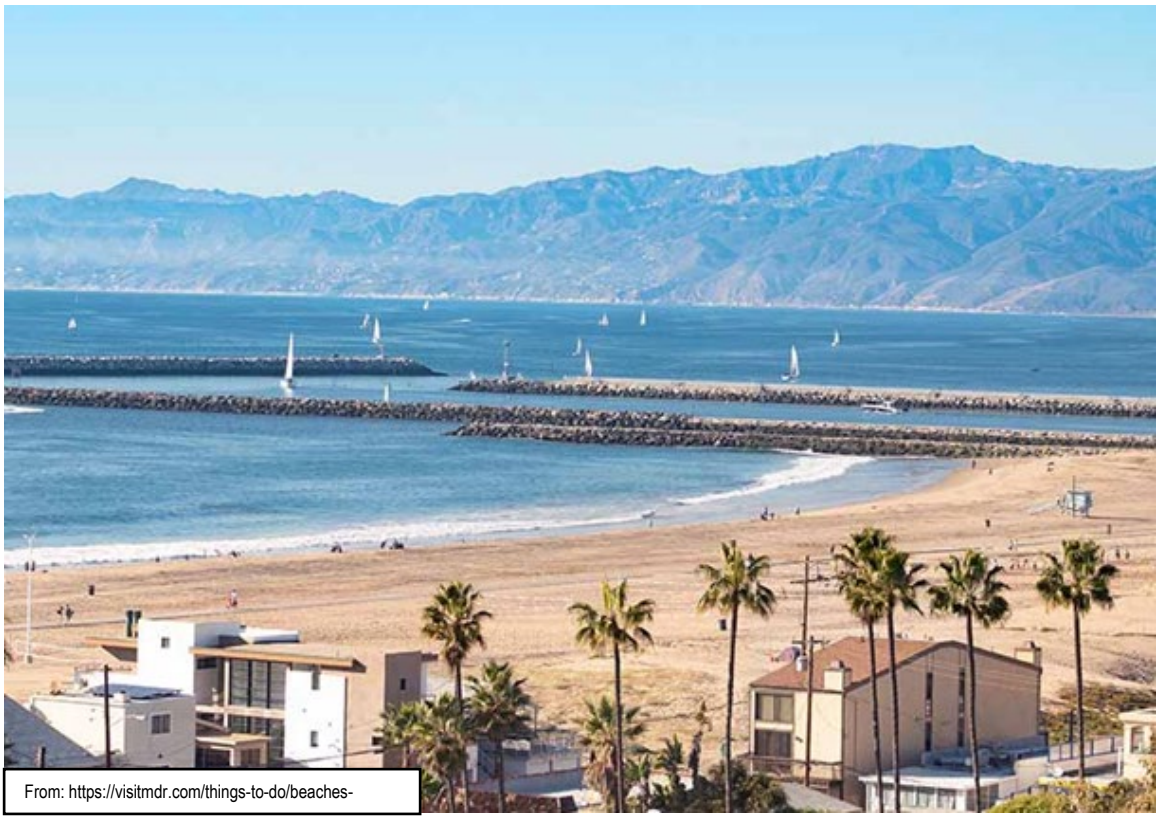
FINAL ENVIRONMENTAL ASSESSMENT

FOR

MARINA DEL REY HARBOR

MAINTENANCE DREDGING

LOS ANGELES COUNTY, CALIFORNIA



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Prepared by

U.S. Army Corps of Engineers

South Pacific Division

Los Angeles District

October 2023

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

MARINA DEL REY HARBOR

MAINTENANCE DREDGING

LOS ANGELES COUNTY, CALIFORNIA

The U.S. Army Corps of Engineers, Los Angeles District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The Environmental Assessment (EA) addresses the proposed operations and maintenance dredging of the Marina del Rey harbor, a federal navigational channel, and placement activities, located in Marina del Rey, Los Angeles County, California.

The EA, incorporated herein by reference, evaluated two alternatives: the No Action and Proposed Action. Under the No Action Alternative, no dredging or placement activities would be conducted. The Proposed Action is the recommended plan.

The Proposed Action is a one-time federal maintenance dredging project of Marina del Rey harbor to occur between October 2023 and May 2024. Project duration is anticipated to last approximately five months, dependent on weather conditions, dredge equipment availability, working performance of the equipment, contractual commitments, and availability of funds. The approximate duration assumes 15 days of mobilization, 130 days of dredging and placement activities, and 15 days of demobilization.

The Proposed Action will remove up to 630,000 cubic yards of sediment from the following sections of the harbor channel: Areas 1 through 6 and the Los Angeles County Department of Beaches and Harbor's North Jetty Shoal. Actual amount may vary depending on amount of shoaling and other factors. Areas 1 and 6 are sand traps and are maintained at a depth of -30 feet Mean Lower Low Water (MLLW). Areas 2 through 5 are maintained at -20 feet MLLW. Design depth of the North Jetty Shoal varies from 0 to -20 feet MLLW. Dredging will be done by mechanical clamshell dredge. Dredged sediment will be loaded onto scows and taken to the nearshore placement site approximately two miles south of the harbor.

The Proposed Action is required to maintain federally authorized channel configurations, restore and assure safe navigability within the Marina del Rey harbor, and replenish nearby beaches.

For both alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the Proposed Action are listed in Table I.

Table I. Summary of Potential Effects of the Proposed Action

Resource	Insignificant Effects	Insignificant Effects as a Result of Mitigation	Unaffected by Action
Geology	**X**		
Oceanography and Water Quality		**X**	
Biological Resources		**X**	
Air Quality		**X**	
Noise		**X**	
Cultural Resources			**X**
Recreation		**X**	
Ground Transportation and Traffic		**X**	
Vessel Traffic and Safety	**X**		
Aesthetics	**X**		
Environmental Justice			**X**

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the Proposed Action. Environmental commitments as detailed in the Final EA will be implemented, as appropriate, to minimize impacts. No compensatory mitigation is required as part of the recommended plan.

A public notice on a preparation of an Environmental Assessment was published on May 31, 2023, for a 30-day public review period ending on June 30, 2023 (Appendix A). No comments were received during the review period.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the USACE determined that the Proposed Action would have no effect on the federally threatened Western snowy plover (*Charadrius nivosus nivosus*) and its designated critical habitat, the endangered Western North Pacific gray whale (*Eschrichtius robustus*), the blue whale (*Balaenoptera musculus*), the fin whale (*Balaenoptera physalus*), the threatened Mexico humpback whale (*Megaptera novaeangliae*), or the endangered Central American humpback whale. The USACE determined that the Proposed Action may affect, but is not likely to adversely affect, the federally endangered California least tern (*Sterna antillarum browni*). The United States Fish and Wildlife Service (USFWS) concurred with the USACE's determination on August 4, 2023. Correspondence related to this consultation is in Appendix I of the Final EA.

In accordance with the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, USACE prepared an Essential Fish Habitat (EFH)

assessment for the Proposed Action. The USACE concluded that the Proposed Action would not result in a substantial, adverse impact to EFH. National Marine Fisheries Service (NMFS) concurred with the USACE's determination by email dated July 10, 2023, and did not offer any EFH conservation recommendations. Correspondence is in Appendix I of the Final EA.

Pursuant to Section 106 of the National Historic Preservation Act of 1966 as amended, USACE determined no historic properties would be affected by the Proposed Action. The State Historic Preservation Office (SHPO) concurred with the USACE's determination on June 23, 2023 (Appendix C).

A water quality certification pursuant to section 401 of the Clean Water Act (CWA) was obtained from the Los Angeles Regional Water Quality Control Board (LARWQCB) for the Proposed Action on September 13, 2023, which can be found in Appendix B of the Final EA. The placement of dredged or fill material associated with the recommended plan has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). The CWA Section 404(b)(1) evaluation can be found in Appendix B of the Final EA.

Pursuant to the Coastal Zone Management Act of 1972, a Negative Determination was submitted on March 20, 2023. Concurrence was received on June 6, 2023 (Appendix G). All conditions of the Negative Determination shall be implemented to minimize adverse impacts to the coastal zone.

All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives and coordination with appropriate agencies and officials has been completed. Based on this Final EA, the reviews by other Federal, State, and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the Proposed Action would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

Questions regarding this Final EA may be submitted to:
CESPL-Marina-del-Rey-Harbor-Dredging@usace.army.mil

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Andrew J. Baker
Colonel, U.S. Army
Commanding

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1. INTRODUCTION

1.1 Proposed Project

1.1.1 Location

Unincorporated Marina del Rey, California, is in Santa Monica Bay, approximately 15 miles southwest of downtown Los Angeles between the cities of Venice and Playa del Rey (**Figure 1**). The Marina del Rey harbor is operated and maintained by the Los Angeles County Department of Beaches and Harbors (LACDBH). Safe navigation of the entrance channels is maintained by the U.S. Army Corps of Engineers, Los Angeles District (USACE). The Marina del Rey harbor entrance complex is composed of four major structures- the north, middle, and south jetties and a detached breakwater (**Figure 2**). The 2,000-foot rubble mound breakwater provides wave protection to the harbor and jetties.

1.1.2 Proposed Action

USACE is responsible for maintaining safe navigation in Marina del Rey harbor. To restore the channel to design depths and maintain safe passage, maintenance dredging is required in the Entrance Channel. For this dredge cycle, dredging is only needed in Areas 1 through 6 and the North Jetty Shoal; Areas 7 through 9 are at or below design depth and do not require dredging at this time (**Figure 3**). The proposed dredging is a federal project.

The design depth is -20 ft mean low lower water (MLLW). Advanced maintenance dredging is authorized for the sand trap areas (Areas 1 and 6) to -30 ft MLLW. The proposed project will remove approximately 630,000 cubic yards (cy; **Table 1**) of sand depending on total available funds and actual contract bids. Areas 2, 3, 4 and 5 are in the primary entrance channel and will have priority. The estimated volume of dredged material is based on a survey conducted in August 2022 and includes a 20% estimate of additional accumulation of sediments.

The preferred project intent is to beneficially reuse Marina del Rey dredge material by returning sediment to the downcoast littoral cell in the nearshore placement area near Dockweiler State Beach (**Figure 2**). Dredged sediment from the proposed project helps mitigate the loss of longshore sand transport interrupted by Marina del Rey and other local harbors. All materials have been determined to be suitable for nearshore placement adjacent to Dockweiler State Beach. Suitability Determinations were made by USACE in consultation with the Southern California Dredged Material Management Team (SC-DMMT). SC-DMMT notes can be made available upon request.

Staging activities will take place within an upland staging area (**Figure 2**). This site will be used for placement of construction materials, parking of support vehicles, and assembly of construction crews. This same site has been used during past USACE dredging cycles at Marina del Rey.

Methodology of the Proposed Action would be similar to previous maintenance dredging events of the federal channel in 2007, 2012, and 2017 (**Table 2**): a clamshell dredge will be used, and placement will occur in the nearshore environment off of Dockweiler State Beach. The Proposed Action also includes dredging of a shoaled area immediately adjacent to the North Jetty to prevent

this material from moving into the adjacent Federal navigation channel. A North Jetty shoal was last dredged during the 1999-2000 dredging event (**Table 2**), as discussed in that EA (USACE 1999).

Dredging will likely be done by clamshell dredge, then loaded onto two scows and taken to the nearshore placement site. This method consists of a derrick mounted on a barge outfitted with a clamshell bucket. Ancillary sea-based equipment includes two tugboats, a crew boat, and a survey boat. Approximately 3,000 to 8,000 cy of sediment can be removed and transported to the placement site per day using a clamshell dredge. Additional construction equipment typically required to support clamshell dredging activities include three support boats (two tugboats to move the barge and/or reposition the dredge, and a crew boat). The clamshell dredge would operate 24 hours a day, 7 days a week.

1.1.3 Timing of Project

Construction is expected to begin in Fall 2023. Duration of dredging will depend on the actual volume dredged and potential delays due to weather or other factors. Dredging would take approximately 130 days using a clamshell dredge. This timing assumes no additional accumulation of sediment due to El Niño storms or other changed conditions. Mobilization and demobilization to the site require an additional estimated 15 days each. Mobilization is currently expected to occur in October 2023, and demobilization is expected to be completed no later than May 31, 2024.

Table 1. Estimated Dredge Volumes for Proposed Project (based on August 2022 Survey)

Dredge Area	Design Depth (ft MLLW)	Design Depth + 2 ft over-depth (ft MLLW)	Volume with no over-depth (cubic yards)	Volume with 2 ft over-depth (cubic yards)	Estimated Volume with 20% Infill
1*	-30	-30	83,906	83,906	100,687
2	-20	-22	10,371	25,631	30,757
3	-20	-22	14,015	28,410	34,092
4	-20	-22	13,602	29,301	35,161
5	-20	-22	44,662	65,936	79,123
6*	-30	-30	267,678	267,678	321,214
North Jetty Shoal	Varies from 0 to -20	Varies from -2 to -22	20,914	23,924	28,709
All Dredge Areas	Varies from 0 to -30	Varies from -2 to -30	455,148	524,786	629,743

* Dredge areas 1 and 6 are sand traps. No over-depth is allowed in sand traps.

Table 2. History of Marina del Rey Harbor Maintenance Dredging

Date	Dredge Method	Placement Site(s)	Volume (cubic yards)
1960-1962	Original Construction	Dockweiler State Beach, Marina Moles, Landfill	12,400,000
1964	Hydraulic Dredge	Dockweiler State Beach	100,000
1969	Hydraulic Dredge	Dockweiler State Beach	390,000
1973	Hydraulic Dredge	Venice Beach	16,000
1981	Hydraulic Dredge	Dockweiler State Beach	217,000
1987	Hydraulic Dredge	Dockweiler State Beach	35,000
1992	Dragging	In situ	21,500
Nov 1994-Jan 1995	Clamshell	Port of Los Angeles Shallow Water Habitat CAD Site	55,000
1996	Hydraulic Dredge	Dockweiler State Beach	240,000
1998	Clamshell	LA-2, Dockweiler Nearshore	126,000
Oct 1999-Mar 2000	Clamshell	Port of Long Beach Middle Harbor, Redondo Beach	672,000
2007	Clamshell	Dockweiler Nearshore	327,000
2012	Clamshell	Port of Long Beach Middle Harbor, Redondo Beach, Redondo Nearshore, Dockweiler Nearshore	778,000
Dec 2016-Mar 2017	Clamshell	Dockweiler Nearshore	388,500

1.2 Environmental Assessment Process

The EA process follows a series of prescribed steps. The first, scoping, has been completed with the purpose of soliciting comments from other federal and state agencies as well as the public. This was accomplished by publishing a Public Notice (PN) for a 30-day public review period from May 31, 2023, to June 30, 2023, during which time written and verbal comments on the Proposed Action and issues to evaluate in the EA were solicited. The next step is preparation of a Final EA (EA) that incorporates and responds to any comments received. The final step is preparing a Finding of No Significant Impact (FONSI); if it is determined that the project will not have a significant impact upon the existing environment or the quality of the human environment. If the EA determines that the environmental impacts of a proposed Federal action will be significant, an EIS would be required. Previous documents related to federal channel maintenance are incorporated herein: 2016 Final EA (USACE 2016), 2006 Final EA (USACE 2006), and 1999 Final EA (USACE 1999).

1.2.1 Scope and Content of the EA

Resources are described in Section 4 (Environment Baseline & Consequences). Impacts are analyzed in Sections 4 and 5 (Growth Inducement and Cumulative Impacts).

The resources evaluated in the EA are:

- Geology
- Oceanography and Water Quality
- Biological Resources
- Air Quality
- Noise
- Cultural Resources
- Recreation
- Ground Transportation and Traffic
- Vessel Traffic and Safety
- Aesthetics
- Environmental Justice

1.2.2 NEPA Scope of Analysis

As part of the NEPA process, the USACE is responsible for establishing the NEPA scope of analysis pursuant to 33 CFR Part 230. The NEPA scope of analysis (also referred to as the Action Area) for the Proposed Action includes the dredge template, the nearshore placement area, the transit corridor between these sites, plus a 300-foot buffer around features to account for indirect effects (**Figure 4**). The NEPA scope of analysis directly encompasses approximately 177.9 acres (40-acre dredge template + 58.8-acre nearshore placement area + 9.9-acre upland staging area + 69.2-acre transit corridor) and indirectly encompasses approximately 127.1 acres (300-foot buffer around features) for a total of 305 acres.

1.3 Relationship to Environmental Protection Statues, Plans and Other Compliance

The USACE is required to comply with all applicable federal laws and regulations. Project compliance is summarized in Section 6.1.

2. HISTORY AND PURPOSE

2.1 Description of Project Area

Marina del Rey harbor, located in the County of Los Angeles, is a small craft harbor constructed in the late 1950s, early 1960s and was formally dedicated in 1965. Today it is one of the largest man-made small boat harbors in the United States with 19 marinas and a capacity for 5,300 boats available for private boaters, recreational and commercial fishing vessels, and U.S. Coast Guard (USCG) vessels. The Marina del Rey harbor is operated and maintained by Los Angeles County. The safe navigation of the entrance channel is maintained by USACE. The Marina del Rey harbor entrance complex is composed of four major structures- the north, middle, and south jetties and a detached breakwater (**Figure 2**). The harbor is surrounded by high-rise condos,

hotels, apartments, restaurants, and shops. The coastal region surrounding the harbor, including the nearshore placement area and transit corridor, is primarily composed of sandy beaches, shallow coastal waters and sandy bottom benthic habitat. The upland staging area would be in an existing paved parking lot.

2.2 Background Information

2.2.1 Project History

The navigation channel to the Marina del Rey harbor routinely becomes shoaled from sediment loads carried down Ballona Creek and through littoral transport predominantly from the north. Like other entrance channels, the sediments in the entrance channel shoals at Marina del Rey are generally sandy and may contain a portion of contaminated material unacceptable for unconfined ocean disposal. The areas proposed for dredging have been determined to be suitable for nearshore placement near Dockweiler State Beach.

The design depth for the Marina del Rey entrance channel is -20 feet MLLW. The design depth of the two sand traps (Areas 1 & 6) is -30 feet MLLW. No over-depth is allowed for dredging in the two sand traps. USACE last performed maintenance dredging at Marina del Rey in 2017. See **Table 2** for a description of past maintenance dredging events.

2.2.2 Authorization

Section 2 of the Rivers and Harbors Act of 1945 (Public Law 79-14) authorizes the USACE to maintain the Federal Navigation Channel at Marina del Rey to authorized depths.

2.2.3 Project Purpose and Need

Need: Federal navigation channels and North Jetty Shoal within Marina del Rey harbor are subject to continual infill of sand from littoral processes. Without frequent dredging, sediment would eventually change the bathymetry to such an extent that vessels would not be able to navigate safely. In addition, the presence of the harbor interrupts the natural transport of sand, resulting in increased erosion of adjacent beaches.

Shoaling within the entrance channel has impacted safe navigation in Marina del Rey harbor. If dredging does not occur, storm events could deposit enough sediment and debris from Ballona Creek and the adjacent beaches to close the harbor, which would result in thousands of recreational and commercial vessels as well as USCG and County lifeguard operations being unable to transit the harbor. The proposed project meets a public need for safe recreational and commercial navigation, and for unobstructed operations of vital USCG operations and County lifeguard rescue, fire suppression, law enforcement, and various emergency response activities.

Purpose: The project would serve the following purposes: (1) maintain the Federal Navigation Channel and the North Jetty Shoal to authorized design depths; (2) assure continued safe navigation for maritime traffic within the harbor by minimizing the risk of hazardous shoaling conditions; and (3) provide beach nourishment material for downcoast beaches.

3. PROJECT ALTERNATIVES

3.1 Evaluation Criteria

Section 2 of the Rivers and Harbors Act of 1945 (Public Law 79-14) authorizes maintenance dredging at Marina del Rey harbor to ensure continued safe navigability within the harbor and to provide suitable materials for replenishment of local beaches. Evaluation criteria have been established to evaluate potential alternatives. The criteria are: 1) timing; 2) technical feasibility and effectiveness; 3) environmental impacts; and 4) cost.

3.2 Alternatives Considered

Because Section 2 of the Rivers and Harbors Act of 1945 (Public Law 79-14) legislation directs dredging operations to occur specifically at Marina del Rey harbor and placement at local beaches, no other alternative dredge sites are considered viable. USACE considered placing dredged sediment directly on the existing beach at Dockweiler State Beach. However, partner agencies in the SC-DMMT expressed concerns over chemistry suitability directly on the beach. USACE subsequently removed beach placement as a placement option and did not carry that alternative forward. Therefore, no other alternative sites are analyzed in detail.

3.2.1 No Action Alternative

The No Action Alternative would consist of no dredging. This would allow the harbor entrance to shoal, which would eventually result in unsafe or impossible navigation conditions. This would also result in a loss to recreation and commercial operations as well as obstructing vital USCG operations, lifeguard rescue, fire suppression, law enforcement, and other emergency response activities. If the harbor is not maintained at safe depths, it could lead to a potential danger of life and property, resulting in an eventual harbor closure. Without nourishment, local beaches would continue to erode and deteriorate. This would eventually impact beach visitation, reducing the value of the recreational experience. The No Action Alternative is carried forward for evaluation and analysis in the EA.

3.2.2 Proposed Action

Dredging would be done by a mechanical clamshell dredge into scows. All materials are expected to be suitable for placement in the nearshore waters adjacent to Dockweiler State Beach. Suitability determinations were made by USACE in consultation with the SC-DMMT. Additional details are provided in Section 1.1.2. Areas 1 through 6 and the North Jetty Shoal are proposed to be dredged during the upcoming dredge cycle (**Figure 3**). Estimated dredge volumes by area are shown in **Table 1**. At this time, areas 7, 8, and 9 have sufficient depth that dredging is not required for safe navigation. All materials would be placed in the nearshore environment for beneficial reuse. Environmental commitments included as part of the Proposed Action are listed in Section 6.2.

4. ENVIRONMENTAL BASELINE & CONSEQUENCES

This section provides an inventory of baseline resources, including physical, natural, and socioeconomic characteristics within the NEPA scope of analysis, which is also referred to as the Action Area throughout this EA (**Figure 4**). The environmental consequences are presented for the Proposed Action as well as the No Action Alternative. If analyses indicate that significant or adverse impacts may occur, then avoidance, minimization or mitigation measures are proposed to ensure that impacts are not significant.

4.1 Geology

4.1.1 Environmental Baseline

The Action Area is located on the southern portion of the Santa Monica Bay, an open embayment adjacent to the Los Angeles Basin. The geology of the southern California coast has been dominated by the evolution of the San Andreas transform zone, which is the boundary between the Pacific and North American plates. The Santa Monica Bay area and Los Angeles Basin, immediately east of the shoreline, are located at the juncture of three primary physiographic provinces of coastal southern California: the Peninsular Ranges, the Transverse Ranges, and the Continental Borderland, which are submerged off the coast. A distinctive feature of the northern border of the Santa Monica Bay is the Pleistocene alluvium cliffs of Malibu, which lead northward to Point Dume; whereas, the southern end of the Santa Monica Bay lies in the Redondo Submarine Canyon, which provides a swift path for sand to drift offshore and into the Santa Monica Basin.

The Action Area is within the South Coast subregion of southwestern California on a broad alluvial coastal plain within the coastal landform division known as Palisades-Redondo Bluff Coast. The coastline lies in the Santa Monica Littoral Cell, which extends from Point Mugu to Palos Verdes Point. This coastline is bounded by Topanga Canyon on the north and Malaga Cove on the south and exhibits a continuous sandy beach over its entire length. The coastline in this northeastern part of the Santa Monica Littoral Cell is predominantly facing west-southwest, with a north-south orientation. As a result, it is generally sheltered from large storm waves, which usually arrive in the Southern California Bight from the northwest; however, this shoreline is still vulnerable to storm energy directly from the west and south. The coastline bathymetry outside Marina del Rey harbor features relatively regular, nearly shore-parallel contours, with a typical slope of 1 vertical:130 horizontal (1V:130H) offshore of the breakwater. This feature extends approximately 5 nautical miles upcoast beyond the Santa Monica Pier and about 3.4 miles downcoast to El Segundo. Inshore of the 10-meter contour, the bathymetry near Marina del Rey harbor has been modified by the development of sand bars, especially on the upcoast side of the harbor.

Marina del Rey harbor is in an area underlain by sediment prone to liquefaction; ground shaking could cause a sudden increase in pore pressure with a resultant reduction in effective strength of the saturated, loose to moderately dense silty sand underlying the marina (USACE, 2002). The nearshore placement area and transit corridor are shallow, coastal waters consisting of material ranging from poorly graded sand to poorly graded sand with silt, to silty sand. The nearshore

placement area depth varies from approximately -1 ft. MLLW to approximately -30 ft. MLLW.

4.1.2 Environmental Consequences

Significance Criteria: An impact to geology will be considered significant if:

- unique geologic features were adversely affected;
- known mineral resources were rendered inaccessible;
- a geologic process such as land sliding or erosion were triggered or accelerated; or
- substantial alteration of topography occurred.

Proposed Action

In this section, direct impacts are defined as adverse changes to geology that would occur within the dredge or placement footprints and caused by those activities. Indirect effects would result from plumes of suspended sediment or changes in geology that extend beyond the Action Area (i.e., the 300-foot buffer within the Action Area).

Direct Effects: Dredging and placement activities would not adversely affect unique geologic features in the Action Area. No known mineral resources would be rendered inaccessible by the Proposed Action. Dredging of the Marina del Rey harbor would have no direct impact on littoral transport. The harbor's bathymetry would be returned to the authorized depth of -20 feet MLLW. A probable immediate physical effect of dredging the area surrounding the south jetty at the harbor entrance channel would be the slumping of materials located in the channel, which would persist until side slopes equilibrate. This slumping process is typical of maintenance dredging projects and would be considered an adverse but insignificant and temporary impact to geologic process such as land sliding or erosion. Slumping would not have a substantial alteration to topography or bathymetry. Placement activities would not substantially alter topography at the nearshore placement site.

Indirect Effects: Indirect effects due to dredging and placement operations such as to unique geologic features, geologic process, or alteration to topography would be less than significant. There are no known mineral resources. A clamshell dredge and scows do not generally create extensive turbidity plumes. The extent of sediment plumes caused by a clamshell dredge and scows depends on site-specific conditions such as grain size, currents, local bathymetry, and tidal phase. In a 2003 literature review conducted by Anchor Environmental, turbidity levels in near-surface plumes typically decrease exponentially with time and distance from the active dredge and placement activities due to settling and dispersion, quickly reaching ambient levels. As the dredged materials are primarily sandy sediments, the sediment plume would be relatively localized to within 300-feet of dredging and placement activities. Indirect effects of the localized sediment plume occur with placement of dredged material in the nearshore environment that indirectly effects natural migration and dispersion of sand under wave action and currents. As dredged

sediment is placed in the nearshore placement site, it becomes part of the existing littoral cell. Coastal processes then gradually transport the sediment in both longshore and cross-shore directions. When the coastal zone reaches equilibrium over the course of several months, dredged material would have spread both north and south of the placement site, as well as across the full range of depth from the nearshore placement area to the shoreline. The time scale of sediment feed to the beach zone is on the order of months to years (Van Duin et al. 2004) as landward migration rates range from 100 to 200 feet per year (Douglass 1995). Any addition of sediment to beaches would be imperceptible (Smith et al. 2017). The sediment plume would not cause changes in geology, would not trigger or accelerate a geologic process, and would not substantially change topography.

Based on the above, the Proposed Action would not result in substantial effects to unique geologic features or mineral resources, nor accelerate or alter topography or other geologic processes. Therefore, impacts to geology would be less than significant.

No Action Alternative

Under the No Action Alternative, the Marina del Rey harbor entrance channel would not be dredged. The No Action Alternative would avoid temporary impacts to geology since there would be no maintenance dredging or placement activities, unless emergency dredging was required to maintain navigability, in which case impacts would be similar to the Proposed Action impacts. No significant impacts to geologic features would occur.

4.2 Oceanography and Water Quality

4.2.1 Environmental Baseline

Physical Processes

The Pacific Coast has two high and two low tides of diurnal inequality. Tidal ranges in Santa Monica Bay (including the Action Area) are typical of the southern California coast. The mean tide range is 3.6 feet with a mean daily range of 5.6 feet and a maximum range of 9.9 feet. Nearshore currents consist of tidal and subtidal currents as well as wave-induced longshore currents in the surf zone. The general surface flow near the Action Area is onshore in late winter and a southward flow in spring and summer; however, seasonal, short-term northward reversals of longshore current can occur during southern swells.

The Action Area is exposed to waves generated by the Northern Hemisphere extra-tropical and tropical storms and Southern Hemisphere winter storms as well as local winds. Waves associated with winds of extra-tropical storms may be a mechanism in generating currents and sedimentation, if strong and persistent. The prevailing wave height at the harbor is about 3 feet with a wave period of 13 seconds. Results of numerical modeling of wave penetration in the Harbor (under prevailing conditions) indicate that the breakwater-jetty complex reduces wave energy by about 90 to 100

percent, and nearshore waves away from the breakwater are amplified by about 20 percent.

Littoral transport contributes about 65 percent of the shoaled sediments in the Marina del Rey harbor entrance channels (of which approximately 89 percent is sand), while watershed discharge from Ballona Creek contributes the remaining 35 percent, predominantly landing in the southern entrance (USACE 2004). Peak flows in Ballona Creek are most frequent in winter since discharge from the watershed is dominated by rainfall runoff in wet months (November to April), and by residential, commercial, and industrial runoff in dry months (May to October). Because the sand input from Ballona Creek depends on activities in the watershed, sediment production from this source varies.

The aquatic conditions of the nearshore placement area are generally dominated by the oceanographic conditions in the Southern California Bight (SCB; Los Angeles County Department of Beaches and Harbors, 2003). For the most part, open coast nearshore sand communities in the SCB are remarkably similar. Detailed studies on the structure of sand bottom communities of southern California have been conducted by Fager (1968), Merril and Hobson (1970), and Davis and Van Blaricom (1978). The mean circulation in the SCB is controlled by the northward-flowing Southern California Counter current, which may be considered as an eddy of the offshore, southward-flowing California Current (Daily, et. al. 1993). This counter current, which is usually well developed during the summer and fall, and weak (or absent) in winter and spring, is characterized by relatively nutrient poor waters during warm water and nutrient rich waters during cold water (Southern California Coastal Water Research Project Authority, 1973). Particles of sediment that are moved via this erosion process are typically suspended in the water column by wave or current action, transported some distance by longshore currents, and then deposited on adjacent beaches. The nearshore placement area is dynamic in nature, with constant and continual longshore and onshore/offshore sediment transport (littoral transport). These processes vary seasonally in intensity depending upon oceanographic and weather conditions occurring both locally and throughout the eastern Pacific Ocean region. Particles of sediment that are moved via this erosional process are typically suspended into the water column by wave or current action, transported some distance by longshore currents, and then deposited on adjacent beaches. The most important natural disturbance to the nearshore bottom communities is from wave action (Moss Landing Marine Laboratories, 2004). The structure of sand bottom communities varies more where the frequency and magnitude of physical disturbance is highest, i.e., in shallow water and at the head of the marine canyon. Near the surf zone, episodic biological interactions also cause major changes in nearshore bottom communities. Although early studies indicated a relatively constant structure in sand bottom epifaunal communities, longer term sampling showed significant variations in the same community, like those observed in other benthic environments.

Water Quality

Marina del Rey harbor is located in southern Santa Monica Bay, adjacent to the greater Los Angeles Basin. Water quality in Marina del Rey harbor is affected by activities both inside and outside of the harbor. A water quality certification pursuant to section 401 of the CWA was obtained from the LARWQCB for the Proposed Action on September 13, 2023 (Appendix B). The harbor receives pollutants through sewage overflows, storm drains, accidental spills, and leaching

antifouling paint compounds from docks and vessels, and from and from the adjacent Santa Monica Bay, Ballona Creek, and Pacific Ocean. Water quality is typically characterized by salinity, pH, temperature, turbidity, and dissolved oxygen (DO). **Table 3** characterizes the general water quality parameters of the Action Area.

During the dry season, the primary source of chemicals affecting the harbor is attributed to boating activities. Chemicals associated with boating activities include lead, zinc, copper, tributyltin (TBT), polycyclic aromatic hydrocarbons (PAHs), and bacteria. During the wet season, the primary source of chemicals affecting the harbor are from watershed runoff during rain events. Impacts on water quality from the watershed are primarily associated with stormwater runoff and sediments containing elevated concentrations of heavy metals, organic compounds, and bacteria.

Discharge from Ballona Creek influences chemical concentrations in the Action Area in two ways. First, sediment accumulation at the mouth of Ballona Creek reduces flushing of the marina during storm flow events, which can lead to an accumulation of chemicals in harbor and marina waters. Second, because a portion of the Ballona Creek discharge can be deflected by the detached breakwater toward the entrance channel, contaminated sediments and stormwater have the potential to be transported into the harbor during flood events. This source of wet weather discharge can be significant.

Table 3. Water Quality Characteristics for the Action Area

pH	Salinity (parts per thousand)	Temperature (Fahrenheit)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
8.0	30-32	57.9-63.9	1.4-6.4	6.6-10.7

Spills in the Action Area have typically been sewage spills. On January 25, 2023, a sewage spill caused by a blocked main line allowed approximately 64,000-gallons of sewage to enter the storm drain system at the corner of Admiralty Way and Palawan Way. This spill closed Mother's Beach in Marina del Rey, Venice Beach, and Dockweiler State Beach (Patch News, 2023). On October 21, 2022, an approximately 1,200-gallon sewage spill produced by a building in the Windsor Hill area closed a beach near Ballona Creek (Fox News, 2022). Approximately 5,000 gallons of raw sewage spilled from a residential street in Palos Verdes Estes, closing the Right After Torrance (RAT) beach on the southern end of Santa Monica Bay. Warnings were also issued for beaches in Santa Monica and Marina Del Rey (KTLA 5 News, 2022).

A review of CWA 303(d) list of impaired bodies found listed pollutants of pathogen (indicator bacteria), total toxics (toxicity), pesticides (DDT; Dieldrin, Chlordane), metals (copper, zinc, lead), toxics organic (PBCs), and nutrients (Dissolved Oxygen) located in the back bay of Marina del Rey harbor (California Water Quality Control Board, 2021) that typically come from upstream via storm water runoff. A review of CWA 303(d) list of impaired bodies found listed pollutants of metals (copper), trash, toxic inorganics (cyanide), metals (zinc, lead), pathogens [viruses (enteric); indicator bacteria), and total toxics (toxicity) in Ballona Creek (California Water Quality Control Board, 2021). Marina del Rey harbor back bay and Ballona Creek are in the vicinity but are not within the Action Area.

Marina del Rey harbor lies at the base of a highly urban watershed. Adjacent Ballona Creek typically contains a high amount of trash and debris, much of which eventually deposits within the Action Area, including the dredge template. To prevent some of this debris from entering the ocean, the Los Angeles County Department of Public Works deployed an automated trash interceptor near the mouth of Ballona Creek in October 2022 to intercept and collect Ballona Creek trash before it enters the ocean. This trash interceptor has been very effective: during one weekend of heavy storms in the area, it caught 11.6 tons of garbage and debris (Los Angeles Times 2023).

Sediment Quality and Suitability Analysis

A Sampling and Analysis Plan (SAP) was developed to determine suitable placement sites for the dredged material in accordance with the Inland Testing Manual guidelines (USACE & USEPA 1998) for beach reuse, the CWA, and the SC-DMMT Sampling and Analysis Plan Results Guidelines for southern California. On December 1, 2021, the Contaminated Sediment Task Force (CSTF) and Heal The Bay were invited to a December 8, 2021, SC-DMMT meeting via email dated December 1, 2021, that included circulation of the SAP. During the December 8, 2021, SC-DMMT meeting, the SAP was discussed and comments were provided. Meeting minutes can be provided upon request.

The SAP was finalized in January 2022. In June 2022, Vibracore sampling was performed to collect subsurface sediment data at 24 locations throughout the six proposed federal dredge areas within the Entrance Channel plus the North Jetty Shoal (3-4 samples per dredge area; USACE 2022). The 24 core subsamples were combined with like subsamples into seven composite samples (one for each dredge area) for chemical and physical testing and archived for possible bioassay testing. A series of surface grabs were also collected in June 2022 along three transects perpendicular to the shore at Dockweiler State Beach and from within a nearshore area of the receiving beach (USACE 2022). Beach transect sampling consisted of collecting surface grab samples at seven elevations (+12, +6, 0, -12, -18, -24 and -30 feet MLLW) along the three perpendicular transects. The project SAP also called for the collection of a sample at the -6-foot MLLW elevation; however, surf conditions on the day of sampling prevented the crew from safely accessing that location. Grab samples were collected at 11 randomly placed locations in the nearshore placement area. Grain size testing was performed on all grab samples. Sediment sampling methods and results (SAP Results (SAPR) are provided in Appendix D).

- ***Chemistry****:* Chemical analyses were performed on the seven composite samples. Bulk sediment chemistry results were evaluated against National Oceanic and Atmospheric Administration (NOAA) toxicity effects-based screening levels (effects range-low [ERL] and effects range-medium [ERM] values; Long et al. 1995) and federal and California human health objectives (USEPA 2021; CalEPA 2010). Most analyte concentrations in the seven composite samples were below detection limits or low compared to screening values. Analytes exceeding ERL values in one or more composite samples were: 4,4' dichlorodiphenyldichloroethane (DDD), 4,4' dichlorodiphenyldichloroethylene (DDE), total dichlorodiphenyltrichloroethane (DDTs), nickel, copper, zinc, and chlordane. Areas 1 and 2 had the most ERL exceedances due to proximity to Ballona Creek. Area 6 had no

exceedances. Arsenic was the only metal to exceed a human health objective, but it was observed at a level consistent with those seen in soils throughout California (Bradford et al. 1996). Arsenic exceeded objectives for residential settings in all samples. Benzo[*a*]pyrene was the only organic compound to exceed a human health objective. Benzo[*a*]pyrene exceeded objectives for residential settings in Areas 1 through 4.

- ***Grain Size:*** Composite grain size averages for all seven areas were well within the bounding grain size curves for the Dockweiler nearshore placement area. Cores from Area 1-3 had the lowest sand content (80-86%) with more silt, while the cores from Areas 4-6 and North Jetty Shoal had higher percent sands (91-98%). The average sand content among all 24 cores from the seven areas was 90%. The USACE Marina del Rey Sediment Physical Compatibility with Dockweiler State Beach Report (Appendix D in the 2022 SAPR Report/Appendices) concluded that sediments sampled from within the federal channel dredge areas and the North Jetty Shoal are geotechnically suitable for placement at the Dockweiler State Beach nearshore area or directly on the beach.

On October 26, 2022, the 2022 SAPR Report and Appendices (including a grain size compatibility report) was presented to the SC-DMMT for comments. During this SC-DMMT meeting, the USEPA requested an additional table comparing past chemistry test results (years 2010, 2011, 2016 and 2022) for poly aromatic hydrocarbons (PAHs), chlorinated pesticides (chlordane) and organics – polychlorinated bi-phenyls (PCBs) and sediment placement sites from Marina del harbor dredging. On December 6, 2022, USACE presented the requested table to USEPA and the larger SC-DMMT during the SC-MMT meeting. SC-DMMT meeting notes can be provided upon request. Overall, PAH, chlordane and PCB concentrations have decreased over time (Appendix D). Nevertheless, due to elevated PAHs, chlordane and PCBs in 2022 samples, the SC-DMMT determined that materials are suitable for nearshore placement off of Dockweiler State Beach only. Beach placement on Dockweiler State Beach was not considered a viable placement alternative due to elevated PAHs, chlordane and PCBs. Therefore, Dockweiler State Beach was removed as an alternative placement site.

4.2.2 Environmental Consequences

Significance Criteria: An impact to oceanography and water quality will be considered significant if it:

- Results in a release of toxic substances that would be deleterious to human, animal, or plant life, or if discharges create a pollution, contamination, or nuisance; or

- Creates a far-ranging and long-term pollution, contamination, or nuisance that extends beyond the project limits or duration.

Proposed Action

In this section, direct impacts are defined as adverse changes to oceanography and water quality that would occur within the dredge or placement footprints and caused by those activities. Indirect effects would result from plumes of suspended sediment or changes in water quality that extend beyond the project area.

Direct Effects: The Federal Navigation Channel and North Jetty Shoal dredging would use a clamshell dredge (a derrick mounted on a barge outfitted with a clamshell bucket) and two scows and with ancillary sea-based vessels (i.e., two tugboats, a crew boat, and a survey boat). Nearshore placement activities would include two scows and ancillary sea-based equipment. A clamshell dredge and scows do not generally create extensive turbidity plumes. The extent of sediment plumes caused by clamshell dredges depends on site-specific conditions such as grain size, currents, local bathymetry, and tidal phase. In a 2003 literature review conducted by Anchor Environmental, turbidity levels in near-surface plumes typically decrease exponentially with time and distance from the active dredge due to settling and dispersion, quickly reaching ambient levels. Impacts due to turbidity and suspension of contaminated materials during dredging would be temporary, with turbidity levels returning to baseline values after the conclusion of operations.

USACE routinely samples and monitors dredge and placement areas and measures standard water quality parameters during maintenance dredging actions. Previous monitoring has not identified any significant or lingering water quality issues associated with dredging or placement activities. This monitoring is required by a State of California CWA section 401 Water Quality Certification that is issued from the LARWQCB (Appendix B). Water quality monitoring would be performed before, during, and after dredging and nearshore placement activities. The USACE would monitor standard water quality parameters in situ, including turbidity, dissolved oxygen (DO), light transmissivity, salinity, pH, and water temperature throughout the project duration. Water quality monitoring would take place during the pre-construction period (at least one week prior to dredging activities); daily for the first week and weekly thereafter throughout construction activities; and during the post-construction period (at least one week after completion of dredging activities). Turbidity levels would be monitored throughout dredging and prescribed actions would be taken (i.e., slowing or pausing dredge cycle times or other measures) should turbidity exceed acceptable levels (if turbidity is 20% greater than control sites; or where natural turbidity is greater than 50 NTU, if turbidity is 10% greater than control sites; or if DO concentrations fall below 5.0 mg/l). As the dredged materials are primarily sandy sediments with placement activities in nearshore, the sediment plume would be relatively localized to the dredged and the nearshore placement areas. In addition, water quality sampling (grab samples) would be performed to include a minimum of two separate days during two different weeks of dredging for total suspended solids (TSS), chlordane, and Total Recoverable Petroleum Hydrocarbons (TRPH) at dredging and nearshore placement sites.

Temporary physical and chemical changes in water quality characteristics may result because of resuspension of bottom sediments during dredging activities or discharges at placement activities. Any contaminants present could become ecologically active upon disturbance by these activities. However, any contaminants suspended in the dredged sediment would be distributed across a very large area and will therefore not result in high concentrations of any chemical in one localized

area. Any existing chemical concentrations are expected to be significantly diluted during dredging and placement activities.

During construction there may be minor inputs of contaminants from construction vessels, i.e., minor leaks and spills. Any such contaminants would be rapidly dispersed and/or cleaned up. Because no toxic materials will be used for dredging and placement operations, a large spill of a toxic substance is extremely unlikely. Impacts to water quality would be adverse but not significant. A Spill Prevention Plan will be prepared to detail how spill events will be contained and cleaned up, should any occur.

The Proposed Action would remove up to 630,000 cubic yards of sediment and would be discharged in a subtidal nearshore placement area off of Dockweiler State Beach. The discharge could temporarily impact approximately 58.8 acres of Waters of the U.S.(WOTUS). The discharge of dredged material in the nearshore placement area would create local and short-term impacts to WOTUS and subtidal area during placement activities. As a result, the dredged material is expected to settle out quickly, minimizing the duration and extent to WOTUS and to the subtidal area.

During the 2012 Marina del Rey harbor maintenance dredging cycle, trash was detected in the vicinity of the Redondo Beach placement site. It is assumed that Ballona Creek was the source of the trash and that it was moved by dredging and placement activities. Considering the recent installation of the Ballona Creek trash interceptor, the amount of trash in the Action Area should be substantially less than that observed in 2012. To ensure that the dredged material is not a source of significant debris to the placement site during the Proposed Action, the USACE has incorporated environmental commitments as part of the Proposed Action (Section 6.2).

Indirect Effects: As the dredged materials are primarily sandy sediments, the sediment plume would be relatively localized to the area near the clamshell dredge and scows used during dredging operations and placement activities. Water quality monitoring performed during dredging and nearshore placement activities would occur 100 feet up current, 100 feet down current, 300 feet up current, and 300 feet down current, which are typical area ranges to monitor water quality parameters, such as turbidity, during dredging operations and placement activities. Outside of these typical area ranges, turbidity levels and DO typically decrease exponentially with time and distance from the active dredge and placement activities due to settling and dispersion, quickly reaching ambient levels. Indirect impacts due to dredging and placement operations such as mortality of organisms, temporary reductions in growth and reproduction, temporary increases in turbidity, clogged gills and breathing apparatuses, suspension of sediments from propeller wash, release of contaminants from equipment, entrainment, and noise would be negligible. Turbidity levels are expected to be temporary and minor since the dredged material is composed primarily of sandy material. Turbidity caused by dredging activities would subside to ambient levels within 1 to 24 hours as suspended sandy sediments quickly resettle (Anchor Environmental 2003).

Based on the above, the Proposed Action would not cause a release of toxic substances that would be deleterious to human, fish, or plant life, and would not create a far-ranging or long-term pollution, contamination, or nuisance that extends beyond the project limits or duration. Therefore, impacts to oceanography and water quality would be less than significant.

No Action Alternative

No adverse effects (turbidity or disturbance of contaminants) would occur under the No Action alternative. However, hazardous conditions caused by shoaling could result in more frequent boating accidents, which would likely involve spillage of oil, gas, and other hazardous substances. As the harbor would likely be shut down to prevent such accidents if significant shoaling and/or emergency dredging occur, and any accidental spills would be quickly contained and remediated, the effects of the No Action Alternative would not be significant.

4.3 Biological Resources

4.3.1 Environmental Baseline

***Marine Habitats*:** The dominant marine habitat in the Action Area includes the marine waters and sandy bottom benthic habitat of the dredge template, transit corridor, and the nearshore placement area. The manmade breakwater and entrance channel jetties are constructed of riprap and support hard-bottom species. Except for these riprap structures, hard-bottom habitat in the harbor is limited to vertical retaining walls, piers, and floats, which lack the crevices and heterogeneous topography to support diverse reef communities.

***Invertebrates*:** Common benthic invertebrates within the Action Area include sponges, worms, crustaceans, tunicates, and mollusks (Rincon 2021). Phytoplankton productivity follows seasonal variations, with low productivity in winter followed by a spring bloom in April (Soule and Oguri 1977). In the nearshore placement area, actively mobile sand and littoral transport results in limited developed benthic community. The nearshore placement area is sandy-bottom benthic habitat typical of the region that experiences active littoral sand transport and seasonal storm movements.

Fisheries: The dredging template and the nearshore placement site are predominantly composed of sandy-bottom nearshore habitat, which supports barred sand bass (*Paralabrax nebulifer*), spotted sand bass (*Paralabrax maculatofasciatus*), sargo (*Anisotremus davidsonii*), diamond turbot (*Hypsopsetta guttulata*), bat ray (*Myliobatis californica*), California halibut (*Paralichthys californicus*), spotted turbot (*Pleuronichthys ritteri*), white croaker (*Genyonemus lineatus*), and yellowfin croaker (*Umbrina roncador*). In addition, round sting ray, tongue fish, california lizard fish, and midshipman species are abundant in the harbor. The most abundant water column fish are the top smelt (*Atherinops affinis*), northern anchovy (*Engraulis mordax*), and queenfish (*Seriphus politus*) (Soule et al. 1996).

The riprap supports many fish species characteristic of southern California rocky habitats such as blacksmith (*Chromis punctipinnis*), opaleye (*Girella nigricans*), pile surfperch (*Rhacochilus vacca*), black surfperch, rock wrasse (*Halichoeres semicinctus*), kelpfish species, garibaldi (*Hypsypops rubicundus*), señorita (*Oxyjulis californica*), kelp bass, barred sand bass, surf perch species, and spotted sand bass.

In addition to federally managed species, there are two notable fish species found within the Action Area: white sea bass (*Cynoscion nobilis*), and California grunion (*Leuresthes tenuis*). Since 1995,

the Marina Del Rey Anglers (Anglers) have operated one of thirteen white sea bass grow out facilities in southern California. Anglers raise the fish in protective enclosures until they reach about 12 inches in length, which significantly increases their likelihood of survival in the wild. Anglers then transfer the sea bass to a tank on a boat and transit to the vicinity of the Venice Pier to release the fish. California grunion are a member of the New World silverside family, along with jacksmelt and topsmelt. During new and full moons, grunion come ashore southern California beaches (including Dockweiler Beach) to spawn from March through August, with a peak in activity from April through June.

Essential Fish Habitat: The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (hereafter, MSA; 16 USC 1801, et seq.) set forth mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate "essential fish habitat" (EFH) for all managed species. The MSA defines EFH as " ... those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The MSA identifies discrete subsets of EFH referred to as Habitat Areas of Particular Concern (HAPC) that are defined as exhibiting one or more of the following traits: rare, stressed by development, provide important ecological functions for federally managed species, or are especially vulnerable to anthropogenic (or human impact) degradation. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH and respond in writing to the NMFS's recommendations. See the Corps' EFH Assessment (Appendix H) for detailed background information regarding fish and EFH.

Birds: Marina del Rey harbor provides a protected habitat for many coastal bird species. The highest abundance of water birds is in the winter when large numbers of waterfowl, gulls, and shorebirds that breed in the north migrate south to spend the winter in a warmer climate. Loons (*Gavia spp*.), grebes (*Podicep spp*.), and ducks swim and feed in the open waters of the marina. The breakwater provides a protected roosting area for the California brown pelican (*Pelecanus occidentalis*), and double-crested (*Phalacrocorax auritus*) and Brandts cormorants (*Phalacrocorax penicillatus*). The breakwater and channel jetties provide foraging for shorebirds such as black oystercatchers *(Haematopus bachmani*), black turnstones (*Arenaria melanocephala*), ruddy turnstones (*Arenaria interpres*), and surfbirds (*Calidris virgata*) that prefer rocky shores (Holt 1990). Gulls utilize most of the habitats in the harbor, including the open water, riprap, docks, and the sandy shore. While limited, the sandy shore in the harbor provides foraging space for shorebirds such as marbled godwits (*Limosa fedoa*), whimbrels (*Numenius phaeopus*), and willets (*Tringa semipalmata*). Terns (*Sterna spp.),* which dive for fish from the air, forage in the protected open water of the marina. Caspian terns (*Hydroprogne caspia*) and Forster's terns (*Sterna forsteri*) are found in the harbor year-round. In summer, the federally endangered California least tern (*Sterna antillarum browni)* nests on nearby Venice Beach and forages in the harbor.

Marine Mammals: The Action Area supports an abundance of marine mammals, which are protected by the Marine Mammal Protection Act (MMPA) of 1972: long-beaked common dolphin (*Delphinus capensis*), short-beaked common dolphin (*Delphinus delphis*), Pacific bottlenose

dolphins (*Tursiops truncatus*), Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), Risso's dolphin (*Grampus griseus*), Northern right whale dolphin (*Lissodelphis borealis*), Dall's porpoise (*Phocoenoides dalli*), California sea lions (*Zalophus californianus*), harbor seal (*Phoca vitulina richardii*), humpback whale (*Megaptera novaeangliae*), blue whale (*Balaenoptera musculus*), gray whale (*Eschrichtius robustus*), fin whale (*Balaenoptera physalus*), minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*), and false killer whale (*Pseudorca crassidens)* have the potential to occur within the Action Area.

Of these marine mammals, dolphins, seals, and sea lions are commonly observed throughout the overall Action Area including the harbor itself and the nearshore waters to the south. Whales are typically observed in nearshore waters such as the placement area, transit corridor and further offshore; however, sightings within southern California harbors happen on occasion. All whale sightings are typically infrequent and transitory in nature.

Threatened and Endangered Species: Federally listed threatened or endangered species that may occur near the Action Area include the California least tern (hereafter, tern), western snowy plover (*Charadrius nivosus nivosus;* hereafter, plover), gray whale, blue whale, fin whale, and humpback whale.

- ***California least tern*** is a black and white colonially nesting seabird. It was listed as federally endangered under the ESA in 1970 (35 FR 8491). The California least tern is listed as a subspecies of least tern and not a DPS (USFWS 2020). The state of California listed the species under the California ESA in 1971.

  Terns are migratory birds that breed in colonies on the coast of California from mid-April through September. They prefer beachfront habitat with sparse or low-lying vegetation and low disturbance from humans and mammalian predators. During their stay in California, terns feed primarily on fish such as northern anchovy (*Engraulis mordax*) and topsmelt (*Atherinops affinis*) in estuaries, embayments, and nearshore waters (Atwood and Minsky 1983). Terns frequently shift foraging areas within and between nesting seasons based on prey availability (Atwood and Minsky 1983; Baird 1997).

  There is a long-standing nesting tern colony on Venice Beach, approximately 500 feet north of the north jetty (**Figure 5**). In 1977, a chain-link fence was erected to protect the Venice Beach tern colony from mammalian predators and human disturbance. Terns typically roost for the night inside this enclosure during nesting season (Atwood 1986). From 2018-2022, an average of 18 tern pairs nested in the Venice Beach colony, resulting in an average of 19 nests annually (CDFW 2023, unpublished data). Predation by avian predators such as American crows (*Corvus brachyrhynchos*) and red foxes (*Vulpes vulpes*) is typically high at this colony and results in total site abandonment some years.

- ***Western snowy plover*** is a small tan and white shorebird. The Pacific Coast DPS was listed as federally threatened under ESA in 1993 (58 FR 12864). Plovers in the Action Area are part of Recovery Unit 6 (USFWS 2007). It is also a California "species of special concern".

This subspecies breeds primarily on coastal beaches from southern Baja California to southern Washington near sand spits, dune-backed beaches, unvegetated beach strands, open areas around estuaries, and beaches at river mouths. The nesting season of this DPS extends from early March through late September (USFWS 2007). Snowy plovers primarily forage on invertebrates in wet sand, among surf cast kelp within the intertidal zone, and in sandy areas above the high tide line.

In winter, plovers may remain at their breeding sites or move to other wintering sites along the Pacific coast. Plovers have been observed on Dockweiler State Beach year-round, but nesting success in Los Angeles County is often low due to disturbance from beachgoers, dogs, lifeguards, beach maintenance, and introduced predators (Ryan et al. 2017, Ryan et al. 2019). In 2010, a protective enclosure for plover roosting was constructed on Dockweiler Beach, approximately ½ mile northeast of the nearshore placement site (Ryan et al. 2017; **Figure 5**).

Outside but adjacent to the scope of analysis, portions of Dockweiler Beach are designated critical habitat for western snowy plover (unit CA-45; USFWS 2012; **Figure 5**).

- ***Gray whale*** is a mottled gray baleen whale species about 45 feet in length. The gray whale was listed as endangered on June 2, 1970 (under the precursor to the ESA- the Endangered Species Conservation Act of 1969). There are two distinct population segments (DPS) of the gray whale that overlap in southern California: the Eastern North Pacific (ENP) DPS and the Western North Pacific (WNP) DPS. The ENP DPS is not listed under the ESA while the WNP DPS is listed as endangered under the ESA.

  In the northern Pacific Ocean, gray whales are found mainly in shallow coastal waters, although they sometimes use deep waters far from shore during migration. Gray whales are the only baleen whales that are primarily bottom feeders, consuming a wide range of benthic and epibenthic invertebrates.

  Gray whales are regularly seen far from shore in Santa Monica Bay. In recent years, they have also been occasionally observed entering the Marina del Rey harbor.

- ***Blue whale*** is a large, slender bluish-gray whale species that can reach nearly 100 feet in length. The blue whale was listed as endangered on June 2, 1970 (under the Endangered Species Conservation Act of 1969).

  This species is found in all oceans except the Arctic Ocean. Along the west coast of North America, blue whales are believed to spend winters off of Mexico and Central America and to spend summers feeding between California and the Gulf of Alaska. The primary diet of blue whales is krill and occasionally fish and copepods.

  Within Santa Monica Bay, blue whales are typically seen in deep waters far from shore and are therefore highly unlikely to occur within the Action Area.

- ***Fin whale*** is a large, black or dark brown-backed baleen whale with a distinctive hooked dorsal fin. This species was listed as endangered on June 2, 1970 (under the Endangered Species Conservation Act of 1969).

  Fin whales broadly inhabit the world's temperate and polar oceans. They are generally more abundant in higher latitudes during warmer months and in lower latitudes (>20°) during colder months. There is a population that appears to live off the coast of California year-round (Falcone et al, 2022). Fin whales typically travel in the open ocean, far from shore. Like other baleen whales, fin whales primarily feed on krill as well as small schooling fish and squid.

  Fin whales are typically found in deep waters far from shore and are therefore highly unlikely to occur within the Action Area.

- ***Humpback whale*** is a dark gray baleen whale approximately 50 feet in length with long pectoral flippers. This species was listed as endangered on June 2, 1970 (under the Endangered Species Conservation Act of 1969). There are currently two federally listed DPSs with potential to occur in the Action Area: Mexico DPS (threatened) and Central America DPS (endangered). The Mexico DPS generally breeds along the west coast of Mexico then transits Baja California to feed between California and Alaska. The Central America DPS generally breeds along the west coast of Central America and feeds along the west coast of the U.S. and southern Canada.

  Humpback whales are found worldwide in all oceans. Most are highly migratory, spending summers in productive temperate and subpolar waters to feed, and winters in tropical and sub-tropical waters to mate and calve. Humpbacks tend to prefer shallow waters close to shorelines during migration and calving; they prefer areas of upwelling and frontal conditions when feeding. Like other baleen whales, humpbacks primarily feed on krill and small schooling fishes.

  As humpback whales can be found in shallow coastal waters, they are unlikely, but may occur within the Action Area.

4.3.2 Environmental Consequences

Significance Criteria: An impact to Biological Resources will be considered significant if an alternative would:

- Degrade habitat for, or reduce, the population size of a federally threatened or endangered species, such that the local population size or capacity is permanently reduced, or its designated critical habitat is permanently adversely modified;
- Substantially or permanently impede the movement or migration of fish; or
- Cause a substantial loss in the population or habitat of any native fish, wildlife, or vegetation (a substantial loss is defined as any change in a population which is detectable over natural variability for a period of 5 years or longer).

Proposed Action

Invertebrates: In this section, direct impacts are defined or described as injury or mortality to invertebrate organisms from direct entrainment or burial that would occur because of dredging or placement of dredge materials at the nearshore placement area. Indirect impacts would potentially be caused by plumes of suspended sediment or other changes in water quality that could occur as a result of dredging or placement of dredge material activities and that may extend beyond the direct dredge prism and nearshore placement area.

Direct effects due to dredging and placement operations could result in temporary disturbance to sandy benthic habitat, direct mortality of organisms due to removal/burial/crushing, and loss of fish foraging habitat and prey. Some invertebrates are expected to be relocated, smothered, or buried, while others may experience clogging to gills and feeding apparatuses, depressed filtration rates, increased mucous secretion, and increased susceptibility to disease. Organisms displaced by dredging and disposal activities would quickly recolonize the impacted areas once construction is complete (Newell et al. 1998; Soule et al 1993). Invertebrate mortality would provide food for opportunistic marine organisms, while some relocated fauna would survive after relocation.

Indirect effects due to dredging and placement operations such as mortality of organisms, temporary reductions in growth and reproduction, temporary increases in turbidity, clogged gills and breathing apparatuses, suspension of sediments from propeller wash, release of contaminants from equipment, entrainment, and noise would be negligible. Turbidity levels are expected to be temporary and minor since the dredged material is composed primarily of sandy material. Turbidity caused by dredging activities would subside to ambient levels within 1 to 24 hours as suspended sandy sediments quickly resettle (Anchor Environmental 2003). To ensure water quality is controlled and confined to the Action Area, per the environmental commitments in Section 6.2 of this EA, the USACE would monitor standard water quality parameters such as turbidity, salinity, pH, temperature, and dissolved oxygen regularly throughout the project duration (see 4.2 Oceanography and Water Quality).

Fisheries and Essential Fish Habitat (EFH): A full assessment of potential impacts to fish and EFH is provided in Appendix H. In this section, direct impacts are defined or described as injury or mortality to fish or EFH from direct entrainment or burial that would occur as a result of dredging or placement of dredge materials at the nearshore placement area. Indirect impacts would potentially be caused by noise, turbidity plumes, or other changes in water quality that could occur as a result of dredging or placement of dredge material activities and that may extend beyond the direct dredge prism and nearshore placement area.

Direct Effects: Noise levels generated by project activities are not expected to rise to levels that would result in hearing loss, physical injury, or mortality of fish. Fishes within the nearshore placement area would not be exposed to high enough sediment concentrations for long enough duration to suffer lethal or sublethal effects (Soule et al. 1993). Many EFH species forage on bottom-dwelling organisms, such as polychaete worms, crustacean, and other EFH prey types. Dredging is expected to adversely affect these prey species in the Action Area by directly removing, burying, or crushing these organisms (Newell et al. 1998).

Indirect Effects: Some fish may avoid the immediate project area during dredging and placement operations because of the increased turbidity, noise levels, and potential oxygen depletion caused by dredging operations. Other fish species may be attracted to the Action Area to feed on mollusks, crustaceans, and other organisms which may have been caught up in, or exposed by, the dredged material. The Action Area is a small percentage of available open water and sandy bottom benthic habitat; therefore, fish movement and migration would not be permanently impeded due to dredging and placement activities. While turbidity at the placement site could be more extensive than that at the dredge site, the surf zone has naturally high turbidity due to wave action.

The Action Area is approximately 1.5 miles from seabass enclosures, so impacts to seabass in the enclosures are not expected. The USACE has notified the Anglers of the Proposed Action. The Proposed Action is expected to overlap with grunion spawning season. Dredged material placement has the potential to temporarily increase turbidity in the nearshore environment and therefore, grunion's ability to approach and spawn on local beaches. In the long-term, nearshore placement may enhance suitable grunion spawning habitat by nourishing local eroded beaches with clean, sandy material.

With implementation of fish and EFH-related environmental commitments included as part of the Proposed Action (Section 6.2; BR 1-5), direct and indirect effects to fish and EFH would be insignificant.

Birds: In this section, direct impacts (if they occurred) would be defined or described as injury or mortality to birds from direct collisions that would occur as a result of dredging or placement of dredge materials at the nearshore placement area. Indirect impacts would potentially be caused by changes in nesting or foraging habitat or other environmental conditions that could occur as a result of dredging or placement of dredge materials and that may extend beyond the direct dredge prism and nearshore placement area.

Direct Effects: Direct collisions with birds are not expected to occur as a result of the Proposed Action. Many birds roost on the breakwaters and other structures in the Action Area. However, due to the distance of the dredge from these structures and the slow-moving nature of Proposed Action vessels, birds are not anticipated to experience injury or mortality due to the Proposed Action.

Indirect Effects: The Proposed Action may temporarily degrade water quality in a localized area. Turbidity can impact visually foraging piscivorous seabirds by making it difficult for them to see their prey. Thus, it is likely that visual feeders will avoid foraging in the immediate vicinity of the dredge and placement activities. Forage fish would also likely avoid direct disturbance areas, so these species would be available for capture as prey elsewhere. Disturbance of feeding or roosting birds may cause a temporary dispersal away from the dredging area. Birds would be expected to return quickly after excavation and placement activities cease. A reduction in overall prey availability would be experienced in the dredge and placement areas until recolonization and recovery of the community has occurred. The immediate active dredge area and nearshore placement area is a small footprint and relatively small fraction of the available foraging area within the surrounding marine waters.

Dredging and placement activities may temporarily increase ambient noise levels, which could cause indirect disturbances to some bird species. Increased levels of anthropogenic activity within the harbor may decrease avian use of the breakwaters and other nearby structures for roosting. However, due to the distance of the dredge to these structures, the slow-moving nature of the dredge, and the high volume of ambient vessel traffic within the harbor, birds are not anticipated to be substantially disturbed by the Proposed Action. Birds are expected to rapidly acclimate to noise produced by the Proposed Action (Climo 1987).

For evaluation of impacts to the California least tern and western snowy plover, see below section on Threatened and Endangered Species.

Marine Mammals: In this section, direct effects (if they occurred) would be defined as injury or mortality to mammals from collisions with the dredge, scow, or other vessels. Indirect impacts would potentially be caused by changes in resting, breeding or foraging habitat or other environmental conditions that could occur as a result of dredging or material placement activities that may extend beyond the direct dredge prism and nearshore placement area.

Direct Effects: Direct collisions with marine mammals are not expected to occur as a result of the Proposed Action. Sea lions, harbor seals, and dolphins have the greatest potential to occur in the Action Area. However, due to the distance of the dredge from structures they use (e.g., docks as haul-out sites), marine mammal mobility, and the slow-moving nature of the Proposed Action vessels, marine mammals are expected to avoid vessels and are not anticipated to experience injury or mortality due to the Proposed Action.

Indirect Effects: Pinnipeds such as sea lions and harbor seals have the greatest potential to occur in the Action Area. These species are not expected to be affected by the Proposed Action given the amount of adjacent foraging areas, and the existing environmental baseline of almost constant human presence and recreational and commercial activity that occurs in the area. For example, Hawaiian monk seals (*Monachus schauinslandi*) observed transiting during similar dredging methods did not appear startled or adversely affected, with no observable change in swim speed or direction (Gilmartin 2003). Marine mammals react to dredging and associated support vessels as they do to any other vessels they encounter. Vessels used for the Proposed Action typically travel at approximately 1-2 knots within the harbor and at or below approximately 6-8 knots outside the harbor, both below the maximum speed recommended by the NMFS (10 knots) for minimizing impacts to marine mammals. This relatively slow speed allows marine mammals to avoid construction-related vessel traffic. While marine mammals may occur in the nearshore placement area, no marine mammal breeding area or haul-out sites are present, and their presence is expected to be transitory in nature.

It is unlikely that dredging-related sounds would physiologically damage marine mammal auditory systems (Todd et al. 2015). Anticipated effects are most likely to be short-term relocations and changes to prey availability. Marine mammals in the area are highly mobile and are expected to avoid the immediate project area; thus, they would likely compensate for small-scale changes in prey abundance by switching prey species, moving to alternative foraging grounds, or increasing foraging time (Todd et al. 2015). The proposed activities pose no substantial risk to marine mammals.

Proposed dredging and placement operations are not expected to affect marine mammals due to the unlikely occurrence of them within the Action Area. However, if a whale is observed within the harbor, dredging operations will immediately cease. USACE will coordinate with the NMFS prior to commencing dredging operations if the whale remains in the area (Section 6.2; BR 6). If the whale leaves the work area, then dredging would again commence. Proposed Action activities, therefore, are not expected to result in a take, as defined in the MMPA.

Threatened and Endangered Species: In this section, direct impacts (if they occurred) would be defined or described as injury or mortality to federally listed threatened or endangered species from direct collisions or burial that would occur as a result of dredging or placement of dredge materials at the nearshore placement area. Indirect impacts would potentially be caused by changes in nesting, spawning or foraging habitat or other environmental conditions that could occur as a result of dredging or placement of dredge material activities that may extend beyond the direct dredge prism and nearshore placement area.

- ***California least tern*** typically migrate to southern California in April each year to rear young. The Proposed Action is anticipated to occur between October 2023 and May 2024, so Proposed Action activities may occur when terns are in the area. A full assessment of potential impacts to terns is provided in Appendix H and I.

  Direct Effects: Direct collisions with terns are not expected to occur as a result of the Proposed Action. Terns may roost and forage within the Action Area. However, due to the distance of the dredge from roosting sites and the slow-moving nature of all Proposed Action vessels, terns are not anticipated to experience injury or mortality due to the Proposed Action.

  Indirect Effects: Proposed Action activities may affect terns' forage base as small fish are expected to avoid the immediate work area due to the turbidity plume and noise. Fish may dive deep or scatter and become unavailable to foraging least terns, which depend on concentrated forage fish. Foraging behavior of the Venice Beach least tern colony was closely studied for several years in the late 1970s and early 1980s. Approximately 75% of observed tern foraging activity occurred in nearshore waters within two miles of the colony; only 5% of observed foraging activity occurred in the harbor channels (Atwood and Minsky 1983). If terns avoid the Action Area during Proposed Action activities, they would lose about 3% of their preferred foraging areas. In addition, because terns frequently shift foraging areas based on prey availability (Atwood and Minsky 1983; Baird 1997), they would likely shift foraging efforts to adjacent undisturbed areas during active dredging. Thus, the effect on tern foraging would be minor and temporary.

  When considering all equipment associated with clamshell dredging, noise levels typically reach 80 dBA within a 35-foot radius and reach 65 dBA within 200 feet (Epsilon 2006). Therefore, any Proposed Action-induced noise impacts to the tern colony would attenuate to the harbor's existing noisy ambient conditions within 200 feet of Proposed Action activities.

  Dredging operations are expected to occur 24 hours a day, 7 days a week. To provide a safe work environment during night-time dredging, the clamshell dredge contains built-in lights to illuminate the immediate work area in an approximately 100-foot radius. Per the tern-related

environmental commitments in Section 6.2 (BR 7-22), Proposed Action-induced light spill is not expected to substantially affect tern nesting or foraging habitat.

The USACE has determined that the Proposed Action May Affect but is Not Likely to Adversely Affect California least tern with implementation of minimization and avoidance measures. Informal consultation pursuant to section 7 of the ESA of 1973, as amended, was initiated with USFWS on May 26, 2023 (Appendix H) and was completed with receipt of USFWS concurrence on August 4, 2023 (Appendix I).

- ***Western snowy plover***: Dredging within the harbor and placement of material in the nearshore placement area would occur outside areas occupied by western snowy plover. All sediment would be placed in nearshore waters between the -15 and -28 ft MLLW depth contours approximately 1,000 feet offshore (**Figure 2**) and would not directly affect any dry beach areas.

  Direct Effects: Direct collisions or encounters with plovers are not expected as a result of the Proposed Action because plovers are not known to occur within the Action Area.

  Indirect Effects: Placement of dredged material in the nearshore environment allows natural migration and dispersion of sand under wave action and currents. As dredged sediment is placed in the nearshore placement site, it becomes part of the existing littoral cell. Coastal processes then gradually transport the sediment in both longshore and cross-shore directions. When the coastal zone reaches equilibrium over the course of several months, dredged material would have spread both north and south of the placement site, as well as across the full range of depth from the nearshore placement area to the shoreline. The time scale of sediment feed to the beach zone is on the order of months to years (Van Duin et al. 2004) as landward migration rates range from 100 to 200 feet per year (Douglass 1995). Any addition of sediment to beaches would be imperceptible (Smith et al. 2017). The dredged sediment would not bury or remove existing sandy beach, wrack, or other habitat features that plover may use. In addition, any turbidity due to the Proposed Action would be localized and temporary and thus would not affect invertebrate populations. Therefore, nearshore placement would not affect existing plover habitat or their invertebrate prey base.

  Similarly, any contaminants suspended in the dredged sediment would not migrate onto Dockweiler State Beach (or other local beaches) in high concentrations. Over time, some dredged sediment will migrate to Dockweiler State Beach, but it will be distributed across a very large area and will therefore not result in high concentrations of any chemical in one localized area. Any existing chemical concentrations are expected to be significantly diluted during the natural littoral movement of sediment placed in the nearshore environment. All dredge materials have been determined to be suitable for nearshore placement in consultation with the SC-DMMT based on both toxicity effects-based screening levels and human health objectives.

  Therefore, USACE has determined that the Proposed Action will have No Effect on the western snowy plover species or its designated critical habitat.

- ***ESA-listed Whales: Gray Whale, Blue Whale, Fin Whale, Humpback Whale***

  Direct Effects: The Action Area is very close to shore and does not overlap with or intersect any known whale migration routes, so the likelihood of encountering a whale during the Proposed Action is very small. As gray whales have entered Marina del Rey harbor previously, this species has the highest possibility of encounter. Vessels associated with the Proposed Action would be slow-moving: tugs towing barges are limited to 6 knots when loaded and 8 knots when empty, less than the NMFS' recommended speed limit of 10 knots. This relatively slow speed allows vessel operators and whales to avoid collisions. No direct effects to whales are anticipated. However, implementation of environmental commitments as part of the Proposed Action (Section 6.2; BR-6) would further ensure no direct effects to whales would result.

  Indirect Effects: Indirect effects would not occur during the Proposed Action as the Action Area does not overlap with any known whale foraging/resting/migrating areas.

  The USACE has concluded that the Proposed Action would have No Effect on the endangered WNP gray whale DPS, the blue whale, the fin whale, the threatened Mexico humpback DPS, or the endangered Central American humpback DPS. Implementation of environmental commitments as part of the Proposed Action would further ensure there would be no effect to whales (Section 6.2; BR-6).

The Proposed Action would not degrade habitat for, or reduce, the population size of a federally threatened or endangered species, such that the local population size or capacity is permanently reduced, or its designated critical habitat is permanently adversely modified; not substantially or permanently impede the movement or migration of fish; or cause a substantial loss in the population or habitat of any native fish, wildlife, or vegetation. Therefore, impacts are considered to be less than significant. No mitigation is required.

No Action Alternative

Under the No Action Alternative, there would be no temporary, adverse impact to biological resources at either the dredge or placement sites. The beneficial impacts to beach habitat from nearshore placement would also not occur. The No Action alternative would not result in significant impacts to biological resources.

4.4 Air Quality

4.4.1 Environmental Baseline

The climate of the South Coast Air Basin (SCAB) is classified as Mediterranean, characterized by cool, dry summers and mild, wet winters. The mean daily air temperature is 63 degrees Fahrenheit (°F) and ranges from a minimum of 34° F to a maximum of 103° F. The average relative humidity is 62 percent, and the annual rainfall is 10.66 inches. The major influence on the regional climate is the Eastern Pacific High, a strong persistent counterclockwise circulation, with the moderating effects of the cool Pacific Ocean.

Located along the Pacific Ocean, the Action Area experiences an inversion layer, and pollutants are forced to accumulate within the lower layer. Because of the low average wind speeds in the summer and a persistent daytime temperature inversion, emission of hydrocarbons and oxides of nitrogen have an opportunity to combine with sunlight to produce smog. Prevailing winds blow from the southwest at an average speed of 3.4 miles per hour.

Air quality (AQ) in the Action Area is generally good, although standards for O^3 are exceeded (most often in summer months). The major source of air pollution in the project area is the automobile, followed by recreational facilities and powerboats. Harbor boating activity and outlying traffic-congested roadways and intersections have the potential to generate localized high levels of CO_2.

The Action Area is within the portion of the SCAB under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The Proposed Action would occur within the SCAB that includes Los Angeles, Orange, and portions of Riverside and San Bernardino Counties.

National Ambient Air Quality Standards

The Clean Air Act (CAA) identified and established the National Ambient Air Quality Standards (NAAQS) for a number of air criteria pollutants in order to protect public health and welfare. The air criteria pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), suspended particulate matter (PM), and lead (Pb). PM emissions are regulated in two size classes: Particulates up to 10 microns in diameter (PM10) and particulates up to 2.5 microns in diameter (PM2.5).

A region is given the status of "attainment" or "unclassified" if the NAAQS have not been exceeded. A status of "nonattainment" for particular criteria pollutants is assigned if the NAAQS have been exceeded. Once designated as nonattainment, attainment status may be achieved after three years of data showing non-exceedance of the standard. When an area is reclassified from nonattainment to attainment, it is designated as a "maintenance area," indicating the requirement to establish and enforce a plan to maintain attainment of the standard. Federal attainment status designations for the SCAB are summarized in **Table 4**.

Table 4. Federal Attainment Status for South Coast Air Basin (SCAB) and General Conformity Applicability Rates

Pollutant	NAAQS SCAB Attainment Designation	General Conformity Applicability Rates (tons/year) [1]
Ozone (O3) (VOC [2] or NOx precursor)	Extreme Non-Attainment	10
CO	Maintenance	100
NO2	Maintenance	100
PM10	Maintenance	100
PM2.5	Serious Non-Attainment	70
Pb (lead) [3]	Non-Attainment	25

[1] Source: USEPA, 2022;
[2] VOC = Volatile Organic Compound;
[3] Pb (lead) was not analyzed.

4.4.2 Environmental Consequences

Significance Criteria: Impacts would be considered significant if the alternative:

- Resulted in emissions that equal or exceed General Conformity Applicability Rates.

General Conformity Applicability Rates as NEPA Significance Threshold

General Conformity Rule applies because the SCAB is in non-attainment or maintenance for certain air criteria pollutants.

Greenhouse Gases (GHG)

Currently, there are no Federal standards for GHG emissions, and no Federal regulations have been set at this time. On January 9, 2023, the CEQ released National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. This guidance provides recommendations to federal agencies for incorporation of GHG and climate change considerations into the NEPA process. Extent of GHG consideration efforts is to be guided by the rule of reason. That is, level of analysis should be proportional to GHG emission levels. Based on the limited emission and temporary nature of GHG emissions associated with the proposed alternatives, GHG consideration for this analysis is limited to the quantification of GHG emission and disclosure of associated social costs of GHGs.

Proposed Action

Air quality impacts related to dredging and placement activities are considered direct effects associated with emissions generated from temporary operation of the dredge, placement activities, and other associated equipment. No indirect or permanent effects would occur.

The Proposed Action would use a clamshell dredge (a derrick mounted on a barge outfitted with a clamshell bucket) and two scows and with ancillary sea-based vessels (i.e., two tugboats, a crew boat, and a survey boat). Nearshore placement activities would include two scows and ancillary sea-based equipment. The clamshell dredge would operate 24 hours a day, 7 days a week. Scows and ancillary sea vessel equipment typically operate 6 hours a day. All sea-based vessels are assumed to be diesel fueled engines. Approximately 18 people would be working on the project crew. Land-based vehicle transportation includes worker/crew vehicles (commuter vehicles; vendor supply trucks, large trash trucks), which would typically operate 2 hours per day. Crew commuter vehicles typically travel approximately 8 miles per day, vendor vehicles typical travel 6 miles per day, and trip hauling is approximately 20 miles. All land-based construction equipment is assumed to be diesel engine or gasoline engine.

Placement is in a nearshore placement area where material would be transported using sea-based scows, a clamshell dredge/derrick barge and tugboats. There is no beach placement; therefore, there is no land-based construction equipment required on the beach or for nearshore placement. Nearshore placement would not require any additional equipment and therefore would not result in additional air emissions. Sea-based dredging equipment vessel/engine information, [i.e., engine rated power [horsepower (hp)]; engine load factor; emissions rates [pounds/hour (lb/hr)] was accessed from Sacramento Metropolitan Air Quality Management District (SMAQMD) Harbor craft, Dredge and Barge Emission Factor Calculator (2017; 2023).

Approximately 90 days during 2023 and approximately 150 days during 2024 are anticipated for construction estimated emissions. Estimated annual air emissions for the sea-based dredging and nearshore placement activities, and for land-based crew vehicles was calculated using EXCEL spreadsheet air quality emission calculations developed by USACE (**Table 5**; Appendix E).

Estimates of lead (Pb) emissions were not calculated. Lead emissions from mobile sources in California have significantly decreased due to the near elimination of lead in fuels. Little to no quantifiable and foreseeable lead emissions would be generated by the Proposed Action. Ozone (O3) formation is driven by two major classes of directly emitted precursors: nitrogen oxides (NOx) and volatile organic compounds (VOC). The relation between O3, NOx and VOC is driven by complex nonlinear photochemistry. Furthermore, the chemical reaction leading to the formation of O3 is reversible. Typically, emission associated with ozone precursors (VOCs and NOx) are calculated and used as a surrogate for reporting O3 emissions per the General Conformity Applicability Rates. Since the consumption of VOC in O3 formation reaction is variable and reversible, actual O3 levels are lower than estimated.

California Emissions Estimator Model (CalEEMod) 2022 calculated emissions with the exception of Pb. Emissions for all air criteria pollutants were calculated for a clamshell dredging equipment and supporting sea vessel equipment including land-based crew laborer vehicles (e.g., commuter,

vendor, large truck hauling). The Action Area of approximately 305 acres was used. CalEEMod 2022 calculated Proposed Action annual emissions (Appendix E) for 2023 and 2024 (**Table 6**).

Table 5. Annual Air Emission Estimates

Pollutant	Federal General Conformity [1] (Tons/Year)	2023 Estimated Emissions (Tons/Year)	2024 Estimated Emissions (Tons/Year)
VOC [3]	10	0.264	0.439
CO	100	1.141	1.902
NOx	10	2.226	3.702
NO2	100	5.469	9.114
PM10	100	0.171	0.285
PM2.5	70	0.153	0.254
Pb [2]	25	Not Calculated	Not Calculated

Source: Sacramento Metropolitan Air Quality Management District (SMAQMD);
[1] U.S Environmental Protection Agency (USEPA), 2022;
[2] Pb (lead) emission not calculated;
[3] VOC (Volatile Organic Compounds). Reactive Organic Gases (ROG) emission factors in Appendix E used for VOC due to similarity with VOC.

Table 6. CalEEMod Annual Emissions Estimates

Pollutant	Federal General Conformity [1] (Tons/Year)	2023 Estimated Emissions (Tons/Year)	2024 Estimated Emissions (Tons/Year)
VOC	10	0.06	0.09
NOx	10	0.54	0.81
NO2	100	0.62	0.93
CO	100	0.61	0.94
PM10	100	0.03	0.04
PM2.5	75	0.02	0.03
Pb [2]	25	Not Calculated	Not Calculated

Source: California Emissions Estimator Model (CalEEMod) 2022 version;
[1] U.S. Environmental Protection Agency (USEPA), 2022;
[2] Pb (lead) emission not calculated.

The Proposed Action would not result in emissions that equal or exceed General Conformity Applicability Rates. Air quality would return to pre-project condition upon completion of the Proposed Action. Impacts would be less than significant.

Table 7 and Appendix E summarize GHG estimated annual emissions for years 2023 and 2024. **Table 8** and Appendix E summarize CalEEMod GHG estimated annual emissions for 2023 and 2024.

Table 7. Proposed Action Greenhouse Gas (GHG) Emissions

Year	Annual Estimated GHG Emissions (Metric Tons /Year) [1]	Estimated Social Costs [2]
2023	905.297	$15,391
2024	543.178	$9,235

Source: [1] Sacramento Metropolitan Air Quality Management District (SMAQMD) Harbor craft, Dredge and Barge Emission Factor Calculator (2017; 2023)
[2] 2020 dollars per metric ton of CO2; estimate based on 2025 emission year 5% discount rate of $17 per metric ton (IWG, 2021)

Table 8. CalEEMod Proposed Action Annual Estimated GHG Emissions

Year	Annual Estimated GHG Emissions (Metric Tons/Year) [1]	Estimated Social Costs [2]
2023	100.00	$1,700
2024	157.00	$2,669

Source: [1] California Emissions Estimator Model (CalEEMod) 2022 version
[2] 2020 dollars per metric ton of CO2; estimate based on 2025 emission year 5% discount rate of $17 per metric ton (IWG, 2021)

No Action Alternative

The No Action Alternative would avoid temporary impacts to air quality since there would be no maintenance dredging or placement activities, unless emergency dredging was required to maintain navigability, in which case impacts would be similar to the Proposed Impacts. No significant impacts to air quality would occur.

4.5 Noise

4.5.1 Environmental Baseline

Noise is generally defined as unwanted sound. The effects of noise on people range from annoyance to inconvenience to temporary or permanent hearing loss. Level of annoyance or impact produced by a sound depends on its loudness, duration, distance from source, time of day, and land use. Noise disrupts normal activities and diminishes the quality of the environment. There are two types of noise sources: stationary, which are typically related to specific land uses, and transient, which move through the environment. A locale's total acoustical environment is the blend of the background (or ambient) acoustics with unwanted noise. Human response to noise is diverse and varies with the type of noise, the time of day, and the sensitivity of the receptor.

Table 9. Range of Noises

Noise level (dBA)	Examples	Human Response
0	recording studio	hearing threshold
20	rustling leaves	
40	conversational speech	quiet
60	freeway at 50 feet	
70	freight train at 100 feet	moderately loud
90	heavy truck at 50 feet	
110	ambulance siren at 100 feet	very loud
120	jet engine at 200 feet	threshold of pain

Source: USEPA, 1971, 1972, 1974.

The decibel (dB) is the accepted standard unit for measuring the level of noise, which equally weights all frequencies. This is generally adjusted to the A scale (dBA), which primarily weighs frequencies within the human range of hearing, to assess the impact of noise on human hearing (**Table 9**; USEPA, 1971, 1972, 1974). Decibel levels decrease with distance from the source, usually by a rate of 6 dB for every doubling of distance. Slight changes in loudness are difficult to detect. A 3-dBA change is considered a just-perceivable difference. A change of at least 5-dBA is required before any noticeable change in community response would be expected. A 10-dBA change is subjectively heard as approximately a doubling in loudness. Exterior noise becomes increasingly noticeable at night and most people are very sensitive to nighttime noise intrusion.

The noise environmental setting for the Action Area is a very active urban environment with both natural and human-induced noise sources including ocean waves, large number of sea birds and sea lions, watercraft engine noise, radios, navigation horns, land-based vehicles, helicopters, and consistent air traffic coming in and out of Los Angeles International Airport (LAX). Recreational boats and vehicles, small commercial fishing boats, and automobiles are major contributors to the ambient noise environment in the Action Area. Noise levels tend to increase during summer months due to increased recreational utilization (USACE 1986). Noise levels in the Action Area are relatively high for a coastal area (compared to beaches that are not adjacent to busy marinas or

airports). During daylight hours, particularly on the weekend, dredge noise would be indistinguishable from background noise levels. Overall, the combined noise level approaches that of a light industrial area (typically 70 to 90 dBA).

For a relatively long-term noise exposure resulting from construction activities, a Community Noise Equivalent Level (CNEL) up to 65 dBA is generally acceptable for noise sensitive land uses, including residences, schools, hospitals, and churches. A CNEL up to 75 dBA is often considered acceptable for office building and other commercial activities.

The closest sensitive noise receptors to the proposed dredging areas are approximately 500-feet away and include harbor-adjacent residential communities, hotels, restaurants, and recreational facilities. The closest sensitive noise receptors to the nearshore placement area are approximately 500 feet away and include areas adjacent to Dockweiler State Beach.

Marina Del Rey noise control is regulated through the Los Angeles County Municipal Code, Title 12, Chapter 12.08 (County of Los Angeles, 1978), which prohibits operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real-property line (except emergency work of public service utilities or by variance issued by the health officer). Contractors must conduct construction activities to comply with noise limits (**Table 10)**.

Table 10. Marina del Rey Noise Limits

Day and Time	Single-Family Residential	Multi-Family Residential	Semi-Residential, Commercial
Monday through Saturday, 7:00 AM to 7:00 PM	75 dBA	80 dBA	85 dBA
Daily, 7:00 PM to 7:00 AM and all-day Sunday and legal holidays	60 dBA	64 dBA	70 dBA

4.5.2 Environmental Consequences

Significance Criteria: Impacts would be considered significant if the alternative:

- Resulted in an increase of 10 dBA above ambient levels within the Action Area.

Proposed Action

Direct Effects are noise impacts associated with temporary operation of the dredge, supporting sea vessel equipment, and other associated land use equipment. No permanent effects would occur. Indirect effects to wildlife are discussed in Section 4.3.

The Federal Navigation Channel and North Jetty Shoal would be dredged using a clamshell dredge

and two scows and with ancillary sea-based vessels. Two scows and ancillary sea-based vessels would be used for placement at the nearshore placement area. The clamshell dredge would operate 24 hours a day, 7 days a week. Scows and ancillary sea vessel equipment typically operate 6 hours per day. Ambient noise levels in harbors have been measured between Leq 56.5 and 75.5 dBA depending on the time of day and day of the week. When considering all equipment associated with clamshell dredging, noise levels typically reach 80 dBA within a 35-foot radius and reach 65 dBA within 200 feet (Epsilon 2006). During daylight hours, particularly on the weekend, dredge noise would be indistinguishable from background noise levels.

Noise levels are atmospherically attenuated by a factor of 6 dB per doubling of the distance. Based on a point source spherical radiator equation (Caltrans Noise Manual, 1980), the noise levels at various distances from clamshell dredging equipment are estimated below, suggesting that a typical dredging noise source will fade into background noise around 200 ft from the dredge:

100 feet –71 dB

200 feet –65 dB

400 feet – 59 dB

Use of equipment in the harbor and at the nearshore placement area, mobilization/demobilization of equipment, and trucks or vehicles used for trash removal are potential sources of noise associated with dredging operations and nearshore placement activities. However, ambient noise levels at the nearshore placement area and within the harbor are such that the dredge and supporting sea vessels dredging operations and placement activities would not be a significant new noise source. Noise levels at hotels, motels, and restaurants on the inland side of Via Marina, Admiralty Way or Fiji Way would not exceed existing highway-associated noise. Noise impacts to wildlife are addressed in Section 4.3 Biological Resources.

Proposed Action activities would occur more than 500-feet from sensitive receptors. As a result, noise impacts at sensitive receptors from dredging and nearshore placement activities would be attenuated at the levels indicated above, resulting in minimal or no change to ambient noise conditions. The Proposed Action dredging is not expected to exceed the 10 dBA limitation on increased background noise. Dredging operations and nearshore placement activities would result in increases in background dBA far below the doubling threshold. Noise levels would return to baseline conditions upon completion of construction. Impacts from dredging and nearshore placement activities would be temporary and not significant.

No Action Alternative

Noise impacts resulting from the Proposed Action would not occur. However, if further shoaling occurs, emergency dredging operations may result to relieve dangerously shoaled conditions. If emergency dredging were necessary, temporary increases in noise levels from the dredge equipment, ancillary vessels, and laborers' vehicles would be expected. This increase would be temporary and not significant.

4.6 Cultural Resources

4.6.1 Environmental Baseline

The Area of Potential Effect (APE) is the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 CFR § 800.16). The USACE has defined the APE as the horizontal and vertical extent of the staging, dredging, and nearshore placement areas. The Project APE consists of three discontinuous areas (referred to in this memo as the Staging APE, Dredging APE, Nearshore APE). These locations are un-sectioned in Township 2 South and Range 15 West as depicted on the U.S. Geological Survey (USGS) Venice, California, 7.5-minute topographic quadrangle.

USACE has a multitude of projects both current and legacy within APE. The largest and most extensive includes the Regulatory action for the Playa Vista project (SPL-1990-00426). Statistical Research, Inc. (SRI) has been the cultural resources management consultant for the Playa Vista project since 1989. SRI has completed the following investigations within the dredging APE for the USACE: A 1,000-acre archaeological survey, architectural assessment of 40 historic buildings; comprehensive research design; Programmatic Agreement between federal and state agencies; documentation of two National Register Districts; visual-aesthetic historical study; archaeological testing at 12 prehistoric and historical-period sites; treatment plan for historic resources (including both prehistoric and historical-period sites); Historic American Engineering Record for 15 buildings eligible for listing in the National Register of Historic Places; archaeological data recovery at 8 prehistoric and historical-period sites; paleoenvironmental reconstruction of the evolution of the Ballona Lagoon; innovative methods for identifying and excavating archaeological sites; and construction monitoring. The APE has been assessed for the presence of properties listed or eligible for listing on the National Register of Historic Places (NRHP) and the results of these studies were coordinated with the State Historic Preservation Officer (SHPO).

4.6.2 Environmental Consequences

Significance Criteria

An impact to Cultural Resources will be considered significant if:

- It results in an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Places.

Proposed Action

The Proposed Action would not impact resources in the Playa Vista area. The Proposed Action would therefore not result in an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP. Therefore, impacts are less than significant.

No Action Alternative

There would be no maintenance dredging or placement activities under the No Action Alternative and no significant effects would occur.

4.7 Recreation

4.7.1 Environmental Baseline

The Action Area is a densely populated area, characterized by multi-family residences and a variety of commercial land uses oriented toward public use of the harbor and beaches. In addition, Marina del Rey has multiple hotels and restaurants located throughout the harbor. The jetties near the channels are often utilized by pedestrians and fishermen.

The Marina del Rey harbor provides approximately 5,000 slips available for private boaters, commercial fishing vessels, and USCG vessels, 700 land storage spaces, up to 12 boat launch facilities, and 640 transient/guest docks with a capacity for 5,300 boats. Commercial and recreational activities include boat rentals, charter boat fishing, sport fishing, dinner cruises, windsurfing, water shuttle service, kayaking, paddle boarding, jet skiing, swimming, sailing, and ferry service to Catalina Island. The entrance channel jetties are regularly used for sightseeing, bicycling, skating, fishing, and walking. The entrance channels incur major boat traffic most of the year, with particularly heavy concentrations on weekends and during summer months.

South of the harbor is Dockweiler State Beach, which extends from north of Marina del Rey harbor's entrance south to El Segundo (County of Los Angeles Beaches and Harbor Department, 2022). It consists of 3.8 miles of ocean frontage and 254 acres of beach. In the summer it can get quite busy. Swimming, surfing, volleyball, and hang gliding are all popular activities at Dockweiler. The bicycle path is readily accessible, which many visitors use for rollerblading, jogging, and of course, bicycling. Jetties at the north end of the beach provide ideal fishing opportunities, and shore fishing is popular. The nearby parking lots have over 1,200 spaces. Extensive amenities are available, including restrooms, showers, picnic facilities, fire rings, volleyball nets, a food concession stand, beach wheelchair, a youth center, and a Recreational Vehicle (RV) Park. Dockweiler State Beach is heavily used (especially during the summer and on weekends) for recreational purposes and attracts many residents and visitors to the area.

4.7.2 Environmental Consequences

Significance Criteria: Impacts would be considered significant if the alternative:

- Resulted in a permanent change or loss of existing recreational uses.

Proposed Action

Direct effects to recreation would be those related to or caused by the physical presence of the dredge, associated equipment and sand placement during construction, as well as bathymetric changes to the channels related to dredging. Indirect effects would be those related to post-construction topographic changes to navigation channels and to the downcoast beach profile resulting from nearshore sediment placement.

Direct Effects: The proposed maintenance dredging would improve navigation safety for recreational and commercial boating by keeping the Federal Navigation Channel and LACDBH's North Jetty Shoal open and free of navigational hazards. Dredging activities would be physically separated from most water contact recreational uses, which primarily take place along the edges of the harbor or along Dockweiler State Beach and typically are outside the Federal Navigational Channel and the North Jetty Shoal.

Some recreational activity could be temporarily inconvenienced at the Marina del Rey Harbor when maintenance dredging activities are occurring, although the presence of the dredge and scows would be a small and easily avoidable obstacle. Dredging of dry sand in Area 6 (a sand trap of Federal channel) would have a temporary impact on recreation on a small portion of Venice Beach adjacent to Area 6. Other portions of Venice Beach north of the Action Area would be open and available for public recreation. Because dredged sediment would be placed in the nearshore placement area, there would be no impact to beach recreation at Dockweiler State Beach. The Proposed Action could have a small, temporary impact on commercial or recreational fishing if or when boats transiting the entrance channel need to navigate around the dredge and associated equipment. Other fishing opportunities located within the Action Area are Venice Fishing Pier located approximately 2 miles northwest of Marina del Rey Harbor, and Manhattan Beach Pier located approximately 3 miles southeast of Dockweiler State Beach. To minimize navigation impacts and threats to vessel safety, tugboats and crew boat vessels would be equipped with markings and lightings in accordance with the USCG regulations. The location and schedule of the work would be published in the USCG Local Notice to Mariners.

Placement of dredged material at the nearshore placement area would temporarily affect turbidity at the point of discharge, temporarily rendering the immediate area unsuitable for water contact recreation. Swimmers may have to move to a different location depending on the location of the dredge and associated vessels. Other swimming opportunities include Venice Beach located approximately 2 miles northwest of Marina del Rey harbor and Manhattan Beach located approximately 3 miles southeast of Dockweiler State Beach. Turbidity impacts would be temporary since sand is expected to settle out of the water column quickly. Placement of dredged material in the nearshore would not interfere with other beach recreational uses such as rollerblading, jogging, bicycling, volleyball or RV park.

Indirect Effects: Post-construction topographic changes to navigation channels and to the downcoast beach profile resulting from nearshore sediment placement would only be visible below the surface of the water. The time scale of sediment feed to the beach zone is on the order of months to years (Van Duin et al. 2004) as landward migration rates range from 100 to 200 feet per year (Douglass 1995). Any addition of sediment to beaches would be imperceptible (Smith et al.

2017). No detectable indirect effects to recreation are expected.

The Proposed Project would not result in a permanent change or loss of existing recreational uses. Recreation would return to baseline conditions upon completion of construction. Impacts would be less than significant.

No Action Alternative

The No Action Alternative would avoid the temporary and minor impacts to recreation. However, continued shoaling would adversely affect recreational boating if it created hazardous conditions that eventually result in full closure of the harbor. If that occurs, emergency dredging would likely be triggered. Similar to the Proposed Action, impacts of emergency dredging would be short-term and insignificant.

4.8 Ground Transportation and Traffic

4.8.1 Environmental Baseline

Marina del Rey Harbor is located southwest of the western terminus of Highway 90. Its internal surface transportation system consists of two main secondary highways that serve as primary collector roads. The local area is accessed from the northeast via State Route (SR) 90, a freeway that connects to the 405 freeway to the northeast. Alternatively, Lincoln Boulevard (SR 1) runs northwest/southeast along the east side of the project area and provides surface street access. Traffic conditions near Marina del Rey Harbor are typically congested.

Transportation and traffic routes in the vicinity of the project area include:

- State Route (SR) 90 and its extension to Lincoln Boulevard serve as the main access to Marina del Rey.
- 405 Freeway (San Diego Freeway) is an automobile roadway route to access Marina del Rey and the beach.
- State Highway Route 1 (SR 1) or Pacific Coast Highway (PCH), is located east of Marina del Rey.
- SR 187 is located north of Marina del Rey.
- SR 10 (Santa Monica Freeway) is located north of Marina del Rey.
- Via Marina is a major street within Marina del Rey.
- Admiralty Way is a major street within Marina del Rey.
- Fiji Way is a major street within Marina del Rey.

Annual Average Daily Traffic (AADT) and daily traffic (DT) capacities represent the general level of daily traffic that each roadway type can carry. **Table 11** shows the current (baseline) traffic volumes for roadways in the Action Area.

Table 11. Current Traffic Volumes in Action Area

Roadway Name	AADT/DT count
SR 1 at LAX Airport via Lincoln Blvd.	83,000 (Back AADT) [1]
SR 1 at SR 90	65,000 (Ahead AADT) [1]
SR 1 at SR 187	47,000 (Back AADT) [1]
SR 1 at SR 10	62,000 (Ahead AADT) [1]
SR 90 at SR 1	34,500 (Ahead AADT) [1]
SR 90 at Culver Boulevard (Blvd.)	77,000 (Ahead AADT) [1]
SR 187 at 405 Freeway	70,000 (Ahead AADT) [1]
SR 187 at 10 Freeway	55,000 (Ahead AADT) [1]
Via Marina, From Washington Blvd. to Old Harbor Lane	11,150 (DT) [2]
Admiralty Way, From Via Marina to Fiji Way	16,650 (DT) [2]
Fiji Way, From Lincoln Blvd. to South Terminus	18,850 (DT) [2]

Source: [1] Caltrans, 2017; [2] County of Los Angeles, 2014.

4.8.2 Environmental Consequences

Significance Criteria: Impacts would be considered significant on traffic if the alternative results in:

- A substantial increase in AADTs/DTs of main arteries used to access the Action Area.

Proposed Action

Direct effects to ground transportation and traffic would be those related to or caused by the physical presence and transit of personnel work crew laborer and vendor vehicles and trash hauling. No indirect or permanent effects would occur.

Under the Proposed Action, dredged material placement in the nearshore placement area would not require any land-based construction equipment other than crew commuting vehicles that would travel to and from the harbor daily. This analysis assumes a total of 18 vehicles (no off-road vehicles) that would make a total of 36 daily trips (18 round trips). Disposal of trash or construction debris material would occur daily in dumpsters located in the harbor or a local landfill or disposal site in the vicinity of Marina del Rey. LACDBH provides parking in Marina del Rey harbor. Parking is also available along the streets adjacent to the harbor. The land-based vehicles would utilize highways and streets during construction; they would not drive on any sandy beaches.

There would not be a substantial increase in AADTs/DTs of roads used within the Action Area. (**Table 12**). The Proposed Action would not require the closure of any roads. Traffic conditions would return to baseline levels upon completion of construction. The dredge would operate within the confines of the Action Area. Impacts would be temporary and short-term. Indirect impacts are not anticipated. Impacts would be less than significant.

Table 12. Comparison of Baseline AADT/DT to Proposed Action Alternative Traffic Increases

Roadway Name	AADT/DT	Projected Increase in AADT/DT	Percent Increase in Baseline AADT/DT
SR 1 at LAX via Lincoln Blvd.	83,000 (Back AADT) [1]	36	0.05%
SR 1 at SR 90	65,000 (Ahead AADT) [1]	36	0.06%
SR 1 at SR 187	47,000 (Back AADT) [1]	36	0.08%
SR 1 at SR 10	62,000 (Ahead AADT) [1]	36	0.06%
SR 90 at SR 1	34,500 (Ahead AADT) [1]	36	0.11%
SR 90 at Culver Boulevard (Blvd.)	77,000 (Ahead AADT) [1]	36	0.05%
SR 187 at 405 Freeway	70,000 (Ahead AADT) [1]	36	0.06%
SR 187 at 10 Freeway	55,000 (Ahead AADT) [1]	36	0.07%
Via Marina, From Washington Blvd. to Old Harbor Lane	11,150 (DT) [2]	36	0.33%
Admiralty Way, From Via Marina to Fiji Way	16,650 (DT) [2]	36	0.22%
Fiji Way, From Lincoln Blvd. to South Terminus	18,850 (DT) [2]	36	0.20%

Source: [1]CalTrans, 2017; [2] County of Los Angeles, 2014.

No Action Alternative

There would be no maintenance dredging or placement activities under the No Action Alternative. However, continued shoaling would prevent safe navigation through the harbor. Emergency dredging would require removal of shoaled material from the federal channels. It is likely that emergency dredging would be limited in scope and duration. Emergency dredging could require the same use of highways and streets as described above. Any effects to ground transportation and traffic impacts would *de minimis* and short-term.

4.9 Vessel Traffic and Safety

4.9.1 Environmental Baseline

Patterns of sea vessel traffic use in the Action Area are a function of boat type. The harbor provides approximately 5,000 slips available for private boaters, commercial fishing vessels, and USCG vessels, 700 land storage spaces, up to 12 boat launch facilities, and 640 transient/guest docks with a capacity for 5,300 boats. Many of these vessels utilize and transit through the transit corridor and nearshore placement area.

Fishing boats typically leave early in the morning and return in the early afternoon when the sea breeze picks up. Sailboats typically go out for an afternoon sail when the winds pick up. Summer Sundays are typically the most popular days for boat use, with approximately 25 to 30 percent of the wet berthed sailboats and 15 to 25 percent of the wet berthed powerboats being observed in use. Winter weekdays are typically the lowest use days. Sailing circulation patterns within the entrance channel consists of outbound (tacking) and inbound (running) in the sail-only channel. Powerboats and sailboats using auxiliary power use the power-only channels (Moffat and Nichol 1989). Peak two-way (inbound and outbound) traffic occurs at approximately 2 p.m., while peak one-way (inbound) traffic occurs around 4 p.m. A similar pattern exists between entrance and launch ramp inbound traffic; however, the outbound launch ramp traffic peaks about 2 p.m. The speed limit within the entrance channel between the jetties is 8 knots and is reduced to 5 knots within the main interior channel.

1.9.2 Environmental Consequences

Significance Criteria: Impacts would be considered significant on vessel traffic and safety if the alternative results in:

- A navigational hazard to boat traffic or interfere with any emergency response or evacuation plans.
- Substantially changes vessel traffic or patterns.

Proposed Action

Direct effects and benefits to sea vessel traffic and safety would be those related to or caused by the physical presence of the dredge and associated supporting sea vessel equipment during construction, as well as bathymetric changes to the channels related to dredging. No indirect effects would occur.

The Proposed Action would use a clamshell dredge and supporting sea vessel equipment (a derrick barge, two scows, two tugboats, a crew boat, and a survey boat), totaling eight (8) sea vessels for the Proposed Action. The dredge, scows, and ancillary sea-based vessels typically remain in the harbor during dredging and transit south to the nearshore placement area during placement operations. To ensure safe transit during dredge and nearshore placement construction activities,

appropriate coordination would be maintained with the LACDBH and the USCG. Egress lanes in the harbor would be established and regulated. Information regarding dredging and placement operations would be published in Local Notice to Mariners, warning boat users about times, durations, and locations of construction activities.

Construction would not impede access to entrances, create a navigational hazard to boat traffic or interfere with local emergency/evacuation response plans. Dredging would not change the number of slips and moorings. Based on the above, the Proposed Action would represent a minor increase of approximately 0.16% in sea vessel traffic.

No Action Alternative

There would be no maintenance dredging or placement activities under the No Action Alternative. Sea vessel traffic and traffic patterns would remain unchanged since the number of slips and moorings would remain unchanged. However, continued shoaling of the Federal Navigation Channel and North Jetty Shoal would compromise navigational safety. Furthermore, the inability of the LACDBH, Marina del Rey Sherriff's Harbor Patrol or USCG vessels to transit could compromise emergency response and evacuation plans. It is likely that an emergency dredging operation would be undertaken in the event that continued shoaling threatens navigational safety.

4.10 Aesthetics

4.10.1 Environmental Baseline

The principal scenic and visual resources of the Action Area include the harbor, marina, beaches, sailboats, yachts, and wildlife. Certain portions of the Action Area offer views of the low hills surrounding Santa Monica Bay and Palos Verde Peninsula.

4.10.2 Environmental Consequences

Significance Criteria: Impacts to aesthetics would be considered significant if the alternative results in:

- A substantial and permanent modification to the scenic vista

Proposed Action

Direct effects to the aesthetic character or viewshed would be those related to or caused by the physical presence of the dredge and associated equipment during construction. Indirect effects would not occur.

Dredging and material placement may temporarily diminish or alter the aesthetic character of the Action Area. The dredge and supporting vessels would be present in the harbor for a few months, which would not permanently affect views of the harbor, beach, ocean, or coastline in the Action Area. All scenic vistas would return to pre-project conditions upon completion of the Proposed Action.

The Proposed Action would not result in substantial and permanent modification to the scenic vista. Therefore, impacts to aesthetics would be less than significant.

No Action Alternative

Under the No Action Alternative, the Marina del Rey harbor channels would not be dredged. The No Action Alternative would avoid impacts to aesthetics, unless shoaling impacts resulted in emergency dredging operations to relieve dangerously shoaled conditions. If emergency dredging were necessary, temporary impacts to aesthetics would result from the dredge equipment. Similar to the Proposed Action, these impacts would be short-term and insignificant.

5. GROWTH INDUCEMENT AND CUMULATIVE IMPACT ANALYSIS

5.1 Growth Inducement

Dredging of the federal channel is a routine, recurring maintenance dredging. USACE last performed maintenance dredging at Marina del Rey Harbor in 2017 and previously in 2012 and 2006 (**Table 2**). Placement activities of dredged material in the nearshore placement area is a beneficial use for beach nourishment. The Proposed Action is not in support of planned infrastructure improvements that would result in additional growth. The Proposed Action would not require additional employees other than temporary contractor employees. The Proposed Action would not induce growth in the Action Area.

5.2 Cumulative Impacts

NEPA requires that cumulative impacts of the Proposed Action be analyzed and disclosed. Cumulative impacts are impacts on the environment that will result from the incremental effect of the action when combined with other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Geographic scope of this analysis is the harbor and the nearshore placement area.

5.2.1 Present Actions

Los Angeles County is working on several other projects in the Marina del Rey harbor entrance channel and at Dockweiler State Beach, some which include improvements on stormwater drains under the State of California's Clean Beaches Initiative (CBI).

5.2.2 Past Actions

Past activities, such as dredging, placement of fill material, and construction of harbor and marina facilities, have reduced the physical and biological aquatic resource functions present in this area, as compared to natural undisturbed areas. Elevated noise levels and vessel traffic cause ongoing disturbances in the project vicinity. Past impacts within and adjacent to the harbor also include negative impacts to air quality. Thus, the project area has been affected by past marina activities and continues to be disturbed.

Since the 1960s, maintenance dredging of the Federal channel in Marina del Rey harbor and placement activities (beach and/or nearshore) have occurred, while LACDBH retained responsibility for dredging the North Jetty Shoal. USACE maintenance dredging of the Federal channels in Marina del Rey harbor have ranged from approximately 4,700 cubic yards (cy) to 800,000 cy from 1969 through 2017. USACE last performed maintenance dredging at Marina del Rey harbor in 2017 and previous dredging occurred in 2012 and 2006 (**Table 2**).

North Jetty Shoal, located outside of the Federal Channel, is dredged on an as-needed basis. USACE last performed dredging of the North Jetty Shoal in 1999/2000 (**Table 2**). North Jetty Shoal maintenance dredging has typically ranged from approximately 25,000 to 35,000 cy per dredge cycle with placement on the beach and/or nearshore. Frequency and extent of North Jetty Shoal dredging is dependent on available funding and the number and direction of storms.

5.2.3 Reasonably Foreseeable Actions

The LACDBH oversees the use of the North Jetty Shoal channel and 19 marinas in the Marina del Rey harbor. Coordination with USACE Regulatory confirmed that no additional projects have recently been permitted or are proposed to occur within the geographic scope of analysis. Most permit actions in Marina del Rey over the last 10-15 years have been for maintenance of existing structures and dock replacement projects that are required for aging infrastructure in compliance with the American Disabilities Act (ADA) requirements, and these do not result in widespread or lingering impacts that would potentially result in cumulative impacts.

Future watershed restoration projects, such as those identified in the Los Angeles Regional Integrated Water Management Plan, are not currently funded. Future harbor development projects, including realignment and replacement of existing dock structures are in the early planning/permitting phases and are not expected to be ready for construction during the proposed project activities.

Under the No Action Alternative, the Proposed Action would not be constructed. Existing conditions within the study area would persist. As the No Action Alternative would not result in any incremental impacts, there would be no resulting cumulative effects even with consideration of past, present, or reasonably foreseeable future actions.

Cumulative effects of the implementation of the proposed action in consideration with other past, present, and reasonably foreseeable actions are discussed below.

Geology: As discussed in Section 4.1, geology would be temporarily affected during the dredging operation and placement activities. When considering the direct and indirect impacts that would result from the Proposed Action, in relation to the overall direct and indirect impacts from past, present, and reasonably foreseeable actions, the incremental effects of the Proposed Action to cumulative impacts in the study area would be less than significant.

Oceanography/Water Quality: As discussed in Section 4.2, water quality would be temporarily affected during the dredging and placement processes. When considering the direct and indirect impacts that would result from the Proposed Action, in relation to the overall direct and indirect impacts from past, present, and reasonably foreseeable actions, the incremental effects of the Proposed Action to cumulative impacts in the study area would be less than significant.

Biological Resources: As discussed in Section 4.3, effects to biological resources s that would result from the Proposed Action would be temporary and insignificant. Most species that occur within the dredge and disposal footprint are common to nearshore environments and widespread throughout the harbor and adjacent coastline and all effects (primarily avoidance of the immediate work area) would be temporary. No effects to federally listed whales or western snowy plovers are expected. The Proposed Action may affect, but is not likely to adversely affect, the California least tern (Appendix H, I). When considering the direct and indirect impacts that would result from the Proposed Action, in consideration with past, present, and reasonably foreseeable actions, the incremental effects of the Proposed Action to cumulative impacts in the study area would be less than significant.

Air Quality: As discussed in Section 4.4, the Action Area is in non-attainment for ozone (O_3) and $PM_{2.5}$ and in maintenance for NO2, CO and PM10. Emissions resulting from the Proposed Action would not equal or exceed the general conformity applicability rates. When considering the direct and indirect impacts that would result from the Proposed Action, in consideration with past, present, and reasonably foreseeable actions, the incremental effects of the Proposed Action to cumulative impacts in the study area would be less than significant.

Noise: As discussed in Section 4.5, noise impacts resulting from construction activities of the Proposed Action would be temporary and intermittent. Even if dredging and placement activities occurred simultaneously, the Proposed Action would not result in a significant increase in decibel levels within residential areas and would remain in compliance with local noise ordinances. When considering the direct and indirect impacts that would result from the Proposed Action, in consideration with past, present, and reasonably foreseeable actions, the incremental effects of the Proposed Action to cumulative impacts in the study area would be less than significant.

Cultural Resources: As discussed in Section 4.6, the APE has been assessed for the presence of cultural resources listed or eligible for listing on the National Register of Historic Places (NRHP). The results of these studies were coordinated with the State Historic Preservation Officer (SHPO). When considering the direct and indirect impacts that would result from the Proposed Action, in consideration with past, present, and reasonably foreseeable actions, the incremental effects of the

Proposed Action to cumulative impacts in the study area would be less than significant.

Recreation: As discussed in Section 4.7, the Proposed Action would not result in a permanent loss of existing recreational uses. When considering the direct and indirect impacts that would result from the Proposed Action, in consideration with past, present, and reasonably foreseeable actions, the incremental effects of the Proposed Action to cumulative impacts in the study area would be less than significant.

Ground Transportation and Traffic: As discussed in Section 4.8, the Proposed Action is expected to have minor adverse impacts on local traffic by not adding substantially to existing traffic in the area nor creating hazardous traffic conditions. Construction crew would temporarily impact traffic on local roads; however, this impact would not be significant because they would not add to the average daily traffic volume. All of the large equipment would come by sea and would not impact local roads. When considering the direct and indirect impacts that would result from the Proposed Action, in consideration with past, present, and reasonably foreseeable actions, the incremental effects of the Proposed Action to cumulative impacts in the study area would be less than significant.

Vessel Traffic and Safety: As discussed in Section 4.9, the Proposed Action avoids to the extent practicable interruption of the vessel operations in the harbor and provides a benefit to recreational and commercial uses of the harbor. Therefore, the risk of vessel traffic and safety is negligible. When considering the direct and indirect impacts that would result from the Proposed Action, in consideration with past, present, and reasonably foreseeable actions, the incremental effects of the Proposed Action to cumulative impacts in the study area would be less than significant.

Aesthetics: As discussed in Section 4.10, visual effects from past dredging and placement activities would be short-term. The presence of the dredge and support equipment may be noticeable but would not significantly, adversely affect the visual character of the harbor or nearshore placement area. When considering the direct and indirect impacts that would result from the Proposed Action, in consideration with past, present, and reasonably foreseeable actions, the incremental effects of the Proposed Action to cumulative impacts in the study area would be less than significant.

6. ENVIRONMENTAL COMPLIANCE AND COMMITMENTS

6.1 Compliance

6.1.1 National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321 et seq.); Council on Environmental Quality Regulations for Implementing NEPA, 40 CFR Parts 1500 to 1508; USACE Regulations for Implementing NEPA, 33 CFR Part 230.

This EA has been prepared in accordance with NEPA and implementing regulations. A Public Notice on a Preparation of an EA was circulated for public review on May 31, 2023, for a 30-day public review period ending June 30, 2023, during which time comments on the Proposed Action were solicited from the public (Appendix A). The California Department of Fish and Wildlife, Gabrielino Tongva Indians of California Tribe (Tribe), U.S. Environmental Protection Agency, and Heal The Bay contacted the USACE seeking clarification on the project or (in the case of the Tribe) confirmation on how coordination would proceed. USACE provided the requested information. No comments were received during the public review period.

6.1.2 Clean Air Act of 1969, as amended (42 USC 7401, et seq.)

Proposed Action emissions are not expected to equal or exceed l applicability rates in 40 CFR 93.153. Therefore, the Proposed Action is consistent with the SIP and meets the requirements of Section 176(c) of the Clean Air Act.

6.1.3 Clean Water Act (CWA) of 1972, as amended (33 USC 1251, et seq.)

A pre-filing meeting request was submitted to the LARWQCB on January 19, 2023, and the pre-filing meeting was held on February 7, 2023. On May 12, 2023, the USACE submitted a request to the LARWQCB for a Water Quality Certification under Section 401 of the CWA for the Marina del Rey harbor Federal Maintenance Dredging Project. A Water Quality Certification was obtained September 13, 2023 (Appendix B). The discharge of dredged or fill material associated with the Proposed Action has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230; Appendix B). The Proposed Action is in compliance with the Clean Water Act.

6.1.4 Coastal Zone Management Act of 1976, as amended (16 USC 1456, et seq.)

A Negative Determination was submitted to the California Coastal Commission for concurrence on March 20, 2023. Negative Determination concurrence was received on June 6, 2023 (Appendix G). The Proposed Action is in compliance with the Coastal Zone Management Act.

6.1.5 Endangered Species Act of 1973, as amended (16 USC 1531, et seq.)

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the USACE determined that the Proposed Action would have no effect on the federally threatened western snowy plover and its designated critical habitat, gray whales, blue whales, fin whales, and humpback whales. USACE determined that the Proposed Action may affect, but is not likely to adversely affect, the federally endangered California least tern subspecies. Informal consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended, was initiated with USFWS on May 26, 2023 (Appendix H) and was completed with receipt of USFWS concurrence on August 4, 2023 (Appendix I).

6.1.6 Migratory Bird Treaty Act of 1918 (16 USC 703-711)

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711) makes it unlawful to possess, buy, sell, purchase, barter or "take" any migratory bird listed in Title 50 of the Code of Federal Regulations Part 10. "Take" is defined as possession or destruction of migratory birds, their nests, or eggs. Birds protected under the MBTA include essentially all native birds in a given region. The Proposed Action does not include land-based construction or vegetation disturbance. Therefore, nesting bird habitat does not occur within the Action Area. The Proposed Action is in compliance.

6.1.7 National Historic Preservation Act of 1966, as amended (54 USC 300101, et seq.)

The USACE determined that no historic properties would be affected by the Proposed Action. SHPO letter was emailed on May 19, 2023. Section 106 coordination with the SHPO was completed on June 23, 2023 (Appendix C). If previously unknown cultural resources are identified during project implementation, all activity will cease until requirements of 36 CFR 800.13, *Post Review Discoveries*, are met. The Proposed Action is in compliance with the Act.

6.1.8 Fish and Wildlife Coordination Act, as amended (16 USC 661, et seq.)

The Fish and Wildlife Coordination Act requires the USACE to consult with the USFWS whenever the waters of any stream or other body of water are proposed to be impounded, diverted, or otherwise modified. The Proposed Action will not result in an impoundment, diversion, or modification of any body of water; therefore, a Coordination Act Report is not required. The USACE has coordinated the Proposed Action with the USFWS and the NMFS. The Proposed Action is in compliance with the Fish and Wildlife Coordination Act.

6.1.9 Magnuson-Stevens Fishery Management and Conservation Act (MSA), as amended (16 USC 1801, et seq.)

In accordance with the MSA, the USACE prepared an Essential Fish Habitat (EFH) assessment for the Proposed Action (Appendix H). The USACE concluded that the Proposed Action would not result in a substantial, adverse impact to EFH. The USACE initiated EFH consultation with the NMFS via email on June 9, 2023. NMFS concurred with the USACE's determination via email on July 10, 2023, and did not provide additional conservation recommendations (Appendix I). The Proposed Action is in compliance with the MSA.

6.1.10 Marine Mammal Protection Act of 1972, as amended (16 USC 1361, et seq.)

The USACE evaluated the potential for the Proposed Action to affect marine mammals in the harbor during dredging and placement activities. Analysis in this EA demonstrates the Proposed Action would not affect marine mammals, including federally listed whale species and Distinct Population Segments. Marine mammals react to dredging and associated support vessels as they do to any other vessels they encounter. Vessels used for the project typically travel at approximately 1-2 knots within the harbor and at or below approximately 6-8 knots outside the harbor, both below the maximum speed recommended by the NMFS (10 knots) for minimizing impacts to marine mammals. This relatively slow speed allows marine mammals to avoid construction-related vessel traffic. This level of interaction does not result in take or harassment under the MMPA. Therefore, the USACE is fully compliant with the provisions of the MMPA.

6.1.11 Executive Order 12898, Environmental Justice in Minority and Low-Income Populations, Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, and Executive Order 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All

Executive Order (EO) 12898 focuses Federal attention on the environment and human health conditions of minority and low-income communities and calls on agencies to achieve environmental justice as part of its mission. Pursuant to Section 220 of EO 14008 January 27, 2021, Section 1–102 of EO 12898 of February 11, 1994, has created an Environmental Justice Interagency Council. The order requires the USEPA and all other Federal agencies (as well as state agencies receiving Federal funds) to develop strategies to address this issue as part of the NEPA process. Agencies are required to identify and address, as appropriate, any disproportionate and adverse human health, environmental impacts, and hazards of their programs, policies, and activities on minority and low-income populations. The order makes clear that its provisions apply fully to programs involving Native Americans. The Council of Environmental Quality (CEQ) has oversight responsibility for the Federal government's compliance with EO 12898 and NEPA. The CEQ, in consultation with the USEPA and other agencies, has developed guidance to assist Federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. According to the CEQ's Environmental Justice Guidance under NEPA, agencies should consider the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the Proposed Action, and if so whether there may be disproportionate and adverse human health or environmental impacts (CEQ 1997). Additionally, provisions of E.O. 14008, ASA(CW)'s March 15, 2022, guidance regarding Environmental Justice and Justice40 initiative, and Executive Order 14096 on Revitalizing Our Nation's Commitment to Environmental Justice for All dated April 21, 2023, apply as well.

Use of the USEPA's online tool, EJ Screen, is recommended to describe the attributes of a community. The CEQ released the Climate and Economic Justice Screening Tool (https://screeningtool.geoplatform.gov/en) per E.O. 14008 to provide a consistent government-wide identification of communities with environmental justice concerns. Based on ASA(CW) guidance (Memo on Implementation of Environmental Justice and the Justice40 Initiative dated (March 15, 2022) the USACE is to use CEQ's and EPA's EJ tools for the purpose of addressing environmental justice concerns. The tools are also useful for identifying minority and low- income populations for compliance with E.O. 12898 and E.O. 14008.

To identify disadvantaged communities within and adjacent to the project area, an analysis was performed using the Council on Environmental Quality's Climate and Economic Justice Tool (https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5). Disadvantaged communities were not identified within census block 06037702901, which includes the project area, or immediately adjacent to said census block. Data can be found in Appendix F.

Additionally, an analysis of demographic data was conducted to further derive information on the approximate locations of low-income and minority populations in the affected area [USEPA's Environmental Justice Screening and Mapping Tool (EJ SCREEN; EPA 2020)]. Minority populations. EO 12898 defines a minority as an individual belonging to one of the following

population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population, for the purposes of this environmental justice analysis, is identified when the minority population of the potentially affected area is greater than 50% or the minority population is meaningfully greater than the general population or other appropriate unit of geographic analysis.

Low-Income Population. EO 12898 does not provide criteria to determine if an affected area consists of a low-income population. For purposes of this assessment, the CEQ criterion for defining minority population has been adapted to identify whether or not the population in an affected area constitutes a low-income population. An affected geographic area is considered to consist of a low-income population (i.e., below the poverty level, for purposes of this analysis) where the percentage of low-income persons: 1) is greater than 50%, or 2) is meaningfully greater than the low-income population percentage in the general population or other appropriate unit of geographic analysis. The United States Census Bureau poverty assessment weighs income before taxes and excludes capital gains and non-cash benefits (such as public housing, Medicaid, and food stamps).

Demographic data from the USEPA's EJ SCREEN (USEPA 2022), an online environmental justice screening and mapping tool, served as the source data for evaluation. Maps and data from EJ SCREEN are found in Appendix F. EJ SCREEN incorporates demographic data from the U.S. Census Bureau. An analysis of demographic data was conducted to derive information on the approximate locations of low-income and minority populations in the community of concern. Since the analysis considers disproportionate impacts, two areas must be defined to facilitate comparison between the area affected and a larger regional area that serves as a basis for comparison. The larger regional area is defined as the smallest political unit that includes the affected area and is called the community of comparison. For purposes of this analysis using EJ Screen, the affected area is a 0.1-mile radius around the Action Area, and Marina del Rey, California is the community of comparison (**Table 13).**

Table 13. Environmental Justice Study Area Demographics

Demographic Indicators	Affected Area	State of California	Marina del Rey, California
Minority Population	45%	63%	26%
Low-Income Population	3%	29%	13%

The aggregate minority population in the Proposed Action affected area is 45% and 3% of individuals in the affected area are considered low-income (**Table 13**). The aggregate minority and low-income population percentages in the affected area do not exceed 50%. In addition, the affected area minority population and low-income percentages are not greater than the minority and low-income population percentages in the state of California as a whole. The affected area minority population percentage is higher (45%) than Marina del Rey, California (26%) and the affected area is meaningfully greater than Marina del Rey, California. Therefore, the affected area does contain a high concentration of minority population. The affected area low-income population percentage is lower than Marina del Rey, California.

It is anticipated the dredge contract would use existing staff which would not create demand on employment opportunities or housing. There would be no discernible impacts to air quality, water quality, or noise to residential areas, including housing, schools, and parks, as a result of the Proposed Action. Construction of the Proposed Action would affect minority populations since the area of analysis consists of 45% minority demographics. However, these impacts are minor; no high or adverse human health effects are anticipated, and no significant adverse environmental impacts would occur. Moreover, the need for this project is fixed to this particular location. The entire community including minority populations would receive the provision of navigation protection. Minority or low-income communities would not result in a disproportionate and adverse human health or environmental effect or hazards by implementation of the Proposed Action. Local populations would directly benefit from construction of the Marina del Rey harbor maintenance dredging project. There is no low-income EJ community. An EJ minority population community does exist, but the community would not be disproportionately affected.

6.2 Environmental Commitments

The following environmental commitments are included as part of the Proposed Action:

Water Quality (WQ)

WQ-1: The Contractor shall implement a Water Quality Monitoring Plan at the dredge and nearshore placement sites.

WQ-2: All dredging and fill activities will remain within the boundaries specified in the plans. There will be no dumping of fill or material outside of the project area or within any adjacent aquatic community.

WQ-3: Grizzly screens shall be placed over the placement barges to mechanically screen out any debris as sediments are placed within the barges.

WQ-4: Twice per week during dredging activities, monitors will examine a 0.8 mile stretch of Dockweiler Beach adjacent to the nearshore placement area (from the 49th Street groin to Imperial Highway) and remove any fugitive trash or debris. One of the weekly cleanup walks will be conducted at low tide and the second will be at low tide when feasible.

WQ-5: All debris will be disposed of as solid waste.

WQ-6: A spill prevention plan will be implemented. Standard dredge specifications include a Spill Prevention Plan, employee training, and the staging of materials on site to clean up accidental spills. Spills are to be cleaned up immediately (within 10 minutes).

WQ-7: Project features shall not interfere with tidal circulation and/or freshwater inflows into and through the mouth of Ballona Creek.

WQ-8: The Contractor shall remove all trash, debris, and excess construction material from the dredge operations and from dredged material placement site and from the staging area at the end of each workday and shall discard all such material in dumpsters located in Marina del Rey harbor (operated by LACDBH) or dispose of all materials offsite at an approved disposal/landfill site.

WQ-9: Mobilization and removal (demobilization) of sea-based dredge equipment located on land-based staging areas and removal of trash dumpsters would be under the direct supervision of the Corps coordinating with the dredging contractor and the LACDBH.

WQ-10: The Contractor will monitor water quality parameters (turbidity, dissolved oxygen [DO], light transmissivity, salinity, pH, and water temperature) 100 feet up current, 100 feet down current, 300 feet up current, and 300 feet down current of the dredge and nearshore placement sites at the following times: during pre-construction activities, weekly throughout the duration of dredging activities, and post-construction. If turbidity exceeds compliance thresholds, the dredging operations or placement of fill will be altered or stopped until minimization measures (e.g., silt curtains or other measures) can be deployed or until the suspended material settles out, and turbidity levels come back into the acceptable range.

WQ-11: During dredging activities, the Contractor will collect a minimum of two grab samples (collected on two separate days during two different weeks) to assess levels of TSS, chlordane, and Total Recoverable Petroleum Hydrocarbons (TRPH) near the dredge and nearshore placement site off Dockweiler State Beach.

WQ-12: The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and to minimize interference with, disturbance to, and damage of fish and wildlife.

Biological Resources (BR)

BR-1: Nearshore placement will not be allowed two hours prior to, two hours during, and two hours after all scheduled grunion runs.

BR-2: To determine if canopy kelp, surfgrass, or eelgrass are present, the USACE will perform a pre-construction survey of the dredge area.

BR-3: Should canopy kelp, surfgrass, or eelgrass be found, they will be avoided to the maximum extent practicable, and a post-construction survey will be conducted.

BR-4: If post-construction surveys indicate a loss of kelp or surfgrass as a result of the Proposed Action, the USACE will coordinate with NMFS. If post-construction surveys indicate a loss of eelgrass as a result of the Proposed Action, the USACE will coordinate with NMFS to mitigate the impacts in accordance with the California Eelgrass Mitigation Policy.

BR-5: The USACE will perform pre-construction surveys in accordance with the Caulerpa Control Protocol, Version 5 October 2021 to confirm the absence of Caulerpa.

BR-6: If a whale is observed within the harbor, dredging operations will immediately cease. USACE will coordinate with the NMFS prior to commencing dredging operations if the whale remains in the area. If the whale leaves the work area, then dredging would again commence.

BR-7: A project biologist will be responsible for overseeing project activities to ensure compliance with the conservation measures and preventing unanticipated impacts including significant disturbance to federally listed species. Different project biologists may be designated for specific measures listed based on the qualifications necessary to satisfy the specific measure or multiple biologists may be needed to satisfy a specific measure. If multiple biologists are required, their activities will be coordinated through one primary biologist. All project biologists will have experience and training necessary to conduct tasks assigned to them as described in this consultation. A resume of experience and training for each designated project biologist(s) including species-specific reference/s will be submitted to the USFWS for review at least 2 weeks in advance so that verification that the individual is qualified to conduct the required biological activities can be provided by the USFWS prior to the beginning of project activities. The project biologist(s) responsible for implementing measures specific to the least tern (least tern biologists) will be trained ornithologists with at least 40 hours of documented experience with location and observation of least terns in the field including a minimum of 20 hours of experience locating and monitoring least tern nests and chicks. This experience must be clearly identified on their resume.

BR-8: The project work areas will be limited to the sites identified in Figure 3. Parking, driving, lay-down, stockpiling, and vehicle and equipment storage will be limited to previously compacted and developed areas and the designated staging area. No off-road vehicle use will be permitted in sandy beach areas.

BR-9: Prior to project implementation, the USACE will submit to the USFWS Geographic Information System (GIS) shapefiles in UTM, Zone 11N (meters), NAD 83 coordinate system that show the following: the project footprints, anticipated permanent impacts, temporary impacts, habitat restoration sites, and habitat conservation sites, as applicable for the project. Please note that these polygons may overlap. For example, one location could be temporarily impacted and subsequently restored and conserved. Include the following metadata for each shapefile: summary/description of the data, attribute definitions, coordinate system/projection information or any other pertinent information. If there are any changes to the boundaries of anticipated impacts, such changes must be addressed consistent with the Reinitiation Notice below. In addition, updated GIS shapefiles will be submitted to the USFWS within 10 business days if the project footprint changes after initial submission of the project shapefiles.

BR-10: All dredging and fill activities will remain within the boundaries specified in Figure 3. There will be no dumping of fill or material outside of the project area or within any adjacent aquatic community. This CM is the same as WQ-2.

BR-11. A contractor education program will be conducted by the project biologist during all project phases and will cover the potential impacts to federally listed species; the requirements and boundaries of the project; the importance of complying with avoidance, minimization, and compensation measures; and problem reporting and resolution methods.

BR-12: The USACE or its contractors will prepare and implement a Spill Prevention Plan. Standard dredge specifications will include employee training, and the staging of materials on site to clean up accidental spills. Spills are to be cleaned up immediately (within 10 minutes). This CM is the same as WQ-6.

BR-13: USACE will ensure its contractor/s will monitor water quality parameters (turbidity, dissolved oxygen, light transmissivity, salinity, pH, and water temperature) near the dredge and nearshore placement sites at the following times: during pre-construction activities, weekly throughout the duration of dredging activities, and post-construction. If turbidity exceeds compliance thresholds, the dredging operations or placement of fill will be altered or stopped until minimization measures (e.g., silt curtains or other measures) can be deployed or until the suspended material settles out, and turbidity levels come back into the acceptable range. This CM is the same as WQ-10.

BR-14: Lighting for any vessel will be shielded if possible and will be directed onto the deck of the vessel to minimize the light spill into adjacent sensitive areas and natural habitat. Lighting will be set to the lowest illumination needed for human safety.

BR-15: The staging area and project vessels will be kept as clean as possible to avoid attracting predators of federally listed species. All food-related trash produced will be placed in predator-proof (i.e., corvids, rodents, squirrels, and meso-mammals) sealed bins and removed from the site daily.

BR-16: Within 60 days of completing the Maintenance Dredging Project, a post-project report will be submitted to the USFWS notifying that project work has been completed. This report will document: the length of time that project activities were conducted, a general description of the nature of the activities, number and location (using GPS) of least terns during each survey, and observed behaviors of federally listed species in response to project activities collected during monitoring sessions.

BR-17: Project-related activities will take place between September 15, 2023, and May 31, 2024, to avoid the 2023 least tern breeding season (April 1 to September 15) to the maximum extent practicable. No project activities will occur after May 31, 2024, until the USFWS has been contacted and coordinated with to discuss if reinitiation of consultation is necessary based on the then-current behavioral patterns of least tern use of the Project area and of least tern breeding status in adjacent occupied habitat within the Venice Beach Least Tern Colony Site.

BR-18: The USACE will begin the Maintenance Dredging Project activities closer to the Venice colony (i.e., North Jetty Shoal and Dredging Area 6) and will work away from the Venice colony to minimize the likelihood of project-related disturbance to least terns as project activities occur closer in time to the breeding season.

BR-19: To the greatest extent practicable, the USACE will sequence dredging activities so that all areas within 1,500 feet of the Venice colony will be dredged prior to April 1. If project activities need to occur within 1,500 feet of the Venice colony after April 1, the USACE will coordinate

with the USFWS to discuss if additional conservation measures are appropriate or if Reinitiation of consultation is necessary.

BR-20: The USACE will contact the USFWS by March 25 and will provide a brief description of the current status of the dredging project. This should include identifying which areas of dredging have completed, where project activities are currently active, if dredging activities are on schedule so that all areas within 1,500 feet of the colony site will be dredged prior to April 1, and an estimated timeline for project completion.

BR-21: If project activities will extend past April 1 and up until April 15 the USACE will implement surveys for least terns to identify any breeding least terns and to help minimize the likelihood of disturbance to least tern breeding.

A. The least tern biologist (BR-7) will conduct three surveys within 1,000 feet of the colony site for least terns roosting along sandy beach areas and foraging along the shoreline and navigational channel between April 1 and April 15. Surveys should be conducted with at least three days between them. Surveys will not be conducted during inclement weather conditions that would significantly reduce the ability to detect least terns (e.g., rain, strong wind, extreme heat or cold).

B. Surveys will include searching the inside of the colony site for least terns from outside of the colony fence. This can be done with binoculars or a spotting scope.

C. Surveying for least terns that are inside or outside of the colony fence will occur from a distance that does not cause the individual or flock to fly away from the area they are roosting in.

D. The least tern biologist will contact the lead biologist at California State Parks once a week between April 1 and April 15 to discuss if any least terns have been documented at the colony site or other areas managed by State Parks within Los Angeles, Orange, and San Diego Counties.

E. The least tern biologist will report any observations of least tern (including those by State Parks) to the USACE who will contact the USFWS within 72 hours to inform them that least terns have been documented for the first time for the season.

BR-22: If project activities will extend past April 15 and up until May 31, the USACE will implement surveys for least terns to identify any breeding least terns and to help minimize the likelihood of disturbance to least tern breeding.

A. The least tern biologist will contact the lead biologist at California State Parks twice a week between April 16 and May 31 to discuss if any least terns have been observed actively exhibiting breeding behaviors (e.g., scraping, territorial displays or calls, fish carrying) or if an active least tern nest (i.e., scrape containing eggs or empty scrapes with least terns actively exhibiting breeding behaviors) occurs in or within 500 feet of the colony site.

B. The least tern biologist will report any least tern nesting to the USACE within 24 hours of documenting the nesting occurrence. Once breeding activities, including nests, have been documented, USACE will provide this information to USFWS within 3 business days.

C. The least tern biologist(s) will conduct three surveys a week within 1,000 feet of the colony site for least terns roosting along sandy beach areas and foraging along the shoreline and navigational channel. BR-21 B and BR-21 C will be implemented during surveys.

D. All surveys will include 2-hour colony monitoring sessions for behaviors indicative of disturbance, and these should be scheduled to occur at different times of the day, including early morning and early evening before sunset when least terns may be more sensitive to disturbance. As with the survey activity, BR-21 B and BR-21 C will be implemented.

E. The least tern biologist will document least tern behaviors in and around the colony [e.g., startling, flushing (i.e., to cause a bird to move or fly away from an area), increased attentive behavior, alarm calls, stopping incubation, etc.] that could constitute responses to project activities, and these behaviors should be documented including: when a least tern, multiple terns, or the whole colony flushes from the nesting site; whether chicks or eggs were left unprotected with flushing; the duration of the flushing event; and, whenever possible, causes of flushing (i.e., presence of predators, beach management activities, or recreational activities). If the least tern biologist identifies that least terns are exhibiting an increase in observed responses during project activities such as but not limited to increased attentive behavior or flushing while the dredge clamshell is being lifted or dropped, then they will report this observation to USACE within 24 hours. The USACE will contact USFWS on the next business day to discuss if additional conservation measures are appropriate or if reinitiation of consultation is necessary.

F. If the least tern biologist has not observed that least terns are exhibiting an increase in responses to project activities by April 30, surveys may revert to once per week from May 1- May 31.

G. The USACE will provide a copy of all field notes and other documentation of least tern behaviors provided by the least tern biologist(s) from the monitoring sessions within 3 days from receipt of the documentation from the least tern biologist(s).

Air Quality (AQ)

AQ-1: It is the Contractor's responsibility to obtain all applicable air permits in advance of construction and to comply with federal, state, and local air regulations. All air permits and all air quality assessments needed for construction include but are not limited to: Authority to Construct permits, Permits to Operate, and other air quality requirements including but not limited to Best Available Control Technology (BACT), new source review(s), hazardous risks analysis (HRA), or other air permits and air quality assessments needed for operation all diesel engine equipment from and in compliance with the SCAQMD.

AQ-2: Retarding injection timing of diesel-powered equipment for nitrogen oxide (NOX) control shall be implemented on applicable equipment.

AQ-3: The Contractor shall use reformulated diesel fuel to reduce reactive organic compounds (ROC) and SO2.

Noise (N)

N-1: It is the Contractor's responsibility to obtain all applicable noise permits and comply with federal, state, and local noise regulations.

Cultural Resources (CR)

CR-1: In the unlikely event that cultural resources are encountered during dredging, all action in the immediate area of the discovery will cease until the provisions of 36 CFR 800.13 (Post-review discoveries) are met.

Recreation (REC)

REC-1: The contractor shall provide public access to beaches, nearshore areas, sidewalks, recreation trails, roads, streets, and highways within Marina del Rey harbor, to the maximum extent possible.

Ground Transportation and Traffic (GTT)

GTT-1: The contractor shall limit large truck (i.e., trash hauling or vendor equipment) trips of equipment and piping to off-peak commute periods and avoid sensitive receptor areas, schools, hospitals, convalescent homes, and residential areas, to the maximum extent possible.

Vessel Traffic and Safety (VTS)

VTS-1: The Contractor shall mark the dredge and all associated equipment in accordance with USCG regulations. The Contractor must contact the USCG two weeks prior to the commencement of dredging. The following information shall be provided: the size and type of equipment to be used; names and radio call signs for all working vessels; telephone number for on-site contact with the project engineer; the schedule for completing the project; and any hazards to navigation.

VTS-2: The Contractor shall move equipment upon request by the USCG and harbor patrol law enforcement and rescue vessels.

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8. ACRONYMS

AADT	Annual Average Daily Traffic
ACHP	Advisory Council on Historic Preservation
ARB	Air Resources Board
CAA	Clean Air Act
CBI	Clean Beaches Initiative
CEQ	Council on Environmental Quality
CSTF	Contaminated Sediments Task Force
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
cy	cubic yard
dB	decibel
dBA	decibel (A-weighted scale)
DO	dissolved oxygen
DPS	Distinct Population Segment
DT	daily traffic
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ERL	Effects Range-Low
ERM	Effects Range-Medium
ESA	Endangered Species Act
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
HAPC	Habitat Area of Particular Concern
LACDBH	Los Angeles County Department of Beaches and Harbors
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOX	Nitrous Oxides
NRHP	National Register of Historic Places
PAH	Polycyclic Aromatic Hydrocarbons
PN	Public Notice
POLB	Port of Long Beach

ROC	Reactive Organic Compounds
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
SC-DMMT	Southern California Dredged Material Management Team
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
TBT	Tributyltin
USCG	U.S. Coast Guard
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WOTUS	Waters of the U.S.

9. DISTRIBUTION LIST

A Public Notice (PN) on a preparation of an EA was published to the public on the Corps' website and distributed to the following agencies soliciting review and comment:

Federal Agencies

- National Marine Fisheries Service
- U.S. Fish and Wildlife Service
- U.S. Environmental Protection Agency
- Federal Aviation Administration
- U.S. Coast Guard

State Agencies

- California Coastal Commission
- California Department of Fish and Wildlife
- Regional Water Quality Control Board, Los Angeles Region
- California State Lands Commission
- California Department of Parks and Recreation (Division of Boating and Waterways)
- California Department of Parks and Recreation (State Parks)
- California Department of Transportation (CalTrans), District 7
- California Natural Resources Agency
- State Historic Preservation Office

Local Agencies

- Heal the Bay
- Los Angeles County Department of Beaches and Harbors
- Los Angeles County Planning
- Los Angeles World Airport, Los Angeles International Airport
- Los Angeles County Sheriff (Marina del Rey Sheriff's Station)
- Lloyd Taber Library-Marina del Rey Library
- Surfrider Foundation (Los Angeles)
- Native American Tribes
- SC-DMMT (CSTF was invited to December 8, 2021, SC-DMMT/CSTF meeting for the SAP discussion and comments, but CSTF did not attend).

10. PREPARERS AND REVIEWERS

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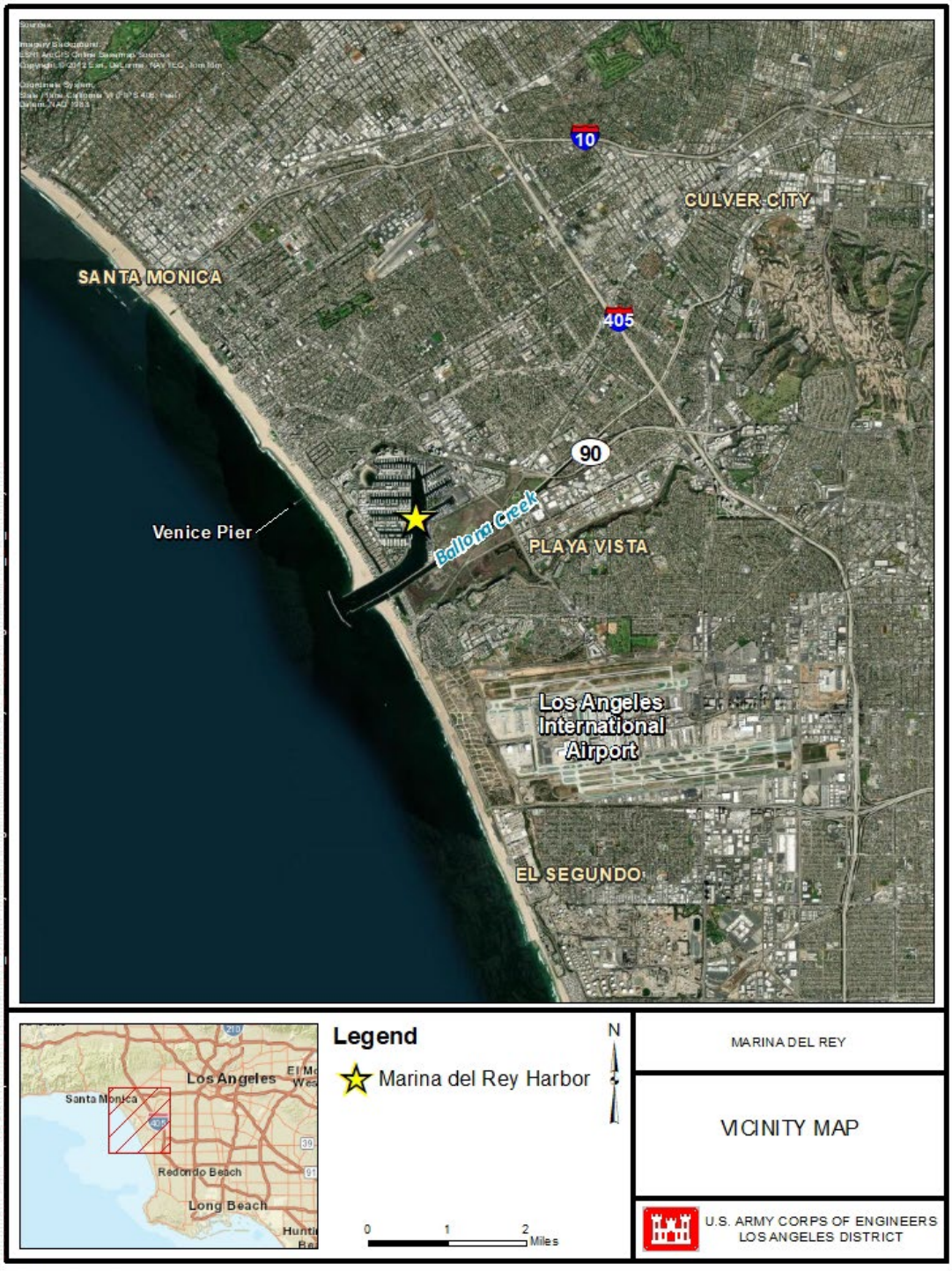
- Hayley Lovan — USACE, Chief, Ecosystem Planning Section
- Tiffany Bostwick — USACE, Chief, Environmental Resources Branch

11. FIGURES

Figure 1. Vicinity Map

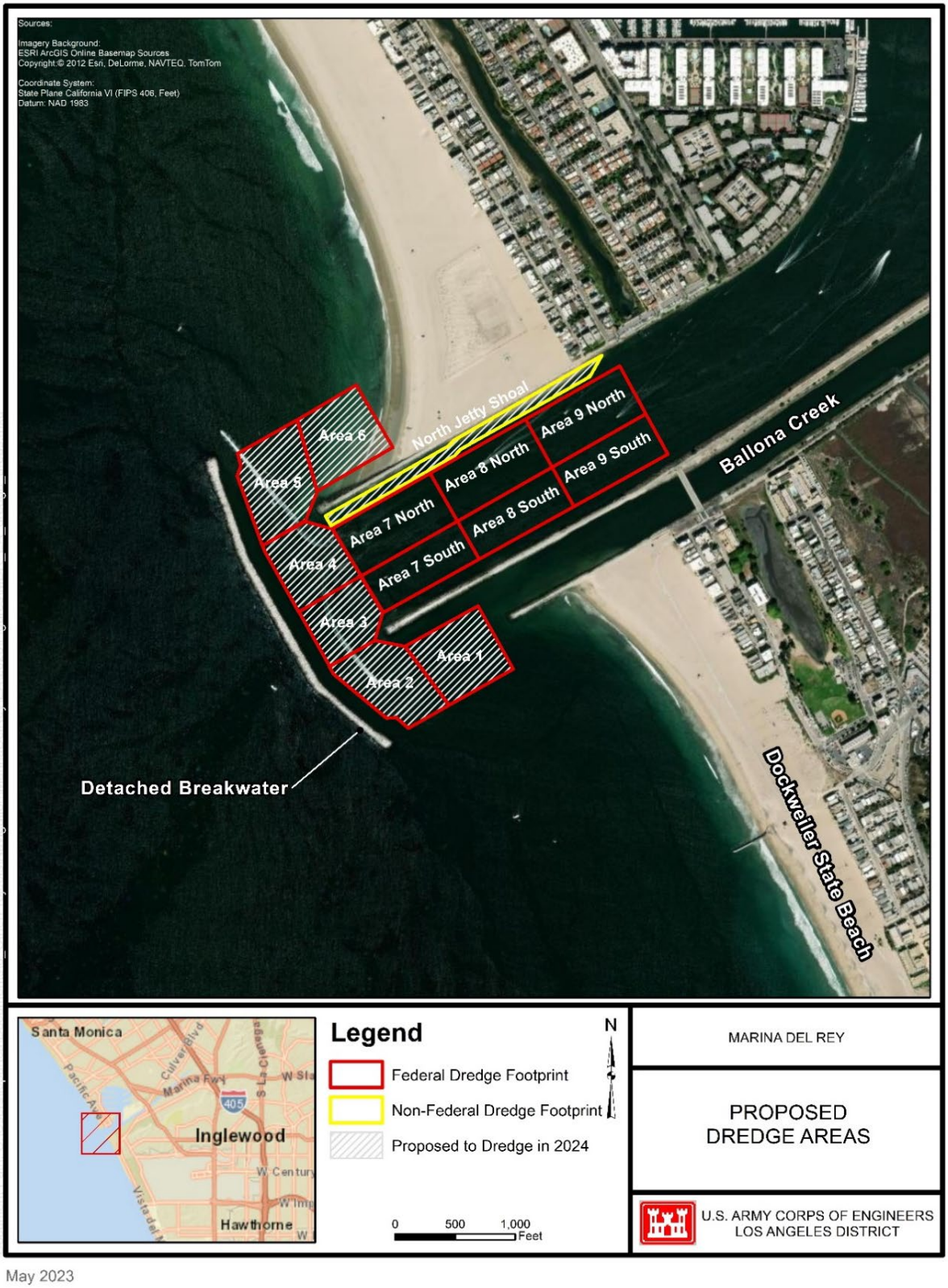


September 2023

Figure 2. Project Features

March 2023

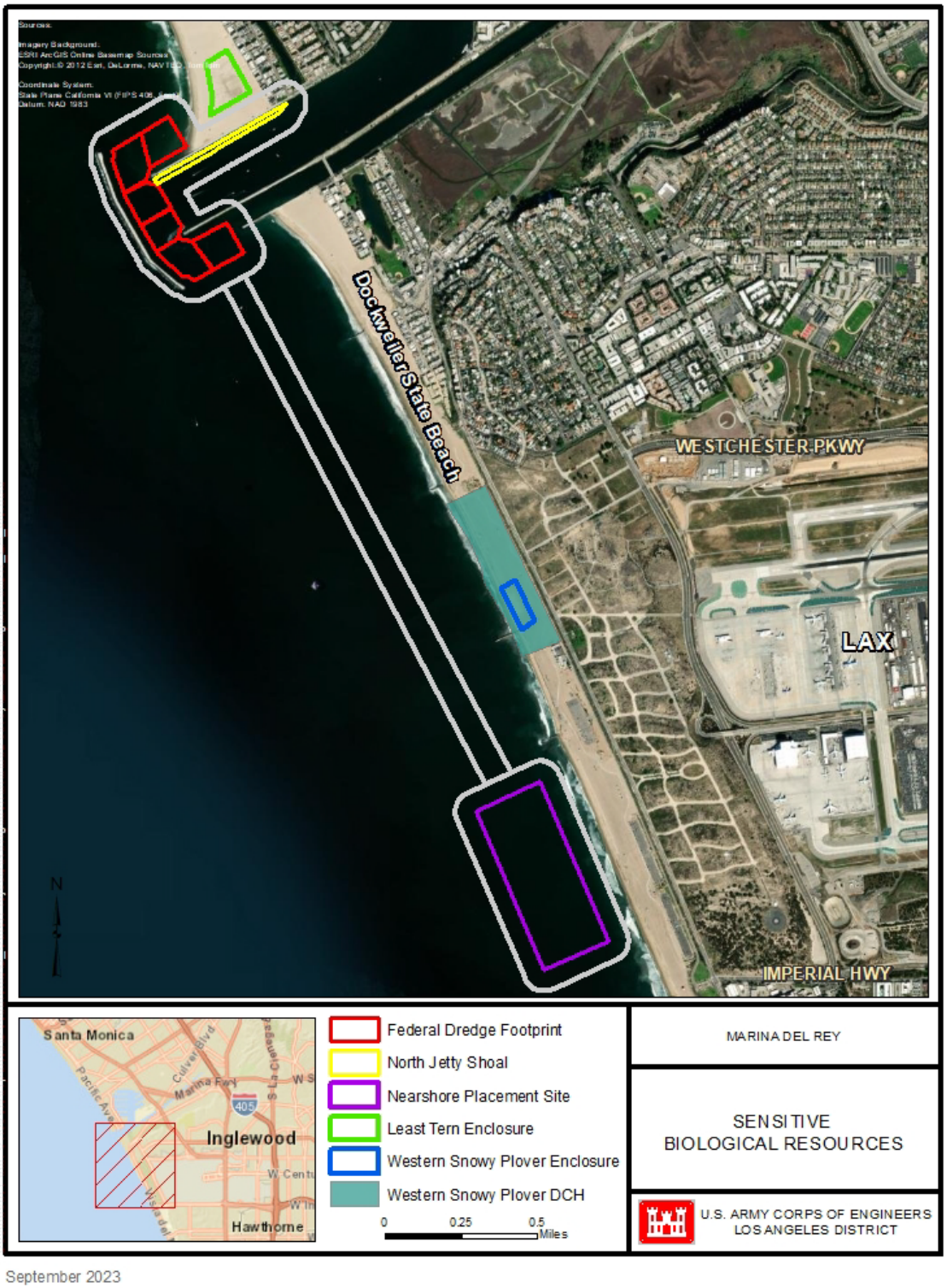
Figure 3. Proposed Dredge Areas



May 2023

Figure 4. NEPA Scope of Analysis/Action Area

Figure 5. Sensitive Biological Resources near the Action Area



September 2023

12. APPENDICES

Appendix A
Public Notice

PUBLIC NOTICE

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

BUILDING STRONG®

MARINA DEL REY HARBOR FEDERAL MAINTENANCE DREDGING PROGRAM

Pursuant to the National Environmental Policy Act (NEPA), the U.S. Army Corps of Engineers (Corps) is preparing an Environmental Assessment (EA) for maintenance dredging within the Marina del Rey (MDR) Harbor, to evaluate potential environmental impacts of dredging and nearshore dredged material placement activities. If the EA identifies significant impacts that cannot be mitigated to a level that is less than significant, an Environmental Impact Statement would be prepared. If no unmitigable, significant impacts are identified, then a Finding of No Significant Impact would be prepared.

As part of its Operations and Maintenance Program, the Corps proposes to complete a one-time maintenance dredging of approximately 630,000 cubic yards (cy) from the MDR Harbor Federal Navigation Channel (Areas 1 through 6) and the Los Angeles County Department of Beaches and Harbor Department's (LACDBH) North Jetty Shoal (Figure 1). Within the Federal Navigation Channel, approximately 420,000 cy will be dredged from the Sand Traps (Areas 1 and 6). Design depth of the Sand Traps is -30 mean lower low water (MLLW) with no over-depth allowance. Approximately 180,000 cy will be dredged from the Entrance Areas (Areas 2 through 5). Approximately 30,000 cy will be dredged from the North Jetty Shoal. Design depth of the Entrance Areas and the North Jetty Shoal is -20 MLLW plus a 2-foot over-depth allowance. Dredging would likely be performed using a mechanical clamshell dredge, then loaded onto scows and taken to the nearshore placement site.

Placement activities would occur in the nearshore area off Dockweiler Beach, in an area that has routinely been used for previous dredging (Figure 1). Maintenance dredging is tentatively scheduled to occur between October 2023 and May 2024. The duration of dredging activity including mobilization and demobilization is approximately 150 days. Dredging is anticipated to occur 24 hours a day, 7 days a week. Maintenance dredging of the MDR Harbor Federal Navigation Channel occurs approximately every five to ten years and maintenance dredging of LACDBH's North Jetty Shoal occurs less frequently, on an as-needed basis.

A Clean Water Act Section 404(b)(1) evaluation and a request for Section 401 Water Quality Certification were prepared and sent to the Los Angeles Regional Water Quality Control Board on May 12, 2023. The project will result in discharges of fill in Waters of the U.S. requiring preparation of a Clean Water Act 404(b)(1) analysis. Preliminary analysis indicates that up to approximately 630,000 cy of fill would be discharged. The discharge could temporarily impact approximately 58.8 acres of Waters of the U.S. The placement area consists entirely of subtidal area.

Federally listed species and critical habitat present in the vicinity of the dredging and placement areas include: California least tern (*Sternula antillarum browni)*, and western snowy plover (*Charadrius nivosus nivosus*). The Corps has determined that the Proposed Action would have "no effect" on the western snowy plover and its designated critical habitat. The Corps has determined that the Proposed Action "may affect but is not likely to adversely affect" the California least tern. Informal consultation with the US Fish and Wildlife Service will be initiated to request their concurrence with the "not likely to adversely affect" determination. The Corps is consulting with local tribes and the State Historic Preservation Office on the Proposed Action. The Corps has coordinated with the California Coastal Commission on a preparation of a Statement of Negative Determination in compliance with the Coastal Zone Management Act.

Environmental resources that will be analyzed in the EA include geology, oceanography and water quality, biological resources, air quality, noise, cultural resources, recreation uses, ground transportation and traffic, vessel traffic and safety, aesthetics, and environmental justice.

Comments on this public notice will be accepted from May 31, 2023, through June 30, 2023. To speak with someone about the public notice, please contact Kirk Brus, Physical Scientist Environmental Coordinator, at (213) 452-3876. Comments may be submitted electronically to: CESPL-Marina-del-Rey-Harbor-Dredging@usace.army.mil

U.S. ARMY CORPS OF ENGINEERS – LOS ANGELES DISTRICT

Marina del Rey Harbor Federal Maintenance Dredging Program

Figure 1. Proposed Action Area

May 2023

Appendix B
404(b)(1) Evaluation and Section 401 Water Quality Certification

THE EVALUATION OF THE EFFECTS
OF THE DISCHARGE OF FILL MATERIAL
INTO THE WATERS OF THE UNITED STATES
IN SUPPORT OF THE ENVIRONMENTAL ASSESSMENT FOR THE
MARINA DEL REY HARBOR
FEDERAL MAINTENANCE DREDGING PROGRAM
LOS ANGELES COUNTY, CALIFORNIA

INTRODUCTION. Consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other federal planning requirements, the U.S. Army Corps of Engineers, Los Angeles District (Corps) has prepared the following evaluation in accordance with Section 404(b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500), as amended by the Clean Water Act of 1977 (Public Law 95-217). Its intent is to evaluate information regarding the effects of discharge of dredge or fill material into the waters of the U.S. as a result of the Marina del Rey Harbor Federal Maintenance Dredging Program (Project). As such, it is not meant to stand alone and relies heavily upon information provided in the environmental document to which it is attached. Citation in brackets [] refer to expanded discussion found in the Final Environmental Assessment (Final EA), to which the reader should refer for details.

I. Project Description [1.1.1]

a. Location: Unincorporated Marina del Rey (MDR), California, is located south of the City of Venice, north of the City of Playa del Rey, and approximately 15 miles southwest of downtown Los Angeles, off the Pacific coast of Santa Monica Bay.

b. General Description: As part of its routine Operations and Maintenance (O&M) Program, the Project will dredge approximately 630,000 cubic yards (cy) from the MDR Federal Navigation Channel and the North Jetty Shoal (Figure 1). Within the Federal Navigation Channel (Areas 1 through 6; Figure 1), approximately 420,000 cy will be dredged from the Sand Traps (Areas 1 and 6). Design depth of the Sand Traps is -30 ft mean lower low water (MLLW) with no over-depth allowance. Approximately 180,000 cy will be dredged from the Entrance Areas (Areas 2 through 5). Approximately 30,000 cy will be dredged from the North Jetty Shoal. Design depth of Areas 2 through 5 and the North Jetty Shoal is -20 ft MLLW plus a 2-foot over-depth allowance.

Dredging activities will occur approximately from October 2023 through May 2024. Dredged material placement activities would occur in the nearshore area off of Dockweiler State Beach, approximately 2 miles south of the MDR harbor (Figure 1). Dredging would be performed using a clamshell dredge on derrick barge. Dredged

material would be transported using scows powered by tugboats to the nearshore placement area. Corps O&M dredging of the Federal Navigation Channel and placement activities have been recurring, routine maintenance activities since 1969.

c. Basic and Overall Project Purpose: The Proposed Project is similar in kind to previous MDR O&M dredging and placement activities. Previous maintenance dredging events of the federal channel occurred in 2007, 2012, and 2017. A North Jetty shoal was last dredged during the 1999-2000 dredging event. The Project would serve the following purposes: (1) maintain the Federal Navigation Channel which is subject to continual filling by littoral transport processes; (2) assure the continued safe navigation for maritime traffic within the harbor by minimizing the risk of hazardous shoaling conditions; and (3) provide beach nourishment material for downcoast beaches eroded by littoral processes.

d. General Description of Dredged or Fill Material: 2022 Corps Sampling and Analysis Plan (SAP) Results (SAPR) Report and Appendices.

(1) General Characteristics of Material (grain size, soil type):
Sediment testing of the proposed dredge and placement areas was performed in 2022 in compliance with the Inland Testing Manual guidelines for beach reuse and the Southern California Dredge Material Management Team (SC-DMMT) Sampling and Analysis Plan Results Guidelines. Composite grain size averages for all proposed dredge areas and weighted average grain size gradations for individual samples were well within the bounding grain size curves for both the proposed beach and nearshore placement areas. Cores from Area 1-3 had lower sand content (80-86%) and more silt; cores from Areas 4-6 and North Jetty Shoal had higher sand content (91-98%). Average sand content among all 24 cores from the 7 dredge areas was 90%.

Chemical analyses were performed on the 7 proposed dredge areas and results were evaluated against National Oceanic and Atmospheric Administration (NOAA) toxicity screening levels (effects range-low [ERL] and effects range-medium [ERM]) and federal and California human health objectives. Most analyte concentrations were below detection limits or low compared to screening values. Analyte concentrations detected above NOAA ERL values were: copper and zinc (Area 2); 4,4’ dichlorodiphenyldichloroethane (Areas 1 through 3); 4,4’ dichlorodiphenyldichloroethylene (Areas 1 through 4 and the North Jetty Shoal); total DDTs and total chlordane (Areas 1 through 5 and the North Jetty Shoal); and total PCBs (Areas 1 and 2). Total chlordane was above the NOAA ERM value in Areas 1 through 3. Arsenic (all 7 composites) and benzo[*a*]pyrene (Areas 1 through 4), were the only analytes in MDR composite samples that exceeded screening levels developed for human protection.

Due to elevated PAHs, chlordane and PCBs in the 2022 samples, the SC-DMMT determined that materials are suitable for nearshore placement only. Beach placement on Dockweiler State Beach was removed as an alternative placement site.

(2) Quantity of Material: Approximately 630,000 cy would be dredged from the harbor and deposited in the nearshore placement area off Dockweiler State Beach.

(3) Source Material: Sandy, clean sediment from MDR Federal Navigation Channel and North Jetty Shoal.

e. Description of the Proposed Discharge Site.

Clean, sandy sediment would be dredged from the MDR Federal Navigation Channel and North Jetty Shoal and placed for beach nourishment in nearshore placement area off of Dockweiler State Beach, approximately 2 miles downcoast of the harbor (Figure 1).

(1) The characteristic habitat of the placement site is sandy bottom benthic habitat.

(2) Size (acres): The suitable dredged sediment would be placed within an approximately 58.8-acre nearshore placement area off Dockweiler State Beach.

(3) Type of Site (confined, unconfined, open water): unconfined, nearshore; open water, nearshore. The nearshore placement area consists entirely of subtidal area.

f. Description of Disposal Method: Placement of dredged sediment would be performed using a clamshell dredge on a derrick barge. Clean, suitable material dredged from clamshell would be placed in scows transported by tugboats to the nearshore placement area.

II. Factual Determinations.

a. Physical Substrate Determinations:

(1) Substrate Elevation and Slope:

The nearshore placement area ranges from approximately -10 to -30 ft MLLW.

(2) Sediment Type:

The 2022 sediment sampling and characterization efforts indicate sediment in the Federal Navigation Channel and North Jetty Shoal dredge templates and placement areas (nearshore off Dockweiler State Beach; Dockweiler State Beach) contained approximately 80% or more sand on average. Sediments were determined physically suitable and compatible for beach placement on Dockweiler State Beach and/or nearshore placement off Dockweiler State Beach.

(3) Dredge Material Movement:

Sandy dredged sediment in the Federal Channel and North Jetty Shoal would be used for nearshore nourishment. While some movement is expected to occur as material is redistributed by waves and currents, most of the material is expected to remain within the

littoral cell.

(4) Physical Effects on Benthos (burial, changes in sediment type, etc.):

The proposed nearshore placement area consists of sandy, clean, benthic bottom. Temporary, short-term adverse impacts would occur. The placement of sediments would bury benthic organisms. Recolonization would be expected to occur quickly. No long-term adverse effects are expected. No attached marine algae are expected to occur in the intertidal or nearshore zone near the dredged material placement site, as little or no hard substrate exists for attachments and the area is characterized by a highly active littoral cell. No known kelp, eelgrasses or seagrasses occur in the nearshore habitats within the immediate vicinity of the nearshore placement area. Placement of dredge material in the nearshore placement area would not significantly degrade the value of intertidal and subtidal sandy bottom benthic habitats.

(5) Other Effects: N/A

(6) Actions Taken to Minimize Impacts (Subpart H)

Needed: X YES _____NO

No measures can be taken to minimize direct impacts to benthic organisms from burial, although indirect impacts will be minimized through water quality monitoring and control of turbidity. Monitoring of water quality to control turbidity during disposal would occur. If turbidity exceeds water quality criteria, disposal would be evaluated and modifications would be made to get back into compliance.

If needed, Taken: X YES _____NO

In accordance with the Environmental Commitments, a water quality monitoring plan will be part of the construction contract and will be coordinated with the Regional Water Quality Control Board, Los Angeles Region. Turbidity levels would be monitored throughout placement operations with prescribed actions to be taken (i.e., slowing dredge cycle times, use of silt curtains) should turbidity exceed action levels.

b. Water Circulation, Fluctuation, and Salinity Determinations:

(1) Water (refer to 40 CFR sections 230.11(b), 230.22 Water, and 230.25 Salinity Gradients; testing specified in Subpart G may be required). Consider effects on salinity, water chemistry, clarity, odor, taste, dissolved gas levels, nutrients, eutrophication, others.

Placement activities would not adversely affect water circulation, fluctuation, salinity, water chemistry, clarity, odor, taste, dissolved gas levels, nutrients, or eutrophication. Only clean, compatible sands from the federal channel dredged areas

would be utilized for placement activities. These sands are not a source of contaminants. Nearshore placement activities off Dockweiler State Beach may include temporary increases in turbidity and suspended solids levels along with the associated decreases in dissolved oxygen (DO) in the immediate vicinity of the dredged material nearshore placement area. DO may be rapidly depleted from waters immediately adjacent to the dredged material nearshore placement area if anaerobic sediments are encountered. Minor increased turbidity levels may exist in the immediate vicinity of the nearshore placement area that may result in minor, temporary reductions in DO. Localized turbidity associated with temporary blackening of sand caused by dredged material placement in nearshore of (chemically reduced) organic material onto the beach could occur. Increased turbidity would result in a decrease in light penetration. Nearshore placement of material may result in minimal localized increases in turbidity nearshore resulting in minor temporary decreases in clarity. The turbidity would be minimal, localized, and dissipate quickly. Receiving waters immediately adjacent to the dredged material nearshore placement area may be subject to changes in pH due to unanticipated anaerobic sediments from the discharge of dredged material on nearshore placement area. Localized nutrient enrichment of seawater may also occur. Sands could be a source of nutrients. However, since the nearshore placement area is a high energy environment, rapid dispersion and oxygenation of sediments is expected to occur. Ocean water would carry along sands; thus, there would be no effect on salinity levels. Water clarity is expected to be a temporary and short-term impact at the nearshore placement area. Because the nearshore placement area is a high energy environment, rapid dispersion and oxygenation of sediments is expected to occur. All water quality parameters would return to baseline levels once sediment transport and chemical parameters reach equilibrium.

(2) Current Patterns and Circulation (consider items in sections 230.11(b), and 230.23), Current Flow, and Water Circulation.

Currents in the nearshore placement area are predominantly parallel to shore. The currents reverse direction seasonally and occasionally even daily. Dredged material placement in the nearshore would not disrupt currents and circulations because the nearshore placement areas are within high energy areas, and rapid dispersion of the dredged material is expected to occur. Nearshore placement activities would not significantly affect circulation or current patterns. The currents are not expected to change in magnitude or direction.

(3) Normal Water Level Fluctuations (tides, river stage, etc.) (consider items in sections 230.11(b) and 230.24).

High energy tidal flows and currents are anticipated to disperse the discharge of dredged material at the dredged material nearshore placement area and is not expected to have a significant impact on normal water level fluctuations. The proposed discharge would not result in stationary fill that would impact water level fluctuations and would not impact

individually and cumulatively normal water fluctuations.

(4) Salinity Gradients (consider items in sections 230.11(b) and 230.25.

The placement of clean, sandy material in the nearshore placement area is not expected to have any impact on normal water salinity nor is it expected to create salinity gradients. Water used to carry along sands would be ocean water from the harbor as is water in the nearshore placement site; thus, there would be no effect on salinity levels.

(5) Actions That Will Be Taken to Minimize Impacts (refer to Subpart H)

Needed: X YES _ NO
If needed, Taken: X YES _ NO

Nearshore placement activities would be monitored for effects on water quality, including turbidity, dissolved oxygen, light transmittance, pH, salinity, and temperature. If turbidity and/or DO exceeds water quality criteria, a Best Management Practice (BMP) would be implemented during nearshore placement activities to evaluate such exceedances and make modifications to nearshore placement activities to reduce and minimize impacts and to get back into compliance, in accordance with the construction contract specifications.

c. Suspended Particulate/Turbidity Determinations:

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site (consider items in sections 230.11(c) and 230.21)

Nearshore placement of clean, sandy sediment from the MDR harbor would cause a temporary increase in suspended sediments and turbidity. The impact is expected to be highly localized within the immediate vicinity of nearshore placement area. The area is expected to return to background levels within 24 to 48 hours after nearshore placement activities cease. Water quality monitoring during placement activities would allow the Corps to modify operations (such as by slowing rate of discharge) until any water quality problems abate. Nearshore placement of sediment may result in minimal localized increases in turbidity in the ocean resulting in minor temporary decreases in clarity. The turbidity would be minimal, localized, and dissipate quickly.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column (consider environmental values in section 230.21, as appropriate)

Only clean, sandy sediment would be placed in the nearshore placement area. Minor turbidity levels may exist in the immediate vicinity of the nearshore placement activities that may result in minor, temporary reductions in DO. The sandy sediment is not a source of contaminants. Minor increased turbidity levels may exist in the immediate vicinity of

the nearshore placement activities. The turbidity would be minimal, localized, and dissipate quickly thus it is unlikely reductions in DO would occur.

(3) Effects on Biota (consider environmental values in sections 230.21, as appropriate).

Biota disturbed or buried during nearshore placement activities are expected to begin recolonization once placement activities are completed. Impacts will be adverse, but temporary and not significant.

(4) Actions taken to Minimize Impacts (Subpart H)

Needed: X YES _ NO
If needed, Taken: X YES _ NO

Monitoring of water quality to control turbidity would occur. If turbidity exceeds water quality criteria, placement activities would be evaluated .

Turbidity levels would be monitored throughout dredging/nearshore placement operations with prescribed actions to be taken (i.e., slowing dredge cycle times, use of silt curtains) should turbidity exceed action levels.

d. Contaminant Determinations (consider requirements in section 230.11(d)): The following information has been considered in evaluating the biological availability of possible contaminants in excavated or nearshore placement sediments. (Check only those appropriate.)

(1) Physical characteristics _X_

(2) Hydrography in relation to known or anticipated sources of contaminants _X_

(3) Results from previous testing of the material or similar material in the vicinity of the proposed project _X_

(4) Known, significant sources of contaminants (e.g. pesticides) from land runoff or percolation

(5) Spill records for petroleum products or designated (Section 311 of the CWA) hazardous substances _X_

(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources

(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man- induced discharge activities

(8) Other sources (specify) X

See Section I. d. General Description of Dredged or Fill Material

e. Aquatic Ecosystem and Organism Determinations (use evaluation and testing procedures in Subpart G, as appropriate).

(1) Plankton, Benthos and Nekton

Plankton refers to all organisms that drift with ocean-going currents including phytoplankton, drifting plants such as diatom and dinoflagellates, and zooplankton, which comprises such slightly mobile animals as small crustaceans, swimming mollusks, jellyfish, and free-swimming larvae of fishes and bottom animals. A baseline marine ecology survey of Marina del Rey Harbor found that phytoplankton productivity followed seasonal variations, with low productivity in winter followed by a spring bloom in April (Soule and Oguri 1977). Productivity declined in May followed by sporadic localized blooms in summer and fall. The areas with the highest phytoplankton productivity were at the mouth of Ballona Creek and in the inner harbor (inland of the Federal Navigation Channel and well outside the Action Area).

Dredging and nearshore dredged material placement activities would result in short-term turbidity impacts that would affect plankton in the area. Organisms could stifle in the immediate vicinity as these small organisms are impacted by turbidity. However, these effects would be minor in both extent and duration and the plankton would be expected to recover quickly once nearshore placement is completed. Larger organisms in the nekton would be expected to avoid placement activities and would not be impacted.

(2) Food Web

Impacts to the bottom of the food web chain (plankton and nekton) due to dredging of sediment and sediment nearshore placement activities would be short-term and occur in a small area. Recovery would be quick once operations are concluded.

(3) Special Aquatic Sites

There are no special aquatic sites in the placement site. No attached marine algae are expected to occur in the intertidal or nearshore zone near the dredged material placement site, as little or no hard substrate exists for attachments and the area is characterized by a highly active littoral cell. No known kelp, eelgrasses or seagrasses occur in the nearshore habitats within the immediate vicinity of the nearshore placement site. Placement of dredge material in the nearshore placement area would not significantly degrade the value of intertidal and subtidal sandy bottom benthic habitat.

Eelgrass was not observed along the manmade breakwater, jetties, or natural substrates in the

Marina del Rey Harbor entrance channel when last surveyed in May 2006. The Corps will perform a pre-construction eelgrass survey of the Action Area to determine if eelgrass is present. Should eelgrass be found in the Action Area, it will be avoided to the maximum extent practicable and a post-construction eelgrass survey will be conducted. If the Corps identifies a negative impact to eelgrass as a result of the Proposed Project, the Corps will coordinate with NMFS to mitigate the impacts to eelgrass in accordance with the California Eelgrass Mitigation Policy.

(4) Threatened & Endangered Species [Section III, (C)]

Federally listed species present in the vicinity of the nearshore placement site include Western snowy plover (*Charadrius nivosus;* plover) and its designated critical habitat (DCH). Plover have been observed year-round on Dockweiler State Beach. Because direct beach placement will not occur, the Corps has determined the Project would have No Effect on plover or its DCH.

Federally listed species present in the vicinity of the dredge site include California least tern (*Sterna antillarum browni;* tern). A tern colony is typically located on Venice Beach, approximately 500 feet north of the North Jetty Shoal. The Corps has determined that the Project May Affect but is Not Likely to Adversely Affect California least tern. The Corps has initiated informal consultation with USFWS for California least tern and will implement avoidance and minimization measures as determined during consultation. See Section 4.3 of the EA for full analysis of impacts to federally listed species.

(5) Other fish and wildlife [Section IV, (B)]

There are two notable fish species found within MDR Harbor: white sea bass (*Cynoscion nobilis*), and California grunion (*Leuresthes tenuis*).

Four species of baleen whales and eight species of toothed whales have been recorded in the waters of Santa Monica Bay (USACE 2006). California gray whales (*Escherichtius robustus*), common dolphins (*Delphinus delphis*), Pacific bottlenose dolphins (*Tursiops truncatus*), and Pacific white-sided dolphins *(Lagenorhynchus obliquidens*) are the most common species. The only marine mammals expected to occur in the project area are California sea lions (*Zalophus californianus*) and harbor seals (*Phoca vitulina*), which are protected under the Marine Mammal Protection Act of 1972. Seals and sea lions are generally found in nearshore waters along the coast, but the California sea lion is frequently present throughout the Harbor on breakwater rocks and boat docks. Sea lions are regularly observed in water along the nearshore environment foraging as well as moving between locales along the coast.

The Proposed Project is expected to occur between October 2023 to May 2024. Dredged material placement in the nearshore environment has the potential to adversely affect turbidity in the short-term and therefore, grunion's ability to spawn on local beaches. However, in the

long-term, nearshore placement may enhance grunion spawning habitat by nourishing local eroded beaches with clean, sandy material. No adverse effects to white seabass are expected due to the distance of the Action Area to the seabass enclosures.

Potential effects to grunion spawning on beaches after March 1 would be minimal with the implementation of the following minimization and avoidance measure included as part of the Proposed Project:

- Nearshore placement would not be allowed two hours prior to, two hours during, and two hours after each scheduled grunion run.

(6) Actions to Minimize Impacts (refer to Subpart H) [Section VI]

Needed: X YES _NO

Minimization and avoidance measures are needed to minimize impacts to marine resources, minimization and avoidance measures are noted in previous sections and the Environmental Commitments Section 4.3.3 of the Final EA.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination (consider factors in section 230.11(f)(2))

Is the mixing zone for each disposal (placement) site confined to the smallest practicable zone?
X_ YES _ NO

Sediments do not require a mixing zone to remain in compliance with water quality standards. As such, the mixing zone is considered to be the smallest practicable.

(2) Determination of Compliance with Applicable Water Quality Standards (present the standards and rationale for compliance or non-compliance with each standard)

The project will be in compliance with state water quality standards of the Water Quality Control Plan for the Los Angeles Basin Plan (Basin Plan), the Ocean Plan, and the Thermal Plan. Applicable water quality objectives include DO, pH, and turbidity. Applicable beneficial uses include marine habitat (MAR), navigation (NAV), and rare, threatened, or endangered species (RARE). BMPs and water quality environmental commitments discussed in Section 4.3.2 of the EA would be implemented to minimize potential environmental impacts to water quality in order for compliance with water quality standards. Nearshore placement off Dockweiler State Beach of clean, sandy sediment would result in short-term elevated turbidity levels and suspended sediment concentrations, but no appreciable long-term changes in other water quality parameters, including DO, pH, nutrients, or chemical contaminants. Factors considered in this assessment include the relatively localized nature of the expected turbidity plumes for the

majority of the nearshore placement period and rapid diluting capacity of the receiving environment. Water quality monitoring would be required during sediment nearshore placement activities. If monitoring indicates that suspended particulate concentrations outside the zone of initial dilution exceeds permissible limits, nearshore placement operations would be modified to reduce turbidity to permissible levels. Therefore, impacts to water quality from placement of sediment at the receiver site would not violate water quality objectives or compromise beneficial uses listed in the Basin Plan. USACE will continue to coordinate with the Los Angeles Regional Water Quality Control Board during construction to minimize impacts to water quality.

(3) Potential Effects on Human Use Characteristic

a) Municipal and Private Water Supply (refer to section 230.50)

There are no municipal or private water supply resources (i.e., aquifers, pipelines) in the project area. The Project would have no effect on municipal or private water supplies or water conservation.

b) Recreational and Commercial Fisheries (refer to section 230.51)

The sediment nearshore placement areas are not subject to commercial fishing. Recreational fishing would move to avoid placement activities to follow fish out of these areas.

c) Water Related Recreation (refer to section 230.52)

Construction equipment would be required to maintain harbor access outside of the immediate, designated construction limits for all uses. During the Project, proper advanced notice to mariners would occur and navigational traffic would not be allowed within the project area. The displacement of recreational boating and kayaking would be temporary and short-term. The currents are not expected to change in magnitude or direction. Therefore, sediment placement activities are not expected to measurably change currents or change surfing in any discernible way. To minimize navigation impacts and threats to vessel safety, all barges, scows and tugboats would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the work would be published in the U.S. Coast Guard Local Notice to Mariners.

d) Aesthetics (refer to section 230.53)

Minor, short term effects during sediment nearshore placement activities are anticipated. During sediment placement activities, the visual character of the site would be affected by the tugboats and crew boats; however, these activities are temporary in duration, and as such, would not result in permanent effects to the visual

character of the site.

e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves (refer to section 230.54)

The discharge of dredged material into waters of the US associated with the Proposed Project would not have any effect on national and historic monuments, national seashores, wild and scenic rivers, wilderness areas or research sites.

f) Determination of Cumulative Effects on the Aquatic Ecosystem (consider requirements in section 230.11(g))

Past dredging work that placed sand at nearshore placement area off Dockweiler State Beach had beneficial cumulative impacts by nourishing eroded beaches. The North Jetty Shoal is dredged approximately every 20 years and was previously dredged in 1999/2000 concurrent with Corps dredging of MDR Federal Navigation Channel. Frequency and extent of North Jetty Shoal dredging is dependent on availability of funding as well as the number and direction of storms. The Proposed Action includes dredging of approximately 30,000 cy from the North Jetty Shoal. Future dredging of the North Jetty Shoal would be infrequent, approximately every 20 years, adjacent to the Federal Navigation Channel. Due to the infrequency of dredging and the limited area of potential effects, future dredging of the North Jetty Shoal would not contribute to cumulative effects to the aquatic ecosystem.

The Los Angeles County is working on several other projects in the Marina del Rey Harbor entrance channel and at Dockweiler State Beach, some which include improvements on stormwater drains under the State of California's Clean Beaches Initiative (CBI). These projects do not positively or negatively affect the need to remove the shoaled sediment from the entrance channel and do not impact the Marina del Rey Harbor entrance channel maintenance dredging project.

Future watershed restoration projects, such as those identified in the Los Angeles Regional Integrated Water Management Plan, are not currently funded. Should they be implemented in the next decade, they will not result in cumulative impacts to the aquatic ecosystem.

Future harbor development projects, including realignment and replacement of existing dock structures are far enough away from the Proposed Action that the projects would not cumulatively affect one another if they occurred concurrently. These projects are in the early planning/permitting phases and are not expected to be ready for construction during the proposed project activities.

Cumulative impacts are considered to be less than significant.

g) Determination of Secondary Effects on the Aquatic Ecosystem (consider requirements in section 230.11(h))

Secondary effects of sediment placement in the nearshore area off Dockweiler State Beach area would be negligible. Nearshore placement area outside the direct impact areas would have only negligible turbidity effects to marine resources. Water quality monitoring conducted during dredging and nearshore placement activities will ensure turbidity is controlled and confined to the immediate area, minimizing secondary effects to marine resources within the vicinity.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

a. Adaptation of the Section 404(b)(l) Guidelines to this Evaluation

No significant adaptations of the guidelines were made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem:

There are no practicable alternatives for dredging and placement activities other than O&M dredging (Proposed Project), or No Action (no dredging or placement activities). The proposed project is the least environmentally damaging practicable alternative (LEDPA).

Potential alternative dredged material placement areas (Dockweiler State Beach) were considered but were determined to be impracticable. Due to elevated PAHs, chlordane and PCBs in 2022 samples, the SC-DMMT determined that materials are suitable for nearshore placement off of Dockweiler State Beach only. Beach placement on Dockweiler State Beach was not considered a viable placement alternative due to elevated PAHs, chlordane and PCBs. Therefore, Dockweiler State Beach was removed as an alternative placement site. Placement of dredged material in upcoast areas would result in additional shoaling as the material moves back into the harbor through littoral transport, and also would leave downcoast beaches in an eroded state. Placement of dredged material further downcoast or offshore would not address the erosion issues immediately downcoast of the harbor and would also result in substantial increased costs and additional environmental impacts due to increased emissions, reduced recreational opportunities on downcoast beaches, increased timeframe for dredging and placement and expanded footprint.

Impacts of the No Action alternative have been evaluated in the EA, but this would not meet the project's purpose and need. Without O&M dredging and placement activities, the MDR Federal Navigation Channel would become increasingly unsafe for navigation, which would jeopardize safety. O&M dredging would eventually be required as emergency work to avoid public safety hazards, and/or closure of the harbor, and would incur additional costs to restore the federal channel.

c. Compliance with Applicable State Water Quality Standards.

The proposed project meets State of California water quality standards.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act.

No toxic materials/wastes are expected to be produced or introduced into the environment by proposed nearshore placement of dredged or fill material into waters of the US.

e. Compliance with Endangered Species Act of 1973.

The Proposed Project is in compliance with the Endangered Species Act. As stated in (4) Threatened & Endangered Species [Section III, (C)], federally listed species present in the vicinity of the nearshore placement site include Western snowy plover (*Charadrius nivosus;* plover). The Corps has determined the Project would have No Effect on plover.

Federally listed species present in the vicinity of the dredge site include California least tern (*Sterna antillarum browni;* tern). The Corps has determined that the Project May Affect but is Not Likely to Adversely Affect California least tern. The Corps has initiated informal consultation with USFWS for California least tern and will implement avoidance and minimization measures as determined during consultation.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972.

No sanctuaries as designated by the Marine Protection, Research and Sanctuaries Act of 1972 will be affected by proposed discharges of dredged material into waters of the US.

g. Evaluation of Extent of Degradation of the Waters of the United States

(1) Significant Adverse Effects on Human Health and Welfare

(a) Municipal and Private Water Supplies

The are no municipal or private water suppliers within the proposed project Nearshore placement activities will have no effect on municipal and private water supplies.

(b) Recreational and Commercial Fisheries

The Project would have minor, short-term impacts, but no significant adverse effects on recreational fisheries. The project area is not subject to commercial fishing. Recreational fishing would move to avoid the project area and follow fish

out of these areas. To minimize navigation impacts and threats to vessel safety, tugboats and crew boat vessels would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the work would be published in the U.S. Coast Guard Local Notice to Mariners.

(c) Plankton

Nearshore placement activities would result in short-term turbidity impacts that would affect plankton in the area. However, these effects would be small in both area and time and the plankton would be expected to recover quickly once nearshore placement is completed.

(d) Fish

Larger organisms in the nekton would be expected to avoid sediment dredging and placement activities and would not be impacted.

(e) Shellfish

Shellfish would be buried by sediment nearshore placement activities, but the areas would be small in extent and recolonization would begin immediately once placement activities are complete.

(f) Wildlife

Birds may be attracted to the nearshore placement area as benthic organisms coming out of the scow offer an alternate food source. Marine mammals are expected to avoid the sediment placement areas, see Section 4.3 of the EA for full analysis of impacts to marine mammals.

(g) Special Aquatic Sites

There are no special aquatic sites in the placement site.

(2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems: Any adverse effects would be short-term and insignificant. Refer to Section 4.3 in the Final EA.

(3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability: Any adverse effects would be short-term and less than significant. Refer to Section 4.3 of the Final EA.

(4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Values: Any adverse effects would be short-term and less than significant. Refer to Sections 4.7

and 4.10 of the Final EA.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

Specific environmental commitments are outlined in the analysis above and in the Final EA. All appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharges on the aquatic ecosystem.

i. On the Basis of the Guidelines, the Proposed Disposal [Placement] Site(s) for the Discharge of Dredged or Fill Material (specify which) is:

____(1) Specified as complying with the requirements of these guidelines; or,
_X_ (2) Specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem; or,
____(3) Specified as failing to comply with the requirements of these guidelines.

Prepared by: Kirk Brus Date: 2 August 2023

Figure 1. Proposed Project Dredge Areas and Nearshore Placement Area

May 2023

Los Angeles Regional Water Quality Control Board

CLEAN WATER ACT SECTION 401 WATER QUALITY CERTIFICATION AND ORDER

Effective Date: September 13, 2023

Program Type: Dredging

Regulatory. Measure ID:	452599
Place ID:	888233
WDID:	4WQC40123097

Project Type: Boating and Navigation

Project: Marina del Rey Harbor Federal Maintenance Dredging Program (Project)

Applicant: United States Army Corps of Engineers

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Water Board Contact Person:
If you have any questions, please call the Los Angeles Regional Water Quality Control Board (Los Angeles Water Board) Staff listed above or (213) 576-6600 and ask to speak with the Water Quality Certification and Wetlands Unit Program Manager. When corresponding via email, please include our general email: RB4-401Certification@waterboards.ca.gov.

Table of Contents

I. Order

This Clean Water Act (CWA) section 401 Water Quality Certification action and Order (Order) is issued at the request of U.S. Army Corps of Engineers, Los Angeles District (hereinafter Corps or Permittee) for the Project. This Order is for the purpose described in the application and supplemental information submitted by the Permittee. The application was received on May 12, 2023. The application was deemed complete on August 17, 2023.

The Applicant submitted a certification request as defined by 40 CFR section 121.5 concurrently to the Los Angeles Water Board and the U.S. Army Corps of Engineers (Corps) on May 12, 2023. In response to the certification request, the Corps provided a reasonable period of time as defined by 40 CFR 121.6 for the Water Board to act on the request by September 13, 2023.

II. Public Notice

The Los Angeles Water Board provided public notice of the application pursuant to California Code of Regulations, title 23, section 3858 from May 18, 2023 to the effective date of the Order. The Los Angeles Water Board did not receive any comments during the comment period.

III. Project Purpose

The Project will maintain the Marina del Rey (MDR) Harbor Federal Navigation Channel and the North Jetty Shoal, assure the continued safe navigation for maritime traffic within the harbor by minimizing the risk of hazardous shoaling conditions and provide beach nourishment material for downcoast beaches.

IV. Project Description

As part of its Operations and Maintenance Program, the Corps will complete maintenance dredging of approximately 630,000 cubic yards (cy) from the MDR Harbor Federal Navigation Channel. Approximately 420,000 cy will be dredged from the sand traps (Areas 1 and 6 (see Attachment A)). Design depth of the sand traps is -30 mean lower low water (MLLW) with no over-depth allowance. Approximately 180,000 cy will be dredged from the Entrance Areas (Areas 2 through 5). Approximately 30,000 cy will be dredged from the North Jetty Shoal. Design depth of the Entrance Areas and the North Jetty Shoal is -20 MLLW plus a 2-foot over-depth allowance.

Placement activities will occur in the nearshore area off of Dockweiler Beach. The maintenance dredging is tentatively scheduled to occur between October 1, 2023 to May 23, 2024. The duration of dredging and placement activities will take approximately 130 days using a clamshell dredge, plus an additional 15 days of mobilization. Recurring, routine maintenance dredging of the MDR Harbor Federal Navigation channel occurs approximately every five or six years and maintenance dredging of Los Angeles County Department of Beaches and Harbors' (LACDBH) North Jetty Shoal occurs approximately every 20 years with proposed placement activities in the nearshore area off of Dockweiler State Beach.

Maintenance dredging and placement of dredged material at the Dockweiler nearshore placement site is expected to be performed with a clamshell dredge. The proposed Federal project is similar in kind to previous MDR Harbor maintenance dredging and placement activities program including the Corps' maintenance dredging of the MDR Harbor Federal Navigation Channel performed in 2007 and 2017 and dredging of the MDR Harbor Federal Navigation Channel and the LACDBH's North Hetty shoal performed in 1999/2000.

Sampling and analysis of sediment of the Federal Navigation Channel and the North Jetty Shoal were prepared in a 2021 sampling and analysis plan (SAP) for the maintenance dredging program. On December 1, 2021, the Corps circulated the 2021 SAP to the multi-agency Southern California Dredge Material Management Team (SCDMMT), Contaminated Sediment Task Force (CSTF) and Heal the Bay. On December 8, 2021, the SAP was presented to the SCDMMT and CSTF during a monthly SCDMMT meeting for comments. The SAP was finalized in January 2022. Sampling was conducted in June 2022.

On October 26, 2022, a 2022 SAP Results (SAPR) Report/Appendices including a grain size compatibility report was presented to the SCDMMT for comments. During this meeting, the U.S. Environmental Protection Agency (USEPA) requested for an additional table (Chemistry Comparison) highlighting test results from 2010, 2011, 2016, and 2022 for polyaromatic hydrocarbons (PAHs), chlorinated pesticides (chlordane) and organics including Polychlorinated bi-phenyls (PCBs), and the location of placement sites from MDR Harbor dredging. On December 6, 2022, the Corps presented the requested Chemistry Comparison table to USEPA and the larger SCDMMT. In general, PAH, chlordane, and PCB concentrations have decreased over time (from 2010-2022). Nevertheless, due to elevated PAHs, chlordane, and PCBs in 2022 samples, the SCDMMT determined that materials were only suitable for nearshore placement off Dockweiler State Beach. Beach placement on Dockweiler State Beach was not considered a viable placement alternative by the SCDMMT.

V. Project Location

Marina del Rey is located west of Hwy 1, south of Venice CA, and adjacent to Ballona Creek.

Latitude	Longitude
-118.45058537345199	33.97077991804976

Maps showing the Project location are found in Attachment A of this Order.

VI. Project Impact and Receiving Waters Information

The Project is located within the jurisdiction of the Los Angeles Water Board. Receiving waters and groundwater potentially impacted by this Project are protected in accordance with the applicable water quality control plan (Basin Plan) for the region and other plans and policies which may be accessed online at: http://www.waterboards.ca.gov/plans_policies/. The Basin Plan includes water quality standards, which consist of existing and potential beneficial uses of waters of the state, water quality objectives to protect those uses, and the state and federal antidegradation policies.

Receiving Water:	Marina Del Rey Entrance Channel (Hydrologic Unit Code: 180701040403)
Designated Beneficial Uses:	NAV, REC-1, REC-2, COMM, MAR, WILD, RARE, SHELL

VII. Description of Direct Impacts to Waters of the State

Total Project dredge quantities for all impacts are summarized in Table 1. Permanent impacts are categorized as those resulting in a physical loss in area and also those degrading ecological condition only.

Table 1: Total Project Dredge Quantity

Aquatic Resource Type	Temporary Impact[1]			Permanent Impact					
				Physical Loss of Area			Degradation of Ecological Condition Only		
	Acres	CY[2]	LF	Acres	CY	LF	Acres	CY	LF
Ocean/bay/ estuary		630,000							

VIII. Avoidance and Minimization

No alternatives analysis is required because the Project has no permanent impacts to aquatic resources and no impacts to rare, threatened or endangered species habitat in waters of the state, wetlands, eel grass beds, Outstanding National Resources Waters or Areas of Special Biological Significance.

IX. Compensatory Mitigation

No compensatory mitigation was required because all Project impacts are temporary.

X. California Environmental Quality Act (CEQA)

The Los Angeles Water Board has determined that the Project is exempt from review under CEQA pursuant to California Water Code of Regulations, Title 14, Section 15061. Specifically, the issuance of this Order and the activities described herein meet the exemption criteria under California Code of Regulations Title 14, Section(s) 15304 minor alterations to land. Additionally, the Los Angeles Water Board concludes that no exceptions to the CEQA exemption apply to the activities approved by this Order.

XI. Petitions for Reconsideration

Any person aggrieved by this action may petition the State Water Board to reconsider this Order in accordance with California Code of Regulations, Title 23, Section 3867. A petition for reconsideration must be submitted in writing and received within 30 calendar days of the issuance of this Order.

[1] Includes only temporary direct impacts to waters of the state and does not include upland areas of temporary disturbance which could result in a discharge to waters of the state. Temporary impacts, by definition, are restored to pre-project conditions and therefore do not include a physical loss of area or degradation of ecological condition.

[2] Cubic Yards (CY); Linear Feet (LF)

XII. Fees Received

This is a United States Army Corps of Engineers (Federal) project and not subject to fees.

XIII. Findings

1. This Order is adopted pursuant to Section 401 of the Clean Water Act and the California Porter-Cologne Water Quality Control Act (Cal. Water Code § § 13000, et seq.). Discharges to waters of the state are prohibited except when in accordance with Water Code Section 13264. Notwithstanding any determinations made by the Corps or other federal agency pursuant to 40 C.F.R. Section 121.9, dischargers must comply with the entirety of this Order because the Order also serves as waste discharge requirements in accordance with State Water Board Water Quality General Order No. 2003-0017-DWQ.

2. Failure to comply with any condition of this Order shall constitute a violation of the Porter-Cologne Water Quality Control Act. The Permittee and/or discharger may then be subject to administrative and/or civil liability pursuant to Water Code section 13385.

3. In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under state and federal law.

4. In response to a suspected violation of any condition of this Order, the Water Board may require the holder of this Order to furnish, under penalty of perjury, any technical or monitoring reports the Water Boards deem appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. The additional monitoring requirements ensure that permitted discharges and activities comport with any applicable effluent limitations, water quality standards, and/or other appropriate requirement of state law.

5. This Order does not provide coverage under the Construction General Permit. As applicable, dischargers shall maintain compliance with conditions described in, and required by, the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-009-DWQ; NPDES No. CAS000002 as amended by Order No. 2010-0014-DWQ, Order No. 2012-0006-DWQ, and any amendments thereto) (General Construction Permit). Enrollment in the Construction General Permit may be required for construction activity resulting in a land disturbance of one acre or more, or less than one acre but part of a larger common plan of development or sale. For projects with ground disturbing activities that require enrollment in the Construction General Permit, dischargers shall maintain compliance with conditions described in, and required by the Permit. For ground disturbing activities that do not require enrollment in Order No. 2009-0009-DWQ, project plans included with the application shall include appropriate erosion and sediment control measures as described in the *Best Management Practices* Section (Stormwater subsection) below.

6. This Order does not authorize any act which results in the taking of a threatened, endangered or candidate species or any act, which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish & Wildlife Code, sections 2050-2097) or the Federal Endangered Species Act (16 U.S.C. Sections 1531-1544). If a “take” will result from any act authorized under this Order held by the discharger, the discharger must obtain authorization for the take prior to any construction or operation of the portion of the Project that

may result in a take. The discharger is responsible for meeting all requirements of the Federal Endangered Species Act for the Project authorized under this Order.

7. This Order includes monitoring and reporting requirements pursuant to Water Code section 13267. The burden of preparing these reports, including costs, are reasonable to the need and benefits of obtaining the reports. The reports confirm that the best management practices required under this Order are sufficient to protect beneficial uses and water quality objectives. The reports related to accidental discharges also ensure that corrective actions, if any, that are necessary to minimize the impact or clean up such discharges can be taken as soon as possible. The anticipated costs are minimal as the reporting obligations require only visual monitoring, in-field measurements, and notification reporting.

XIV. Conditions

The Los Angeles Water Board has independently reviewed the record of the Project to analyze impacts to water quality and designated beneficial uses within the watershed of the Project. In accordance with this Order, the Permittee may proceed with the Project under the following terms and conditions. This Order provides reasonable assurance that the Project authorized under this Order will comply with state and federally approved water quality requirements, provided that the following conditions are adhered to.

A. Authorization

Impacts to waters of the United States shall not exceed quantities shown in Table 1.

B. Reporting and Notification Requirements

Requirements for the content of these reporting and notification types are detailed in Attachment C, including specifications for photo and map documentation during the Project. Written reports and notifications must be submitted using the Reporting and Notification Cover Sheet located in Attachment C, which must be signed by the Permittee or an authorized representative.

1. Project Reporting

a. Annual Reporting: The Permittee shall submit an Annual Report each year on the anniversary of Project effective date. Annual Reporting requirements are detailed in Attachment C. Annual reporting shall continue until a Notice of Project Complete Letter is issued to the Permittee.

2. Project Status Notifications

a. Request for Notice of Completion of Discharges Letter: The Permittee shall submit a Request for Notice of Completion of Discharges Letter following completion of active Project construction activities, including any required restoration and permittee-responsible mitigation. This request shall be submitted to Los Angeles Water Board staff within thirty (30) days following completion of all Project construction activities. Upon acceptance of the request, Los Angeles Water Board staff shall issue a Notice of Completion of Discharges Letter to the Permittee, which will end the active discharge period and associated annual fees.

b. Request for Notice of Project Complete Letter: The Permittee shall submit a Request for Notice of Project Complete Letter when construction and/or any post-construction

monitoring is complete,[3] and no further Project activities will occur. This request shall be submitted to Los Angeles Water Board staff within thirty (30) days following completion of all Project activities. Upon approval of the request, Los Angeles Water Board staff shall issue a Notice of Project Complete Letter to the Permittee which will end the post discharge monitoring period and associated annual fees.

3. **Conditional Notifications and Reports:** The following notifications and reports are required as appropriate.

   a. **Accidental Discharges of Hazardous Materials**[4]

   Following an accidental discharge of a reportable quantity of a hazardous material, sewage, or an unknown material, the following applies (Wat. Code, § 13271):

   i. As soon as (A) the Permittee has knowledge of the discharge or noncompliance, (B) notification is possible, and (C) notification can be provided without substantially impeding cleanup or other emergency measures then:
   - first call – 911 (to notify local response agency)
   - then call – Office of Emergency Services (OES) State Warning Center at: (800) 852-7550 or (916) 845-8911
     Lastly, follow the required OES procedures as set forth in the Office of Emergency Services' Accidental Discharge Notification Web Page (https://www.caloes.ca.gov/office-of-the-director/operations/response-operations/fire-rescue/hazardous-materials/spill-release-reporting/)

   ii. Following notification to OES, the Permittee shall notify the Los Angeles Water Board, as soon as practicable (ideally within 24 hours). Notification may be via telephone, e-mail, or delivered written notice.

   iii. Within five (5) working days of notification to the Los Angeles Water Board, the Permittee must submit an Accidental Discharge of Hazardous Material Report.

   b. **Violation of Compliance with Water Quality Standards:** The Permittee shall notify the Los Angeles Water Board of any event causing a violation of compliance with water quality standards. Notification may be via telephone, e-mail, or delivered written notice.

   i. Examples of noncompliance events include: lack of any reporting in a timely manner, lack of storm water treatment following a rain event, discharges causing a visible plume in a water of the state, water contact with uncured concrete, and exceedances of limits for the analytes for *In-Water Work or Diversions* listed below.

[3] Completion of post-construction monitoring shall be determined by Los Angeles Water Board staff and shall be contingent on successful attainment of restoration and mitigation performance criteria.

[4] "Hazardous material" means any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment. (Health & Saf. Code, § 25501.)

ii. This notification must be followed within three (3) working days by submission of a Violation of Compliance with Water Quality Standards Report.

c. In-Water Work

i. During in-water work, water quality monitoring shall be conducted. Requirements for water quality monitoring are below.

ii. The Permittee shall notify the Los Angeles Water Board at least forty-eight (48) hours prior to initiating work in water. Notification may be via telephone, e-mail, or delivered written notice.

d. Modifications to Project: Project modifications may require an amendment of this Order. The Permittee shall give advance notice to Los Angeles Water Board staff if Project implementation as described in the application materials is altered in any way or by the imposition of subsequent permit conditions by any local, state or federal regulatory authority by submitting a Modifications to Project Report. The Permittee shall inform Los Angeles Water Board staff of any Project modifications that will interfere with the Permittee's compliance with this Order.

e. Transfer: This Order is not transferable in its entirety or in part to any person or organization except after receiving certification for the Project from the Los Angeles Water Board. Water Quality Monitoring

1. **General:** If surface water is present, continuous visual surface water monitoring shall be conducted to detect accidental discharge of construction related pollutants (e.g., oil and grease, turbidity plume, or uncured concrete).

2. **Accidental Discharges/Noncompliance:** Upon occurrence of an accidental discharge of hazardous materials or a violation of compliance with a water quality standard, Los Angeles Water Board staff may require water quality monitoring based on the discharge constituents and/or related water quality objectives and beneficial uses.

3. **In-Water Work:**

   During planned work in water, any discharge(s) to waters of the state shall conform to the following water quality standards:

   a. Oil and Grease. Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.

   b. Dissolved Oxygen. At a minimum, the mean annual dissolved oxygen concentration of all waters shall be greater than 7 mg/L, and no single determination shall be less than 5.0 mg/L, except when natural conditions cause lesser concentrations.

   c. pH. The pH of bays or estuaries shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0.2 units from natural conditions as a result of waste discharge.

d. Turbidity. Where natural turbidity is between 0 and 50 Nephelometric Turbidity Units (NTU), increases shall not exceed 20%. Where natural turbidity is greater than 50 NTU, increases shall not exceed 10%.

Sampling shall be conducted in accordance with Table 2 sampling parameters.[5]

Table 2: Sample Type and Frequency Requirements

Parameter	Unit of Measurement	Type of Sample	Minimum Frequency
Oil and Grease	N/A	Visual	Continuous
Dissolved Oxygen	mg/L & % saturation	In situ	Daily for the first week, weekly, thereafter
pH	Standard Units	In situ	Daily for the first week, weekly, thereafter
Turbidity	NTU	In situ	Daily for the first week, weekly, thereafter
Temperature	°F (or as °C)	In situ	Daily for the first week, weekly, thereafter

Baseline sampling may be conducted at the following locations: 1. 300 feet down current of the active dredging site, 2. 300 feet up current of the active dredge site, 3. A control site located in an area unaffected by dredge activities, 4. 300 feet down current from the placement discharge location, 5. 300 feet up current from the placement discharge location, 6. A control site located in an area unaffected by placement activities. A map or drawing indicating the locations of sampling points shall be included with each submittal. A summary of results shall discuss the analysis and compliance. Every measurement not meeting the compliance limits shall be accompanied by an explanation, the actions taken to correct the degradation to waters, and addressed in *Violation of Compliance with Water Quality Standards* report described above.

C. Standard Conditions

1. This Order is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Water Code section 13330, and California Code of Regulations, title 23, chapter 28, Article 6 commencing with sections 3867-3869, inclusive. Additionally, the Los Angeles Water Board reserves the right to suspend, cancel, or modify and reissue this Order, after providing notice to the Permittee, if the Los Angeles Water Board determines that: the Project fails to comply with any of the conditions of this Order; or, when necessary to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act (Wat. Code, §

[5] Pollutants shall be analyzed using the analytical methods described in 40 Code of Federal Regulations Part 136; where no methods are specified for a given pollutant, the method shall be approved by Los Angeles Water Board staff. Grab samples shall be taken between the surface and mid-depth and not be collected at the same time each day to get a complete representation of variations in the receiving water. A hand-held field meter may be used, provided the meter utilizes a U.S. EPA-approved algorithm/method and is calibrated and maintained in accordance with the manufacturer's instructions. A calibration and maintenance log for each meter used for monitoring shall be maintained onsite.

13000 et seq.) or federal Clean Water Act section 303 (33 U.S.C. § 1313). For purposes of Clean Water Act section 401(d), the condition constitutes a limitation necessary to assure compliance with water quality standards and appropriate requirements of state law.

2. This Order is not intended and shall not be construed to apply to any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license, unless the pertinent certification application was filed pursuant to subsection 3855(b) of chapter 28, title 23 of the California Code of Regulations, and that application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. This Order is conditioned upon total payment of any fee required under title 23 of the California Code of Regulations and owed by the Permittee.

D. General Compliance

1. Permitted actions must not cause a violation of any applicable water quality standards, including impairment of designated beneficial uses for receiving waters as adopted in the Basin Plans by any applicable Los Angeles Water Board or any applicable State Water Board (collectively Water Boards) water quality control plan or policy. The source of any such discharge must be eliminated as soon as practicable.

2. Authorization under this Order is granted based on the application information submitted, including engineering plans, specifications, and technical reports. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order.

E. Administrative

1. Signatory requirements for all document submittals required by this Order are presented in Attachment B of this Order.

2. The Permittee shall grant Los Angeles Water Board staff, or an authorized representative (including an authorized contractor acting as a Water Board representative), upon presentation of credentials and other documents as may be required by law, permission to:

    a. Enter upon the premises where a regulated activity is located or conducted, or where records are kept.

    b. Have access to and copy any records that are kept and are relevant to the Project or the requirements of this Order.

    c. Inspect any equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order.

    d. Sample or monitor for the purposes of assuring Order compliance.

3. A copy of this Order shall be provided to any consultants, contractors, and subcontractors working on the Project. Copies of this Order shall remain at the Project site for the duration of this Order. The Permittee shall be responsible for work conducted by its consultants, contractors, and any subcontractors.

4. A copy of this Order must be available at the Project site(s) during construction for review by site personnel and agencies. All personnel performing work on the Project shall be familiar with the content of this Order and its posted location at the Project site.

5. This Order shall expire **five (5) years** from date of this Order. The Applicant shall submit a complete application at least 90 days prior to termination of this Order if renewal is requested.

F. Best Management Practices

1. Dredging

a) All dredging and fill activities shall remain within the boundaries specified in the plans. There shall be no dumping of fill or material outside of the project area or within any adjacent aquatic community.

b) If dredging is performed with a clamshell dredge, grizzly screens shall be placed over the placement barges to mechanically screen out any debris as sediments are placed on the barges. Debris shall be disposed of as solid waste.

c) Project features shall not interfere with tidal circulation and/or freshwater inflows into and through the mouth of Ballona Creek.

2. Site Management

a) The Corps shall require its contractor to remove all trash, debris, and excess construction material from the dredge operations and from dredged material placement site and from the staging area at the end of each workday and to discard all such material in dumpsters located in Marina del Rey Harbor (operated by LACDBH) or dispose of all such materials offsite at an approved disposal/landfill site.

b) Mobilization and removal (demobilization) of sea-based dredge equipment located on land-based staging areas and removal of trash dumpsters shall be under coordination with the Corps the dredging contractor, and the LACDBH.

3. Hazardous Materials

a) The Corps shall require its contractor to not discharge of petroleum products or other hazardous materials to surface water.

b) The Corps shall require its contractor to not cause visible oil, or grease, in the work area.

c) The Corps shall require its contractor to develop and maintain onsite a Project-specific spill prevention, containment and cleanup plan outlining the practices to prevent, minimize, and/or clean up potential spills during construction of the Project.

XV. Water Quality Certification

I hereby issue the Order for the Marina del Rey Harbor Federal Maintenance Dredging Program, 4WQC40123097 certifying that as long as all of the conditions listed in this Order are met, any discharge from the referenced Project will comply with the applicable provisions of Clean Water Act sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards).

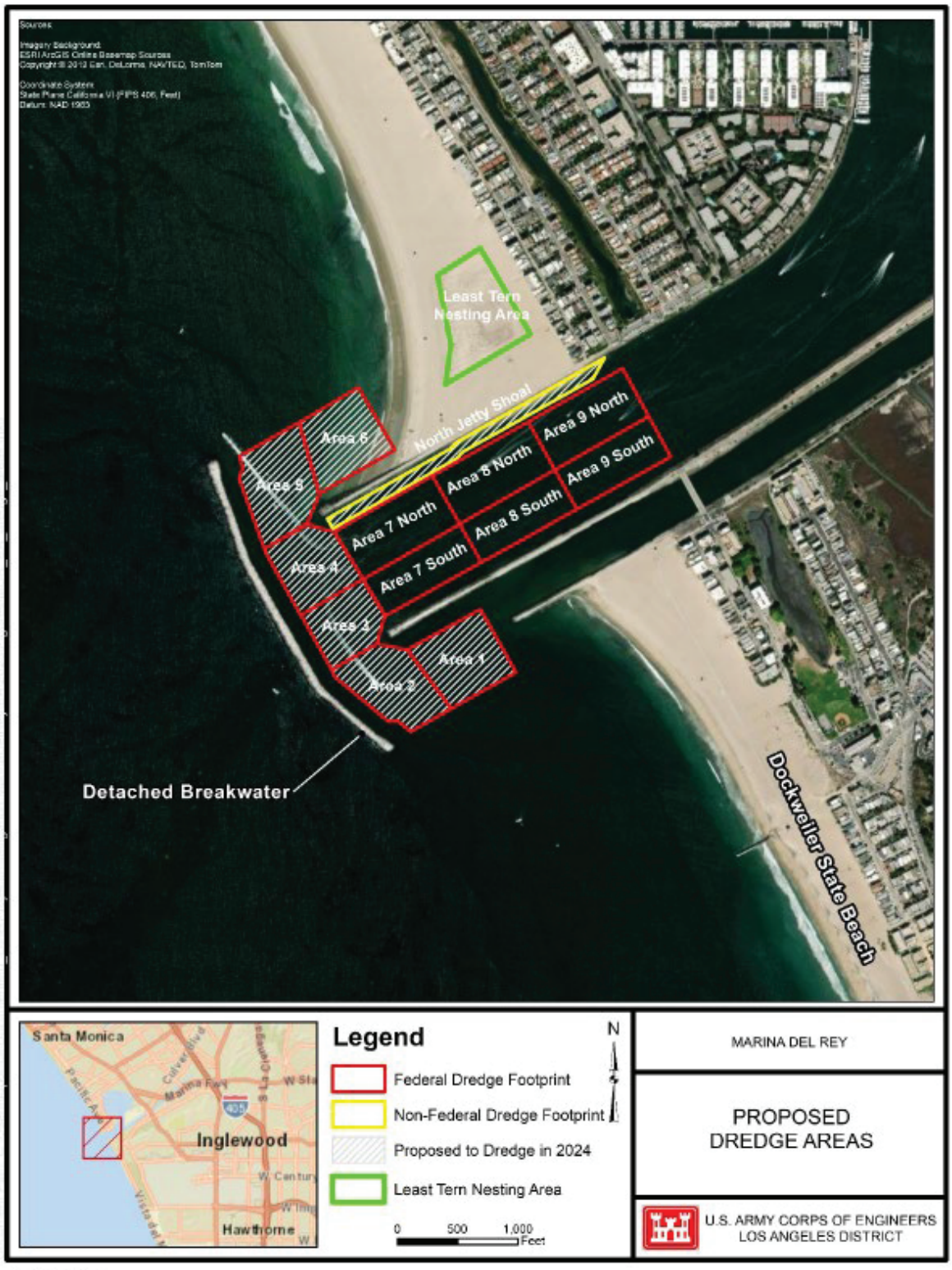
This discharge is also regulated pursuant to State Water Board Water Quality Order No. 2003-0017-DWQ which authorizes this Order to serve as Waste Discharge Requirements pursuant to the Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.).

Except insofar as may be modified by any preceding conditions, all Order actions are contingent on: (a) the discharge being limited and all proposed mitigation being completed in strict compliance with the conditions of this Order and the attachments to this Order; and, (b) compliance with all applicable requirements of Statewide Water Quality Control Plans and Policies, the Regional Water Boards' Water Quality Control Plans and Policies.

Jenny Newman
Digitally signed by Jenny Newman
Date: 2023.09.13 13:23:47 -07'00'
Water Boards

for Susana Arredondo
Executive Officer
Los Angeles Water Quality Control Board

Date



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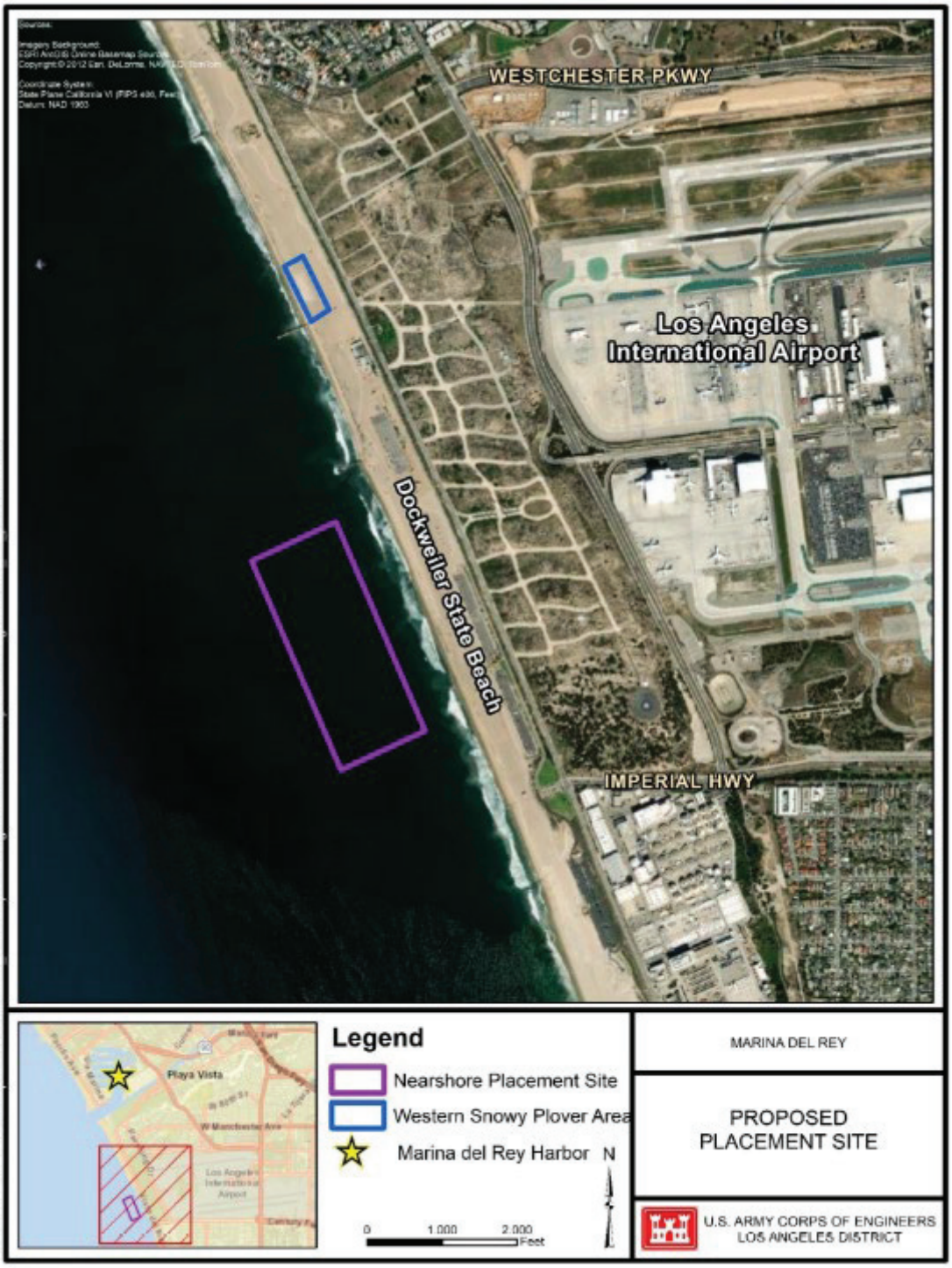
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PROPOSED PLACEMENT SITE
U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

March 2023

SIGNATORY REQUIREMENTS

All Documents Submitted In Compliance With This Order Shall Meet The Following Signatory Requirements:

1. All applications, reports, or information submitted to the Los Angeles Water Quality Control Board (Los Angeles Water Board) must be signed and certified as follows:

    a) For a corporation, by a responsible corporate officer of at least the level of vice-president.
    b) For a partnership or sole proprietorship, by a general partner or proprietor, respectively.
    c) For a municipality, or a state, federal, or other public agency, by either a principal executive officer or ranking elected official.

2. A duly authorized representative of a person designated in items 1.a through 1.c above may sign documents if:

    a) The authorization is made in writing by a person described in items 1.a through 1.c above.
    b) The authorization specifies either an individual or position having responsibility for the overall operation of the regulated activity.
    c) The written authorization is submitted to the Los Angeles Water Board Staff Contact prior to submitting any documents listed in item 1 above.

3. Any person signing a document under this section shall make the following certification:

    "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Copies of this Form

Include a copy of the Project specific Cover Sheet below with your report: please retain a copy for your records.

Report Submittal Instructions

1. Check the box on the Report and Notification Cover Sheet next to the report or notification you are submitting.

   - Part A (Annual Report): This report will be submitted annually from the anniversary of Project effective date until a Notice of Project Complete Letter is issued.

   - Part B (Project Status Notifications): Used to notify the Los Angeles Water Board of the status of the Project schedule that may affect Project billing.

   - **Part C (Conditional Notifications and Reports):** Required on a case by case basis for accidental discharges of hazardous materials, violation of compliance with water quality standards, notification of in-water work, or other reports.

2. Sign the Report and Notification Cover Sheet and attach all information requested for the Report Type.

3. **Electronic Report Submittal Instructions:**

   - Submit signed Report and Notification Cover Sheet and required information via email to: RB4-401Certification@Waterboards.ca.gov

   - Include in the subject line of the email: Subject: ATTN: Emily Duncan; File No: 23-097, Reg. Measure ID: 452599 Report

Definition of Reporting Terms

1. **Active Discharge Period:** The active discharge period begins with the effective date of this Order and ends on the date that the Permittee receives a Notice of Completion of Discharges Letter or, if no post-construction monitoring is required, a Notice of Project Complete Letter. The Active Discharge Period includes all elements of the Project including site construction and restoration, and any Permittee responsible compensatory mitigation construction.
2. **Request for Notice of Completion of Discharges Letter:** This request by the Permittee to the Los Angeles Water Board staff pertains to projects that have post construction monitoring requirements, e.g. if site restoration was required to be monitored for 5 years following construction. Los Angeles Water Board staff will review the request and send a Completion of Discharges Letter to the Permittee upon approval. This letter will initiate the post-discharge monitoring period and a change in fees from the annual active discharge fee to the annual post-discharge monitoring fee.

3. **Request for Notice of Project Complete Letter:** This request by the Permittee to the Los Angeles Water Board staff pertains to projects that either have completed post-construction monitoring and achieved performance standards or have no post-construction monitoring requirements, and no further Project activities are planned. Los Angeles Water Board staff will review the request and send a Project Complete Letter to the Permittee upon approval. Termination of annual invoicing of fees will correspond with the date of this letter.
4. **Post-Discharge Monitoring Period:** The post-discharge monitoring period begins on the date of the Notice of Completion of Discharges Letter and ends on the date of the Notice of Project Complete Letter issued by the Los Angeles Water Board staff. The Post-Discharge Monitoring Period includes continued water quality monitoring or compensatory mitigation monitoring.
5. **Effective Date:** Date of Order issuance.

Map/Photo Documentation Information

When submitting maps or photos, please use the following formats.

1. **Map Format Information:**
   Preferred map formats of at least 1:24000 (1" = 2000') detail (listed in order of preference):

   - **GIS shapefiles**: The shapefiles must depict the boundaries of all project areas and extent of aquatic resources impacted. Each shape should be attributed with the extent/type of aquatic resources impacted. Features and boundaries should be accurate to within 33 feet (10 meters). Identify datum/projection used and if possible, provide map with a North American Datum of 1983 (NAD38) in the California Teale Albers projection in feet.
   - **Google KML files** saved from Google Maps: My Maps or Google Earth Pro. Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. Include URL(s) of maps. If this format is used include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.
   - **Other electronic format** (CAD or illustration format) that provides a context for location (inclusion of landmarks, known structures, geographic coordinates, or USGS DRG or DOQQ). Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. If this format is used include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.
   - Aquatic resource maps marked on paper **USGS 7.5 minute topographic maps** or **Digital Orthophoto Quarter Quads (DOQQ)** printouts. Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. If this format is used include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.

2. **Photo-Documentation:** Include a unique identifier, date stamp, written description of photo details, and latitude/longitude (in decimal degrees) or map indicating location of photo. Successive photos should be taken from the same vantage point to compare pre/post construction conditions.

REPORT AND NOTIFICATION COVER SHEET

Project:	Marina del Rey Harbor Federal Maintenance Dredging Program				
Permittee:	U.S. Army Corps of Engineers, Los Angeles District				
Reg. Meas. ID:	452599	**Place ID:**	888233	**File No:**	23-097

Report Type Submitted

Part A – Project Reporting	
Report Type	☐ **Annual Report**
Part B - Project Status Notifications	
Report Type	☐ **Commencement of Construction**
Report Type	☐ **Request for Notice of Completion of Discharges Letter**
Report Type	☐ **Request for Notice of Project Complete Letter**
Part C - Conditional Notifications and Reports	
Report Type	☐ **Accidental Discharge of Hazardous Material Report**
Report Type	☐ **Violation of Compliance with Water Quality Standards Report**
Report Type	☐ **In-Water Work/Diversions Water Quality Monitoring Report**
Report Type	☐ **Modifications to Project Report**
Report Type	☐ **Transfer of Property Ownership Report**

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name [1]	**Affiliation and Job Title**
Signature	**Date**

[1]STATEMENT OF AUTHORIZATION (include if authorization has changed since application was submitted)

I hereby authorize _____ to act in my behalf as my representative in the submittal of this report, and to furnish upon request, supplemental information in support of this submittal.

Permittee's Signature

Date

***This Report and Notification Cover Sheet must be signed by the Permittee or a duly authorized representative and included with all written submittals.**

Part A – Project Reporting

Report Type	**Annual Report**
Report Purpose	Notify the Los Angeles Water Board staff of Project status during both the active discharge and post-discharge monitoring periods.
When to Submit	Annual reports shall be submitted each year on the anniversary of Project effective date. Annual reports shall continue until a Notice of Project Complete Letter is issued to the Permittee.
Report Contents	The contents of the annual report shall include the topics indicated below for each project period. Report contents are outlined in Annual Report Topics below. **<u>During the Active Discharge Period</u>** **Topic 1: Construction Summary** **Topic 2: Mitigation for Temporary Impacts Status** **Topic 3: Compensatory Mitigation for Permanent Impacts Status** **<u>During the Post-Discharge Monitoring Period</u>** **Topic 2: Mitigation for Temporary Impacts Status** **Topic 3: Compensatory Mitigation for Permanent Impacts Status**
Annual Report Topics (1-3)	
Annual Report Topic 1	**Construction Summary**
When to Submit	With the annual report during the Active Discharge Period.
Report Contents	**1.** Project progress and schedule including initial ground disturbance, site clearing and grubbing, road construction, site construction, and the implementation status of construction storm water best management practices (BMPs). If construction has not started, provide estimated start date and reasons for delay. **2.** Color photos, pre-project and current. **3.** Map showing general Project progress. **4.** If applicable: **a.** Summary of any conditional reports sent during the year such as "Accidental Discharge of Hazardous Material Report" or "Accidental Discharge of Hazardous Material Report" **b.** Copies of revised permits from other agencies **c.** Compilation of all water quality monitoring results for the year in a spreadsheet format.
Annual Report Topic 2	**Mitigation for Temporary Impacts Status**
When to Submit	With the annual report during both the Active Discharge Period and Post-Discharge Monitoring Period.

Report Contents	***If not applicable report N/A.** **1.** Planned date of initiation and map showing locations of mitigation for temporary impacts to waters of the state and all upland areas of temporary disturbance which could result in a discharge to waters of the state**.** **2.** If mitigation for temporary impacts has already commenced, provide a map and information concerning attainment of mitigation success.
Annual Report Topic 3	**Compensatory Mitigation for Permanent Impacts Status**
When to Submit	With the annual report during both the Active Discharge Period and Post-Discharge Monitoring Period.
Report Contents	***If not applicable report N/A.** **Part A. Permittee Responsible** **1.** Planned date of initiation of compensatory mitigation site installation**.** **2.** If installation is in progress, a map of what has been completed to date. **3.** If the compensatory mitigation site has been installed, provide a final map and information concerning attainment of performance standards contained in the compensatory mitigation plan. **Part B. Mitigation Bank or In-Lieu Fee** **1.** Status or proof of purchase of credit types and quantities. **2.** Include the name of bank/ILF Program and contact information. **3.** If ILF, location of project and type if known.

Part B – Project Status Notifications

Report Type	**Notice of Completion of an Eelgrass survey**
Report Purpose	Notify Los Angeles Water Board staff of the completion of an Eelgrass survey.
When to Submit	Construction shall not begin before approval of the survey by the Los Angeles Regional Water Board.
Report Contents	**1.** An eelgrass survey conducted following the California Eelgrass Mitigation Policy (CEMP) instructions. **2.** As stated in CEMP, a survey must be conducted during the active growth period for eelgrass (typically March through October for southern California) no more than 60 days prior to construction activities.

Report Type	**Commencement of Construction**
Report Purpose	Notify Los Angeles Water Board staff prior to the start of construction.
When to Submit	Must be received at least seven (7) days prior to start of initial ground disturbance activities.
Report Contents	**3.** Date of commencement of construction. **4.** Anticipated date when discharges to waters of the state will occur. **5.** Project schedule milestones including a schedule for onsite compensatory mitigation, if applicable.

Report Type	Request for Notice of Completion of Discharges Letter
Report Purpose	Notify Los Angeles Water Board staff that post-construction monitoring is required and that active Project construction, including any mitigation and permittee responsible compensatory mitigation, is complete.
When to Submit	Must be received by Los Angeles Water Board staff within thirty (30) days following completion of all Project construction activities.
Report Contents	**1.** Pre- and post-photo documentation of all Project activity sites where the discharge of dredge and/or fill/excavation was authorized. **2.** An updated monitoring schedule for mitigation for temporary impacts to waters of the state and permittee responsible compensatory mitigation during the post-discharge monitoring period, if applicable.

Report Type	Request for Notice of Project Complete Letter
Report Purpose	Notify Los Angeles Water Board staff that construction and/or any post-construction monitoring is complete, or is not required, and no further Project activity is planned.
When to Submit	Must be received by Los Angeles Water Board staff within thirty (30) days following completion of all Project activities.
Report Contents	**Part A: Mitigation for Temporary Impacts** **1.** A report establishing that areas of temporary impacts to waters of the state, and upland areas of temporary disturbance which could result in a discharge to waters of the state, have been successfully restored and all identified success criteria have been met. Pre- and post-photo documentation of all restoration sites. **Part B: Permittee Responsible Compensatory Mitigation** **2.** A report establishing that the performance standards outlined in the compensatory mitigation plan have been met. **3.** Status on the implementation of the long-term maintenance and management plan and funding of endowment. **4.** Pre- and post-photo documentation of all compensatory mitigation sites. **5.** Final maps of all compensatory mitigation areas (including buffers). **Part C: Post-Construction Storm Water BMPs** **6.** Date of storm water permit Notice of Termination(s), if applicable. **7.** Report status and functionality of all post-construction BMPs.

Part C – Conditional Notifications and Reports

Report Type	Accidental Discharge of Hazardous Material Report
Report Purpose	Notifies Los Angeles Water Board staff that an accidental discharge of hazardous material has occurred.

When to Submit	Within five (5) working days following the date of an accidental discharge. Continue reporting as required by Los Angeles Water Board staff.
Report Contents	**1.** The report shall include the OES Incident/Assessment Form, a full description and map of the accidental discharge incident (i.e. location, time and date, source, discharge constituent and quantity, aerial extent, and photo documentation). If applicable, the OES Written Follow-Up Report may be substituted. **2.** If applicable, any required sampling data, a full description of the sampling methods including frequency/dates and times of sampling, equipment, locations of sampling sites. **3.** Locations and construction specifications of any barriers, including silt curtains or diverting structures, and any associated trenching or anchoring.

Report Type	**Violation of Compliance with Water Quality Standards Report**
Report Purpose	Notifies Los Angeles Water Board staff that a violation of compliance with water quality standards has occurred.
When to Submit	The Permittee shall report any event that causes a violation of water quality standards within three (3) working days of the noncompliance event notification to Los Angeles Water Board staff.
Report Contents	The report shall include: the cause; the location shown on a map; and the period of the noncompliance including exact dates and times. If the noncompliance has not been corrected, include: the anticipated time it is expected to continue; the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and any monitoring results if required by Los Angeles Water Board staff.

Report Type	**In-Water Work and Diversions Water Quality Monitoring Report**
Report Purpose	Notifies Los Angeles Water Board staff of the completion of in-water work.
When to Submit	Within three (3) working days following the completion of in-water work. Continue reporting in accordance with the approved water quality monitoring plan.
Report Contents	As required by the approved water quality monitoring plan.

Report Type	**Modifications to Project Report**
Report Purpose	Notifies Los Angeles Water Board staff if the Project, as described in the application materials, is altered in any way or by the imposition of subsequent permit conditions by any local, state or federal regulatory authority.
When to Submit	Prior to any alteration or modification of Project activities.
Report Contents	A description and location of any alterations of Project activities. Identify any Project modifications that will interfere with the Permittee's compliance with the Order. Any alteration may require an Amendment, to be determined by Los Angeles Water Board staff.

Report Type	**Transfer of Property Ownership Report**
Report Purpose	Notifies Los Angeles Water Board staff of change in ownership of the Project or Permittee-responsible mitigation area.
When to Submit	At least 10 working days prior to the transfer of ownership.
Report Contents	**1.** A statement that the Permittee has provided the purchaser with a copy of this Order and that the purchaser understands and accepts: **a.** the Order's requirements and the obligation to implement them or be subject to administrative and/or civil liability for failure to do so; and **b.** responsibility for compliance with any long-term BMP[1] maintenance plan requirements in this Order. **2.** A statement that the Permittee has informed the purchaser to submit a written request to the Los Angeles Water Board to be named as the permittee in a revised order.
Report Type	**Transfer of Long-Term BMP Maintenance Report**
Report Purpose	Notifies Los Angeles Water Board staff of transfer of long-term BMP maintenance responsibility.
When to Submit	At least 10 working days prior to the transfer of BMP maintenance responsibility.
Report Contents	A copy of the legal document transferring maintenance responsibility of post-construction BMPs.

[1] Best Management Practices (BMPs) is a term used to describe a type of water pollution or environmental control.

Compliance with Code of Federal Regulations, title 40, section 121.7, subdivision (d).

The purpose of this attachment is to comply with Title 40, Code of Federal Regulations (CFR) Part 121.7(d)(1), which requires an explanation of why a condition is necessary to assure that the authorized discharge will comply with water quality requirements, and a citation to federal, state, or tribal law that authorizes the condition.

This Attachment uses the same organizational structure as the *Conditions* Section, and the statements below correspond with the conditions set forth in the *Conditions* Section. The Sections preceding the *Conditions* Section are not "conditions" as used in 40 CFR section 121.7.(A).

The following three sources of authority are applicable to almost all conditions. Because these authorities are relevant to so many conditions, they are described in greater detail here and then cross-referenced below.

The state's Statement of Policy with respect to Maintaining High Quality of Waters in California ("Antidegradation Policy", State Board Resolution No. 68-16), requires that any "activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the state will be maintained." All Regional Board Water Quality Control Plans incorporate the state's Antidegradation Policy by reference. The state Antidegradation Policy incorporates the federal Antidegradation Policy (40 CFR Part 131.12), which requires "[e]xisting instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected." According to U.S. EPA, for dischargers of dredged or fill material comply with the federal Antidegradation Policy by complying with U.S. EPA's section 404(b)(1) Guidelines. The State Water Board adopted a modified version of U.S. EPA's section 404(b)(1) Guidelines in the Dredge or Fill Procedures (also referred as State Supplemental Guidelines).

The State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (Dredge or Fill Procedures) were adopted on April 2, 2019 and went into effect on May 28, 2020. The Dredge or Fill Procedures were adopted pursuant to the State Water Board's authority under Water Code section 13140 (state policy for water quality control) and 13170 (water quality control plan), and accordingly have regulatory effect. Consistent with Government Code, section 11353, a clear and concise summary of the Dredge or Fill Procedures is available in California Code of Regulations, section 3013. Per the Dredge or Fill Procedures, the permitting authority may only approve a project if the demonstrations set forth in Section IV.B.1 have been made. The information required by Section IV.A is necessary to ensure compliance with Section IV.B.1.

In addition, the conditions within the Order are generally required pursuant to the Los Angeles Water Board's Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan). The Basin Plan includes water quality standards, which consist of existing and potential beneficial uses of waters of the state, water quality objectives to protect those uses, and the state and federal antidegradation policies. For instance, the Basin Plan

includes water quality objectives for chemical constituents, oil and grease, pH, dissolved oxygen, temperature, toxicity, pesticides, solid, suspended or settleable materials, floating material, turbidity, exotic vegetation, color, and taste and odor which ensure protection of beneficial uses.

Furthermore, the conditions within the Order are also required, where applicable, pursuant to statewide water quality control plans and policies which were adopted and are periodically revised pursuant to Water Code section 13240, including, but not limited to, the following:

- California Ocean Plan (Ocean Plan),
- California Thermal Plan (Thermal Plan),
- Enclosed Bays and Estuaries Plan,
- Inland Surface Waters, Enclosed Bays, and Estuaries (ISWEBE) Plan,
- Plan for California's Nonpoint Source (NPS) Pollution Control Program,
- Water Quality Control Policy for the Enclosed Bays and Estuaries of California,
- Policy for the Implementation and Enforcement of the Nonpoint Source (NPS) Pollution
- Control Program, and
- State of California Executive Order W-59-93 (Wetlands "No Net Loss" Policy),

Furthermore, California Code of Regulations, title 23, Chapter 28 also sets forth regulations pertaining to water quality certifications. Section 3856 sets forth information that must be included in water quality certification requests, includes a description of steps that have or will be taken to avoid, minimize, and compensate for impacts to waters of the state.

Conditions

Authorization

Authorization under this Order is granted based on the application information submitted. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order.

Reporting and Notification Requirements

The reports confirm that the best management practices required under this Order are sufficient to protect beneficial uses and water quality objectives. The reports related to accidental discharges also ensure that corrective actions, if any, that are necessary to minimize the impact or clean up such discharges are taken as soon as possible. These monitoring and reporting conditions are authorized because the Water Boards have the authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. The burden of preparing these reports, including costs, bears a reasonably relationship to the benefits to be obtained from the reports. Specifically, the reports are necessary to demonstrate protection of beneficial uses and compliance with the requirements of the Order and relevant laws (including the Clean Water Act and other authorities). The anticipated costs are minimal as the reporting obligations require only visual monitoring, in-field measurements, and notification reporting.

Authorization under this Order is granted based on the application information submitted, including identification of the legally responsible party. Conditions regarding transfers are necessary to confirm whether the new owner wishes to assume legal responsibility for compliance with this Order. If not, the original discharger remains responsible for compliance with this Order. Confirmation is also necessary to confirm whether liability for long-term best management practices maintenance is accepted by another entity. If not, the original discharger remains responsible for compliance with this Order. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order.

Water Quality Monitoring

General

This monitoring condition is authorized because the Water Boards have the authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. The burden of monitoring, including costs, bears a reasonable relationship to the need for the monitoring, and the benefits to be obtained from the monitoring. The anticipated costs are minimal as only visual monitoring and in-field measurements are required. Specifically, the reports are necessary to demonstrate protection of beneficial uses and compliance with the requirements of the Order and relevant laws (including the Clean Water Act and other authorities

Accidental Discharges/Noncompliance

See explanation for the *Reporting and Notification Requirements* Section

In-Water Work or Diversions

Consistent with the Dredge or Fill Procedures, section IV.A.2.c, water quality monitoring plans are required for any in-water work, including temporary dewatering or diversions. These conditions are required to assure that 1) the discharge shall not adversely affect the beneficial uses of the receiving water or cause a condition of nuisance; 2) the discharge shall comply with all applicable water quality objectives; and 3) treatment and control of the discharge shall be implemented to assure that pollution and nuisance will not occur and the highest water quality is maintained. A water quality monitoring plan is necessary to conform to water quality standards for oil and grease, dissolved oxygen, pH, turbidity, and temperature. The Regional Water Board's Basin Plan and/or applicable statewide plans and policies contains provisions related to all these constituents.

These monitoring and reporting conditions are authorized because the Water Boards have the authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. The burden of preparing these reports, including costs, bears a reasonable relationship to the need for, and benefits of, the reports. The anticipated costs are minimal as the sampling requirements are either visual or only require a grab sample on a daily and/or weekly basis. Specifically, the reports are necessary to demonstrate protection of beneficial uses and compliance with the requirements of the Order and relevant laws (including the Clean Water Act and other authorities

Post-Construction

The reports confirm that the best management practices required under this order are sufficient to protect beneficial uses and water quality objectives. The reports related to accidental

discharges ensure that corrective actions, if any, that are necessary to minimize the impact or clean up such discharges are taken as soon as possible. These monitoring and reporting conditions are authorized because the Water Boards have the authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. The burden of preparing these reports, including costs, bears a reasonable relationship to the need for, and benefits of, the reports. The anticipated costs are minimal as the reporting obligations require only visual monitoring, in-field measurements, and notification reporting.

Standard Conditions

"This Order is subject to modification or revocation …"

"This Order is not intended and shall not be construed to apply to any activity involving a hydroelectric facility …"

"This Order is conditioned upon total payment of any fee …"

These Conditions are standard conditions that "shall be included as conditions of all water quality certification actions." (Cal. Code of Regs., section 3860.)

General Compliance

"Permitted actions must not cause a violation of any applicable water quality standards …"

By the plain language of section 401 of the Clean Water Act, permitted actions may not cause a violation of applicable water quality standards. This condition related to compliance with water quality objectives and designated beneficial uses is required pursuant to the Los Angeles Water Board's Basin Plan and/or other applicable statewide plans and policies. The Basin Plan's water quality standards consist of existing and potential beneficial uses of waters of the state, water quality objectives to protect those uses, and the state and federal antidegradation policies. The Antidegradation Policy requires that the quality of existing high-quality water be maintained unless any change will be consistent with the maximum benefit to the people of the state, will not unreasonably affect present or anticipated future beneficial uses of such water, and will not result in water quality less than that prescribed in water quality control plans or policies. The Antidegradation Policy further requires best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the state will be maintained. Applicable beneficial uses and water quality objectives to protect those uses include the designated beneficial uses (Basin Plan, Chapter 2, Tables 2-1, 2-1a, 2-3, 2-3a, 2-4, and 2-4a; Ocean Plan, Page 4), and water quality objectives for chemical constituents (Basin Plan, page 3-29), color (Basin Plan, page 3-32), exotic vegetation (Basin Plan, page 3-32), floating material (Basin Plan, page 3-33), oil and grease (Basin Plan, page 3-34), dissolved oxygen (Basin Plan, page 3-39), pesticides (Basin Plan, page 3-40), pH (Basin Plan, page 3-40), solid, suspended and settleable material (Basin Plan, page 3-44), taste and odor (Basin Plan, page 3-44), temperature (Basin Plan, page 3-44), toxicity (Basin Plan, page 3-45), and turbidity (Basin Plan, page 3-46), and in ocean waters for physical (Ocean Plan, page 7), chemical (Ocean Plan, page 7), and biological characteristics (Ocean Plan, page 8).

"The Permittee must, at all times, fully comply with engineering plans, specifications, and technical reports…"

Authorization under this Order is granted based on the application information submitted, including engineering plans, specifications, and technical reports. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order.

Administrative

"Signatory requirements for all document submittals…"

Conditions related to signatory requirements are also authorized by Water Code sections 13383 and 13267, which requires any person discharging waste that could affects the quality of waters to provide to the Water Boards, under penalty of perjury, any technical or monitoring program reports as required by the Water Boards. The signatory requirements are consistent with 40 C.F.R. section 122.22.

"The Permittee shall grant Los Angeles Water Board staff …"

Conditions related to site access requirements are authorized pursuant to the Water Boards' authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. Water Code section 13267(c) provides that "the regional board may inspect the facilities of any person to ascertain whether the purposes of this division are being met and waste discharge requirements are being complied with."

"A copy of this Order shall be provided to any consultants, contractors, and subcontractors …"

"A copy of this Order must be available at the Project site(s) during construction…"

These conditions require site personnel (agents of the applicant) and agencies to be familiar with the content of the Order and mandate availability of the document at the project site. These conditions are required to assure that any authorized discharge will comply with the terms and conditions of the Order and is inherently tied to the signature requirements required by Water Code section 13267.

Best Management Practices

All the conditions related to best management practices are consistent with the Water Board's authority to establish, "[w]ater quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area" pursuant to Water Code section 13241(c). Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order. The activities authorized under this Order have the potential to result in a discharge that exceeds water quality objectives, which is prohibited by the Clean Water Act, Antidegradation Policy and Water Code section 13263. As required by Water Code section 13369, all Water Quality Control Plans incentivize the use of best management practices to prevent prohibited discharges into waters of the state.

Dredging

Dischargers of dredged or fill material comply with the federal Antidegradation Policy by complying with U.S. EPA's section 404(b)(1) Guidelines. The State Water Boards adopted a modified version of U.S. EPA's section 404(b)(1) Guidelines in the Dredge or Fill Procedures

(State Supplemental Guidelines). In addition, this condition is required to assure that dredging operations will comply with water quality objectives established for surface waters, including solid, suspended and settleable material, toxicity and turbidity (Basin Plan, page 3-44, 3-45, 3-46), and in ocean waters physical (Ocean Plan, page 7), chemical (Ocean Plan, page 7), and biological characteristics (Ocean Plan, page 8), Ocean Plan, Thermal Plan, Enclosed Bays and Estuaries Plan, ISWEBE Plan, NPS Pollution Control Program, Water Quality Control Policy for the Enclosed Bays and Estuaries of California, Policy for the Implementation and Enforcement of the NPS Pollution Control Program, Wetlands “No Net Loss” Policy.

Site Management

This condition is necessary to prevent violation of state discharge prohibitions that protect water quality objectives. For instance, fuels and lubricants associated with the use of mechanized equipment have the potential to result in toxic discharges to waters of the state in violation of water quality standards, including the floating material and toxicity and floating material water quality objectives (Basin Plan, pages 3-33 & 3-45), and in ocean waters the physical (Ocean Plan, page 7), chemical (Ocean Plan, page 7), and biological characteristics objectives (Ocean Plan, page 8). Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order. Failure to appropriately manage site conditions has the potential to result in a discharge that exceeds water quality objectives, which is prohibited by the Clean Water Act, Antidegradation Policy and Water Code section 13263, Ocean Plan, Thermal Plan, Enclosed Bays and Estuaries Plan, ISWEBE Plan, NPS Pollution Control Program, Water Quality Control Policy for the Enclosed Bays and Estuaries of California, Policy for the Implementation and Enforcement of the NPS Pollution Control Program, Wetlands “No Net Loss” Policy.

Hazardous Materials

These conditions are required pursuant to the Los Angeles Basin Plan (toxicity objective, page 3-40), and the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP), which prohibit the discharge of substances in concentrations toxic to human, plant, animal, or aquatic life. Toxic compounds can impair the beneficial uses of cold freshwater habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, fish migration, fish spawning, warm freshwater habitat, and wildlife habitat. Conditions related to toxic and hazardous materials are necessary to assure that discharges comply with any water quality objectives adopted or approved under sections 13170 or 13245 of the Water Code.

Conditions related to concrete/cement are required pursuant to the Los Angeles Basin Plan, which require discharges to waters do not adversely raise or lower pH levels (Basin Plan, page 3-40). Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order. The release of hazardous materials has the potential to result in a discharge that exceeds water quality objectives, which is prohibited by the Clean Water Act, the Antidegradation Policy, the Los Angeles Basin Plan, the Dredge or Fill Procedures and Water Code section 13263, Ocean Plan, Thermal Plan, Enclosed Bays and Estuaries Plan, ISWEBE Plan, NPS Pollution Control Program, Water Quality Control Policy for the Enclosed Bays and Estuaries of California, Policy for the Implementation and Enforcement of the NPS Pollution

Appendix C
Cultural Resources Documentation

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

May 19, 2023

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, California 95816

Dear Ms. Polanco:

The U.S. Army Corps of Engineers Los Angeles District (USACE) is initiating consultation with you under the National Historic Preservation Act (NHPA; 54 USC § 306108) and its implementing regulations (36 CFR 800). The proposed Marina del Rey Harbor Maintenance Dredging Program, located in Marina del Rey, Los Angeles County, California, is considered an undertaking pursuant to 36 CFR 800.16(y) and the USACE is responsible for compliance with the NHPA. This correspondence is to request comments on our delineation of the Area of Potential Effects (APE) and historic property identification efforts and to request concurrence with our determination of effect for the undertaking.

Maintenance dredging of the Marina del Rey Harbor is authorized by the Rivers and Harbors Act of 1954 (House Document 362, 83rd Congress, 2nd Session). Recurring routine maintenance dredging of the MDR Harbor Federal Navigation Channel occurs approximately every 5-6 years and at the North Jetty Shoal approximately every 20 years. The Federal Navigation Channel maintained areas include Areas 1 through 9.

Marina del Rey Harbor is approximately 15 miles southwest of downtown Los Angeles between the cities of Venice and Playa del Rey. The navigation channel to the Marina del Rey Harbor routinely becomes shoaled from sediment loads carried down Ballona Creek and through littoral transport from the north. The Marina del Rey Harbor is operated and maintained by the Los Angeles County Department of Beaches and Harbors. Safe navigation of the Federal Navigation Channel has been maintained by the USACE since the original construction in 1960. The Marina del Rey Harbor entrance complex is composed of four major structures: the north, middle, and south jetties and a detached breakwater. The 2,000-foot rubble mound breakwater provides wave protection to the harbor and jetties.

The APE is the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 CFR § 800.16). The USACE has defined the APE as the horizontal and vertical extent of the Staging, Dredging, and Nearshore Placement areas. The Project APE consists of three discontinuous areas (referred to in this memo as the Staging APE, Dredging APE, and

Nearshore APE). These locations are un-sectioned in Township 2 South and Range 15 West as depicted on the U.S. Geological Survey (USGS) Venice, California, 7.5-minute topographic quadrangle (Enclosure 1).

The maintenance dredging program includes the maintenance dredging of approximately 630,000 cubic yards (cy). For the current dredge cycle, dredging is only needed in Areas 1 through 6 and the North Jetty Shoal; Areas 7 through 9 are at or below design depth and do not require dredging. In the event that the maintenance dredging needs to be deferred to a subsequent year due to equipment availability and funding delays, or if higher than normal infilling occurs, the dredging quantity could be increased to that dredge cycle to maintain the design depths. The vertical APE of maintenance dredging is authorized for the sand trap areas (Areas 1 and 6) to a maximum of -30 feet mean lower low water (MLLW). The vertical APE for the Entrance Areas 2 through 5 and 7 through 9, and the North Jetty Shoal is a maximum of -20 feet MLLW, plus a 2-foot over-depth allowance. The preferred project intent is to beneficially reuse Marina del Rey dredge material for nourishment at Dockweiler State Beach in the nearshore placement area. Dredged sediment from the proposed project helps mitigate the loss of longshore sand transport interrupted by Marina del Rey and other local harbors. In consultation with the Southern California Dredged Material Management Team and the Contaminated Sediments Task Force, all materials have been determined to be suitable for nearshore placement at Dockweiler State Beach.

The California Historical Resources Information System (CHRIS) records search identified a total of 3 previously documented cultural resources within a 0.8-km (0.5-mile) radius of the Project APE, none of which intersect the Project APE. A search of the Wrecks and Obstructions Database from the Office of Coast Survey under the National Oceanic and Atmospheric Administration (NOAA) was also completed. The APE is void of Obstructions and Wrecks based on the Automated Wreck and Obstruction Information System database. On May 14, 2023, a USACE archaeologist completed a pedestrian survey of the Staging Area APE. No previously or newly recorded resources were observed during the survey (Enclosure 2).

USACE has a multitude of projects both current and legacy within the APE. The largest and most extensive includes the Regulatory action for the Playa Vista project (SPL-1990-00426). Statistical Research, Inc. (SRI) has been the cultural resources management consultant for the Playa Vista project since 1989. SRI has completed the following investigations within the dredging APE for the USACE: A 1,000-acre archaeological survey, architectural assessment of 40 historic buildings; comprehensive research design; Programmatic Agreement between federal and state agencies; documentation of two National Register Districts; visual-aesthetic historical study; archaeological testing at 12 prehistoric and historical-period sites; treatment plan for historic resources (including both prehistoric and historical-period sites); Historic American Engineering Record for 15 buildings eligible for listing in the National Register of Historic Places; archaeological data recovery at 8 prehistoric and historical-period sites; paleoenvironmental reconstruction of the evolution of the Ballona Lagoon; innovative methods for identifying and excavating archaeological sites; and construction

monitoring (Enclosure 3).

The USACE requested a Sacred Lands File (SLF) search from the Native American Heritage Commission (NAHC) and they responded on March 28, 2023. The results were positive. Native American coordination was initiated by the USACE on May 19, 2023. If the USACE receives additional responses from any of the tribes the USACE will continue its consultation efforts accordingly and would notify the State Historic Preservation Officer (SHPO) if any such outreach would result in a change to our Section 106 consultation (Enclosure 4).

All maintenance dredging equipment is temporary and will be removed at the completion of the project. The proposed project will not have an effect on any historic property's location, style, design, materials, workmanship, setting, and association pursuant to 36 CFR Part 800.5(a)(1)(2). Based on the routine maintenance aspect and temporary nature of this undertaking the USACE has determined a finding of "no historic properties affected" pursuant to 36 CFR Part 800.4(d)(1).

If you have specific questions or if we can provide any clarification about this request or any other concerns, please contact Mr. Daniel Grijalva, USACE Archaeologist at (213) 215-3228, or via email at Daniel.S.Grijalva@usace.army.mil.

Sincerely,

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION
Armando Quintero, *Director*
Julianne Polanco, State Historic Preservation Officer
1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
Telephone: (916) 445-7000 FAX: (916) 445-7053
calshpo.ohp@parks.ca.gov www.ohp.parks.ca.gov

June 23, 2023 In reply refer to: COE_2023_0519_002

VIA ELECTRONIC MAIL

Jodi L. Clifford
Chief, Planning Division
U.S. Army Corps of Engineers, Los Angeles District
915 Wilshire Blvd., Suite 1109
Los Angeles, CA 90017-3409

RE: Section 106 consultation for the Marina del Rey Harbor Maintenance Dredging Program, Marina del Rey, Los Angeles County

Dear Jodi L. Clifford,

The U.S. Army Corps of Engineers (COE) is initiating consultation with the State Historic Preservation Officer (SHPO) to comply with Section 106 of the National Historic Preservation Act of 1966, as amended (54 USC § 306108) and its implementing regulation at 36 CFR Part 800. By letter received on May 19, 2023, the COE is seeking comments on its area of potential effects (APE), identification efforts, and finding of effect for the above-referenced undertaking.

The COE is proposing to perform maintenance dredging of the Marina del Rey Harbor located in the Marina del Rey Harbor in the city of Marina del Rey, in Los Angeles County. The Marina del Rey Harbor entrance complex is composed of four major structures: the north, middle, and south jetties and a detached breakwater. The 2,000-foot rubble mound breakwater provides wave protection to the harbor and jetties. Proposed project activities include the maintenance dredging of approximately 630,000 cubic yards (cy). For the current dredge cycle, dredging is only needed in Areas 1 through 6 and the North Jetty Shoal; Areas 7 through 9 are at or below design depth and do not require dredging. The Marina del Rey Harbor has been dredged regularly from its construction in 1960-1962 to the present.

The COE requested a search of the Sacred Lands File from the Native American Heritage Commission (NAHC) returning positive results on March 28, 2023. The NAHC requested that the COE contact the Gabrielino Tongva Indians of California Tribal Council for

information on the positive results. The COE contacted Native American entities listed by the NAHC as having cultural ties to the project area on May 19, 2023. The COE received a response from the Gabrielino Tongva Indians of California Tribe on May 20, 2023 requesting to review the Section 106 reports. The COE provided the reports on May 22, 2023. On June 12, 2023, the Gabrielino Tongva Indians of California Tribe commented that the area is highly sensitive for cultural resources and would like to be present during the excavation. The COE is continuing to consult with the Gabrielino Tongva Indians of California Tribe. No other responses were received as of June 23, 2023.

The COE submitted the following documents to support its determination of the APE for the undertaking, to provide evidence of its efforts to identify historic properties, and to support its finding of effect:

- Enclosure 1 APE Maps
- Enclosure 2 *Marina del Rey Maintenance Dredging Project [Cultural Resources] Los Angeles County.* Prepared by the USACE (Grijalva 2023)
- Enclosure 3 *Playa Vista Archaeological and Historical Project at the Base of the Bluff, Archaeological Inventory and Evaluation along Lower Centinela Creek, Marina del Rey, California* (2003)
- Enclosure 4 Native American correspondence

The COE describes the APE as consisting of three discontinuous areas referred to as the Staging APE, Dredging APE, and Nearshore Placement APE. The vertical APE of maintenance dredging is authorized for the sand trap areas (Areas 1 and 6) to a maximum of -30 feet mean lower low water (MLLW). The vertical APE for the Entrance Areas 2 through 5 and 7 through 9, and the North Jetty Shoal is a maximum of -20 feet MLLW, plus a 2-foot over-depth allowance. The materials removed from the Dredging APE will be placed offshore in the Nearshore Placement APE. The Staging Area APE is the Marina del Rey paved public parking lot and launch ramp. The COE refers to Enclosure 1 to display their APE.

Pursuant to 36 CFR 800.4(a)(1), I have no comments on the APE.

Efforts to identify historic properties include a records search, pedestrian survey, and Native American outreach. Efforts to identify historic properties resulted in the identification of 3 previously documented cultural resources within a 0.5-mile radius of the APE, the resources do not cross into the APE. A search of the Wrecks and Obstructions Database from the Office of Coast Survey under the National Oceanic and Atmospheric Administration (NOAA) was completed. The APE is void of Obstructions and Wrecks based on the Automated Wreck and Obstruction Information System database. On May 14, 2023, a COE archaeologist completed a pedestrian survey of the Staging Area APE. No previously or newly recorded resources were observed during the survey.

Pursuant to 36 CFR 800.4(b)(1), I agree the COE has made a reasonable and good-faith effort to identify historic properties in the APE for this undertaking.

The COE has concluded that the undertaking would have no effect on historic properties and has requested my review and comment on their finding of effect for the proposed undertaking. After reviewing your letter and supporting documentation, I do not object to a finding of *no historic properties affected* for this undertaking pursuant to 36 CFR 800.4(d)(1).

If you require further information, please contact Aubrie Morlet at (916) 893-8270 or Aubrie.Morlet@parks.ca.gov

Sincerely,

Julianne Polanco
State Historic Preservation Officer

US Army
USACE of
Engineers

Los Angeles District

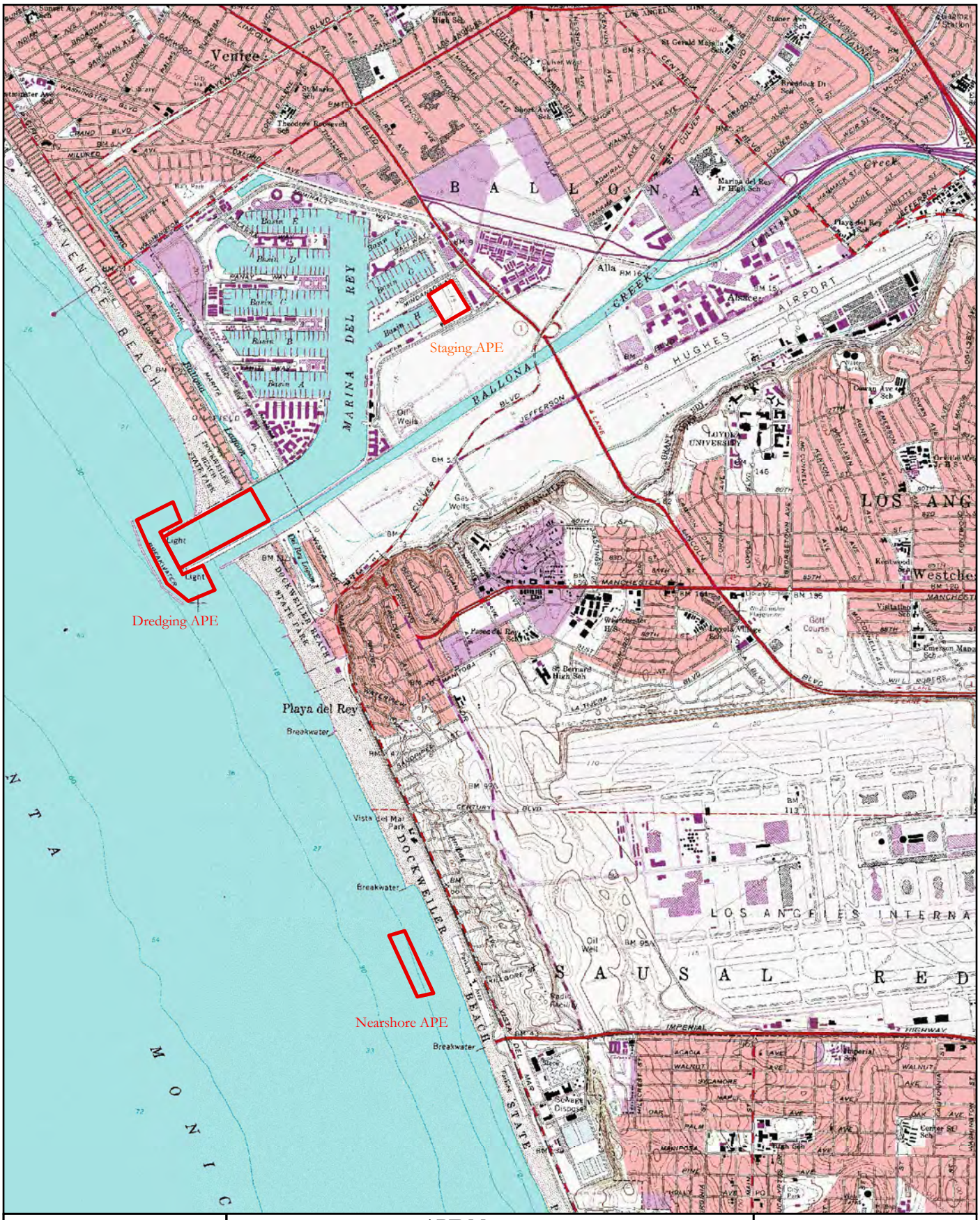
Marina del Rey Maintenance Dredging Project
Los Angeles County, California

Section 106 of the National Historic Preservation Act and its Implementing Regulations at 36 CFR Part 800

Prepared by Daniel Grijalva, Archaeologist

May 2023

Environmental Resources Branch, Planning Division
U.S. Army USACE of Engineers, Los Angeles District



APE Map
Marina del Rey Maintenance Dredging Project
Los Angeles County, California
United State Army Corps of Engineers

APE

2023

Coordinate System: NAD 1983 UTM Zone 11N

N

0 0.3 0.6 Mi

0 0.5 1 Km

Map showing dredging areas
Marina del Rey Maintenance Dredging Project
Los Angeles County, California
United State Army Corps of Engineers

2023

Coordinate System: NAD 1983 UTM Zone 11N

N

0 0.05 0.1 Mi

0 0.1 0.2 Km

Response to Comments

The Gabrielino Tongva Indians of California tribe

Comment: We have been in contact with your office regarding this project as our Tribal Leader (Robert Dorame) is the MLD for the APE. This area is highly sensitive for cultural resources and has tested positive by the Native American Heritage Commission. The APE falls within the Guashna Village and we consider this to be extremely culturally sensitive area.

On Monday June 12, 2023, Christina Conley, Cultural Resource Administrator, for the Gabrielino Tongva Indians of California tribe replied to the emailed Public Notice (preparation of an Environmental Assessment (EA) for maintenance dredging of the Marina del Rey Dredging Project that was sent on May 31, 2023.

On Saturday May 20, 2023, Christina Conley, Cultural Resource Administrator, for the The Gabrielino Tongva Indians of California tribe replied to the emailed tribal consultation initiation letter on May 19, 2023.

Corps' Response:

USACE Archaeologist Daniel Grijalva forwarded Christina Conley the National Historic Preservation Act Section 106 consultation package that was submitted to SHPO for review on May 22, 2023. USACE emailed Christina Conley on June 13, 2023 that the Gabrielino Tongva Indians of California tribe comments on the public notice have been accepted.

Appendix D
Sediment Sampling and Testing Report
Appendix D is available upon request via email to:
CESPL-Marina-del-Rey-Harbor-Dredging@usace.army.mil

Appendix E
Construction Emissions Calculations

CORPS EXCEL SPREADSHEET CONSTRUCTION EMISSIONS CALCULATIONS

MARINA del REY HARBOR CLAMSHELL DREDGING EQUIPMENT LIST, EMISSION FACTORS, AND ESTIMATED AIR EMISSIONS

	Equipment			Approximate (Approx) Engine Rated Horsepower (HP)	Approx. Engine Load Factor		Emission Rates											Notes		Emission Rates for a Single Engine										Notes
Equipment	Units	Engine Count	Kilowatt (KW)	(Hp)	Factor		Units	PM10	PM2.5	NOx	SOX	CO	ROG	CO2	CH4	N2O	CO2e			Units	PM10	PM2.5	NOX	SOX	CO	ROG	CO2	CH4	N2O	CO2e	
Clamshell Dredge Main Engine	1	1	Not Applicable (NA)	2883	0.45		lb/hr	0.458	0.408	16.237	0.016	3.289	0.682	1706.847	0.069	0.014	1712.704	1		g/bhp-hr	0.16	0.143	5.678	0.006	1.15	0.238	596.868	0.024	0.005	598.9	1
Clamshell Dredge Auxiliary Engine	1	1	Not Applicable (NA)	410	0.75		lb/hr	0.27	0.241	9.671	0.008	1.551	0.542	805.118	0.033	0.007	807.881	1		g/bhp-hr	0.2	0.18	7.17	0.006	1.15	0.4	596.87	0.02	0	598.9	1
Towing Sediment Barge (Derrick Barge) Main Engine	1	1	Not Applicable (NA)	2883	0.45		lb/hr	0.458	0.408	16.237	0.016	3.289	0.682	1706.847	0.069	0.014	1712.704	1		g/bhp-hr	0.16	0.143	5.678	0.006	1.15	0.238	596.868	0.024	0.005	598.9	1
Towing Sediment Barge (Derrick Barge) Auxiliary Engine	1	1	Not Applicable (NA)	410	0.75		lb/hr	0.27	0.241	9.671	0.008	1.551	0.542	805.118	0.033	0.007	807.881	1		g/bhp-hr	0.2	0.18	7.17	0.006	1.15	0.4	596.87	0.02	0	598.9	1
Shifting Dredge Barge (Scows) Main Engine	2	1	Not Applicable (NA)	2883	0.45		lb/hr	0.458	0.408	16.237	0.016	3.289	0.682	1706.847	0.069	0.014	1712.704	1		g/bhp-hr	0.16	0.143	5.678	0.006	1.15	0.238	596.868	0.024	0.005	598.9	1
Shifting Dredge Barge (Scows) Auxiliary Engine	2	1	Not Applicable (NA)	410	0.75		lb/hr	0.27	0.241	9.671	0.008	1.551	0.542	805.118	0.033	0.007	807.881	1		g/bhp-hr	0.2	0.18	7.17	0.006	1.15	0.4	596.87	0.02	0	598.9	1
Tug Boat Main Engine	2	1	Not Applicable (NA)	1167	0.5		lb/hr	0.621	0.553	10.79	0.007	3.17	0.907	760.559	0.031	0.006	763.169	1		g/bhp-hr	0.482	0.429	8.385	0.006	2.464	0.705	591.045	0.024	0.005	593.1	1
Tug Boat Auxiliary Engine	2	1	Not Applicable (NA)	86	0.31		lb/hr	0.157	0.141	1.86	0.001	0.982	0.256	139.127	0.006	0.001	139.605	1		g/bhp-hr	0.67	0.6	7.9	0.006	4.17	1.09	591.04	0.02	0	593.1	1
Crew Boat (Crew and Supply Boat) Main Engine	1	1	Not Applicable (NA)	384	0.38		lb/hr	0.14	0.124	3.487	0.002	0.792	0.274	189.982	0.008	0.002	190.634	1		g/bhp-hr	0.434	0.387	10.849	0.006	2.464	0.853	591.045	0.024	0.005	593.1	1
Crew Boat (Crew and Supply Boat) Auxiliary Engine	1	1	Not Applicable (NA)	83	0.32		lb/hr	0.086	0.077	1.618	0.001	0.673	0.224	69.404	0.003	0.001	69.642	1		g/bhp-hr	0.73	0.66	13.78	0.006	5.74	1.91	591.04	0.02	0	593.1	1
Crew Boat (Work Survey Boat) Main Engine	1	1	Not Applicable (NA)	384	0.38		lb/hr	0.072	0.065	2.115	0.002	1.685	0.255	213.66	0.009	0.002	214.393	1		g/bhp-hr	0.2	0.178	5.852	0.006	4.663	0.705	591.045	0.024	0.005	593.1	1
Crew Boat (Work Survey Boat) Auxiliary Engine	1	1	Not Applicable (NA)	83	0.32		lb/hr	0.066	0.059	1.422	0.001	0.581	0.134	106.364	0.004	0.002	106.729	1		g/bhp-hr	0.37	0.33	7.9	0.006	3.23	0.75	591.04	0.02	0	593.1	1
Land Based Vehicle Transpiration : Worker Vehicles (Commuter Vehicles, Vendor Supply Trucks, Large Trash Trucks)	18	1																4, 7,8												4, 7,8

DAILY EMISSIONS (LBS/DAY)

Equipment	Units	Engine Count	(kW)	(Hp)	Load Factor	Hours per Day	HP-HR per Day w/ LF	Kw-HR per Day w/ LF	PM10	PM2.5	NOx	SOX	CO	ROG	CO2	CH4	N2O	CO2e	Notes
Clamshell Dredge Main Engine	1	1	Not Applicable (NA)	2883	0.45	24	1297.35		1.312	1.168	46.501	0.046	9.419	1.953	4888.252	0.198	0.040	4905.025	1,2, 5
Clamshell Dredge Auxiliary Engine	1	1	Not Applicable (NA)	410	0.75	24	307.5		0.183	0.164	6.565	0.005	1.053	0.368	546.520	0.022	0.005	548.396	1,2, 5
Towing Sediment Barge (Derrick Barge) Main Engine	1	1	Not Applicable (NA)	2883	0.45	6	324.338		0.328	0.292	11.625	0.011	2.355	0.488	1222.063	0.049	0.010	1226.256	1,2,6
Towing Sediment Barge (Derrick Barge) Auxiliary Engine	1	1	Not Applicable (NA)	410	0.75	6	76.875		0.046	0.041	1.641	0.001	0.263	0.092	136.630	0.006	0.001	137.099	1,2, 6
Shifting Dredge Barge (Scows) Main Engine	2	1	Not Applicable (NA)	2883	0.45	6	648.675		1.312	1.168	46.501	0.046	9.419	1.953	4888.252	0.198	0.040	4905.025	1,2,6
Shifting Dredge Barge (Scows) Auxiliary Engine	2	1	Not Applicable (NA)	410	0.75	6	153.75		0.183	0.164	6.565	0.005	1.053	0.368	546.520	0.022	0.005	548.396	1,2, 6
Tug Boat Main Engine	2	1	Not Applicable (NA)	1167	0.5	6	291.75		0.800	0.712	13.898	0.009	4.083	1.168	979.660	0.040	0.008	983.022	1,2, 6
Tug Boat Auxiliary Engine	2	1	Not Applicable (NA)	86	0.31	6	13.33		0.009	0.008	0.109	0.000	0.058	0.015	8.188	0.000	0.000	8.216	1,2, 6
Crew Boat (Crew and Supply Boat) Main Engine	1	1	Not Applicable (NA)	384	0.38	6	36.48		0.011	0.010	0.281	0.000	0.064	0.022	15.299	0.001	0.000	15.352	1,2, 6

Crew Boat (Crew and Supply Boat) Auxiliary Engine	1	1	Not Applicable (NA)	83	0.32	6	6.64		0.001	0.001	0.024	0.000	0.010	0.003	1.017	0.000	0.000	1.021	1,2,6
Crew Boat (Work Survey Boat) Main Engine	1	1	Not Applicable (NA)	384	0.38	6	36.48		0.006	0.005	0.170	0.000	0.136	0.021	17.206	0.001	0.000	17.265	1,2,6
Crew Boat (Work Survey Boat) Auxiliary Engine	1	1	Not Applicable (NA)	83	0.32	6	6.64		0.001	0.001	0.021	0.000	0.009	0.002	1.559	0.000	0.000	1.564	1,2,6
Land Based Vehicle Transportation: Worker Vehicles (Commuter Vehicles, Vendor Supply Trucks, Large Trash Trucks)	18	1				2			0.002	0.001	0.020	0.001	0.024	0.002	5.192	0.001	0.001	5.194	4, 7, 8, 9
Daily Emissions w/ diesel dredge equipment (lbs/day)									**4.194**	**3.736**	133.922	**0.125**	**27.945**	**6.456**	**13256.359**	**0.536**	**0.109**	13301.833	

ANNUAL (2024) EMISSIONS (TONS/YEAR)					Load	Hours per	HP-HR per	Kw-HR per	PM10	PM2.5	NOx	SOX	CO	ROG	CO2	CH4	N2O	CO2e	Notes
Equipment	Days/Year	Units	Engine Count	(Hp)	Factor	Day	Day w/ LF	Day w/ LF											
Clamshell Dredge Main Engine	150	1	1						0.0893	0.0795	3.1648	0.0031	0.64107	0.13293	332.684997	0.0134	0.0027	333.8266	1,3, 5, 8
Clamshell Dredge Auxiliary Engine	150	1	1						0.0125	0.0111	0.4468	0.0004	0.07165	0.02504	37.1951336	0.0015	0.0003	37.32278	1,3, 5,8
Towing Sediment Barge (Derrick Barge) Main Engine	150	1	1						0.0223	0.0199	0.7912	0.0008	0.16027	0.03323	83.1712493	0.0034	0.0007	83.456649	1,3, 6, 8
Towing Sediment Barge (Derrick Barge) Auxiliary Engine	150	1	1						0.0031	0.0028	0.1117	9E-05	0.01791	0.00626	9.29878341	0.0004	8E-05	9.3306949	1,3, 6,8
Shifting Dredge Barge (Scows) Main Engine	150	2	1						0.0893	0.0795	3.1648	0.0031	0.64107	0.13293	332.685	0.0134	0.0027	333.8266	1,3, 6,8
Shifting Dredge Barge (Scows) Auxiliary Engine	150	2	1						0.0125	0.0111	0.4468	0.0004	0.07165	0.02504	37.195	0.0015	0.0003	37.32278	1,3, 6,8
Tug Boat Main Engine	150	2	1						0.0544	0.0485	0.9459	0.0006	0.2779	0.07951	66.674	0.0027	0.0005	66.902608	1,3, 6,8
Tug Boat Auxiliary Engine	150	2	1						0.0006	0.0006	0.0074	4E-06	0.00393	0.00103	0.557	2E-05	4E-06	0.5591684	1,3, 6, 8
Crew Boat (Crew and Supply Boat) Main Engine	150	1	1						0.0008	0.0007	0.0191	1E-05	0.00434	0.0015	1.041	4E-05	1E-05	1.0448084	1,3, 6, 8
Crew Boat (Crew and Supply Boat) Auxiliary Engine	150	1	1						9E-05	8E-05	0.0016	1E-06	0.00067	0.00022	0.069	3E-06	1E-06	0.0694738	1,3,6, 8
Crew Boat (Work Survey Boat) Main Engine	150	1	1						0.0004	0.0004	0.0116	1E-05	0.00923	0.0014	1.171	5E-05	1E-05	1.1750244	1,3, 6,8
Crew Boat (Work Survey Boat) Auxiliary Engine	150	1	1						7E-05	6E-05	0.0014	1E-06	0.00058	0.00013	0.106	4E-06	2E-06	0.1064712	1,3, 6, 8
Land Based Vehicle Transportation: Worker Vehicles (Commuter Vehicles, Vendor Supply Trucks, Large Trash Trucks)	150	18	1						0.000	0.000	0.001	0.000	0.002	0.000	0.353	0.000	0.000	0.353	4, 7, 8, 9
Annual (2024) Emissions w/ diesel dredge equipment (ton/year 2024)									**0.285**	**0.254**	**9.114**	**0.009**	**1.902**	**0.439**	**902.202**	**0.037**	**0.007**	**905.297**	10
Annual (2023) Emissions w/ diesel dredge equipment (ton/year 2023)									**0.171**	**0.153**	**5.469**	**0.005**	**1.141**	**0.264**	**541.321**	**0.022**	**0.004**	**543.178**	11
Applicable General Conformity Rates (tons/year)									**100**	**70**	**100**	**100**	**100**	**10**					

Notes:

1. Vessel/Engine Information, Engine Rated Power [Horsepower (hp)]; Engine Load Factor; Emissions Rates (lb/hr) accessed from Sacramento Metropolitan Air Quality Management District (SMAQMD) Harbor craft, Dredge and Barge Emission Factor Calculator (Accessed January 24, 2023 through February 6, 2023) [2017, 2023]
2. conversion factor pounds-grams: 453 grams/lb.
3. 1 metric ton = 2204 lbs
4.. Land Based Vehicle Transportation : Worker Vehicles (Commuter Vehicles; Vendor Supply Trucks; Large Trash Trucks), approximately 18 worker. Estimated air emissions based on similar land based vehicles emissions for 2022 Santa Barbara Harbor Dredging Six Year Program Environmental Assessment, Santa Barbara Harbor, Santa Barbara County, California (December 2022). ProjectOrange County, California, November 2022
5. One (1) Clamshell dredge daily operation estimated 24 hours a day.
6. One (1) Derrick barge, Two (2) scows, two (2) tug boats, one (1) crew boat, and one (1) survey boat, each piece of equipment daily operation estimated 6 hours a day
7. Land Based Vehicle Transpiration: Work Vehicles (Commuter Vehicles; Vendor Supply Trucks; Large Trash Trucks), each piece of land based vehicle transportation daily operations estimated 2 hours a day.
8. Proposed Dredging Project Duration is approximately 120 days; approximately 15 days of equipment mobilization; approximately 15 days of equipment demobilization: Estimated 150 days dredging project operations.
9. Greenhouse Gases (GHG) estimated emissions are in Metric Tons (MT).
10. Annual (2024) Construction Emissions calculated for approximately 150 days (January 1, 2024 through May 23, 2024)
11. Annual (2023) Construction Emissions for approximately 90 days (October 1, 2023 through December 31, 2023)

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT
EMISSION FACTORS

SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator - Instructions

Introduction: This tool estimates emission rates for harbor craft engines based on California Air Resources Board emission estimation databases.

How to start using this tool:

1. Review the Instructions tab
2. Enter data in the Inputs tab
3. View final results in the MainEngineEmissRates and AuxEngineEmissRates tabs

Tab Descriptions:

- Instructions: The current tab with brief description of all tabs and calculator functions.
- Input: This is the only tab that requires user input. Not all fields in this tab are required for the calculations to be completed. Different colors are used to indicate which fields are required and which are optional. *If using this tool for environmental planning purposes, the engine model year, engine rated power, vessel number and location for Main Engine Inputs and Auxiliary Engine Inputs are optional since during the planning phase of a project the User is not expected to know this information. If this tool is being used for calculating emissions for construction mitigation purposes, the User must provide ALL Main Engine Inputs and Auxiliary Engine Inputs. The engine model year, engine rated power, vessel number and location information is expected to be accessible for the construction phase of a project.*
- MainEngineEmissRates: This tab contains final results (emission rates and emission factors) for the main engine(s) of each vessel specified in the "A2. Main Engine" input table in the "Inputs" tab.
- AuxEngineEmissRates: This tab contains final results (emission rates and emission factors) for each auxiliary engine specified in the "A3. Auxiliary Engine" input table in the "Inputs" tab.
- VesselDesc: This tab includes brief descriptions of harbor craft vessel types.
- Documentation: This tab documents calculator version information.

- Calculations: Contains all emission factor and emission rate calculations. The "MainEngineEmissRates" and "AuxEngineEmissRates" tabs reference cells in this tab.
- CARB_EFs: Contains reference emission factors.
- CARB_Defaults: Contains default information such as useful life, load factors, average usage, rated horsepower, and model year.

SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator - Input Data Page

INSTRUCTIONS:
1. Enter inputs into tables A1, A2, A3, and A4 below. Required inputs must be entered to estimate emission rates, optional inputs should be entered if available.
2. After entering inputs, review status and error messages (cell E14); make changes as necessary until this cell is green indicating that inputs are ready.
3. Results may be reviewed in "MainEngineEmissRates" and "AuxEngineEmissRates" tabs, both colored yellow.

Inputs and Status

Inputs color legend	Required Input
	Optional Input
Status and error messages	OK. Default values will be applied to blank model year and HP

A1. Inventory Calendar year

Inventory Calendar Year	2023

A4. Project Information

Inputs	
Date (mm/dd/yyyy):	1/24/2023
Project Name:	Marina del Rey (MDR) Harbor Dredging
Project Location:	Marina del Rey (MDR) Harbor, Los Angeles County, California
Contact Person:	Kirk Brus
Company Name:	Department of the Army, U.S Army Corps of Engineers
Mailing Address:	915 Wilshire Blvd, Room 1109, Los Angeles California
Phone Number:	213 452-3876
Email Address:	Kirk.C.Brus@usace.army.mil

A2. Main Engine Inputs

Required Inputs			Optional Inputs			
Vessel Name	Vessel Type	No. of Engines	Engine Model Year	Engine Rated Power (hp)	Vessel Number	Home Port
Clamshell	Dredge	1				
Tug boats	Tug Boats	1				
Towing Sediment Barge	Barge	1				
Shifting Dredged Barge	Barge	1				
Crew Boat	Crew and Supply	1				
Crew Boat	Work Boats	1				

A3. Auxiliary Engine Inputs

Required Inputs			Optional Inputs	
Vessel Name	Auxiliary Engine Type	No. of Engines	Engine Model Year	Engine Rated Power (hp)
Clamshell	Barge/Dredge Generator	1		
Tug boats	Tug Boats Generator	1		
Towing Sediment Barge	Barge/Dredge Generator	1		
Shifting Dredged Barge	Barge/Dredge Generator	1		
Crew Boat	Crew and Supply Generator	1		
Crew Boat	Work Boats Generator	1		

SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator - Main Engine Emission Rates

Calendar Year: 2023 **Number of Entries:** 6

Vessel/Engine Information								Emission Rates (lb/hr; estimates for each row are totals over the number of engines listed in column J for that row)										Emission Rates for a Single Engine (g/bhp-hr)									
Vessel Name	Vessel Number	Home Port	Vessel Type	Engine Model Year	Engine Rated Power (hp)	Engine Load Factor	Number of engines	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	SO_2	CO_2	CH_4	N_2O	CO_2e
Clamshell			Dredge	2006	2883	0.45	1	0.458	0.408	16.237	0.682	3.289	0.016	1706.847	0.069	0.014	1712.704	0.160	0.143	5.678	0.238	1.150	0.006	596.868	0.024	0.005	598.9
Tug boats			Tug Boats	2002	1167	0.50	1	0.621	0.553	10.790	0.907	3.170	0.007	760.559	0.031	0.006	763.169	0.482	0.429	8.385	0.705	2.464	0.006	591.045	0.024	0.005	593.1
Towing Sedime			Barge	2006	2883	0.45	1	0.458	0.408	16.237	0.682	3.289	0.016	1706.847	0.069	0.014	1712.704	0.160	0.143	5.678	0.238	1.150	0.006	596.868	0.024	0.005	598.9
Shifting Dredge			Barge	2006	2883	0.45	1	0.458	0.408	16.237	0.682	3.289	0.016	1706.847	0.069	0.014	1712.704	0.160	0.143	5.678	0.238	1.150	0.006	596.868	0.024	0.005	598.9
Crew Boat			Crew and Supply	1995	384	0.38	1	0.140	0.124	3.487	0.274	0.792	0.002	189.982	0.008	0.002	190.634	0.434	0.387	10.849	0.853	2.464	0.006	591.045	0.024	0.005	593.1
Crew Boat			Work Boats	2006	364	0.45	1	0.072	0.065	2.115	0.255	1.685	0.002	213.660	0.009	0.002	214.393	0.200	0.178	5.852	0.705	4.663	0.006	591.045	0.024	0.005	593.1

SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator - Auxiliary Engine Emission Rates

Calendar Year: 2023 **Number of Entries:** 6

Vessel/Engine Information									Emission Rates (lb/hr; estimates for each row are totals over the number of engines listed in column K for that row)										Emission Rates for a Single Engine (g/bhp-hr)									
Vessel Name	Vessel Number	Home Port	Vessel Type	Auxiliary Engine Type	Engine Model Year	Engine Rated Power (hp)	Engine Load Factor	Number of Engines	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	SO_2	CO_2	CH_4	N_2O	CO_2e
Clamshell			Dredge	Barge/Dredge Generator	2000	410	0.75	1	0.135	0.120	4.835	0.271	0.776	0.004	402.559	0.016	0.003	403.941	0.20	0.18	7.17	0.40	1.15	0.006	596.87	0.02	0.00	598.9
Tug boats			Tug Boats	Tug Boats Generator	2000	86	0.31	1	0.039	0.035	0.465	0.064	0.245	0.000	34.782	0.001	0.000	34.901	0.67	0.60	7.90	1.09	4.17	0.006	591.04	0.02	0.00	593.1
Towing Sedime			Barge	Barge/Dredge Generator	2000	410	0.75	1	0.135	0.120	4.835	0.271	0.776	0.004	402.559	0.016	0.003	403.941	0.20	0.18	7.17	0.40	1.15	0.006	596.87	0.02	0.00	598.9
Shifting Dredg			Barge	Barge/Dredge Generator	2000	410	0.75	1	0.135	0.120	4.835	0.271	0.776	0.004	402.559	0.016	0.003	403.941	0.20	0.18	7.17	0.40	1.15	0.006	596.87	0.02	0.00	598.9
Crew Boat			Crew and Supply	Crew and Supply Generator	1995	83	0.32	1	0.043	0.039	0.809	0.112	0.337	0.000	34.702	0.001	0.000	34.821	0.73	0.66	13.78	1.91	5.74	0.006	591.04	0.02	0.00	593.1
Crew Boat			Crew and Supply	Work Boats Generator	2000	190	0.43	1	0.066	0.059	1.422	0.134	0.581	0.001	106.364	0.004	0.001	106.729	0.37	0.33	7.90	0.75	3.23	0.006	591.04	0.02	0.00	593.1

SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator - Brief Vessel Descriptions

Reference Sources for Vessel Descriptions and Pictures Below:

1. South Coast Air Quality Management District, 2015, Draft Technology Assessment: Commercial Harbor Craft, http://www.arb.ca.gov/msprog/tech/techreport/draft_chc_technology_assessment.pdf
2. California Air Resources Board, 2004, Statewide Commercial Harbor Craft Survey: Final Report, https://www.arb.ca.gov/ports/marinevess/harborcraft/documents/hcsurveyrep0304.pdf
3. San Francisco Bay Crossings, Dutra in the Delta, http://www.baycrossings.com/dispnews.php?id=2538
4. Dutra Group Inc, Fleet http://www.dutragroup.com/equipment-aggregates-dredging-marine-construction.html?id=39

Vessel Descriptions (Pictures and Descriptions Sourced from SCAQMD and CARB Reports)		
Barges		Cargo barges carry liquid, bulk, and containerized cargo within and between harbors. Work barges may carry construction materials or equipment.
Commercial Fishing		Vessels used in the search and collection of fish for the purpose of sale at market
Charter Fishing		Vessels available for hire by the general public and used for the search and collection of fish for the purpose of personal consumption
Crew and Supply		Vessels used for carrying personnel and supplies to and from offshore and in-harbor locations
Dredges	 	Special purpose barges used to construct and maintain channels, berths, docks, breakwaters and other facilities in harbors and ports

Ferries		Vessels used for public use in the transportation of persons or property
Pilot Vessels		Vessels used to guide ocean-going vessels into and out of a port or harbor
Tug Boats		Vessels used for the towing and pushing of ships or other floating structures such as barges
Tow Boats / Push Boats		Vessels used to tow barges and pontoons. The hull of these vessels is usually rectangular in plan and has little freeboard.
Work Boats		Vessels used to perform duties such as fire/rescue, law enforcement, hydrographic surveys, spill/response research, training, and construction
Others		Vessels used in various commercial operations that do not fit into any other category such as vessels used to dispose of cremated remains

SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator - Documentation

Version 1.0

1. User provides vessel type; the following inputs for main engines: model year, horsepower, engine count; the following inputs for auxiliary engines: engine type, model year, horsepower, engine count. If engine horsepower or model year are not provided an average estimate from the CARB source calculators will be used to develop emission rates.
2. Calculator looks up zero-hour emission factors, deterioration factors, load factor, and useful life.
3. Calculator calculates emission rates (lb/hr) and emission factors (g/bhp-hr).
4. Additional documentation available in June (2017) Ramboll Environ Memorandum

SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator - Emission Factor Calculations

Main Engine Emission Factor Calculator

Calendar Year: 2023 **Number of Entries:** 6

Vessel/Engine Information												Activity			Zero-Hour Emission Factors (g/hp-hr)					Deterioration Factors (g/hp - hr)					Emission Rates (g/bhp-hr)									Emission Rates (g/hr)									Fuel Correction Factor			
Vessel Name	Vessel Type	Engine Type	Engine Category	Engine Model Year	MdlYr Group	Engine HP	HP Category	FCF HP Category	Engine Load Factor	BSFC (g/hp-hr)	No. of engines	Annual Hours	Age	Useful life	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	SO_2	CO_2	CH_4	N_2O	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	SO_2	CO_2	CH_4	N_2O	NOx	PM	ROG	MY Bin
Clamshell	Dredge	Main	C1	2006	2006	2,883	10	4	0.45	185.97	1	1,776	17	17	0.120	0.110	4.950	0.230	0.920	0.67	0.62	0.21	0.44	0.25	0.160	0.143	5.678	0.238	1.150	0.006	596.868	0.024	0.005	208.0	185.2	7,365.1	309.2	1,491.7	7.2	774,212.0	31.4	6.3	0.95	0.80	0.72	1996
Tug boats	Tug Boats	Main	A1	2002	2002	1,167	7	4	0.50	184.16	1	1,250	21	21	0.361	0.332	7.310	0.680	1.971	0.67	0.62	0.21	0.44	0.25	0.482	0.429	8.385	0.705	2.464	0.006	591.045	0.024	0.005	281.5	250.7	4,894.3	411.5	1,438.1	3.2	344,983.4	14.0	2.8	0.95	0.80	0.72	1996
Towing Sediment Barge	Barge	Main	C1	2006	2006	2,883	10	4	0.45	185.97	1	1,776	17	17	0.120	0.110	4.950	0.230	0.920	0.67	0.62	0.21	0.44	0.25	0.160	0.143	5.678	0.238	1.150	0.006	596.868	0.024	0.005	208.0	185.2	7,365.1	309.2	1,491.7	7.2	774,212.0	31.4	6.3	0.95	0.80	0.72	1996
Shifting Dredged Barge	Barge	Main	C1	2006	2006	2,883	10	4	0.45	185.97	1	1,776	17	17	0.120	0.110	4.950	0.230	0.920	0.67	0.62	0.21	0.44	0.25	0.160	0.143	5.678	0.238	1.150	0.006	596.868	0.024	0.005	208.0	185.2	7,365.1	309.2	1,491.7	7.2	774,212.0	31.4	6.3	0.95	0.80	0.72	1996
Crew Boat	Crew and Supply	Main	B1	1995	1995	384	5	4	0.38	184.16	1	788	28	28	0.361	0.332	9.641	0.823	1.971	0.67	0.62	0.21	0.44	0.25	0.434	0.387	10.849	0.853	2.464	0.006	591.045	0.024	0.005	63.3	56.4	1,581.7	124.4	359.2	0.8	86,174.5	3.5	0.7	0.9	0.7	0.7	1960
Crew Boat	Work Boats	Main	A1	2006	2006	364	5	4	0.45	184.16	1	1,250	17	17	0.150	0.138	5.102	0.680	3.730	0.67	0.62	0.21	0.44	0.25	0.200	0.178	5.852	0.705	4.663	0.006	591.045	0.024	0.005	32.9	29.3	959.5	115.6	764.5	0.9	96,914.4	3.9	0.8	0.9	0.8	0.7	1996

Auxiliary Engine Emission Factor Calculator

Calendar Year: 2023 **Number of Entries:** 6

Vessel/Engine Information												Activity			Zero-Hour Emission Factors (g/hp-hr)					Deterioration Factors (g/hp - hr)					Emission Rates (g/bhp-hr)									Emission Rates (g/hr)									Fuel Correction Factor			
Vessel Name	Vessel Type	Engine Type	Engine Category	Engine Model Year	MdlYr Group	Engine HP	HP Category	FCF HP Category	Engine Load Factor	BSFC (g/hp-hr)	No. of engines	Annual Hours	Age	Useful life	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	SO_2	CO_2	CH_4	N_2O	PM_{10}	$PM_{2.5}$	NOx	ROG	CO	SO_2	CO_2	CH_4	N_2O	NOx	PM	ROG	MY Bin
Clamshell	Barge/Dredge Generator	Aux	C2	2000	2000	410	7	4	0.75	185.97	1	360	23	23	0.150	0.138	6.250	0.387	0.920	0.67	0.62	0.21	0.44	0.25	0.200	0.178	7.169	0.401	1.150	0.006	596.868	0.024	0.005	61.3	54.6	2,193.3	122.8	351.8	1.7	182,597.6	7.4	1.5	0.9	0.8	0.7	1996
Tug boats	Tug Boats Generator	Aux	A2	2000	2000	86	2	2	0.31	184.16	1	1,633	23	23	0.580	0.533	7.310	1.178	3.595	0.44	0.40	0.14	0.28	0.16	0.668	0.599	7.900	1.086	4.170	0.006	591.045	0.024	0.005	17.8	16.0	210.9	29.0	111.3	0.1	15,776.7	0.6	0.1	0.9	0.8	0.7	1998
Towing Sediment Barge	Barge/Dredge Generator	Aux	C2	2000	2000	410	7	4	0.75	185.97	1	360	23	23	0.150	0.138	6.250	0.387	0.920	0.67	0.62	0.21	0.44	0.25	0.200	0.178	7.169	0.401	1.150	0.006	596.868	0.024	0.005	61.3	54.6	2,193.3	122.8	351.8	1.7	182,597.6	7.4	1.5	0.9	0.8	0.7	1996
Shifting Dredged Barge	Barge/Dredge Generator	Aux	C2	2000	2000	410	7	4	0.75	185.97	1	360	23	23	0.150	0.138	6.250	0.387	0.920	0.67	0.62	0.21	0.44	0.25	0.200	0.178	7.169	0.401	1.150	0.006	596.868	0.024	0.005	61.3	54.6	2,193.3	122.8	351.8	1.7	182,597.6	7.4	1.5	0.9	0.8	0.7	1996
Crew Boat	Crew and Supply Generat	Aux	B2	1995	1995	83	2	2	0.32	184.16	1	3,036	28	28	0.706	0.649	13.000	2.073	4.944	0.44	0.40	0.14	0.28	0.16	0.732	0.657	13.783	1.911	5.735	0.006	591.045	0.024	0.005	19.5	17.5	367.1	50.9	152.7	0.1	15,740.6	0.6	0.1	0.9	0.7	0.7	1960
Crew Boat	Work Boats Generator	Aux	A2	2000	2000	190	4	4	0.43	184.16	1	1,633	23	23	0.319	0.294	7.310	0.809	2.781	0.44	0.40	0.14	0.28	0.16	0.368	0.330	7.900	0.746	3.226	0.006	591.045	0.024	0.005	30.0	26.9	644.9	60.9	263.3	0.5	48,246.0	2.0	0.4	0.9	0.8	0.7	1996

SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator - CARB Emission Factors Inputs

Data sources:

https://www.arb.ca.gov/msei/california_harbor_craft_emissions_inventory_database_10072011.mdb

https://www.arb.ca.gov/msei/california_crew_supply_emissions_inventory_database_10072011.mdb

https://www.arb.ca.gov/msei/california_barge_dredge_emissions_inventory_database_10072011.mdb

				Zero-Hour Emission Factor (g/hp-hr)					
LOOKUP	Engine Category	HP Category	Model Year	ROG	CO	NOx	PM10	PM2.5	BSFC
A1_1_1987	A1	1	1987	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1988	A1	1	1988	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1989	A1	1	1989	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1990	A1	1	1990	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1991	A1	1	1991	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1992	A1	1	1992	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1993	A1	1	1993	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1994	A1	1	1994	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1995	A1	1	1995	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1996	A1	1	1996	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1997	A1	1	1997	1.84	3.65	8.142	0.722	0.664	184.158502
A1_1_1998	A1	1	1998	1.8	3.65	8.142	0.722	0.664	184.158502
A1_1_1999	A1	1	1999	1.8	3.65	8.142	0.722	0.664	184.158502
A1_1_2000	A1	1	2000	1.8	3.65	7.31	0.722	0.664	184.158502
A1_1_2001	A1	1	2001	1.8	3.65	7.31	0.722	0.664	184.158502
A1_1_2002	A1	1	2002	1.8	3.65	7.31	0.722	0.664	184.158502
A1_1_2003	A1	1	2003	1.8	3.65	7.31	0.722	0.664	184.158502
A1_1_2004	A1	1	2004	1.8	3.65	7.31	0.722	0.664	184.158502
A1_1_2005	A1	1	2005	1.8	3.73	5.32	0.3	0.276	184.158502
A1_1_2006	A1	1	2006	1.8	3.73	5.32	0.3	0.276	184.158502
A1_1_2007	A1	1	2007	1.8	3.73	5.32	0.3	0.276	184.158502
A1_1_2008	A1	1	2008	1.8	3.73	5.32	0.3	0.276	184.158502
A1_1_2009	A1	1	2009	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2010	A1	1	2010	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2011	A1	1	2011	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2012	A1	1	2012	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2013	A1	1	2013	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2014	A1	1	2014	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2015	A1	1	2015	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2016	A1	1	2016	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2017	A1	1	2017	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2018	A1	1	2018	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2019	A1	1	2019	1.8	3.73	5.32	0.22	0.202	184.158502
A1_1_2020	A1	1	2020	1.8	3.73	5.32	0.22	0.202	184.158502
A1_2_1987	A1	2	1987	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1988	A1	2	1988	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1989	A1	2	1989	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1990	A1	2	1990	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1991	A1	2	1991	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1992	A1	2	1992	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1993	A1	2	1993	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1994	A1	2	1994	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1995	A1	2	1995	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1996	A1	2	1996	1.44	3.504	15.34	0.798	0.734	184.158502
A1_2_1997	A1	2	1997	0.99	2.5477	10.325	0.6555	0.603	184.158502
A1_2_1998	A1	2	1998	0.99	2.5477	10.325	0.6555	0.603	184.158502
A1_2_1999	A1	2	1999	0.99	2.5477	10.325	0.6555	0.603	184.158502
A1_2_2000	A1	2	2000	0.99	2.5477	7.31	0.6555	0.603	184.158502
A1_2_2001	A1	2	2001	0.99	2.5477	7.31	0.6555	0.603	184.158502
A1_2_2002	A1	2	2002	0.99	2.5477	7.31	0.6555	0.603	184.158502
A1_2_2003	A1	2	2003	0.99	2.5477	7.31	0.6555	0.603	184.158502
A1_2_2004	A1	2	2004	0.99	2.5477	7.31	0.6555	0.603	184.158502
A1_2_2005	A1	2	2005	0.99	3.73	5.32	0.3	0.276	184.158502
A1_2_2006	A1	2	2006	0.99	3.73	5.32	0.3	0.276	184.158502
A1_2_2007	A1	2	2007	0.99	3.73	5.32	0.3	0.276	184.158502
A1_2_2008	A1	2	2008	0.99	3.73	5.32	0.3	0.276	184.158502
A1_2_2009	A1	2	2009	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2010	A1	2	2010	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2011	A1	2	2011	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2012	A1	2	2012	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2013	A1	2	2013	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2014	A1	2	2014	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2015	A1	2	2015	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2016	A1	2	2016	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2017	A1	2	2017	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2018	A1	2	2018	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2019	A1	2	2019	0.99	3.73	5.32	0.22	0.202	184.158502
A1_2_2020	A1	2	2020	0.99	3.73	5.32	0.22	0.202	184.158502
A1_3_1969	A1	3	1969	1.32	3.212	16.52	0.7315	0.673	184.158502
A1_3_1970	A1	3	1970	1.32	3.212	16.52	0.7315	0.673	184.158502
A1_3_1971	A1	3	1971	1.1	3.212	15.34	0.627	0.577	184.158502
A1_3_1972	A1	3	1972	1.1	3.212	15.34	0.627	0.577	184.158502
A1_3_1973	A1	3	1973	1.1	3.212	15.34	0.627	0.577	184.158502
A1_3_1974	A1	3	1974	1.1	3.212	15.34	0.627	0.577	184.158502
A1_3_1975	A1	3	1975	1.1	3.212	15.34	0.627	0.577	184.158502
A1_3_1976	A1	3	1976	1.1	3.212	15.34	0.627	0.577	184.158502
A1_3_1977	A1	3	1977	1.1	3.212	15.34	0.627	0.577	184.158502
A1_3_1978	A1	3	1978	1.1	3.212	15.34	0.627	0.577	184.158502
A1_3_1979	A1	3	1979	1	3.212	14.16	0.5225	0.481	184.158502
A1_3_1980	A1	3	1980	1	3.212	14.16	0.5225	0.481	184.158502
A1_3_1981	A1	3	1981	1	3.212	14.16	0.5225	0.481	184.158502
A1_3_1982	A1	3	1982	1	3.212	14.16	0.5225	0.481	184.158502
A1_3_1983	A1	3	1983	1	3.212	14.16	0.5225	0.481	184.158502
A1_3_1984	A1	3	1984	0.94	3.139	12.98	0.5225	0.481	184.158502
A1_3_1985	A1	3	1985	0.94	3.139	12.98	0.5225	0.481	184.158502
A1_3_1986	A1	3	1986	0.94	3.139	12.98	0.5225	0.481	184.158502
A1_3_1987	A1	3	1987	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_3_1988	A1	3	1988	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_3_1989	A1	3	1989	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_3_1990	A1	3	1990	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_3_1991	A1	3	1991	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_3_1992	A1	3	1992	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_3_1993	A1	3	1993	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_3_1994	A1	3	1994	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_3_1995	A1	3	1995	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_3_1996	A1	3	1996	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_3_1997	A1	3	1997	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_3_1998	A1	3	1998	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_3_1999	A1	3	1999	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_3_2000	A1	3	2000	0.68	1.971	7.31	0.361	0.332	184.158502
A1_3_2001	A1	3	2001	0.68	1.971	7.31	0.361	0.332	184.158502
A1_3_2002	A1	3	2002	0.68	1.971	7.31	0.361	0.332	184.158502
A1_3_2003	A1	3	2003	0.68	1.971	7.31	0.361	0.332	184.158502
A1_3_2004	A1	3	2004	0.68	3.73	5.1015	0.22	0.202	184.158502
A1_3_2005	A1	3	2005	0.68	3.73	5.1015	0.22	0.202	184.158502
A1_3_2006	A1	3	2006	0.68	3.73	5.1015	0.22	0.202	184.158502
A1_3_2007	A1	3	2007	0.68	3.73	5.1015	0.22	0.202	184.158502
A1_3_2008	A1	3	2008	0.68	3.73	5.1015	0.22	0.202	184.158502
A1_3_2009	A1	3	2009	0.68	3.73	5.1015	0.22	0.202	184.158502
A1_3_2010	A1	3	2010	0.68	3.73	5.1015	0.22	0.202	184.158502
A1_3_2011	A1	3	2011	0.68	3.73	5.1015	0.22	0.202	184.158502
A1_3_2012	A1	3	2012	0.68	3.73	5.1015	0.22	0.202	184.158502
A1_3_2013	A1	3	2013	0.68	3.73	3.8	0.09	0.083	184.158502
A1_3_2014	A1	3	2014	0.68	3.73	3.8	0.09	0.083	184.158502
A1_3_2015	A1	3	2015	0.68	3.73	3.8	0.09	0.083	184.158502
A1_3_2016	A1	3	2016	0.68	3.73	3.8	0.09	0.083	184.158502
A1_3_2017	A1	3	2017	0.68	3.73	3.8	0.09	0.083	184.158502
A1_3_2018	A1	3	2018	0.68	3.73	3.8	0.09	0.083	184.158502
A1_3_2019	A1	3	2019	0.68	3.73	3.8	0.09	0.083	184.158502
A1_3_2020	A1	3	2020	0.68	3.73	3.8	0.09	0.083	184.158502
A1_4_1969	A1	4	1969	1.32	3.212	16.52	0.7315	0.673	184.158502
A1_4_1970	A1	4	1970	1.32	3.212	16.52	0.7315	0.673	184.158502
A1_4_1971	A1	4	1971	1.1	3.212	15.34	0.627	0.577	184.158502
A1_4_1972	A1	4	1972	1.1	3.212	15.34	0.627	0.577	184.158502
A1_4_1973	A1	4	1973	1.1	3.212	15.34	0.627	0.577	184.158502
A1_4_1974	A1	4	1974	1.1	3.212	15.34	0.627	0.577	184.158502
A1_4_1975	A1	4	1975	1.1	3.212	15.34	0.627	0.577	184.158502
A1_4_1976	A1	4	1976	1.1	3.212	15.34	0.627	0.577	184.158502
A1_4_1977	A1	4	1977	1.1	3.212	15.34	0.627	0.577	184.158502
A1_4_1978	A1	4	1978	1.1	3.212	15.34	0.627	0.577	184.158502
A1_4_1979	A1	4	1979	1	3.212	14.16	0.5225	0.481	184.158502
A1_4_1980	A1	4	1980	1	3.212	14.16	0.5225	0.481	184.158502
A1_4_1981	A1	4	1981	1	3.212	14.16	0.5225	0.481	184.158502
A1_4_1982	A1	4	1982	1	3.212	14.16	0.5225	0.481	184.158502
A1_4_1983	A1	4	1983	1	3.212	14.16	0.5225	0.481	184.158502
A1_4_1984	A1	4	1984	0.94	3.139	12.98	0.5225	0.481	184.158502
A1_4_1985	A1	4	1985	0.94	3.139	12.98	0.5225	0.481	184.158502
A1_4_1986	A1	4	1986	0.94	3.139	12.98	0.5225	0.481	184.158502
A1_4_1987	A1	4	1987	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_4_1988	A1	4	1988	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_4_1989	A1	4	1989	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_4_1990	A1	4	1990	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_4_1991	A1	4	1991	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_4_1992	A1	4	1992	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_4_1993	A1	4	1993	0.88	3.066	12.98	0.5225	0.481	184.158502

			Deterioration Factor (g/hp-hr)					
LOOKUP	Engine Category	HP Category	ROG	HC	CO	NOx	PM	PM2.5
A1_1	A1	1	0.51	0.51	0.41	0.06	0.31	0.2852
A1_2	A1	2	0.28	0.28	0.16	0.14	0.44	0.4048
A1_3	A1	3	0.28	0.28	0.16	0.14	0.44	0.4048
A1_4	A1	4	0.28	0.28	0.16	0.14	0.44	0.4048
A1_5	A1	5	0.44	0.44	0.25	0.21	0.67	0.6164
A1_6	A1	6	0.44	0.44	0.25	0.21	0.67	0.6164
A1_7	A1	7	0.44	0.44	0.25	0.21	0.67	0.6164
A1_8	A1	8	0.44	0.44	0.25	0.21	0.67	0.6164
A1_9	A1	9	0.44	0.44	0.25	0.21	0.67	0.6164
A2_1	A2	1	0.51	0.51	0.41	0.06	0.31	0.2852
A2_2	A2	2	0.28	0.28	0.16	0.14	0.44	0.4048
A2_3	A2	3	0.28	0.28	0.16	0.14	0.44	0.4048
A2_4	A2	4	0.28	0.28	0.16	0.14	0.44	0.4048
A2_5	A2	5	0.44	0.44	0.25	0.21	0.67	0.6164
A2_6	A2	6	0.44	0.44	0.25	0.21	0.67	0.6164
A2_7	A2	7	0.44	0.44	0.25	0.21	0.67	0.6164
A2_8	A2	8	0.44	0.44	0.25	0.21	0.67	0.6164
A2_9	A2	9	0.44	0.44	0.25	0.21	0.67	0.6164
B1_1	B1	1	0.51	0.51	0.41	0.06	0.31	0.2852
B1_2	B1	2	0.28	0.28	0.16	0.14	0.44	0.4048
B1_3	B1	3	0.28	0.28	0.16	0.14	0.44	0.4048
B1_4	B1	4	0.28	0.28	0.16	0.14	0.44	0.4048
B1_5	B1	5	0.44	0.44	0.25	0.21	0.67	0.6164
B1_6	B1	6	0.44	0.44	0.25	0.21	0.67	0.6164
B1_7	B1	7	0.44	0.44	0.25	0.21	0.67	0.6164
B1_8	B1	8	0.44	0.44	0.25	0.21	0.67	0.6164
B1_9	B1	9	0.44	0.44	0.25	0.21	0.67	0.6164
B2_1	B2	1	0.51	0.51	0.41	0.06	0.31	0.2852
B2_2	B2	2	0.28	0.28	0.16	0.14	0.44	0.4048
B2_3	B2	3	0.28	0.28	0.16	0.14	0.44	0.4048
B2_4	B2	4	0.28	0.28	0.16	0.14	0.44	0.4048
B2_5	B2	5	0.44	0.44	0.25	0.21	0.67	0.6164
B2_6	B2	6	0.44	0.44	0.25	0.21	0.67	0.6164
B2_7	B2	7	0.44	0.44	0.25	0.21	0.67	0.6164
B2_8	B2	8	0.44	0.44	0.25	0.21	0.67	0.6164
B2_9	B2	9	0.44	0.44	0.25	0.21	0.67	0.6164
C1_1	C1	1	0.51	0.51	0.41	0.06	0.31	0.2852
C1_2	C1	2	0.51	0.51	0.41	0.06	0.31	0.2852
C1_3	C1	3	0.51	0.51	0.41	0.06	0.31	0.2852
C1_4	C1	4	0.28	0.28	0.16	0.14	0.44	0.4048
C1_5	C1	5	0.28	0.28	0.16	0.14	0.44	0.4048
C1_6	C1	6	0.28	0.28	0.16	0.14	0.44	0.4048
C1_7	C1	7	0.44	0.44	0.25	0.21	0.67	0.6164
C1_8	C1	8	0.44	0.44	0.25	0.21	0.67	0.6164
C1_9	C1	9	0.44	0.44	0.25	0.21	0.67	0.6164
C1_10	C1	10	0.44	0.44	0.25	0.21	0.67	0.6164
C2_1	C2	1	0.51	0.51	0.41	0.06	0.31	0.2852
C2_2	C2	2	0.51	0.51	0.41	0.06	0.31	0.2852
C2_3	C2	3	0.51	0.51	0.41	0.06	0.31	0.2852
C2_4	C2	4	0.28	0.28	0.16	0.14	0.44	0.4048
C2_5	C2	5	0.28	0.28	0.16	0.14	0.44	0.4048
C2_6	C2	6	0.28	0.28	0.16	0.14	0.44	0.4048
C2_7	C2	7	0.44	0.44	0.25	0.21	0.67	0.6164
C2_8	C2	8	0.44	0.44	0.25	0.21	0.67	0.6164
C2_9	C2	9	0.44	0.44	0.25	0.21	0.67	0.6164
C2_10	C2	10	0.44	0.44	0.25	0.21	0.67	0.6164

				Fuel Correction Factor		
FCF HP Category	Max HP	Model Year Bin		NOx	PM	ROG
1	50	1960	1998	0.93	0.72	0.72
1	50	1999	2010	0.948	0.8	0.72
1	50	2011	2040	0.948	0.852	0.72
2	100	1960	1997	0.93	0.72	0.72
2	100	1998	2010	0.948	0.8	0.72
2	100	2011	2040	0.948	0.852	0.72
3	175	1960	1996	0.93	0.72	0.72
3	175	1997	2010	0.948	0.8	0.72
3	175	2011	2040	0.948	0.852	0.72
4	9999	1960	1995	0.93	0.72	0.72
4	9999	1996	2010	0.948	0.8	0.72
4	9999	2011	2040	0.948	0.852	0.72

A1_4_1994	A1	4	1994	0.88	3.066	12.98	0.5225	0.481	184.158502
A1_4_1995	A1	4	1995	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_4_1996	A1	4	1996	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_4_1997	A1	4	1997	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_4_1998	A1	4	1998	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_4_1999	A1	4	1999	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_4_2000	A1	4	2000	0.68	1.971	7.31	0.361	0.332	184.158502
A1_4_2001	A1	4	2001	0.68	1.971	7.31	0.361	0.332	184.158502
A1_4_2002	A1	4	2002	0.68	1.971	7.31	0.361	0.332	184.158502
A1_4_2003	A1	4	2003	0.68	1.971	7.31	0.361	0.332	184.158502
A1_4_2004	A1	4	2004	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2005	A1	4	2005	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2006	A1	4	2006	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2007	A1	4	2007	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2008	A1	4	2008	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2009	A1	4	2009	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2010	A1	4	2010	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2011	A1	4	2011	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2012	A1	4	2012	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2013	A1	4	2013	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_4_2014	A1	4	2014	0.68	3.73	3.99	0.08	0.074	184.158502
A1_4_2015	A1	4	2015	0.68	3.73	3.99	0.08	0.074	184.158502
A1_4_2016	A1	4	2016	0.68	3.73	3.99	0.08	0.074	184.158502
A1_4_2017	A1	4	2017	0.68	3.73	3.99	0.08	0.074	184.158502
A1_4_2018	A1	4	2018	0.68	3.73	3.99	0.08	0.074	184.158502
A1_4_2019	A1	4	2019	0.68	3.73	3.99	0.08	0.074	184.158502
A1_4_2020	A1	4	2020	0.68	3.73	3.99	0.08	0.074	184.158502
A1_5_1969	A1	5	1969	1.26	3.066	16.52	0.703	0.647	184.158502
A1_5_1970	A1	5	1970	1.26	3.066	16.52	0.703	0.647	184.158502
A1_5_1971	A1	5	1971	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_5_1972	A1	5	1972	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_5_1973	A1	5	1973	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_5_1974	A1	5	1974	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_5_1975	A1	5	1975	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_5_1976	A1	5	1976	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_5_1977	A1	5	1977	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_5_1978	A1	5	1978	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_5_1979	A1	5	1979	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_5_1980	A1	5	1980	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_5_1981	A1	5	1981	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_5_1982	A1	5	1982	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_5_1983	A1	5	1983	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_5_1984	A1	5	1984	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_5_1985	A1	5	1985	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_5_1986	A1	5	1986	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_5_1987	A1	5	1987	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_5_1988	A1	5	1988	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_5_1989	A1	5	1989	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_5_1990	A1	5	1990	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_5_1991	A1	5	1991	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_5_1992	A1	5	1992	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_5_1993	A1	5	1993	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_5_1994	A1	5	1994	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_5_1995	A1	5	1995	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_5_1996	A1	5	1996	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_5_1997	A1	5	1997	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_5_1998	A1	5	1998	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_5_1999	A1	5	1999	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_5_2000	A1	5	2000	0.68	1.971	7.31	0.361	0.332	184.158502
A1_5_2001	A1	5	2001	0.68	1.971	7.31	0.361	0.332	184.158502
A1_5_2002	A1	5	2002	0.68	1.971	7.31	0.361	0.332	184.158502
A1_5_2003	A1	5	2003	0.68	1.971	7.31	0.361	0.332	184.158502
A1_5_2004	A1	5	2004	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2005	A1	5	2005	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2006	A1	5	2006	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2007	A1	5	2007	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2008	A1	5	2008	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2009	A1	5	2009	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2010	A1	5	2010	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2011	A1	5	2011	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2012	A1	5	2012	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2013	A1	5	2013	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_5_2014	A1	5	2014	0.68	3.73	3.99	0.08	0.074	184.158502
A1_5_2015	A1	5	2015	0.68	3.73	3.99	0.08	0.074	184.158502
A1_5_2016	A1	5	2016	0.68	3.73	3.99	0.08	0.074	184.158502
A1_5_2017	A1	5	2017	0.68	3.73	3.99	0.08	0.074	184.158502
A1_5_2018	A1	5	2018	0.68	3.73	3.99	0.08	0.074	184.158502
A1_5_2019	A1	5	2019	0.68	3.73	3.99	0.08	0.074	184.158502
A1_5_2020	A1	5	2020	0.68	3.73	3.99	0.08	0.074	184.158502
A1_6_1969	A1	6	1969	1.26	3.066	16.52	0.703	0.647	184.158502
A1_6_1970	A1	6	1970	1.26	3.066	16.52	0.703	0.647	184.158502
A1_6_1971	A1	6	1971	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_6_1972	A1	6	1972	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_6_1973	A1	6	1973	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_6_1974	A1	6	1974	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_6_1975	A1	6	1975	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_6_1976	A1	6	1976	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_6_1977	A1	6	1977	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_6_1978	A1	6	1978	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_6_1979	A1	6	1979	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_6_1980	A1	6	1980	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_6_1981	A1	6	1981	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_6_1982	A1	6	1982	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_6_1983	A1	6	1983	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_6_1984	A1	6	1984	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_6_1985	A1	6	1985	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_6_1986	A1	6	1986	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_6_1987	A1	6	1987	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_6_1988	A1	6	1988	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_6_1989	A1	6	1989	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_6_1990	A1	6	1990	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_6_1991	A1	6	1991	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_6_1992	A1	6	1992	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_6_1993	A1	6	1993	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_6_1994	A1	6	1994	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_6_1995	A1	6	1995	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_6_1996	A1	6	1996	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_6_1997	A1	6	1997	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_6_1998	A1	6	1998	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_6_1999	A1	6	1999	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_6_2000	A1	6	2000	0.68	1.971	7.31	0.361	0.332	184.158502
A1_6_2001	A1	6	2001	0.68	1.971	7.31	0.361	0.332	184.158502
A1_6_2002	A1	6	2002	0.68	1.971	7.31	0.361	0.332	184.158502
A1_6_2003	A1	6	2003	0.68	1.971	7.31	0.361	0.332	184.158502
A1_6_2004	A1	6	2004	0.68	1.971	7.31	0.361	0.332	184.158502
A1_6_2005	A1	6	2005	0.68	1.971	7.31	0.361	0.332	184.158502
A1_6_2006	A1	6	2006	0.68	1.971	7.31	0.361	0.332	184.158502
A1_6_2007	A1	6	2007	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_6_2008	A1	6	2008	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_6_2009	A1	6	2009	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_6_2010	A1	6	2010	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_6_2011	A1	6	2011	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_6_2012	A1	6	2012	0.68	3.73	5.1015	0.15	0.138	184.158502
A1_6_2013	A1	6	2013	0.68	3.73	3.99	0.08	0.074	184.158502
A1_6_2014	A1	6	2014	0.68	3.73	3.99	0.08	0.074	184.158502
A1_6_2015	A1	6	2015	0.68	3.73	3.99	0.08	0.074	184.158502
A1_6_2016	A1	6	2016	0.68	3.73	3.99	0.08	0.074	184.158502
A1_6_2017	A1	6	2017	0.68	3.73	3.99	0.08	0.074	184.158502
A1_6_2018	A1	6	2018	0.68	3.73	3.99	0.08	0.074	184.158502
A1_6_2019	A1	6	2019	0.68	3.73	3.99	0.08	0.074	184.158502
A1_6_2020	A1	6	2020	0.68	3.73	3.99	0.08	0.074	184.158502
A1_7_1969	A1	7	1969	1.26	3.066	16.52	0.703	0.647	184.158502
A1_7_1970	A1	7	1970	1.26	3.066	16.52	0.703	0.647	184.158502
A1_7_1971	A1	7	1971	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_7_1972	A1	7	1972	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_7_1973	A1	7	1973	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_7_1974	A1	7	1974	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_7_1975	A1	7	1975	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_7_1976	A1	7	1976	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_7_1977	A1	7	1977	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_7_1978	A1	7	1978	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_7_1979	A1	7	1979	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_7_1980	A1	7	1980	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_7_1981	A1	7	1981	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_7_1982	A1	7	1982	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_7_1983	A1	7	1983	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_7_1984	A1	7	1984	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_7_1985	A1	7	1985	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_7_1986	A1	7	1986	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_7_1987	A1	7	1987	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1988	A1	7	1988	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1989	A1	7	1989	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1990	A1	7	1990	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1991	A1	7	1991	0.84	2.993	12.98	0.5035	0.463	184.158502

A1_7_1992	A1	7	1992	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1993	A1	7	1993	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1994	A1	7	1994	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1995	A1	7	1995	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1996	A1	7	1996	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1997	A1	7	1997	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1998	A1	7	1998	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_7_1999	A1	7	1999	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_7_2000	A1	7	2000	0.68	1.971	7.31	0.361	0.332	184.158502
A1_7_2001	A1	7	2001	0.68	1.971	7.31	0.361	0.332	184.158502
A1_7_2002	A1	7	2002	0.68	1.971	7.31	0.361	0.332	184.158502
A1_7_2003	A1	7	2003	0.68	1.971	7.31	0.361	0.332	184.158502
A1_7_2004	A1	7	2004	0.68	1.971	7.31	0.361	0.332	184.158502
A1_7_2005	A1	7	2005	0.68	1.971	7.31	0.361	0.332	184.158502
A1_7_2006	A1	7	2006	0.68	1.971	7.31	0.361	0.332	184.158502
A1_7_2007	A1	7	2007	0.68	3.73	5.529	0.2	0.184	184.158502
A1_7_2008	A1	7	2008	0.68	3.73	5.529	0.2	0.184	184.158502
A1_7_2009	A1	7	2009	0.68	3.73	5.529	0.2	0.184	184.158502
A1_7_2010	A1	7	2010	0.68	3.73	5.529	0.2	0.184	184.158502
A1_7_2011	A1	7	2011	0.68	3.73	5.529	0.2	0.184	184.158502
A1_7_2012	A1	7	2012	0.68	3.73	4.085	0.08	0.074	184.158502
A1_7_2013	A1	7	2013	0.68	3.73	4.085	0.08	0.074	184.158502
A1_7_2014	A1	7	2014	0.68	3.73	4.085	0.08	0.074	184.158502
A1_7_2015	A1	7	2015	0.68	3.73	4.085	0.08	0.074	184.158502
A1_7_2016	A1	7	2016	0.68	3.73	4.085	0.08	0.074	184.158502
A1_7_2017	A1	7	2017	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_7_2018	A1	7	2018	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_7_2019	A1	7	2019	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_7_2020	A1	7	2020	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_8_1969	A1	8	1969	1.26	3.066	16.52	0.703	0.647	184.158502
A1_8_1970	A1	8	1970	1.26	3.066	16.52	0.703	0.647	184.158502
A1_8_1971	A1	8	1971	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_8_1972	A1	8	1972	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_8_1973	A1	8	1973	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_8_1974	A1	8	1974	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_8_1975	A1	8	1975	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_8_1976	A1	8	1976	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_8_1977	A1	8	1977	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_8_1978	A1	8	1978	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_8_1979	A1	8	1979	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_8_1980	A1	8	1980	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_8_1981	A1	8	1981	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_8_1982	A1	8	1982	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_8_1983	A1	8	1983	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_8_1984	A1	8	1984	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_8_1985	A1	8	1985	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_8_1986	A1	8	1986	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_8_1987	A1	8	1987	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1988	A1	8	1988	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1989	A1	8	1989	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1990	A1	8	1990	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1991	A1	8	1991	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1992	A1	8	1992	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1993	A1	8	1993	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1994	A1	8	1994	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1995	A1	8	1995	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1996	A1	8	1996	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1997	A1	8	1997	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1998	A1	8	1998	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_8_1999	A1	8	1999	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_8_2000	A1	8	2000	0.68	1.971	7.31	0.361	0.332	184.158502
A1_8_2001	A1	8	2001	0.68	1.971	7.31	0.361	0.332	184.158502
A1_8_2002	A1	8	2002	0.68	1.971	7.31	0.361	0.332	184.158502
A1_8_2003	A1	8	2003	0.68	1.971	7.31	0.361	0.332	184.158502
A1_8_2004	A1	8	2004	0.68	1.971	7.31	0.361	0.332	184.158502
A1_8_2005	A1	8	2005	0.68	1.971	7.31	0.361	0.332	184.158502
A1_8_2006	A1	8	2006	0.68	1.971	7.31	0.361	0.332	184.158502
A1_8_2007	A1	8	2007	0.68	3.73	5.529	0.2	0.184	184.158502
A1_8_2008	A1	8	2008	0.68	3.73	5.529	0.2	0.184	184.158502
A1_8_2009	A1	8	2009	0.68	3.73	5.529	0.2	0.184	184.158502
A1_8_2010	A1	8	2010	0.68	3.73	5.529	0.2	0.184	184.158502
A1_8_2011	A1	8	2011	0.68	3.73	5.529	0.2	0.184	184.158502
A1_8_2012	A1	8	2012	0.68	3.73	5.529	0.2	0.184	184.158502
A1_8_2013	A1	8	2013	0.68	3.73	4.37	0.1	0.092	184.158502
A1_8_2014	A1	8	2014	0.68	3.73	4.37	0.1	0.092	184.158502
A1_8_2015	A1	8	2015	0.68	3.73	4.37	0.1	0.092	184.158502
A1_8_2016	A1	8	2016	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_8_2017	A1	8	2017	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_8_2018	A1	8	2018	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_8_2019	A1	8	2019	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_8_2020	A1	8	2020	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_9_1969	A1	9	1969	1.26	3.066	16.52	0.703	0.647	184.158502
A1_9_1970	A1	9	1970	1.26	3.066	16.52	0.703	0.647	184.158502
A1_9_1971	A1	9	1971	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_9_1972	A1	9	1972	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_9_1973	A1	9	1973	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_9_1974	A1	9	1974	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_9_1975	A1	9	1975	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_9_1976	A1	9	1976	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_9_1977	A1	9	1977	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_9_1978	A1	9	1978	1.05	3.066	15.34	0.5985	0.551	184.158502
A1_9_1979	A1	9	1979	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_9_1980	A1	9	1980	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_9_1981	A1	9	1981	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_9_1982	A1	9	1982	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_9_1983	A1	9	1983	0.95	3.066	14.16	0.5035	0.463	184.158502
A1_9_1984	A1	9	1984	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_9_1985	A1	9	1985	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_9_1986	A1	9	1986	0.9	3.066	12.98	0.5035	0.463	184.158502
A1_9_1987	A1	9	1987	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1988	A1	9	1988	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1989	A1	9	1989	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1990	A1	9	1990	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1991	A1	9	1991	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1992	A1	9	1992	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1993	A1	9	1993	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1994	A1	9	1994	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1995	A1	9	1995	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1996	A1	9	1996	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1997	A1	9	1997	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1998	A1	9	1998	0.84	2.993	12.98	0.5035	0.463	184.158502
A1_9_1999	A1	9	1999	0.68	1.971	9.6406	0.361	0.332	184.158502
A1_9_2000	A1	9	2000	0.68	1.971	7.31	0.361	0.332	184.158502
A1_9_2001	A1	9	2001	0.68	1.971	7.31	0.361	0.332	184.158502
A1_9_2002	A1	9	2002	0.68	1.971	7.31	0.361	0.332	184.158502
A1_9_2003	A1	9	2003	0.68	1.971	7.31	0.361	0.332	184.158502
A1_9_2004	A1	9	2004	0.68	1.971	7.31	0.361	0.332	184.158502
A1_9_2005	A1	9	2005	0.68	1.971	7.31	0.361	0.332	184.158502
A1_9_2006	A1	9	2006	0.68	1.971	7.31	0.361	0.332	184.158502
A1_9_2007	A1	9	2007	0.68	3.73	5.529	0.2	0.184	184.158502
A1_9_2008	A1	9	2008	0.68	3.73	5.529	0.2	0.184	184.158502
A1_9_2009	A1	9	2009	0.68	3.73	5.529	0.2	0.184	184.158502
A1_9_2010	A1	9	2010	0.68	3.73	5.529	0.2	0.184	184.158502
A1_9_2011	A1	9	2011	0.68	3.73	5.529	0.2	0.184	184.158502
A1_9_2012	A1	9	2012	0.68	3.73	5.529	0.2	0.184	184.158502
A1_9_2013	A1	9	2013	0.68	3.73	5.529	0.2	0.184	184.158502
A1_9_2014	A1	9	2014	0.68	3.73	4.94	0.25	0.230	184.158502
A1_9_2015	A1	9	2015	0.68	3.73	4.94	0.25	0.230	184.158502
A1_9_2016	A1	9	2016	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_9_2017	A1	9	2017	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_9_2018	A1	9	2018	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_9_2019	A1	9	2019	0.1772946	3.73	1.3	0.03	0.028	184.158502
A1_9_2020	A1	9	2020	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_1_1987	A2	1	1987	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1988	A2	1	1988	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1989	A2	1	1989	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1990	A2	1	1990	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1991	A2	1	1991	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1992	A2	1	1992	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1993	A2	1	1993	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1994	A2	1	1994	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1995	A2	1	1995	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1996	A2	1	1996	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1997	A2	1	1997	2.1896	5.15	6.9	0.6384	0.587	184.158502
A2_1_1998	A2	1	1998	2.142	5.15	6.9	0.6384	0.587	184.158502
A2_1_1999	A2	1	1999	2.142	5.15	6.9	0.6384	0.587	184.158502
A2_1_2000	A2	1	2000	2.142	5.15	6.9	0.6384	0.587	184.158502
A2_1_2001	A2	1	2001	2.142	5.15	6.9	0.6384	0.587	184.158502
A2_1_2002	A2	1	2002	2.142	5.15	6.9	0.6384	0.587	184.158502
A2_1_2003	A2	1	2003	2.142	5.15	6.9	0.6384	0.587	184.158502
A2_1_2004	A2	1	2004	2.142	5.15	6.9	0.6384	0.587	184.158502
A2_1_2005	A2	1	2005	2.142	3.73	5.32	0.3	0.276	184.158502
A2_1_2006	A2	1	2006	2.142	3.73	5.32	0.3	0.276	184.158502
A2_1_2007	A2	1	2007	2.142	3.73	5.32	0.3	0.276	184.158502

A2_1_2008	A2	1	2008	2.142	3.73	5.32	0.3	0.276	184.158502
A2_1_2009	A2	1	2009	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2010	A2	1	2010	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2011	A2	1	2011	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2012	A2	1	2012	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2013	A2	1	2013	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2014	A2	1	2014	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2015	A2	1	2015	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2016	A2	1	2016	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2017	A2	1	2017	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2018	A2	1	2018	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2019	A2	1	2019	2.142	3.73	5.32	0.22	0.202	184.158502
A2_1_2020	A2	1	2020	2.142	3.73	5.32	0.22	0.202	184.158502
A2_2_1987	A2	2	1987	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1988	A2	2	1988	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1989	A2	2	1989	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1990	A2	2	1990	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1991	A2	2	1991	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1992	A2	2	1992	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1993	A2	2	1993	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1994	A2	2	1994	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1995	A2	2	1995	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1996	A2	2	1996	1.7136	4.944	13	0.7056	0.649	184.158502
A2_2_1997	A2	2	1997	1.1781	3.5947	8.75	0.5796	0.533	184.158502
A2_2_1998	A2	2	1998	1.1781	3.5947	8.75	0.5796	0.533	184.158502
A2_2_1999	A2	2	1999	1.1781	3.5947	8.75	0.5796	0.533	184.158502
A2_2_2000	A2	2	2000	1.1781	3.5947	7.31	0.5796	0.533	184.158502
A2_2_2001	A2	2	2001	1.1781	3.5947	7.31	0.5796	0.533	184.158502
A2_2_2002	A2	2	2002	1.1781	3.5947	7.31	0.5796	0.533	184.158502
A2_2_2003	A2	2	2003	1.1781	3.5947	7.31	0.5796	0.533	184.158502
A2_2_2004	A2	2	2004	1.1781	3.5947	7.31	0.5796	0.533	184.158502
A2_2_2005	A2	2	2005	1.1781	3.73	5.32	0.3	0.276	184.158502
A2_2_2006	A2	2	2006	1.1781	3.73	5.32	0.3	0.276	184.158502
A2_2_2007	A2	2	2007	1.1781	3.73	5.32	0.3	0.276	184.158502
A2_2_2008	A2	2	2008	1.1781	3.73	5.32	0.3	0.276	184.158502
A2_2_2009	A2	2	2009	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2010	A2	2	2010	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2011	A2	2	2011	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2012	A2	2	2012	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2013	A2	2	2013	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2014	A2	2	2014	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2015	A2	2	2015	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2016	A2	2	2016	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2017	A2	2	2017	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2018	A2	2	2018	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2019	A2	2	2019	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_2_2020	A2	2	2020	1.1781	3.73	5.32	0.22	0.202	184.158502
A2_3_1969	A2	3	1969	1.5708	4.532	14	0.6468	0.595	184.158502
A2_3_1970	A2	3	1970	1.5708	4.532	14	0.6468	0.595	184.158502
A2_3_1971	A2	3	1971	1.309	4.532	13	0.5544	0.510	184.158502
A2_3_1972	A2	3	1972	1.309	4.532	13	0.5544	0.510	184.158502
A2_3_1973	A2	3	1973	1.309	4.532	13	0.5544	0.510	184.158502
A2_3_1974	A2	3	1974	1.309	4.532	13	0.5544	0.510	184.158502
A2_3_1975	A2	3	1975	1.309	4.532	13	0.5544	0.510	184.158502
A2_3_1976	A2	3	1976	1.309	4.532	13	0.5544	0.510	184.158502
A2_3_1977	A2	3	1977	1.309	4.532	13	0.5544	0.510	184.158502
A2_3_1978	A2	3	1978	1.309	4.532	13	0.5544	0.510	184.158502
A2_3_1979	A2	3	1979	1.19	4.532	12	0.462	0.425	184.158502
A2_3_1980	A2	3	1980	1.19	4.532	12	0.462	0.425	184.158502
A2_3_1981	A2	3	1981	1.19	4.532	12	0.462	0.425	184.158502
A2_3_1982	A2	3	1982	1.19	4.532	12	0.462	0.425	184.158502
A2_3_1983	A2	3	1983	1.19	4.532	12	0.462	0.425	184.158502
A2_3_1984	A2	3	1984	1.1186	4.429	11	0.462	0.425	184.158502
A2_3_1985	A2	3	1985	1.1186	4.429	11	0.462	0.425	184.158502
A2_3_1986	A2	3	1986	1.1186	4.429	11	0.462	0.425	184.158502
A2_3_1987	A2	3	1987	1.0472	4.326	11	0.462	0.425	184.158502
A2_3_1988	A2	3	1988	1.0472	4.326	11	0.462	0.425	184.158502
A2_3_1989	A2	3	1989	1.0472	4.326	11	0.462	0.425	184.158502
A2_3_1990	A2	3	1990	1.0472	4.326	11	0.462	0.425	184.158502
A2_3_1991	A2	3	1991	1.0472	4.326	11	0.462	0.425	184.158502
A2_3_1992	A2	3	1992	1.0472	4.326	11	0.462	0.425	184.158502
A2_3_1993	A2	3	1993	1.0472	4.326	11	0.462	0.425	184.158502
A2_3_1994	A2	3	1994	1.0472	4.326	11	0.462	0.425	184.158502
A2_3_1995	A2	3	1995	1.0472	4.326	11	0.462	0.425	184.158502
A2_3_1996	A2	3	1996	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_3_1997	A2	3	1997	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_3_1998	A2	3	1998	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_3_1999	A2	3	1999	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_3_2000	A2	3	2000	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_3_2001	A2	3	2001	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_3_2002	A2	3	2002	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_3_2003	A2	3	2003	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_3_2004	A2	3	2004	0.8092	3.73	5.1015	0.22	0.202	184.158502
A2_3_2005	A2	3	2005	0.8092	3.73	5.1015	0.22	0.202	184.158502
A2_3_2006	A2	3	2006	0.8092	3.73	5.1015	0.22	0.202	184.158502
A2_3_2007	A2	3	2007	0.8092	3.73	5.1015	0.22	0.202	184.158502
A2_3_2008	A2	3	2008	0.8092	3.73	5.1015	0.22	0.202	184.158502
A2_3_2009	A2	3	2009	0.8092	3.73	5.1015	0.22	0.202	184.158502
A2_3_2010	A2	3	2010	0.8092	3.73	5.1015	0.22	0.202	184.158502
A2_3_2011	A2	3	2011	0.8092	3.73	5.1015	0.22	0.202	184.158502
A2_3_2012	A2	3	2012	0.8092	3.73	5.1015	0.22	0.202	184.158502
A2_3_2013	A2	3	2013	0.8092	3.73	3.8	0.09	0.083	184.158502
A2_3_2014	A2	3	2014	0.8092	3.73	3.8	0.09	0.083	184.158502
A2_3_2015	A2	3	2015	0.8092	3.73	3.8	0.09	0.083	184.158502
A2_3_2016	A2	3	2016	0.8092	3.73	3.8	0.09	0.083	184.158502
A2_3_2017	A2	3	2017	0.8092	3.73	3.8	0.09	0.083	184.158502
A2_3_2018	A2	3	2018	0.8092	3.73	3.8	0.09	0.083	184.158502
A2_3_2019	A2	3	2019	0.8092	3.73	3.8	0.09	0.083	184.158502
A2_3_2020	A2	3	2020	0.8092	3.73	3.8	0.09	0.083	184.158502
A2_4_1969	A2	4	1969	1.5708	4.532	14	0.6468	0.595	184.158502
A2_4_1970	A2	4	1970	1.5708	4.532	14	0.6468	0.595	184.158502
A2_4_1971	A2	4	1971	1.309	4.532	13	0.5544	0.510	184.158502
A2_4_1972	A2	4	1972	1.309	4.532	13	0.5544	0.510	184.158502
A2_4_1973	A2	4	1973	1.309	4.532	13	0.5544	0.510	184.158502
A2_4_1974	A2	4	1974	1.309	4.532	13	0.5544	0.510	184.158502
A2_4_1975	A2	4	1975	1.309	4.532	13	0.5544	0.510	184.158502
A2_4_1976	A2	4	1976	1.309	4.532	13	0.5544	0.510	184.158502
A2_4_1977	A2	4	1977	1.309	4.532	13	0.5544	0.510	184.158502
A2_4_1978	A2	4	1978	1.309	4.532	13	0.5544	0.510	184.158502
A2_4_1979	A2	4	1979	1.19	4.532	12	0.462	0.425	184.158502
A2_4_1980	A2	4	1980	1.19	4.532	12	0.462	0.425	184.158502
A2_4_1981	A2	4	1981	1.19	4.532	12	0.462	0.425	184.158502
A2_4_1982	A2	4	1982	1.19	4.532	12	0.462	0.425	184.158502
A2_4_1983	A2	4	1983	1.19	4.532	12	0.462	0.425	184.158502
A2_4_1984	A2	4	1984	1.1186	4.429	11	0.462	0.425	184.158502
A2_4_1985	A2	4	1985	1.1186	4.429	11	0.462	0.425	184.158502
A2_4_1986	A2	4	1986	1.1186	4.429	11	0.462	0.425	184.158502
A2_4_1987	A2	4	1987	1.0472	4.326	11	0.462	0.425	184.158502
A2_4_1988	A2	4	1988	1.0472	4.326	11	0.462	0.425	184.158502
A2_4_1989	A2	4	1989	1.0472	4.326	11	0.462	0.425	184.158502
A2_4_1990	A2	4	1990	1.0472	4.326	11	0.462	0.425	184.158502
A2_4_1991	A2	4	1991	1.0472	4.326	11	0.462	0.425	184.158502
A2_4_1992	A2	4	1992	1.0472	4.326	11	0.462	0.425	184.158502
A2_4_1993	A2	4	1993	1.0472	4.326	11	0.462	0.425	184.158502
A2_4_1994	A2	4	1994	1.0472	4.326	11	0.462	0.425	184.158502
A2_4_1995	A2	4	1995	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_4_1996	A2	4	1996	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_4_1997	A2	4	1997	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_4_1998	A2	4	1998	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_4_1999	A2	4	1999	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_4_2000	A2	4	2000	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_4_2001	A2	4	2001	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_4_2002	A2	4	2002	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_4_2003	A2	4	2003	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_4_2004	A2	4	2004	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2005	A2	4	2005	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2006	A2	4	2006	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2007	A2	4	2007	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2008	A2	4	2008	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2009	A2	4	2009	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2010	A2	4	2010	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2011	A2	4	2011	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2012	A2	4	2012	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2013	A2	4	2013	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_4_2014	A2	4	2014	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_4_2015	A2	4	2015	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_4_2016	A2	4	2016	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_4_2017	A2	4	2017	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_4_2018	A2	4	2018	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_4_2019	A2	4	2019	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_4_2020	A2	4	2020	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_5_1969	A2	5	1969	1.4994	4.326	14	0.6216	0.572	184.158502
A2_5_1970	A2	5	1970	1.4994	4.326	14	0.6216	0.572	184.158502
A2_5_1971	A2	5	1971	1.2495	4.326	13	0.5292	0.487	184.158502

A2_5_1972	A2	5	1972	1.2495	4.326	13	0.5292	0.487	184.158502
A2_5_1973	A2	5	1973	1.2495	4.326	13	0.5292	0.487	184.158502
A2_5_1974	A2	5	1974	1.2495	4.326	13	0.5292	0.487	184.158502
A2_5_1975	A2	5	1975	1.2495	4.326	13	0.5292	0.487	184.158502
A2_5_1976	A2	5	1976	1.2495	4.326	13	0.5292	0.487	184.158502
A2_5_1977	A2	5	1977	1.2495	4.326	13	0.5292	0.487	184.158502
A2_5_1978	A2	5	1978	1.2495	4.326	13	0.5292	0.487	184.158502
A2_5_1979	A2	5	1979	1.1305	4.326	12	0.4452	0.410	184.158502
A2_5_1980	A2	5	1980	1.1305	4.326	12	0.4452	0.410	184.158502
A2_5_1981	A2	5	1981	1.1305	4.326	12	0.4452	0.410	184.158502
A2_5_1982	A2	5	1982	1.1305	4.326	12	0.4452	0.410	184.158502
A2_5_1983	A2	5	1983	1.1305	4.326	12	0.4452	0.410	184.158502
A2_5_1984	A2	5	1984	1.071	4.326	11	0.4452	0.410	184.158502
A2_5_1985	A2	5	1985	1.071	4.326	11	0.4452	0.410	184.158502
A2_5_1986	A2	5	1986	1.071	4.326	11	0.4452	0.410	184.158502
A2_5_1987	A2	5	1987	0.9996	4.223	11	0.4452	0.410	184.158502
A2_5_1988	A2	5	1988	0.9996	4.223	11	0.4452	0.410	184.158502
A2_5_1989	A2	5	1989	0.9996	4.223	11	0.4452	0.410	184.158502
A2_5_1990	A2	5	1990	0.9996	4.223	11	0.4452	0.410	184.158502
A2_5_1991	A2	5	1991	0.9996	4.223	11	0.4452	0.410	184.158502
A2_5_1992	A2	5	1992	0.9996	4.223	11	0.4452	0.410	184.158502
A2_5_1993	A2	5	1993	0.9996	4.223	11	0.4452	0.410	184.158502
A2_5_1994	A2	5	1994	0.9996	4.223	11	0.4452	0.410	184.158502
A2_5_1995	A2	5	1995	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_5_1996	A2	5	1996	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_5_1997	A2	5	1997	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_5_1998	A2	5	1998	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_5_1999	A2	5	1999	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_5_2000	A2	5	2000	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_5_2001	A2	5	2001	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_5_2002	A2	5	2002	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_5_2003	A2	5	2003	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_5_2004	A2	5	2004	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2005	A2	5	2005	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2006	A2	5	2006	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2007	A2	5	2007	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2008	A2	5	2008	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2009	A2	5	2009	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2010	A2	5	2010	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2011	A2	5	2011	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2012	A2	5	2012	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2013	A2	5	2013	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_5_2014	A2	5	2014	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_5_2015	A2	5	2015	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_5_2016	A2	5	2016	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_5_2017	A2	5	2017	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_5_2018	A2	5	2018	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_5_2019	A2	5	2019	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_5_2020	A2	5	2020	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_6_1969	A2	6	1969	1.4994	4.326	14	0.6216	0.572	184.158502
A2_6_1970	A2	6	1970	1.4994	4.326	14	0.6216	0.572	184.158502
A2_6_1971	A2	6	1971	1.2495	4.326	13	0.5292	0.487	184.158502
A2_6_1972	A2	6	1972	1.2495	4.326	13	0.5292	0.487	184.158502
A2_6_1973	A2	6	1973	1.2495	4.326	13	0.5292	0.487	184.158502
A2_6_1974	A2	6	1974	1.2495	4.326	13	0.5292	0.487	184.158502
A2_6_1975	A2	6	1975	1.2495	4.326	13	0.5292	0.487	184.158502
A2_6_1976	A2	6	1976	1.2495	4.326	13	0.5292	0.487	184.158502
A2_6_1977	A2	6	1977	1.2495	4.326	13	0.5292	0.487	184.158502
A2_6_1978	A2	6	1978	1.2495	4.326	13	0.5292	0.487	184.158502
A2_6_1979	A2	6	1979	1.1305	4.326	12	0.4452	0.410	184.158502
A2_6_1980	A2	6	1980	1.1305	4.326	12	0.4452	0.410	184.158502
A2_6_1981	A2	6	1981	1.1305	4.326	12	0.4452	0.410	184.158502
A2_6_1982	A2	6	1982	1.1305	4.326	12	0.4452	0.410	184.158502
A2_6_1983	A2	6	1983	1.1305	4.326	12	0.4452	0.410	184.158502
A2_6_1984	A2	6	1984	1.071	4.326	11	0.4452	0.410	184.158502
A2_6_1985	A2	6	1985	1.071	4.326	11	0.4452	0.410	184.158502
A2_6_1986	A2	6	1986	1.071	4.326	11	0.4452	0.410	184.158502
A2_6_1987	A2	6	1987	0.9996	4.223	11	0.4452	0.410	184.158502
A2_6_1988	A2	6	1988	0.9996	4.223	11	0.4452	0.410	184.158502
A2_6_1989	A2	6	1989	0.9996	4.223	11	0.4452	0.410	184.158502
A2_6_1990	A2	6	1990	0.9996	4.223	11	0.4452	0.410	184.158502
A2_6_1991	A2	6	1991	0.9996	4.223	11	0.4452	0.410	184.158502
A2_6_1992	A2	6	1992	0.9996	4.223	11	0.4452	0.410	184.158502
A2_6_1993	A2	6	1993	0.9996	4.223	11	0.4452	0.410	184.158502
A2_6_1994	A2	6	1994	0.9996	4.223	11	0.4452	0.410	184.158502
A2_6_1995	A2	6	1995	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_6_1996	A2	6	1996	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_6_1997	A2	6	1997	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_6_1998	A2	6	1998	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_6_1999	A2	6	1999	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_6_2000	A2	6	2000	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_6_2001	A2	6	2001	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_6_2002	A2	6	2002	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_6_2003	A2	6	2003	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_6_2004	A2	6	2004	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_6_2005	A2	6	2005	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_6_2006	A2	6	2006	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_6_2007	A2	6	2007	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_6_2008	A2	6	2008	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_6_2009	A2	6	2009	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_6_2010	A2	6	2010	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_6_2011	A2	6	2011	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_6_2012	A2	6	2012	0.8092	3.73	5.1015	0.15	0.138	184.158502
A2_6_2013	A2	6	2013	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_6_2014	A2	6	2014	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_6_2015	A2	6	2015	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_6_2016	A2	6	2016	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_6_2017	A2	6	2017	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_6_2018	A2	6	2018	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_6_2019	A2	6	2019	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_6_2020	A2	6	2020	0.8092	3.73	3.99	0.08	0.074	184.158502
A2_7_1969	A2	7	1969	1.4994	4.326	14	0.6216	0.572	184.158502
A2_7_1970	A2	7	1970	1.4994	4.326	14	0.6216	0.572	184.158502
A2_7_1971	A2	7	1971	1.2495	4.326	13	0.5292	0.487	184.158502
A2_7_1972	A2	7	1972	1.2495	4.326	13	0.5292	0.487	184.158502
A2_7_1973	A2	7	1973	1.2495	4.326	13	0.5292	0.487	184.158502
A2_7_1974	A2	7	1974	1.2495	4.326	13	0.5292	0.487	184.158502
A2_7_1975	A2	7	1975	1.2495	4.326	13	0.5292	0.487	184.158502
A2_7_1976	A2	7	1976	1.2495	4.326	13	0.5292	0.487	184.158502
A2_7_1977	A2	7	1977	1.2495	4.326	13	0.5292	0.487	184.158502
A2_7_1978	A2	7	1978	1.2495	4.326	13	0.5292	0.487	184.158502
A2_7_1979	A2	7	1979	1.1305	4.326	12	0.4452	0.410	184.158502
A2_7_1980	A2	7	1980	1.1305	4.326	12	0.4452	0.410	184.158502
A2_7_1981	A2	7	1981	1.1305	4.326	12	0.4452	0.410	184.158502
A2_7_1982	A2	7	1982	1.1305	4.326	12	0.4452	0.410	184.158502
A2_7_1983	A2	7	1983	1.1305	4.326	12	0.4452	0.410	184.158502
A2_7_1984	A2	7	1984	1.071	4.326	11	0.4452	0.410	184.158502
A2_7_1985	A2	7	1985	1.071	4.326	11	0.4452	0.410	184.158502
A2_7_1986	A2	7	1986	1.071	4.326	11	0.4452	0.410	184.158502
A2_7_1987	A2	7	1987	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1988	A2	7	1988	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1989	A2	7	1989	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1990	A2	7	1990	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1991	A2	7	1991	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1992	A2	7	1992	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1993	A2	7	1993	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1994	A2	7	1994	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1995	A2	7	1995	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1996	A2	7	1996	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1997	A2	7	1997	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1998	A2	7	1998	0.9996	4.223	11	0.4452	0.410	184.158502
A2_7_1999	A2	7	1999	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_7_2000	A2	7	2000	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_7_2001	A2	7	2001	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_7_2002	A2	7	2002	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_7_2003	A2	7	2003	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_7_2004	A2	7	2004	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_7_2005	A2	7	2005	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_7_2006	A2	7	2006	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_7_2007	A2	7	2007	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_7_2008	A2	7	2008	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_7_2009	A2	7	2009	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_7_2010	A2	7	2010	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_7_2011	A2	7	2011	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_7_2012	A2	7	2012	0.8092	3.73	4.085	0.08	0.074	184.158502
A2_7_2013	A2	7	2013	0.8092	3.73	4.085	0.08	0.074	184.158502
A2_7_2014	A2	7	2014	0.8092	3.73	4.085	0.08	0.074	184.158502
A2_7_2015	A2	7	2015	0.8092	3.73	4.085	0.08	0.074	184.158502
A2_7_2016	A2	7	2016	0.8092	3.73	4.085	0.08	0.074	184.158502
A2_7_2017	A2	7	2017	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_7_2018	A2	7	2018	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_7_2019	A2	7	2019	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_7_2020	A2	7	2020	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_8_1969	A2	8	1969	1.4994	4.326	14	0.6216	0.572	184.158502

A2_8_1970	A2	8	1970	1.4994	4.326	14	0.6216	0.572	184.158502
A2_8_1971	A2	8	1971	1.2495	4.326	13	0.5292	0.487	184.158502
A2_8_1972	A2	8	1972	1.2495	4.326	13	0.5292	0.487	184.158502
A2_8_1973	A2	8	1973	1.2495	4.326	13	0.5292	0.487	184.158502
A2_8_1974	A2	8	1974	1.2495	4.326	13	0.5292	0.487	184.158502
A2_8_1975	A2	8	1975	1.2495	4.326	13	0.5292	0.487	184.158502
A2_8_1976	A2	8	1976	1.2495	4.326	13	0.5292	0.487	184.158502
A2_8_1977	A2	8	1977	1.2495	4.326	13	0.5292	0.487	184.158502
A2_8_1978	A2	8	1978	1.2495	4.326	13	0.5292	0.487	184.158502
A2_8_1979	A2	8	1979	1.1305	4.326	12	0.4452	0.410	184.158502
A2_8_1980	A2	8	1980	1.1305	4.326	12	0.4452	0.410	184.158502
A2_8_1981	A2	8	1981	1.1305	4.326	12	0.4452	0.410	184.158502
A2_8_1982	A2	8	1982	1.1305	4.326	12	0.4452	0.410	184.158502
A2_8_1983	A2	8	1983	1.1305	4.326	12	0.4452	0.410	184.158502
A2_8_1984	A2	8	1984	1.071	4.326	11	0.4452	0.410	184.158502
A2_8_1985	A2	8	1985	1.071	4.326	11	0.4452	0.410	184.158502
A2_8_1986	A2	8	1986	1.071	4.326	11	0.4452	0.410	184.158502
A2_8_1987	A2	8	1987	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1988	A2	8	1988	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1989	A2	8	1989	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1990	A2	8	1990	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1991	A2	8	1991	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1992	A2	8	1992	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1993	A2	8	1993	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1994	A2	8	1994	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1995	A2	8	1995	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1996	A2	8	1996	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1997	A2	8	1997	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1998	A2	8	1998	0.9996	4.223	11	0.4452	0.410	184.158502
A2_8_1999	A2	8	1999	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_8_2000	A2	8	2000	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_8_2001	A2	8	2001	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_8_2002	A2	8	2002	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_8_2003	A2	8	2003	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_8_2004	A2	8	2004	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_8_2005	A2	8	2005	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_8_2006	A2	8	2006	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_8_2007	A2	8	2007	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_8_2008	A2	8	2008	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_8_2009	A2	8	2009	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_8_2010	A2	8	2010	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_8_2011	A2	8	2011	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_8_2012	A2	8	2012	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_8_2013	A2	8	2013	0.8092	3.73	4.37	0.1	0.092	184.158502
A2_8_2014	A2	8	2014	0.8092	3.73	4.37	0.1	0.092	184.158502
A2_8_2015	A2	8	2015	0.8092	3.73	4.37	0.1	0.092	184.158502
A2_8_2016	A2	8	2016	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_8_2017	A2	8	2017	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_8_2018	A2	8	2018	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_8_2019	A2	8	2019	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_8_2020	A2	8	2020	0.1772946	3.73	1.3	0.03	0.028	184.158502
A2_9_1969	A2	9	1969	1.4994	4.326	14	0.6216	0.572	184.158502
A2_9_1970	A2	9	1970	1.4994	4.326	14	0.6216	0.572	184.158502
A2_9_1971	A2	9	1971	1.2495	4.326	13	0.5292	0.487	184.158502
A2_9_1972	A2	9	1972	1.2495	4.326	13	0.5292	0.487	184.158502
A2_9_1973	A2	9	1973	1.2495	4.326	13	0.5292	0.487	184.158502
A2_9_1974	A2	9	1974	1.2495	4.326	13	0.5292	0.487	184.158502
A2_9_1975	A2	9	1975	1.2495	4.326	13	0.5292	0.487	184.158502
A2_9_1976	A2	9	1976	1.2495	4.326	13	0.5292	0.487	184.158502
A2_9_1977	A2	9	1977	1.2495	4.326	13	0.5292	0.487	184.158502
A2_9_1978	A2	9	1978	1.2495	4.326	13	0.5292	0.487	184.158502
A2_9_1979	A2	9	1979	1.1305	4.326	12	0.4452	0.410	184.158502
A2_9_1980	A2	9	1980	1.1305	4.326	12	0.4452	0.410	184.158502
A2_9_1981	A2	9	1981	1.1305	4.326	12	0.4452	0.410	184.158502
A2_9_1982	A2	9	1982	1.1305	4.326	12	0.4452	0.410	184.158502
A2_9_1983	A2	9	1983	1.1305	4.326	12	0.4452	0.410	184.158502
A2_9_1984	A2	9	1984	1.071	4.326	11	0.4452	0.410	184.158502
A2_9_1985	A2	9	1985	1.071	4.326	11	0.4452	0.410	184.158502
A2_9_1986	A2	9	1986	1.071	4.326	11	0.4452	0.410	184.158502
A2_9_1987	A2	9	1987	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1988	A2	9	1988	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1989	A2	9	1989	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1990	A2	9	1990	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1991	A2	9	1991	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1992	A2	9	1992	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1993	A2	9	1993	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1994	A2	9	1994	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1995	A2	9	1995	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1996	A2	9	1996	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1997	A2	9	1997	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1998	A2	9	1998	0.9996	4.223	11	0.4452	0.410	184.158502
A2_9_1999	A2	9	1999	0.8092	2.781	8.17	0.3192	0.294	184.158502
A2_9_2000	A2	9	2000	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_9_2001	A2	9	2001	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_9_2002	A2	9	2002	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_9_2003	A2	9	2003	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_9_2004	A2	9	2004	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_9_2005	A2	9	2005	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_9_2006	A2	9	2006	0.8092	2.781	7.31	0.3192	0.294	184.158502
A2_9_2007	A2	9	2007	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_9_2008	A2	9	2008	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_9_2009	A2	9	2009	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_9_2010	A2	9	2010	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_9_2011	A2	9	2011	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_9_2012	A2	9	2012	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_9_2013	A2	9	2013	0.8092	3.73	5.529	0.2	0.184	184.158502
A2_9_2014	A2	9	2014	0.8092	3.75	4.94	0.25	0.230	184.158502
A2_9_2015	A2	9	2015	0.8092	3.75	4.94	0.25	0.230	184.158502
A2_9_2016	A2	9	2016	0.1772946	3.75	1.3	0.03	0.028	184.158502
A2_9_2017	A2	9	2017	0.1772946	3.75	1.3	0.03	0.028	184.158502
A2_9_2018	A2	9	2018	0.1772946	3.75	1.3	0.03	0.028	184.158502
A2_9_2019	A2	9	2019	0.1772946	3.75	1.3	0.03	0.028	184.158502
A2_9_2020	A2	9	2020	0.1772946	3.75	1.3	0.03	0.028	184.158502
B1_1_1987	B1	1	1987	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1988	B1	1	1988	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1989	B1	1	1989	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1990	B1	1	1990	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1991	B1	1	1991	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1992	B1	1	1992	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1993	B1	1	1993	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1994	B1	1	1994	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1995	B1	1	1995	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1996	B1	1	1996	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1997	B1	1	1997	2.2264	3.65	8.142	0.722	0.664	184.158502
B1_1_1998	B1	1	1998	2.178	3.65	8.142	0.722	0.664	184.158502
B1_1_1999	B1	1	1999	2.178	3.65	8.142	0.722	0.664	184.158502
B1_1_2000	B1	1	2000	2.178	3.65	7.31	0.722	0.664	184.158502
B1_1_2001	B1	1	2001	2.178	3.65	7.31	0.722	0.664	184.158502
B1_1_2002	B1	1	2002	2.178	3.65	7.31	0.722	0.664	184.158502
B1_1_2003	B1	1	2003	2.178	3.65	7.31	0.722	0.664	184.158502
B1_1_2004	B1	1	2004	2.178	3.65	7.31	0.722	0.664	184.158502
B1_1_2005	B1	1	2005	2.178	3.73	5.32	0.3	0.276	184.158502
B1_1_2006	B1	1	2006	2.178	3.73	5.32	0.3	0.276	184.158502
B1_1_2007	B1	1	2007	2.178	3.73	5.32	0.3	0.276	184.158502
B1_1_2008	B1	1	2008	2.178	3.73	5.32	0.3	0.276	184.158502
B1_1_2009	B1	1	2009	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2010	B1	1	2010	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2011	B1	1	2011	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2012	B1	1	2012	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2013	B1	1	2013	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2014	B1	1	2014	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2015	B1	1	2015	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2016	B1	1	2016	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2017	B1	1	2017	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2018	B1	1	2018	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2019	B1	1	2019	2.178	3.73	5.32	0.22	0.202	184.158502
B1_1_2020	B1	1	2020	2.178	3.73	5.32	0.22	0.202	184.158502
B1_2_1987	B1	2	1987	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1988	B1	2	1988	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1989	B1	2	1989	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1990	B1	2	1990	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1991	B1	2	1991	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1992	B1	2	1992	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1993	B1	2	1993	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1994	B1	2	1994	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1995	B1	2	1995	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1996	B1	2	1996	1.7424	3.504	15.34	0.798	0.734	184.158502
B1_2_1997	B1	2	1997	1.1979	2.5477	10.325	0.6555	0.603	184.158502
B1_2_1998	B1	2	1998	1.1979	2.5477	10.325	0.6555	0.603	184.158502
B1_2_1999	B1	2	1999	1.1979	2.5477	10.325	0.6555	0.603	184.158502
B1_2_2000	B1	2	2000	1.1979	2.5477	7.31	0.6555	0.603	184.158502
B1_2_2001	B1	2	2001	1.1979	2.5477	7.31	0.6555	0.603	184.158502
B1_2_2002	B1	2	2002	1.1979	2.5477	7.31	0.6555	0.603	184.158502
B1_2_2003	B1	2	2003	1.1979	2.5477	7.31	0.6555	0.603	184.158502

b1_5_2001	b1	5	2001	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_5_2000	b1	5	2000	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_5_1999	b1	5	1999	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_5_1998	b1	5	1998	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_5_1997	b1	5	1997	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_5_1996	b1	5	1996	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_5_1995	b1	5	1995	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_5_1994	b1	5	1994	1.0164	2.993	12.98	0.5035	0.463	184.15852
b1_5_1993	b1	5	1993	1.0164	2.993	12.98	0.5035	0.463	184.15852
b1_5_1992	b1	5	1992	1.0164	2.993	12.98	0.5035	0.463	184.15852
b1_5_1991	b1	5	1991	1.0164	2.993	12.98	0.5035	0.463	184.15852
b1_5_1990	b1	5	1990	1.0164	2.993	12.98	0.5035	0.463	184.15852
b1_5_1989	b1	5	1989	1.0164	2.993	12.98	0.5035	0.463	184.15852
b1_5_1988	b1	5	1988	1.0164	2.993	12.98	0.5035	0.463	184.15852
b1_5_1987	b1	5	1987	1.0164	2.993	12.98	0.5035	0.463	184.15852
b1_5_1986	b1	5	1986	1.089	3.066	12.98	0.5035	0.463	184.15852
b1_5_1985	b1	5	1985	1.089	3.066	12.98	0.5035	0.463	184.15852
b1_5_1984	b1	5	1984	1.089	3.066	12.98	0.5035	0.463	184.15852
b1_5_1983	b1	5	1983	1.1495	3.066	14.16	0.5035	0.463	184.15852
b1_5_1982	b1	5	1982	1.1495	3.066	14.16	0.5035	0.463	184.15852
b1_5_1981	b1	5	1981	1.1495	3.066	14.16	0.5035	0.463	184.15852
b1_5_1980	b1	5	1980	1.1495	3.066	14.16	0.5035	0.463	184.15852
b1_5_1979	b1	5	1979	1.1495	3.066	14.16	0.5035	0.463	184.15852
b1_5_1978	b1	5	1978	1.2705	3.066	15.34	0.5985	0.551	184.15852
b1_5_1977	b1	5	1977	1.2705	3.066	15.34	0.5985	0.551	184.15852
b1_5_1976	b1	5	1976	1.2705	3.066	15.34	0.5985	0.551	184.15852
b1_5_1975	b1	5	1975	1.2705	3.066	15.34	0.5985	0.551	184.15852
b1_5_1974	b1	5	1974	1.2705	3.066	15.34	0.5985	0.551	184.15852
b1_5_1973	b1	5	1973	1.2705	3.066	15.34	0.5985	0.551	184.15852
b1_5_1972	b1	5	1972	1.2705	3.066	15.34	0.5985	0.551	184.15852
b1_5_1971	b1	5	1971	1.2705	3.066	15.34	0.5985	0.551	184.15852
b1_5_1970	b1	5	1970	1.5246	3.066	16.52	0.703	0.647	184.15852
b1_5_1969	b1	5	1969	1.5246	3.066	16.52	0.703	0.647	184.15852
b1_4_2020	b1	4	2020	0.8228	3.73	3.99	0.08	0.074	184.15852
b1_4_2019	b1	4	2019	0.8228	3.73	3.99	0.08	0.074	184.15852
b1_4_2018	b1	4	2018	0.8228	3.73	3.99	0.08	0.074	184.15852
b1_4_2017	b1	4	2017	0.8228	3.73	3.99	0.08	0.074	184.15852
b1_4_2016	b1	4	2016	0.8228	3.73	3.99	0.08	0.074	184.15852
b1_4_2015	b1	4	2015	0.8228	3.73	3.99	0.08	0.074	184.15852
b1_4_2014	b1	4	2014	0.8228	3.73	3.99	0.08	0.074	184.15852
b1_4_2013	b1	4	2013	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2012	b1	4	2012	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2011	b1	4	2011	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2010	b1	4	2010	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2009	b1	4	2009	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2008	b1	4	2008	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2007	b1	4	2007	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2006	b1	4	2006	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2005	b1	4	2005	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2004	b1	4	2004	0.8228	3.73	5.1015	0.15	0.138	184.15852
b1_4_2003	b1	4	2003	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_4_2002	b1	4	2002	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_4_2001	b1	4	2001	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_4_2000	b1	4	2000	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_4_1999	b1	4	1999	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_4_1998	b1	4	1998	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_4_1997	b1	4	1997	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_4_1996	b1	4	1996	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_4_1995	b1	4	1995	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_4_1994	b1	4	1994	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_4_1993	b1	4	1993	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_4_1992	b1	4	1992	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_4_1991	b1	4	1991	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_4_1990	b1	4	1990	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_4_1989	b1	4	1989	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_4_1988	b1	4	1988	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_4_1987	b1	4	1987	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_4_1986	b1	4	1986	1.1374	3.139	12.98	0.5225	0.481	184.15852
b1_4_1985	b1	4	1985	1.1374	3.139	12.98	0.5225	0.481	184.15852
b1_4_1984	b1	4	1984	1.1374	3.139	12.98	0.5225	0.481	184.15852
b1_4_1983	b1	4	1983	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_4_1982	b1	4	1982	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_4_1981	b1	4	1981	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_4_1980	b1	4	1980	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_4_1979	b1	4	1979	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_4_1978	b1	4	1978	1.331	3.212	15.34	0.627	0.577	184.15852
b1_4_1977	b1	4	1977	1.331	3.212	15.34	0.627	0.577	184.15852
b1_4_1976	b1	4	1976	1.331	3.212	15.34	0.627	0.577	184.15852
b1_4_1975	b1	4	1975	1.331	3.212	15.34	0.627	0.577	184.15852
b1_4_1974	b1	4	1974	1.331	3.212	15.34	0.627	0.577	184.15852
b1_4_1973	b1	4	1973	1.331	3.212	15.34	0.627	0.577	184.15852
b1_4_1972	b1	4	1972	1.331	3.212	15.34	0.627	0.577	184.15852
b1_4_1971	b1	4	1971	1.331	3.212	15.34	0.627	0.577	184.15852
b1_4_1970	b1	4	1970	1.5972	3.212	16.52	0.7315	0.673	184.15852
b1_4_1969	b1	4	1969	1.5972	3.212	16.52	0.7315	0.673	184.15852
b1_3_2020	b1	3	2020	0.8228	3.73	3.8	0.09	0.083	184.15852
b1_3_2019	b1	3	2019	0.8228	3.73	3.8	0.09	0.083	184.15852
b1_3_2018	b1	3	2018	0.8228	3.73	3.8	0.09	0.083	184.15852
b1_3_2017	b1	3	2017	0.8228	3.73	3.8	0.09	0.083	184.15852
b1_3_2016	b1	3	2016	0.8228	3.73	3.8	0.09	0.083	184.15852
b1_3_2015	b1	3	2015	0.8228	3.73	3.8	0.09	0.083	184.15852
b1_3_2014	b1	3	2014	0.8228	3.73	3.8	0.09	0.083	184.15852
b1_3_2013	b1	3	2013	0.8228	3.73	3.8	0.09	0.083	184.15852
b1_3_2012	b1	3	2012	0.8228	3.73	5.1015	0.22	0.202	184.15852
b1_3_2011	b1	3	2011	0.8228	3.73	5.1015	0.22	0.202	184.15852
b1_3_2010	b1	3	2010	0.8228	3.73	5.1015	0.22	0.202	184.15852
b1_3_2009	b1	3	2009	0.8228	3.73	5.1015	0.22	0.202	184.15852
b1_3_2008	b1	3	2008	0.8228	3.73	5.1015	0.22	0.202	184.15852
b1_3_2007	b1	3	2007	0.8228	3.73	5.1015	0.22	0.202	184.15852
b1_3_2006	b1	3	2006	0.8228	3.73	5.1015	0.22	0.202	184.15852
b1_3_2005	b1	3	2005	0.8228	3.73	5.1015	0.22	0.202	184.15852
b1_3_2004	b1	3	2004	0.8228	3.73	5.1015	0.22	0.202	184.15852
b1_3_2003	b1	3	2003	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_3_2002	b1	3	2002	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_3_2001	b1	3	2001	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_3_2000	b1	3	2000	0.8228	1.971	7.31	0.361	0.332	184.15852
b1_3_1999	b1	3	1999	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_3_1998	b1	3	1998	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_3_1997	b1	3	1997	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_3_1996	b1	3	1996	0.8228	1.971	9.6406	0.361	0.332	184.15852
b1_3_1995	b1	3	1995	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_3_1994	b1	3	1994	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_3_1993	b1	3	1993	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_3_1992	b1	3	1992	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_3_1991	b1	3	1991	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_3_1990	b1	3	1990	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_3_1989	b1	3	1989	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_3_1988	b1	3	1988	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_3_1987	b1	3	1987	1.0648	3.066	12.98	0.5225	0.481	184.15852
b1_3_1986	b1	3	1986	1.1374	3.139	12.98	0.5225	0.481	184.15852
b1_3_1985	b1	3	1985	1.1374	3.139	12.98	0.5225	0.481	184.15852
b1_3_1984	b1	3	1984	1.1374	3.139	12.98	0.5225	0.481	184.15852
b1_3_1983	b1	3	1983	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_3_1982	b1	3	1982	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_3_1981	b1	3	1981	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_3_1980	b1	3	1980	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_3_1979	b1	3	1979	1.21	3.212	14.16	0.5225	0.481	184.15852
b1_3_1978	b1	3	1978	1.331	3.212	15.34	0.627	0.577	184.15852
b1_3_1977	b1	3	1977	1.331	3.212	15.34	0.627	0.577	184.15852
b1_3_1976	b1	3	1976	1.331	3.212	15.34	0.627	0.577	184.15852
b1_3_1975	b1	3	1975	1.331	3.212	15.34	0.627	0.577	184.15852
b1_3_1974	b1	3	1974	1.331	3.212	15.34	0.627	0.577	184.15852
b1_3_1973	b1	3	1973	1.331	3.212	15.34	0.627	0.577	184.15852
b1_3_1972	b1	3	1972	1.331	3.212	15.34	0.627	0.577	184.15852
b1_3_1971	b1	3	1971	1.331	3.212	15.34	0.627	0.577	184.15852
b1_3_1970	b1	3	1970	1.5972	3.212	16.52	0.7315	0.673	184.15852
b1_3_1969	b1	3	1969	1.5972	3.212	16.52	0.7315	0.673	184.15852
b1_2_2020	b1	2	2020	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2019	b1	2	2019	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2018	b1	2	2018	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2017	b1	2	2017	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2016	b1	2	2016	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2015	b1	2	2015	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2014	b1	2	2014	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2013	b1	2	2013	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2012	b1	2	2012	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2011	b1	2	2011	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2010	b1	2	2010	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2009	b1	2	2009	1.1979	3.73	5.32	0.22	0.202	184.15852
b1_2_2008	b1	2	2008	1.1979	3.73	5.32	0.3	0.276	184.15852
b1_2_2007	b1	2	2007	1.1979	3.73	5.32	0.3	0.276	184.15852
b1_2_2006	b1	2	2006	1.1979	3.73	5.32	0.3	0.276	184.15852
b1_2_2005	b1	2	2005	1.1979	3.73	5.32	0.3	0.276	184.15852
b1_2_2004	b1	2	2004	1.1979	2.5477	7.31	0.6555	0.603	184.15852

B1_5_2002	B1	5	2002	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_5_2003	B1	5	2003	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_5_2004	B1	5	2004	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2005	B1	5	2005	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2006	B1	5	2006	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2007	B1	5	2007	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2008	B1	5	2008	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2009	B1	5	2009	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2010	B1	5	2010	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2011	B1	5	2011	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2012	B1	5	2012	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2013	B1	5	2013	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_5_2014	B1	5	2014	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_5_2015	B1	5	2015	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_5_2016	B1	5	2016	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_5_2017	B1	5	2017	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_5_2018	B1	5	2018	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_5_2019	B1	5	2019	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_5_2020	B1	5	2020	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_6_1969	B1	6	1969	1.5246	3.066	16.52	0.703	0.647	184.158502
B1_6_1970	B1	6	1970	1.5246	3.066	16.52	0.703	0.647	184.158502
B1_6_1971	B1	6	1971	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_6_1972	B1	6	1972	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_6_1973	B1	6	1973	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_6_1974	B1	6	1974	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_6_1975	B1	6	1975	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_6_1976	B1	6	1976	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_6_1977	B1	6	1977	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_6_1978	B1	6	1978	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_6_1979	B1	6	1979	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_6_1980	B1	6	1980	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_6_1981	B1	6	1981	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_6_1982	B1	6	1982	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_6_1983	B1	6	1983	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_6_1984	B1	6	1984	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_6_1985	B1	6	1985	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_6_1986	B1	6	1986	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_6_1987	B1	6	1987	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_6_1988	B1	6	1988	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_6_1989	B1	6	1989	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_6_1990	B1	6	1990	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_6_1991	B1	6	1991	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_6_1992	B1	6	1992	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_6_1993	B1	6	1993	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_6_1994	B1	6	1994	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_6_1995	B1	6	1995	0.8228	1.971	9.6406	0.361	0.332	184.158502
B1_6_1996	B1	6	1996	0.8228	1.971	9.6406	0.361	0.332	184.158502
B1_6_1997	B1	6	1997	0.8228	1.971	9.6406	0.361	0.332	184.158502
B1_6_1998	B1	6	1998	0.8228	1.971	9.6406	0.361	0.332	184.158502
B1_6_1999	B1	6	1999	0.8228	1.971	9.6406	0.361	0.332	184.158502
B1_6_2000	B1	6	2000	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_6_2001	B1	6	2001	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_6_2002	B1	6	2002	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_6_2003	B1	6	2003	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_6_2004	B1	6	2004	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_6_2005	B1	6	2005	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_6_2006	B1	6	2006	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_6_2007	B1	6	2007	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_6_2008	B1	6	2008	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_6_2009	B1	6	2009	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_6_2010	B1	6	2010	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_6_2011	B1	6	2011	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_6_2012	B1	6	2012	0.8228	3.73	5.1015	0.15	0.138	184.158502
B1_6_2013	B1	6	2013	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_6_2014	B1	6	2014	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_6_2015	B1	6	2015	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_6_2016	B1	6	2016	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_6_2017	B1	6	2017	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_6_2018	B1	6	2018	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_6_2019	B1	6	2019	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_6_2020	B1	6	2020	0.8228	3.73	3.99	0.08	0.074	184.158502
B1_7_1969	B1	7	1969	1.5246	3.066	16.52	0.703	0.647	184.158502
B1_7_1970	B1	7	1970	1.5246	3.066	16.52	0.703	0.647	184.158502
B1_7_1971	B1	7	1971	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_7_1972	B1	7	1972	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_7_1973	B1	7	1973	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_7_1974	B1	7	1974	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_7_1975	B1	7	1975	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_7_1976	B1	7	1976	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_7_1977	B1	7	1977	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_7_1978	B1	7	1978	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_7_1979	B1	7	1979	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_7_1980	B1	7	1980	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_7_1981	B1	7	1981	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_7_1982	B1	7	1982	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_7_1983	B1	7	1983	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_7_1984	B1	7	1984	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_7_1985	B1	7	1985	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_7_1986	B1	7	1986	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_7_1987	B1	7	1987	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1988	B1	7	1988	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1989	B1	7	1989	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1990	B1	7	1990	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1991	B1	7	1991	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1992	B1	7	1992	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1993	B1	7	1993	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1994	B1	7	1994	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1995	B1	7	1995	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1996	B1	7	1996	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1997	B1	7	1997	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1998	B1	7	1998	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_7_1999	B1	7	1999	0.8228	1.971	9.6406	0.361	0.332	184.158502
B1_7_2000	B1	7	2000	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_7_2001	B1	7	2001	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_7_2002	B1	7	2002	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_7_2003	B1	7	2003	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_7_2004	B1	7	2004	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_7_2005	B1	7	2005	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_7_2006	B1	7	2006	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_7_2007	B1	7	2007	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_7_2008	B1	7	2008	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_7_2009	B1	7	2009	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_7_2010	B1	7	2010	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_7_2011	B1	7	2011	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_7_2012	B1	7	2012	0.8228	3.73	4.085	0.08	0.074	184.158502
B1_7_2013	B1	7	2013	0.8228	3.73	4.085	0.08	0.074	184.158502
B1_7_2014	B1	7	2014	0.8228	3.73	4.085	0.08	0.074	184.158502
B1_7_2015	B1	7	2015	0.8228	3.73	4.085	0.08	0.074	184.158502
B1_7_2016	B1	7	2016	0.8228	3.73	4.085	0.08	0.074	184.158502
B1_7_2017	B1	7	2017	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_7_2018	B1	7	2018	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_7_2019	B1	7	2019	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_7_2020	B1	7	2020	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_8_1969	B1	8	1969	1.5246	3.066	16.52	0.703	0.647	184.158502
B1_8_1970	B1	8	1970	1.5246	3.066	16.52	0.703	0.647	184.158502
B1_8_1971	B1	8	1971	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_8_1972	B1	8	1972	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_8_1973	B1	8	1973	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_8_1974	B1	8	1974	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_8_1975	B1	8	1975	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_8_1976	B1	8	1976	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_8_1977	B1	8	1977	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_8_1978	B1	8	1978	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_8_1979	B1	8	1979	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_8_1980	B1	8	1980	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_8_1981	B1	8	1981	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_8_1982	B1	8	1982	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_8_1983	B1	8	1983	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_8_1984	B1	8	1984	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_8_1985	B1	8	1985	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_8_1986	B1	8	1986	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_8_1987	B1	8	1987	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1988	B1	8	1988	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1989	B1	8	1989	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1990	B1	8	1990	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1991	B1	8	1991	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1992	B1	8	1992	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1993	B1	8	1993	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1994	B1	8	1994	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1995	B1	8	1995	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1996	B1	8	1996	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1997	B1	8	1997	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1998	B1	8	1998	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_8_1999	B1	8	1999	0.8228	1.971	9.6406	0.361	0.332	184.158502

B1_8_2000	B1	8	2000	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_8_2001	B1	8	2001	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_8_2002	B1	8	2002	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_8_2003	B1	8	2003	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_8_2004	B1	8	2004	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_8_2005	B1	8	2005	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_8_2006	B1	8	2006	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_8_2007	B1	8	2007	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_8_2008	B1	8	2008	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_8_2009	B1	8	2009	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_8_2010	B1	8	2010	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_8_2011	B1	8	2011	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_8_2012	B1	8	2012	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_8_2013	B1	8	2013	0.8228	3.73	4.37	0.1	0.092	184.158502
B1_8_2014	B1	8	2014	0.8228	3.73	4.37	0.1	0.092	184.158502
B1_8_2015	B1	8	2015	0.8228	3.73	4.37	0.1	0.092	184.158502
B1_8_2016	B1	8	2016	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_8_2017	B1	8	2017	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_8_2018	B1	8	2018	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_8_2019	B1	8	2019	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_8_2020	B1	8	2020	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_9_1969	B1	9	1969	1.5246	3.066	16.52	0.703	0.647	184.158502
B1_9_1970	B1	9	1970	1.5246	3.066	16.52	0.703	0.647	184.158502
B1_9_1971	B1	9	1971	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_9_1972	B1	9	1972	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_9_1973	B1	9	1973	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_9_1974	B1	9	1974	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_9_1975	B1	9	1975	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_9_1976	B1	9	1976	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_9_1977	B1	9	1977	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_9_1978	B1	9	1978	1.2705	3.066	15.34	0.5985	0.551	184.158502
B1_9_1979	B1	9	1979	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_9_1980	B1	9	1980	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_9_1981	B1	9	1981	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_9_1982	B1	9	1982	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_9_1983	B1	9	1983	1.1495	3.066	14.16	0.5035	0.463	184.158502
B1_9_1984	B1	9	1984	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_9_1985	B1	9	1985	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_9_1986	B1	9	1986	1.089	3.066	12.98	0.5035	0.463	184.158502
B1_9_1987	B1	9	1987	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1988	B1	9	1988	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1989	B1	9	1989	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1990	B1	9	1990	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1991	B1	9	1991	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1992	B1	9	1992	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1993	B1	9	1993	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1994	B1	9	1994	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1995	B1	9	1995	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1996	B1	9	1996	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1997	B1	9	1997	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1998	B1	9	1998	1.0164	2.993	12.98	0.5035	0.463	184.158502
B1_9_1999	B1	9	1999	0.8228	1.971	9.6406	0.361	0.332	184.158502
B1_9_2000	B1	9	2000	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_9_2001	B1	9	2001	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_9_2002	B1	9	2002	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_9_2003	B1	9	2003	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_9_2004	B1	9	2004	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_9_2005	B1	9	2005	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_9_2006	B1	9	2006	0.8228	1.971	7.31	0.361	0.332	184.158502
B1_9_2007	B1	9	2007	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_9_2008	B1	9	2008	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_9_2009	B1	9	2009	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_9_2010	B1	9	2010	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_9_2011	B1	9	2011	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_9_2012	B1	9	2012	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_9_2013	B1	9	2013	0.8228	3.73	5.529	0.2	0.184	184.158502
B1_9_2014	B1	9	2014	0.8228	3.73	4.94	0.25	0.230	184.158502
B1_9_2015	B1	9	2015	0.8228	3.73	4.94	0.25	0.230	184.158502
B1_9_2016	B1	9	2016	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_9_2017	B1	9	2017	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_9_2018	B1	9	2018	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_9_2019	B1	9	2019	0.21452647	3.73	1.3	0.03	0.028	184.158502
B1_9_2020	B1	9	2020	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_1_1987	B2	1	1987	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1988	B2	1	1988	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1989	B2	1	1989	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1990	B2	1	1990	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1991	B2	1	1991	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1992	B2	1	1992	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1993	B2	1	1993	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1994	B2	1	1994	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1995	B2	1	1995	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1996	B2	1	1996	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1997	B2	1	1997	2.649416	5.15	6.9	0.6384	0.587	184.158502
B2_1_1998	B2	1	1998	2.59182	5.15	6.9	0.6384	0.587	184.158502
B2_1_1999	B2	1	1999	2.59182	5.15	6.9	0.6384	0.587	184.158502
B2_1_2000	B2	1	2000	2.59182	5.15	6.9	0.6384	0.587	184.158502
B2_1_2001	B2	1	2001	2.59182	5.15	6.9	0.6384	0.587	184.158502
B2_1_2002	B2	1	2002	2.59182	5.15	6.9	0.6384	0.587	184.158502
B2_1_2003	B2	1	2003	2.59182	5.15	6.9	0.6384	0.587	184.158502
B2_1_2004	B2	1	2004	2.59182	5.15	6.9	0.6384	0.587	184.158502
B2_1_2005	B2	1	2005	2.59182	3.73	5.32	0.3	0.276	184.158502
B2_1_2006	B2	1	2006	2.59182	3.73	5.32	0.3	0.276	184.158502
B2_1_2007	B2	1	2007	2.59182	3.73	5.32	0.3	0.276	184.158502
B2_1_2008	B2	1	2008	2.59182	3.73	5.32	0.3	0.276	184.158502
B2_1_2009	B2	1	2009	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2010	B2	1	2010	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2011	B2	1	2011	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2012	B2	1	2012	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2013	B2	1	2013	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2014	B2	1	2014	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2015	B2	1	2015	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2016	B2	1	2016	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2017	B2	1	2017	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2018	B2	1	2018	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2019	B2	1	2019	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_1_2020	B2	1	2020	2.59182	3.73	5.32	0.22	0.202	184.158502
B2_2_1987	B2	2	1987	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1988	B2	2	1988	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1989	B2	2	1989	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1990	B2	2	1990	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1991	B2	2	1991	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1992	B2	2	1992	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1993	B2	2	1993	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1994	B2	2	1994	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1995	B2	2	1995	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1996	B2	2	1996	2.073456	4.944	13	0.7056	0.649	184.158502
B2_2_1997	B2	2	1997	1.425501	3.5947	8.75	0.5796	0.533	184.158502
B2_2_1998	B2	2	1998	1.425501	3.5947	8.75	0.5796	0.533	184.158502
B2_2_1999	B2	2	1999	1.425501	3.5947	8.75	0.5796	0.533	184.158502
B2_2_2000	B2	2	2000	1.425501	3.5947	7.31	0.5796	0.533	184.158502
B2_2_2001	B2	2	2001	1.425501	3.5947	7.31	0.5796	0.533	184.158502
B2_2_2002	B2	2	2002	1.425501	3.5947	7.31	0.5796	0.533	184.158502
B2_2_2003	B2	2	2003	1.425501	3.5947	7.31	0.5796	0.533	184.158502
B2_2_2004	B2	2	2004	1.425501	3.5947	7.31	0.5796	0.533	184.158502
B2_2_2005	B2	2	2005	1.425501	3.73	5.32	0.3	0.276	184.158502
B2_2_2006	B2	2	2006	1.425501	3.73	5.32	0.3	0.276	184.158502
B2_2_2007	B2	2	2007	1.425501	3.73	5.32	0.3	0.276	184.158502
B2_2_2008	B2	2	2008	1.425501	3.73	5.32	0.3	0.276	184.158502
B2_2_2009	B2	2	2009	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2010	B2	2	2010	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2011	B2	2	2011	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2012	B2	2	2012	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2013	B2	2	2013	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2014	B2	2	2014	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2015	B2	2	2015	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2016	B2	2	2016	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2017	B2	2	2017	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2018	B2	2	2018	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2019	B2	2	2019	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_2_2020	B2	2	2020	1.425501	3.73	5.32	0.22	0.202	184.158502
B2_3_1969	B2	3	1969	1.900668	4.532	14	0.6468	0.595	184.158502
B2_3_1970	B2	3	1970	1.900668	4.532	14	0.6468	0.595	184.158502
B2_3_1971	B2	3	1971	1.58389	4.532	13	0.5544	0.510	184.158502
B2_3_1972	B2	3	1972	1.58389	4.532	13	0.5544	0.510	184.158502
B2_3_1973	B2	3	1973	1.58389	4.532	13	0.5544	0.510	184.158502
B2_3_1974	B2	3	1974	1.58389	4.532	13	0.5544	0.510	184.158502
B2_3_1975	B2	3	1975	1.58389	4.532	13	0.5544	0.510	184.158502
B2_3_1976	B2	3	1976	1.58389	4.532	13	0.5544	0.510	184.158502
B2_3_1977	B2	3	1977	1.58389	4.532	13	0.5544	0.510	184.158502
B2_3_1978	B2	3	1978	1.58389	4.532	13	0.5544	0.510	184.158502
B2_3_1979	B2	3	1979	1.4399	4.532	12	0.462	0.425	184.158502
B2_3_1980	B2	3	1980	1.4399	4.532	12	0.462	0.425	184.158502
B2_3_1981	B2	3	1981	1.4399	4.532	12	0.462	0.425	184.158502

B2_3_1982	B2	3	1982	1.4399	4.532	12	0.462	0.425	184.158502
B2_3_1983	B2	3	1983	1.4399	4.532	12	0.462	0.425	184.158502
B2_3_1984	B2	3	1984	1.353506	4.429	11	0.462	0.425	184.158502
B2_3_1985	B2	3	1985	1.353506	4.429	11	0.462	0.425	184.158502
B2_3_1986	B2	3	1986	1.353506	4.429	11	0.462	0.425	184.158502
B2_3_1987	B2	3	1987	1.267112	4.326	11	0.462	0.425	184.158502
B2_3_1988	B2	3	1988	1.267112	4.326	11	0.462	0.425	184.158502
B2_3_1989	B2	3	1989	1.267112	4.326	11	0.462	0.425	184.158502
B2_3_1990	B2	3	1990	1.267112	4.326	11	0.462	0.425	184.158502
B2_3_1991	B2	3	1991	1.267112	4.326	11	0.462	0.425	184.158502
B2_3_1992	B2	3	1992	1.267112	4.326	11	0.462	0.425	184.158502
B2_3_1993	B2	3	1993	1.267112	4.326	11	0.462	0.425	184.158502
B2_3_1994	B2	3	1994	1.267112	4.326	11	0.462	0.425	184.158502
B2_3_1995	B2	3	1995	1.267112	4.326	11	0.462	0.425	184.158502
B2_3_1996	B2	3	1996	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_3_1997	B2	3	1997	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_3_1998	B2	3	1998	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_3_1999	B2	3	1999	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_3_2000	B2	3	2000	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_3_2001	B2	3	2001	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_3_2002	B2	3	2002	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_3_2003	B2	3	2003	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_3_2004	B2	3	2004	0.979132	3.73	5.1015	0.22	0.202	184.158502
B2_3_2005	B2	3	2005	0.979132	3.73	5.1015	0.22	0.202	184.158502
B2_3_2006	B2	3	2006	0.979132	3.73	5.1015	0.22	0.202	184.158502
B2_3_2007	B2	3	2007	0.979132	3.73	5.1015	0.22	0.202	184.158502
B2_3_2008	B2	3	2008	0.979132	3.73	5.1015	0.22	0.202	184.158502
B2_3_2009	B2	3	2009	0.979132	3.73	5.1015	0.22	0.202	184.158502
B2_3_2010	B2	3	2010	0.979132	3.73	5.1015	0.22	0.202	184.158502
B2_3_2011	B2	3	2011	0.979132	3.73	5.1015	0.22	0.202	184.158502
B2_3_2012	B2	3	2012	0.979132	3.73	5.1015	0.22	0.202	184.158502
B2_3_2013	B2	3	2013	0.979132	3.73	3.8	0.09	0.083	184.158502
B2_3_2014	B2	3	2014	0.979132	3.73	3.8	0.09	0.083	184.158502
B2_3_2015	B2	3	2015	0.979132	3.73	3.8	0.09	0.083	184.158502
B2_3_2016	B2	3	2016	0.979132	3.73	3.8	0.09	0.083	184.158502
B2_3_2017	B2	3	2017	0.979132	3.73	3.8	0.09	0.083	184.158502
B2_3_2018	B2	3	2018	0.979132	3.73	3.8	0.09	0.083	184.158502
B2_3_2019	B2	3	2019	0.979132	3.73	3.8	0.09	0.083	184.158502
B2_3_2020	B2	3	2020	0.979132	3.73	3.8	0.09	0.083	184.158502
B2_4_1969	B2	4	1969	1.900668	4.532	14	0.6468	0.595	184.158502
B2_4_1970	B2	4	1970	1.900668	4.532	14	0.6468	0.595	184.158502
B2_4_1971	B2	4	1971	1.58389	4.532	13	0.5544	0.510	184.158502
B2_4_1972	B2	4	1972	1.58389	4.532	13	0.5544	0.510	184.158502
B2_4_1973	B2	4	1973	1.58389	4.532	13	0.5544	0.510	184.158502
B2_4_1974	B2	4	1974	1.58389	4.532	13	0.5544	0.510	184.158502
B2_4_1975	B2	4	1975	1.58389	4.532	13	0.5544	0.510	184.158502
B2_4_1976	B2	4	1976	1.58389	4.532	13	0.5544	0.510	184.158502
B2_4_1977	B2	4	1977	1.58389	4.532	13	0.5544	0.510	184.158502
B2_4_1978	B2	4	1978	1.58389	4.532	13	0.5544	0.510	184.158502
B2_4_1979	B2	4	1979	1.4399	4.532	12	0.462	0.425	184.158502
B2_4_1980	B2	4	1980	1.4399	4.532	12	0.462	0.425	184.158502
B2_4_1981	B2	4	1981	1.4399	4.532	12	0.462	0.425	184.158502
B2_4_1982	B2	4	1982	1.4399	4.532	12	0.462	0.425	184.158502
B2_4_1983	B2	4	1983	1.4399	4.532	12	0.462	0.425	184.158502
B2_4_1984	B2	4	1984	1.353506	4.429	11	0.462	0.425	184.158502
B2_4_1985	B2	4	1985	1.353506	4.429	11	0.462	0.425	184.158502
B2_4_1986	B2	4	1986	1.353506	4.429	11	0.462	0.425	184.158502
B2_4_1987	B2	4	1987	1.267112	4.326	11	0.462	0.425	184.158502
B2_4_1988	B2	4	1988	1.267112	4.326	11	0.462	0.425	184.158502
B2_4_1989	B2	4	1989	1.267112	4.326	11	0.462	0.425	184.158502
B2_4_1990	B2	4	1990	1.267112	4.326	11	0.462	0.425	184.158502
B2_4_1991	B2	4	1991	1.267112	4.326	11	0.462	0.425	184.158502
B2_4_1992	B2	4	1992	1.267112	4.326	11	0.462	0.425	184.158502
B2_4_1993	B2	4	1993	1.267112	4.326	11	0.462	0.425	184.158502
B2_4_1994	B2	4	1994	1.267112	4.326	11	0.462	0.425	184.158502
B2_4_1995	B2	4	1995	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_4_1996	B2	4	1996	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_4_1997	B2	4	1997	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_4_1998	B2	4	1998	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_4_1999	B2	4	1999	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_4_2000	B2	4	2000	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_4_2001	B2	4	2001	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_4_2002	B2	4	2002	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_4_2003	B2	4	2003	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_4_2004	B2	4	2004	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2005	B2	4	2005	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2006	B2	4	2006	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2007	B2	4	2007	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2008	B2	4	2008	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2009	B2	4	2009	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2010	B2	4	2010	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2011	B2	4	2011	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2012	B2	4	2012	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2013	B2	4	2013	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_4_2014	B2	4	2014	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_4_2015	B2	4	2015	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_4_2016	B2	4	2016	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_4_2017	B2	4	2017	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_4_2018	B2	4	2018	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_4_2019	B2	4	2019	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_4_2020	B2	4	2020	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_5_1969	B2	5	1969	1.814274	4.326	14	0.6216	0.572	184.158502
B2_5_1970	B2	5	1970	1.814274	4.326	14	0.6216	0.572	184.158502
B2_5_1971	B2	5	1971	1.511895	4.326	13	0.5292	0.487	184.158502
B2_5_1972	B2	5	1972	1.511895	4.326	13	0.5292	0.487	184.158502
B2_5_1973	B2	5	1973	1.511895	4.326	13	0.5292	0.487	184.158502
B2_5_1974	B2	5	1974	1.511895	4.326	13	0.5292	0.487	184.158502
B2_5_1975	B2	5	1975	1.511895	4.326	13	0.5292	0.487	184.158502
B2_5_1976	B2	5	1976	1.511895	4.326	13	0.5292	0.487	184.158502
B2_5_1977	B2	5	1977	1.511895	4.326	13	0.5292	0.487	184.158502
B2_5_1978	B2	5	1978	1.511895	4.326	13	0.5292	0.487	184.158502
B2_5_1979	B2	5	1979	1.367905	4.326	12	0.4452	0.410	184.158502
B2_5_1980	B2	5	1980	1.367905	4.326	12	0.4452	0.410	184.158502
B2_5_1981	B2	5	1981	1.367905	4.326	12	0.4452	0.410	184.158502
B2_5_1982	B2	5	1982	1.367905	4.326	12	0.4452	0.410	184.158502
B2_5_1983	B2	5	1983	1.367905	4.326	12	0.4452	0.410	184.158502
B2_5_1984	B2	5	1984	1.29591	4.326	11	0.4452	0.410	184.158502
B2_5_1985	B2	5	1985	1.29591	4.326	11	0.4452	0.410	184.158502
B2_5_1986	B2	5	1986	1.29591	4.326	11	0.4452	0.410	184.158502
B2_5_1987	B2	5	1987	1.209516	4.223	11	0.4452	0.410	184.158502
B2_5_1988	B2	5	1988	1.209516	4.223	11	0.4452	0.410	184.158502
B2_5_1989	B2	5	1989	1.209516	4.223	11	0.4452	0.410	184.158502
B2_5_1990	B2	5	1990	1.209516	4.223	11	0.4452	0.410	184.158502
B2_5_1991	B2	5	1991	1.209516	4.223	11	0.4452	0.410	184.158502
B2_5_1992	B2	5	1992	1.209516	4.223	11	0.4452	0.410	184.158502
B2_5_1993	B2	5	1993	1.209516	4.223	11	0.4452	0.410	184.158502
B2_5_1994	B2	5	1994	1.209516	4.223	11	0.4452	0.410	184.158502
B2_5_1995	B2	5	1995	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_5_1996	B2	5	1996	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_5_1997	B2	5	1997	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_5_1998	B2	5	1998	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_5_1999	B2	5	1999	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_5_2000	B2	5	2000	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_5_2001	B2	5	2001	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_5_2002	B2	5	2002	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_5_2003	B2	5	2003	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_5_2004	B2	5	2004	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2005	B2	5	2005	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2006	B2	5	2006	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2007	B2	5	2007	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2008	B2	5	2008	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2009	B2	5	2009	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2010	B2	5	2010	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2011	B2	5	2011	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2012	B2	5	2012	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2013	B2	5	2013	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_5_2014	B2	5	2014	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_5_2015	B2	5	2015	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_5_2016	B2	5	2016	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_5_2017	B2	5	2017	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_5_2018	B2	5	2018	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_5_2019	B2	5	2019	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_5_2020	B2	5	2020	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_6_1969	B2	6	1969	1.814274	4.326	14	0.6216	0.572	184.158502
B2_6_1970	B2	6	1970	1.814274	4.326	14	0.6216	0.572	184.158502
B2_6_1971	B2	6	1971	1.511895	4.326	13	0.5292	0.487	184.158502
B2_6_1972	B2	6	1972	1.511895	4.326	13	0.5292	0.487	184.158502
B2_6_1973	B2	6	1973	1.511895	4.326	13	0.5292	0.487	184.158502
B2_6_1974	B2	6	1974	1.511895	4.326	13	0.5292	0.487	184.158502
B2_6_1975	B2	6	1975	1.511895	4.326	13	0.5292	0.487	184.158502
B2_6_1976	B2	6	1976	1.511895	4.326	13	0.5292	0.487	184.158502
B2_6_1977	B2	6	1977	1.511895	4.326	13	0.5292	0.487	184.158502
B2_6_1978	B2	6	1978	1.511895	4.326	13	0.5292	0.487	184.158502
B2_6_1979	B2	6	1979	1.367905	4.326	12	0.4452	0.410	184.158502

B2_6_1980	B2	6	1980	1.367905	4.326	12	0.4452	0.410	184.158502
B2_6_1981	B2	6	1981	1.367905	4.326	12	0.4452	0.410	184.158502
B2_6_1982	B2	6	1982	1.367905	4.326	12	0.4452	0.410	184.158502
B2_6_1983	B2	6	1983	1.367905	4.326	12	0.4452	0.410	184.158502
B2_6_1984	B2	6	1984	1.29591	4.326	11	0.4452	0.410	184.158502
B2_6_1985	B2	6	1985	1.29591	4.326	11	0.4452	0.410	184.158502
B2_6_1986	B2	6	1986	1.29591	4.326	11	0.4452	0.410	184.158502
B2_6_1987	B2	6	1987	1.209516	4.223	11	0.4452	0.410	184.158502
B2_6_1988	B2	6	1988	1.209516	4.223	11	0.4452	0.410	184.158502
B2_6_1989	B2	6	1989	1.209516	4.223	11	0.4452	0.410	184.158502
B2_6_1990	B2	6	1990	1.209516	4.223	11	0.4452	0.410	184.158502
B2_6_1991	B2	6	1991	1.209516	4.223	11	0.4452	0.410	184.158502
B2_6_1992	B2	6	1992	1.209516	4.223	11	0.4452	0.410	184.158502
B2_6_1993	B2	6	1993	1.209516	4.223	11	0.4452	0.410	184.158502
B2_6_1994	B2	6	1994	1.209516	4.223	11	0.4452	0.410	184.158502
B2_6_1995	B2	6	1995	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_6_1996	B2	6	1996	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_6_1997	B2	6	1997	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_6_1998	B2	6	1998	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_6_1999	B2	6	1999	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_6_2000	B2	6	2000	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_6_2001	B2	6	2001	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_6_2002	B2	6	2002	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_6_2003	B2	6	2003	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_6_2004	B2	6	2004	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_6_2005	B2	6	2005	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_6_2006	B2	6	2006	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_6_2007	B2	6	2007	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_6_2008	B2	6	2008	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_6_2009	B2	6	2009	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_6_2010	B2	6	2010	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_6_2011	B2	6	2011	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_6_2012	B2	6	2012	0.979132	3.73	5.1015	0.15	0.138	184.158502
B2_6_2013	B2	6	2013	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_6_2014	B2	6	2014	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_6_2015	B2	6	2015	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_6_2016	B2	6	2016	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_6_2017	B2	6	2017	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_6_2018	B2	6	2018	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_6_2019	B2	6	2019	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_6_2020	B2	6	2020	0.979132	3.73	3.99	0.08	0.074	184.158502
B2_7_1969	B2	7	1969	1.814274	4.326	14	0.6216	0.572	184.158502
B2_7_1970	B2	7	1970	1.814274	4.326	14	0.6216	0.572	184.158502
B2_7_1971	B2	7	1971	1.511895	4.326	13	0.5292	0.487	184.158502
B2_7_1972	B2	7	1972	1.511895	4.326	13	0.5292	0.487	184.158502
B2_7_1973	B2	7	1973	1.511895	4.326	13	0.5292	0.487	184.158502
B2_7_1974	B2	7	1974	1.511895	4.326	13	0.5292	0.487	184.158502
B2_7_1975	B2	7	1975	1.511895	4.326	13	0.5292	0.487	184.158502
B2_7_1976	B2	7	1976	1.511895	4.326	13	0.5292	0.487	184.158502
B2_7_1977	B2	7	1977	1.511895	4.326	13	0.5292	0.487	184.158502
B2_7_1978	B2	7	1978	1.511895	4.326	13	0.5292	0.487	184.158502
B2_7_1979	B2	7	1979	1.367905	4.326	12	0.4452	0.410	184.158502
B2_7_1980	B2	7	1980	1.367905	4.326	12	0.4452	0.410	184.158502
B2_7_1981	B2	7	1981	1.367905	4.326	12	0.4452	0.410	184.158502
B2_7_1982	B2	7	1982	1.367905	4.326	12	0.4452	0.410	184.158502
B2_7_1983	B2	7	1983	1.367905	4.326	12	0.4452	0.410	184.158502
B2_7_1984	B2	7	1984	1.29591	4.326	11	0.4452	0.410	184.158502
B2_7_1985	B2	7	1985	1.29591	4.326	11	0.4452	0.410	184.158502
B2_7_1986	B2	7	1986	1.29591	4.326	11	0.4452	0.410	184.158502
B2_7_1987	B2	7	1987	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1988	B2	7	1988	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1989	B2	7	1989	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1990	B2	7	1990	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1991	B2	7	1991	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1992	B2	7	1992	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1993	B2	7	1993	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1994	B2	7	1994	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1995	B2	7	1995	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1996	B2	7	1996	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1997	B2	7	1997	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1998	B2	7	1998	1.209516	4.223	11	0.4452	0.410	184.158502
B2_7_1999	B2	7	1999	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_7_2000	B2	7	2000	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_7_2001	B2	7	2001	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_7_2002	B2	7	2002	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_7_2003	B2	7	2003	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_7_2004	B2	7	2004	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_7_2005	B2	7	2005	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_7_2006	B2	7	2006	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_7_2007	B2	7	2007	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_7_2008	B2	7	2008	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_7_2009	B2	7	2009	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_7_2010	B2	7	2010	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_7_2011	B2	7	2011	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_7_2012	B2	7	2012	0.979132	3.73	4.085	0.08	0.074	184.158502
B2_7_2013	B2	7	2013	0.979132	3.73	4.085	0.08	0.074	184.158502
B2_7_2014	B2	7	2014	0.979132	3.73	4.085	0.08	0.074	184.158502
B2_7_2015	B2	7	2015	0.979132	3.73	4.085	0.08	0.074	184.158502
B2_7_2016	B2	7	2016	0.979132	3.73	4.085	0.08	0.074	184.158502
B2_7_2017	B2	7	2017	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_7_2018	B2	7	2018	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_7_2019	B2	7	2019	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_7_2020	B2	7	2020	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_8_1969	B2	8	1969	1.814274	4.326	14	0.6216	0.572	184.158502
B2_8_1970	B2	8	1970	1.814274	4.326	14	0.6216	0.572	184.158502
B2_8_1971	B2	8	1971	1.511895	4.326	13	0.5292	0.487	184.158502
B2_8_1972	B2	8	1972	1.511895	4.326	13	0.5292	0.487	184.158502
B2_8_1973	B2	8	1973	1.511895	4.326	13	0.5292	0.487	184.158502
B2_8_1974	B2	8	1974	1.511895	4.326	13	0.5292	0.487	184.158502
B2_8_1975	B2	8	1975	1.511895	4.326	13	0.5292	0.487	184.158502
B2_8_1976	B2	8	1976	1.511895	4.326	13	0.5292	0.487	184.158502
B2_8_1977	B2	8	1977	1.511895	4.326	13	0.5292	0.487	184.158502
B2_8_1978	B2	8	1978	1.511895	4.326	13	0.5292	0.487	184.158502
B2_8_1979	B2	8	1979	1.367905	4.326	12	0.4452	0.410	184.158502
B2_8_1980	B2	8	1980	1.367905	4.326	12	0.4452	0.410	184.158502
B2_8_1981	B2	8	1981	1.367905	4.326	12	0.4452	0.410	184.158502
B2_8_1982	B2	8	1982	1.367905	4.326	12	0.4452	0.410	184.158502
B2_8_1983	B2	8	1983	1.367905	4.326	12	0.4452	0.410	184.158502
B2_8_1984	B2	8	1984	1.29591	4.326	11	0.4452	0.410	184.158502
B2_8_1985	B2	8	1985	1.29591	4.326	11	0.4452	0.410	184.158502
B2_8_1986	B2	8	1986	1.29591	4.326	11	0.4452	0.410	184.158502
B2_8_1987	B2	8	1987	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1988	B2	8	1988	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1989	B2	8	1989	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1990	B2	8	1990	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1991	B2	8	1991	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1992	B2	8	1992	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1993	B2	8	1993	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1994	B2	8	1994	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1995	B2	8	1995	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1996	B2	8	1996	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1997	B2	8	1997	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1998	B2	8	1998	1.209516	4.223	11	0.4452	0.410	184.158502
B2_8_1999	B2	8	1999	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_8_2000	B2	8	2000	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_8_2001	B2	8	2001	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_8_2002	B2	8	2002	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_8_2003	B2	8	2003	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_8_2004	B2	8	2004	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_8_2005	B2	8	2005	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_8_2006	B2	8	2006	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_8_2007	B2	8	2007	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_8_2008	B2	8	2008	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_8_2009	B2	8	2009	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_8_2010	B2	8	2010	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_8_2011	B2	8	2011	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_8_2012	B2	8	2012	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_8_2013	B2	8	2013	0.979132	3.73	4.37	0.1	0.092	184.158502
B2_8_2014	B2	8	2014	0.979132	3.73	4.37	0.1	0.092	184.158502
B2_8_2015	B2	8	2015	0.979132	3.73	4.37	0.1	0.092	184.158502
B2_8_2016	B2	8	2016	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_8_2017	B2	8	2017	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_8_2018	B2	8	2018	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_8_2019	B2	8	2019	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_8_2020	B2	8	2020	0.21452647	3.73	1.3	0.03	0.028	184.158502
B2_9_1969	B2	9	1969	1.814274	4.326	14	0.6216	0.572	184.158502
B2_9_1970	B2	9	1970	1.814274	4.326	14	0.6216	0.572	184.158502
B2_9_1971	B2	9	1971	1.511895	4.326	13	0.5292	0.487	184.158502
B2_9_1972	B2	9	1972	1.511895	4.326	13	0.5292	0.487	184.158502
B2_9_1973	B2	9	1973	1.511895	4.326	13	0.5292	0.487	184.158502
B2_9_1974	B2	9	1974	1.511895	4.326	13	0.5292	0.487	184.158502
B2_9_1975	B2	9	1975	1.511895	4.326	13	0.5292	0.487	184.158502
B2_9_1976	B2	9	1976	1.511895	4.326	13	0.5292	0.487	184.158502
B2_9_1977	B2	9	1977	1.511895	4.326	13	0.5292	0.487	184.158502

B2_9_1978	B2	9	1978	1.511895	4.326	13	0.5292	0.487	184.158502
B2_9_1979	B2	9	1979	1.367905	4.326	12	0.4452	0.410	184.158502
B2_9_1980	B2	9	1980	1.367905	4.326	12	0.4452	0.410	184.158502
B2_9_1981	B2	9	1981	1.367905	4.326	12	0.4452	0.410	184.158502
B2_9_1982	B2	9	1982	1.367905	4.326	12	0.4452	0.410	184.158502
B2_9_1983	B2	9	1983	1.367905	4.326	12	0.4452	0.410	184.158502
B2_9_1984	B2	9	1984	1.29591	4.326	11	0.4452	0.410	184.158502
B2_9_1985	B2	9	1985	1.29591	4.326	11	0.4452	0.410	184.158502
B2_9_1986	B2	9	1986	1.29591	4.326	11	0.4452	0.410	184.158502
B2_9_1987	B2	9	1987	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1988	B2	9	1988	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1989	B2	9	1989	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1990	B2	9	1990	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1991	B2	9	1991	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1992	B2	9	1992	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1993	B2	9	1993	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1994	B2	9	1994	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1995	B2	9	1995	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1996	B2	9	1996	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1997	B2	9	1997	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1998	B2	9	1998	1.209516	4.223	11	0.4452	0.410	184.158502
B2_9_1999	B2	9	1999	0.979132	2.781	8.17	0.3192	0.294	184.158502
B2_9_2000	B2	9	2000	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_9_2001	B2	9	2001	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_9_2002	B2	9	2002	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_9_2003	B2	9	2003	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_9_2004	B2	9	2004	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_9_2005	B2	9	2005	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_9_2006	B2	9	2006	0.979132	2.781	7.31	0.3192	0.294	184.158502
B2_9_2007	B2	9	2007	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_9_2008	B2	9	2008	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_9_2009	B2	9	2009	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_9_2010	B2	9	2010	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_9_2011	B2	9	2011	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_9_2012	B2	9	2012	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_9_2013	B2	9	2013	0.979132	3.73	5.529	0.2	0.184	184.158502
B2_9_2014	B2	9	2014	0.979132	3.75	4.94	0.25	0.230	184.158502
B2_9_2015	B2	9	2015	0.979132	3.75	4.94	0.25	0.230	184.158502
B2_9_2016	B2	9	2016	0.21452647	3.75	1.3	0.03	0.028	184.158502
B2_9_2017	B2	9	2017	0.21452647	3.75	1.3	0.03	0.028	184.158502
B2_9_2018	B2	9	2018	0.21452647	3.75	1.3	0.03	0.028	184.158502
B2_9_2019	B2	9	2019	0.21452647	3.75	1.3	0.03	0.028	184.158502
B2_9_2020	B2	9	2020	0.21452647	3.75	1.3	0.03	0.028	184.158502
C1_1_1994	C1	1	1994	1.815	5	10	1	0.920	244.93988
C1_1_1995	C1	1	1995	1.815	5	10	1	0.920	244.93988
C1_1_1996	C1	1	1996	1.815	5	10	1	0.920	244.93988
C1_1_1997	C1	1	1997	1.815	5	10	1	0.920	244.93988
C1_1_1998	C1	1	1998	1.815	5	10	1	0.920	244.93988
C1_1_1999	C1	1	1999	1.2705	5	9.35	0.57	0.524	244.93988
C1_1_2000	C1	1	2000	1.2705	5	9.35	0.57	0.524	244.93988
C1_1_2001	C1	1	2001	1.2705	5	9.35	0.57	0.524	244.93988
C1_1_2002	C1	1	2002	1.2705	5	9.35	0.57	0.524	244.93988
C1_1_2003	C1	1	2003	1.2705	5	9.35	0.57	0.524	244.93988
C1_1_2004	C1	1	2004	0.8228	3.47	6.08	0.47	0.432	244.93988
C1_1_2005	C1	1	2005	0.8228	3.47	6.08	0.47	0.432	244.93988
C1_1_2006	C1	1	2006	0.8228	3.47	6.08	0.47	0.432	244.93988
C1_1_2007	C1	1	2007	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2008	C1	1	2008	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2009	C1	1	2009	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2010	C1	1	2010	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2011	C1	1	2011	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2012	C1	1	2012	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2013	C1	1	2013	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2014	C1	1	2014	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2015	C1	1	2015	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2016	C1	1	2016	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2017	C1	1	2017	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2018	C1	1	2018	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2019	C1	1	2019	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2020	C1	1	2020	0.5929	3.47	4.37	0.38	0.350	244.93988
C1_1_2040	C1	1	2040	0.5929	3.47	4.37	0.19	0.175	244.93988
C1_2_1994	C1	2	1994	2.2264	5	6.92	0.76	0.699	244.93988
C1_2_1995	C1	2	1995	2.2264	5	6.92	0.76	0.699	244.93988
C1_2_1996	C1	2	1996	2.2264	5	6.92	0.76	0.699	244.93988
C1_2_1997	C1	2	1997	2.2264	5	6.92	0.76	0.699	244.93988
C1_2_1998	C1	2	1998	2.2264	5	6.92	0.76	0.699	244.93988
C1_2_1999	C1	2	1999	1.089	5	6.92	0.57	0.524	244.93988
C1_2_2000	C1	2	2000	1.089	5	6.92	0.57	0.524	244.93988
C1_2_2001	C1	2	2001	1.089	5	6.92	0.57	0.524	244.93988
C1_2_2002	C1	2	2002	1.089	5	6.92	0.57	0.524	244.93988
C1_2_2003	C1	2	2003	1.089	5	6.92	0.57	0.524	244.93988
C1_2_2004	C1	2	2004	0.7744	2.34	5.79	0.38	0.350	244.93988
C1_2_2005	C1	2	2005	0.7744	2.34	5.79	0.38	0.350	244.93988
C1_2_2006	C1	2	2006	0.7744	2.34	5.79	0.38	0.350	244.93988
C1_2_2007	C1	2	2007	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2008	C1	2	2008	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2009	C1	2	2009	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2010	C1	2	2010	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2011	C1	2	2011	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2012	C1	2	2012	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2013	C1	2	2013	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2014	C1	2	2014	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2015	C1	2	2015	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2016	C1	2	2016	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2017	C1	2	2017	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2018	C1	2	2018	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2019	C1	2	2019	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2020	C1	2	2020	0.6897	2.34	4.57	0.38	0.350	244.93988
C1_2_2040	C1	2	2040	0.6897	2.34	4.57	0.19	0.175	244.93988
C1_3_1987	C1	3	1987	2.2264	5	7	0.76	0.699	244.93988
C1_3_1988	C1	3	1988	2.2264	5	7	0.76	0.699	244.93988
C1_3_1989	C1	3	1989	2.2264	5	7	0.76	0.699	244.93988
C1_3_1990	C1	3	1990	2.2264	5	7	0.76	0.699	244.93988
C1_3_1991	C1	3	1991	2.2264	5	7	0.76	0.699	244.93988
C1_3_1992	C1	3	1992	2.2264	5	7	0.76	0.699	244.93988
C1_3_1993	C1	3	1993	2.2264	5	7	0.76	0.699	244.93988
C1_3_1994	C1	3	1994	2.2264	5	7	0.76	0.699	244.93988
C1_3_1995	C1	3	1995	2.2264	5	7	0.76	0.699	244.93988
C1_3_1996	C1	3	1996	2.2264	5	7	0.76	0.699	244.93988
C1_3_1997	C1	3	1997	2.2264	5	7	0.76	0.699	244.93988
C1_3_1998	C1	3	1998	2.178	5	6.9	0.76	0.699	244.93988
C1_3_1999	C1	3	1999	2.178	5	6.9	0.76	0.699	244.93988
C1_3_2000	C1	3	2000	2.178	5	6.9	0.76	0.699	244.93988
C1_3_2001	C1	3	2001	2.178	5	6.9	0.76	0.699	244.93988
C1_3_2002	C1	3	2002	2.178	5	6.9	0.76	0.699	244.93988
C1_3_2003	C1	3	2003	1.7545	4.1	5.55	0.6	0.552	244.93988
C1_3_2004	C1	3	2004	0.7744	3.27	5.1	0.43	0.396	244.93988
C1_3_2005	C1	3	2005	0.4477	3	4.95	0.38	0.350	244.93988
C1_3_2006	C1	3	2006	0.4477	3	4.95	0.38	0.350	244.93988
C1_3_2007	C1	3	2007	0.2904	2.86	4.88	0.35	0.322	244.93988
C1_3_2008	C1	3	2008	0.2904	2.86	4.88	0.35	0.322	244.93988
C1_3_2009	C1	3	2009	0.2904	2.86	4.88	0.35	0.322	244.93988
C1_3_2010	C1	3	2010	0.2904	2.86	4.88	0.35	0.322	244.93988
C1_3_2011	C1	3	2011	0.2904	2.86	4.88	0.35	0.322	244.93988
C1_3_2012	C1	3	2012	0.121	2.72	4.8	0.16	0.147	244.93988
C1_3_2013	C1	3	2013	0.121	2.72	4.8	0.16	0.147	244.93988
C1_3_2014	C1	3	2014	0.121	2.72	4.8	0.16	0.147	244.93988
C1_3_2015	C1	3	2015	0.121	2.72	4.8	0.16	0.147	244.93988
C1_3_2016	C1	3	2016	0.121	2.72	4.8	0.16	0.147	244.93988
C1_3_2017	C1	3	2017	0.121	2.72	4.8	0.16	0.147	244.93988
C1_3_2018	C1	3	2018	0.121	2.72	4.8	0.16	0.147	244.93988
C1_3_2019	C1	3	2019	0.121	2.72	4.8	0.16	0.147	244.93988
C1_3_2020	C1	3	2020	0.121	2.72	4.8	0.16	0.147	244.93988
C1_3_2040	C1	3	2040	0.121	2.72	2.9	0.01	0.009	244.93988
C1_4_1987	C1	4	1987	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1988	C1	4	1988	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1989	C1	4	1989	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1990	C1	4	1990	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1991	C1	4	1991	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1992	C1	4	1992	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1993	C1	4	1993	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1994	C1	4	1994	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1995	C1	4	1995	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1996	C1	4	1996	1.7424	4.8	13	0.84	0.773	222.260261
C1_4_1997	C1	4	1997	1.1979	3.49	8.75	0.69	0.635	222.260261
C1_4_1998	C1	4	1998	1.1979	3.49	8.75	0.69	0.635	222.260261
C1_4_1999	C1	4	1999	1.1979	3.49	8.75	0.69	0.635	222.260261
C1_4_2000	C1	4	2000	1.1979	3.49	8.75	0.69	0.635	222.260261
C1_4_2001	C1	4	2001	1.1979	3.49	8.75	0.69	0.635	222.260261
C1_4_2002	C1	4	2002	1.1979	3.49	8.75	0.69	0.635	222.260261
C1_4_2003	C1	4	2003	1.1979	3.49	6.9	0.69	0.635	222.260261
C1_4_2004	C1	4	2004	0.5566	3.23	5.64	0.39	0.359	222.260261
C1_4_2005	C1	4	2005	0.3388	3.14	5.22	0.29	0.267	222.260261
C1_4_2006	C1	4	2006	0.3388	3.14	5.22	0.29	0.267	222.260261

C1_4_2007	C1	4	2007	0.2299	3.09	5.01	0.24	0.221	222.260261
C1_4_2008	C1	4	2008	0.2299	3.09	5.01	0.24	0.221	222.260261
C1_4_2009	C1	4	2009	0.2299	3.09	5.01	0.24	0.221	222.260261
C1_4_2010	C1	4	2010	0.2299	3.09	5.01	0.24	0.221	222.260261
C1_4_2011	C1	4	2011	0.121	3.05	2.89	0.2	0.184	222.260261
C1_4_2012	C1	4	2012	0.1089	3.05	2.53	0.07	0.064	222.260261
C1_4_2013	C1	4	2013	0.1089	3.05	2.53	0.07	0.064	222.260261
C1_4_2014	C1	4	2014	0.1089	3.05	2.53	0.01	0.009	222.260261
C1_4_2015	C1	4	2015	0.1089	3.05	2.53	0.01	0.009	222.260261
C1_4_2016	C1	4	2016	0.1089	3.05	2.53	0.01	0.009	222.260261
C1_4_2017	C1	4	2017	0.1089	3.05	2.53	0.01	0.009	222.260261
C1_4_2018	C1	4	2018	0.1089	3.05	2.53	0.01	0.009	222.260261
C1_4_2019	C1	4	2019	0.1089	3.05	2.53	0.01	0.009	222.260261
C1_4_2020	C1	4	2020	0.1089	3.05	2.53	0.01	0.009	222.260261
C1_4_2040	C1	4	2040	0.0847	3.05	1.4	0.01	0.009	222.260261
C1_5_1969	C1	5	1969	1.5972	4.4	14	0.77	0.708	213.188414
C1_5_1970	C1	5	1970	1.5972	4.4	14	0.77	0.708	213.188414
C1_5_1971	C1	5	1971	1.331	4.4	13	0.66	0.607	213.188414
C1_5_1972	C1	5	1972	1.331	4.4	13	0.66	0.607	213.188414
C1_5_1973	C1	5	1973	1.331	4.4	13	0.66	0.607	213.188414
C1_5_1974	C1	5	1974	1.331	4.4	13	0.66	0.607	213.188414
C1_5_1975	C1	5	1975	1.331	4.4	13	0.66	0.607	213.188414
C1_5_1976	C1	5	1976	1.331	4.4	13	0.66	0.607	213.188414
C1_5_1977	C1	5	1977	1.331	4.4	13	0.66	0.607	213.188414
C1_5_1978	C1	5	1978	1.331	4.4	13	0.66	0.607	213.188414
C1_5_1979	C1	5	1979	1.21	4.4	12	0.55	0.506	213.188414
C1_5_1980	C1	5	1980	1.21	4.4	12	0.55	0.506	213.188414
C1_5_1981	C1	5	1981	1.21	4.4	12	0.55	0.506	213.188414
C1_5_1982	C1	5	1982	1.21	4.4	12	0.55	0.506	213.188414
C1_5_1983	C1	5	1983	1.21	4.4	12	0.55	0.506	213.188414
C1_5_1984	C1	5	1984	1.1374	4.3	11	0.55	0.506	213.188414
C1_5_1985	C1	5	1985	1.1374	4.3	11	0.55	0.506	213.188414
C1_5_1986	C1	5	1986	1.1374	4.3	11	0.55	0.506	213.188414
C1_5_1987	C1	5	1987	1.0648	4.2	11	0.55	0.506	213.188414
C1_5_1988	C1	5	1988	1.0648	4.2	11	0.55	0.506	213.188414
C1_5_1989	C1	5	1989	1.0648	4.2	11	0.55	0.506	213.188414
C1_5_1990	C1	5	1990	1.0648	4.2	11	0.55	0.506	213.188414
C1_5_1991	C1	5	1991	1.0648	4.2	11	0.55	0.506	213.188414
C1_5_1992	C1	5	1992	1.0648	4.2	11	0.55	0.506	213.188414
C1_5_1993	C1	5	1993	1.0648	4.2	11	0.55	0.506	213.188414
C1_5_1994	C1	5	1994	1.0648	4.2	11	0.55	0.506	213.188414
C1_5_1995	C1	5	1995	1.0648	4.2	11	0.55	0.506	213.188414
C1_5_1996	C1	5	1996	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_5_1997	C1	5	1997	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_5_1998	C1	5	1998	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_5_1999	C1	5	1999	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_5_2000	C1	5	2000	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_5_2001	C1	5	2001	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_5_2002	C1	5	2002	0.8228	2.7	6.9	0.38	0.350	213.188414
C1_5_2003	C1	5	2003	0.3993	2.7	5.26	0.24	0.221	213.188414
C1_5_2004	C1	5	2004	0.2662	2.7	4.72	0.19	0.175	213.188414
C1_5_2005	C1	5	2005	0.2662	2.7	4.72	0.19	0.175	213.188414
C1_5_2006	C1	5	2006	0.1936	2.7	4.44	0.16	0.147	213.188414
C1_5_2007	C1	5	2007	0.1936	2.7	4.44	0.16	0.147	213.188414
C1_5_2008	C1	5	2008	0.1936	2.7	4.44	0.16	0.147	213.188414
C1_5_2009	C1	5	2009	0.1936	2.7	4.44	0.16	0.147	213.188414
C1_5_2010	C1	5	2010	0.1936	2.7	4.44	0.16	0.147	213.188414
C1_5_2011	C1	5	2011	0.121	2.7	2.45	0.14	0.129	213.188414
C1_5_2012	C1	5	2012	0.121	2.7	2.45	0.14	0.129	213.188414
C1_5_2013	C1	5	2013	0.121	2.7	2.45	0.14	0.129	213.188414
C1_5_2014	C1	5	2014	0.1089	2.7	2.27	0.01	0.009	213.188414
C1_5_2015	C1	5	2015	0.1089	2.7	2.27	0.01	0.009	213.188414
C1_5_2016	C1	5	2016	0.1089	2.7	2.27	0.01	0.009	213.188414
C1_5_2017	C1	5	2017	0.1089	2.7	2.27	0.01	0.009	213.188414
C1_5_2018	C1	5	2018	0.1089	2.7	2.27	0.01	0.009	213.188414
C1_5_2019	C1	5	2019	0.1089	2.7	2.27	0.01	0.009	213.188414
C1_5_2020	C1	5	2020	0.1089	2.7	2.27	0.01	0.009	213.188414
C1_5_2040	C1	5	2040	0.0605	2.7	0.27	0.01	0.009	213.188414
C1_6_1969	C1	6	1969	1.5972	4.4	14	0.77	0.708	213.188414
C1_6_1970	C1	6	1970	1.5972	4.4	14	0.77	0.708	213.188414
C1_6_1971	C1	6	1971	1.331	4.4	13	0.66	0.607	213.188414
C1_6_1972	C1	6	1972	1.331	4.4	13	0.66	0.607	213.188414
C1_6_1973	C1	6	1973	1.331	4.4	13	0.66	0.607	213.188414
C1_6_1974	C1	6	1974	1.331	4.4	13	0.66	0.607	213.188414
C1_6_1975	C1	6	1975	1.331	4.4	13	0.66	0.607	213.188414
C1_6_1976	C1	6	1976	1.331	4.4	13	0.66	0.607	213.188414
C1_6_1977	C1	6	1977	1.331	4.4	13	0.66	0.607	213.188414
C1_6_1978	C1	6	1978	1.331	4.4	13	0.66	0.607	213.188414
C1_6_1979	C1	6	1979	1.21	4.4	12	0.55	0.506	213.188414
C1_6_1980	C1	6	1980	1.21	4.4	12	0.55	0.506	213.188414
C1_6_1981	C1	6	1981	1.21	4.4	12	0.55	0.506	213.188414
C1_6_1982	C1	6	1982	1.21	4.4	12	0.55	0.506	213.188414
C1_6_1983	C1	6	1983	1.21	4.4	12	0.55	0.506	213.188414
C1_6_1984	C1	6	1984	1.1374	4.3	11	0.55	0.506	213.188414
C1_6_1985	C1	6	1985	1.1374	4.3	11	0.55	0.506	213.188414
C1_6_1986	C1	6	1986	1.1374	4.3	11	0.55	0.506	213.188414
C1_6_1987	C1	6	1987	1.0648	4.2	11	0.55	0.506	213.188414
C1_6_1988	C1	6	1988	1.0648	4.2	11	0.55	0.506	213.188414
C1_6_1989	C1	6	1989	1.0648	4.2	11	0.55	0.506	213.188414
C1_6_1990	C1	6	1990	1.0648	4.2	11	0.55	0.506	213.188414
C1_6_1991	C1	6	1991	1.0648	4.2	11	0.55	0.506	213.188414
C1_6_1992	C1	6	1992	1.0648	4.2	11	0.55	0.506	213.188414
C1_6_1993	C1	6	1993	1.0648	4.2	11	0.55	0.506	213.188414
C1_6_1994	C1	6	1994	1.0648	4.2	11	0.55	0.506	213.188414
C1_6_1995	C1	6	1995	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_6_1996	C1	6	1996	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_6_1997	C1	6	1997	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_6_1998	C1	6	1998	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_6_1999	C1	6	1999	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_6_2000	C1	6	2000	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_6_2001	C1	6	2001	0.8228	2.7	8.17	0.38	0.350	213.188414
C1_6_2002	C1	6	2002	0.3872	0.92	6.25	0.15	0.138	213.188414
C1_6_2003	C1	6	2003	0.2299	0.92	5	0.12	0.110	213.188414
C1_6_2004	C1	6	2004	0.1694	0.92	4.58	0.11	0.101	213.188414
C1_6_2005	C1	6	2005	0.1694	0.92	4.58	0.11	0.101	213.188414
C1_6_2006	C1	6	2006	0.1452	0.92	4.38	0.11	0.101	213.188414
C1_6_2007	C1	6	2007	0.1452	0.92	4.38	0.11	0.101	213.188414
C1_6_2008	C1	6	2008	0.1452	0.92	4.38	0.11	0.101	213.188414
C1_6_2009	C1	6	2009	0.1452	0.92	4.38	0.11	0.101	213.188414
C1_6_2010	C1	6	2010	0.121	0.92	2.45	0.11	0.101	213.188414
C1_6_2011	C1	6	2011	0.121	0.92	2.45	0.11	0.101	213.188414
C1_6_2012	C1	6	2012	0.121	0.92	2.45	0.11	0.101	213.188414
C1_6_2013	C1	6	2013	0.0847	0.92	1.36	0.01	0.009	213.188414
C1_6_2014	C1	6	2014	0.0847	0.92	1.36	0.01	0.009	213.188414
C1_6_2015	C1	6	2015	0.0847	0.92	1.36	0.01	0.009	213.188414
C1_6_2016	C1	6	2016	0.0847	0.92	1.36	0.01	0.009	213.188414
C1_6_2017	C1	6	2017	0.0847	0.92	1.36	0.01	0.009	213.188414
C1_6_2018	C1	6	2018	0.0847	0.92	1.36	0.01	0.009	213.188414
C1_6_2019	C1	6	2019	0.0847	0.92	1.36	0.01	0.009	213.188414
C1_6_2020	C1	6	2020	0.0847	0.92	1.36	0.01	0.009	213.188414
C1_6_2040	C1	6	2040	0.0605	0.92	0.27	0.01	0.009	213.188414
C1_7_1969	C1	7	1969	1.5246	4.2	14	0.74	0.681	185.972872
C1_7_1970	C1	7	1970	1.5246	4.2	14	0.74	0.681	185.972872
C1_7_1971	C1	7	1971	1.2705	4.2	13	0.63	0.580	185.972872
C1_7_1972	C1	7	1972	1.2705	4.2	13	0.63	0.580	185.972872
C1_7_1973	C1	7	1973	1.2705	4.2	13	0.63	0.580	185.972872
C1_7_1974	C1	7	1974	1.2705	4.2	13	0.63	0.580	185.972872
C1_7_1975	C1	7	1975	1.2705	4.2	13	0.63	0.580	185.972872
C1_7_1976	C1	7	1976	1.2705	4.2	13	0.63	0.580	185.972872
C1_7_1977	C1	7	1977	1.2705	4.2	13	0.63	0.580	185.972872
C1_7_1978	C1	7	1978	1.2705	4.2	13	0.63	0.580	185.972872
C1_7_1979	C1	7	1979	1.1495	4.2	12	0.53	0.488	185.972872
C1_7_1980	C1	7	1980	1.1495	4.2	12	0.53	0.488	185.972872
C1_7_1981	C1	7	1981	1.1495	4.2	12	0.53	0.488	185.972872
C1_7_1982	C1	7	1982	1.1495	4.2	12	0.53	0.488	185.972872
C1_7_1983	C1	7	1983	1.1495	4.2	12	0.53	0.488	185.972872
C1_7_1984	C1	7	1984	1.089	4.2	11	0.53	0.488	185.972872
C1_7_1985	C1	7	1985	1.089	4.2	11	0.53	0.488	185.972872
C1_7_1986	C1	7	1986	1.089	4.2	11	0.53	0.488	185.972872
C1_7_1987	C1	7	1987	1.0164	4.1	11	0.53	0.488	185.972872
C1_7_1988	C1	7	1988	1.0164	4.1	11	0.53	0.488	185.972872
C1_7_1989	C1	7	1989	1.0164	4.1	11	0.53	0.488	185.972872
C1_7_1990	C1	7	1990	1.0164	4.1	11	0.53	0.488	185.972872
C1_7_1991	C1	7	1991	1.0164	4.1	11	0.53	0.488	185.972872
C1_7_1992	C1	7	1992	1.0164	4.1	11	0.53	0.488	185.972872
C1_7_1993	C1	7	1993	1.0164	4.1	11	0.53	0.488	185.972872
C1_7_1994	C1	7	1994	1.0164	4.1	11	0.53	0.488	185.972872
C1_7_1995	C1	7	1995	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_7_1996	C1	7	1996	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_7_1997	C1	7	1997	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_7_1998	C1	7	1998	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_7_1999	C1	7	1999	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_7_2000	C1	7	2000	0.3872	0.92	6.25	0.15	0.138	185.972872
C1_7_2001	C1	7	2001	0.2299	0.92	4.95	0.12	0.110	185.972872

C1_7_2002	C1	7	2002	0.1694	0.92	4.51	0.11	0.101	185.972872
C1_7_2003	C1	7	2003	0.1694	0.92	4.51	0.11	0.101	185.972872
C1_7_2004	C1	7	2004	0.1452	0.92	4.29	0.11	0.101	185.972872
C1_7_2005	C1	7	2005	0.121	0.92	4	0.11	0.101	185.972872
C1_7_2006	C1	7	2006	0.121	0.92	4	0.11	0.101	185.972872
C1_7_2007	C1	7	2007	0.121	0.92	4	0.11	0.101	185.972872
C1_7_2008	C1	7	2008	0.121	0.92	4	0.11	0.101	185.972872
C1_7_2009	C1	7	2009	0.121	0.92	4	0.11	0.101	185.972872
C1_7_2010	C1	7	2010	0.121	0.92	2.45	0.11	0.101	185.972872
C1_7_2011	C1	7	2011	0.121	0.92	2.45	0.11	0.101	185.972872
C1_7_2012	C1	7	2012	0.121	0.92	2.45	0.11	0.101	185.972872
C1_7_2013	C1	7	2013	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_7_2014	C1	7	2014	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_7_2015	C1	7	2015	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_7_2016	C1	7	2016	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_7_2017	C1	7	2017	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_7_2018	C1	7	2018	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_7_2019	C1	7	2019	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_7_2020	C1	7	2020	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_7_2040	C1	7	2040	0.0605	0.92	0.27	0.01	0.009	185.972872
C1_8_1969	C1	8	1969	1.5246	4.2	14	0.74	0.681	185.972872
C1_8_1970	C1	8	1970	1.5246	4.2	14	0.74	0.681	185.972872
C1_8_1971	C1	8	1971	1.2705	4.2	13	0.63	0.580	185.972872
C1_8_1972	C1	8	1972	1.2705	4.2	13	0.63	0.580	185.972872
C1_8_1973	C1	8	1973	1.2705	4.2	13	0.63	0.580	185.972872
C1_8_1974	C1	8	1974	1.2705	4.2	13	0.63	0.580	185.972872
C1_8_1975	C1	8	1975	1.2705	4.2	13	0.63	0.580	185.972872
C1_8_1976	C1	8	1976	1.2705	4.2	13	0.63	0.580	185.972872
C1_8_1977	C1	8	1977	1.2705	4.2	13	0.63	0.580	185.972872
C1_8_1978	C1	8	1978	1.2705	4.2	13	0.63	0.580	185.972872
C1_8_1979	C1	8	1979	1.1495	4.2	12	0.53	0.488	185.972872
C1_8_1980	C1	8	1980	1.1495	4.2	12	0.53	0.488	185.972872
C1_8_1981	C1	8	1981	1.1495	4.2	12	0.53	0.488	185.972872
C1_8_1982	C1	8	1982	1.1495	4.2	12	0.53	0.488	185.972872
C1_8_1983	C1	8	1983	1.1495	4.2	12	0.53	0.488	185.972872
C1_8_1984	C1	8	1984	1.089	4.2	11	0.53	0.488	185.972872
C1_8_1985	C1	8	1985	1.089	4.2	11	0.53	0.488	185.972872
C1_8_1986	C1	8	1986	1.089	4.2	11	0.53	0.488	185.972872
C1_8_1987	C1	8	1987	1.0164	4.1	11	0.53	0.488	185.972872
C1_8_1988	C1	8	1988	1.0164	4.1	11	0.53	0.488	185.972872
C1_8_1989	C1	8	1989	1.0164	4.1	11	0.53	0.488	185.972872
C1_8_1990	C1	8	1990	1.0164	4.1	11	0.53	0.488	185.972872
C1_8_1991	C1	8	1991	1.0164	4.1	11	0.53	0.488	185.972872
C1_8_1992	C1	8	1992	1.0164	4.1	11	0.53	0.488	185.972872
C1_8_1993	C1	8	1993	1.0164	4.1	11	0.53	0.488	185.972872
C1_8_1994	C1	8	1994	1.0164	4.1	11	0.53	0.488	185.972872
C1_8_1995	C1	8	1995	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_8_1996	C1	8	1996	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_8_1997	C1	8	1997	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_8_1998	C1	8	1998	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_8_1999	C1	8	1999	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_8_2000	C1	8	2000	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_8_2001	C1	8	2001	0.3872	0.92	6.25	0.15	0.138	185.972872
C1_8_2002	C1	8	2002	0.2299	0.92	4.95	0.12	0.110	185.972872
C1_8_2003	C1	8	2003	0.1694	0.92	4.51	0.11	0.101	185.972872
C1_8_2004	C1	8	2004	0.1694	0.92	4.51	0.11	0.101	185.972872
C1_8_2005	C1	8	2005	0.1452	0.92	4.29	0.11	0.101	185.972872
C1_8_2006	C1	8	2006	0.1452	0.92	4.29	0.11	0.101	185.972872
C1_8_2007	C1	8	2007	0.1452	0.92	4.29	0.11	0.101	185.972872
C1_8_2008	C1	8	2008	0.1452	0.92	4.29	0.11	0.101	185.972872
C1_8_2009	C1	8	2009	0.1452	0.92	4.29	0.11	0.101	185.972872
C1_8_2010	C1	8	2010	0.121	0.92	2.45	0.11	0.101	185.972872
C1_8_2011	C1	8	2011	0.121	0.92	2.45	0.11	0.101	185.972872
C1_8_2012	C1	8	2012	0.121	0.92	2.45	0.11	0.101	185.972872
C1_8_2013	C1	8	2013	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_8_2014	C1	8	2014	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_8_2015	C1	8	2015	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_8_2016	C1	8	2016	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_8_2017	C1	8	2017	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_8_2018	C1	8	2018	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_8_2019	C1	8	2019	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_8_2020	C1	8	2020	0.0847	0.92	1.36	0.01	0.009	185.972872
C1_8_2040	C1	8	2040	0.0605	0.92	0.27	0.01	0.009	185.972872
C1_9_1969	C1	9	1969	1.5246	4.2	14	0.74	0.681	185.972872
C1_9_1970	C1	9	1970	1.5246	4.2	14	0.74	0.681	185.972872
C1_9_1971	C1	9	1971	1.2705	4.2	13	0.63	0.580	185.972872
C1_9_1972	C1	9	1972	1.2705	4.2	13	0.63	0.580	185.972872
C1_9_1973	C1	9	1973	1.2705	4.2	13	0.63	0.580	185.972872
C1_9_1974	C1	9	1974	1.2705	4.2	13	0.63	0.580	185.972872
C1_9_1975	C1	9	1975	1.2705	4.2	13	0.63	0.580	185.972872
C1_9_1976	C1	9	1976	1.2705	4.2	13	0.63	0.580	185.972872
C1_9_1977	C1	9	1977	1.2705	4.2	13	0.63	0.580	185.972872
C1_9_1978	C1	9	1978	1.2705	4.2	13	0.63	0.580	185.972872
C1_9_1979	C1	9	1979	1.1495	4.2	12	0.53	0.488	185.972872
C1_9_1980	C1	9	1980	1.1495	4.2	12	0.53	0.488	185.972872
C1_9_1981	C1	9	1981	1.1495	4.2	12	0.53	0.488	185.972872
C1_9_1982	C1	9	1982	1.1495	4.2	12	0.53	0.488	185.972872
C1_9_1983	C1	9	1983	1.1495	4.2	12	0.53	0.488	185.972872
C1_9_1984	C1	9	1984	1.089	4.2	11	0.53	0.488	185.972872
C1_9_1985	C1	9	1985	1.089	4.2	11	0.53	0.488	185.972872
C1_9_1986	C1	9	1986	1.089	4.2	11	0.53	0.488	185.972872
C1_9_1987	C1	9	1987	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1988	C1	9	1988	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1989	C1	9	1989	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1990	C1	9	1990	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1991	C1	9	1991	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1992	C1	9	1992	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1993	C1	9	1993	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1994	C1	9	1994	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1995	C1	9	1995	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1996	C1	9	1996	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1997	C1	9	1997	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1998	C1	9	1998	1.0164	4.1	11	0.53	0.488	185.972872
C1_9_1999	C1	9	1999	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_9_2000	C1	9	2000	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_9_2001	C1	9	2001	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_9_2002	C1	9	2002	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_9_2003	C1	9	2003	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_9_2004	C1	9	2004	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_9_2005	C1	9	2005	0.3872	0.92	6.25	0.15	0.138	185.972872
C1_9_2006	C1	9	2006	0.2299	0.92	4.95	0.12	0.110	185.972872
C1_9_2007	C1	9	2007	0.1694	0.92	4.51	0.11	0.101	185.972872
C1_9_2008	C1	9	2008	0.1694	0.92	4.51	0.11	0.101	185.972872
C1_9_2009	C1	9	2009	0.1452	0.92	4.29	0.11	0.101	185.972872
C1_9_2010	C1	9	2010	0.121	0.92	4.08	0.11	0.101	185.972872
C1_9_2011	C1	9	2011	0.121	0.92	4.08	0.11	0.101	185.972872
C1_9_2012	C1	9	2012	0.121	0.92	4.08	0.11	0.101	185.972872
C1_9_2013	C1	9	2013	0.121	0.92	4.08	0.11	0.101	185.972872
C1_9_2014	C1	9	2014	0.0847	0.92	2.36	0.06	0.055	185.972872
C1_9_2015	C1	9	2015	0.0847	0.92	2.36	0.06	0.055	185.972872
C1_9_2016	C1	9	2016	0.0847	0.92	2.36	0.06	0.055	185.972872
C1_9_2017	C1	9	2017	0.0847	0.92	2.36	0.06	0.055	185.972872
C1_9_2018	C1	9	2018	0.0847	0.92	2.36	0.06	0.055	185.972872
C1_9_2019	C1	9	2019	0.0847	0.92	2.36	0.06	0.055	185.972872
C1_9_2020	C1	9	2020	0.0847	0.92	2.36	0.06	0.055	185.972872
C1_9_2040	C1	9	2040	0.0605	0.92	2.36	0.02	0.018	185.972872
C1_10_1969	C1	10	1969	1.5246	4.2	14	0.74	0.681	185.972872
C1_10_1970	C1	10	1970	1.5246	4.2	14	0.74	0.681	185.972872
C1_10_1971	C1	10	1971	1.2705	4.2	13	0.63	0.580	185.972872
C1_10_1972	C1	10	1972	1.2705	4.2	13	0.63	0.580	185.972872
C1_10_1973	C1	10	1973	1.2705	4.2	13	0.63	0.580	185.972872
C1_10_1974	C1	10	1974	1.2705	4.2	13	0.63	0.580	185.972872
C1_10_1975	C1	10	1975	1.2705	4.2	13	0.63	0.580	185.972872
C1_10_1976	C1	10	1976	1.2705	4.2	13	0.63	0.580	185.972872
C1_10_1977	C1	10	1977	1.2705	4.2	13	0.63	0.580	185.972872
C1_10_1978	C1	10	1978	1.2705	4.2	13	0.63	0.580	185.972872
C1_10_1979	C1	10	1979	1.1495	4.2	12	0.53	0.488	185.972872
C1_10_1980	C1	10	1980	1.1495	4.2	12	0.53	0.488	185.972872
C1_10_1981	C1	10	1981	1.1495	4.2	12	0.53	0.488	185.972872
C1_10_1982	C1	10	1982	1.1495	4.2	12	0.53	0.488	185.972872
C1_10_1983	C1	10	1983	1.1495	4.2	12	0.53	0.488	185.972872
C1_10_1984	C1	10	1984	1.089	4.2	11	0.53	0.488	185.972872
C1_10_1985	C1	10	1985	1.089	4.2	11	0.53	0.488	185.972872
C1_10_1986	C1	10	1986	1.089	4.2	11	0.53	0.488	185.972872
C1_10_1987	C1	10	1987	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1988	C1	10	1988	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1989	C1	10	1989	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1990	C1	10	1990	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1991	C1	10	1991	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1992	C1	10	1992	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1993	C1	10	1993	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1994	C1	10	1994	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1995	C1	10	1995	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1996	C1	10	1996	1.0164	4.1	11	0.53	0.488	185.972872

C1_10_1997	C1	10	1997	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1998	C1	10	1998	1.0164	4.1	11	0.53	0.488	185.972872
C1_10_1999	C1	10	1999	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_10_2000	C1	10	2000	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_10_2001	C1	10	2001	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_10_2002	C1	10	2002	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_10_2003	C1	10	2003	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_10_2004	C1	10	2004	0.8228	2.7	8.17	0.38	0.350	185.972872
C1_10_2005	C1	10	2005	0.3872	0.92	6.25	0.15	0.138	185.972872
C1_10_2006	C1	10	2006	0.2299	0.92	4.95	0.12	0.110	185.972872
C1_10_2007	C1	10	2007	0.1694	0.92	4.51	0.11	0.101	185.972872
C1_10_2008	C1	10	2008	0.1694	0.92	4.51	0.11	0.101	185.972872
C1_10_2009	C1	10	2009	0.1452	0.92	4.29	0.11	0.101	185.972872
C1_10_2010	C1	10	2010	0.121	0.92	4.08	0.11	0.101	185.972872
C1_10_2011	C1	10	2011	0.121	0.92	4.08	0.11	0.101	185.972872
C1_10_2012	C1	10	2012	0.121	0.92	4.08	0.11	0.101	185.972872
C1_10_2013	C1	10	2013	0.121	0.92	4.08	0.11	0.101	185.972872
C1_10_2014	C1	10	2014	0.121	0.92	2.36	0.06	0.055	185.972872
C1_10_2015	C1	10	2015	0.121	0.92	2.36	0.06	0.055	185.972872
C1_10_2016	C1	10	2016	0.121	0.92	2.36	0.06	0.055	185.972872
C1_10_2017	C1	10	2017	0.121	0.92	2.36	0.06	0.055	185.972872
C1_10_2018	C1	10	2018	0.121	0.92	2.36	0.06	0.055	185.972872
C1_10_2019	C1	10	2019	0.121	0.92	2.36	0.06	0.055	185.972872
C1_10_2020	C1	10	2020	0.121	0.92	2.36	0.06	0.055	185.972872
C1_10_2040	C1	10	2040	0.0605	0.92	2.36	0.02	0.018	185.972872
C2_1_1994	C2	1	1994	1.815	5	10	1	0.920	244.93988
C2_1_1995	C2	1	1995	1.815	5	10	1	0.920	244.93988
C2_1_1996	C2	1	1996	1.815	5	10	1	0.920	244.93988
C2_1_1997	C2	1	1997	1.815	5	10	1	0.920	244.93988
C2_1_1998	C2	1	1998	1.815	5	10	1	0.920	244.93988
C2_1_1999	C2	1	1999	1.2705	5	9.35	0.57	0.524	244.93988
C2_1_2000	C2	1	2000	1.2705	5	9.35	0.57	0.524	244.93988
C2_1_2001	C2	1	2001	1.2705	5	9.35	0.57	0.524	244.93988
C2_1_2002	C2	1	2002	1.2705	5	9.35	0.57	0.524	244.93988
C2_1_2003	C2	1	2003	1.2705	5	9.35	0.57	0.524	244.93988
C2_1_2004	C2	1	2004	0.8228	3.47	6.08	0.47	0.432	244.93988
C2_1_2005	C2	1	2005	0.8228	3.47	6.08	0.47	0.432	244.93988
C2_1_2006	C2	1	2006	0.8228	3.47	6.08	0.47	0.432	244.93988
C2_1_2007	C2	1	2007	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2008	C2	1	2008	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2009	C2	1	2009	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2010	C2	1	2010	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2011	C2	1	2011	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2012	C2	1	2012	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2013	C2	1	2013	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2014	C2	1	2014	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2015	C2	1	2015	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2016	C2	1	2016	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2017	C2	1	2017	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2018	C2	1	2018	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2019	C2	1	2019	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2020	C2	1	2020	0.5929	3.47	4.37	0.38	0.350	244.93988
C2_1_2040	C2	1	2040	0.5929	3.47	4.37	0.19	0.175	244.93988
C2_2_1994	C2	2	1994	2.2264	5	6.92	0.76	0.699	244.93988
C2_2_1995	C2	2	1995	2.2264	5	6.92	0.76	0.699	244.93988
C2_2_1996	C2	2	1996	2.2264	5	6.92	0.76	0.699	244.93988
C2_2_1997	C2	2	1997	2.2264	5	6.92	0.76	0.699	244.93988
C2_2_1998	C2	2	1998	2.2264	5	6.92	0.76	0.699	244.93988
C2_2_1999	C2	2	1999	1.089	5	6.92	0.57	0.524	244.93988
C2_2_2000	C2	2	2000	1.089	5	6.92	0.57	0.524	244.93988
C2_2_2001	C2	2	2001	1.089	5	6.92	0.57	0.524	244.93988
C2_2_2002	C2	2	2002	1.089	5	6.92	0.57	0.524	244.93988
C2_2_2003	C2	2	2003	1.089	5	6.92	0.57	0.524	244.93988
C2_2_2004	C2	2	2004	0.7744	2.34	5.79	0.38	0.350	244.93988
C2_2_2005	C2	2	2005	0.7744	2.34	5.79	0.38	0.350	244.93988
C2_2_2006	C2	2	2006	0.7744	2.34	5.79	0.38	0.350	244.93988
C2_2_2007	C2	2	2007	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2008	C2	2	2008	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2009	C2	2	2009	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2010	C2	2	2010	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2011	C2	2	2011	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2012	C2	2	2012	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2013	C2	2	2013	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2014	C2	2	2014	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2015	C2	2	2015	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2016	C2	2	2016	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2017	C2	2	2017	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2018	C2	2	2018	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2019	C2	2	2019	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2020	C2	2	2020	0.6897	2.34	4.57	0.38	0.350	244.93988
C2_2_2040	C2	2	2040	0.6897	2.34	4.57	0.19	0.175	244.93988
C2_3_1987	C2	3	1987	2.2264	5	7	0.76	0.699	244.93988
C2_3_1988	C2	3	1988	2.2264	5	7	0.76	0.699	244.93988
C2_3_1989	C2	3	1989	2.2264	5	7	0.76	0.699	244.93988
C2_3_1990	C2	3	1990	2.2264	5	7	0.76	0.699	244.93988
C2_3_1991	C2	3	1991	2.2264	5	7	0.76	0.699	244.93988
C2_3_1992	C2	3	1992	2.2264	5	7	0.76	0.699	244.93988
C2_3_1993	C2	3	1993	2.2264	5	7	0.76	0.699	244.93988
C2_3_1994	C2	3	1994	2.2264	5	7	0.76	0.699	244.93988
C2_3_1995	C2	3	1995	2.2264	5	7	0.76	0.699	244.93988
C2_3_1996	C2	3	1996	2.2264	5	7	0.76	0.699	244.93988
C2_3_1997	C2	3	1997	2.2264	5	7	0.76	0.699	244.93988
C2_3_1998	C2	3	1998	2.178	5	6.9	0.76	0.699	244.93988
C2_3_1999	C2	3	1999	2.178	5	6.9	0.76	0.699	244.93988
C2_3_2000	C2	3	2000	2.178	5	6.9	0.76	0.699	244.93988
C2_3_2001	C2	3	2001	2.178	5	6.9	0.76	0.699	244.93988
C2_3_2002	C2	3	2002	2.178	5	6.9	0.76	0.699	244.93988
C2_3_2003	C2	3	2003	1.7545	4.1	5.55	0.6	0.552	244.93988
C2_3_2004	C2	3	2004	0.7744	3.27	5.1	0.43	0.396	244.93988
C2_3_2005	C2	3	2005	0.4477	3	4.95	0.38	0.350	244.93988
C2_3_2006	C2	3	2006	0.4477	3	4.95	0.38	0.350	244.93988
C2_3_2007	C2	3	2007	0.2904	2.86	4.88	0.35	0.322	244.93988
C2_3_2008	C2	3	2008	0.2904	2.86	4.88	0.35	0.322	244.93988
C2_3_2009	C2	3	2009	0.2904	2.86	4.88	0.35	0.322	244.93988
C2_3_2010	C2	3	2010	0.2904	2.86	4.88	0.35	0.322	244.93988
C2_3_2011	C2	3	2011	0.2904	2.86	4.88	0.35	0.322	244.93988
C2_3_2012	C2	3	2012	0.121	2.72	4.8	0.16	0.147	244.93988
C2_3_2013	C2	3	2013	0.121	2.72	4.8	0.16	0.147	244.93988
C2_3_2014	C2	3	2014	0.121	2.72	4.8	0.16	0.147	244.93988
C2_3_2015	C2	3	2015	0.121	2.72	4.8	0.16	0.147	244.93988
C2_3_2016	C2	3	2016	0.121	2.72	4.8	0.16	0.147	244.93988
C2_3_2017	C2	3	2017	0.121	2.72	4.8	0.16	0.147	244.93988
C2_3_2018	C2	3	2018	0.121	2.72	4.8	0.16	0.147	244.93988
C2_3_2019	C2	3	2019	0.121	2.72	4.8	0.16	0.147	244.93988
C2_3_2020	C2	3	2020	0.121	2.72	4.8	0.16	0.147	244.93988
C2_3_2040	C2	3	2040	0.121	2.72	2.9	0.01	0.009	244.93988
C2_4_1987	C2	4	1987	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1988	C2	4	1988	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1989	C2	4	1989	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1990	C2	4	1990	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1991	C2	4	1991	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1992	C2	4	1992	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1993	C2	4	1993	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1994	C2	4	1994	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1995	C2	4	1995	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1996	C2	4	1996	1.7424	4.8	13	0.84	0.773	222.260261
C2_4_1997	C2	4	1997	1.1979	3.49	8.75	0.69	0.635	222.260261
C2_4_1998	C2	4	1998	1.1979	3.49	8.75	0.69	0.635	222.260261
C2_4_1999	C2	4	1999	1.1979	3.49	8.75	0.69	0.635	222.260261
C2_4_2000	C2	4	2000	1.1979	3.49	8.75	0.69	0.635	222.260261
C2_4_2001	C2	4	2001	1.1979	3.49	8.75	0.69	0.635	222.260261
C2_4_2002	C2	4	2002	1.1979	3.49	8.75	0.69	0.635	222.260261
C2_4_2003	C2	4	2003	1.1979	3.49	6.9	0.69	0.635	222.260261
C2_4_2004	C2	4	2004	0.5566	3.23	5.64	0.39	0.359	222.260261
C2_4_2005	C2	4	2005	0.3388	3.14	5.22	0.29	0.267	222.260261
C2_4_2006	C2	4	2006	0.3388	3.14	5.22	0.29	0.267	222.260261
C2_4_2007	C2	4	2007	0.2299	3.09	5.01	0.24	0.221	222.260261
C2_4_2008	C2	4	2008	0.2299	3.09	5.01	0.24	0.221	222.260261
C2_4_2009	C2	4	2009	0.2299	3.09	5.01	0.24	0.221	222.260261
C2_4_2010	C2	4	2010	0.2299	3.09	5.01	0.24	0.221	222.260261
C2_4_2011	C2	4	2011	0.121	3.05	2.89	0.2	0.184	222.260261
C2_4_2012	C2	4	2012	0.1089	3.05	2.53	0.07	0.064	222.260261
C2_4_2013	C2	4	2013	0.1089	3.05	2.53	0.07	0.064	222.260261
C2_4_2014	C2	4	2014	0.1089	3.05	2.53	0.01	0.009	222.260261
C2_4_2015	C2	4	2015	0.1089	3.05	2.53	0.01	0.009	222.260261
C2_4_2016	C2	4	2016	0.1089	3.05	2.53	0.01	0.009	222.260261
C2_4_2017	C2	4	2017	0.1089	3.05	2.53	0.01	0.009	222.260261
C2_4_2018	C2	4	2018	0.1089	3.05	2.53	0.01	0.009	222.260261
C2_4_2019	C2	4	2019	0.1089	3.05	2.53	0.01	0.009	222.260261
C2_4_2020	C2	4	2020	0.1089	3.05	2.53	0.01	0.009	222.260261
C2_4_2040	C2	4	2040	0.0847	3.05	1.4	0.01	0.009	222.260261
C2_5_1969	C2	5	1969	1.5972	4.4	14	0.77	0.708	213.188414
C2_5_1970	C2	5	1970	1.5972	4.4	14	0.77	0.708	213.188414
C2_5_1971	C2	5	1971	1.331	4.4	13	0.66	0.607	213.188414

C2_5_1972	C2	5	1972	1.331	4.4	13	0.66	0.607	213.188414
C2_5_1973	C2	5	1973	1.331	4.4	13	0.66	0.607	213.188414
C2_5_1974	C2	5	1974	1.331	4.4	13	0.66	0.607	213.188414
C2_5_1975	C2	5	1975	1.331	4.4	13	0.66	0.607	213.188414
C2_5_1976	C2	5	1976	1.331	4.4	13	0.66	0.607	213.188414
C2_5_1977	C2	5	1977	1.331	4.4	13	0.66	0.607	213.188414
C2_5_1978	C2	5	1978	1.331	4.4	13	0.66	0.607	213.188414
C2_5_1979	C2	5	1979	1.21	4.4	12	0.55	0.506	213.188414
C2_5_1980	C2	5	1980	1.21	4.4	12	0.55	0.506	213.188414
C2_5_1981	C2	5	1981	1.21	4.4	12	0.55	0.506	213.188414
C2_5_1982	C2	5	1982	1.21	4.4	12	0.55	0.506	213.188414
C2_5_1983	C2	5	1983	1.21	4.4	12	0.55	0.506	213.188414
C2_5_1984	C2	5	1984	1.1374	4.3	11	0.55	0.506	213.188414
C2_5_1985	C2	5	1985	1.1374	4.3	11	0.55	0.506	213.188414
C2_5_1986	C2	5	1986	1.1374	4.3	11	0.55	0.506	213.188414
C2_5_1987	C2	5	1987	1.0648	4.2	11	0.55	0.506	213.188414
C2_5_1988	C2	5	1988	1.0648	4.2	11	0.55	0.506	213.188414
C2_5_1989	C2	5	1989	1.0648	4.2	11	0.55	0.506	213.188414
C2_5_1990	C2	5	1990	1.0648	4.2	11	0.55	0.506	213.188414
C2_5_1991	C2	5	1991	1.0648	4.2	11	0.55	0.506	213.188414
C2_5_1992	C2	5	1992	1.0648	4.2	11	0.55	0.506	213.188414
C2_5_1993	C2	5	1993	1.0648	4.2	11	0.55	0.506	213.188414
C2_5_1994	C2	5	1994	1.0648	4.2	11	0.55	0.506	213.188414
C2_5_1995	C2	5	1995	1.0648	4.2	11	0.55	0.506	213.188414
C2_5_1996	C2	5	1996	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_5_1997	C2	5	1997	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_5_1998	C2	5	1998	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_5_1999	C2	5	1999	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_5_2000	C2	5	2000	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_5_2001	C2	5	2001	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_5_2002	C2	5	2002	0.8228	2.7	6.9	0.38	0.350	213.188414
C2_5_2003	C2	5	2003	0.3993	2.7	5.26	0.24	0.221	213.188414
C2_5_2004	C2	5	2004	0.2662	2.7	4.72	0.19	0.175	213.188414
C2_5_2005	C2	5	2005	0.2662	2.7	4.72	0.19	0.175	213.188414
C2_5_2006	C2	5	2006	0.1936	2.7	4.44	0.16	0.147	213.188414
C2_5_2007	C2	5	2007	0.1936	2.7	4.44	0.16	0.147	213.188414
C2_5_2008	C2	5	2008	0.1936	2.7	4.44	0.16	0.147	213.188414
C2_5_2009	C2	5	2009	0.1936	2.7	4.44	0.16	0.147	213.188414
C2_5_2010	C2	5	2010	0.1936	2.7	4.44	0.16	0.147	213.188414
C2_5_2011	C2	5	2011	0.121	2.7	2.45	0.14	0.129	213.188414
C2_5_2012	C2	5	2012	0.121	2.7	2.45	0.14	0.129	213.188414
C2_5_2013	C2	5	2013	0.121	2.7	2.45	0.14	0.129	213.188414
C2_5_2014	C2	5	2014	0.1089	2.7	2.27	0.01	0.009	213.188414
C2_5_2015	C2	5	2015	0.1089	2.7	2.27	0.01	0.009	213.188414
C2_5_2016	C2	5	2016	0.1089	2.7	2.27	0.01	0.009	213.188414
C2_5_2017	C2	5	2017	0.1089	2.7	2.27	0.01	0.009	213.188414
C2_5_2018	C2	5	2018	0.1089	2.7	2.27	0.01	0.009	213.188414
C2_5_2019	C2	5	2019	0.1089	2.7	2.27	0.01	0.009	213.188414
C2_5_2020	C2	5	2020	0.1089	2.7	2.27	0.01	0.009	213.188414
C2_5_2040	C2	5	2040	0.0605	2.7	0.27	0.01	0.009	213.188414
C2_6_1969	C2	6	1969	1.5972	4.4	14	0.77	0.708	213.188414
C2_6_1970	C2	6	1970	1.5972	4.4	14	0.77	0.708	213.188414
C2_6_1971	C2	6	1971	1.331	4.4	13	0.66	0.607	213.188414
C2_6_1972	C2	6	1972	1.331	4.4	13	0.66	0.607	213.188414
C2_6_1973	C2	6	1973	1.331	4.4	13	0.66	0.607	213.188414
C2_6_1974	C2	6	1974	1.331	4.4	13	0.66	0.607	213.188414
C2_6_1975	C2	6	1975	1.331	4.4	13	0.66	0.607	213.188414
C2_6_1976	C2	6	1976	1.331	4.4	13	0.66	0.607	213.188414
C2_6_1977	C2	6	1977	1.331	4.4	13	0.66	0.607	213.188414
C2_6_1978	C2	6	1978	1.331	4.4	13	0.66	0.607	213.188414
C2_6_1979	C2	6	1979	1.21	4.4	12	0.55	0.506	213.188414
C2_6_1980	C2	6	1980	1.21	4.4	12	0.55	0.506	213.188414
C2_6_1981	C2	6	1981	1.21	4.4	12	0.55	0.506	213.188414
C2_6_1982	C2	6	1982	1.21	4.4	12	0.55	0.506	213.188414
C2_6_1983	C2	6	1983	1.21	4.4	12	0.55	0.506	213.188414
C2_6_1984	C2	6	1984	1.1374	4.3	11	0.55	0.506	213.188414
C2_6_1985	C2	6	1985	1.1374	4.3	11	0.55	0.506	213.188414
C2_6_1986	C2	6	1986	1.1374	4.3	11	0.55	0.506	213.188414
C2_6_1987	C2	6	1987	1.0648	4.2	11	0.55	0.506	213.188414
C2_6_1988	C2	6	1988	1.0648	4.2	11	0.55	0.506	213.188414
C2_6_1989	C2	6	1989	1.0648	4.2	11	0.55	0.506	213.188414
C2_6_1990	C2	6	1990	1.0648	4.2	11	0.55	0.506	213.188414
C2_6_1991	C2	6	1991	1.0648	4.2	11	0.55	0.506	213.188414
C2_6_1992	C2	6	1992	1.0648	4.2	11	0.55	0.506	213.188414
C2_6_1993	C2	6	1993	1.0648	4.2	11	0.55	0.506	213.188414
C2_6_1994	C2	6	1994	1.0648	4.2	11	0.55	0.506	213.188414
C2_6_1995	C2	6	1995	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_6_1996	C2	6	1996	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_6_1997	C2	6	1997	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_6_1998	C2	6	1998	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_6_1999	C2	6	1999	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_6_2000	C2	6	2000	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_6_2001	C2	6	2001	0.8228	2.7	8.17	0.38	0.350	213.188414
C2_6_2002	C2	6	2002	0.3872	0.92	6.25	0.15	0.138	213.188414
C2_6_2003	C2	6	2003	0.2299	0.92	5	0.12	0.110	213.188414
C2_6_2004	C2	6	2004	0.1694	0.92	4.58	0.11	0.101	213.188414
C2_6_2005	C2	6	2005	0.1694	0.92	4.58	0.11	0.101	213.188414
C2_6_2006	C2	6	2006	0.1452	0.92	4.38	0.11	0.101	213.188414
C2_6_2007	C2	6	2007	0.1452	0.92	4.38	0.11	0.101	213.188414
C2_6_2008	C2	6	2008	0.1452	0.92	4.38	0.11	0.101	213.188414
C2_6_2009	C2	6	2009	0.1452	0.92	4.38	0.11	0.101	213.188414
C2_6_2010	C2	6	2010	0.121	0.92	2.45	0.11	0.101	213.188414
C2_6_2011	C2	6	2011	0.121	0.92	2.45	0.11	0.101	213.188414
C2_6_2012	C2	6	2012	0.121	0.92	2.45	0.11	0.101	213.188414
C2_6_2013	C2	6	2013	0.0847	0.92	1.36	0.01	0.009	213.188414
C2_6_2014	C2	6	2014	0.0847	0.92	1.36	0.01	0.009	213.188414
C2_6_2015	C2	6	2015	0.0847	0.92	1.36	0.01	0.009	213.188414
C2_6_2016	C2	6	2016	0.0847	0.92	1.36	0.01	0.009	213.188414
C2_6_2017	C2	6	2017	0.0847	0.92	1.36	0.01	0.009	213.188414
C2_6_2018	C2	6	2018	0.0847	0.92	1.36	0.01	0.009	213.188414
C2_6_2019	C2	6	2019	0.0847	0.92	1.36	0.01	0.009	213.188414
C2_6_2020	C2	6	2020	0.0847	0.92	1.36	0.01	0.009	213.188414
C2_6_2040	C2	6	2040	0.0605	0.92	0.27	0.01	0.009	213.188414
C2_7_1969	C2	7	1969	1.5246	4.2	14	0.74	0.681	185.972872
C2_7_1970	C2	7	1970	1.5246	4.2	14	0.74	0.681	185.972872
C2_7_1971	C2	7	1971	1.2705	4.2	13	0.63	0.580	185.972872
C2_7_1972	C2	7	1972	1.2705	4.2	13	0.63	0.580	185.972872
C2_7_1973	C2	7	1973	1.2705	4.2	13	0.63	0.580	185.972872
C2_7_1974	C2	7	1974	1.2705	4.2	13	0.63	0.580	185.972872
C2_7_1975	C2	7	1975	1.2705	4.2	13	0.63	0.580	185.972872
C2_7_1976	C2	7	1976	1.2705	4.2	13	0.63	0.580	185.972872
C2_7_1977	C2	7	1977	1.2705	4.2	13	0.63	0.580	185.972872
C2_7_1978	C2	7	1978	1.2705	4.2	13	0.63	0.580	185.972872
C2_7_1979	C2	7	1979	1.1495	4.2	12	0.53	0.488	185.972872
C2_7_1980	C2	7	1980	1.1495	4.2	12	0.53	0.488	185.972872
C2_7_1981	C2	7	1981	1.1495	4.2	12	0.53	0.488	185.972872
C2_7_1982	C2	7	1982	1.1495	4.2	12	0.53	0.488	185.972872
C2_7_1983	C2	7	1983	1.1495	4.2	12	0.53	0.488	185.972872
C2_7_1984	C2	7	1984	1.089	4.2	11	0.53	0.488	185.972872
C2_7_1985	C2	7	1985	1.089	4.2	11	0.53	0.488	185.972872
C2_7_1986	C2	7	1986	1.089	4.2	11	0.53	0.488	185.972872
C2_7_1987	C2	7	1987	1.0164	4.1	11	0.53	0.488	185.972872
C2_7_1988	C2	7	1988	1.0164	4.1	11	0.53	0.488	185.972872
C2_7_1989	C2	7	1989	1.0164	4.1	11	0.53	0.488	185.972872
C2_7_1990	C2	7	1990	1.0164	4.1	11	0.53	0.488	185.972872
C2_7_1991	C2	7	1991	1.0164	4.1	11	0.53	0.488	185.972872
C2_7_1992	C2	7	1992	1.0164	4.1	11	0.53	0.488	185.972872
C2_7_1993	C2	7	1993	1.0164	4.1	11	0.53	0.488	185.972872
C2_7_1994	C2	7	1994	1.0164	4.1	11	0.53	0.488	185.972872
C2_7_1995	C2	7	1995	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_7_1996	C2	7	1996	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_7_1997	C2	7	1997	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_7_1998	C2	7	1998	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_7_1999	C2	7	1999	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_7_2000	C2	7	2000	0.3872	0.92	6.25	0.15	0.138	185.972872
C2_7_2001	C2	7	2001	0.2299	0.92	4.95	0.12	0.110	185.972872
C2_7_2002	C2	7	2002	0.1694	0.92	4.51	0.11	0.101	185.972872
C2_7_2003	C2	7	2003	0.1694	0.92	4.51	0.11	0.101	185.972872
C2_7_2004	C2	7	2004	0.1452	0.92	4.29	0.11	0.101	185.972872
C2_7_2005	C2	7	2005	0.121	0.92	4	0.11	0.101	185.972872
C2_7_2006	C2	7	2006	0.121	0.92	4	0.11	0.101	185.972872
C2_7_2007	C2	7	2007	0.121	0.92	4	0.11	0.101	185.972872
C2_7_2008	C2	7	2008	0.121	0.92	4	0.11	0.101	185.972872
C2_7_2009	C2	7	2009	0.121	0.92	4	0.11	0.101	185.972872
C2_7_2010	C2	7	2010	0.121	0.92	2.45	0.11	0.101	185.972872
C2_7_2011	C2	7	2011	0.121	0.92	2.45	0.11	0.101	185.972872
C2_7_2012	C2	7	2012	0.121	0.92	2.45	0.11	0.101	185.972872
C2_7_2013	C2	7	2013	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_7_2014	C2	7	2014	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_7_2015	C2	7	2015	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_7_2016	C2	7	2016	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_7_2017	C2	7	2017	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_7_2018	C2	7	2018	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_7_2019	C2	7	2019	0.0847	0.92	1.36	0.01	0.009	185.972872

C2_7_2020	C2	7	2020	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_7_2040	C2	7	2040	0.0605	0.92	0.27	0.01	0.009	185.972872
C2_8_1969	C2	8	1969	1.5246	4.2	14	0.74	0.681	185.972872
C2_8_1970	C2	8	1970	1.5246	4.2	14	0.74	0.681	185.972872
C2_8_1971	C2	8	1971	1.2705	4.2	13	0.63	0.580	185.972872
C2_8_1972	C2	8	1972	1.2705	4.2	13	0.63	0.580	185.972872
C2_8_1973	C2	8	1973	1.2705	4.2	13	0.63	0.580	185.972872
C2_8_1974	C2	8	1974	1.2705	4.2	13	0.63	0.580	185.972872
C2_8_1975	C2	8	1975	1.2705	4.2	13	0.63	0.580	185.972872
C2_8_1976	C2	8	1976	1.2705	4.2	13	0.63	0.580	185.972872
C2_8_1977	C2	8	1977	1.2705	4.2	13	0.63	0.580	185.972872
C2_8_1978	C2	8	1978	1.2705	4.2	13	0.63	0.580	185.972872
C2_8_1979	C2	8	1979	1.1495	4.2	12	0.53	0.488	185.972872
C2_8_1980	C2	8	1980	1.1495	4.2	12	0.53	0.488	185.972872
C2_8_1981	C2	8	1981	1.1495	4.2	12	0.53	0.488	185.972872
C2_8_1982	C2	8	1982	1.1495	4.2	12	0.53	0.488	185.972872
C2_8_1983	C2	8	1983	1.1495	4.2	12	0.53	0.488	185.972872
C2_8_1984	C2	8	1984	1.089	4.2	11	0.53	0.488	185.972872
C2_8_1985	C2	8	1985	1.089	4.2	11	0.53	0.488	185.972872
C2_8_1986	C2	8	1986	1.089	4.2	11	0.53	0.488	185.972872
C2_8_1987	C2	8	1987	1.0164	4.1	11	0.53	0.488	185.972872
C2_8_1988	C2	8	1988	1.0164	4.1	11	0.53	0.488	185.972872
C2_8_1989	C2	8	1989	1.0164	4.1	11	0.53	0.488	185.972872
C2_8_1990	C2	8	1990	1.0164	4.1	11	0.53	0.488	185.972872
C2_8_1991	C2	8	1991	1.0164	4.1	11	0.53	0.488	185.972872
C2_8_1992	C2	8	1992	1.0164	4.1	11	0.53	0.488	185.972872
C2_8_1993	C2	8	1993	1.0164	4.1	11	0.53	0.488	185.972872
C2_8_1994	C2	8	1994	1.0164	4.1	11	0.53	0.488	185.972872
C2_8_1995	C2	8	1995	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_8_1996	C2	8	1996	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_8_1997	C2	8	1997	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_8_1998	C2	8	1998	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_8_1999	C2	8	1999	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_8_2000	C2	8	2000	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_8_2001	C2	8	2001	0.3872	0.92	6.25	0.15	0.138	185.972872
C2_8_2002	C2	8	2002	0.2299	0.92	4.95	0.12	0.110	185.972872
C2_8_2003	C2	8	2003	0.1694	0.92	4.51	0.11	0.101	185.972872
C2_8_2004	C2	8	2004	0.1694	0.92	4.51	0.11	0.101	185.972872
C2_8_2005	C2	8	2005	0.1452	0.92	4.29	0.11	0.101	185.972872
C2_8_2006	C2	8	2006	0.1452	0.92	4.29	0.11	0.101	185.972872
C2_8_2007	C2	8	2007	0.1452	0.92	4.29	0.11	0.101	185.972872
C2_8_2008	C2	8	2008	0.1452	0.92	4.29	0.11	0.101	185.972872
C2_8_2009	C2	8	2009	0.1452	0.92	4.29	0.11	0.101	185.972872
C2_8_2010	C2	8	2010	0.121	0.92	2.45	0.11	0.101	185.972872
C2_8_2011	C2	8	2011	0.121	0.92	2.45	0.11	0.101	185.972872
C2_8_2012	C2	8	2012	0.121	0.92	2.45	0.11	0.101	185.972872
C2_8_2013	C2	8	2013	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_8_2014	C2	8	2014	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_8_2015	C2	8	2015	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_8_2016	C2	8	2016	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_8_2017	C2	8	2017	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_8_2018	C2	8	2018	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_8_2019	C2	8	2019	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_8_2020	C2	8	2020	0.0847	0.92	1.36	0.01	0.009	185.972872
C2_8_2040	C2	8	2040	0.0605	0.92	0.27	0.01	0.009	185.972872
C2_9_1969	C2	9	1969	1.5246	4.2	14	0.74	0.681	185.972872
C2_9_1970	C2	9	1970	1.5246	4.2	14	0.74	0.681	185.972872
C2_9_1971	C2	9	1971	1.2705	4.2	13	0.63	0.580	185.972872
C2_9_1972	C2	9	1972	1.2705	4.2	13	0.63	0.580	185.972872
C2_9_1973	C2	9	1973	1.2705	4.2	13	0.63	0.580	185.972872
C2_9_1974	C2	9	1974	1.2705	4.2	13	0.63	0.580	185.972872
C2_9_1975	C2	9	1975	1.2705	4.2	13	0.63	0.580	185.972872
C2_9_1976	C2	9	1976	1.2705	4.2	13	0.63	0.580	185.972872
C2_9_1977	C2	9	1977	1.2705	4.2	13	0.63	0.580	185.972872
C2_9_1978	C2	9	1978	1.2705	4.2	13	0.63	0.580	185.972872
C2_9_1979	C2	9	1979	1.1495	4.2	12	0.53	0.488	185.972872
C2_9_1980	C2	9	1980	1.1495	4.2	12	0.53	0.488	185.972872
C2_9_1981	C2	9	1981	1.1495	4.2	12	0.53	0.488	185.972872
C2_9_1982	C2	9	1982	1.1495	4.2	12	0.53	0.488	185.972872
C2_9_1983	C2	9	1983	1.1495	4.2	12	0.53	0.488	185.972872
C2_9_1984	C2	9	1984	1.089	4.2	11	0.53	0.488	185.972872
C2_9_1985	C2	9	1985	1.089	4.2	11	0.53	0.488	185.972872
C2_9_1986	C2	9	1986	1.089	4.2	11	0.53	0.488	185.972872
C2_9_1987	C2	9	1987	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1988	C2	9	1988	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1989	C2	9	1989	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1990	C2	9	1990	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1991	C2	9	1991	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1992	C2	9	1992	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1993	C2	9	1993	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1994	C2	9	1994	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1995	C2	9	1995	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1996	C2	9	1996	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1997	C2	9	1997	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1998	C2	9	1998	1.0164	4.1	11	0.53	0.488	185.972872
C2_9_1999	C2	9	1999	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_9_2000	C2	9	2000	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_9_2001	C2	9	2001	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_9_2002	C2	9	2002	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_9_2003	C2	9	2003	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_9_2004	C2	9	2004	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_9_2005	C2	9	2005	0.3872	0.92	6.25	0.15	0.138	185.972872
C2_9_2006	C2	9	2006	0.2299	0.92	4.95	0.12	0.110	185.972872
C2_9_2007	C2	9	2007	0.1694	0.92	4.51	0.11	0.101	185.972872
C2_9_2008	C2	9	2008	0.1694	0.92	4.51	0.11	0.101	185.972872
C2_9_2009	C2	9	2009	0.1452	0.92	4.29	0.11	0.101	185.972872
C2_9_2010	C2	9	2010	0.121	0.92	4.08	0.11	0.101	185.972872
C2_9_2011	C2	9	2011	0.121	0.92	4.08	0.11	0.101	185.972872
C2_9_2012	C2	9	2012	0.121	0.92	4.08	0.11	0.101	185.972872
C2_9_2013	C2	9	2013	0.121	0.92	4.08	0.11	0.101	185.972872
C2_9_2014	C2	9	2014	0.0847	0.92	2.36	0.06	0.055	185.972872
C2_9_2015	C2	9	2015	0.0847	0.92	2.36	0.06	0.055	185.972872
C2_9_2016	C2	9	2016	0.0847	0.92	2.36	0.06	0.055	185.972872
C2_9_2017	C2	9	2017	0.0847	0.92	2.36	0.06	0.055	185.972872
C2_9_2018	C2	9	2018	0.0847	0.92	2.36	0.06	0.055	185.972872
C2_9_2019	C2	9	2019	0.0847	0.92	2.36	0.06	0.055	185.972872
C2_9_2020	C2	9	2020	0.0847	0.92	2.36	0.06	0.055	185.972872
C2_9_2040	C2	9	2040	0.0605	0.92	2.36	0.02	0.018	185.972872
C2_10_1969	C2	10	1969	1.5246	4.2	14	0.74	0.681	185.972872
C2_10_1970	C2	10	1970	1.5246	4.2	14	0.74	0.681	185.972872
C2_10_1971	C2	10	1971	1.2705	4.2	13	0.63	0.580	185.972872
C2_10_1972	C2	10	1972	1.2705	4.2	13	0.63	0.580	185.972872
C2_10_1973	C2	10	1973	1.2705	4.2	13	0.63	0.580	185.972872
C2_10_1974	C2	10	1974	1.2705	4.2	13	0.63	0.580	185.972872
C2_10_1975	C2	10	1975	1.2705	4.2	13	0.63	0.580	185.972872
C2_10_1976	C2	10	1976	1.2705	4.2	13	0.63	0.580	185.972872
C2_10_1977	C2	10	1977	1.2705	4.2	13	0.63	0.580	185.972872
C2_10_1978	C2	10	1978	1.2705	4.2	13	0.63	0.580	185.972872
C2_10_1979	C2	10	1979	1.1495	4.2	12	0.53	0.488	185.972872
C2_10_1980	C2	10	1980	1.1495	4.2	12	0.53	0.488	185.972872
C2_10_1981	C2	10	1981	1.1495	4.2	12	0.53	0.488	185.972872
C2_10_1982	C2	10	1982	1.1495	4.2	12	0.53	0.488	185.972872
C2_10_1983	C2	10	1983	1.1495	4.2	12	0.53	0.488	185.972872
C2_10_1984	C2	10	1984	1.089	4.2	11	0.53	0.488	185.972872
C2_10_1985	C2	10	1985	1.089	4.2	11	0.53	0.488	185.972872
C2_10_1986	C2	10	1986	1.089	4.2	11	0.53	0.488	185.972872
C2_10_1987	C2	10	1987	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1988	C2	10	1988	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1989	C2	10	1989	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1990	C2	10	1990	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1991	C2	10	1991	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1992	C2	10	1992	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1993	C2	10	1993	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1994	C2	10	1994	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1995	C2	10	1995	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1996	C2	10	1996	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1997	C2	10	1997	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1998	C2	10	1998	1.0164	4.1	11	0.53	0.488	185.972872
C2_10_1999	C2	10	1999	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_10_2000	C2	10	2000	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_10_2001	C2	10	2001	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_10_2002	C2	10	2002	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_10_2003	C2	10	2003	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_10_2004	C2	10	2004	0.8228	2.7	8.17	0.38	0.350	185.972872
C2_10_2005	C2	10	2005	0.3872	0.92	6.25	0.15	0.138	185.972872
C2_10_2006	C2	10	2006	0.2299	0.92	4.95	0.12	0.110	185.972872
C2_10_2007	C2	10	2007	0.1694	0.92	4.51	0.11	0.101	185.972872
C2_10_2008	C2	10	2008	0.1694	0.92	4.51	0.11	0.101	185.972872
C2_10_2009	C2	10	2009	0.1452	0.92	4.29	0.11	0.101	185.972872
C2_10_2010	C2	10	2010	0.121	0.92	4.08	0.11	0.101	185.972872
C2_10_2011	C2	10	2011	0.121	0.92	4.08	0.11	0.101	185.972872
C2_10_2012	C2	10	2012	0.121	0.92	4.08	0.11	0.101	185.972872
C2_10_2013	C2	10	2013	0.121	0.92	4.08	0.11	0.101	185.972872
C2_10_2014	C2	10	2014	0.121	0.92	2.36	0.06	0.055	185.972872

C2_10_2015	C2	10	2015	0.121	0.92	2.36	0.06	0.055	185.972872
C2_10_2016	C2	10	2016	0.121	0.92	2.36	0.06	0.055	185.972872
C2_10_2017	C2	10	2017	0.121	0.92	2.36	0.06	0.055	185.972872
C2_10_2018	C2	10	2018	0.121	0.92	2.36	0.06	0.055	185.972872
C2_10_2019	C2	10	2019	0.121	0.92	2.36	0.06	0.055	185.972872
C2_10_2020	C2	10	2020	0.121	0.92	2.36	0.06	0.055	185.972872
C2_10_2040	C2	10	2040	0.0605	0.92	2.36	0.02	0.018	185.972872

SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator - CARB Defaults

Data sources for all tables below except GHG Parameters:

https://www.arb.ca.gov/msei/california_harbor_craft_emissions_inventory_database_10072011.mdb

https://www.arb.ca.gov/msei/california_crew_supply_emissions_inventory_database_10072011.mdb

https://www.arb.ca.gov/msei/california_barge_dredge_emissions_inventory_database_10072011.mdb

HP Category

Vessel Type ID	HP Category ID	Min HP	Max HP
A/B	1	25	50
A/B	2	51	120
A/B	3	121	175
A/B	4	176	250
A/B	5	251	500
A/B	6	501	750
A/B	7	751	1900
A/B	8	1901	3300
A/B	9	3301	5000
C	1	0	15
C	2	16	25
C	3	26	50
C	4	51	120
C	5	121	175
C	6	176	250
C	7	251	500
C	8	501	750
C	9	751	1000
C	10	1001	9999

Engine Category

Combined Vessel Type and Engine Type ID	Engine Type	Description
A1	Main	Harbor Craft main engine
A2	Aux	Harbor Craft auxiliary engine
B1	Main	Crew and Supply Vessel main engine
B2	Aux	Crew and Supply Vessel auxiliary engine
C1	Main	Barge and Dredge main engine
C2	Aux	Barge and Dredge auxiliary engine

Combined Vessel Type and Engine Type ID	Engine Type	Description
C1	Main	Barge
C1	Main	Dredge
A1	Main	Ferries
B1	Main	Crew and Supply
A1	Main	Pilot Vessels
A1	Main	Tug Boats
A1	Main	Tow Boats / Push Boats
A1	Main	Work Boats
A1	Main	Others
A1	Main	Commercial Fishing
A1	Main	Charter Fishing
A2	Aux	Commercial Fishing Generator
A2	Aux	Charter Fishing Generator
A2	Aux	Ferries Generator
B2	Aux	Crew and Supply Generator
A2	Aux	Pilot Vessels Generator
A2	Aux	Tug Boats Generator
A2	Aux	Tow Boats / Push Boats Generator
A2	Aux	Work Boats Generator
A2	Aux	Others Generator
C2	Aux	Compressor
C2	Aux	Crane
C2	Aux	Deck_door_engine
C2	Aux	Dredger
C2	Aux	Barge/Dredge Generator
C2	Aux	Hoist_swing_winch
C2	Aux	Other
C2	Aux	Pump

GHG Parameters

GHG Type	GHG Emitted per Unit Activity (g/gal)	Global Warming Potential
CO2	10206	1
CH4	0.414	25
N2O	0.0828	298

Fuel Density	3180	g/gal

Vessel Default Parameters

Combined Vessel Type and Engine Type ID	Vessel_Type	Load Factor	Useful Life	Average Annual Hours	Average HP
A1	Commercial Fishing	0.27	21	1250	192
A1	Charter Fishing	0.52	16	1622	373
A1	Ferries	0.42	20	1843	392
B1	Crew and Supply	0.38	28	788	384
A1	Pilot Vessels	0.51	19	1031	547
A1	Tug Boats	0.5	21	2274	1167
A1	Tow Boats / Push Boats	0.68	26	1993	331
A1	Work Boats	0.45	17	675	364
A1	Others	0.52	23	779	192
A2	Commercial Fishing Generator	0.43	15	1633	30
A2	Charter Fishing Generator	0.43	15	2077	30
A2	Ferries Generator	0.43	20	1254	82
B2	Crew and Supply Generator	0.32	28	3036	83
A2	Pilot Vessels Generator	0.43	25	994	30
A2	Tug Boats Generator	0.31	22.5	2486	86
A2	Tow Boats / Push Boats Generator	0.43	25	2965	79
A2	Work Boats Generator	0.43	23	750	190
A2	Others Generator	0.43	22	805	29
C2	Compressor	0.54	19.5	360	472
C2	Crane	0.42	9	1050	349
C2	Deck_door_engine	0.89	16	1400	86
C2	Dredger	0.51	16	561	425
C2	Barge/Dredge Generator	0.75	22.5	561	410
C2	Hoist_swing_winch	0.31	27	82	216
C2	Other	0.80	16	575	344
C2	Pump	0.71	21	413	383
C1	Barge	0.45	17	1776	2883
C1	Dredge	0.45	17	1776	2883

Calendar Year Range
2015
2016
2017
2018
2019
2020
2021
2022
2023
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2050

CalEEMod SUMMARY REPORT AND DETAILED REPORT

Marina del Rey Harbor Federal operations & maintenance dredging project navigation program Summary Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Marina del Rey Harbor Federal operations & maintenance dredging project navigation program
Construction Start Date	10/1/2023
Operational Year	2025
Lead Agency	U.S. Army Corps of Engineers
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.70
Precipitation (days)	8.20
Location	Marina del Rey, California 90292, USA
County	Los Angeles-South Coast
City	Unincorporated
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	4427
EDFZ	7
Electric Utility	Los Angeles Department of Water & Power
Gas Utility	Southern California Gas
App Version	2022.1.1.13

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

User Defined Industrial	1.00	User Defined Unit	340	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.44	1.20	11.2	13.1	0.02	0.50	0.00	0.50	0.46	0.00	0.46	—	2,398	2,398	0.10	0.02	0.00	2,406
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.50	1.26	11.8	13.2	0.02	0.55	0.00	0.55	0.51	0.00	0.51	—	2,398	2,398	0.10	0.02	0.00	2,406
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.57	0.47	4.43	5.17	0.01	0.20	0.00	0.20	0.18	0.00	0.18	—	946	946	0.04	0.01	0.00	949
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.10	0.09	0.81	0.94	< 0.005	0.04	0.00	0.04	0.03	0.00	0.03	—	157	157	0.01	< 0.005	0.00	157

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

6. Climate Risk Detailed Report

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

7. Health and Equity Details

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	38.0
Healthy Places Index Score for Project Location (b)	77.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

Marina del Rey Harbor Federal operations & maintenance dredging project navigation program Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Marina del Rey Harbor Federal operations & maintenance dredging project navigation program
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Lead Agency	U.S. Army Corps of Engineers
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.70
Precipitation (days)	8.20
Location	Marina del Rey, California 90292, USA
County	Los Angeles-South Coast
City	Unincorporated
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	4427
EDFZ	7
Electric Utility	Los Angeles Department of Water & Power
Gas Utility	Southern California Gas
App Version	2022.1.1.13

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

User Defined Industrial	1.00	User Defined Unit	340	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.44	1.20	11.2	13.1	0.02	0.50	0.00	0.50	0.46	0.00	0.46	—	2,398	2,398	0.10	0.02	0.00	2,406
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.50	1.26	11.8	13.2	0.02	0.55	0.00	0.55	0.51	0.00	0.51	—	2,398	2,398	0.10	0.02	0.00	2,406
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.57	0.47	4.43	5.17	0.01	0.20	0.00	0.20	0.18	0.00	0.18	—	946	946	0.04	0.01	0.00	949
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.10	0.09	0.81	0.94	< 0.005	0.04	0.00	0.04	0.03	0.00	0.03	—	157	157	0.01	< 0.005	0.00	157

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.44	1.20	11.2	13.1	0.02	0.50	0.00	0.50	0.46	0.00	0.46	—	2,398	2,398	0.10	0.02	0.00	2,406
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	1.50	1.26	11.8	13.2	0.02	0.55	0.00	0.55	0.51	0.00	0.51	—	2,397	2,397	0.10	0.02	0.00	2,406
2024	1.44	1.20	11.2	13.1	0.02	0.50	0.00	0.50	0.46	0.00	0.46	—	2,398	2,398	0.10	0.02	0.00	2,406
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	0.38	0.32	2.98	3.32	0.01	0.14	0.00	0.14	0.13	0.00	0.13	—	604	604	0.02	< 0.005	0.00	606
2024	0.57	0.47	4.43	5.17	0.01	0.20	0.00	0.20	0.18	0.00	0.18	—	946	946	0.04	0.01	0.00	949
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	0.07	0.06	0.54	0.61	< 0.005	0.03	0.00	0.03	0.02	0.00	0.02	—	100	100	< 0.005	< 0.005	0.00	100
2024	0.10	0.09	0.81	0.94	< 0.005	0.04	0.00	0.04	0.03	0.00	0.03	—	157	157	0.01	< 0.005	0.00	157

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Unmit.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Area	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3. Construction Emissions Details

3.1. Building Construction (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.50	1.26	11.8	13.2	0.02	0.55	—	0.55	0.51	—	0.51	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.38	0.32	2.98	3.32	0.01	0.14	—	0.14	0.13	—	0.13	—	604	604	0.02	< 0.005	—	606
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.54	0.61	< 0.005	0.03	—	0.03	0.02	—	0.02	—	100	100	< 0.005	< 0.005	—	100
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.44	1.20	11.2	13.1	0.02	0.50	—	0.50	0.46	—	0.46	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.44	1.20	11.2	13.1	0.02	0.50	—	0.50	0.46	—	0.46	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.57	0.47	4.43	5.17	0.01	0.20	—	0.20	0.18	—	0.18	—	946	946	0.04	0.01	—	949
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.09	0.81	0.94	< 0.005	0.04	—	0.04	0.03	—	0.03	—	157	157	0.01	< 0.005	—	157
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

User Defined Industrial	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.3. Area Emissions by Source

4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Building Construction	Building Construction	10/1/2023	5/23/2024	7.00	236	Mobilization, Dredging and Nearshore Placement Activities, and Demobilization

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Building Construction	—	—	—	—
Building Construction	Worker	0.00	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	0.00	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
User Defined Industrial	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2023	0.00	690	0.05	0.01
2024	0.00	690	0.05	0.01

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
User Defined Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	0.00	0.00	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
User Defined Industrial	0.00	690	0.0489	0.0069	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
User Defined Industrial	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
User Defined Industrial	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

—	—

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	8.06	annual days of extreme heat
Extreme Precipitation	4.50	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth

Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider different increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation depth for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2

Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	40.0
AQ-PM	66.1
AQ-DPM	95.9
Drinking Water	69.7
Lead Risk Housing	14.8
Pesticides	0.00
Toxic Releases	80.6
Traffic	68.7

Effect Indicators	—
CleanUp Sites	82.0
Groundwater	88.1
Haz Waste Facilities/Generators	66.6
Impaired Water Bodies	99.7
Solid Waste	95.0
Sensitive Population	—
Asthma	21.0
Cardio-vascular	30.4
Low Birth Weights	27.6
Socioeconomic Factor Indicators	—
Education	2.30
Housing	52.6
Linguistic	10.4
Poverty	32.0
Unemployment	14.4

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	77.37713332
Employed	78.49351983
Median HI	84.96086231
Education	—
Bachelor's or higher	90.85076351
High school enrollment	27.21673297

Preschool enrollment	89.87552932
Transportation	—
Auto Access	83.51084306
Active commuting	38.41909406
Social	—
2-parent households	80.52098037
Voting	1.655331708
Neighborhood	—
Alcohol availability	29.05171308
Park access	62.37649172
Retail density	97.74156294
Supermarket access	40.61337097
Tree canopy	67.61195945
Housing	—
Homeownership	1.745155909
Housing habitability	41.39612473
Low-inc homeowner severe housing cost burden	61.08045682
Low-inc renter severe housing cost burden	85.14051071
Uncrowded housing	71.88502502
Health Outcomes	—
Insured adults	50.62235339
Arthritis	0.0
Asthma ER Admissions	74.3
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0

Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	86.4
Cognitively Disabled	70.6
Physically Disabled	78.7
Heart Attack ER Admissions	70.3
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	52.3
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	49.7
Children	78.7
Elderly	43.3
English Speaking	56.6
Foreign-born	50.4
Outdoor Workers	76.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	12.4
Traffic Density	75.7

Traffic Access	58.0
Other Indices	—
Hardship	4.3
Other Decision Support	—
2016 Voting	34.6

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	38.0
Healthy Places Index Score for Project Location (b)	77.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification

Land Use	Proposed action (Proposed project) directly encompasses approximately 122.8 acres and indirectly encompasses approximately 217.2 acres within the Harbor and the surrounding Dockweiler Nearshore Placement Area in the vicinity of the Marina del Rey harbor for a total of 340 acres.
Construction: Construction Phases	Construction Phase includes Mobilization, Dredging and Nearshore Placement Activities, and Demobilization. Mobilization will commence no earlier than October 1, 2023. Construction is expected to begin in November 2023. Duration of dredging will depend on equipment type and the actual volume dredged. Dredging would take approximately 120 days if using a clamshell dredge. This timing assumes no additional accumulation of sediment due to El Niño storms or other changed conditions. Mobilization and demobilization to the site require an additional 15 days each. Demobilization will be completed on or prior to May 23, 2024.

Appendix F
Environmental Justice (EJ) Screen Results

EJScreen Report (Version 2.1)

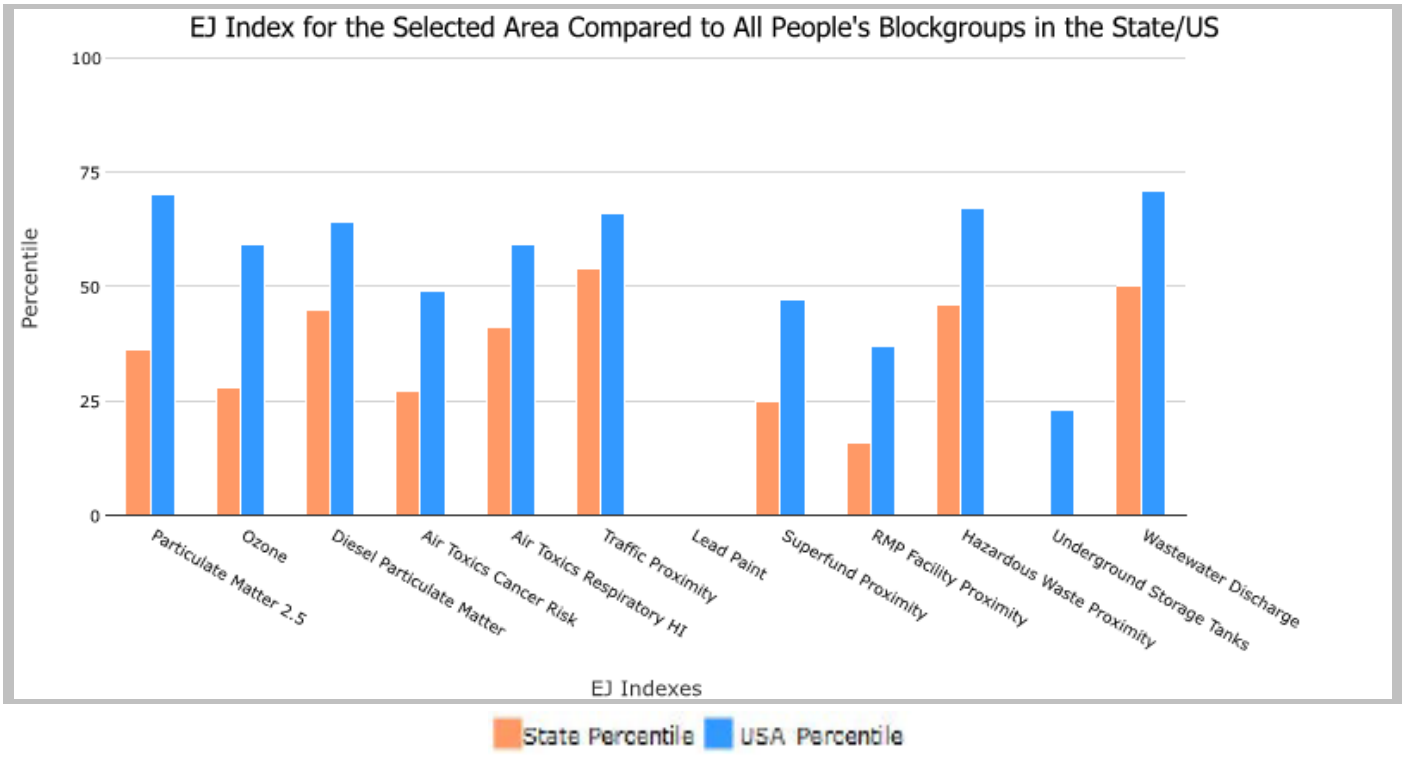
0.1 miles Ring around the Area, CALIFORNIA, EPA Region 9

Approximate Population: 1,562

Input Area (sq. miles): 2.25

Marina del Rey Harbor Dredging (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	State Percentile	USA Percentile
Environmental Justice Indexes		
EJ Index for Particulate Matter 2.5	36	70
EJ Index for Ozone	28	59
EJ Index for Diesel Particulate Matter*	45	64
EJ Index for Air Toxics Cancer Risk*	27	49
EJ Index for Air Toxics Respiratory HI*	41	59
EJ Index for Traffic Proximity	54	66
EJ Index for Lead Paint	0	0
EJ Index for Superfund Proximity	25	47
EJ Index for RMP Facility Proximity	16	37
EJ Index for Hazardous Waste Proximity	46	67
EJ Index for Underground Storage Tanks	0	23
EJ Index for Wastewater Discharge	50	71



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

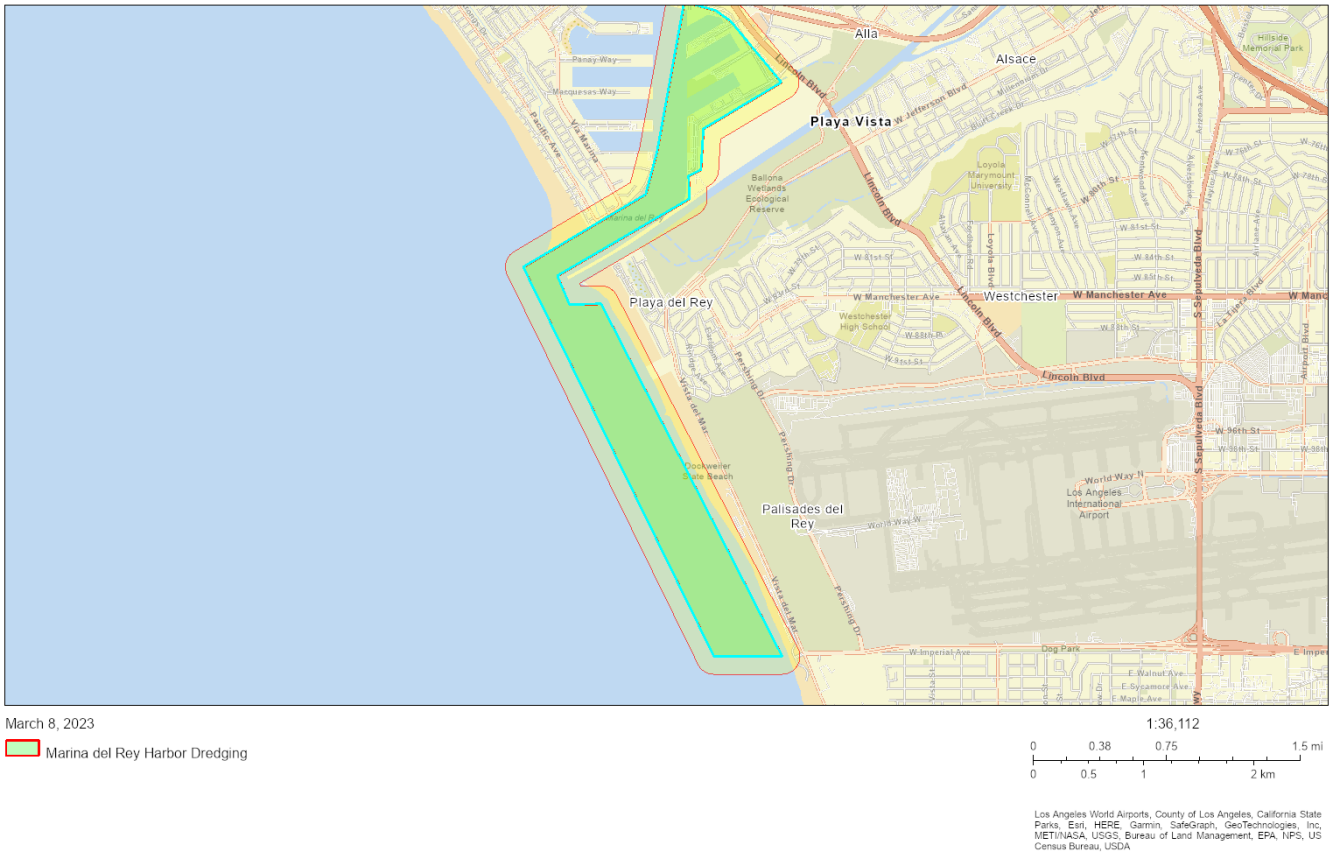
EJScreen Report (Version 2.1)

0.1 miles Ring around the Area, CALIFORNIA, EPA Region 9

Approximate Population: 1,562

Input Area (sq. miles): 2.25

Marina del Rey Harbor Dredging (The study area contains 1 blockgroup(s) with zero population.)



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJScreen Report (Version 2.1)

0.1 miles Ring around the Area, CALIFORNIA, EPA Region 9

Approximate Population: 1,562

Input Area (sq. miles): 2.25

Marina del Rey Harbor Dredging (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	Value	State Avg.	%ile in State	USA Avg.	%ile in USA
Pollution and Sources					
Particulate Matter 2.5 (µg/m^3)	11.9	11.7	48	8.67	94
Ozone (ppb)	43.2	47.7	37	42.5	60
Diesel Particulate Matter* (µg/m^3)	0.42	0.33	69	0.294	80-90th
Air Toxics Cancer Risk* (lifetime risk per million)	28	31	63	28	70-80th
Air Toxics Respiratory HI*	0.48	0.43	86	0.36	90-95th
Traffic Proximity (daily traffic count/distance to road)	4600	1400	91	760	97
Lead Paint (% Pre-1960 Housing)	0.0039	0.28	0	0.27	0
Superfund Proximity (site count/km distance)	0.049	0.17	30	0.13	43
RMP Facility Proximity (facility count/km distance)	0.17	1.1	17	0.77	32
Hazardous Waste Proximity (facility count/km distance)	6.7	5.2	70	2.2	91
Underground Storage Tanks (count/km^2)	0.53	1.5	75	3.9	40
Wastewater Discharge (toxicity-weighted concentration/m distance)	1.4	67	76	12	93
Socioeconomic Indicators					
Demographic Index	24%	44%	19	35%	41
People of Color	45%	63%	33	40%	63
Low Income	3%	29%	5	30%	5
Unemployment Rate	4%	6%	45	5%	53
Limited English Speaking Households	2%	9%	36	5%	65
Less Than High School Education	1%	16%	10	12%	12
Under Age 5	1%	6%	14	6%	16
Over Age 64	21%	14%	77	16%	72

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJScreen Report (Version 2.1)

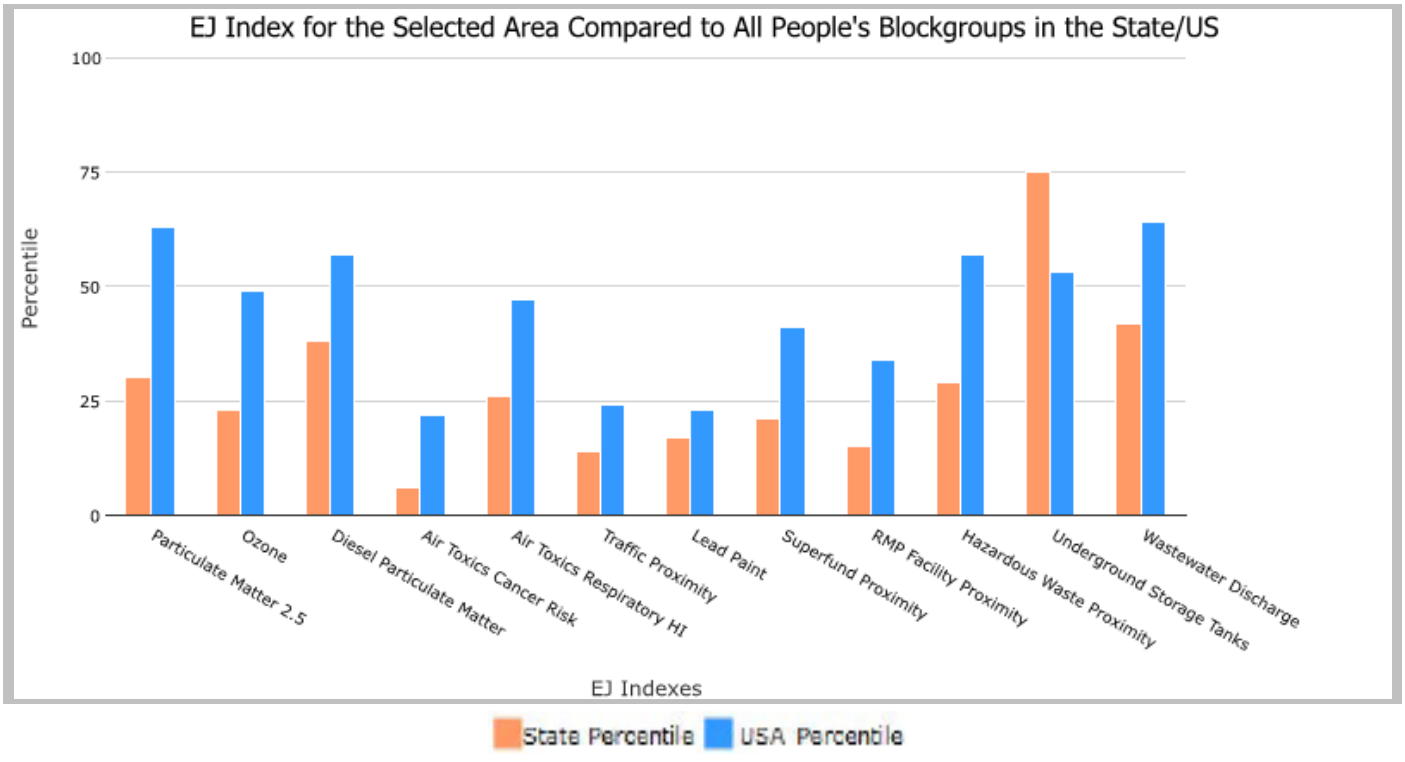
the User Specified Area, CALIFORNIA, EPA Region 9

Approximate Population: 11,239

Input Area (sq. miles): 1.26

Marina del Rey

Selected Variables	State Percentile	USA Percentile
Environmental Justice Indexes		
EJ Index for Particulate Matter 2.5	30	63
EJ Index for Ozone	23	49
EJ Index for Diesel Particulate Matter*	38	57
EJ Index for Air Toxics Cancer Risk*	6	22
EJ Index for Air Toxics Respiratory HI*	26	47
EJ Index for Traffic Proximity	14	24
EJ Index for Lead Paint	17	23
EJ Index for Superfund Proximity	21	41
EJ Index for RMP Facility Proximity	15	34
EJ Index for Hazardous Waste Proximity	29	57
EJ Index for Underground Storage Tanks	75	53
EJ Index for Wastewater Discharge	42	64



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

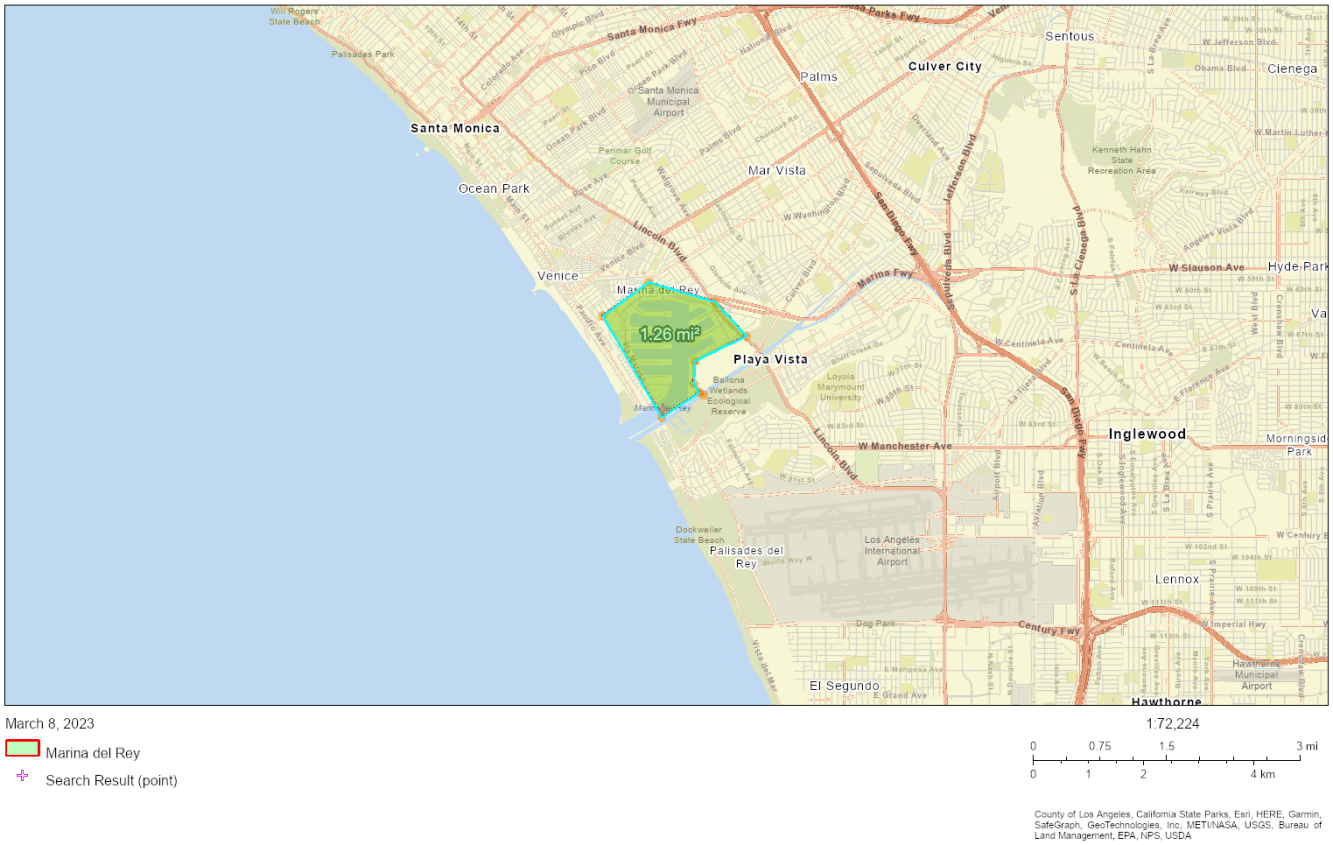
EJScreen Report (Version 2.1)

the User Specified Area, CALIFORNIA, EPA Region 9

Approximate Population: 11,239

Input Area (sq. miles): 1.26

Marina del Rey



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJScreen Report (Version 2.1)

the User Specified Area, CALIFORNIA, EPA Region 9

Approximate Population: 11,239

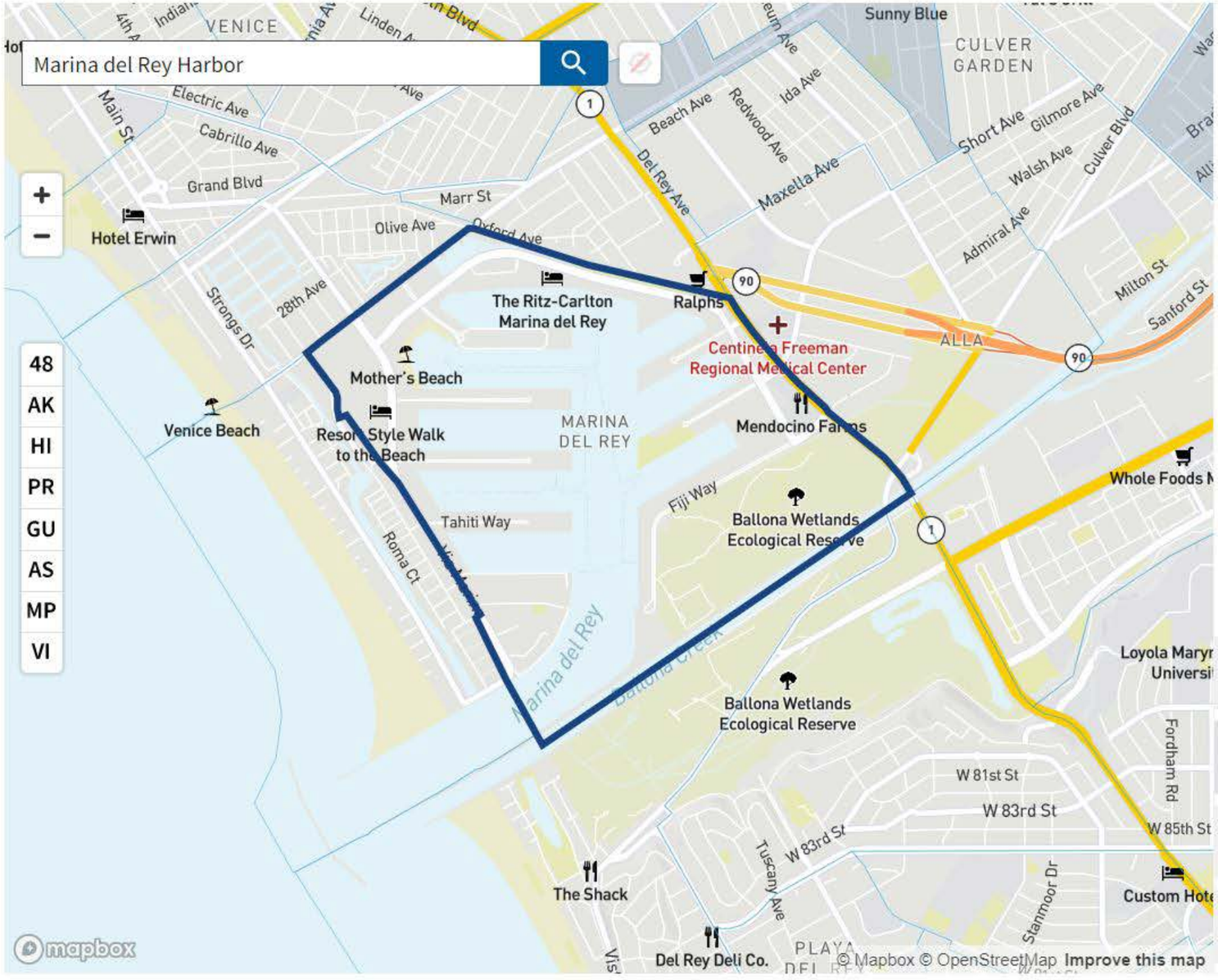
Input Area (sq. miles): 1.26

Marina del Rey

Selected Variables	Value	State Avg.	%ile in State	USA Avg.	%ile in USA
Pollution and Sources					
Particulate Matter 2.5 (µg/m^3)	11.9	11.7	48	8.67	94
Ozone (ppb)	42.9	47.7	36	42.5	56
Diesel Particulate Matter* (µg/m^3)	0.413	0.33	67	0.294	70-80th
Air Toxics Cancer Risk* (lifetime risk per million)	21	31	21	28	<50th
Air Toxics Respiratory HI*	0.41	0.43	68	0.36	80-90th
Traffic Proximity (daily traffic count/distance to road)	500	1400	57	760	66
Lead Paint (% Pre-1960 Housing)	0.038	0.28	24	0.27	23
Superfund Proximity (site count/km distance)	0.049	0.17	30	0.13	43
RMP Facility Proximity (facility count/km distance)	0.18	1.1	21	0.77	35
Hazardous Waste Proximity (facility count/km distance)	3.9	5.2	50	2.2	83
Underground Storage Tanks (count/km^2)	3.8	1.5	86	3.9	71
Wastewater Discharge (toxicity-weighted concentration/m distance)	1.8	67	79	12	94
Socioeconomic Indicators					
Demographic Index	19%	44%	12	35%	31
People of Color	26%	63%	14	40%	46
Low Income	13%	29%	27	30%	24
Unemployment Rate	5%	6%	53	5%	60
Limited English Speaking Households	1%	9%	30	5%	59
Less Than High School Education	1%	16%	10	12%	11
Under Age 5	6%	6%	62	6%	63
Over Age 64	11%	14%	37	16%	30

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice



Tract information
Number: 06037702901
County: Los Angeles County
State: California
Population: 9,852

Tract demographics

Race / Ethnicity (show)

Age (show)

Identified as disadvantaged?

NO

This tract is not considered disadvantaged. It does not meet any burden thresholds **OR** at least one associated socioeconomic threshold.

Send feedback

Climate change +

Energy +

Health +

Housing +

Help improve the tool

Appendix G
Negative Determination (ND) and Concurrence Letter

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

March 20, 2023

Mr. John Ainsworth
Executive Director
California Coastal Commission
Attention: Mr. Cassidy Teufel
455 Market Street, Suite 300
San Francisco, CA 94105

Dear Dr. Ainsworth:

The U.S. Army Corps of Engineers, Los Angeles District (Corps), as part of its Operations and Maintenance Program, is proposing to perform maintenance dredging of the Marina del Rey (MDR) Harbor Federal Navigation Channel (Entrance and Sand Traps) and the Los Angeles County Department of Beaches and Harbors' (LACDBH) North Jetty Shoal Channel to reestablish authorized channel depths and for safe navigation (Proposed Project/Proposed Action). On February 3, 2023, Corps lead biologist Tiffany Armenta and Corps environmental coordinator Kirk Brus had a Cisco Webex meeting with California Coastal Commission Manager Cassidy Teufel and staff Jules Kelly and discussed whether a Negative Determination (ND) for the proposed project would be applicable. During the meeting, the California Coastal Commission communicated an ND could be applicable. This letter, with two enclosed maps, serve as a Statement of Negative Determination (ND) in compliance with the Coastal Zone Management Act (CZMA) of 1972. The Corps is requesting your review and concurrence on this ND by May 20, 2023.

This ND includes recurring (approximately every five or six years) maintenance dredging of the MDR Harbor Federal Navigation Channel and recurring (approximately every 20 years) maintenance dredging of LACDBH's North Jetty Shoal channel with placement activities in the nearshore area off of Dockweiler Beach. The maintenance dredging is tentatively scheduled to occur between October 1, 2023 to May 23, 2024. Approximately 575,000 cubic yards (cy) of shoaled material would be dredged from the Federal Navigation Channel, and approximately 25,000 cy would be dredged from the North Jetty Shoal channel. The Federal Navigation Channel Entrance (Areas 2, 3, 4, and 5; **Figure 1**) and the North Jetty Shoal Channel design depths are -20 feet mean lower low water (MLLW) with 2 feet overdepth allowance. The design depth for the Federal Navigation Channel Sand Traps (Areas 1 and 6) is -28 feet MLLW with 2 feet overdepth allowance.

The duration of dredging activity is approximately 150 days, which assumes 15 days of mobilization, 120 days of dredging and placement activities, and 15 days of demobilization. Maintenance dredging and placement of dredged material at the

Dockweiler nearshore placement site is expected to be performed with a clamshell dredge, similar to previous Corps maintenance dredging projects in MDR Harbor of the Federal Channel performed in 2007 and 2017, and MDR dredging of the Federal Navigation Channel and the LACDBH's North Jetty Shoal channel performed in 1999/2000. The proposed project is similar in kind to previous MDR Harbor maintenance dredging and placement activities program concurred with by the California Coastal Commission in Consistency Determination (CD)-022-99**,** CD-040-06, CD-035-10, ND-006-12, ND-0021-12, and ND-0022-16.

Sampling and analysis of sediment of the Federal Navigation Channel and the North Jetty Shoal Channel were prepared in a 2021 sampling and analysis plan (SAP) for the maintenance dredging program. On December 1, 2021, the Corps circulated the 2021 SAP to the multi-agency Southern California Dredge Material Management Team (SCDMMT), Contaminated Sediment Task Force (CSTF) and Heal the Bay. On December 8, 2021, the SAP was presented to the SCDMMT and CSTF during a monthly SCDMMT meeting for comments. The SAP was finalized in January 2022. Sampling was conducted in June 2022. On October 26, 2022, a 2022 SAP Results (SAPR) Report/Appendices including a grain size compatibility report was presented to the SCDMMT for comments. During this meeting, the U.S. Environmental Protection Agency (USEPA) requested for an additional table (Chemistry Comparison) highlighting test results from 2010, 2011, 2016, and 2022 for poly aromatic hydrocarbons (PAHs), chlorinated pesticides (chlordane) and organics – polychlorinated bi-phenyls (PCBs), and the location of placement sites from MDR Harbor dredging. On December 6, 2022, the Corps presented the requested Chemistry Comparison table to USEPA and the larger SCDMMT.

In general, PAH, chlordane, and PCB concentrations have decreased over time (from 2010 – 2022). Nevertheless, due to elevated PAHs, chlordane, and PCBs in 2022 samples, the SCDMMT determined that materials were only suitable for nearshore placement off Dockweiler State Beach. Beach placement on Dockweiler State Beach was not considered a viable placement alternative by the SCDMMT. Results of the physical compatibility analysis were presented in a report prepared by the Corps for the SAPR in October 2022.

The proposed project will create short-term increases in turbidity in the vicinity of dredging operations. Turbidity levels will be monitored throughout dredging and the project will include prescribed actions (e.g., slowing dredge cycle times; use of silt curtains) should turbidity exceed pre-established water quality conditions. The project will also include measures to minimize the presence of trash and debris in dredged sediments placed in the nearshore. Grizzly screens will be placed over the placement barges to mechanically screen out debris as sediments are placed in the barge. All trash and debris collected will be disposed as solid waste in dumpsters located in MDR Harbor or to a local approved inland landfill/disposal site.

The proposed project may occur within the nesting season of California least tern (*Sterna antillarum browni;* CLT). A CLT colony is typically present on a portion of Venice Beach adjacent to Area 6 and the North Jetty Shoal Channel (**Figure 1**). To avoid disturbance to CLT, the Corps will sequence dredging activities so that Areas 4, 5, 6 and the North Jetty Shoal will be dredged prior to April 15 (when CLT nesting season begins in this area). Should project activities go beyond April 15, dredging would only occur in Areas 1, 2, and 3 after that date. Areas 1, 2, and 3 are over 1,500 feet from the CLT colony. By incorporating this timing restriction and other environmental commitments, the proposed project may effect but is not likely to adversely affect CLT.

Wintering western snowy plovers (*Charadrius nivosus nivosus;* WSP) have been known to be present on Dockweiler State Beach. Since dredged sediment would only be placed in the nearshore placement site, the proposed project would have no effect on WSP. The nearshore placement site is located approximately 2,800 feet from the cordoned area of Dockweiler State Beach where WSP commonly occur (**Figure 2**).

The southeast corner of Area 6 and, to a lesser extent, the southwest portion of the North Jetty Shoal Channel, regularly shoal prior to recurring maintenance dredging of MDR Harbor. Since 2006, recurring maintenance dredging of Area 6 has ensured accretion of sediment only temporarily fills in the southeast corner of Area 6. Therefore, there is not enough time between dredging episodes for high quality habitat for WSP, CLT, or other species to establish in these temporary shoals.

The proposed project would serve the following purposes: (1) maintain the Federal Navigation and North Jetty Shoal Channels, which are subject to continual filling by littoral transport processes; (2) assure the continued safe navigation for maritime traffic within the harbor by minimizing the risk of hazardous shoaling conditions; and (3) provide beach nourishment material for downcoast beaches eroded by the littoral processes and by the harbor disruption of the longshore transport of sand.

The Corps has determined that the proposed project modification is consistent, to the maximum extent practicable, with the CZMA of 1972 with enforceable policies of the California Coastal Management Plan and pursuant to 15 CFR Section 930.35 of the National Oceanic Atmospheric Administration implementing regulations. The proposed project will not adversely affect coastal zone resources.

If you have any questions regarding the project, please contact Kirk Brus, Environmental Coordinator, at (213) 452-3876 and via email at Kirk.C.Brus@usace.army.mil. Thank you for your attention to this document.

Sincerely,

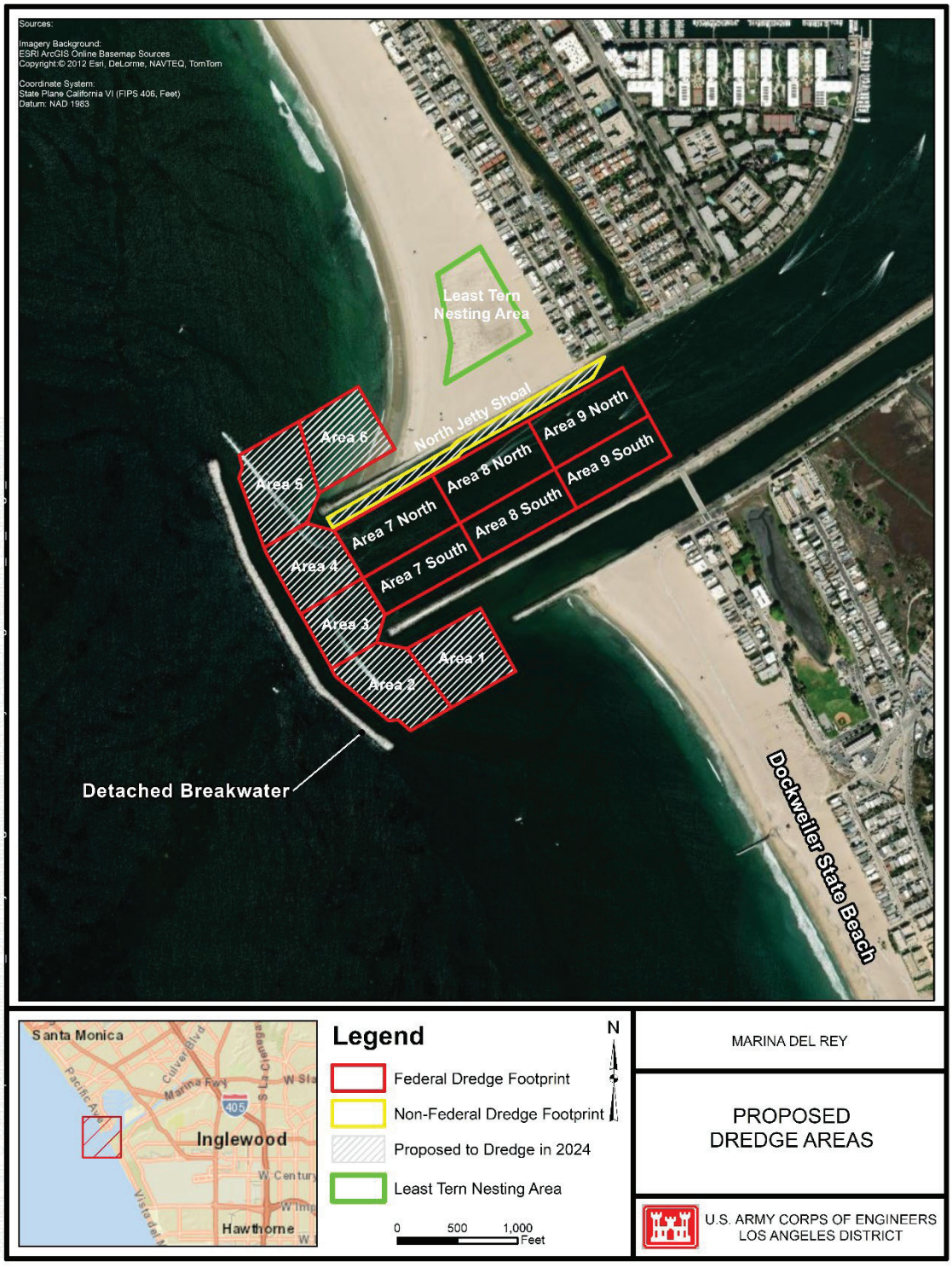
Maricris C. Lee, P.E.

Digitally signed by Maricris C. Lee, P.E.
Date: 2023.03.20 12:29:01 -07'00'

for Jodi L. Clifford
Chief, Planning Division

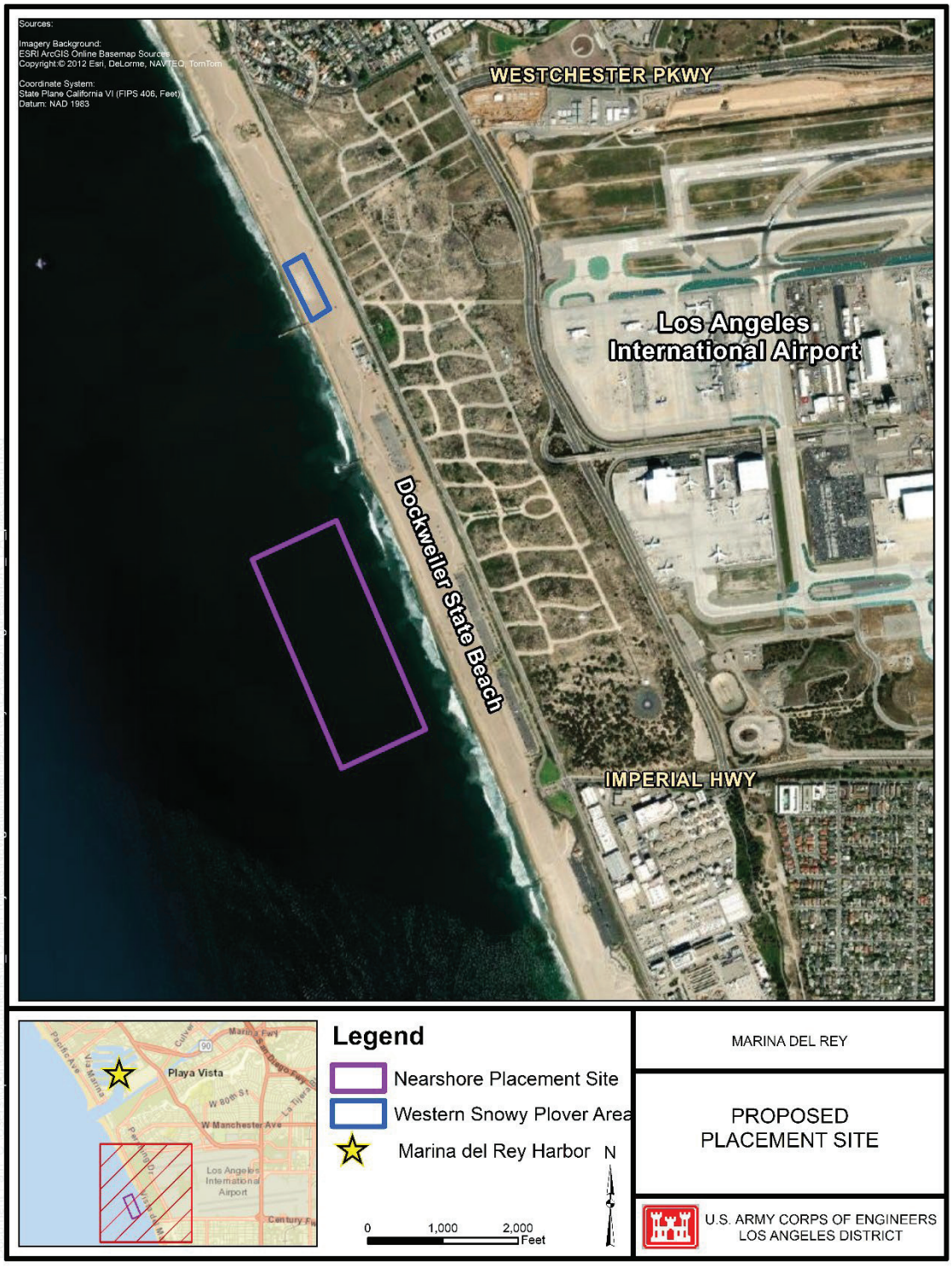
Enclosure(s)

Figure 1. Proposed Project Dredge Areas



January 2023

Figure 2. Proposed Project Placement Site



March 2023

CALIFORNIA COASTAL COMMISSION
ENERGY, OCEAN RESOURCES AND FEDERAL CONSISTENCY
455 MARKET STREET, SUITE 300
SAN FRANCISCO, CA 94105
VOICE (415) 904-5260 FAX (415) 904-5400

June 6, 2023

Jodi L. Clifford
Chief, Planning Division
U.S. Army Corps of Engineers, Los Angeles District
915 Wilshire Boulevard, Suite 1109
Los Angeles, CA 90017-3409

Re: Negative Determination ND-0011-23 (Maintenance Dredging of Marina del Rey Entrance Channel and North Jetty Shoal, Los Angeles County)

Dear Ms. Clifford:

The Coastal Commission staff has reviewed your letter dated March 20, 2023, in which the U.S. Army Corps of Engineers (USACE) determined that the above-referenced maintenance dredging of the Marina del Rey (MDR) Harbor Federal Navigation Channel and Los Angeles County Department of Beaches and Harbors (LACDBH) North Jetty Shoal Channel, with nearshore placement off Dockweiler State Beach, would have no adverse effect on coastal resources for the reasons identified in Negative Determination No. ND-0011-23 and all supplemental information provided. On June 1, 2023, the USACE granted an extension to the deadline for the Commission's decision to June 6, 2023.

The proposed maintenance dredging and nearshore placement project will take approximately 150 days to complete between October 1, 2023, and May 23, 2024. A clamshell dredge will be used to dredge approximately 600,000 cubic yards (cy) of sediment from the MDR Federal Navigation Channel and approximately 30,000 cy from the LACDBH North Jetty Shoal. The design depth of Areas 2 through 5 and the North Jetty Shoal is minus 20 feet mean lower low water (MLLW) plus two feet of over-depth allowance. The design depth of Areas 1 and 6 is minus 30 feet MLLW with no over-depth allowance. The multi-agency Southern California Dredge Material Management Team (DMMT) reviewed the sediment testing results at its December 6, 2022, meeting and determined the sediment to be dredged is not suitable for direct beach placement. USACE has therefore proposed placement in the nearshore waters off of Dockweiler State Beach. Prior to future dredge episodes, USACE will also perform bioassay testing. If this testing indicates that contaminant levels are unsuitable for beach or nearshore placement, an alternative placement location would be proposed.

USACE will also ensure that the project contractor implements a water quality monitoring plan during dredging and placement activities. The proposed project will create short-term increases in turbidity in the vicinity of dredging operations. Turbidity levels will be monitored throughout dredging and the project includes prescribed actions (e.g. slowing dredge cycle times, use of silt curtains) should turbidity exceed pre-established water quality conditions. The project also includes measures to minimize and remove trash and debris. "Grizzly" type mesh screens will be placed over the placement barge to mechanically screen out debris as

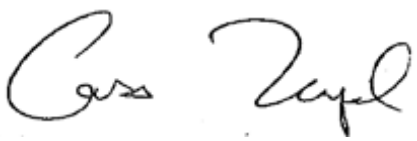
sediment is placed on the barge. All trash and debris will be collected and disposed at an approved inland disposal site. In addition, USACE will conduct two beach walks per week to remove any fugitive trash or debris. One of the weekly cleanup walks will be conducted at low tide and the second will be at low tide when feasible.

The proposed project is located near a California least tern (CLT) nesting colony at Venice Beach and is anticipated to occur during the CLT nesting season (April 15 to September 15). To minimize potential impacts to CLT nesting and foraging, the Corps will sequence dredging activities so that the dredge areas closest to the CLT colony (Areas 4, 5, 6 and the North Jetty Shoal) will be dredged prior to April 15, 2024. Should project activities go beyond April 15, when CLT nesting season begins, dredging would only occur in the dredge areas furthest from the CLT colony (Areas 1, 2, and 3), which are over 1,500 feet from the CLT colony. With implementation of these protective measures, adverse impacts to CLT and its nesting colony would be avoided.

Nearshore disposal is expected to occur until May 23, 2024, within the spawning season of California grunion, a special interest fish species known to occur in the project area. California grunion have been observed spawning on Dockweiler State Beach and Redondo Beach from March through August, and occasionally in February and September. Peak spawning is typically in late March to early June. The Corps will halt nearshore disposal during predicted grunion runs for the time period extending from two hours before the predicted start of the run until two hours after the predicted end of the run. This measure will ensure that nearshore turbidity from dredged sediment disposal does not impede grunion from approaching and spawning on the beach.

Under the federal consistency regulations, a negative determination can be submitted for an activity “which is the same as or similar to activities for which consistency determinations have been prepared in the past.” The Coastal Commission staff agrees that the proposed project is similar to previously concurred with consistency and negative determinations concurred with by the Commission and Executive Director for maintenance dredging at Marina del Rey Harbor and placement at Dockweiler State Beach (CD-035-10, ND-006-12, ND-021-12, ND-0022-16). We therefore **concur** with USACE’s negative determination made pursuant to 15 CFR Section 930.35 of the NOAA implementing regulations. Please contact Cassidy Teufel at Cassidy.Teufel@coastal.ca.gov, should you have any questions regarding this matter.

Sincerely,



CASSIDY TEUFEL
Federal Consistency Coordinator
(for)

KATE HUCKELBRIDGE, PhD
Executive Director

Appendix H
ESA and EFH Assessments

Project Description

The Proposed Action is a one-time federal maintenance dredging project in Marina del Rey Harbor to occur between October 2023 and May 2024. The approximate duration of project activity is 150 days, which assumes 15 days of mobilization, 120 days of dredging and placement activities, and 15 days of demobilization. Dredging will be done by clamshell dredge. Dredged sediment will be loaded onto scows and taken to the Nearshore Placement Site approximately 2 miles south of the harbor (**Figure 1**).

The Proposed Action will remove up to 630,000 cubic yards (cy) of sediment from the following sections of the harbor channel: Areas 1 through 6 and the Los Angeles County Department of Beaches and Harbors (LACDBH) North Jetty Shoal (**Figure 2**) to maintain authorized design depths. Federal dredge Areas 7 through 9 are currently at or below design depth and do not require dredging. The actual amount dredged may vary depending on amount of shoaling and other factors. Areas 1 and 6 are sand traps and are maintained at a depth of -30 feet Mean Lower Low Water (MLLW). Areas 2 through 5 are maintained at -20 feet MLLW. Design depth of the North Jetty Shoal varies from 0 to -20 feet MLLW. Except for sand traps, all dredge areas include two feet of over depth allowance. All materials have been determined to be suitable for nearshore placement at Dockweiler State Beach through consultation with the Southern California Dredged Material Management Team (SC-DMMT) and the Contaminated Sediments Task Force (CSTF).

The Proposed Action would serve the following purposes: (1) maintain the Federal Navigation Channel to authorized design depths; (2) assure continued safe navigation for maritime traffic within the harbor by minimizing the risk of hazardous shoaling conditions; and (3) provide beach nourishment material for downcoast beaches.

Existing Conditions

California least tern (*Sterna antillarum browni;* hereafter, tern) is a black and white colonially nesting seabird. It was listed as federally endangered under the ESA in 1970 (35 FR 8491). The California least tern is listed as a subspecies of least tern and not a DPS (USFWS 2020). The state of California listed the species under the California ESA in 1971.

California least terns are migratory birds that breed in colonies on the coast of California from mid-April through September. They prefer beachfront habitat with sparse or low-lying vegetation and low disturbance from humans and mammalian predators. During their stay in California, terns feed primarily on fish such as northern anchovy (*Engraulis mordax*) and topsmelt (*Atherinops affinis*) in estuaries, embayments, and nearshore waters (Atwood and Minsky 1983). Terns frequently shift foraging areas within and between nesting seasons based on prey availability (Atwood and Minsky 1983; Baird 1997).

There is a long-standing nesting tern colony on Venice Beach, approximately 500 feet north of

the north jetty (**Figure 3**). In 1977, a chain-link fence was erected to protect the Venice Beach tern colony from mammalian predators and human disturbance. Terns typically roost for the night inside this enclosure during nesting season (Atwood 1986). From 2018-2022, an average of 18 tern pairs nested in the Venice Beach colony, resulting in an average of 19 nests annually (CDFW 2023, unpublished data). Predation by avian predators such as American crows (*Corvus brachyrhynchos*) and red foxes (*Vulpes vulpes*) is typically high at this colony and results in total site abandonment some years.

Environmental Consequences

Direct impacts (if they occurred) would be defined or described as injury or mortality to federally listed threatened or endangered species from direct collisions or burial that would occur as a result of dredging or placement of dredge materials at the Nearshore Placement Area. Indirect impacts would potentially be caused by changes in nesting or foraging habitat or other environmental conditions that could occur as a result of dredging or placement of dredge material activities that may extend beyond the dredge prism and Nearshore Placement Area.

Environmental commitments to minimize or avoid effects to listed species are underlined.

California least tern typically migrate to southern California in April each year to rear young. The Proposed Action is anticipated to occur between October 2023 and May 2024. Per USFWS guidance, tern nesting season begins on April 15 in this area, so project activities may overlap with tern nesting season.

Foraging: If dredging occurs on or after April 15, project activities may affect terns' forage base as small fish are expected to avoid the immediate work area due to the turbidity plume and noise. Fish may dive deep or scatter and become unavailable to foraging least terns, which depend on concentrated forage fish. Foraging behavior of the Venice Beach least tern colony was closely studied for several years in the late 1970's and early 1980's. Approximately 75% of observed tern foraging activity occurred in nearshore waters within two miles of the colony; only 5% of observed foraging activity occurred in the harbor channels (Atwood and Minsky 1983). If terns avoid the Action Area during project activities, they will lose about 3% of their preferred foraging areas. In addition, because terns frequently shift foraging areas based on prey availability (Atwood and Minsky 1983; Baird 1997), they would likely shift foraging efforts to adjacent undisturbed areas during active dredging. Thus, the effect on tern foraging would be minor and temporary. To further minimize impacts to tern foraging opportunities, USACE will sequence dredging activities so that all areas within 1,500 feet of the tern enclosure will be dredged prior to April 15. Should project activities occur on or beyond April 15, dredging would only occur outside the 1,500-foot buffer after that date. This measure will allow terns to maintain access to extensive undisturbed foraging habitat within the channel and in adjacent nearshore waters during all project activities. Previous recommendations for buffer zones to protect breeding terns from human disturbances have ranged from 150 to 1,200 feet (Erwin 1989;

Rodgers and Schwikert 2002; Althouse et al. 2019).

Noise: During clamshell dredging activities, the most intense noise impacts are produced underwater during the bucket's impact with the seafloor (Reine et al. 2014; Jones and Martin 2016). Above the water's surface, the tugboat and the clamshell dredge emit the loudest sounds, with recordings of 87 and 77 dBA (A-weighted decibels, respectively) approximately 50 feet from the equipment (Epsilon 2006). When considering all equipment associated with clamshell dredging, noise levels typically reach 80 dBA within a 35-foot radius and reach 65 dBA within 200 feet (Epsilon 2006). Therefore, any project-induced noise impacts to the tern colony would attenuate to the harbor's existing noisy ambient conditions well within the 1,500-foot buffer proposed above.

Artificial Lighting: Dredging operations are expected to occur 24 hours a day, 7 days a week. To provide a safe work environment during night-time dredging, the clamshell dredge contains built-in lights to illuminate the immediate work area in an approximately 100-foot radius. Lights can be shielded and aimed down to avoid illuminating sensitive areas as long as minimum safe illumination is met. By incorporating the sequencing measure proposed above (1,500-foot buffer), no project-induced light spill is expected to reach the tern colony.

In addition, the Venice Beach tern colony is regularly monitored by California State Parks during the breeding season. If terns are observed to be affected by the Proposed Action, the Corps will coordinate with USFWS to modify project activities to further minimize impacts to this species. If it is determined that adverse effects to least terns are unavoidable, the Corps will initiate formal consultation with USFWS.

Therefore, the Corps has determined that **the Proposed Action May Affect but is Not Likely to Adversely Affect California least tern** with implementation of the preceding minimization and avoidance measures.

Environmental Commitments

- USACE will sequence dredging activities so that all areas within 1,500 feet of the tern enclosure will be dredged prior to April 15. Should project activities occur on or beyond April 15, dredging would only occur outside the 1,500-foot buffer after that date.
- If terns are observed to be affected by the Proposed Action, the Corps will coordinate with USFWS to modify project activities to further minimize impacts to this species.
- If it is determined that adverse effects to least terns are unavoidable, the Corps will initiate formal consultation with USFWS.

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Figures

Figure 1. Maintenance dredging footprint and vicinity map.

Figure 2. Maintenance dredging areas within the federal navigation channel.

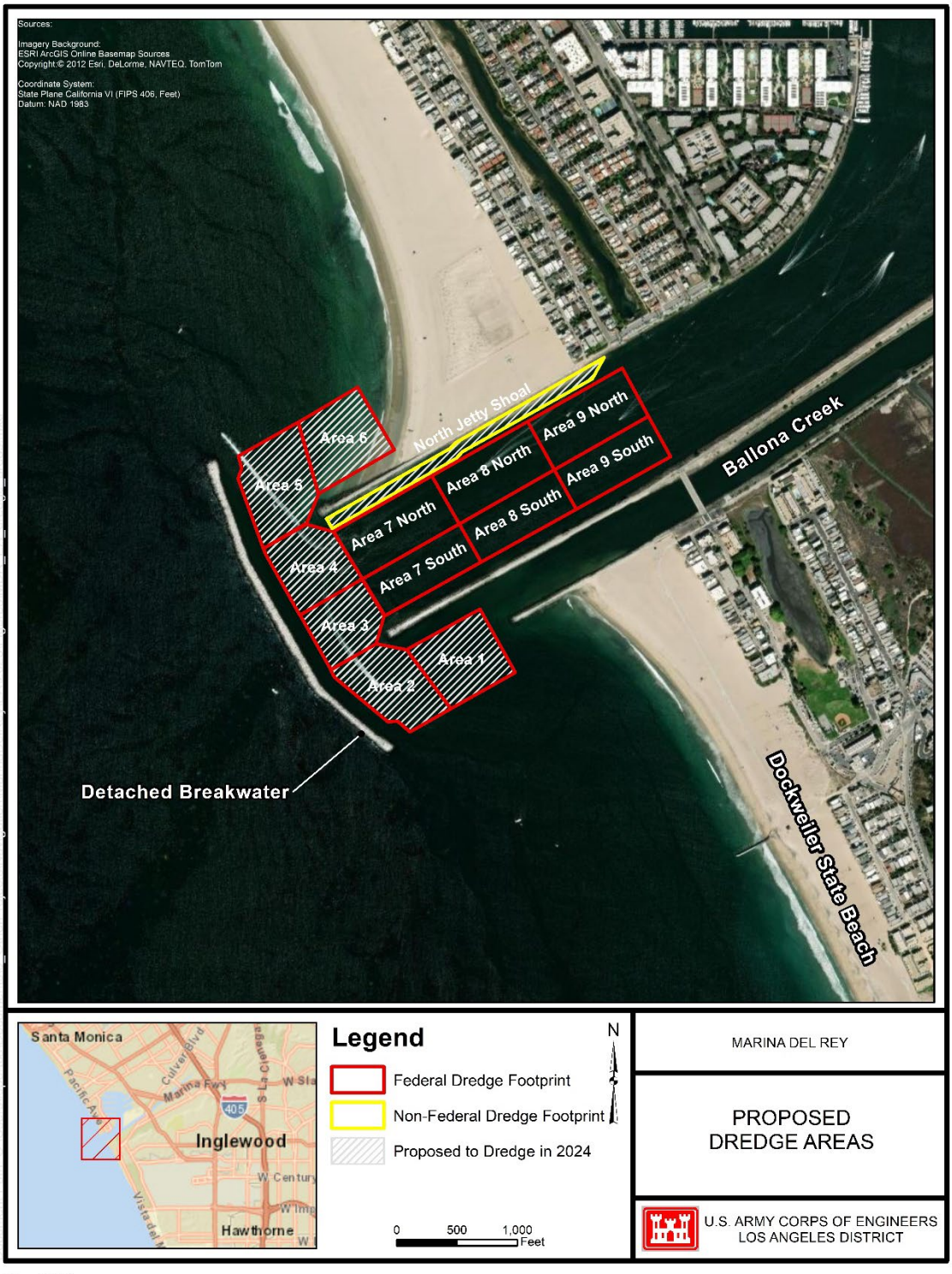
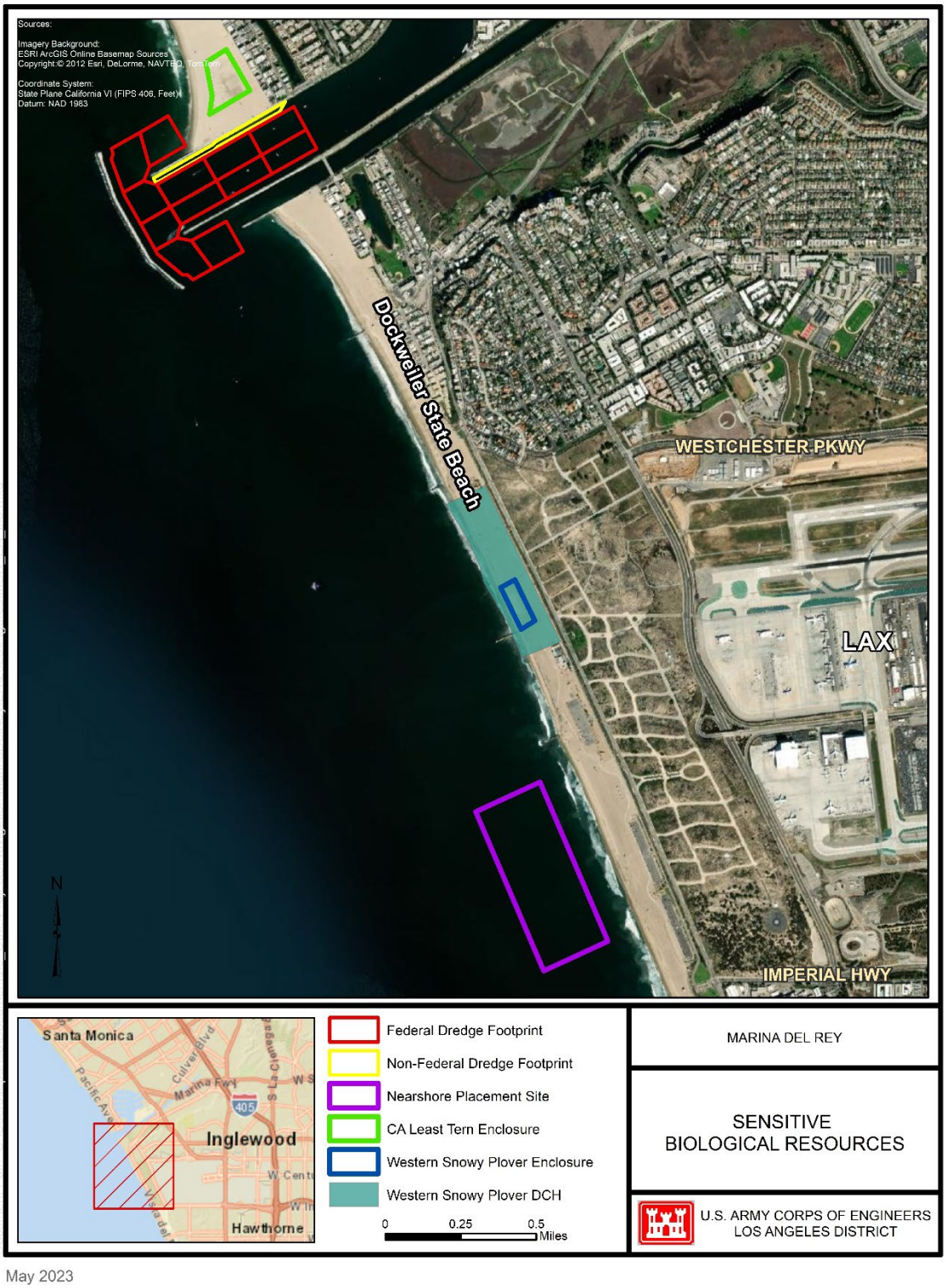


Figure 3. Sensitive biological resources in the proposed action area.



May 2023

Project Description

The Proposed Action is a one-time federal maintenance dredging project in Marina del Rey Harbor to occur between October 2023 and May 2024. The project duration is anticipated to last approximately five months, dependent on weather conditions, dredge equipment availability, working performance of the equipment, contractual commitments, and availability of funds. The approximate duration assumes 15 days of mobilization, 120 days of dredging and placement activities, and 15 days of demobilization. Dredging will be done by clamshell dredge. Dredged sediment will be loaded onto scows and taken to the Nearshore Placement Site approximately 2 miles south of the harbor (**Figure 1**).

The Proposed Action will remove up to 750,000 cubic yards (cy) of sediment from the following sections of the harbor channel: Areas 1 through 6 and the Los Angeles County Department of Beaches and Harbors (LACDBH) North Jetty Shoal (**Figure 2**) to maintain authorized design depths. Actual amount may vary depending on amount of shoaling and other factors. Federal dredge Areas 7 through 9 are currently at or below design depth and do not require dredging. Areas 1 and 6 are sand traps and are maintained at a depth of -30 feet Mean Lower Low Water (MLLW). Areas 2 through 5 are maintained at -20 feet MLLW. Design depth of the North Jetty Shoal varies from 0 to -20 feet MLLW. Except for sand traps, all dredge areas include two feet of over depth allowance. All materials have been determined to be suitable for nearshore placement at Dockweiler State Beach through consultation with the Southern California Dredged Material Management Team (SC-DMMT) and the Contaminated Sediments Task Force (CSTF).

The Proposed Action would serve the following purposes: (1) maintain the Federal Navigation Channel to authorized design depths; (2) assure continued safe navigation for maritime traffic within the harbor by minimizing the risk of hazardous shoaling conditions; and (3) provide beach nourishment material for downcoast beaches.

Existing Conditions

The dredging template and the nearshore placement site are predominantly composed of sandy-bottom nearshore habitat, which supports barred sand bass (*Paralabrax nebulifer*), spotted sand bass (*Paralabrax maculatofasciatus*), sargo (*Anisotremus davidsonii*), diamond turbot (*Hypsopsetta guttulata*), bat ray (*Myliobatis californica*), California halibut (*Paralichthys californicus*), spotted turbot (*Pleuronichthys ritteri*), white croaker (*Genyonemus lineatus*), and yellowfin croaker (*Umbrina roncador*). In addition, round sting ray, tongue fish, california lizard fish, and midshipman species are abundant in the harbor. The most abundant water column fish are the top smelt (*Atherinops affinis*), northern anchovy (*Engraulis mordax*), and queenfish (*Seriphus politus*) (Soule et al. 1996).

The manmade breakwater and entrance channel jetties are constructed of riprap and support hard-bottom species. Except for these riprap structures, hard-bottom habitat in the harbor is

limited to vertical retaining walls, piers, and floats, which lack the crevices and heterogeneous topography to support diverse reef communities. The riprap supports many fish species characteristic of southern California rocky habitats such as blacksmith (*Chromis punctipinnis*), opaleye (*Girella nigricans*), pile surfperch (*Rhacochilus vacca*), black surfperch, rock wrasse (*Halichoeres semicinctus*), kelpfish species, garibaldi (*Hypsypops rubicundus*), señorita (*Oxyjulis californica*), kelp bass, barred sand bass, surf perch species, and spotted sand bass.

In additional to federally managed species, there are two notable fish species found within the Action Area: white sea bass (*Cynoscion nobilis*), and California grunion (*Leuresthes tenuis*). Since 1995, the Marina Del Rey Anglers (Anglers) have operated one of thirteen white sea bass grow out facilities in southern California. Anglers raise the fish in protective enclosures until they reach about 12 inches in length, which significantly increases their likelihood of survival in the wild. Anglers then transfer the sea bass to a tank on a boat and transit to the vicinity of the Venice Pier to release the fish. California grunion are a member of the silversides family, along with jacksmelt and topsmelt. During new and full moons, grunion come ashore southern California beaches (including Dockweiler Beach) to spawn from March through August, with a peak in activity from April through June.

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (hereafter, MSA; 16 USC 1801, et seq.) set forth mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate "essential fish habitat" (EFH) for all managed species. The MSA defines EFH as " ... those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The MSA identifies discrete subsets of EFH referred to as Habitat Areas of Particular Concern (HAPC) that are defined as exhibiting one or more of the following traits: rare, stressed by development, provide important ecological functions for federally managed species, or are especially vulnerable to anthropogenic (or human impact) degradation. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH and respond in writing to the NMFS's recommendations.

For the Pacific region, EFH has been identified for over 119 species covered by four fishery management plans (FMPs) under the auspices of the Pacific Fishery Management Council: Coastal Pelagic Species FMP, Pacific Coast Groundfish FMP, Pacific Coast Salmon FMP, and Highly Migratory Species FMP. The EFH for these are to include all marine and estuarine waters from the shoreline to 200 nautical miles offshore (i.e., the Exclusive Economic Zone [EEZ]).

In accordance with the MSA, an assessment of EFH is being conducted for the Proposed Project. Species managed under three of the FMPs (Coastal Pelagic, Pacific Coast Groundfish, and Highly Migratory Species) have the potential to occur within the Action Area. Several of the species managed under the Pacific Coast Groundfish and Coastal Pelagic Species FMPs are known to occur within Marina del Rey Harbor and adjacent open coastal waters (e.g., Northern

anchovy, Pacific sardine, Pacific mackerel, jack mackerel, Pacific sanddab, rockfish species, California scorpionfish, and English sole). In addition, many species identified as Ecosystem Component Species under the Pacific Groundfish Management Plan are present in the Harbor and adjacent coastal waters (e.g., skates, silversides, and smelts). Furthermore, many other native marine fish in the project area undoubtedly serve as prey for many of the managed species.

Three HAPC components have the potential to occur in the harbor: canopy kelp, surfgrass, and eelgrass. These species are not expected in the nearshore placement site due to the highly active nature of the surf zone. Native giant kelp (*Macrocystis pyrifera*) and feather boa kelp (*Egregia menziezii*) were recently observed along the manmade detached breakwater (Rincon 2021). Eelgrass and surfgrass have not been reported in the Action Area (Corps 2011; Rincon 2021).

Environmental Consequences

Impacts to EFH would occur primarily due to benthic disturbance and water quality impacts; however, they would be short-term in duration and localized. Dredging and placement operations could result in temporary disturbance to sandy benthic habitat, loss of fish foraging habitat, prey, and temporary increases in turbidity. Impacts to EFH within the project footprint may include direct mortality of organisms due to removal/burial/crushing, temporary turbidity plumes and suspension of sediments from propeller wash, release of contaminants from equipment, entrainment, and noise. Turbidity caused by dredging activities would subside to ambient levels within 1 to 24 hours as suspended sediments resettle (Anchor Environmental 2003). Organisms displaced by dredging and disposal activities would quickly recolonize the impacted areas once construction is complete (Newell et al. 1998; Soule et al 1993).

Some fish may avoid the immediate project area during dredging and placement operations because of the increased turbidity, noise levels, and potential oxygen depletion caused by dredging operations. Noise levels generated by project activities are not expected to rise to levels that would result in hearing loss, physical injury, or mortality of fish. Other fish species may be attracted to the Action Area to feed on mollusks, crustaceans, and other organisms which may have been caught up in, or exposed by, the dredged material. The Action Area is a small percentage of available open water and sandy bottom benthic habitat; therefore, fish movement and migration would not be impeded due to dredging and placement activities. While turbidity at the placement site could be more extensive than that at the dredge site, the surf zone has naturally high turbidity due to wave action. Fishes within the Dockweiler nearshore area would not be exposed to high enough sediment concentrations for long enough duration to suffer lethal or sublethal effects (Soule et al. 1993).

To ensure that any substantial increases in turbidity or decreases in dissolved oxygen (DO) are restricted to the immediate area around the dredge and that these impacts dissipate within 300 feet of the dredge, the Corps will monitor standard water quality parameters including turbidity, light transmissivity, salinity, pH, temperature, and DO regularly throughout the project duration. The Corps will report water quality monitoring results and will implement appropriate measures should impacts exceed acceptable levels. Any such dredge-related impacts would be limited in extent and duration, and therefore insignificant. Greater potential for impacts would exist if there were substantial amounts of fine sediments in the dredging template; however, sediment testing indicated that grain sizes are predominately fine to medium grain sands, which settle quickly.

The Action Area is approximately 1.5 miles from seabass enclosures, so impacts to seabass in the enclosures are not expected. The Corps has notified the Anglers of the Proposed Action. The Proposed Action is expected to overlap with grunion spawning season. Dredged material placement has the potential to temporarily increase turbidity in the nearshore environment and therefore, grunion's ability to approach and spawn on local beaches. In the long-term, nearshore placement may enhance suitable grunion spawning habitat by nourishing local eroded beaches with clean, sandy material. Potential effects to grunion spawning on beaches would be minimal with the implementation of the following minimization and avoidance measure included as part of the Proposed Action: Nearshore placement will not be allowed two hours prior to, two hours during, and two hours after all scheduled grunion runs.

Canopy kelp, surfgrass, and eelgrass HAPC have the potential to occur in the dredge area. Dredging will take place solely in soft-bottom habitat; no work will occur directly on the jetty or breakwater structures. Therefore, the Corps does not anticipate direct impacts to kelp or surfgrass. However, these species may incur indirect effects due to temporarily increased turbidity. Eelgrass has not been reported in the Action Area. To determine if canopy kelp, surfgrass, or eelgrass are present, the Corps will perform a pre-construction survey of the dredge area. Should these species be found, they will be avoided to the maximum extent practicable, and a post-construction survey will be conducted. If post-construction surveys indicate a loss of kelp or surfgrass as a result of this project, the Corps will coordinate with NMFS. If post-construction surveys indicate a loss of eelgrass as a result of this project, the Corps will coordinate with NMFS to mitigate the impacts in accordance with the California Eelgrass Mitigation Policy.

The invasive algal *Caulerpa* species has also not been reported in the Action Area. The Corps will perform pre-construction surveys in accordance with the Caulerpa Control Protocol, Version 5 October 2021 to confirm the absence of *Caulerpa*.

Environmental Commitments Summary

- The Corps will monitor standard water quality parameters including turbidity, light transmissivity, salinity, pH, temperature, and DO regularly throughout the project duration.
- Nearshore placement will not be allowed two hours prior to, two hours during, and two hours after all scheduled grunion runs.
- To determine if canopy kelp, surfgrass, or eelgrass are present, the Corps will perform a pre-construction survey of the dredge area.
- Should these species be found, they will be avoided to the maximum extent practicable, and a post-construction survey will be conducted.
- If post-construction surveys indicate a loss of kelp or surfgrass as a result of the Proposed Action, the Corps will coordinate with NMFS. If post-construction surveys indicate a loss of eelgrass as a result of the Proposed Action, the Corps will coordinate with NMFS to mitigate the impacts in accordance with the California Eelgrass Mitigation Policy.
- The Corps will perform pre-construction surveys in accordance with the Caulerpa Control Protocol, Version 5 October 2021 to confirm the absence of *Caulerpa*.

EFH Determination

With the minimization and avoidance measures outlined above to monitor and control water quality and avoid or reduce impacts to species and habitat, the Corps has determined the Proposed Action may result in temporary adverse effects to EFH, but impacts would not be substantial. The Proposed Action would not cause a substantial loss in the population or habitat of any native wildlife; or impede the movement or migration of fish. Therefore, the Proposed Action would result in less than significant impacts to fish and EFH.

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Figures

Figure 1. Maintenance dredging action area and vicinity map.

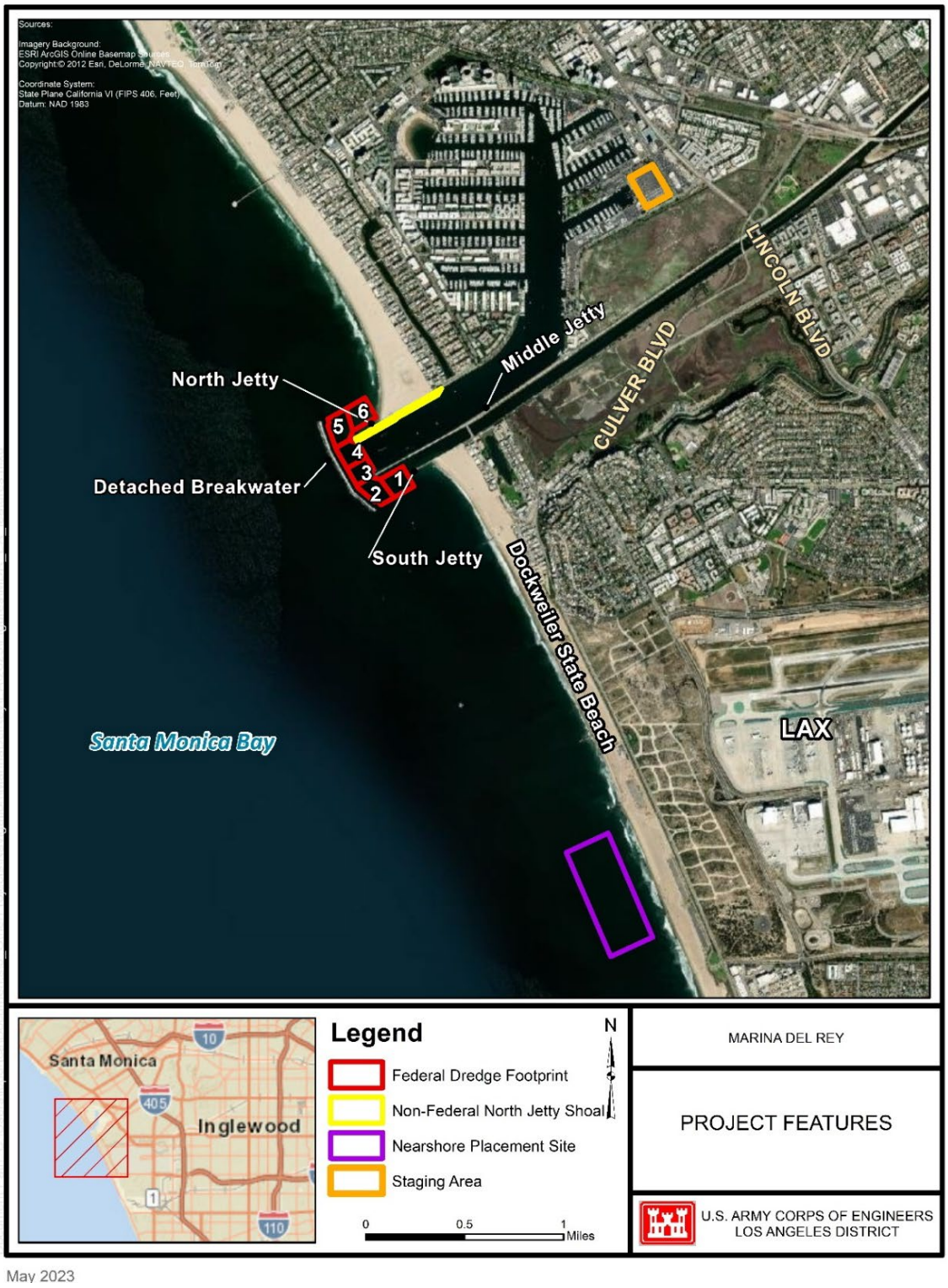
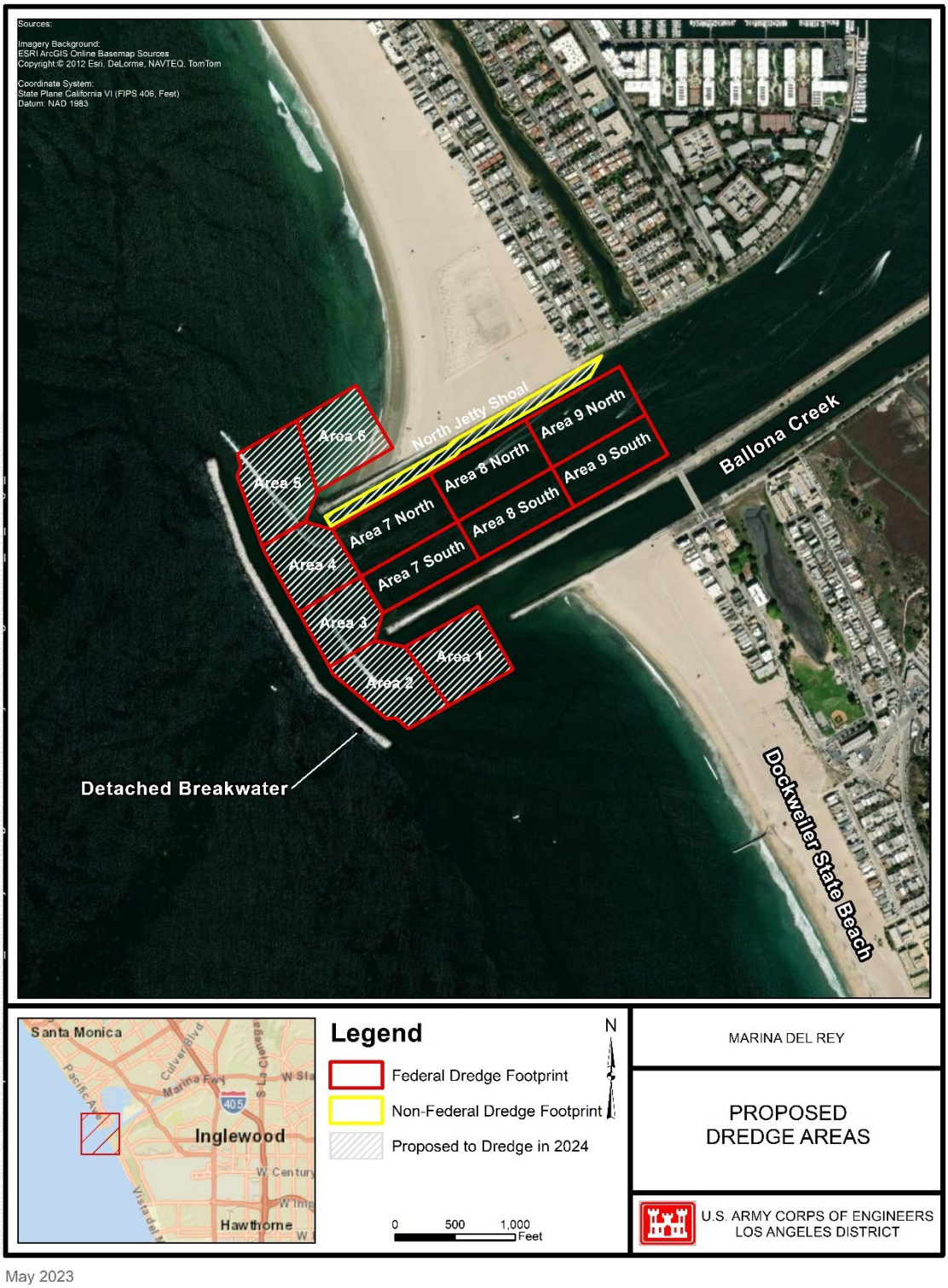


Figure 2. Maintenance dredging areas within the federal navigation channel.



Appendix I
ESA and EFH Correspondences and Concurrences

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

In Reply Refer to:
FWS-2023-0105330-S7-I-LA

August 4, 2023
Sent Electronically

Jodi Clifford
Chief, Planning Division
U.S. Army Corps of Engineers - Los Angeles District
915 Wilshire Blvd
Los Angeles, California 90017-3409

Attn: Tiffany Armenta

Subject: Informal Consultation for the Maintenance Dredging of Marina del Rey Harbor Project, Los Angeles County, California

This document was prepared in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq*.). We received the U.S. Corps of Engineers (Corps) email dated February 9, 2022, requesting initiation of consultation on the Maintenance Dredging of Marina del Rey Harbor (Maintenance Dredging) Project, City of Marina del Rey, California. The Corps has requested our concurrence that the proposed action may affect, but is not likely to adversely affect, the federally endangered California least tern [*Sternula antillarum browni* (*Sterna a. b.*); least tern]. The Corps has determined that the proposed action will have no effect on the federally threatened western snowy plover {Pacific Coast population DPS [*Charadrius nivosus* (*C. alexandrinus n.*); snowy plover]}.

Maintenance Dredging will occur within Marina del Rey harbor located in Marina del Rey, an unincorporated community within Los Angeles County, and within the nearshore placement site offshore of Dockweiler State Beach (SB) located within the City of Los Angeles (Figure 1). Maintenance Dredging is required to maintain the channel to its federally authorized design depths and to ensure safe navigation. Sediment placement within the nearshore location will provide beach nourishment material for downcoast beaches. Maintenance dredging of the navigational channel occurs approximately every five to ten years and maintenance dredging of the shoal that regularly forms within the channel, the North Jetty Shoal, occurs less frequently, on an as-needed basis. The channel and harbor are used by recreational vessels.

The proposed action is to dredge up to 630,000 cubic yards (cy) of sediment from within the harbor channel. The harbor channel has twelve designated Federal dredge areas and one non-Federal dredge area, the Los Angeles County Department of Beaches and Harbors' (LACBH) North Jetty Shoal (Figure 2). For this action sediment will be dredged from Areas 1 through 6 and the Beaches and Harbors' North Jetty Shoal. Dredging Areas 1 and 6 are sand traps and are

maintained at a depth of -30 feet Mean Lower Low Water (MLLW). Dredging Areas 2, 3, 4, and 5 are maintained at -20 feet MLLW. Design depth of the North Jetty Shoal varies from 0 to -20 feet MLLW. Approximately 180,000 cy will be dredged from Areas 2 through 5, approximately 30,000 cy will be dredged from the North Jetty Shoal, and the remaining 420,000 cy will be dredged from a combination of Area 1 and Area 6. Except for Areas 1 and 6, all dredge areas include two feet of over depth allowance (i.e., they will be dredged two feet deeper than their identified design depth). Federal dredge Areas 7 through 9 are currently at or below design depth and do not require dredging, so dredging of these areas is not part of this consultation. The Corps has completed their consultation with the Southern California Dredged Material Management Team (SC-DMMT) for placement of the dredged materials, and the materials have been approved for the proposed nearshore placement.

Dredging will be conducted by clamshell dredge[1] which will excavate the material from the harbor bed and transport it vertically out of the water and place the sediment onto split-hulled barges or scows.[2] These split-hulled barges will transport the excavated sediments to the approximately 58.8-acre nearshore placement site (Figure 3) approximately 2 miles south of the harbor. The transported dredged materials will be unloaded from the split-hulled barges by splitting the barge longitudinally which allows the sediment to drop into the sea. A tugboat will be used to maneuver the clamshell dredge throughout the dredge and placement footprints. Dredging of sediment within the navigational channel and placement of those sediments within the nearshore placement site will result in turbidity[3] of the water within the project areas and within a larger area that falls outside of the footprints for dredging and placement. The Corps estimates that dredging activities will result in a turbidity plume (an area of turbidity that stretches out from the site of disturbance due to currents and tides) around the clamshell dredge that may extend up to 300 feet, generally in the direction of dominant currents, from the active dredge site. Less opaque turbidity may be detected beyond the 300-foot radius. For the nearshore placement site, the Corps estimates that placement of the dredged materials will create a turbidity plume that may extend up to 300 feet, generally in the direction of dominant currents, from the active placement site.

To move approximately 630,000 cy of sand out of the navigational channel and transport it to the placement site, project work will be conducted for up to 150 days, which anticipates 15 days of mobilization, 120 days of dredging and placement activities, and 15 days of demobilization, between October 2023 and May 2024. Dredging operations will be conducted 24 hours a day, 7 days a week for the entirety of the project timeline. To provide a safe work environment during night-time activities, the clamshell dredge contains built-in lights to illuminate the immediate work area and an approximately 100-foot radius around the vessel. Operation of the tugboat and the clamshell dredge are anticipated to produce approximately 87 and 77 dBA (A-weighted decibels, respectively) when measured approximately 50 feet from the equipment. During

[1] A clamshell dredge is usually a stationary or rotating cab dredge crane that are affixed to a large barge. The barge often houses additional equipment as necessary.
[2] The Corps identifies any floating plant which transports dredge material to be a scow. They can include a flat deck or sealed barges as well as split hull or bottom dumbing scows.
[3] Turbidity is a quantitative measure of how clear or cloudy the water is. Water is turbid when it contains suspended materials such as silt. The cloudier the water, the greater the turbidity.

clamshell dredging activities, the most intense noise will be produced underwater when the bucket impacts with the seafloor.

Conservation Measures

The Corps will implement the following conservation measures (CM) to avoid, minimize, and offset project-related adverse effects to the least tern.

General Measures

CM 1. A project biologist will be responsible for overseeing project activities to ensure compliance with the conservation measures and preventing unanticipated impacts including significant disturbance to federally listed species. Different project biologists may be designated for specific measures listed based on the qualifications necessary to satisfy the specific measure or multiple biologists may be needed to satisfy a specific measure. If multiple biologists are required, their activities will be coordinated through one primary biologist. All project biologists will have experience and training necessary to conduct tasks assigned to them as described in this consultation. A resume of experience and training for each designated project biologist(s) including species-specific reference/s will be submitted to the CFWO for review at least 2 weeks in advance so that verification that the individual is qualified to conduct the required biological activities can be provided by the CFWO prior to the beginning of project activities. The project biologist(s) responsible for implementing measures specific to the least tern (least tern biologist) will be trained ornithologists with at least 40 hours of documented experience with location and observation of least terns in the field including a minimum of 20 hours of experience locating and monitoring least tern nests and chicks. This experience must be clearly identified on their resume.

CM 2. The project work areas will be limited to the sites identified in Figure 1. Parking, driving, lay-down, stockpiling, and vehicle and equipment storage will be limited to previously compacted and developed areas and the designated staging area. No off-road vehicle use will be permitted in sandy beach areas.

CM 3. Prior to project implementation, the Corps will submit to the CFWO Geographic Information System (GIS) shapefiles in UTM, Zone 11N (meters), NAD 83 coordinate system that show the following: the project footprints, anticipated permanent impacts, temporary impacts, habitat restoration sites, and habitat conservation sites, as applicable for the project. Please note that these polygons may overlap. For example, one location could be temporarily impacted and subsequently restored and conserved. Include the following metadata for each shapefile: summary/description of the data, attribute definitions, coordinate system/projection information or any other pertinent information. If there are any changes to the boundaries of anticipated impacts, such changes must be addressed consistent with the Reinitiation Notice below. In addition, updated GIS shapefiles

will be submitted to the CFWO within 10 business days if the project footprint changes after initial submission of the project shapefiles.

CM 4. All dredging and fill activities will remain within the boundaries specified in Figure 1. There will be no dumping of fill or material outside of the project area or within any adjacent aquatic community.

CM 5. A contractor education program will be conducted by the project biologist during all project phases and will cover the potential impacts to federally listed species; the requirements and boundaries of the project; the importance of complying with avoidance, minimization, and compensation measures; and problem reporting and resolution methods.

CM 6. The Corps or its contractors will prepare and implement a Spill Prevention Plan. Standard dredge specifications will include, employee training, and the staging of materials on site to clean up accidental spills. Spills are to be cleaned up immediately (within 15 minutes).

CM 7. The Corps will ensure its contractor/s will monitor water quality parameters (turbidity, dissolved oxygen, light transmissivity, salinity, pH, and water temperature) near the dredge and nearshore placement sites at the following times: during pre-construction activities, weekly throughout the duration of dredging activities, and post-construction. If turbidity exceeds compliance thresholds, the dredging operations or placement of fill will be altered or stopped until minimization measures (e.g., silt curtains) can be deployed or until the suspended material settles out, and turbidity levels come back into the acceptable range.

CM 8. Lighting for any vessel will be shielded if possible and will be directed onto the deck of the vessel to minimize the light spill into adjacent sensitive areas and natural habitat. Lighting will be set to the lowest illumination needed for human safety.

CM 9. The staging area and project vessels will be kept as clean as possible to avoid attracting predators of federally listed species. All food-related trash produced will be placed in predator-proof (i.e., corvids, rodents, squirrels, and meso-mammals) sealed bins and removed from the site daily.

CM 10. Within 60 days of completing the Maintenance Dredging Project, a post-project report will be submitted to the CFWO notifying that project work has been completed. This report will document: the length of time that project activities were conducted, a general description of the nature of the activities, number and location (using GPS) of least terns during each survey, and observed behaviors of federally listed species in response to project activities collected during monitoring sessions.

Measures Specific to the Least Tern

CM 11. Project-related activities will take place between September 15, 2023, and May 31, 2024, to avoid the 2023 least tern breeding season (April 1 to September 15) to the maximum extent practicable. No project activities will occur after May 31, 2024, until the CFWO has been contacted and coordinated with to discuss if reinitiation of consultation is necessary based on the then-current behavioral patterns of least tern use of the Project area and of least tern breeding status in adjacent occupied habitat within the Venice Beach Least Tern Colony Site (colony site).

CM 12. The Corps will begin the Maintenance Dredging Project activities closer to the Venice colony (i.e., North Jetty Shoal and Dredging Area 6) and will work away from the Venice colony to minimize the likelihood of project-related disturbance to least terns as project activities occur closer in time to the breeding season.

CM 13. To the greatest extent practicable, the Corps will sequence dredging activities so that all areas within 1,500 feet of the Venice colony will be dredged prior to April 1. If project activities need to occur within 1,500 feet of the Venice colony after April 1, the Corps will coordinate with the CFWO to discuss if additional conservation measures are appropriate or if reinitiation of consultation is necessary.

CM 14. The Corps will contact the CFWO by March 25 and will provide a brief description of the current status of the dredging project. This should include identifying which areas of dredging have been completed, where project activities are currently active, if dredging activities are on schedule so that all areas within 1,500 feet of the colony site will be dredged prior to April 1, and an estimated timeline for project completion.

Measures Specific to the Least Tern for April 1 to May 31

If project activities will extend past April 1st and up until May 31st, the Corps or its contractors will implement the following conservation measures in addition to those above:

CM 15. If project activities will extend past April 1 and up until April 15 the Corps will implement surveys for least terns to identify any breeding least terns and to help minimize the likelihood of disturbance to least tern breeding.

A. The least tern biologist (CM 1) will conduct three surveys within 1,000 feet of the colony site for least terns roosting along sandy beach areas and foraging along the shoreline and navigational channel between April 1 and April 15. Surveys should be conducted with at least three days between them. Surveys will not be conducted during inclement weather conditions that would significantly reduce the ability to detect least terns (e.g., rain, strong wind, extreme heat or cold).

B. Surveys will include searching the inside of the colony site for least terns from outside of the colony fence. This can be done with binoculars or a spotting scope.

C. Surveying for least terns that are inside or outside of the colony fence will occur from a distance that does not cause the individual or flock to fly away from the area they are roosting in.

D. The least tern biologist will contact the lead biologist at California State Parks once a week between April 1 and April 15 to discuss if any least terns have been documented at the colony site or other areas managed by State Parks within Los Angeles Orange, and San Diego Counties.

E. The least tern biologist will report any observations of least tern (including those by State Parks) to the Corps who will contact the CFWO within 72 hours to inform them that least terns have been documented for the first time for the season.

CM 16. If project activities will extend past April 15 and up until May 31, the Corps will implement surveys for least terns to identify any breeding least terns and to help minimize the likelihood of disturbance to least tern breeding.

A. The least tern biologist will contact the lead biologist at California State Parks twice a week between April 16 and May 31 to discuss if any least terns have been observed actively exhibiting breeding behaviors (e.g., scraping, territorial displays or calls, fish carrying) or if an active least tern nest (i.e., scrape containing eggs or empty scrapes with least terns actively exhibiting breeding behaviors) occurs in or within 500 feet of the colony site.

B. The least tern biologist will report any least tern nesting to the Corps within 24 hours of documenting the nesting occurrence. Once breeding activities, including nests, have been documented, the Corps will provide this information to the CFWO within 3 business days.

C. The least tern biologist(s) will conduct three surveys a week within 1,000 feet of the colony site for least terns roosting along sandy beach areas and foraging along the shoreline and navigational channel. CM 15 B and CM 15 C will be implemented during surveys.

D. All surveys will include 2-hour colony monitoring sessions for behaviors indicative of disturbance, and these should be scheduled to occur at different times of the day, including early morning and early evening before sunset when least terns may be more sensitive to disturbance. As with the survey activity, CM 15 B and CM 15 C will be implemented.

E. The least tern biologist will observe for least tern behaviors in and around the colony [e.g., startling, flushing (i.e., to cause a bird to move or fly away from an area), increased attentive behavior, alarm calls, stopping incubation, etc.] that could constitute responses to project activities, and these behaviors should be documented including: when a least tern, multiple terns, or the whole colony flushes from the nesting site; whether chicks or eggs were left unprotected with flushing; the duration of the flushing event; and, whenever possible, causes of flushing (i.e., presence of predators, beach management activities, or recreational activities).If the least tern biologist identifies that least terns are exhibiting an increase in observed responses during project activities such as but not limited to increased attentive behavior or flushing while the dredge clamshell is being lifted or dropped, then they will report this observation to the Corps within 24 hours. The Corps will contact the CFWO on the next business day to discuss if additional conservation measures are appropriate or if reinitiation of consultation is necessary.

F. If the least tern biologist has not observed that least terns are exhibiting an increase in responses to project activities by April 30, surveys may revert to once per week from May 1- May 31.

G. The Corps will provide a copy of all field notes and other documentation of least tern behaviors provided by the least tern biologist(s) from the monitoring sessions within 3 days from receipt of the documentation from the least tern biologist(s).

On-going Baseline Activities

Marina del Rey beach is the recreational beach north of the channel to the harbor. Marina del Rey beach is managed by the County of Los Angeles. Playa del Rey is the recreational beach south of the channel and is the northern section of Dockweiler SB. Although Dockweiler SB is owned by California State Parks, it is managed by the County of Los Angeles. These beaches are publicly accessible and receive millions of visitors a year.

The County's Department of Beaches and Harbors is the primary manager for activities that occur within and adjacent to sandy beach areas at Marina del Rey and Dockweiler SB and is responsible for operational services,[4] planning,[5] community and marketing,[6] asset management,

[4] Operational services include maintenance of the 20 Los Angeles County owned and/or maintained beaches and the public land and waterways of Marina del Rey. This includes beach grooming, trash collection, shoreline cleaning, and seasonal berm construction on the beaches.

[5] Planning Division responsibilities include, but are not limited to, overseeing and administering the Local Coastal Program and Land Use Plan for Marina del Rey; monitoring and maintaining the seawall; reviewing and approving temporary signs, banners and tents; mitigating transportation issues in Marina del Rey and along seven of the County-operated beaches; addressing environmental concerns; and planning and monitoring capital projects.

[6] Community and Marketing Services is responsible for offering an array of community programs, services, and facilities to Los Angeles County residents and visitors in Marina del Rey and on the Los Angeles County beaches

and administrative services. Ongoing beach management activities that the Division of Beaches and Harbors oversees within or adjacent to the action area include beach raking (grooming), garbage collection, and construction of sand berms for protection of facilities from winter storms. The Division of Beaches and Harbors also approves and permits on-going public recreational activities including youth summer camps, sporting and cultural events, and other large scale special events that are held on beaches under their management. In addition to these types of management and recreational activities, other County and local government entities access and use beach areas. These include the Los Angeles County Fire Department, which implements the lifeguard activities and patrols, and County and City law enforcement divisions, which patrol the beaches directly on the sand and along paved access roads. Other beach uses that are granted access permits to drive vehicles along Los Angeles County beaches include patrols for and response to marine mammal strandings and water quality monitoring and testing employees. Unpermitted beach uses include unauthorized camping, fires, and leashed and off-leash pets.

Beach management activities that use vehicles (e.g., beach grooming, garbage collection, lifeguard activities, law enforcement patrols, marine mammal stranding patrols, and water quality monitoring testing) on beaches with least terns have the potential to destroy eggs, kill chicks or adults, cause abandonment of nests, and cause considerable stress and harassment (i.e., disrupt breeding and roosting activities), thereby decreasing energy reserves needed for reproduction, migration, and survival (Service 2020). In addition, beach grooming alters beach topography, flattening any natural dunes and hummocks, removes natural wave-cast objects associated with nesting habitat, and prevents establishment of native beach vegetation, all of which degrade least tern breeding and roosting habitat. In areas with active nesting by least terns, beach grooming can physically modify important elements of least tern breeding habitat, including removing scrapes [e.g., a shallow bowl-shaped depression constructed by both the male and female least terns kicking their feet (scraping), which is used as a future nest location and/or created as part of a pair-bonding activity and as part of establishing a breeding territory] and actual nests, crushing or removing eggs within the nests, and crushing chicks in the nesting area. Beach recreational activities that generally do not involve or regularly include vehicle use include, but are not limited to, youth summer camps, sporting and cultural events, and other large scale special events. In areas occupied by least terns, these types of activities have the potential to destroy eggs, kill chicks, cause abandonment of nests, and displace adults and juveniles, decreasing energy reserves needed for reproduction, migration, and survival. Such activities also can result in an increase in food-related trash that attracts predators of the least tern to these areas resulting in an increased exposure of eggs, chicks, and adults to predation. Unpermitted beach uses can also result in degradation of nesting habitat and direct impacts to least terns and their eggs and chicks through nocturnal disturbance, removal of driftwood or wooden signs/stakes used to delineate nesting areas for use in illegal fires, and injury and death of individual least

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including processing film and special event permits; producing and promoting recreational and community programming; operating facilities, marketing and branding for the Department; supporting visitor services; and managing some operational needs in Marina del Rey.

terns by leashed and off-leash pets crushing and/or eating eggs and chicks and chasing chicks and adults.

In addition to least tern breeding at Marine del Rey beach, other shorebird species regularly use this beach and adjacent Los Angeles County Beaches for foraging and roosting. The federally threatened snowy plover regularly uses Marina del Rey, Dockweiler SB, and adjacent Los Angeles County beaches throughout most of the year. Individual snowy plovers that have successfully or unsuccessfully nested, are unpaired, or are not fully mature appear to use these beaches as roosting, foraging, and migration habitat from April to August and as migration and wintering habitat from September to March. Although the snowy plover breeding season spans a 6-month period, most snowy plovers breed and nest within a 2- to 3-month period. Consequently, snowy plovers spend about 9 to 10 months of the year roosting and foraging within their breeding and wintering habitat or migrating between these habitat areas. In 2017, snowy plovers were documented breeding in Los Angeles County. Snowy plovers have been intermittently nesting at Dockweiler SB since 2017 within the established Avian Conservation Area (Figure 3), which is approximately 0.4 mile north of the nearshore placement area. Non-breeding snowy plovers have regularly been documented roosting at Marina del Rey, Dockweiler SB, and Playa del Rey.

Status of the Species in the Action Area

Status of Least Terns on Marina del Rey and Dockweiler State Beach

The least tern is a small migratory seabird that breeds in southern and central California and the Pacific coast of Baja California, Mexico. The species winters in coastal southern Mexico, Central America, and South America. The least tern is present on nesting grounds in California and Baja California between April and mid-September. Within the U.S., most of the least tern breeding population is concentrated in southern California within Los Angeles, Orange, and San Diego counties. Individuals often return to their natal site (i.e., where they hatched) or to a previously used nest site (Atwood and Massey 1988) to breed. Least terns nest directly on the sand and may adorn a nest scrape with small shell fragments or pebbles. Hatched chicks move from the nest scrape within days of hatching but remain vulnerable and dependent on the parents for food and protection until they are able fly (about 28 days) and can forage efficiently. Least terns feed primarily on small, slender-bodied fishes captured in shallow water in estuaries, embayments, and nearshore waters, particularly at or near estuary and river mouths; parents make frequent trips to deliver the small fish/fish larvae needed by the chicks (Massey and Atwood 1982).

Twenty-nine extant nesting areas[7] have been identified in California (Service 2020), including natural beach or coastal strand habitat as well as manmade nest sites created from dredge materials. Because most of the wide sandy beaches suitable for least tern nesting are also heavily used for recreation and military training, there is limited opportunity for additional expansion of least tern nesting sites, and existing least tern nesting sites will continue to require intensive management to limit human disturbance, maintain suitable substrate and vegetation conditions,

[7] Nest site is used to identify a discrete nest site location, and a collective grouping of nest sites is referred to as a nesting area.

and control predators (Service 2020). Each least tern nesting colony faces a unique suite of potential disturbances and stressors related to the physical characteristics of the site, local predator abundance, local prey availability, and types of adjacent uses.

The Venice colony, located north of the Marina del Rey harbor entrance, is one of three nesting areas in Los Angeles County (Malibu Lagoon State Beach, Pier 400 Los Angeles Harbor, and Venice Beach) where least terns regularly breed and migrate and is one of the few historical sites where least terns have continued to breed, since early documented observations. Least terns have nested on or near Venice Beach since at least 1894 (WFVZR 2023). In 1897, Grinnell (1898) referenced least tern colonies at Terminal Island and Ballona Beach, and in 1908, Chambers referenced two active sites in Los Angeles and Orange Counties (Ballona Beach and Redondo Beach) and identified the Ballona Beach colony as supporting approximately 125 pairs that year (Chambers 1908). In Craig (1971), Marina del Rey and Terminal Island are both identified within a list of former nesting sites, however, Bender (1974a) identified nesting terns at Playa del Rey (defined as a salt pan in a degraded salt marsh south of the Ballona Creek flood control channel) in 1973, and least terns were documented nesting at this site through 1976 (Bender 1974b, Massey 1975, and Jurek 1977). In 1977, least terns nested at the Playa del Rey colony site, however, an unseasonal storm flooded much of the colony site and least terns abandoned the site on approximately May 16, 1977. On May 23, 1977, three pairs and three nests were located at Venice Beach, scattered over an approximately 8-acre area. The area (see Figure 3) was fenced off with metal sand fencing with the assistance of local property owners and the Los Angeles County Department of Beaches. Up to 35 least tern pairs nested at the colony site in 1977. (Atwood *et al*. 1977). The colony site has been regularly monitored since 1977.

The current colony fence demarcates the approximately 8-acre area where least tern breeding habitat is protected from direct impacts from vehicle use, beach management activities, and recreational activities. Areas within the fenced colony site are managed for least tern breeding and sheltering. Management activities include fence maintenance (i.e., annual removal of sand from around the perimeter of the fence by LACBH), population monitoring (i.e., nest monitoring, chick monitoring, banding, predation, and disturbance monitoring), habitat management/enhancement (i.e., trash removal by hand and vegetation management,), predator management, and public outreach and education. Sandy beach areas outside of the fenced colony site are also suitable least tern breeding habitat, however, these areas are degraded by high level of ongoing beach management and recreational activities that occur in areas immediately adjacent to the fenced colony site. Because of the high level of beach management and recreational activities that occur at Venice Beach, management of the fenced colony site includes using a small gauge fencing along the bottom few feet of the chain link fencing. This smaller gauge fencing is used to prevent least tern chicks from walking through the chain link fencing and onto the publicly accessible beach where they are likely to be directly impacted by on-going beach management, recreational activities, and unpermitted beach uses. The colony fencing generally needs to be replaced approximately every 10 years due to constant exposure to harsh environmental conditions on the beach. The fence has been deteriorating and in need of replacement and repair since 2017. Funding for replacement of the fence was secured in 2022, however, due to the processing time for the grant money and time needed to secure contracts, it's unlikely that the fence will be replaced until fall of 2023. Breeding least terns also use areas

within the colony site and adjacent beaches for staging prior to migration where they continue to tend to their recently fledged chicks and as temporary roosting areas.

The number of breeding pairs fluctuates between years as a result of various factors, including food availability and predation pressure. Between 2013 and 2022, the average number of pairs of least terns nesting at the colony site was 23 (Table 1). In 2022, due to the severity of fence degradation and buildup of sand, red fox (*Vulpes vulpes*) tracks and individuals (adults and young) were repeatedly observed within the fenced tern colony. In addition, due to right-of-entry permit delays, no predator control activities could occur until April 28, 2022, after least terns were already present on the site. Although two individuals were successfully removed, foxes continued to be observed through the breeding season, and the least tern colony abandoned the colony site by June 25, 2022. In 2023, small canid tracks consistent with the shape and size of red foxes were observed prior to the breeding season and then throughout the 2023 breeding season. Least terns were observed flying over the colony site adjacent navigational channel on April 28, 2023, however, by May 26, there continued to be no least tern nests documented.

Table 1. Least Tern Nesting at Venice Beach Colony Site[1]

Year	Date of First Observation at Venice	Date of First Eggs at Venice	Number of Pairs	Number of Nests
2022	April 22	NLT[2] June 22	25	3
2021	April 20	May 17	30	37
2020[3]	-	-	24	45
2019	May 1	May 8	6	6
2018	April 17	May 31[4]	5-8	5
2017	April 10	N/A [4]	10-15	0
2016	April 9	May 23	2	1
2015	April 21	May 19	40	15
2014	April 30	May 15	66	81
2013	April 22	May 10	15	30

[1] Ryan 2019a, Ryan 2019b, Ryan 2022, Frost 2014, Frost 2015, Frost 2016, Frost 2017.
[2] No Later Than (NLT), three nests were found with four eggs on June 25, 2022. A typical least tern nest is a three or four-egg clutch and therefore, nest initiation started no later than June 22, 2022. Earlier nesting attempts are likely to have occurred and been undetected due to fox predation within the colony.
[3] In 2020, due to Covid-19 pandemic restrictions, the data are incomplete or conflicted between resources and were not included.
[4] Earlier nesting attempts are likely to have occurred and been undetected due to the large presence of American crows (*Corvus brachyrhynchos*) within the colony.

The North Jetty Shoal is immediately adjacent to occupied least tern roosting habitat and approximately 250 feet from occupied breeding habitat.[8] The rock jetty and a paved access

[8] The colony fence demarcates the area where least tern breeding habitat is protected from direct impacts from vehicle use, beach management activities, and recreational activities. For this consultation, occupied least tern

path/multi-use trail separates the project footprint within the navigational channel from the sandy beach. The colony fence is approximately 350 feet from the rock jetty at the closest point. The distances for the six dredging areas are provided in Table 2 below. Please see Figure 2 for the locations of the Dredging Areas.

Table 2. Distance of Dredging Areas from Least Tern Habitat Elements

Dredging Area	Approximate Distance from Occupied Roosting Habitat	Approximate Distance from Occupied Breeding Habitat Outside the Colony Site	Minimum Distance from Occupied Breeding Habitat Inside the Colony Site
Dredging Area 6	half <300 feet, all <500 feet	550 feet	650 feet
Dredging Area 5	550 feet	1,100 feet	1,200 feet
Dredging Area 4	600 feet	1,250 feet	1,350 feet
Dredging Area 3	740 feet	1,350 feet	1,450 feet
Dredging Area 2	740 feet (north) 1,300 feet (south)	1,350 feet	1,450 feet
Dredging Area 1	1,030 feet (north) 700 feet (south)	1,780 feet	1,880 feet

Effects of the Action

Surveys During Project-Related Activities

Presence/absence surveys and breeding behavior/nest monitoring sessions have the potential to impact least terns by disturbing roosting and breeding pairs in adjacent habitat. Although least terns may be temporarily disturbed (individuals that are flushed temporarily but are able to continue to use the general area for roosting or sheltering), surveys will occur from outside of the colony fence from a distance and are likely to occur within only a portion of any territory for a short period of time. These surveys are not likely to displace least terns (i.e., subjecting individuals to repeated flushing so that they can no longer roost in a general area and therefore fly away to a different beach) either temporarily or permanently. Furthermore, pre-project surveys, presence/absence surveys, and breeding behavior/nest monitoring sessions will be conducted by individuals familiar with avian biology and ecology and that have field experience surveying for nests and broods and conducting monitoring activities for least terns. Therefore, implementation of the above conservation measures (CM 1, CM 15, and CM 16) involving presence/absence surveys and breeding behavior/nest monitoring sessions may result in minor

breeding habitat includes sandy beach habitat where least terns court, nest, and where breeding least terns will continue to feed and tend to their recently fledged young. This includes the area within the fenced colony site, beach habitat outside of the colony site within approximately 100 feet to the north and south, and beach habitat approximately 300 to 350 feet west from the colony site fence to the water line. Sandy beach areas outside of these areas could also be suitable least tern breeding habitat, however, these areas are degraded by the high level of ongoing beach management and recreational activities so that breeding activities are unlikely to be successful.

disturbance to least terns, but this disturbance is anticipated to have an insignificant effect (i.e., unable to be meaningfully measured, detected, or evaluated) on least tern survival and reproduction.

Project-related Noise, Activity, Equipment Use, and Lighting

Daytime project activities in the project footprints include the use of a clamshell dredge, a tugboat, and two split-hulled barges. Nighttime activities will also include operation of a clamshell dredge, a tugboat, and two split-hulled barges. In addition, during nighttime dredging activities, the clamshell dredge will operate built-in lights to illuminate the immediate work area and an approximately 100-foot radius around the vessel and the tugboat and barges will operate with their running lights illuminated. Project activities consisting of use of the dredge, tugboat, two barges, and workers and their associated noise and movement will occur for 24 hours a day, 7 days a week, for 150 days.

Noise, vibrations, and movement associated with the use of mechanized equipment (clamshell dredge), the tugboat, split-hulled barges, and workers during project activities have the potential to disrupt least tern behaviors in the project footprints and within adjacent habitat, discouraging least terns from breeding, foraging, and roosting in the project area, and by startling birds and masking intraspecific communication. (e.g., see Dooling and Popper 2007 for a discussion of observed effects of highway noise on birds). Although least terns on Venice Beach are already exposed to some level of noise and movement associated with human presence on this recreational beach and the public navigational channel, project-related noise levels are anticipated to be significantly higher than the existing ambient noise levels within the project footprint. The Corps has identified that operation of the tugboat and the clamshell dredge are anticipated to produce approximately 87 and 77 dBA, respectively, when measured approximately 50 feet from the equipment. Because sound decreases as the distance from the source of the noise increases, tugboat noise at 100 feet away will be about 81 dBA, at 400 feet will be about 69 dBA, and at 1,600 feet will be about 57 dBA (Table 3). During clamshell dredging activities, the most intense noise will be produced underwater when the bucket impacts with the seafloor. Noise levels for the scows is anticipated to be similar to, and no more than, that of the tugboat (87 dBA).

Table 3. Noise Level of Equipment as Distance Increases from the Noise Source

Equipment	Noise Level at 50 feet	Noise Level at 100 feet	Noise Level at 200 feet	Noise Level at 400 feet	Noise Level at 800 feet	Noise Level at 1,600 feet
Tugboat	87 dBA	81 dBA	75 dBA	69 dBA	63 dBA	57 dBA
Clamshell Dredge	77 dBA	71 dBA	65 dBA	59 dBA	53 dBA	47 dBA
Split-hull Barge	87 dBA	81 dBA	75 dBA	69 dBA	63 dBA	57 dBA

We anticipate that behavior of migrating (to their breeding grounds) and breeding least terns in response to project-related noise disturbance, lighting, and visual disturbance in the breeding season will be highly variable. In breeding adults, this may include nighttime startling and disorientation from nighttime lighting; increased stress; interruption of normal nighttime behaviors due to illumination of breeding, feeding, and sheltering habitat; increased energy expenditure from being excluded (i.e., forced to move out of) from foraging habitat or from a reduction in foraging success within close proximity to project equipment; interruption of courtship activities; increased energy expenditure from being repeatedly forced off the nest; and abandonment of an active nest. Breeding adults that are repeatedly disturbed within breeding habitat or that are displaced from nesting, foraging, and roosting habitat will expend increased time and energy as they are forced to move away from suitable breeding, feeding, and sheltering habitat or while locating new nesting, foraging, and roosting sites. These individuals are expected to experience reduced productivity (e.g., delayed initiation or prevention of nest building, increased agonistic behavior between pairs, fewer nesting attempts per season, and/or overall reduction in reproductive output) and an increased risk of mortality from high energetic demands.

To avoid these types of impacts on breeding least terns, the Corps will: schedule the project work at the navigation channel to begin as close to September 15 as is practicable (CM 11) which should provide a larger amount of the project to be completed prior to least terns arriving back on their breeding grounds; schedule the dredging to start at the north end of the project footprint closest to colony site and will work away from the Venice colony site (CM 12) concentrating project activities farther away from occupied breeding habitat at Marina del Rey as the breeding season begins; prioritize dredging activities within areas 1,500 feet of the colony site (i.e., North Jetty Shoal and Dredging Areas 6, 5, and 4) so that dredging activities after April 1, 2024, occur only in areas greater than 1,500 feet from the colony site and project-related noise levels are likely to be no louder than ambient noise (CM 13); shield vessel lighting and use the lowest illumination necessary to minimize light spill (CM 8), conduct behavior monitoring of least terns exhibiting breeding behaviors and tending nests (CM 15 and CM 16); and will finalize project activities by May 31, 2024 (CM 11). With implementation of the proposed minimization measures, and because there is a high availability of foraging habitat along Los Angeles County beaches for use by least terns outside of the project footprints, we anticipate that least terns that are displaced out of foraging habitat due to the presence of project equipment and vessels will continue to find suitable foraging habitat in adjacent areas. The majority of the project work will be completed prior to least terns arriving back to their breeding grounds, and project activities will be scheduled to be completed closest to the colony site first with the purpose that areas closest to occupied breeding, feeding, and sheltering habitat are free from project-related noise above ambient noise levels. Also, equipment use, activity, and lighting with be at least 1,500 feet from occupied least tern breeding habitat when least terns arrive back to their breeding grounds. For these reasons, we have determined that least tern habitat that is currently occupied will continue to be used by the species, and the potential effects to least terns from project activities, noise, lighting, and equipment will have an insignificant effect on least tern survival and reproduction.

Turbidity and Sedimentation within the Dredging Footprints and the Nearshore Placement Site

Dredging within the Navigational Channel and the North Jetty Shoal

Dredging of excess sediment within the navigational channel and North Jetty Shoal may disrupt or reduce least tern foraging success in the vicinity of the project footprints as a result of project-related turbidity levels temporarily degrading suitable foraging habitat. Dredging activities will create a turbidity plume of suspended particulate matter that lowers water clarity, decreasing the visibility of prey (small fish) to least terns foraging within the navigation channel and adjacent areas of the Pacific Ocean. The Corps estimates that dredging activities will result in a turbidity plume around the clamshell dredge that may extend up to 300 feet in radius[9] (approximately 6.5 acres in size), generally in the direction of dominant currents, from the active dredge site and that a larger, less opaque plume may be detected beyond the 300-foot radius. The reduction in least tern foraging success within the turbidity plume could result in least terns expending increased time and energy as they are forced to forage for longer periods of time in poor quality habitat, flying greater distances to forage, or while locating new foraging sites. Although least terns may experience a decreased ability to detect prey and increased time foraging in poor quality habitat while foraging in these areas, there is also some evidence that increased turbidity can alter the behavior of fish, making them easier to capture (Keane and Smith 2016) by foraging least terns. However, in general, the relationship between water clarity and foraging success by least terns and other seabirds has been studied to some extent with mixed conclusions (Burton and Terrill 2012). Although project-related turbidity is expected during project implementation, increased turbidity over the long-term is not expected to be a persistent problem once dredging of the navigation channel and North Jetty Shoal is completed and the suspended fine particulates can settle out of the water column.

Nevertheless, the Corps will: schedule the project work at the navigation channel to begin as close to September 15 as is practicable (CM 11) which should provide a larger amount of the project to be completed prior to least terns arriving back on their breeding grounds; schedule the dredging to start at the north end of the project footprint closest to the colony site and will work away from the Venice colony site (CM 12) concentrating project activities farther away from occupied breeding habitat at Marina del Rey as the breeding season begins; prioritize dredging activities within areas 1,500 feet of the colony site (i.e., North Jetty Shoal and Dredging Areas 6, 5, and 4) so that dredging activities after April 1, 2024, occur only in areas greater than 1,500 feet from the colony site (CM 13) and will monitor for turbidity and employ silt curtains or otherwise alter project activities if turbidity exceeds compliance thresholds until turbidity levels reach an acceptable range to minimize the effects and extent of turbidity (CM 7). We anticipate that with implementation of the above conservation measures and because several hundred acres of shallow water and nearshore water foraging habitat will be available for use by least terns in adjacent nearshore habitat and the Pacific Ocean where no project activities will be creating

[9] The turbidity plume is unlikely to be in a circular shape, however, the plume is likely to extend around the entirety of the dredging vessel and, due to the currents, is likely to be larger in some areas than in other areas around the dredging vessel. We are using the area of a circle with the radius of 300 feet to estimate the approximate size of the turbidity plume.

turbidity plumes, sufficient foraging resources will be available for least terns outside of the project footprint, and potential effects to least tern survival and productivity from temporary degradation of foraging habitat will be insignificant.

Turbidity within least tern foraging habitat caused by suspended silt and other particulates may disrupt or reduce least tern foraging success due to a temporary degradation of suitable foraging habitat in the vicinity of the project footprints as a result of project-related sedimentation of the invertebrate and marine plant communities. Turbidity can kill suspension-feeding benthic animals (Peterson et al. 2000, Bell *et al*. 2015) by clogging intake mechanisms resulting in impacts to biological processes and reductions in feeding efficiency, through smothering and abrasion (Bell *et al*. 2015), through a reduction in light availability which can impact photosynthetic symbionts (Fraser *et al*. 2017), and through altering sediment characteristics that result in a change in the rate of invertebrate recolonization and in the invertebrate community composition (Peterson et al. 2000; Wooldridge et al. 2016) in nearshore habitats. Turbidity can also impact seagrasses and other vegetation including micro and macroalgae through a reduction in light availability as a result of increased suspension of sediments and direct sedimentation of the plants which can impact plant physiology and productivity (Erftemeijer and Lewis 2006). These types of impacts to marine plant communities can then degrade vegetated shallows as nesting, spawning, nursery, cover, and forage areas for fish and invertebrate species and their larvae. Impacts to the invertebrate community which least tern prey fish likely feed on and impacts to marine vegetation which support spawning, nursery, cover and forage for fish are likely to cause reduced prey availability resulting in a disruption or reduction in least tern foraging success within the project footprint and adjacent areas. This reduction in least tern foraging success could result in least terns expending increased time and energy as they are forced to forage for longer periods of time in poor quality habitat, flying greater distances to forage, or while locating new foraging sites. Although project-related turbidity is expected during project implementation, increased turbidity over the long-term is not expected to be a problem in the nearshore area post-placement of dredged materials, because the sediment was determined by the SC-DMMT to be a good match between the parent material and the receiver site, and the material is not anticipated to contain high silt or clay content that is easily mobilized by wave action (Peterson *et al*. 2006). Once project activities are completed, the suspended particulates are expected to settle out of the water column.

To minimize these types of impacts on breeding least terns, the Corps will: schedule the project work at the navigation channel to begin as close to September 15 as is practicable (CM 11) to allow a larger amount of the project to be completed prior to least terns arriving back on their breeding grounds; schedule the dredging to start at the north end of the project footprint closest to colony site and work away from the Venice colony site (CM 12) concentrating project activities farther away from occupied breeding habitat at Marina del Rey as the breeding season begins so the plume of increased turbidity will shift farther away as the breeding season approaches; and monitor for turbidity and employ silt curtains or otherwise alter project activities if turbidity exceeds compliance thresholds until turbidity levels reach an acceptable range to minimize the effects and extent of turbidity (CM 7). Given several hundred acres of shallow water and nearshore water foraging habitat will be available for use by least terns in adjacent nearshore habitat and the Pacific Ocean where no project activities will be creating turbidity

plumes, combined with the implementation of the conservation measures discussed above, we anticipate that sufficient foraging resources will be available for least terns outside of the project footprint, and potential effects to least tern survival and productivity from temporary degradation of foraging habitat will be insignificant.

Placement of Sand within the Nearshore Placement Site for Beach Nourishment Material for Downcoast Beaches

The Corps estimates that sediment placement will result in a turbidity plume around the placement site that may extend up to 300 feet, from the perimeter of the approximately 59-acre nearshore placement site, generally in the direction of dominant currents. A larger, less opaque plume may be detected beyond the 300-foot radius. Excavated sediment placed within the nearshore habitat may disrupt or reduce least tern foraging success in the vicinity of the nearshore placement site and adjacent areas of the Pacific Ocean as a result of project-related increased turbidity levels temporarily degrading suitable foraging habitat when dredged material placement creates turbidity, lowering water clarity and decreasing the visibility of prey to foraging least terns. As explained in the Dredging within the Navigational Channel and the North Jetty Shoal Section above, project-related sedimentation from the turbidity will result in impacts to the invertebrate and marine plant communities which support least tern prey species. In addition, nearshore and swash zone habitats will be impacted when dredged materials are placed on top of them, burying them under 600,000 cy of sand, and when finer dredged materials are redistributed by tidal action into adjacent nearshore and/or onshore habitats further impacting invertebrate and marine plant communities in the project vicinity. These types of impacts are likely to cause reduced prey availability resulting in a reduction in least tern foraging success within this portion of the project footprint and adjacent areas. As with the dredging area, this reduction in least tern foraging success is likely to contribute to least terns expending increased time and energy foraging for longer periods in poor quality habitat, flying greater distances to forage, and/or while locating new foraging sites. To minimize these types of impacts on breeding least terns, the Corps will implement CM 11, CM 12, and CM 7 as described above. We anticipate that with implementation of these conservation measures, combined with the fact that several hundred acres of shallow water and nearshore water foraging habitat will be available for use by least terns in adjacent nearshore habitat outside of the project footprint, the potential effects to least tern survival and productivity from temporary degradation of foraging habitat will be insignificant.

Contaminant Exposure

Sediment dredging and placement of sediments conducted in areas known to support least tern foraging could expose least terns to harmful levels of contaminants if contaminants are present in disturbed sediment or is present in high levels in least tern prey items. However, the Corps has completed the consultation process for determining if the dredged materials will be suitable for nearshore placement, which includes an evaluation for the potential for contaminants within dredged materials. These materials have been approved for nearshore placement by the SC-DMMT. The Corps will prepare and implement a Spill Prevention Plan to address accidental spills that occur during project implementation (CM 6) and will ensure water quality parameters

are monitored (CM 7) during project implementation. Given the approval of the SC-DMMT for the proposed placement, and with incorporation of the proposed conservation measures, we anticipate that potential exposure to contaminants from disturbed sediment or spills and their potential effects to least tern survival and productivity will be insignificant.

Based on the above analysis, the Service concurs with your determination that the proposed action may affect, but is not likely to adversely affect, the California least tern. With this determination, the interagency consultation requirements of section 7 of the Act have been satisfied. This determination shall be reconsidered if: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (2) this action is subsequently modified in a manner that was not considered in this assessment, or (3) a new species is listed, or critical habitat designated that may be affected by the action.

If you have any questions regarding this consultation, please contact Katy Kughen[10] at 760-431-9440, extension 201.

Sincerely,

CAROL ROBERTS
Digitally signed by CAROL ROBERTS
Date: 2023.08.04 13:52:59 -07'00'

For Jonathan D. Snyder
Assistant Field Supervisor

[10] katy_kughen@fws.gov

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May 2023

Figure 1. Project Footprints for the Maintenance Dredging of Marina del Rey Harbor Project (Corps 2023).

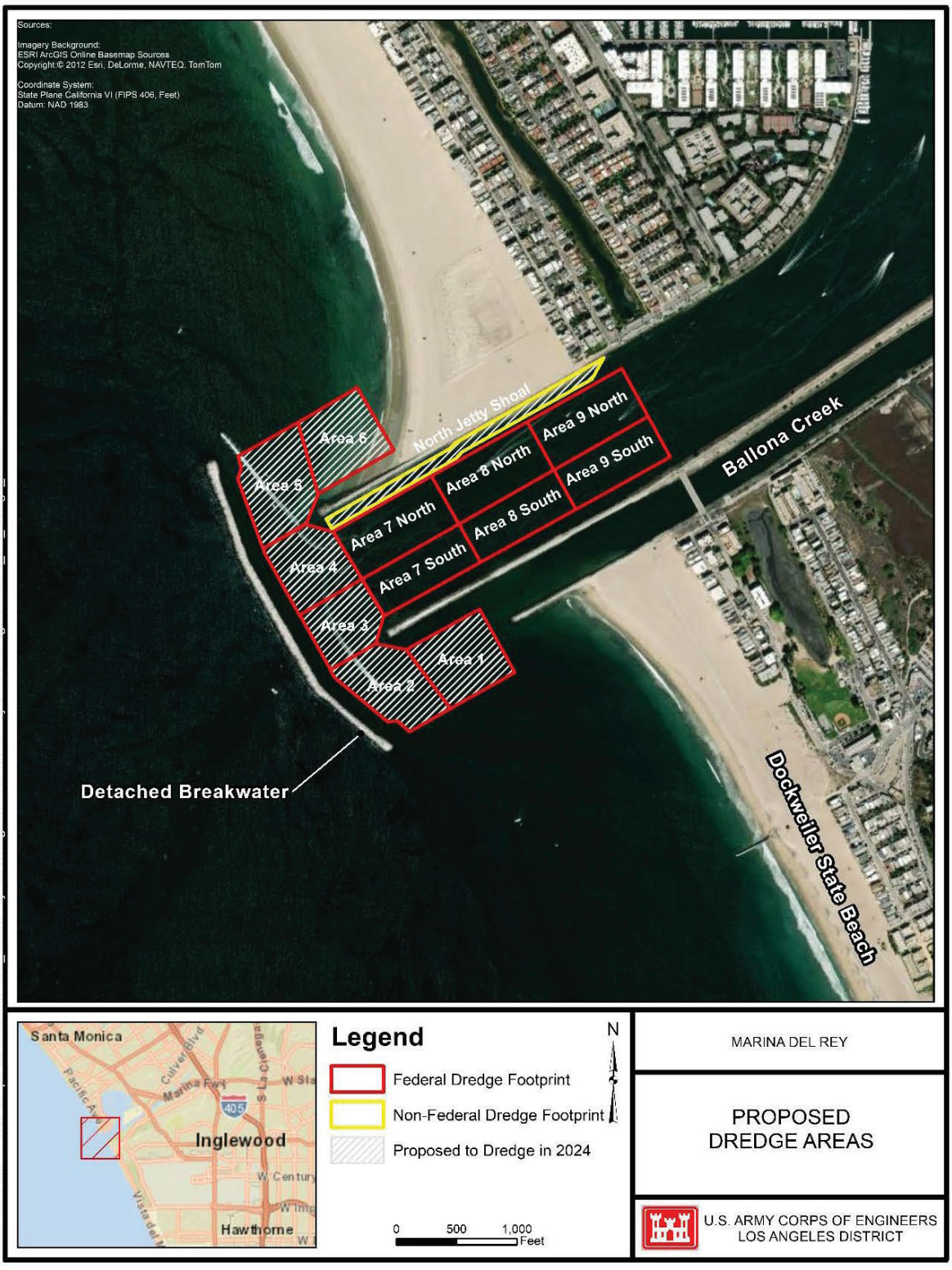

Figure 2. Dredging Areas 1 through 6 and the North Jetty Shoal Footprints for the Maintenance Dredging of Marina del Rey Harbor Project. (Corps 2023)

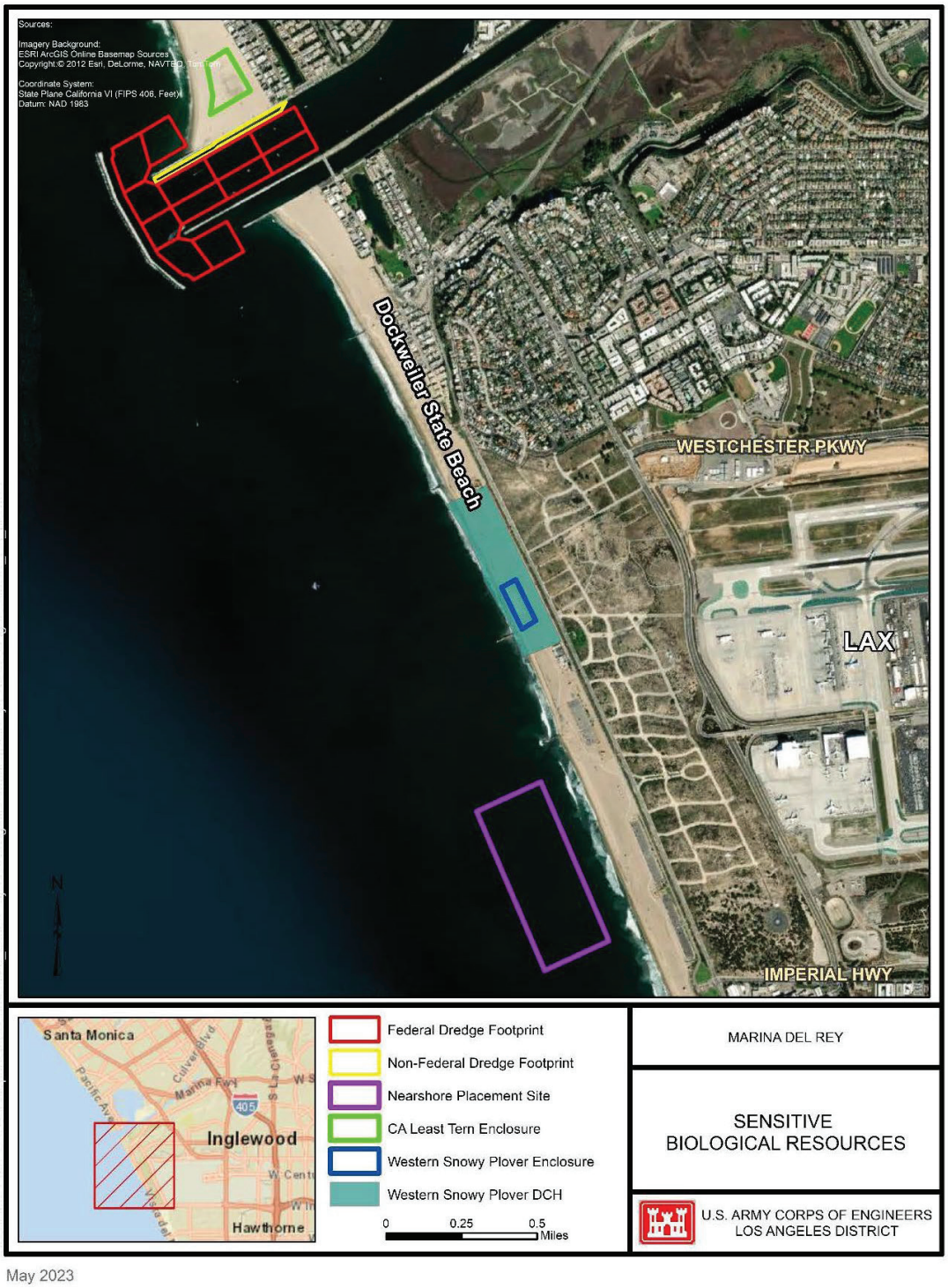

Figure 3. Project Footprints in Relationship to Snowy Plover Critical Habitat and the Dockweiler SB Avian Conservation Area. (Corps 2023)

From: Jhen Cabasal (she/her) - NOAA Federal
To: Armenta, Tiffany C CIV USARMY CESPL (USA)
Cc: Dan Lawson - NOAA Federal; Bryant Chesney - NOAA ...
Subject: [URL Verdict: Neutral][Non-DoD Source] Re: Marina del Rey EFH consultation
Date: Monday, July 10, 2023 3:23:43 PM

Hi Tiffany,

NOAA's National Marine Fisheries Service (NMFS) has reviewed the U.S. Army Corps of Engineers' (USACE) essential fish habitat (EFH) assessment for the Marina del Rey Harbor maintenance dredging project. NMFS generally concurs with the EFH adverse effects analysis within the assessment and the USACE's determination that impacts to EFH would not be substantial. In addition, NMFS believes the environmental commitments summarized in the assessment and through electronic communication adequately address anticipated adverse effects to EFH. Therefore, we have no additional EFH conservation recommendations to provide. Thank you for consulting with NMFS!

On Fri, Jun 9, 2023 at 8:48 AM Dan Lawson - NOAA Federal <dan.lawson@noaa.gov> wrote:

> Hello Tiffany
>
> Jhen Cabasal will be handling your EFH consultation request, and in touch as needed to help complete it.
>
> Dan
>
> On Thu, Jun 8, 2023 at 9:56 AM Armenta, Tiffany C CIV USARMY CESPL (USA) <Tiffany.C.Armenta@usace.army.mil> wrote:
>
> > Dear Mr. Dan Lawson,
> >
> > The Corps, as part of its Operations and Maintenance Program, is proposing to perform maintenance dredging in the Marina del Rey Federal Navigation Channel to re-establish authorized channel depths. The Corps is requesting initiation of Essential Fish Habitat (EFH) consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, as amended. Comments and Conservation Recommendations, or concurrence with the Corps' EFH Assessment attached here, are requested.
> >
> > The proposed action includes a one-time maintenance dredging and disposal of Marina del Rey harbor between October 2023 and May 2024. Dredged material would be placed in the Nearshore Placement Site approximately 2 miles south of the harbor. Dredging and placement of dredged material would be performed with a clamshell dredge. The proposed federal maintenance dredging includes annual removal of up to 400,000 cubic yards (cy) of littoral material from the Federal Navigation Channel. The proposed dredging is a fully federal project, using solely federal appropriations to fund the work.

The Proposed Action would serve the following purposes: (1) maintain the Federal Navigation Channel to authorized design depths, which is subject to continual filling by littoral transport processes; (2) assure continued safe navigation for maritime traffic within the harbor by minimizing the risk of hazardous shoaling conditions; and (3) provide beach nourishment material for downcoast beaches.

Attached is the Corps' draft EFH assessment. Comments and Conservation Recommendations, or concurrence with the Corps' EFH Assessment, are requested by July 10, 2023.

If you have any questions regarding this consultation request, please contact me at (310) 259-7833 or via email at tiffany.c.armenta@usace.army.mil.

Thank you,

Tiffany Armenta, PhD

Biologist

Environmental Resources Branch

Los Angeles District, U.S. Army Corps of Engineers

310-259-7833

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Jhenevieve (Jhen) Cabasal (she/her)
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