California

(1) The California coast of the United States,is mostly rugged and mountainous, with high land rising abruptly from the sea in many places. South of San Francisco Bay the mountains are usually bare or covered with chaparral and underbrush. North of the bay the mountains are generally well timbered.

(2)

Disposal sites and dumping grounds

(3) These areas are rarely mentioned in the Coast Pilot but are shown on the nautical charts. (See Disposal Sites and Dumping Grounds, chapter 1, and charts for limits.)

(4)

Aids to navigation

(5) Lights are numerous along the coast; there are only a few places where a vessel is not in sight of one or more lights. Sound signals are at most of the principal light stations. Many coastal and harbor buoys are equipped with radar reflectors, which greatly increase the range at which the buoys may be detected. The critical dangers are buoyed and are generally marked by kelp.

(6) There are many aerolights along the coast that are useful for navigation purposes, but they should not be confused with the marine lights. (See the Light List for a complete description of navigational aids.)

(7) The frequent occurrence of fog along this coast makes radar an invaluable aid in detecting other traffic and obtaining a line of position and/or fix. Bridge-to-bridge radio communication (VHF-FM) is another useful aid, regardless of weather, in waters where maneuvering room is limited or restricted. The primary advantages of this radio system are its line-of-sight characteristic and relative freedom from static interference.

(8)

COLREGS Demarcation Lines

(9) Lines have been established to delineate those waters upon which mariners must comply with the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS), and those waters upon which mariners must comply with the Inland Navigational Rules Act of 1980 (Inland Rules). The waters inside of the lines are **Inland Rules Waters**, and the waters outside of the lines are **COLREGS Waters**. (See **33 CFR Part 80**, chapter 2, for specific lines of demarcation.)

(10)

Ports and Waterways Safety

(11) (See **33 CFR Part 160**, chapter 2, for regulations governing vessel operations and requirements for notification of arrivals, departures, hazardous conditions and certain dangerous cargoes to the Captain of the Port.)

(12)

Channels

(13) **Federal project depth** is the dredging depth of a channel as authorized by an Act of Congress upon recommendation of the Chief of Engineers, U.S. Army. **Controlling depth** in a channel is its least depth; it restricts use of the channel to drafts less than that depth.

(14) Where deepwater channels are maintained by the Corps of Engineers and the controlling depths are printed on the charts, the Coast Pilot usually gives only the project depth. Because of constant shoaling in places, depths may vary considerably between maintenance dredgings. (See Notice to Mariners and latest editions of charts for controlling depths.)

(15) Where secondary channels are maintained regularly by the Corps of Engineers, the Coast Pilot refers to information in Appendix A. Surveys and channel condition reports are available through a USACE hydrographic survey website listed in Appendix A. For detailed channel information and minimum depths as reported by the U.S. Army Corps of Engineers (USACE), use NOAA Electronic Navigational Charts.

(16) In the case of other channels, the controlling depths printed in the Coast Pilot are from the latest available reports, which may, however, be several years old.

(17)

Depths

(18) **Depths** along most of the Pacific coast decrease much too rapidly from seaward to be of any practical use as an aid to navigation. The 100-fathom curve lies at an average distance of less than 10 miles from shore, but this distance is exceeded in the approaches to San Francisco Bay.

(19) In general, depths given alongside wharves are those reported by owners and/or operators of the waterfront facilities and have not been verified by government surveys. Since these depths may be subject to change, local authorities should be consulted for current controlling depths.

(20) Depths are in feet below the low-water tidal datum of the charts; deck heights where given are in feet above the chart datum for water depths.

(21)

Traffic Separation Schemes

(22) **Traffic Separation Schemes (Traffic Lanes)** have been established from the Gulf of Santa Catalina to the

(27)

North American Emission Control Area Low Sulfur Fuel Oil Regulations

General Information

International Maritime Organization: The International Convention for the Prevention of Pollution from Ships (MARPOL) ANNEX VI Regulation 14 requires ships with Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder use fuel with sulfur content less than 0.1%, after 01 January 2015 within 200 miles of the North American area and when operating in the United States Caribbean Sea area – as defined in Appendix VII of Annex VI of MARPOL.

The California Air Resources Board (ARB) created regulations for vessel emissions reductions for California's ports as part of its continued mission to improve air quality around the state. The requirements came into effect in July 2009, under Title 13 California Code of Regulations (CCR), Section 2299.2, *Fuel Sulfur and Other Operational Requirements for Ocean Going Vessels within California Waters and 24 Nautical Miles of the California Baseline*.

The regulations require vessels use distillate fuel, either marine gas oil with maximum 0.1% sulfur, or marine diesel oil with maximum 0.1% sulfur, in their main and auxiliary engines. These regulations are still in effect pending review in April 2015.

Following the implementation of the regulations, California continued to experience loss of propulsion (LOP) incidents within state waters at a much higher rate than was seen prior to July 2009. This advisory focuses upon reducing the probability of an LOP incident occurring on vessels due to the use of Low Sulfur Distillate Fuel Oil (LSDFO).

OPERATIONS

Initial Entry

For vessels intending to enter the North American Emissions Control Area (NAECA) for the first time, the crew is advised to conduct a "TRIAL" (actual) fuel switching within 45 days prior to entering NAECA waters. Run main and auxiliary engines no less than four (4) hours on LSDFO if the vessel intends to use distillate fuel to comply with MARPOL ECA regulations. This will help identify any specific change over or operational issues or problems.

REPEAT AND INITIAL ENTRY

Part One–Training:

- Within 45 days prior to entering any port within the NAECA, vessel engineers are strongly advised to exercise*:*
  - A. Operating main engine from the engine control room.
  - B. Operating main engine from engine side (local).
- Crew should become familiar with "Failure to Start" procedures while maneuvering and establish corrective protocols for "Failure to Start" incidents.

Part Two–While Underway after Fuel Switching Completed (HFO to Low Sulfur Distillate):

- Ensure one of the senior* engineering officers is in the engine control room while the vessel is in pilot waters and be:
  - A. Able to operate the vessel main engine from the engine control room.
  - B. Able to operate the vessel main engine from engine side (local).

*Special Attention to International Standards of Training, Certification and Watchkeeping (STCW) Rest Requirements

Part Three–Engine Guidelines:

- Consult engine and boiler manufacturers for fuel switching guidance.
- Consult fuel suppliers for proper fuel selection.
- Exercise strict control when possible over the quality of the fuel oils received.
- Consult manufacturers to determine if system modifications or additional safeguards are necessary for intended fuels.
- Develop detailed fuel switching procedures.
- Establish a fuel system inspection and maintenance schedule.
- Ensure system pressure and temperature alarms, flow indicators, filter differential pressure transmitters, etc., are all operational.
- Ensure system purifiers, filters and strainers are maintained.
- Ensure system seals, gaskets, flanges, fittings, brackets and supports are maintained.
- Ensure that the steam isolation valves on fuel lines, filters, heaters etc. are fully tight in closed position while running on Low Sulfur Distillate Fuel Oil.
- Ensure that the fuel oil viscosity and temperature control equipment is accurate and operational.
- Ensure detailed system diagrams are available and engineers are familiar with systems and troubleshooting techniques. Senior engineering officers should know the location and function of all automation components associated with starting the main engine.

(28)

California Code of Regulations – Oil Spill Contingency Plans for Non-tank Vessels

Non-tank vessels (300 gross tons or greater) entering California waters should be aware of California state regulations that set forth planning requirements for oil spill prevention and response, unless otherwise exempt as defined in the regulation.

Owners or operators of non-tank vessels which are 300 gross tons or greater, shall provide an oil spill contingency plan for that non-tank vessel. The planning requirements specify that the owner/operator of a non-tank vessel must own or have contracted for on-water recovery and storage resources sufficient to respond to all spills up to the reasonable worst case spill volume in the time frames specified. The information required must be submitted to the Office of Spill Prevention and Response (OSPR), and maintained by the owner/operator.

For more information, reference the **California Code of Regulations (CCR), Title 14, Division 1, Subdivision 4, Chapter 3, Subchapter 4**: *wildlife.ca.gov/OSPR/Legal/OSPR-Regulations-Index*

In addition to the state regulations noted above, non-tank vessel owners/operators should be familiar with Federal regulations for a Notification of Arrival requirement (**33 CFR 160 – Subpart C, chapter 2**) and non-tank vessel response plans (**33 CFR 155 – Subpart J**, not contained in this Coast Pilot.)

vicinity of Point Conception, off the entrance to San Francisco Bay.

(23)

Vessel Traffic Services

(24) **Vessel Traffic Services (VTS)** have been established in the San Francisco Bay area. The services have been established to prevent collisions and groundings and to protect the navigable waters from environmental harm.

(25) The Vessel Traffic Services provide for a **Vessel Traffic Center (VTC)** that may regulate the routing and movement of vessels by radar surveillance, movement reports of vessels, VHF-FM radio communications and specific reporting points. The systems consists of traffic lanes, separation zones, precautionary areas and reporting points.

(26) Participation in the **Vessel Traffic Service San Francisco** is mandatory for certain vessels within navigable waters of the United States and within the 12-mile boundary of the U.S. territorial sea. (See chapter 7 for details.) (See **33 CFR 161.1** through **161.60**, chapter 2, for rules governing vessel operations in the Vessel Traffic Service)

(29) **Offshore Vessel Movement Reporting System San Francisco** has been established in the ocean approaches to San Francisco; the system is mandatory. (See chapter 7 for details.)

(30) **Vessel Traffic Information Service LosAngeles/ Long Beach** has been established for the approaches to Los Angeles and Long Beach; the Service is voluntary. (See chapter 4 for details.)

(31)

Area to be Avoided

(32) Along the coast of California are areas that require specific attention. Most of these areas are associated with marine sanctuaries and are noted on charts as an Area to be Avoided. These areas are adopted by the International Maritime Organization in an effort to avoid the risk of pollution to their associated sanctuaries. See the following chapters for detailed information on the areas: the Channel Islands (chapter 5) and off San Francisco (chapter 7).

(33)

Recommended Tracks, California

(34) Along the California coast, west of Monterey Bay and between Point Sur and Pigeon Point, recommended tracks have been adopted by the International Maritime Organization. These tracks consist of two sets (northbound and southbound) each. The tracks closest to the coast are for vessels 300 gross tons or greater, except those carrying hazardous cargo in bulk or crude oil. The other set of tracks farthest offshore is for vessels carrying hazardous cargo in bulk. (See chapter 6 for details.)

(35)

Offshore Vessel Traffic Management Recommendations

(36) Based on the West Coast Offshore Vessel Traffic Risk Management Project, which was co-sponsored by the Pacific States/British Columbia Oil Spill Task Force and U.S. Coast Guard Pacific Area, it is recommended that, where no other traffic management areas exist such as Traffic Separation Schemes, Vessel Traffic Services or recommended routes, vessels 300 gross tons or larger transiting along the coast anywhere between Cook Inlet and San Diego should voluntarily stay a minimum distance of 25 nautical miles offshore. It is also recommended that tank ships laden with persistent petroleum products and transiting along the coast between Cook Inlet and San Diego should voluntarily stay a minimum distance of 50 nautical miles offshore. Vessels transiting short distances between adjacent ports should seek routing guidance as needed from the local Captain of the Port or VTS authority for that area. This recommendation is intended to reduce the potential for vessel groundings and resulting oil spills in the event of a vessel casualty.

(37)

Drawbridges

(38) The general regulations that apply to all drawbridges are given in **33 CFR 117.1** through **117.49**, chapter 2,

and the specific regulations that apply only to certain drawbridges are given in **33 CFR Part 117, Subpart B**, chapter 2. Where these regulations apply, references to them are made in the Coast Pilot under the name of the bridge or the waterway over which the bridge crosses.

(39) The drawbridge opening signals (see **33 CFR 117.15**, chapter 2) have been standardized for most drawbridges within the United States. The opening signals for those few bridges that are nonstandard are given in the specific drawbridge regulations. The specific regulations also address matters such as restricted operating hours and required advance notice for openings.

(40) The mariner should be acquainted with the general and specific regulations for drawbridges over waterways to be transited.

(41)

Anchorages

(42) Anchorages, affording shelter for large vessels from the severe northwest winds of summer, may be had in a number of places along the coast. In southeast and southwest weather there are few places where shelter is available; San Diego Bay, Los Angeles Harbor, the lee side of the Channel Islands and Monterey Bay are the only places south of San Francisco Bay. North of San Francisco, good shelter is found in Humboldt Bay but must be made before the sea rises, as afterward the bars become impassable. Many anchorages have been established in the area covered by this Coast Pilot. (See **33 CFR Part 110**, chapter 2, for limits and regulations.)

(43)

Dangers

(44) There are few outlying dangers, the principal ones being Bishop Rock, west of San Diego; Noonday Rock and the Farallon Islands, off San Francisco Bay; and Blunts, St. George, Rogue River, Orford and Umatilla Reefs, north of San Francisco. The Channel Islands, off southern California, are the largest, most prominent and the farthest offshore of any islands along the coast.

(45)

Oil Well Structures

(46) Offshore drilling and exploration operations are increasing in the waters off California, especially in Santa Barbara Channel.

(47) Obstructions in these waters consist of submerged wells and oil well structures (platforms), including appurtenances thereto, such as mooring piles, anchor and mooring buoys, pipes and stakes.

(48) Pacific offshore platforms are regulated by **safety zones** administered and enforced by the United States Coast Guard. (See **33 CFR 147**, chapter 2, for limits and regulations.) If, for safety reasons, a vessel must approach an offshore platform, it is essential to notify the operator of the platform and/or the Captain of the Port on VHF-FM channel 16 for permission to enter the safety zone. Boarding or mooring to a platform is strongly discouraged and may be considered trespass unless permission is given in advance from the platform operator or Captain of the Port or access to the platform is required as a result of emergency circumstances.

(49) In general, the oil well structures (platforms), depending on their size, depth of water in which located, proximity of vessel routes, nature and amount of vessel traffic and the effect of background lighting, may be marked in one of the following ways:

(50) Quick flashing white light(s) visible at least 5 miles: sound signal sounded when visibility is less than 5 miles.

(51) Quick flashing white light(s) visible at least 3 miles: sound signal sounded when visibility is less than 3 miles.

(52) Quick flashing white or red lights visible at least 1 mile: may or may not be equipped with sound signal.

(53) Structures on or adjacent to the edges of navigable channels and fairways, regardless of location, may be required to display lights and sound signals for the safety of navigation.

(54) Associated structures within 100 yards of the main structure, regardless of location, are not normally lighted but are marked with red or white retro-reflective material. Mariners are cautioned that uncharted submerged pipelines and cables may exist in the vicinity of these structures or between such structures and the shore.

(55) During construction of a well or during drilling operations, and until such time as the platform is capable of supporting the required aids, fixed white lights on the attending vessel or drilling rig may be shown in lieu of the required quick flashing lights on the structure. The attending vessel's foghorn may also be used as a substitute.

(56) Submerged wells may or may not be marked depending on their location and depth of water over them.

(57) All obstruction lights and sound signals, used to mark the various structures, are operated as privately maintained aids to navigation. (See **33 CFR 67**, for detailed regulations for the marking of offshore structures.)

(58) Information concerning the establishment, change or discontinuance of offshore oil-well structures and their appurtenances is published in the Local Notice to Mariners or by Broadcast Notice. Additional information may also be obtained from the Coast Guard Commander. Mariners are advised to navigate with caution in the vicinity of these structures and in those waters where oil exploration is in progress and to use the latest and largest scale chart of the area.

(59) During the continuing program of establishing, changing and discontinuing oil-well structures, special caution should be exercised when navigating the inshore and offshore waters of the affected areas in order to avoid collision with any of the structures.

(60) Information concerning seismographic operations is not published in Notice to Mariners unless such operations create a menace to navigation in waters used by general navigation. Where seismographic operations are being conducted, casings (pipes), buoys, stakes and detectors are installed. Casings are marked with flags by day and fixed red lights by night; buoys are colored international

orange and white horizontal bands; and stakes are marked with flags.

(61)

Pipelaying barges

(62) With the increased number of pipeline laying operations, operators of all types of vessels should be aware of the dangers of passing close aboard, close ahead or close astern of a jetbarge or pipelaying barge. Pipelaying barges and jetbarges usually move at 0.5 knot or less and have anchors that extend out about 3,500 to 5,000 feet in all directions and that may be marked by lighted anchor buoys. The exposed pipeline behind the pipelaying barge and the area in the vicinity of anchors are hazardous to navigation and should be avoided. The pipeline and anchor cables also represent a submerged hazard to navigation. It is suggested, if safe navigation permits, for all types of vessels to pass well ahead of the pipelaying barge or well astern of the jetbarge. The pipelaying barge, jetbarge and attending vessels may be contacted on VHF-FM channel 16 for passage instructions.

(63)

Fish havens

(64) Fish havens, some marked by private buoys, are numerous along the Pacific coast. Navigators should be cautious about passing over fish havens or anchoring in their vicinity.

(65)

Kelp

(66) Kelp grows on nearly every danger with a rocky bottom and is particularly heavy at various points in Santa Barbara Channel and in the vicinity of San Diego Bay. It will be seen on the surface of the water during the summer and autumn; during the winter and spring it is not always to be seen, especially where it is exposed to a heavy sea. Many rocks are not marked by kelp, because a heavy sea will occasionally tear it away and a moderate current will draw it under water so that it will not be seen. When passing on the side of a kelp patch from which the stems stream away with the current, care should be taken to give it a good berth. Dead, detached kelp floats on the water curled in masses, while live kelp, attached to rocks, streams away level with the surface. Live kelp is usually an indication of depths less than 10 fathoms.

(67)

River entrances

(68) Along the coast, bars build up at the mouths of the many rivers and streams that empty into the Pacific Ocean. The tidal currents at these entrances can obtain considerable velocity, especially when the ebb tide is reinforced by the river runoff. The most dangerous condition prevails when a swift ebb current meets the heavy seas rolling in from the Pacific at the shallow river entrances. The water piles up and breaks and creates a bar condition too rough for small craft. In a bar area, sea conditions can change rapidly and without warning; always cross with caution.

(69)

Regulated boating areas

(70) The bars located in the regulated navigation areas will be closed to all vessels whenever environmental conditions exceed the operational limitations of the relevant Coast Guard search and rescue resources as determined by the Captain of the Port (COTP). When a bar is closed, the operation of any vessel in the regulated navigation area is prohibited unless specifically authorized by the COTP or his designated representative. It is important for the small-craft operators to know when operating in the general vicinity of a regulated navigation area and be prepared for any changing tidal or sea conditions which may be hazardous to the vessel.

(71)

Danger zones

(72) **Danger zones** and **restricted areas** are along the Pacific coast around the Channel Islands. (See **33 CFR 334**, chapter 2, for limits and regulations.)

(73)

Caution

(74) Heavy concentrations of fishing gear may be expected off Drakes Bay and Humboldt Bay between December 1 and August 15, from shore to about 30 fathoms.

(75) To reduce the destruction of fishing gear by vessels and to reduce the fouling of propellers and shafts by fishing gear, Washington Sea Grant, Washington State University Extension has coordinated an agreement between towboaters and crab fishermen for the establishment of towboat lanes along the Pacific coast between San Francisco, California and Cape Flattery, Washington. Copies of the agreement showing fishing areas and towboat lanes may be obtained from Washington Sea Grant, 3716 Brooklyn Avenue NE, Box 355060, Seattle, WA 98105-6716; 206–543–6600; *seagrant@uw.edu*.

(76)

Tides

(77) A very important characteristic of the tides along the west coast of the United States is the large inequality in the heights of the two high waters and of the two low waters of each day. On the outer coast the average difference between the heights of the two high waters of the day is from 1 to 2 feet and the average difference in the heights of the two low waters from 2 to 3 feet. It was because of this large difference in the low-water heights that the mean of the lower low waters, rather than the mean of all low waters, was adopted as the plane of reference for the charts of this region.

(78) This inequality changes with the declination of the moon. When the moon is near the equator the inequality is relatively small; but when the moon is near its greatest north or south declination, the difference in the heights of the two high waters or of the two low waters of each day reaches a maximum. The tides at this time are called **tropic tides**.

(79) Off the outer coast, the mean rise of the tide is about 5 feet off southern California. Extreme variations from

3 feet below to 10 feet above the datum may reasonably be expected.

(80) At the entrance to San Francisco Bay the mean rise of the tide is about 5 feet. At the south end of the bay the tide occurs about 1½ hours later, and the mean rise is about 2.5 feet greater than at the entrance of the bay. Passing north into San Pablo Bay, the tide occurs from 1 to 2 hours later than at the Golden Gate, with a mean rise of about 0.5 foot greater than at the latter place. In Suisun Bay the time of tide is about 3 hours later than at the Golden Gate, with a mean rise about the same. It requires about 4 hours for high water to pass from Suisun Bay to Stockton, on the San Joaquin River, and about 5 hours from Suisun Bay to Sacramento, on the Sacramento River. The mean rise of the tide at Stockton is 3.6 feet and at Sacramento is 2.6 feet.

(81) In Humboldt Bay the tide is from ½ to 1 hour later than on the outer coast. The mean rise is about 6 feet.

(82) In using the Tide Tables, high or low water should not be confused with slack water. For ocean stations there is usually little difference between the time of high or low water and the beginning of ebb or flood currents; but for places in narrow channels, landlocked harbors, or on tidal rivers the time of slack water may differ by several hours from the time of high or low water stand. The relation of the times of high and low water to the turning of the current depends upon a number of factors, hence no simple rule can be given. See the Tidal Current prediction service at *tidesandcurrents.noaa.gov* for the predicted times of slack water, and the strength and velocity of currents in the area. Links to a user guide for this service can be found in chapter 1 of this book. .)

(83)

Currents

(84) A current, the outer limit of which extends offshore more than 300 miles, flows approximately parallel to the U.S. Pacific coast from latitude 50° to 30°N. The direction of the current is generally south throughout the year except as noted below. Its velocity, which averages about 0.2 knot, is greatly influenced by prevailing winds; north winds increase it, and south winds diminish it. North of latitude 45°N. the set is usually north from November through February.

(85) Along the coast during certain periods there is a weak north flow known as the **Davidson Inshore Current**, which is evident between San Diego and Point Conception from July through February and between Point Conception and Cape Flattery from November through February.

(86) The above statements apply to general or average conditions. The currents, particularly offshore, at a specific time depend largely upon prevailing winds, whereas alongshore and off the entrances to inland waterways they depend also upon tidal and drainage effects. See the Tidal Current prediction service at *tidesandcurrents.noaa.gov*. Links to a user guide for this service can be found in chapter 1 of this book.

(87)

Tsunamis

(88) Although the coast of California is not generally subject to waves of the magnitude that strike the Hawai‘ian Islands and other Pacific areas, widespread damage to shipping and to waterfront areas occasionally occurs. The tsunami of March 28, 1964, originating in the Gulf of Alaska, caused 16 deaths and several million dollars damage to ships and property in California, Oregon and Washington. The loss of life and property can be lessened if shipmasters and others acquaint themselves with the behavior of these waves so that intelligent action can be taken when they become imminent. (See chapter 1 for details about these waves.)

(89) The Warning System operated by the National Oceanic and Atmospheric Administration and described in Coast Pilot 10 supplies warnings to the Civil Defense authorities in California, Oregon and Washington who are responsible for disseminating this information to the affected areas. The warnings are also broadcast by the National Weather Service on NOAA Weather Radio.

(90) When a warning is received, persons should vacate waterfront areas and seek high ground. The safest procedure for ships will depend on the amount of time available, and this may not always be known. A ship well out at sea would ride such waves safely, and hence if time is available to put to sea, that would be the safest action. On the other hand, the crew of a ship in harbor may have a difficult time averting serious damage. The ship may be washed ashore by incoming waves or grounded because of excessive withdrawal of water between crests. Much of the damage in the Los Angeles area during the 1960 Chilean tsunami was caused by rapid currents and the swift rise and fall of the water level that parted mooring lines and set floating docks and ships adrift.

(91)

Blue, fin and humpback whales

(92) All whales are protected under the Marine Mammal Protection Act (MMPA) and, when in Sanctuary waters, under the National Marine Sanctuaries Act (NMSA). Certain large whales, including blue, fin and humpback whales, are also listed as endangered under the Endangered Species Act (ESA). Blue, fin and humpback whales migrate through or may be found in large aggregations feeding in the nutrient-rich and highly productive waters along the continental shelf of California, Oregon and Washington. Whales may not react to approaching vessels, increasing the risk of collision. A collision could result in significant damage to the vessel and death or serious injury to the whale. Collisions with vessels in these waters may be affecting the recovery of blue, fin and humpback whales. NOAA is responsible for providing protection to whales under the MMPA, ESA and NMSA and provides the following species information and precautionary measures for mariners to reduce risk of vessel collisions.

(93) **Descriptions of blue, fin and humpback whales:**

(114)

Mean Surface Water Temperatures (°C) and Densities

	Years		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
La Jolla, CA	56	Temp	13.9	13.9	14.4	15.4	16.9	18.4	19.9	20.8	19.3	18.0	16.3	14.9	16.8
		Density	24.9	24.8	24.8	24.9	25.0	25.0	25.0	25.0	24.9	24.9	24.9	24.9	24.9
Newport Bay, CA	17	Temp	14.0	14.5	15.4	16.6	17.7	19.0	20.3	21.2	19.9	18.7	16.4	14.7	17.4
		Density	24.4	24.4	24.5	24.5	24.9	25.0	25.0	25.0	25.0	24.9	24.6	24.5	24.7
Los Angeles, CA (Outer Harbor)	49	Temp	13.9	14.2	14.7	15.4	16.2	17.7	18.9	19.7	19.0	18.1	16.5	14.8	16.6
		Density	24.7	24.6	24.8	24.9	25.1	25.1	25.1	25.1	25.1	25.0	24.9	24.8	24.9
Santa Monica, CA	27	Temp	13.5	13.7	13.9	14.7	15.7	17.5	19.2	19.9	19.0	17.6	15.7	14.3	16.2
		Density	24.9	24.9	25.0	25.0	25.2	25.2	25.2	25.2	25.1	25.0	25.0	24.9	25.0
Avila Beach, CA	27	Temp	12.4	12.5	12.3	12.5	13.1	14.1	15.4	15.9	15.7	15.0	13.9	12.8	13.8
		Density	24.5	24.4	24.7	24.9	25.2	25.4	25.4	25.3	25.2	25.1	24.9	24.8	25.0
Pacific Grove, CA	51	Temp	11.8	12.0	12.2	12.4	12.8	13.4	13.8	13.9	14.2	13.7	12.9	12.4	13.0
		Density	24.7	24.6	24.6	24.7	24.9	25.0	25.1	25.0	25.0	24.9	24.8	24.8	24.8
San Francisco, CA (Fort Point)	51	Temp	10.4	10.9	11.6	12.4	13.1	13.9	14.7	15.2	15.5	14.8	13.0	11.2	13.1
		Density	21.1	20.0	19.9	20.0	20.7	21.5	22.9	23.7	23.8	23.8	23.2	22.4	21.9
Alameda, CA	33	Temp	10.3	11.9	13.9	16.1	17.8	19.4	20.5	20.5	20.2	17.7	14.4	11.4	16.2
		Density	17.3	15.6	15.7	16.5	17.6	18.7	20.5	21.8	22.4	21.9	21.1	19.5	19.0
Crescent City, CA	37	Temp	9.6	9.9	10.2	10.7	11.5	12.5	13.6	14.3	13.5	12.1	11.2	10.2	11.7
		Density	20.8	20.7	21.1	21.8	22.6	23.3	24.0	24.1	24.2	24.0	22.8	21.8	22.6

Temperature (Celsius)
F (Fahrenheit) = 1.8C (Celsius) + 32

Density as used in this table is the specific gravity of the sea water or the ratio between the weight of a sea-water sample and the weight of an equal volume of distilled water at 15°C (59°F).

(94) **Blue whales**: body is mottled bluish-gray; up to 85 feet in length; blow is tall and columnar; relatively small dorsal fin is usually not seen during surfacing (but can be seen prior to a dive); tail flukes are often raised before a dive. The most recent population estimate for blue whales off the U.S. west coast is approximately 2,500.

(95) **Fin whales**: body is solid gray to black above and white below, with a chevron pattern behind head often visible from above; up to 79 feet in length; blow is tall and shaped like an inverted cone; the dorsal fin is usually sickle shaped and visible during surfacing; tail flukes are rarely raised before a dive. The most recent population estimate for fin whales off the U.S. west coast is approximately 3,000.

(96) **Humpback whales**: body is dark gray with black and white patches on underside; up to 52 feet in length; blow is round and bushy; long white and black flippers; head covered with knobs or nodules; relatively prominent dorsal fin relative to body size; flukes are often raised before deep dives. The most recent population estimate for humpback whales off the U.S. west coast is approximately 2,000.

(97) **Occurrence of blue, fin and humpback whales:** Though these large whales are found along the western coast of the United States year-round, overall abundance is highest from May to November, when whales are feeding on dense aggregations of krill and other forage fish. Blue whales are most commonly seen in California from May through September. Fin whales are most common in summer and winter, and humpback whales are most common in summer and fall. These whales regularly occur in large feeding groups around the Channel Islands and off of Long Beach and Orange County in southern California and in the waters off of San Francisco and Monterey Bay in central California.

(98) **Precautions when transiting whale habitat:**

(99) Vessel operators and observers are advised to keep a sharp lookout for whales when transiting near the coast, especially near the 100-fathom curve and offshore islands. NOAA has established two whale advisory zones to alert mariners of the seasonal presence (May through November) of blue, fin and humpback whales and to encourage vessel operators to keep a sharp lookout for whales and proceed with caution within these areas. One whale advisory zone, in southern California, includes the waters from Point Arguello to Dana Point; a second, in Central California, extends from Point Piedras Blancas to Bodega Bay. NOAA works with the U.S. Coast Guard and the National Weather Service to broadcast and publish this information annually.

(100) NOAA may make recommendations to large vessels to reduce speed in specific areas to reduce the risk of lethal ship strikes. NOAA's recommendations are broadcast via the Coast Guard Notice to Mariners (and appear in the published Local Notice to Mariners) and NOAA Weather Radio. To receive current advisories and other whale-related information, mariners can sign up for e-mail announcements here: *rain.org/mailman/listinfo/noaa-whale-advisory-l*.

(101) Please report any collisions with whales or any observed injured, entangled or dead whales to NOAA at 877–SOS–WHALE (877–767–9425) or to the U.S. Coast

Guard on VHF Channel 16. For more information, visit: *sanctuaries.noaa.gov/protect/shipstrike/welcome.html*.

(102) **Precautions when in the presence of whales**:

(103) NOAA has established additional guidelines to help keep both mariners and whales safe. In the presence of whales, mariners should:

(104) Maintain a distance of at least 100 yards from any marine mammal;

(105) Never pass in front of a whale's path;

(106) Avoid sudden speed or directional changes around whales;

(107) Never get between two whales, especially a cow and her calf;

(108) Always travel parallel to whales and at or below their speed;

(109) Never chase whales.

(110) Civil and criminal penalties could apply if these guidelines are not observed. NOAA's National Marine Fisheries Service (NMFS) has regulatory responsibility for implementing the MMPA and ESA. Whales in a national marine sanctuary are also protected under the National Marine Sanctuaries Act (NMSA), which prohibits unauthorized take or possession of any marine mammal in sanctuary waters, including harassment and disturbance.

(111)

Weather, West Coast

(112) This section presents an overall, seasonal picture of the weather that can be expected in the offshore waters along the entire west coast of the United States as well as coastal and near-coastal sites and the Hawai'ian and Pacific Islands. Detailed information, particularly concerning navigational weather hazards, can be found in the weather articles in the following chapters.

(113) All weather articles in this volume are the product of the **National Oceanographic Data Center (NODC)** and the **National Climatic Data Center (NCDC).** The meteorological and climatological tables are the product of the NCDC. Both centers are entities of the **National Environmental Satellite, Data, and Information Service (NESDIS)** of the **National Oceanic and Atmospheric Administration (NOAA)**. If further information is needed in relation to the content of the weather articles, meteorological tables or climatological tables, contact the National Climatic Data Center, Attn: Customer Service Division, Federal Building, 151 Patton Avenue, Room 120, Asheville, NC 28801-5001. You may also contact the CSD at 704–271–4994, or fax your request to 704–271–4876.

(115) Climatological tables and meteorological tables for coastal locations relevant to discussions within this volume are located in this chapter (chapter 3) and in following chapters within the appropriate port text description. The climatological tables are a special extraction from the International Station Meteorological Climate Summary (ISMCS). The ISMCS is a CD-ROM jointly produced by the National Climatic Data Center (NCDC), Fleet Numerical Meteorology and Oceanography Detachment-Asheville, and the U.S. Air Force Environmental Technical Applications Center, Operating Location-A. The meteorological tables for the ocean areas are compiled from observations made by ships in passage and extracted from the National Climatic Data Center's Tape Deck-1129, Surface Marine Observations. Listed in Appendix A are National Weather Service offices and radio stations that transmit weather information.

(116) The Pacific coastal region of the United States and the adjacent ocean areas are located along the east portion of the Pacific high-pressure system. This high, when well developed, forms the principal circulation control forcing most of the low-pressure systems to follow a course to the north of the contiguous United States. This is reflected in the presence of the Aleutian low in the Gulf of Alaska. This action damps out weather changes that might otherwise occur and brings a stability factor that would not otherwise exist. Air that reaches the coast as a result of the prevailing westerly winds has acquired much moisture during its ocean passage, resulting in high humidities along the coast. The marine influence is also evidenced in a cooling effect in summer and a warming influence in winter.

(117) Two features of the climate in these waters, while not commonplace, warrant the mariner's attention because of their severity. One is the tropical cyclones and the other a local wind known as the Santa Ana.

(118) **Tropical cyclones** originate south of the area, off the west Mexican coast, in summer and autumn. About 15 form each season, of which eight reach hurricane intensity. Few come far enough north to affect U.S. coastal waters. The ones that do have usually lost their hurricane intensity and are short lived. However, these storms can be dangerous and have generated winds of more than 120 knots. Further reference is made to tropical cyclones in the seasonal description.

(119) The **Santa Ana** is an offshore desert wind that occurs in or near San Pedro Bay. While infrequent, it may be violent; speeds have been measured at more than 50 knots. These winds diminish little, if any, immediately after passing over water, and can extend up to 50 miles (93 km) out to sea. They are most likely in late autumn or winter. (See Weather articles, chapter 4, for more details.)

(120) A third feature, the **El Niño/Southern Oscillation (ENSO)**, sporadically influences these waters. **ENSO** is a two-phased weather phenomenon with roots in the equatorial Pacific and coastal South America; El Niño is the warm water phase and **La Niña**, the cool water phase.

(121) El Niño is an abnormally warm, eastward-moving, equatorial Pacific current that is thought to have a pronounced influence on the global atmospheric circulations. It is known that during an El Niño event, the normal southeast trade winds of the near equatorial Pacific region break down allowing for near-global-wide altered weather patterns. During a strong El Niño, this typically means an unusually strong subtropical jet stream

that brings storms from central and southern California eastward through the gulf coast and southeast states. If the El Niño is weaker, drought to California and rains to the Gulf Coast and southeast states may be expected.

(122) Following an El Niño event, the near-equatorial trade winds return to normal. On occasion, the southeast trade winds become stronger than normal. If this occurs, a La Niña is present, the opposite of El Niño. It is believed that a strong La Niña leads to drought across much of North America.

(123) Winter, like an incoming tide, creeps over the northeastern North Pacific. Subtle changes begin in September. Seas off central and southern California come under the protection of a weak, good-weather subtropical high centered near 35°N and 145°W. Only enough storms penetrate this protective barrier to make winter a distinguishable season off southern California. This same high-pressure system in conjunction with a strengthening Aleutian Low, bodes differently for points further north. Summer breezes become gales. Rain is commonplace. Winds and cool temperatures make the air feel damp and chilly. Storms become routine and onshore flow is near-persistent. Choppy seas turn rough.

(124) Winter storms usually work their way from the central Pacific northward into the Gulf of Alaska or to the coast of British Columbia, trailing their frontal systems across the area. Two or three times a month, on an average, a storm will move directly through the seas off the Washington-Oregon coast. The more seaward storms generate the moderate to strong southeast through west winds that prevail over northern waters and influence the weather as far south as central California. The stronger winds that blow over a long fetch of water whip up rough seas. Seas of 12 feet (3.7 m) or more are generated 15 to 20 percent of the time. In addition, the warm south flow brings cloudiness, drizzle and sometimes fog. Drizzle occurs about 5 to 8 percent of the time, and there are about 2 to 4 days a month when dense fog reduces visibilities to 0.5 mile (0.9 km) or less at sea. These conditions can persist for a week or more if one of these big storms stalls in the Gulf of Alaska. The south flow is also responsible for air temperatures in the upper forties and fifties (8.9° to 15°C). Cold temperatures are unusual and are most likely when cold Arctic air is fed into a low in the Gulf by a large high in the Bering Sea or when a rare outbreak of Arctic air occurs over the area from the north or northeast. Temperatures at these times may drop below freezing (<0°C) off the Washington coast and into the upper thirties (3.3° to 3.9°C) farther south. The infrequency of cold temperatures lessens the chances for snow, which is observed less than 2 percent of the time off Washington and less than 1 percent of the time off Oregon.

(125) When a storm moves close or through these northern waters, weather changes rapidly. The center is preceded by a strong southeast to southwest flow that may reach gale force (gales occur on about 3 to 5 days per winter month) and may whip seas up to 20 feet (6.1 m) or more; seas of these heights occur up to 4 percent of the time. These conditions are often accompanied by clouds and rain, with temperatures in the fifties (10° to 15°C). After the center passes, winds will veer to the west through north and remain strong for a while. Brief showers soon end, the clouds break, and temperatures drop into the low forties (5° to 6.7°C). A high-pressure system from the central Pacific may follow and bring a brief period of clear conditions. If a storm stalls or it is followed by a series of storms, bad weather can be prolonged for a week or more. Rain falls on 18 to 28 days per winter month in these north waters, and skies are overcast or obscured 40 to 50 percent of the time.

(126) About once or twice a month, a storm moves into northern California offshore waters. While these lows are often weaker than those farther north, some cause gales and rough seas. Gales blow on 4 to 5 days per month, and seas reach 12 feet (3.7 m) or more about 8 to 16 percent of the time. These conditions can also be generated by the interaction of a low to the north and a high to the south. The south winds can raise temperatures into the sixties (16.1° to 20.6°C) off northern and central California. Clouds and rain accompany these systems. Rain falls on about 10 to 15 days per month.

(127) Off northern and central California, storms bring a preponderance of southeast through southwest winds, but this is matched by northwest and north winds that blow around the subtropical highs. These highs either form in the Pacific or migrate from Asia. They dominate the weather off the southern California coast, where west through north winds blow more than 60 percent of the time. However, these highs are weakest during winter, and occasionally storms move close enough to bring some clouds, rain and wind. Rain occurs on about 5 to 10 days per month off central and southern California. Gales and rough seas are rare south of Los Angeles. Between Los Angeles and San Francisco, gales blow on about 1 to 4 days per month, while seas of 12 feet (3.7 m) or more occur about 4 to 8 percent of the time.

(128) Fog is a problem in the offshore waters between Los Angeles and San Francisco. Visibilities less than 2 miles (4 km) occur 5 to 7 percent of the time, while dense fog reduces visibilities to less than 0.5 mile (0.9 km) on 2 to 5 days per month.

(129) Spring brings change. March is an epilogue to winter, while May provides a prologue to summer. Cold rainy days alternate with mild sunny ones. The gradual changeover takes place under the forceful prodding of the expanding good-weather Pacific high. In March the center approximates 30°N and 140°W. As the high expands, it forces the increasingly weak and infrequent storms north into the western Gulf of Alaska and Bering Sea. Since the high is not yet a permanent feature, storms will occasionally penetrate the area, particularly in early spring, when they sometimes move into the Pacific northwest or even across the northern California coast. Southern California waters remain protected by the high. This expanding high-pressure system, which brings good weather, creates a problem in the offshore waters

of central and northern California. It causes a tightening of the pressure gradient, which increases wind strength. In other areas, winds and waves are becoming less of a problem. A change is taking place in the direction of prevailing winds. Off southern California, prevailing northwest and north winds are becoming increasingly persistent. With the expansion of the high, north and northwest winds are becoming the prevailing directions throughout the area. This is a slow change. In March, south and north winds share equal billing.

(130) Storms to the west and northwest of the Washington-Oregon offshore waters, while not as frequent as in winter, still generate southeast to west winds as they work their way north. The prevailing storm track is shifting northward so not as many lows move directly through the area, and they are often less intense. Gales from these near and distant storms blow on about 2 days in March, and they are rare by May. Seas also calm down. In March, waves of 12 feet (3.7 m) or more occur 15 to 20 percent of the time; this drops to 10 percent by April and to around 5 percent by May. The general south flow from these storms still bring rain, drizzle and fog. Rain or drizzle can be expected on about 15 to 18 days in March and 9 to 15 days in May. Dense fog (visibilities less than 0.5 mile (0.9 km)) forms on less than 2 days per month, while visibilities drop below 2 miles (4 km), 2 to 4 percent of the time. Because of the clouds and rain associated with this south flow, it is not always responsible for the warmest spring temperatures. Usually, it is accompanied by temperatures in the forties and low fifties (5° to 11.1°C) in March and 50°F (10°C) readings during May. An occasional cold north outbreak, usually following a storm, can drop March temperatures into the mid- to upper thirties (0.6° to 3.9°C).

(131) Occasionally a low will move close enough to bring some clouds, rain and drizzle; distant lows often account for some of the cloudy days. This is more likely in early spring, when rain falls on about 4 to 5 days in the south and 5 to 15 days in central and northern waters. By May, storms are less frequent, and rain occurs on just 1 or 2 days south of Los Angeles and 3 to 10 days to the north.

(132) Fog is a problem in the offshore waters between Los Angeles and San Francisco. In April and May, visibilities drop below 2 miles (4 km) 8 percent of the time, and fog reduces visibilities to less than 0.5 mile (0.9 km) on about 2 to 3 days per month. It occurs mostly with winds from the southwest through northwest, when they bring warm air over the cooler waters.

(133) Two important features are responsible for the summer weather in these offshore waters, the subtropical Pacific high and the cold California Current.

(134) The influence of high-pressure systems becomes increasingly frequent in these northern waters during spring. In fact, a principal path of highs from the central and western Pacific runs through this area and onto the Washington-Oregon coast. These systems bring clearing conditions, west through north winds and sometimes mild temperatures. Temperatures can, on occasion, get up into the upper fifties and low sixties (14.4° to 16.7°C) in March and into the upper sixties (19.4° to 20.0°C) in May. Clear to partly cloudy skies occur most often with west to north winds. Wind speeds are less than 10 knots most often with west to north winds.

(135) High-pressure systems dominate the weather in California offshore waters, although an occasional storm disrupts the good weather, particularly in early spring. Wind and sea conditions are not so good, however, in waters from off San Francisco northward. In this region, the pressure gradient between highs and lows is often very tight, creating strong north winds that blow at speeds that average near 20 knots and whip up seas of 12 feet (3.7 m) or more from 8 to 20 percent of the time. This situation continues throughout spring.

(136) Conditions improve rapidly toward the south, where winds are lighter and seas calmer. The high-pressure systems are responsible for west through north winds, clear skies and cool temperatures. Winds become increasingly persistent during spring, as the highs become more frequent. By May, northwest through north winds are blowing close to 70 percent of the time north of San Francisco, and west through northwest, about the same to the south. These winds blow over cold water and help keep temperatures in the fifties (10.6° to 15.0°C) throughout the spring, north of San Francisco. Even to the south, temperatures in the fifties (10.6° to 15°C) in March only climb into the mid-fifties to mid-sixties (11.7° to 19.4°C) by May. This compares with temperatures in the 70° to 80° (21.1° to 26.7°C) range at the same latitudes in North Atlantic offshore waters, where the Gulf Stream helps warm the air. The high-pressure systems are also responsible for the clear skies (about one-quarter cloud cover) that occur 25 to 50 percent of the time in these offshore California waters.

(137) The high is made up of high-pressure systems, which either form in the eastern Pacific or move into the area from western Pacific waters, the Bering Sea, or the Gulf of Alaska. By July the mean center of the Pacific High is located around 40°N and 150°W. The south flowing California Current is partially driven by the clockwise circulation of these high-pressure systems. Upwelling also contributes to cool water temperatures. Sea-surface temperatures run 10° to 15° cooler than they do off the Atlantic coast. Its influence is so great that average air temperatures off Eureka never get out of the fifties (10.6° to 15.0°C), and extremes have only reached 87°F (30.6°C), just 9° warmer than the January extreme. The California Current and coastal upwelling are responsible for the poor visibilities of summer and fall. The most dense and frequent fog occurs over the narrow stream of coldest water, just off the coast and is often limited to a band of 50 miles (81 km) or less. At other times, fog covers large areas, both in latitude and longitude, and may extend for hundreds of miles (>161 km). Its effect is even more pronounced onshore, as you can read in the weather articles in the chapters following. The effect of

the California Current in summer extends along the entire coast.

(138) When a high sits to the west, which is most of the time in summer, west through north winds blow over the offshore waters. Between Point Arguello and Portland, this warm moist air is being chilled by the California Current. This results in not only cool temperatures but low clouds and fog. West through north winds blow 70 to 80 percent of the time. In the offshore waters, where merchant ships are trying to avoid poor visibilities, fog and haze are still encountered 30 to 40 percent of the time between Point Arguello and San Francisco. The fog reduces visibilities to below 0.5 mile (0.9 km) up to 5 days per month. Skies are obscured by fog, or are overcast, up to 50 percent of the time in these offshore waters. Temperatures are often in the mid-fifties to mid-sixties (11.7° to 19.4°C) at these times.

(139) Between San Francisco and Portland, fog and haze occur 15 to 25 percent of the time. Fog reduces visibilities to below 0.5 mile (0.9 km) on about 3 to 8 days per month. Skies are obscured or overcast about 30 to 40 percent of the time. In addition to fog, this offshore area is often plagued by gales and rough seas created by a tight pressure gradient between a high off the coast and a heat low over the southwestern United States and Mexico. Gales blow on about 4 to 6 days per month. Strong winds whip up seas of 12 to 20 feet (3.7 to 6.1 m) about 3 to 10 percent of the time.

(140) As storms become less frequent during summer, so does rain. By August, rain falls 3 to 7 percent of the time in the offshore waters from Point Arguello to Vancouver Island.

(141) In the offshore waters between Portland and Vancouver Island, west and northwest winds blow more than one-half of the time, skies are clear 20 to 30 percent of the time, and temperatures are frequently in the sixties (16.1° to 20.6°C). Gales are rare, and, while it rains 5 to 10 percent of the time, this a lot less frequent than during any other season. West through north winds often bring poor visibilities to this area. Fog and haze are encountered 8 to 15 percent of the time. Fog drops visibilities below 0.5 mile (0.9 km) on about 2 to 5 days per month and is most frequent from midsummer on.

(142) South of Point Arguello, weather is fair. Visibilities are usually better than 5 miles, winds and seas are calmer, but temperatures are cool. These offshore waters are almost always under the influence of a high. West through northwest winds, which blow 70 to 75 percent of the time, keep temperatures mostly in the sixties (16.1° to 20.6°C) and bring haze and fog about 15 percent of the time. These warm, moist winds blowing over the California Current also help keep the sky overcast or obscured almost one-half of the time. Skies are clear about one-quarter of the time. Gales are rare, as are rough seas. Winds blow at about 10 knots.

(143) The subtropical high-pressure system forces most tropical storms south of southern California. There is a threat of tropical cyclones from June through November. An average tropical cyclone season sees about 15 tropical cyclones (winds of about 34 knots), of which an average of 8 reach hurricane strength. These storms seldom move north of 30°N. They are most likely to reach the latitudes of 30° to 35°N in August or September. However, by this time, they are usually weak and either well out to sea or well inland over Arizona. The eastern North Pacific season peaks in July, August and September. About three to five tropical cyclones can be expected each month, with an average of one to two reaching hurricane strength. The last damaging tropical cyclone to affect southern California was the September 1939 storm that moved inland near Los Angeles. In September 1972, the remains of a hurricane moved inland between San Diego and Los Angeles; it carried only 20-knot winds at the time of landfall. Several other tropical storms have completed the decaying process in the California coastal waters near the Channel Islands.

(144) Fall arrives subtly in September north of Point Arguello. It is delayed a month or so to the south by the subtropical high. High-pressure systems still bring some sunny, mild days with light west through north winds off Oregon and Washington, but even on these days, swells from distant storms often cast an ominous mood over these waters. Some storms move close enough to generate a southeast through southwest flow off Oregon and Washington. They also bring rain to offshore Washington waters about 8 to 13 percent of the time. A tightening of pressure gradients off northern California and Oregon in September is responsible for gales on 2 to 5 days and for seas of 12 feet (3.7 m) or more 2 to 4 percent of the time. Meanwhile, off central California, gales blow less often and seas are calmer than they were last month. September is usually the driest month in offshore waters from Oregon southward. Precipitation frequencies range from 6 percent off Oregon to less than 1 percent off southern California. Poor visibilities continue to plague the offshore waters north of Point Arguello. Fog reduces visibilities to less than 0.5 mile (0.9 km) on about 4 to 6 days in September. September temperatures usually range from the upper fifties and low sixties (14.4° to 16.7°C) in the north to the mid- and upper sixties (18.3° to 20.6°C) off southern California.

(145) During October and particularly November, storms become more frequent and more intense and move closer to the area than those of summer and early autumn. As the subtropical high weakens and retreats southward and the Aleutian Low is at its deepest, these storms move to the northwest and north, most affecting the vulnerable waters off Washington and Oregon. They frequently sweep these seas with strong southeast through southwest winds, which carry rain and sometimes fog. These winds average 15 to 20 knots. Gales occur on about 2 to 4 days in October and 3 to 6 days in November, off Washington and Oregon. Strong winds whip up seas of 12 feet (3.7 m) or more about 10 to 16 percent of the time. Rain falls more often as autumn progresses. It occurs about 8 to 20 percent of the time in October, increasing to 16

to 30 percent by November in these north seas. This is about as much as it rains in any month. Fog continues to plague this area and often rides in on a strong, warm south flow that accompanies a low-pressure system. It reduces visibilities to below 0.5 mile (0.9 km) on about 2 to 5 days per month. Temperatures of Washington and Oregon are often in the fifties (10.6° to 15°C) in October and mid-forties to mid-fifties (8.9° to 13.9°C) the following month.

(146) The winter transition comes later to California offshore waters. High-pressure systems remain influential, so winds often blow out of the north and northwest through late autumn, particularly in the south. Even off northern California, winds out of the north are only slightly less frequent than southerlies as late as November. Storms move closer and occasionally break through the protective barrier in November. In offshore northern California waters, they are responsible for about 3 to 5 gale days per month and for seas of 12 feet (3.7 m) or more 6 to 10 percent of the time. They also dump rain up to 10 percent of the time. Weather generally improves to the south, where rain falls as little as 3 percent of the time. Gales occur on about 2 days or less. Seas of 12 feet (3.7 m) or more occur about 8 percent of the time in central waters and about 1 percent in the south. Temperatures change slowly over offshore waters. In October, they frequently run in the fifties (10.6° to 15.0°C) in the north and in the sixties (16.1° to 20.6°C) to the south. Temperatures drop just a few degrees in November.

(147) Fog continues to be the most frequent navigational weather hazard in the waters of offshore northern and central California. Fog reduces visibilities to below 0.5 mile (0.9 km) on about 5 to 7 days during October, the worst month. Fog and haze are reported about 15 to 20 percent of the time, except off Los Angeles, where they occur about 40 percent of the time.

(148)

Principal ports

(149) The principal deep-draft commercial ports within the area of this Coast Pilot are San Diego, Long Beach, Los Angeles, San Francisco, Oakland, Richmond, Stockton and Humboldt Bay.

(150) Other ports are Port Hueneme, Port San Luis, Redwood City and Sacramento.

(151)

Pilotage

(152) In the area covered by this Coast Pilot, pilotage, with a few exceptions, is compulsory for all foreign vessels and for U.S. vessels under register in the foreign trade. It is optional for U.S. vessels in the coastwise trade, provided they are under the control and direction of a pilot duly licensed by federal law for the waters which that vessel travels.

(153) Only at San Francisco do pilot boats cruise on station continuously. At the other ports the pilots must be notified in advance in order for the pilot boat to meet the vessel at the proper time. Most of the pilot boats and stations may be contacted by radio; though ships' agents normally arrange for pilots, a vessel may notify the pilot station of its estimated time of arrival by radio. Specific information is given in the description of the various ports.

(154)

Towage

(155) Tugs of various sizes are available at all the deep-draft ports. Arrangements for their use are usually made by the ship's agent but in some cases may be made from the vessel by radio. For further information, refer to the description of the port.

(156)

Vessel arrival inspections

(157) Quarantine, customs, immigration and agricultural quarantine officials are stationed in most major U.S. ports. Consult Appendix A for a list of ports of entry found in this Coast Pilot. Vessels subject to such inspections generally make arrangements in advance through ships' agents. Unless otherwise directed, officials usually board vessels at their berths.

(158)

Harbormasters and wharfingers

(159) Harbormasters and wharfingers are mentioned in the text when applicable. They generally have charge of the anchorage and berthing of vessels.

(160)

Supplies

(161) Supplies of all kinds are available at San Diego, Los Angeles, Long Beach and San Francisco Bay. Limited quantities can be obtained at many other ports.

(162)

Repairs

(163) Large ocean-going vessels may be drydocked for complete repairs at Los Angeles, Long Beach, and San Francisco Bay. Smaller ships of up to about 7,000 tons may also be drydocked at San Diego. Fishing boats and yachts can be hauled out and can have hulls and engines repaired at numerous other places. The Coast Pilot gives information on some of these facilities; usually the largest repair facility in each area is mentioned.

(164) **Salvage** equipment is available at Los Angeles and San Francisco Bay.

(165)

Small-craft facilities

(166) There are numerous places where fuel, supplies, protected berths, repairs and shore facilities are available for small craft. For isolated places and small cities, the Coast Pilot describes the more important of these facilities; for large port areas, where individual facilities are too numerous to mention, the information given is more general. Additional information may be obtained online and from various local small-craft guides.

(167) **A vessel of less than 65.6 feet (20 meters) in length or a sailing vessel shall not impede the passage of a vessel that can safely navigate only within a narrow**

channel or fairway. (Navigation Rules, International-Inland Rule 9(b).)

(168) Southern California has many small-craft harbors with excellent facilities, but north of San Francisco the distances between protected harbors having facilities increases considerably until in the Puget Sound area. Temporary moorage is usually available for transients at most of the harbors. The intense yachting activity of California as far north as San Francisco, however, makes transient moorage more difficult along this section of the coast, even with its numerous harbors built especially for such craft.

(169)

Standard time

(170) The time zone in California is Pacific Standard Time, which is 8 hours behind Coordinated Universal Time (UTC).

(171)

Daylight saving time

(172) In California, clocks are advanced 1 hour on the second Sunday of March and are set back to standard time on the first Sunday of November.

(173)

Legal public holidays

(174) The following are legal holidays in the area covered by this Coast Pilot: New Year's Day, January 1; Martin Luther King, Jr.'s Birthday, third Monday in January; Presidents' Day, February 17; César Chávez Day, March 31; Memorial Day, last Monday in May; Independence Day, July 4; Labor Day, first Monday in September; General Election Day, first Tuesday after first Monday in November; Veterans Day, November 11; Thanksgiving Day, fourth Thursday in November; and Christmas Day, December 25. The national holidays are observed by employees of the federal government and the District of Columbia and may not be observed by all the states in every case.