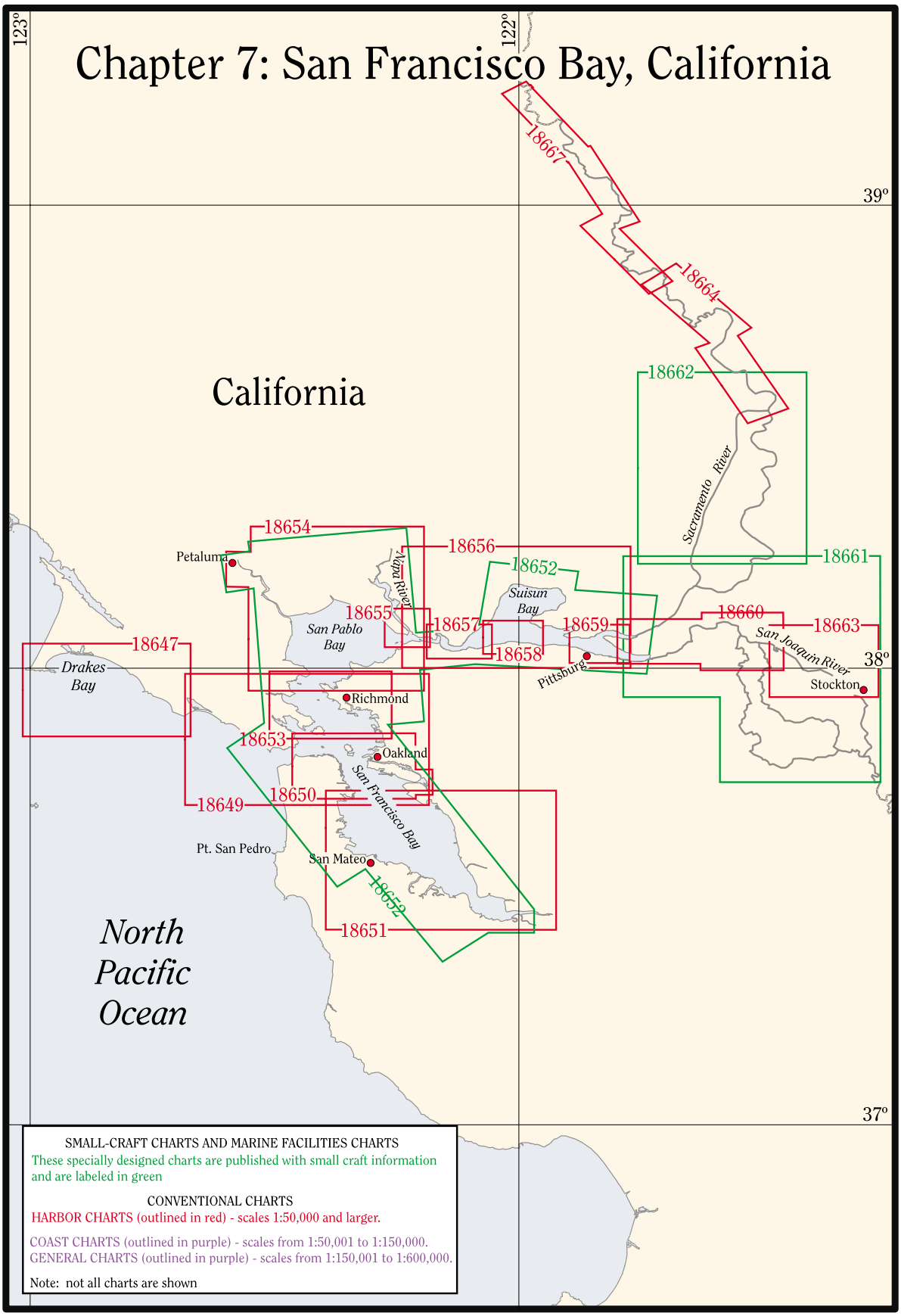

Chapter 7: San Francisco Bay, California
123°
122°
39°
38°
37°
18667
18664
18662
California
Sacramento River
18654
Petaluma
18656
18652
18661
Napa River
Suisun Bay
18655
San Pablo Bay
18657
18659
18660
18663
San Joaquin River
18647
18658
Drakes Bay
Pittsburg
Stockton
Richmond
18653
Oakland
San Francisco Bay
18650
18649
Pt. San Pedro
San Mateo
18652
18651
North Pacific Ocean
SMALL-CRAFT CHARTS AND MARINE FACILITIES CHARTS
These specially designed charts are published with small craft information and are labeled in green
CONVENTIONAL CHARTS
HARBOR CHARTS (outlined in red) - scales 1:50,000 and larger.
COAST CHARTS (outlined in purple) - scales from 1:50,001 to 1:150,000.
GENERAL CHARTS (outlined in purple) - scales from 1:150,001 to 1:600,000.
Note: not all charts are shown

San Francisco Bay, California

Chart 18640

(1) **San Francisco Bay**, the largest harbor on the Pacific coast of the United States, is more properly described as a series of connecting bays and harbors of which San Francisco Bay proper, San Pablo Bay, and Suisun Bay are the largest. Depths of 29 to 40 feet are available for deep-draft vessels to San Francisco, Oakland, Alameda, Richmond, and Redwood City in San Francisco Bay proper; to Stockton on the San Joaquin River; and to Sacramento through the lower Sacramento River and a deepwater channel. Much of the local navigation is by light-draft vessels and barges.

(2) The extensive foreign and domestic commerce of San Francisco Bay is handled through the several large ports which are the terminals for many transpacific steamship lines, airlines, and transcontinental railroads.

(3) The E shore of San Francisco Bay proper is low except for rolling grassy hills in the N part and extensive marshes intersected by numerous winding sloughs in the S part. The W shore N of the entrance is much bolder than the E shore where there are only a few stretches of low marsh. Below San Francisco, marshes and flats intersected by numerous sloughs extend to the S end of the bay.

(4) The Coast Guard Captain of the Port, San Francisco, has ordered that all ships greater than 300 gross tons, anchored in San Francisco Bay maintain a radio listening watch on VHF-FM channels 13 and 14 when the wind is 25 knots or greater. Any ship not equipped with channel 13 shall maintain a listening watch on VHF-FM channel 16. This radio watch must be maintained by a person who can speak the English language.

(5) The Coast Guard considers the following areas to be narrow channels or fairways for the purpose of enforcing the International and Inland Rules of the Road:

(6) a. All one-way traffic lanes and precautionary zones in the San Francisco Bay eastward of the San Francisco Approach Lighted Horn Buoy SF.

(7) b. South San Francisco Bay channels between the termination of the Traffic Separation Scheme in the vicinity of San Francisco Bay South Channel Lighted Buoy 1 and Redwood Creek Entrance Light 2.

(8) c. Redwood Creek between Redwood Creek Entrance Light 2 and Redwood Creek Daybeacon 21.

(9) d. Pinole Shoal Channel in San Pablo Bay between the termination of the Traffic Separation Scheme at San Pablo Bay Channel Light 7 and the Carquinez Strait highway bridge.

(10) e. Carquinez Strait between the Carquinez Strait highway bridge and the Benicia-Martinez highway bridge.

(11) f. Suisun Bay Channels between the Benicia-Martinez Highway Bridge and Suisun Bay Light 34.

(12) g. New York Slough between Suisun Bay Lighted Buoy 30 and San Joaquin River Light 2.

(13) h. San Joaquin River from San Joaquin River Light 2 to the Port of Stockton.

(14) i. Sacramento River Deep Water Ship Channel from Suisun Bay Light 34 to the Port of Sacramento.

(15) j. Oakland Harbor Bar Channel.

(16) k. Oakland Outer Harbor, including the Outer Harbor Entrance Channel.

(17) l. Oakland Inner Harbor from the Inner Harbor Entrance Channel to, and including, the Brooklyn Basin South Channel.

(18) m. Alameda Point Naval Channel.

(19) n. Southampton Shoal Channel.

(20) o. Richmond Harbor Entrance Channel.

(21) p. Point Potrero Reach and Turn.

(22) q. Richmond Harbor Channel.

(23) r. Santa Fe Channel.

(24) s. Mare Island Strait between Mare Island Strait Light 2 and Mare Island Causeway Bridge.

(25) The above listing of narrow channel or fairway areas is not intended to be exhaustive. Rather it identifies deep-draft navigation areas where commercial and public vessels routinely operate and where small craft can impede the safe transit of larger vessels if extreme care is not exercised. Narrow Channels, Inland-Navigation Rule 9, applies.

COLREGS Demarcation Lines

(26) The lines established for San Francisco Bay are described in **80.1142**, chapter 2.

Traffic Separation Scheme

(27) A **Traffic Separation Scheme, San Francisco** has been established off the entrance to San Francisco Bay. (See chart 18645.)

(28) The scheme is composed of **directed traffic areas** each with one-way inbound and outbound **traffic lanes** separated by defined **separation zones; a precautionary area;** and a **pilot boat cruising area.** The Scheme is recommended for use by vessels approaching or departing San Francisco Bay, but is not necessarily intended for tugs, tows, or other small vessels which traditionally operate outside of the usual steamer lanes or close inshore.

(29) **The Traffic Separation Scheme has been designed to aid in the prevention of collisions at the approaches to major harbors, but is not intended in any way to supersede or alter the applicable Navigation Rules. Separation zones are intended to separate inbound and outbound traffic lanes and to be free of ship traffic, and should not be used except for crossing purposes. Mariners should use extreme caution when crossing traffic lanes and separation zones.** (See Traffic Separation Schemes, chapter 1, for additional information.)

(30) When not calling at San Francisco mariners are urged to sail direct between Point Arguello and Point Arena so as to pass the San Francisco Bay area to the W of the Farallon Islands and clear of the San Francisco Traffic Separation Scheme. In this manner through coastwise traffic will avoid crossing the directed traffic areas and/or precautionary area.

(31) The **precautionary area** off the entrance to San Francisco Bay is inscribed by a circle with a radius of 6 miles centered on San Francisco Approach Lighted Horn Buoy SF (37°45.0'N., 122°41.6'W.) with the traffic lanes fanning out from its periphery. The W half of the circle has depths of 15 to 30 fathoms, the E half has lesser depths of 4 to 21 fathoms. Extreme caution must be exercised in navigating within the precautionary area inasmuch as both incoming and outgoing vessels use the area in making the transition between San Francisco Main Ship Channel and one of the established directed traffic areas as well as maneuvering to embark and disembark pilots. It is recommended that all vessels in the precautionary area guard VHF-FM channels 13 and 14.

(32) A circular area to be avoided, with a 0.5 mile radius centered on the San Francisco Approach Lighted Horn Buoy SF, has been established in the precautionary area of the San Francisco Traffic Separation Scheme. This zone has been established for the protection of the lighted horn buoy.

(33) Mariners are cautioned that San Francisco Approach Lighted Horn Buoy SF cannot be safely used as a leading mark to be passed close aboard, and are requested to stay outside that area.

(34) The **pilot boat cruising area** is about 1 mile NE of the San Francisco Approach Lighted Horn Buoy SF. (See pilotage for San Francisco Bay, this chapter.)

Northern Traffic Lanes:

Traffic Lane, Inbound

(35) The N approach to San Francisco is between Point Reyes and the Farallon Islands through the N inbound traffic lane that tapers from 1.7 miles to 1 mile wide in its length of about 15.4 miles. Entering the traffic lane at a point in about 37°55.0'N., 123°05.2'W., a course of **120°** follows the centerline of the traffic lane to the junction with the precautionary area; thence an ESE course for about 7 miles leads to the pilot boat cruising area. The least known depth in the traffic lane is 29 fathoms.

Traffic Lane, Outbound

(36) The N exit from San Francisco Bay by outbound vessels is 6 miles, 312° from the San Francisco Approach Lighted Horn Buoy SF through the N outbound traffic lane that expands from 1 mile to 1.7 miles wide in its length of about 15.4 miles. A course of **305°** follows the centerline of the traffic lane to its end; thence steer usual courses to destination. Least known depth in the traffic lane is 25 fathoms.

Separation Zone

(37) The N separation zone between the inbound and outbound traffic lanes tapers from 1.7 miles wide at its outer end to 1 mile wide at its junction with the precautionary area and is centered on a line bearing 302½° and passing through San Francisco Approach Lighted Horn Buoy SF and San Francisco Northern Traffic Lane Lighted Bell Buoy N (37°48.2'N., 122°47.9'W.).

Western Traffic Lanes:

Traffic Lane, Inbound

(38) The SW approach to San Francisco Bay is SE of the Southeast Farallon Island through the main inbound traffic lane which tapers from 1.7 miles to 1 mile wide in its length of about 9.4 miles. Entering at a point in about 37°35.8'N., 122°56.9'W., a course of **058½°** follows the centerline of the traffic lane to the junction with the precautionary area; thence a NE course for about 6.7 miles leads to the pilot boat cruising area. The least known depth in the traffic lane is 28 fathoms, except for the charted wreck 6.7 miles 226° from San Francisco Approach Lighted Horn Buoy SF which has a minimum depth of at least 9½ fathoms.

Traffic Lane, Outbound

(39) The SW exit from San Francisco Bay by outbound vessels is 6 miles, 244° from the San Francisco Approach Lighted Horn Buoy SF through the main outbound traffic lane that expands from 1 mile to 1.7 miles

wide in its length of about 8.8 miles. A course of **247°** follows the centerline of the traffic lane to its end; thence steer usual courses to destination. The leastknown depth in the traffic lane is 29 fathoms.

Separation Zone

(40) The main separation zone between the inbound and outbound traffic lanes tapers from 1.7 miles wide at its outer end to 1 mile wide at its junction with the precautionary area and is centered on a line bearing 242½° from San Francisco Main Traffic Lane Lighted Gong Buoy W (37°41.5'N., 122°47.7'W.).

Southern Traffic Lanes:

Traffic Lane, Inbound

(41) The S approach to San Francisco Bay is through the 1-mile wide Southern Traffic Lane (Inbound) that has a length of about 12 miles. Entering at a point in about 37°27.0'N., 122°39.5'W., a **000°** course follows the centerline of the traffic lane to the junction with the precautionary area; thence a NNW course for about 6 miles leads to the pilot boat cruising area. In June 1981, a sunken wreck was reported in the inbound traffic lane in about 37°37.0'N., 122°37.5'W. Least known depth in the traffic lane is about 21 fathoms.

Traffic Lane, Outbound

(42) The S exit from San Francisco Bay for outbound vessels is about 6 miles 195° from the San Francisco Approach Lighted Horn Buoy SF through the 1-mile wide Southern Traffic Lane (Outbound) that has a length of about 12 miles. A course of **180°** follows the centerline of the traffic lane to its end. Least known depth in the traffic lane is about 25 fathoms.

Separation Zone

(43) The S separation zone between the inbound and outbound traffic lanes tapers from 1.7 miles wide at its outer end to 1 mile wide at its junction with the precautionary area and is centered on a line bearing 166° and passing through San Francisco Approach Lighted Horn Buoy SF and San Francisco South Traffic Lane Lighted Bell Buoy S (37°39'00"N., 121°41'42"W.).

(44) In 1975, shoaling to 10 fathoms was reported in 37°00.0'N., 122°30.1'W., about 17.5 miles S of the S end of the Southern Directed Traffic Area. (See chart 18680.)

(45) An additional **Traffic Separation Scheme** has been established through the Main Ship Channel and Golden Gate into San Francisco Bay. The scheme consists of one-way **traffic lanes** separated by a **separation line** and, after entry into San Francisco Bay, includes a **precautionary area**, a **regulated navigation area**, and **recreation areas**. For purposes of INTERNATIONAL NAVIGATION Rule 10, this scheme has been adopted by IMO seaward of the demarcation line. (See Traffic Separation Schemes, chapter 1, for additional information).

(46) **Vessel Traffic Service San Francisco** serves San Francisco Bay, its seaward approaches and its tributaries as far inland as Stockton and Sacramento. Participation is mandatory for certain vessels within navigable waters of the United States. (See **161.1 through 161.23 and 161.50**, chapter 2, for limits and regulations.)

(47) The purpose of the San Francisco Vessel Traffic Service (VTS) is to help facilitate the safe and efficient transit of vessels in San Francisco Bay in an effort to prevent accidents, associated loss of life, damage to property, and harm to the environment. VTS also fully supports Coast Guard and other public service missions through it's unique communications and surveillance capabilities. The Vessel Traffic Center (VTC), located on Yerba Buena Island in San Francisco, is staffed 24 hours a day, seven days a week by Coast Guard personnel.

(48) The VTS uses radar, closed-circuit television and VHF-FM radiotelephone to gather information, and uses VHF-FM radiotelephone to disseminate information. Information provided by the VTS is mostly generated from vessel reports; this information can therefore be no more accurate than the reports received from mariners coupled with the ability of VTS equipment to verify those reports. The VTS may not have first hand knowledge of hazardous circumstances existing in the VTS area. Unreported hazards may still confront mariners at any time. This service does not in any way supersede or alter applicable Navigation Rules. The owner, operator, charterer, master, or person directing the movement of the vessel remains at all times responsible for the manner in which the vessel is operated and maneuvered, and is responsible for the safe navigation of the vessel under all circumstances.

(49) The VTS maintains a continuous radiotelephone watch on VHF-FM channels 12, 13, 14, and 16. The VTS is also equipped to communicate on all VHF-FM radiotelephone channels. The radio call sign is "San Francisco Vessel Traffic Service." After communications have been established, the abbreviated call sign "Traffic" may be used. Mariners may also contract VTS by cellular or land-line telephone at (415) 556-2760.

(50) The VTS area is divided into two sectors: offshore and inshore. The **Offshore Sector** consists of the ocean waters within a 38 nautical mile radius of Mount Tamalpais (37°55.8'N., 122°34.6'W.) excluding the San Francisco Offshore Precautionary Area. (The San Francisco Offshore Precautionary Area is the area within a

SAN FRANCISCO BAY ENTRANCE

six-mile radius of the San Francisco Approach Lighted Horn Buoy SF.) Channel 12 VHF-FM is the designated working frequency for the Offshore Sector. At minute 15 and minute 45 of each hour, VTS makes broadcasts giving the positions, courses, and speeds or participating vessels in the sector.

(51) The **Inshore Sector** consists of the waters of the San Francisco Offshore Precautionary Area eastward to San Francisco Bay and its tributaries extending inland to the ports of Stockton, Sacramento, and Redwood City. VHF-FM Channel 14 is the designated working frequency for the Inshore Sector.

Reporting points for the San Francisco VTS area are as follows.

(52) Offshore Sector: at the "N", "W", "S" buoys marking the entrance to the Traffic Separation Scheme lane to be used; at the seaward and of the Traffic Separation Scheme lane used; at the outer limit of the Offshore Sector 38 nautical miles from Mount Tamalpas. (These points are given as for an outbound transit; inbound vessels use the same points in reverse order.)

(53) Inshore Sector: Pilot Area/Point of Entry into the Inshore Sector; San Mateo Bridge; Redwood Creek Lights 2 & 3; Dumbarton Bridge; Richmond-San Rafael Bridge; "E" buoy in San Pablo Bay; Petaluma Channel Daybeacons 1 & 2 and 19 & 20; Mare Island Strait Light 1; Mare Island Causeway Bridge; Carquinez Bridge; Southern Pacific Railroad Bridge; Naval Weapons Station Concord Pier 3 (Port Chicago); New York Point; Antioch Bridge; Prisoners Point; Rio Vista Bridge; Sacramento Deep Water Channel Light 51 and 65; and when secured at the destination or when departing the Inshore Sector.

(54) For a complete detailed description of the system, mariners should obtain the latest edition of the U.S. Coast Guard VTS San Francisco User's Manual, available at no cost from the Commanding Officer, U.S. Coast Guard Vessel Traffic Service, Yerba Buena Island, San Francisco, Calif. 94130 (Internet: CO/VTSSFRAN@CGSMTP.COMDT.USCG.MIL). Vessels operating within the VTS Area defined as VTS Users are reminded of the requirement to carry a copy of the National VTS Regulations aboard their vessel and are recommended to carry a copy of the San Francisco VTS User's Manual.

(55) **Regulated Navigation Areas** have been established in the waters of San Francisco Bay, Golden Gate, Central Bay, Lower Bay, San Pablo Bay, San Pablo, Carquinez Strait, and Suisun Bay. (See **165.1 through**

165.13 and 165.1114, and 165.1115, chapter 2, for limits and regulations.)

Chart 18645

(56) The entrance to San Francisco Bay is through **Gulf of the Farallones** and the narrow Golden Gate. The gulf extends from Point San Pedro on the S for 34 miles to Point Reyes on the N, and has a greatest width of 23 miles from Farallon Islands on the W to the mainland.

(57) In clear weather many prominent features are available for use in making San Francisco Bay, but in thick weather the heavy traffic and the currents, variable in direction and velocity, render the approaches difficult and dangerous. Point San Pedro, Montara Mountain, Farallon Islands, Mount Tamalpais, and Point Reyes are prominent in clear weather and frequently can be seen when the land near the beach is shut in by low fog or haze. Radar navigation on the approach to San Francisco Bay is not difficult because of the numerous distinctive and high relief of targets available. Southeast Farallon Island, Point Reyes, Double Point, Bolinas Point, Duxbury Point, Rocky Point, Point Bonita, San Pedro Rock and Point, and Pillar Point are good radar targets.

(58) The first 8 miles of coast from Point San Pedro to San Francisco Bay entrance consists of whitish bluffs that reach a height of 600 feet, then a 3-mile sand beach extends to the entrance. **Shelter Cove,** on the N side of Point San Pedro, provides shelter from the E storms with good holding ground in gray sand bottom. **San Pedro Rock,** close to the point and 100 feet high, also gives some protection in S weather.

(59) The **Gulf of the Farallones National Marine Sanctuary** has been established to protect and preserve the marine birds and mammals, their habitats, and other natural resources in the waters surrounding the Farallon Islands and Point Reyes, and to ensure the continued availability of the area as a research and recreational resource. The sanctuary encompasses the waters off Bodega Head and Point Reyes, and the waters surrounding Farallon Islands. The sanctuary includes Bodega Bay but not Bodega Harbor. Recreational use of the area is encouraged. (See **15 CFR 922,** chapter 2, for limits and regulations.)

(60) **Farallon Islands,** 23 miles W of San Francisco Bay entrance, are rocky islets extending NW for 7 miles. **Southeast Farallon,** the largest of the group, actually consists of two islands separated by a narrow impassable gorge. The larger E island is pyramidal in shape and 350 feet high; a small-boat landing is on the S side. **Farallon Light** (37°41.9'N., 123°00.1'W.), 358 feet above the water, is shown from a 41-foot white conical tower on the highest peak of the island. Dwellings are on the lowland on the S side of the island. **Fisherman Bay,** just N of Farallon Light, is somewhat protected by several rocky islets on the W side and affords anchorage in 8 fathoms in the outer part. Boats can be landed on a small sand beach on the largest islet.

(61) **Hurst Shoal,** 0.6 mile SE of Farallon Light, is covered 22 feet and breaks only in heavy weather.

(62) **Middle Farallon,** 2.3 miles NW of the light, is a 20-foot single black rock 50 yards in diameter; several rocks covered 5 to 7 fathoms are within 0.7 mile S and SW of it.

(63) **North Farallon,** 6.5 miles NW of Farallon Light, consists of two clusters of bare precipitous islets and rocks from 91 to 155 feet high, 0.9 mile in extent, and 0.3 mile wide; submerged rocks surround them.

(64) **Fanny Shoal,** 9.8 miles NW of Farallon Light and 14 miles SW of Point Reyes, is 2 miles in extent and covered 2 to 30 fathoms. **Noonday Rock,** covered 13 feet, rises abruptly from 20 fathoms and is the shallowest point of the shoal; it is the principal danger in the N approach to San Francisco Bay. A lighted bell buoy is about 0.7 mile W of the rock. Noonday Rock derives its name from the clipper ship that struck it in 1862 and sank within an hour, in 40 fathoms.

(65) **Cordell Bank,** 27 miles NW of Farallon Light and 20 miles W of Point Reyes, is about 6 miles long and 3 miles wide; the bank is covered 20 to 40 fathoms, but depths increase rapidly outside it.

(66) The **Cordell Bank National Marine Sanctuary** has been established to protect and conserve the special, discrete, highly productive marine area of Cordell Bank and its surrounding waters and to ensure the continued availability of the areas ecological, research, educational, aesthetic, historical, and recreational resources. (See **15 CFR 922,** chapter 2, for limits and regulations.)

Chart 18647

(67) **Point Reyes**, 18 miles N of Farallon Light, is a bold, dark, rocky headland 612 feet high at the W and higher extremity of a ridge running in an E direction for 3 miles. It is an excellent radar target in thick weather. There is lowland N of the point, so that from N and S, and from seaward in hazy weather, it usually appears as an island. The point is visible for over 25 miles.

(68) **Point Reyes Light** (37°59.7'N., 123°01.4'W.), 265 feet above the water, is shown from a platform on top of a square building on the W extremity of the point. A fog signal is at the light. Two rocks, 275 yards W of the light, are covered about 3 feet and break in a moderate swell.

(69) The **Gulf of the Farallones National Marine Sanctuary** has been established to protect and preserve the marine birds and mammals, their habitats, and other natural resources in the waters surrounding the Farallon Islands and Point Reyes, and to ensure the continued availability of the area as a research and recreational resource. The sanctuary encompasses the waters off Bodega Head and Point Reyes, and the waters surrounding Farallon Islands. The sanctuary includes Bodega Bay but not Bodega Harbor. Recreational use of the area is encouraged. (See **15 CFR 922,** chapter 2, for limits and regulations.)

(70) **Drakes Bay,** named after English explorer Sir Francis Drake, who anchored here in 1579, is NE of the 1-mile-long 200-foot-high, narrow peninsula that forms the easternmost part of Point Reyes. White cliffs commence at the SW angle of the bay and curve round to the NE for about 6 miles, ending at high white sand dunes. This curving shoreline forms Drakes Bay, which affords good anchorage in depths of 4 to 6 fathoms, sandy bottom, in heavy NW weather. Several lagoons back of the N shore empty into the bay through a common channel which is navigable by shallow-draft vessels with local knowledge.

(71) **Chimney Rock** lies close under the outer end of the Drakes Bay peninsula. The area between Chimney Rock and the 5-fathom curve, 0.4 mile E and SE, breaks in moderate weather. A lighted whistle buoy is moored 0.6 mile SE of the rock.

(72) Drakes Bay is used extensively in heavy NW weather and many fishing vessels operate from here during the season. A fish wharf is about midway along the inner side of the peninsula. A visible wreck is about 100 feet E of the fish wharf in about 37°59'41"N., 122°58'19"W. Visible and submerged piles W of the fish wharf are a hazard.

(73) From the sand dunes near the E part of Drakes Bay, cliffs 100 to 200 feet high extend 5 miles SE to **Double Point,** which has two high spurs, 0.4 mile apart, projecting 200 to 300 yards from the general coastline. A small 47-foot-high island is 300 yards off the NW spur, and a 54-foot-high rock is close under the longer and lower SE spur. From Double Point to Bolinas Point, about 3.5 miles SE, the coast is bold with high cliffs behind narrow sand beaches.

(74) **Bolinas Point,** 15.3 miles SE of Point Reyes Light, is 160 feet high and the W extremity of the comparatively level tableland extending E to Bolinas Lagoon. An aerolight and numerous radio towers are 0.6 mile N of the point.

(75) **Duxbury Point,** 16.5 miles SE of Point Reyes Light, is 160 feet high and yellow in color. The point is the S edge of the tableland W of Bolinas Lagoon.

(76) **Duxbury Reef,** extending 1.2 miles SE of Duxbury Point, is long, narrow, and partly bare at low water. A ledge covered 30 to 36 feet extends from the reef to about 1.4 miles S of the point; a lighted whistle buoy is about 2 miles S of the point. Great care must be exercised in passing this area.

(77) **Warning.**–It was reported that in heavy weather strong N currents resulting from prolonged S winds may exist in the area from Duxbury Reef to Golden Gate.

Chart 18649

(78) **Bolinas Bay**, E of Duxbury Point, is an open bight 3.5 miles wide between Duxbury Point and Rocky Point. The bay affords shelter in NW weather in 24 to 36 feet, sandy bottom. Care must be taken to avoid Duxbury Reef and the dangers extending up to 0.7 mile E of it. **Bolinas Lagoon** is separated from the bay by a narrow strip of sandy beach that is cut by a narrow shifting channel. The lagoon is shoal and entered only by small boats with local knowledge. The entrance has a depth of less than 3 feet.

(79) **Rocky Point** is 100 feet high and shelving. Numerous detached rocks are within 200 yards of the high and precipitous cliffs on the S side of the point.

(80) The 6-mile coast between Rocky Point and Point Bonita is very rugged and broken. The cliffs, which are seaward ends of spurs from Mount Tamalpais, rise to heights of over 500 feet and are cut by deep narrow valleys stretching inland.

(81) **Point Bonita,** on the N side of the entrance to Golden Gate, is a sharp black cliff 100 feet high, increasing to 300 feet on its seaward face, 0.3 mile N. From NW it shows as three heads. **Point Bonita Light** (37°48.9'N., 122°31.8'W.), 124 feet above the water, is shown from a 33-foot white tower on the S head. A fog signal is at the light. A tower and radar antenna operated by the San Francisco Vessel Traffic Service is prominent on the N head about 0.3 mile from the light. In summer the cliffs are white with bird droppings, but the first heavy rain restores them to their natural black color. There are a few detached rocks surrounding the point, but these do not extend over 200 yards offshore.

(82) **Bonita Cove,** E of Point Bonita, is occasionally used as an anchorage by small vessels. The anchorage is close under Point Bonita in about 36 feet.

(83) **Mount Tamalpais,** 7 miles N of Point Bonita, is visible for over 60 miles in clear weather. From S and W it shows three summits, the westernmost with two radar domes is the highest and the easternmost with a lookout tower is the sharpest. The mountain is covered with bushes and scrub trees, giving it a dark appearance

which contrasts strongly with the surrounding hills, especially in summer when the hills assume a light reddish color.

(84) **San Francisco Approach Lighted Horn Buoy SF** (37°45.0'N., 122°41.6'W.) is 9 miles WSW of San Francisco Bay entrance. The buoy is red and white and is equipped with a fog signal, racon, and strobe light.

(85) **San Francisco Bar,** a semicircular shoal with depths less than 36 feet, is formed by silt deposits carried to the ocean by the Sacramento and San Joaquin River systems. The bar extends from 3 miles S of Point Lobos to within 0.5 mile of Point Bonita off the southern coast of Marin Peninsula; the extreme outer part is about 5 miles WSW of San Francisco Bay entrance. **Potatopatch Shoal,** the N part of the bar on **Fourfathom Bank,** has reported depths of less than 23 feet. The name is said to have originated from the fact that schooners from Bodega Bay frequently lost their deck load of potatoes while crossing the shoal. The S part of the bar has depths of 31 to 36 feet.

(86) **Warning.**–Very dangerous conditions develop over the bar whenever large swells, generated by storms far out at sea, reach the coast. A natural condition called shoaling causes the large swells to be amplified and increase in height when they move over the shallow water shoals. This piling up of the water over the shoals is worsened during times when the tidal current is flowing out (ebbing) through the Golden Gate. Outbound tidal current is strongest about 4 hours after high water at the Golden Gate Bridge and attains a velocity in excess of 6 knots at times. The incoming large swells are met by outbound tidal current causing very rough and dangerous conditions over the bar. Steep waves to 20 or 25 feet have been reported in the area. Mariners should exercise extreme caution as the bar conditions may change considerably in a relatively short period of time.

(87) **The most dangerous part of the San Francisco Bar is considered to be Fourfathom Bank. Bonita Channel, between the shoal and the Marin coast, can also become very dangerous during large swell conditions. The safest part of the bar is the Main Ship Channel through the center of the bar. But even that area can be extremely dangerous when the tidal current is ebbing.**

(88) A **Traffic Separation Scheme** has been established through the Main Ship Channel and Golden Gate into San Francisco Bay. The scheme consists of one-way **traffic lanes** separated by a **separation line** and, after entry into San Francisco Bay, includes a **Deep Water Route, precautionary area**, a **limited traffic area**, and **recreation areas.** For purposes of INTERNATIONAL NAVIGATION Rule 10, this scheme has been adopted by IMO seaward of the demarcation line. (See Traffic Separation Schemes, chapter 1, for additional information.)

Local Regulations

(89) **Tank Vessel Escort Regulations** have been established by the State of California for San Francisco, San Pablo, and Suisun Bays. Tank vessel masters, owners, and operators are expected to be familiar, and in compliance, with Tank Vessel Escort Regulations. Failure to be in compliance may result in unsafe transits, transit delays, and fines. Excerpts from the regulations are below. The full text of the regulations can be found on the internet at **www.dfg.ca.gov/ospr/organizational/msb/regulations/regulations.htm**, or may be obtained by calling the California Office of Spill Prevention and Response 24-hour Communications Center at 916-445-0045. Tank vessel masters should contact their agent or vessel manager/owner for additional information. The San Francisco Marine Exchange may also be able to provide mariners with additional information and can be contacted at 915-441-6600.

(90) "851.2 Purpose and Scope"

(91) This subchapter sets forth tank vessel escort requirements for the San Francisco, San Pablo and Suisun Bays. These requirements specify that tank vessels carrying 5,000 or more long tons of oil in bulk as cargo shall be escorted by a suitable escort tug or tugs. The escort tugs will be available, and shall respond as needed to influence the speed and direction of travel of the tank vessel in the event of a casualty, or steering or propulsion failure, thereby reducing the possibility of groundings or collisions and the risk of oil spills from these tank vessels.

(92) "851.4 Applicability"

(93) (a) This subchapter shall apply to all tank vessels capable of carrying 5,000 or more long tons of oil in bulk as cargo when these vessels are underway on waters in the San Francisco, San Pablo and Suisun Bays, as follows:

(94) (1) tank vessels carrying 5,000 or more long tons of oil as cargo shall be required to comply with all the requirements in this subchapter;

(95) (2) tank vessels carrying less than 5,000 long tons of oil as cargo shall only be required to comply with the reporting requirement as stated in Subsection 851.7

(96) (b) The escort requirements of this subchapter shall not apply to tank vessels that are only shifting location within an anchorage. Any tug used during such as shifting maneuver need not be an escort tug registered with Clearing House.

(97) (c) This subchapter shall not apply to tank vessels otherwise covered by the requirements of this subchapter in the event of an emergency. The master of

the tank vessel shall report to the Clearing House any deviation from the requirements outlined in this subchapter as soon as practicable, and in no case later than the departure of the tank vessel from the marine waters of the state. For purposes of this section, an emergency shall include, but not be limited to, any the following:

(98) (1) imminent and immediate danger to the vessel, its cargo, or its crew; or

(99) (2) imminent and immediate danger to a marine terminal, or to the escort tug; or

(100) (3) imminent and immediate danger to a vessel in close proximity to the tank vessel; or

(101) (4) any emergency declared by the Captain of the Port.

(102) (d) This subchapter (except for this Subsection 851.4(d)) shall not apply to tankers with double hulls, as that term is defined in **33 CFR 157.03**, when the tanker also has the following:

(103) (1) Fully redundant steering and propulsion systems to include:

(104) (A) two independent propulsion systems each with a dedicated propeller, engine (or motor), electrical generation system, electrical system (including the switchboard), fuel system, lube oil system, and any other system required to provide the vessel with independent means of propulsion; and

(105) (B) two independent rudders each with separate steering systems; and

(106) (C) the propulsion and steering components, as described in Subsection (A) and (B) above, shall be arranged in separate spaces, such that a fire or flood in one space will not affect the equivalent system in the other spaces(s); and

(107) (D) a bow thruster with an assigned power source;

(108) (2) A Navigation System in compliance with the federal navigational equipment requirements set forth in 33 CFR Sections 164.35, 164.37, 164.38(b), 164.40, 164.41, 164.42, and 164.43.

(109) (3) No exemption to this subchapter shall be allowed for a tanker requesting a U.S. Coast Guard Captain of the Port letter of deviation, pursuant to 33 CFR Sections 164.51, 164.53, and 164.55.

(110) (4) The Administrator may require tankers that are exempt from this subchapter under the conditions outlined in Subsection (d) to periodically demonstrate the tanker and crew's ability to maneuver in response to a partial or total loss of propulsion and/or steering at a level of safety at least equal to that of an escorted tanker.

(111) (See **33 CFR 157**, chapter 2, for regulations for Tank Vessels Carrying Oil in Bulk and Maneuvering Performance Capability, and **33 CFR 164**, chapter 2 for Navigation Safety Regulations.)

(112) (e) This subchapter shall apply to all tugs being used to escort tank vessels in waters identified as escort zones.

(113) (f) The tank vessel master remains responsible for the safe navigation and maneuvering of the vessel in all circumstances. The requirements outlined in this section are in addition to, and not a limitation of, any other responsibility created by custom, law, or regulation.

(114) "851.5 Escort Zone Requirements"

(115) (a) Six tank vessel escort zones are established as follows:

(116) (1) Zone 1: All waters in the area encompassed by a straight line drawn between Point Bonita Light, through Mile Rocks Light to the shore (the COLREGS Demarcation Line), and eastward to the Golden Gate Bridge;

(117) (2) Zone 2: All waters from the Golden Gate Bridge, south to a line drawn between the southern tip of Bay Farm Island and the southeastern tip of Point San Bruno Peninsula, and north to a line drawn from Point San Pablo to San Pablo Bay Light 4 (Light List number 5880), to San Pablo Bay Channel Light 5 (Light List number 5885), to Point San Pablo;

(118) (3) Zone 3: All waters from the southern end of Zone 2 to one mile north of the San Mateo Bridge;

(119) (4) Zone 4: All waters in the navigable channel from one mile north of and to one mile south of the San Mateo Bridge;

(120) (5) Zone 5: All waters from the eastern boundary of Zone 2 to the western approaches of the Carquinez Bridges at Light 15;

(121) (6) Zone 6: All waters from Light 15, through the Carquinez Strait, north on the Sacramento Ship Channel to one mile beyond the Ryer Island Ferry Terminal and east on the San Joaquin River to one mile beyond the Antioch Bridge;

(122) (b) Tank vessels required to have escorts under this subchapter shall be escorted in the zones as specified below:

(123) (1) Escort tugs are required for tank vessels operating within Zones 1, 2, 4, or 6;

(124) (2) Escort tugs will not be required in Zones 3 or 5, or in areas outside of Zones 1 through 6;

(125) (3) No tank vessel may transit in a zone that requires an escort tug unless escorted by a tug or tugs of sufficient size and capability, as specified in sections 851.9 (for tankers) and 851.9.1 (for barges) (not carried in this Coast Pilot).

(126) (4) In Zone 1, escort tugs shall be stationed as follows:

(127) (A) on an inbound transit, the escort tug shall be in Zone 1 prior to the tank vessel's arrival to the area

bounded by an arc eight nautical miles seaward of and centered on Mile Rocks Light; and

(128) (B) on an outbound transit, the escort tug shall remain in Zone 1 until the tank vessel leaves the area bounded by an arc eight nautical miles seaward of and centered on Mile Rocks Light.

(129) "851.5.1 Escort Plans"

(130) (a) All tank vessel maters shall use an Escort Plan for transits through zones 1, 2, 4, or 6. The tank vessel shall not continue or commence a transit through any Escort Zone without an Escort Plan that is complete and adequate. The plan shall document the steps that the tank vessel owner/operator and/or master will take to comply with the requirements of this subchapter. The Escort Plan requirements set forth in this section are only planning standards and may not reflect the exigencies of an actual incident response. However, the Escort Plan must demonstrate that the vessel master is prepared to take the actions necessary to assure a reasonable level of success in providing the protection intended by this subchapter, as stated in section 851.2. The Escort Plan shall include:

(131) (1) the tank vessel's intended route(s);

(132) (2) the intended transit speed(s);

(133) (3) a communication plan, to include the radio frequencies that will be used and any other means of electronic communication;

(134) (4) the following characteristics of the tank vessel:

(135) (A) the location and strength of the bitts and chocks to be used by the escort tugs,

(136) (B) the location of the pushing surfaces on the hull that are strong enough to sustain the forces that can be exerted by the escort tug(s),

(137) (C) the number of crew assigned to escort-related duties,

(138) (D) any pertinent performance characteristics and related limitations of the steering and propulsion system(s);

(139) (5) the escort tugs to be use during the transit as required in section 851.9 (for tankers) or 851.9.1 (for barges);

(140) (6) the response actions that will most likely be implemented in the event of an emergency, taking into account the available bitts and chocks, pushing surfaces, line type, and expected tides and currents.

(141) (b) Escorts Plans shall be prepared using one of the following:

(142) (1) a format as designed, completed and submitted by the tank vessel owner/operator; or

(143) (2) a Checklist as recommended by the Harbor Safety Committee of the San Francisco Bay region, and approved by the Administrator of the California Office of Spill Prevention and Response (the Administrator). The vessel owner/operator shall assure that the vessel master completes the Checklist according to the requirements in this subchapter.

(144) (c) Review, approval and use of an Escort Plan designed and submitted by the tank vessel owner/operator:

(145) (1) a tank vessel owner/operator may develop an Escort Plan for a vessel or vessels, and submit that plan to the Administrator for review and approval prior to using the plan for escorted transits;

(146) (2) the Escort Plan developed by the vessel owner/operator shall include all the information required in subsection 851.5.1(a). The requirement for information regarding the tug(s) to be used during the transit may be met by stating the size and braking force capacity of the tug(s) needed for each of the vessels covered by the plan.

(147) (3) each plan shall be either approved, approved with conditions, or denied within 60 days after the Administrator receives the plan. Approval, once given, may be revoked if it is found that the plan submitter is not complying with the requirements of this subchapter;

(148) (A) to be approved, the plan must comply with the requirements in this section, must match tug(s) to the tank vessels in accordance with the requirements in this subchapter, and must demonstrate that the tank vessel owner/operator and/or master maintains a level of readiness that will allow for effective implementation of the plan. The plan submitter shall be notified in writing when a plan has been approved.

(149) (B) approval shall be denied or revoked if the plan, or the implementation of the plan, does not comply with the requirements of this subchapter. If a plan is denied or revoked, the Administrator shall notify the owner/operator in writing of the reasons for denial or revocation, and provide an explanation of those actions necessary to secure approval. The Checklist form of escort plan, as prescribed in this section, shall be used unless and until a new or revised escort plan is submitted and approved by the Administrator.

(150) (4) once approved, the master and pilot shall use and comply with the Escort Plan on each escorted transit:

(151) (A) the details of the Escort Plan shall be reviewed and discussed as part of the pre-escort conference (section 851.7);

(152) (B) as part of the pre-escort communications, the pilot or, if there is no pilot on board, the master shall notify the Clearing House that the plan has been reviewed, and shall inform the Clearing House of the tugs that have been chosen for the escort.

(153) (5) the Checklist format, as described in this section, shall be used for all escorted transits unless or until an Escort Plan is submitted by the vessel owner/operator, and approved by the Administrator.

(154) (d) Completion, review and use of Escort Plans prepared using the Checklist format developed by the Harbor Safety Committee:

(155) (1) the Checklist shall include all the items enumerated in subsection 851.5.1(a), as well as a schematic drawing of a tank vessel sufficient to illustrate the location of the bitts and chocks, and those areas on the hull that are capable of withstanding the forces exerted by the escort tug(s). The Administrator shall provide a copy of the approved Checklist to the Marine Exchange for distribution to tank vessel owner/operators, masters and/or pilots.

(156) (2) the master shall complete the Checklist, and shall verify that all the requisite elements have been included. The master shall sign the Checklist to indicate that, to the best of the master's knowledge, the information on the Checklist is correct, and is in compliance with the requirements of this subchapter. If there is no pilot on board, the master shall notify the Clearing House when the Checklist has been completed and shall inform the Clearing House of the tugs that have been chosen for the escort. The Administrator may request a copy of any Checklist at any time to determine if the planning process has been completed adequately.

(157) (3) the Checklist shall be completed by the tank vessel master at the following points during a transit operation;

(158) (A) for vessels arriving from sea, the Checklist shall be completed prior to entering Zone 1;

(159) 1. Alternatively, the agent or owner/operator may complete the checklist and electronically send the completed form to the master and the Clearing House:

(160) (i) before the vessel's estimated time of arrival to the San Francisco Bay Pilotage area, or

(161) (ii) before the vessel's arrival at the San Francisco Bay Precautionary Area, or

(162) (iii) after the vessel's departure from its last Port of Call.

(163) (B) for in-bay movements or departures, the Checklist shall be completed prior to beginning the transit.

(164) (4) if a pilot is on board, the pilot shall review the Checklist as cited in subsection 851.5.1(d) and shall verify that all the elements have been completed adequately. The pilot shall sign the Checklist after reviewing and verifying its adequacy. The pilot shall then notify the Clearing House that the planning process has been completed, and shall inform the Clearing House of the tugs that have been chosen for the escort.

(165) (A) the pilot shall determine that the Checklist is adequate if the following are met:

(166) 1. all the items on the Checklist have been addressed completely; and

(167) 2. the information provided demonstrates that the tank vessel master is prepared to take the actions necessary to assure a reasonable level of success in using the escort tug(s) in response to a vessel casualty.

(168) (B) if the pilot determines that the Checklist is not adequate, the pilot shall notify the Clearing House, and explain the reason(s) for such determination. The Clearing House shall then immediately notify the Administrator that a Checklist has been determined to be inadequate by the pilot.

(169) (C) The Administrator shall review all inadequacy determinations made by a pilot and shall decide whether the determination is appropriate. The Administrator may affirm or overturn such determination, or may provide for conditional approval of a Checklist, as follows;

(170) (1) the Checklist will be considered adequate if it is complete, it the tug to tanker match has been done in accordance with this subchapter, and the information provided demonstrates that the tank vessel master is prepared to take the actions necessary to assure a reasonable level of success in using the escort tug(s) in response to a vessel casualty. If a Checklist is determined to be inadequate, the vessel may be ordered to discontinue operations until an adequate Checklist is completed;

(171) (2) a Checklist may be approved conditionally if there is a minor deficiency in one or more of the requisite elements. Conditional approval may require that the tank vessel operate under specified precautionary measures (such as operating at a slower speed). If the owner/operator of a tank vessel fails to comply with the requirements of the conditional approval, the Administrator may order the tank vessel to discontinue operations until an acceptable Checklist for that vessel has been completed and approved.

(172) (D) The pilot is not responsible for delaying or stopping the transit solely because of a plan's inadequacy.

(173) (5) The tank vessel owner/operator or the master shall ensure a copy of the completed, signed Checklist is submitted to the Clearing House within 14 days after the transit covered by the Checklist. The master, pilot, ship's agent or vessel owner/operator may send the copy to the Clearing House. A copy of the Checklist shall also be maintained aboard the vessel for a period of one year after the transit. A copy of the Checklist shall be made available to the Administrator upon request.

(174) "851.7 Communication and Reporting Requirements Before, During and After an Escorted Transit"

(175) (a) No more than one hour prior to entering or transiting the marine waters of the San Francisco, San Pablo or Suisun Bays, the pilot or, if there is no pilot onboard, the master of a tank vessel shall report the

vessel's name and position to the Clearing House, and shall report the status of the vessel as follows:

(176) (1) tank vessels carrying 5,000 or more long tons of oil as cargo shall report as "Escort Required"; or

(177) (2) tank vessels carrying less than 5,000 long tons of oil as cargo and requiring no escort need not be reported.

(178) (b) After completing the review of the Checklist or the Escort Plan, as specified in section 851.5.1, the pilot or, if there is no pilot onboard, the master of the tank vessel shall report the following to the Clearing House:

(179) (1) a statement that the Escort Planning process has been completed;

(180) (2) if a pilot is onboard, a statement from the pilot as to whether the Checklist is completed, and whether the Checklist is or is not adequate;

(181) (3) a listing of the tugs that were chosen for the escort during the Escort Planning process;

(182) (4) for a tanker, the vessel's displacement;

(183) (5) for a barge, the vessel's deadweight tonnage.

(184) (c) Pre-Escort Conference: Before commencing an escorted transit, the pilot or, if there is no pilot onboard, the master of the tank vessel shall initiate communications with the escort tug(s). During this pre-escort conference, all parties shall plan and discuss the details of the escorted transit as specified on the Checklist or in the Escort Plan, including, but not limited to, the following:

(185) (1) the intended route;

(186) (2) the intended destination;

(187) (3) the speed of the vessel;

(188) (4) the positioning of the escort tug(s) relative to the tank vessel being escorted;

(189) (5) the manner in which an emergency connection would be made between the escort tug and tank vessel;

(190) (6) radio communications, including primary and secondary frequencies; and

(191) (7) anticipated weather and tidal conditions.

(192) (d) The master of the escort tug(s) shall report the name of the tug(s) and the name of the tank vessel to the Clearing House upon arrival at the following locations:

(193) (1) for unbound tank vessel movements; when passing Alcatraz, and when on-station;

(194) (2) for in-bay and outbound tank vessel movements; when on-station at the tank vessel prior to movement of the tank vessel.

(195) (e) At all times during the escorted transit, the master or pilot of the tank vessel shall maintain direct, two-way radio communication with the master or pilot of the escort tug. The radio communication shall be on a channel agreed to by both the master or pilot of the tank vessel and the master or pilot of the escort tug.

(196) (f) Reporting tug casualties during and after an escorted transit:

(197) (1) the master of the escort tug shall immediately notify the master or pilot of the escorted vessel of any casualty that occurs to the tug during the escorted transit. A casualty shall include any loss of main propulsion, primary steering, or any component or system that reduces the maneuverability of the tug, or any other occurrence that adversely affects the tug's ability to perform the escort function:

(198) (2) the tug owner, operator or agent shall file a written casualty report with the Clearing House within 72 hours of occurrence. The Clearing House shall maintain a database of these reports for three years.

(199) "851.8 Requirements for Escort Tugs: Braking Force Measurement, Crew and Training Standards, Equipment and Stationing Criteria."

(200) (g) Stationing requirements for escort tugs:

(201) (1) an escort tug shall not simultaneously engage in the escort of more than one tank vessel;

(202) (2) escort tugs shall maintain a station-keeping distance of no more than 1,000 feet ahead or aside, or 500 feet astern of the tank vessel while engaged in escort activity;

(203) (3) escort tugs shall standby as the tank vessel transits Zones 3 and/or 5, as follows:

(204) (A) the escort tug(s) shall standby in Zone 2 or 6 as the tank vessel transits Zone 5; and

(205) (B) the escort tug(s) shall standby in Zone 2 or 4 as the tank vessel transits Zone 3; or

(206) (C) the escort tug(s) may accompany the escorted tank vessel through Zone 3 and/or 5 in lieu of standing by.

(207) (4) in Zone 1, the escort tug(s) shall be stationed as follows:

(208) (A) on an inbound transit, the escort tug shall be in Zone 1 prior to the tank vessel's arrival to the area bounded by an arc eight nautical miles seaward of and centered on Mile Rocks Light; and

(209) (B) on an outbound transit, the escort tug shall remain in Zone 1 until the tank vessel leaves the area bounded by an arc eight nautical miles seaward of and centered on Mile Rocks Light.

(210) (h) Escort transit log:

(211) (1) escort tug masters shall keep a record in the ship's log of every escorted transit;

(212) (2) the record of the escorted transit in the ship's log shall include information regarding the sequence of events during the transit, the crew assignments, any casualties that may occur, and any drills conducted.

(213) **Golden Gate,** the passage between the ocean and San Francisco Bay, is 2 miles wide at the W end between Point Bonita and Point Lobos, but the channel is

reduced in width to 1.5 miles by Mile Rocks and to less than 0.7 mile by the Golden Gate Bridge pier. Depths in the passage vary from 108 feet to over 300 feet.

(214) **Point Lobos,** the S entrance point to the Golden Gate, is high, rocky, and rounding with black rugged cliffs at its base. A large water tank is on the summit. The **Cliff House** is near the S part of the W face of the point; high and rocky **Seal Rocks** are just offshore.

(215) **Mile Rocks,** 700 yards NW of the sharp projecting point off **Lands End** on the N face of Point Lobos, are two small 20-foot-high black rocks about 100 feet apart. **Mile Rocks Light** (37°47.6'N., 122°30.6'W.), 49 feet above the water, is shown from an orange and white horizontally banded tower on the outer and larger rock; a fog signal is at the light.

(216) Passage between Mile Rocks and Point Lobos should not be attempted because of the covered and visible rocks extending over 300 yards from shore and the rocks covered 6 and 14 feet S of Mile Rocks Light.

(217) The S shore of the Golden Gate extends in a gentle curve NE for 2 miles to Fort Point, forming a shallow bight called **South Bay.** The cliffs rise abruptly from narrow beaches, except near the middle of the bight where a valley terminates in a sand beach 0.3 mile long. Sailing craft are sometimes obliged to anchor here when becalmed, or when meeting an ebb current, to avoid drifting onto Mile Rocks, but the anchorage is uncomfortable and it is difficult to get underway from it.

(218) **Fort Point** projects slightly from the high cliffs and is marked by a square red brick fort with a stone seawall in front. The fort, which is obscured by the S end of the Golden Gate Bridge, and 29 acres of land adjacent to the fort are part of the Fort Point National Historic Site. The fishing wharf at Fort Point is unsafe for mooring because of surge conditions.

(219) The N shore of the Golden Gate is bold and rugged, with reddish cliffs rising abruptly from the water's edge to over 600 feet.

(220) **Point Diablo,** 1.4 miles E of Point Bonita, rises abruptly from a 0.1-mile sharp projection to a height of over 200 feet with deep water on all sides. A light is shown from a white house on the end of the point; a fog signal is at the light.

(221) The mile-long shore between Point Diablo and Lime Point forms a shallow bight with steep cliffs. Near the middle of the bight the cliffs are cut by a narrow valley which ends in a low beach at the shore.

(222) **Lime Point,** 2.5 miles E of Point Bonita, is high and precipitous, and rises abruptly to a height of nearly 500 feet in less than 0.3 mile. A light is shown from a pole at the end of the point; a fog signal is at the light.

(223) **Golden Gate Bridge,** crossing the Golden Gate from Fort Point to Lime Point, has a clearance of 225 feet at the center of the 4,028-foot-wide channel span between the 740-foot-high supporting towers; the least clearance is 211 feet at the S pier. The center of the span is marked by a fixed green light with three fixed white lights in a vertical line above it and by a private fog signal; a private light and fog signals are on the S pier. When approaching Golden Gate Bridge in the eastbound traffic lane in fog, channel Buoy 2 sometimes provides a radar image that indicates the location of the S pier of the bridge. Aero obstruction lights mark the tops of the bridge towers. (Do not rely on radiobeacon bearings when within 0.5 mile of the bridge.)

Coast Guard

(224) **Golden Gate Coast Guard Station** is about 0.4 mile NNE of the bridge at the entrance to Horseshoe Bay.

COLREGS Demarcation Lines

(225) The lines established for San Francisco Harbor are described in **80.1142**, chapter 2.

Channels

(226) The principal approach to San Francisco Bay is through the buoyed **Main Ship Channel** over the bar on bearing **070°** toward Alcatraz Light. The project depth is 55 feet in the 2,000-foot wide channel. (See Notice to Mariners and latest edition of chart for controlling depths.) In September 1998, a sunken wreck was reported W of Buoy 8, in about 37°46'30"N., 122°35'21"W. Caution is advised when transiting the area.

(227) From S, some coasters and fishing vessels drawing not more than 15 feet use unmarked **South Channel,** parallel to and 0.7 mile off the peninsula shore. A reported obstruction, covered 25 feet, is near the S end of the channel about 3.5 miles 192° from Mile Rocks Light.

(228) From N, coasters and other vessels use buoyed **Bonita Channel,** between the E end of Potatopatch Shoal and the shore N of Point Bonita. The channel is narrowed to 0.2 mile by several rocky patches including **Sears Rock,** covered 19 feet, 1.2 miles NW of Point Bonita.

(229) **Caution.**–Vessels departing San Francisco Bay through Bonita Channel on the ebb current must use extreme caution when crossing the tide rip off Point Bonita. When the bow passes the rip the stern is thrown to port and, unless promptly met, the vessel will head straight for the rocks off the point. Vessels favoring Potatopatch Shoal too closely have reported a set toward it.

(230) Neither South Channel nor Bonita Channel should be used by large vessels. Strangers wishing to cross the bar in thick weather should either wait for clearing or

take a pilot. Fog is prevalent in the Golden Gate; radar is a great aid here.

(231) It has been reported, however, that radar targets at the entrance to San Francisco Bay may be difficult to identify at times because of ghost echoes.

Currents

(232) The currents at the entrance to San Francisco Bay are variable, uncertain, and at times attain considerable velocity. Immediately outside the bar there is a slight current to the N and W, known as the **Coast Eddy Current.** The currents at San Francisco Approach Lighted Horn Buoy SF are described in some detail in the Tidal Current Tables. The currents most affecting navigation in this vicinity are the tidal currents. Across the bar the flood current converges toward the entrance and is felt sooner around Point Lobos and Point Bonita than across the Main Ship Channel. The ebb current spreads from the entrance over the bar, but the main strength is WSW, parallel with the S edge of the Potatopatch Shoal, and through the Main Ship Channel. In the Bonita Channel the ebb current is weak and of short duration; the flood current begins so early that during the last half of the ebb in the Golden Gate the current in Bonita Channel forms an eddy flowing SE around Point Bonita into Bonita Cove.

(233) In the vicinity of Mile Rocks the currents attain considerable velocity within a few minutes after slack on both flood and ebb.

(234) In the Golden Gate the flood current sets straight in, with a slight tendency toward the N shore, with heavy overfalls both at Lime Point and Fort Point when strong. It causes an eddy in the bight between Point Lobos and Fort Point. The ebb current has been observed to have a velocity of more than 6.5 knots between Lime Point and Fort Point, and it sets from inside the bay on the N side toward the latter point. Like the flood current, it causes an eddy in the bight between Fort Point and Point Lobos, and a heavy rip and overfall reaching about 0.25 mile S from Point Bonita. At the Golden Gate Bridge, large current eddies near the foundation piers cause ships to sheer off course.

(235) Daily current predictions are given in the Tidal Current Tables. In October 1991, tidal currents at San Francisco Bay Entrance (Golden Gate) were reported to deviate significantly from official predictions published by the National Ocean Service. Mariners should exercise caution and discretion in the use of published tidal current predictions. Also, previously available Tidal Current Charts of San Francisco Bay have been withdrawn.

Weather, San Francisco Bay

(236) Winter winds, from about November through February, are variable. The procession of lows and highs brings frequent wind shifts and a great range of speeds. Calms occur from 15 to 40 percent of the time inside the bay and about 10 to 12 percent outside, while extreme winds of 50 knots with gusts of 68 knots (January 1951) have occurred in winter. Strongest winter winds are often out of the SE through SW, ahead of a cold front; sometimes strong W through N winds follow. Inside the bay, gales occur less than 1 percent of the time; this rises to around 2 percent in the ocean approaches. December is the month with most frequent gales followed closely by January and May. Gales are unheard of during August and September.

(237) Spring is often the windiest season and June the windiest month, as reflected by the average wind speeds which range from about 6 to 12 knots inside the bay and up to 15 knots in the ocean approaches. While the extremes of winter are less likely, winds in the 17- to 28-knot range are more likely. Inside the bay, they occur 5 to 10 percent of the time, except at exposed locations like San Francisco International Airport, where winds pour through the San Bruno Gap at these speeds up to 25 percent of the time. Over the ocean approaches, they blow in this 17- to 28-knot range up to 40 percent of the time. Wind directions in spring become less variable as strong NW winds are generated by the Pacific High and reinforced by the sea breeze. SW and W winds are also common, as directions are deflected and channeled by the hills that surround the bay.

(238) Summer winds are the most constant and predictable of all. Wind directions inside the bay are often local, but they are derived from the NW through N flow that persists outside the bay. At San Francisco International Airport, for example, winds are out of the W through NW 80 percent of the time; they usually back to the SW briefly in the early morning hours. In the southern part of the bay, NW through N winds come funneling in through the San Bruno and Crystal Springs Gaps, aided by the onshore sea breeze. Along the E shores, these two factors result in a SW through NW flow. Over the northern part of the bay, winds S of W prevail as the W flow through the Golden Gate is deflected N by topography and the heating of the Petaluma and Napa Valleys. If an area is completely protected from the prevailing flow, then a local onshore sea breeze will most likely develop. At Petaluma River entrance, summer winds out of the SE are most common.

(239) This flow is usually so persistent that it continues through the night, with only a reduction in speed and perhaps a slight shift in direction. Only over the

extreme southern part of the bay does an offshore land breeze develop at night–and even here it is an infrequent occurrence.

(240) Wind speeds over the bay increase during the day, owing to the strengthening of the sea breeze, and then fall off late at night. In general, depending upon exposure, winds blow at 3 to 10 knots from 2300 to 0900. During the morning hours, they increase to 6 to 15 knots. By early afternoon they are blowing at 14 to 20 knots, and this usually lasts until early evening, when they begin to drop off to nighttime levels. This same diurnal variation exists over the Gulf of the Farallones, with speeds sometimes reaching 25 knots or so during the afternoon.

(241) Few changes take place in this summertime pattern, but one that occasionally disrupts it occurs when a high-pressure system gets situated over the Pacific Northwest. During these periods, a NE flow, sometimes very strong, comes whipping down the high plateaus of interior Washington and Oregon and Idaho, across the Cascades and Sierra through the coastal valleys and gaps in the inner coast range, to flood the bay region with warm and often hot, dry air. Due to the compression of sinking air, it warms and dries out as it falls into lower elevations. This flow clears the fog and stratus from the bay. Sometimes these NE winds are just enough to offset the prevailing flow, but at other times they blow fiercely across the area for a few days. They are so dry that many devastating brush fires have occurred in the bay area during these periods.

(242) The summer conditions last through October, although they are not as persistent in October as the Pacific High weakens and occasional weather fronts affect the area.

(243) Fog is a problem in the San Francisco Bay area, particularly in and around the Golden Gate. The foggiest months at the airport are December and January when, on average, 17 days, report foggy conditions. The foggiest months at the Golden Gate are July and August for reasons discussed later. June is the most fog-free month reporting, on average, only three foggy days. It can be local or widespread, thick or wispy, low or high. It may roll in rapidly from the sea or creep out from the land.

(244) Fog ebbs and flows in cycles, daily and seasonal. They are long-term fluctuations not predictable enough to be termed cycles. Several foggy summers may be followed by several clear ones and one clear summer may be succeeded by a foggy one. Daily and seasonal cycles are more predictable.

(245) Summer fog and stratus are advected off the Pacific by the prevailing onshore winds. They pour through the gaps and passes in the Coast Range and spread out over San Francisco Bay. Low stratus clouds are often referred to as high fog–an accurate term, since fog is simply stratus clouds touching the surface. This high fog is much more prevalent than dense surface fog in the bay.

(246) Several conditions usually exist in summer to create this fog and stratus. The large Pacific High becomes well established off the coast. Its clockwise circulation generates a NW flow along the coast. This drives a cool California current S and even more importantly causes the upwelling of cold water close to the coast. On the E side of the high, air aloft subsides and warms, creating a layer of warm, dry air aloft (inversion). As warm, moist air moves across the Pacific and into the coastal region, it is chilled, first by the California current and then further by the cold pools of coastal water. If the air mass isn't too dry, then condensation through cooling causes fog and stratus to form from the surface, possibly to the height of the inversion (usually 500 to 1,500 feet, 153 to 458 m). This situation occurs often enough to create a semipermanent fog bank off the coast during the summer.

(247) Meanwhile, the inland valleys of California are heated by the summer sun, creating a large thermal low pressure system and setting up a flow from the ocean to the land–sea breeze. This intensifies the normal onshore flow, particularly during the afternoon and evening. This flow is blocked or deflected by the coast ranges except where there are gaps and passes. In the San Francisco Bay area, there are six major gaps, including the largest and only sea-level gap, the Golden Gate. It is the most influential feature in the climate of the bay. Minor gaps and passes are numerous also, resulting in very local conditions as cool, damp ocean air funnels through to the bay.

(248) Under normal summer conditions, a daily cycle is evident. What happens in the Golden Gate usually occurs along the other passes to a lesser degree. Usually a sheet of fog appears in the early forenoon on either side of the bold headlands of the Golden Gate. It becomes more formidable as the day wears on. By late afternoon, it begins to move through the Golden Gate at a speed of about 14 knots, on the afternoon sea breeze. Once inside the bay, it is carried by local winds. Because of warm bay temperatures and other factors, it usually becomes high fog or stratus, E of Alcatraz. The height of the cloud base often lifts to 500 to 1,500 feet (143 to 458 m), and visibilities range from 3 to 7 miles (5 to 11 km) on the E side of the bay. A narrow tongue of fog and stratus sometimes follows a local wind N into San Pablo Bay and then E into Carquinez Strait. Another night wind carries some fog and stratus into the S part of the bay, while the W wind pushes some clouds across the bay through the Golden Gate to Berkeley and the E

shores. In a similar pattern, high fog moves over the bay through the other gaps and passes.

(249) As the sun rises, fog and stratus burn off; first from the shore and near-shore areas and then gradually from the middle of the bay. In general, the N part of the bay is the last to be enveloped at night and the first to clear in the morning. Occasionally the stratus is so thick that the bay remains blanketed all day. It is most persistent in the central part of the bay from the Golden Gate to Berkeley.

(250) The foggiest waters lie at the ocean approaches to the Golden Gate. In the Gulf of Farallones, fog signals operate 40 to 50 percent of the time during August, the worst month. In Bolinas and Drakes Bays, fog is constantly pushed in against the shores. At Point Reyes, the fog signal, 300 feet (92 m) above mean sea level, operates about 45 to 50 percent of the time during July and August. At the entrance to the Golden Gate, fog signals blow about 30 percent of the time during an average August. Frequencies drop slightly in the channel itself, particularly at places like Anita Rock, which is somewhat sheltered by land. However, fog signals in the Golden Gate operate 15 to 25 percent of the time during August. July through September remain the foggiest months. Alcatraz represents the E extent of the frequent dense summer fog.

(251) Once inside the bay, the extent of fog and stratus is determined by the winds, water temperature, and nearby land temperatures. Stratus continues across the bay to Berkeley. Often it is carried N through Southhampton Shoal into San Pablo Bay and then E into Carquinez Strait. Usually it is not touching the surface, so visibilities remain above 5 miles (9 km). Some cool, moist night air also reaches these N waters through Muir Woods Gap, Nicasio Gap, and Estero Lowland. While stratus touches the hills in these areas, it usually overhangs the bay. If nighttime cooling has been sufficient, it can build down to the surface. Fog is only likely to affect Richardson Bay and Raccoon Strait when the wind is a few points S of W. At the entrance to the Petaluma River, August visibilities drop below 7 miles (13 km) on about 6 days, but below 0.5 mile (0.9 km) on only 1 day on the average. In N waters, the narrow stretch through Southhampton Shoal to Carquinez Strait is the most likely place to encounter fog.

(252) While stratus is common at night along the Alameda-Oakland coast, dense fog is rare. Prevailing nighttime conditions are stratus at 500 to 1,900 feet (153 to 580 m) with visibilities of 7 to 15 miles (13 to 28 km), occasionally dropping to 3 to 6 miles (6 to 11 km). At Moffett Field, August visibilities are reduced to less than 7 miles (13 km) on about 8 days, but fall below 0.5 mile (0.9 km) on 1 day, at most. Fog and most often stratus reach the S part of the Bay, mainly through the San Bruno and Crystal Springs Gaps. At San Francisco International Airport, visibilities drop below 0.5 mile (0.9 km) on about 1 day in August.

(253) There are times, however, when the whole bay becomes blanketed by fog. It can occur over a period of several days or a couple of weeks. On the average, it is a weekly cycle. At these times the indraft of air through the gaps is so strong that sea fog penetrates as far E as Sacramento and Stockton. If this flow continues for a few days, cooler ocean air replaces the warm valley air, finally causing the sea breeze mechanism to break down. Winds diminish, and the bay area clears for a few days. Slowly the valley reheats, and the process begins again.

(254) Sea fog occurs infrequently in fall and winter. It is most likely with the warm, moist flow ahead of a frontal system, and it occurs most often near the approaches to and in the Golden Gate. A visibility problem that is most likely in fall is smog. It occurs when an inversion forms at low levels and traps pollutants. At times, the afternoon sea breezes push this smog from San Francisco across the bay to the Berkeley Hills, and a gray, noxious vapor can blanket this part of the bay and drop visibilities to less than 2 miles (4 km). If winds are light, San Francisco can become wrapped in a dense smog that reduces visibilities to below 0.5 mile (0.9 km). These conditions are most likely when a large high-pressure system settles over the bay area.

(255) This high pressure also gives rise to radiation fog, particularly in late fall and winter. Under its clear skies and light winds, land temperatures fall rapidly at night. In low, damp places such as the Delta, this results in a shallow radiation fog. Because this fog forms most readily in regions where tules and other marsh plants grow, they are commonly called "**tule fogs**". Often they are nothing more than a wisp a few feet deep. However, these fogs can build to several hundred feet (>31 m) deep and become dense, particularly if conditions persist for several days. The cool inland areas and the warmer ocean waters tend to create a land breeze on these occasions. In the early morning hours, the fog will drift seaward through the Carquinez Strait and other gaps in the Berkeley Hills, move across the bay to San Francisco and Marin, and roll slowly out the Golden Gate. It is often aided by radiation fog that has formed along the shores of the bay, or sometimes even over the bay itself. Most often, this relatively shallow fog burns off by late morning. Conditions conducive to this phenomenon usually last just a few days.

(256) Tule fog is most likely in December and January, when calm conditions occur up to 40 percent of the time at some locations around the bay. In areas like Richardson Bay, Southampton Shoal, Raccoon Strait,

and Carquinez Strait, fog signals operate 10 to 20 percent of the time on the average during these months. The addition of sea fog makes poor visibilities just as frequent in the Golden Gate and over its ocean approaches. Most shore points around the bay are affected much more by winter fog than summer fog. At the entrance to the Petaluma River, visibilities drop below 0.5 mile (0.9 km) on 5 to 8 days per month from October through February. At Oakland, Alameda, Moffett, and San Francisco Airports, visibilities are reduced below 0.5 mile (0.9 km) on an average of 4 to 6 days per month during December and January.

(257) Spring visibilities are usually excellent. March and April are the best months. Strong breezes and a lack of highs inhibit the formation of land fog, while fewer frontal passages reduce the chances of sea fog. Fog signals operate about 7 to 10 percent of the time in the Golden Gate and around the bay. At land stations, visibilities drop below 0.5 mile (0.9 km) on about 1 day per month, and below 7 miles (13 km) on less than 5 days per month. At sheltered locations like Hamilton Air Force Base, these figures are a little higher. Fog is infrequent but often a haze hangs over the bay and surrounds hills in various shapes, such as wreaths and domes. It is one time of the year that fog may be enjoyed.

Routes

(258) The routes for approaching San Francisco Bay are described in chapter 3 and at the beginning of this chapter under San Francisco Traffic Separation Scheme.

(259) Taking care to avoid the circular 0.5-mile-radius area centered on San Francisco Approach Lighted Horn Buoy SF, steer a course to enter the charted eastbound San Francisco Bay traffic lane. The recommended route for outbound vessels is via the charted westbound San Francisco Bay traffic lane to the precautionary area of the San Francisco Traffic Separation Scheme.

(260) Vessels with a draft of 45 feet or greater bound for the deepwater anchorages S of the San Francisco-Oakland Bay Bridge or N to San Pablo Bay and Carquinez Strait should use the charted **Deep Water Route** E of the Golden Gate Bridge. Vessels intending to use the Deep Water Route should notify San Francisco Traffic before passing Mile Rocks. Deep draft vessels will neither meet nor overtake in the Deep Water Route. Deep draft vessels bound for Anchorage 9, S of San Francisco-Oakland Bay Bridge, should pass E of Blossom Rock then through the C-D or D-E spans of the bridge.

(261) From the Golden Gate Bridge, vessels with drafts less than 45 feet bound for San Pablo Bay and Carquinez Strait set a course to follow the charted Traffic Separation Scheme to the precautionary area E of Alcatraz Island, thence N through the charted Traffic Separation Scheme to San Pablo Bay and Carquinez Strait.

(262) Mariners are cautioned that the traffic lanes between Angel Island and North Point are frequently crossed by tugs with barges, and self-propelled dredges. These vessels normally transit to and from the dumping ground S of Alcatraz Island.

Pilotage, San Francisco

(263) Pilotage in and out of San Francisco is compulsory for all vessels of foreign registry and U.S. vessels under enrollment not having a federal licensed pilot on board. The San Francisco Bar Pilots provide pilotage to ports in San Francisco Bay and to ports on all tributaries to the bay, including Stockton and Sacramento.

(264) The San Francisco Bar Pilots keep one of two vessels on station at all times, the SAN FRANCISCO or the CALIFORNIA. The pilot boats are 85 feet long with a blue waterline band, international orange hull, and white superstructure. The top of the cabin houses, the mast, and after deck covers are orange. The word "PILOT" is shown on the fore part as well as the port and starboard sides of the midship house. The boat displays the standard day and night signals. The pilot vessel cruises on station 24 hours a day near the San Francisco Approach Lighted Horn Buoy SF, or, in foul weather, seaward of it. Prior arrangements with the bar pilots' office can be made by telephone (415-393-0457), telex (SF Pilot 415-371-5595), fax messages (415-982-4721), or cable (BARPILOTS, San Francisco). If prior arrangements have not been made with the pilots' office on Pier 9, masters may give these signals upon approaching the San Francisco Approach Lighted Horn Buoy SF:

(265) **Clear visibility**: by day, hoist code flag "G"; by night, four long flashes on the signal lamp. **Limited visibility**: four long blasts and lay to. The pilot boat monitors VHF-FM channels 10, 13, and 16. The pilot boats' radio calls are SAN FRANCISCO WYZ-8288 and CALIFORNIA WYK-4689; the pilot office call is KMG-389; cable address: BARPILOTS, San Francisco. The office monitors VHF-FM channel 10. Masters or agents are requested to advise the pilots whenever there is a change in the draft, arrival or sailing time, or maneuvering or equipment limitations.

(266) The pilots board directly from the pilot boat. Pilot ladders should be rigged clear of all discharges and spouts about 10 feet from the waterline and amidship of the vessel at all times. The ladder must comply with International Maritime Organization (IMO) and IMPA recommendations and be made in one length and not consist of two lengths shackled or lashed together, and

should be equipped with spreaders about ten feet apart to comply with SOLAS Regulation 17, Chapter 5, (not in this text). A light must be ready to illuminate the ladder if necessary. Contact pilot boat about 30 minutes prior to arrival to determine on what side the ladder should be rigged. No lines should be attached to the lower end of the ladder. A manrope, heaving line, and a ring buoy with a self-igniting light must be provided; vessel speed, 6 to 8 knots.

(267) Pilot boarding is usually conducted in all but the most severe conditions. Extensive fog conditions are often experienced. Strong currents, accelerated by river freshets in the winter and spring months, often exist and greatly alter the predicted current calculations.

(268) The preferred anchorage for deep-draft vessels in the vicinity of the bar pilots pickup station (San Francisco Approach Lighted Horn Buoy SF) is an area with a 1 mile radius centered in 37°49'N., 122°42'W.)

(269) **Inbound tank vessels under escort embark pilots about 1 mile W of San Francisco Approach Lighted Horn Buoy SF.**

Chart 18650

(270) **San Francisco,** one of America's great cities, occupies the N portion of the peninsula forming the S entrance to the bay. The 3-mile N shore of San Francisco from the Golden Gate Bridge to the main waterfront includes the **Presidio of San Francisco**; several yacht harbors; Government buildings and piers on Black Point; Aquatic Park; and Fisherman's Wharf. Shoals with depths less than 10 feet extend up to 0.2 mile from the shore.

(271) The charted **recreation area** extending along this shore is intended primarily for use by recreation vessels. It should not be utilized by vessels 300 tons or more for through passage or for any other purpose, except in case of emergency or special circumstances.

(272) **Alcatraz Island,** 2.5 miles E of the Golden Gate Bridge, is one of the leading marks in entering San Francisco Bay. The small island is 148 feet high and has many buildings on it. Near the NW end of the island is a water tower, which is reported to be usually the only landmark visible when that area is in fog. **Alcatraz Light** (37°49.6'N., 122°25.3'W.), 214 feet above the water, is shown from a gray, octagonal pyramidal tower on the SE part of the island. Fog signals are on the extreme NW and SE ends of the island.

(273) A rock awash, marked on its W side by a bell buoy, is 125 yards W of the NW end of Alcatraz Island. The rocks and tide pools, which extend about 100 feet from the S tip of the island, are reported to cover at high water.

(274) Mariners are advised that surveys indicate shoaling tends to build to the W of the disposal area S of Alcatraz Island and caution should be used in the area. A shoal oriented SW to NE with depths less than 42 feet extends off the E shore of the island.

(275) Alcatraz Island, a part of the Golden Gate National Recreation Area, is administered by the Department of Interior's National Park Service.

(276) Federal regulations require that prior permission to land at Alcatraz, or to berth vessels at Fort Mason, Black Point, and Aquatic Park must be obtained from the General Superintendent, Golden Gate National Recreation Area, Fort Mason, San Francisco, Calif. 94123.

(277) A passenger ferry, which operates frequently, uses a dock on the SE side of the island. In December 1979, 28 feet was reported off the dock.

(278) **Yerba Buena Island,** 345 feet high and 2.5 miles SE of Alcatraz Island, is of small extent, irregular in shape, and covered with a scrubby growth of trees. On its summit is a former lookout tower and the Coast Guard operated San Francisco Vessel Traffic Service Operation Center and radar antenna site. **San Francisco Coast Guard Station** is on the E side of the island.

(279) **Treasure Island** is a low filled area N of and connected by a causeway to Yerba Buena Island. Built originally for the San Francisco International Exposition of 1939-40, Treasure Island now belongs to the city of San Francisco. Some of the piers around the island have lights. A shoal covered 15 feet, is off the N end of the island.

(280) When the prevailing W winds are blowing, deep-draft vessels proceeding to the berthing area on the E side of the island may have extreme difficulty making the 90° turn from the narrow channel between the 30-foot curves SE of Yerba Buena Island.

(281) **Naval restricted areas** are off the N end of Treasure Island and between this island and Yerba Buena Island. (See **334.1070 and 334.1080**, chapter 2, for limits and regulations.)

(282) The **San Francisco-Oakland Bay Bridge,** said to be the eighth longest bridge in the world, crosses the bay from **Rincon Point** in San Francisco to Yerba Buena Island, thence to Oakland. Racons mark the main bridge spans. The recommended passage for southbound traffic is under the NE half of span A-B (midspan clearance 204 feet). Northbound traffic should use the SW half of span D-E (midspan clearance 204 feet). The midspan clearance of spans B-C and C-D are each 220 feet. The bridge span between Yerba Buena Island and Oakland has a greatest vertical clearance of 184 feet between piers G and H and a least vertical clearance of 141 feet between piers M and N. These clearances are approximate; they may be reduced by several feet due to heavy

traffic on the bridge and prolonged periods of extremely high temperature, and as much as 10 feet under extreme conditions. In June 2002, a replacement bridge was under construction, just N of the existing bridge between Yerba Buena Island and Oakland, with a design clearance of 140 feet over the main navigation channel.

(283) A **regulated navigation area** is S of Yerba Buena Island and E to Oakland and Alameda. Passage by vessels 300 gross tons or more should be coordinated with the Vessel Traffic Service and limited to one such vessel at a time to avoid crossing or meeting situations.

(284) The **Port of San Francisco** is the oldest on the Pacific coast. Though primarily a general cargo port, grain, bulk liquids, containers, newsprint, automobiles, bananas, copra, cotton, and other commodities are handled here. San Francisco is a popular port of call for passenger vessels on regular scheduled and special cruises.

Prominent features

(285) The skyline of the city of San Francisco is unmistakable, with several dominant landmarks: the 980-foot television tower supporting three antennas, the pyramid-shaped Transamerica Building, the Coit Tower on Telegraph Hill 3.4 miles E of the bay entrance, and the Bay Bridges with their freeway elevated approaches. Inside the bay, the Bank of America Building, the Bank of America Clock Tower, the clock tower at the S end of the San Francisco-Oakland Bay Bridge, the old Ferry Building with its 240-foot clock tower on the waterfront S of Pier 1, and the U.S. Coast Guard radar tower on Yerba Buena Island are prominent.

(286) The **Ferry Building,** terminal of many ferry boats, also houses the **San Francisco Port Authority** offices, the offices of the Marine Exchange, Inc., and the many offices and exhibits of the World Trade Center.

Channels

(287) Depths of 45 feet or more are available from the Golden Gate Bridge to most of the anchorages; depths ranging from 29 to 40 feet can be taken to most of the San Francisco piers.

Anchorages

(288) General, naval, and explosives anchorages are in San Francisco Bay. (See **110.1 and 110.224**, chapter 2, for limits and regulations.)

(289) **Warning**.–Two submarine pipeline areas cross San Francisco Bay within General Anchorage 9; one crosses between Metropolitan Oakland International Airport and **Brisbane,** and the other about 1.5 miles to the S. Mariners are cautioned not to anchor in these areas. (See chart 18651.)

Dangers

(290) **Anita Rock,** 1.1 miles E of Fort Point and 300 yards from shore, is covered 3 feet and marked by a light.

(291) There are several rocky patches with depths of 33 to 35 feet W and NW of Alcatraz Island that must be avoided by deep-draft vessels. The northwesternmost of these shoals is **Harding Rock,** marked by a lighted buoy equipped with a racon.

(292) The Trans-Bay Tube of the Bay Area Rapid Transit District crosses San Francisco Bay from the vicinity of the Ferry Tower to Oakland. Mariners are **prohibited** from dropping or dragging anchors when in the vicinity of the tunnel crossing.

(293) Heavy tide rips occur in the vicinity of Alcatraz Island.

Tides

(294) The mean range of tide at Golden Gate is 4.1 feet, and the diurnal range of tide is 5.8 feet. A range of about 9 feet may occur at the time of maximum tides. The lowest low water is about 2.5 feet below mean lower low water. Daily tide predictions for Golden Gate are given in the Tide Tables.

Currents

(295) Inside the Golden Gate the flood current sets into all parts of the bay and causes swirls from the Golden Gate as far E as Alcatraz and Angel Islands and through Raccoon Strait, N of Angel Island. The ebb current, inside the Golden Gate, is felt first along the S shore. In the Golden Gate, the average duration of the ebb stream is somewhat greater than that of the flood. The Sacramento and San Joaquin Rivers have weak flood currents during periods of freshets.

(296) The San Francisco-Oakland Bridge has large current eddies near the foundation piers that cause ships to sheer off course.

(297) Strong currents due to heavy spring runoffs have been reported along the San Francisco waterfront between piers 39 and 94.

(298) **Caution.**–Oakland's Seventh Street Marine Terminal, about 1 mile E of Yerba Buena Island, forms a current lee on both the flood and the ebb current. Vessels making for Middle Harbor and Oakland Inner Harbor on a flood current will encounter a lee on the S side of the terminal; when the bow enters the slack water, the vessel will tend to sheer to the left. Similarly, vessels bound for the Outer Harbor on an ebb current will encounter slack water on the N side of the terminal, with a tendency to sheer to the right. This condition may be dangerous to deep-draft, loaded vessels, and should be anticipated.

(299) See the Tidal Current Tables for daily predictions for San Francisco Bay area.

Weather, San Francisco

(300) San Francisco enjoys a marine-type climate characterized by mild and moderately wet winters and by dry, cool summers. Winter rains (December through March) account for about three-fourths of the average annual rainfall of just over 19 inches (483 mm), and measurable precipitation occurs on an average of 13 days per month during this period. Snowfall occurs, but is infrequent. The greatest amount is 1.5 inches (38 mm) recorded in January 1962. Flurries have occurred in each month, December through March. There are frequent dry periods lasting well over a week. Severe winter storms with gale winds and heavy rains occur only occasionally. December is the month most likely to experience gales followed by January. Thunderstorms average five a year and may occur in any month, but are usually very mild.

(301) The daily and annual range in temperature is small ranging from an average annual maximum of 65.2°F (18.4°C) and an average annual minimum of 48.7°F (9.3°C). A few frosty mornings occur during the winter, but the temperature seldom drops below freezing. The coldest temperature on record at the International Airport is 24°F recorded in December 1972. Each month, November through March, has recorded temperatures below freezing (0°C). Winter temperatures generally rise to the high fifties (13.9° to 15°C) in the early afternoon.

(302) The summer weather is dominated by a cool sea breeze resulting in an average summer wind speed of nearly 13 knots. Winds are light in the early morning, but normally reach 17 to 22 knots in the afternoon, depending on location. Where topography and man-made structures funnel the winds, higher gusts may occur in those areas.

(303) A sea fog, arriving over the station during the late evening or night as a low stratified cloud, is another persistent feature of the summer weather. This "high" fog, occasionally producing drizzle or mist, usually disappears during the late forenoon. Despite the morning overcast, summer days are remarkably sunny. On the average a total of only 15 days during the 4 months from June through September are classified as cloudy.

(304) Daytime temperatures are held down both by the morning low overcast and the afternoon strengthening sea breeze, resulting in daily maximum readings averaging in the lower- to middle seventies (21.7° to 23.9°C) from May through August. However, during these months occasional "hot" spells lasting a few days are experienced without the usual "high" fog and sea breeze. September, when the sea breeze becomes less pronounced, is the warmest month with an average maximum of 73°F (22.8°C). Minimum temperatures during the summer are in the lower- to middle fifties (10.6° to 12.8°C). The all-time high temperature recorded at the International Airport is 106°F (41.1°C) recorded in June 1961.

(305) A strong temperature inversion with its base usually at a height of 1,500 feet (458) m) persists throughout the summer. Inversions close to the ground are infrequent in summer, but rather common in fall and winter. As a consequence of these factors and the continued population and economic growth of the area, atmospheric pollution has become a problem of increasing importance.

(306) The National Weather Service maintains offices in Oakland, Redwood City, and at San Francisco International Airport; barometers may be compared there or by telephone. (See appendix for addresses.)

(307) (See page T–3 for **San Francisco climatological table.**)

Towage

(308) Tugboats are available in sufficient quantity for the traffic in the greater harbor.

Quarantine, customs, immigration, and agricultural quarantine

(309) (See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(310) San Francisco–Oakland is a **customs port of entry.**

(311) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard

(312) A **marine safety office** and a **vessel documentation office** are on Coast Guard Island. (See appendix for addresses.) **San Francisco Coast Guard Air Station** is at San Francisco International Airport. A Coast Guard base and station are on the E side of Yerba Buena Island.

(313) The **Marine Exchange** of the San Francisco Bay region reports and records all Golden Gate ship arrivals and departures and conducts communications to serve the bay area commercial traffic. The station can be called 24 hours a day for relay of messages and other marine related services on VHF-FM channels 10 and 18. The station also monitors channels 13 and 16. The ship spotting station is located in Building B, Fort Mason, about 2.5 miles E of the Golden Gate Bridge.

Harbor regulations

(314) The Port of San Francisco is under control of the city of San Francisco, and its management is vested in the San Francisco Port Commission, in direct charge of the port director of that body. The office of the **Chief Wharfinger** is in the Ferry Building.

(315) The harbor regulations are prescribed by the San Francisco Port Authority and enforced by the Chief Wharfinger.

Navigation Guidelines, San Francisco

(316) In addition to the harbor regulations prescribed by the San Francisco Port Authority, the Coast Guard Captain of the Port has prescribed the following supplemental regulations for vessels carrying explosives and certain hazardous bulk cargoes.

(317) Vessels entering or leaving San Francisco Bay laden with explosives (Class A or Military) having a net explosive weight in excess of 100 short tons for ships and in excess of 5 short tons for barges, or carry cargoes of a particular hazard as listed in 33 CFR 126.10 (not in this Coast Pilot), may be escorted by a Coast Guard patrol craft while underway within the bay. These escorts are at the discretion of the Captain of the Port (COTP). Each vessel shall coordinate all movements with the Captain of the Port and ensure:

(318) a) Speed of transit shall not exceed 12 knots.

(319) b) No transit will be made when visibility is reduced to less than 1 mile.

(320) c) A 24 hour advance notice of arrival is required.

(321) d) Vessels shall participate in the Vessel Traffic Service (VTS) and adhere to the traffic separation scheme, except as permitted by VTS or COTP.

Wharves

(322) The general cargo and specialized terminals of the Port of San Francisco are on the bay and on Islais Creek and the canal extending from China Basin; the facilities on the latter waterways are included in the description of these waterways. All of the piers described are owned by the San Francisco Port Authority and leased to private concerns. Only the major piers are described. The alongside depths given for each facility described are reported depths. (For information on the latest depths, contact the Port of San Francisco.) The deck height of each pier is 12 feet unless otherwise stated.

(323) The port has 30 active deepwater piers, 29 of which have 74 berths used primarily for general cargo. Several of the other piers are used for the receipt of oil and fish, ship repairs, mooring various types of small vessels, and for other purposes. Four other piers, actually wharves, are used mostly as special-purpose terminals and can accommodate five vessels.

(324) All of the piers have rail trackage on the aprons and one or more transit sheds. Most of the port's inbound and outbound cargo moves to and from the piers by truck. The Embarcadero, a four-lane thoroughfare, provides access to most of the piers; truck connections to piers S of Pier 46A are via other marginal and arterial streets. The arterials connect with the city's extensive freeway system.

(325) Cargo at the port is handled mostly by ship's tackle, but hoisting and heavy lift equipment is available in the port. Most piers have electrical shore power and water connections.

(326) The port operates its own beltline railroad, which connects to three major railroads; five ferry slips are maintained by the port for the transfer of railroad cars to and from other ports in the bay. Bonded warehouses, cold storage facilities, extermination and fumigation services, marine and cargo surveying services, and other maritime services are available in San Francisco. For a complete description of the port facilities refer to Port Series No. 30, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

Piers N of Ferry Building (37°47.7'N., 122°23.5'W.):

(327) Pier 9 (37°48'04"N., 122°23'42"W.): S side 800 feet, face 154 feet, N side 800 feet; 15 feet alongside; transit shed 820 by 112 feet; mooring company-owned floating equipment; mooring pilot boats; operated by Blue and Gold Fleet LP and San Francisco Bar Pilots.

(328) Piers 15 and 17 (37°48'09"N., 122°23'45"W.): S side 800 feet, face 485 feet, 35 feet alongside; N side 800 feet, 17 feet alongside; transit sheds 820 feet by 167 feet and 780 feet by 143 feet; mooring company-owned floating equipment; operated by Baydelta Maritime.

(329) Pier 27 (37°48'19"N., 122°24'01"W.): E side 1,358 feet, 18 to 33 feet alongside; face 266 feet, 33 feet alongside; mooring vessels; operated by the Port of San Francisco.

(330) Pier 33 (37°48'32"N., 122°24'11"W.): E side 687 feet, face 150 feet, W side 787 feet; 15 feet alongside; transit shed 800 feet by 110 feet, 66,900 square feet covered storage; receipt of seafood; mooring fishing vessels; operated by the Port of San Francisco.

(331) Pier 35 (37°48'36"N., 122°24'20"W.): E side 1,053 feet, face 200 feet; W side 802 feet; 35 feet alongside, two berths; transit shed 990 feet by 162 feet; 171,200 square of covered storage; passengers; operated by Metropolitan Stevedore Co.

(332) Pier 45 (37°48'37"N., 122°24'57"W.): Sheds A and C; face, 1,314 feet; 14 to 35 feet alongside; transit sheds, 98,000 square feet covered storage; mooring transient vessels; various operators; Sheds B and D; face, 1,200 feet; 14 to 25 feet alongside; transit sheds, 88,000 square feet covered storage; receipt of seafood; mooring and icing fishing vessels; operated by the Port of San Francisco.

Piers S of Ferry Building:

(333) Piers 30 and 32 (37°47'12"N., 122°23'00"W.): N side 932 feet, 18 to 38 feet alongside; face 622 feet, 38 feet

alongside; S side 845 feet, 12 to 18 feet alongside; three berths; mooring vessels; operated by the Port of San Francisco.

(334) Pier 50 (Mission Rock Terminal) (37°46'24"N., 122°22'50"W.): N side 1,575 feet; S side 1,480 feet; 35 feet alongside; face 1,000 feet, 45 feet alongside; six berths; four transit sheds, 231,000 square feet of covered storage; mooring vessels; various operators.

(335) Pier 54 (37°46'11"N., 122°22'56"W.): N side 630 feet; face 150 feet; S side 730 feet; 18 to 20 feet alongside; transit shed, 15,000 square feet of covered storage; mooring vessels; receipt of seafood; operated by Crowley Maritime Corp and Sea-K Fish Co.

(336) Pier 70 (37°45'43"N., 122°22'47"W.): E side 1,300 feet, face 80 feet; W side 1,180 feet, 35 feet alongside; mooring vessels; operated by the Port of San Francisco.

(337) Pier 80 (North Container Terminal) (37°45'02"N., 122°22'33"W.): N side 2,657 feet, face 1,296 feet, S side 1,138 feet; 38 feet alongside; nine berths; two transit sheds, 10.5 acres covered storage; container cranes on a track running along the N and S sides and the face; receipt and shipment of conventional, containerized, and roll-on/roll-off general cargo; operated by Marine Terminals Corp.

(338) **China Basin,** 1.1 miles S of the Ferry Building, is a canal extending about 0.6 mile SW from San Francisco Bay. The 3rd and 4th Street bascule bridges across the canal have a least clearance of 1 foot. (See **117.1 through 117.59 and 117.149**, chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 9 and works on channels 13, 17, and 65A; call sign WXY–959, San Francisco Drawbridges. China Basin is a no anchorage zone.

(339) **Islais Creek Channel** is entered 2.9 miles S of the Ferry Building. A dredged approach area with a project depth of 35 feet is off the entrance. The 3rd Street bascule bridge with a clearance of 4 feet crosses the creek about 0.6 mile above the entrance. (See **117.1 through 117.59 and 117.T164**, chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 16 and uses channel 9 for working; call sign WXY-977, San Francisco Drawbridges.

(340) The wharves described in Islais Creek Channel are owned by the San Francisco Port Authority and leased to private concerns. The alongside depths given for each facility described are reported depths. (Contact the Port of San Francisco for latest depths.)

(341) Pier 80 (North Container Terminal), on the entrance: described earlier under wharves for the Port of San Francisco.

(342) Pier 90 (37°44'50"N., 122°23'04"W.): 1,210 feet of berthing space; 28 feet alongside; deck height, 12 feet; grain elevator with 2-million-bushel capacity; six automated loading spouts, loading rate, 40,000 bushels per hour; mooring vessels; operated by the Port of San Francisco.

(343) Pier 92 (37°44'50"N., 122°22'48"W.): face 868 feet; 35 feet alongside; deck height, 12 feet; storage tanks, 2.9-million-gallon capacity; shipment of tallow; receipt of sand; operated by Darling International, Inc. and Mission Valley Rock.

(344) Piers 94-96 (37°44'34"N., 122°22'13"W.): face, 2,456 feet; 40 feet alongside; cranes to 40 tons; 76 acres open storage; mooring vessels; operated by the Port of San Francisco.

Supplies

(345) Fuel oils, gasoline, and all other marine supplies and services may be had in any desired quantity. Fuel oil is usually delivered by barge. Water can be obtained on the piers or by barge.

Repairs

(346) San Francisco, Oakland, Richmond, and Alameda have facilities for making repairs to vessels and machinery of all kinds and sizes. The largest commercial floating drydock in San Francisco has a length of 900 feet, width of 148 feet, and a lifting capacity of 65,000 tons. There are several small drydocks on the San Francisco side, and several marine railways and floating docks on the Oakland side.

Communications

(347) San Francisco is the terminus of several transpacific steamship lines and the port of call for numerous lines of foreign, coastal, and intercoastal vessels. It is served directly by a major highway and is connected by the Bay Bridge to several others. The city is served by three transcontinental railroads; connections to two of the railroads are by barge, while one has tracks extending S and E around the S bay. San Francisco International Airport is on the W shore of the bay about 5 miles S of the city; it is served by many airlines.

Small-craft facilities

(348) San Francisco Municipal Yacht Harbor, 1.8 miles E of the Golden Gate Bridge with a W and E basin about 0.3 mile apart, has depths of 8 to 12 feet to the berths. A light near the end of a point marks the N side of the entrance to W basin; a prominent stone tower is 0.2 mile W of the light. The E basin is protected on the N by a breakwater extending E from the W shore, and on the E by a pier of **Fort Mason.** The seaward end of the breakwater is marked by a light. E basin is entered between the breakwater light and the pier. The harbor accommodates about 700 boats in the W and E basins. Guest berths are available; transients should report to the

harbormaster's office on the S side of the W basin for berth assignment.

(349) **Aquatic Park,** 2.6 miles E of the Golden Gate Bridge, is a recreation area protected on the W by a curved pier extending out from Black Point and on the E by a pier that berths historic ships of the National Maritime Museum. The basin is closed to power vessels, and other vessels must stay offshore away from buoys marking a swimming area. The **speed limit** is 3 knots. Depths of 9 to 16 feet are inside the basin. Small craft can find anchorage in about 13 feet. Permission to anchor for more than 24 hours must be obtained from the Aquatic Park Ranger Station.

(350) **Fishermans Wharf** is 2.8 miles E of the Golden Gate Bridge.

(351) The approach to the wharf is marked by lights. Depths of 15 feet or more are available to the wharves. Gasoline, diesel fuel, water, ice, and marine supplies are available.

(352) **Pier 39 Marina,** 0.3 mile E of Fisherman's Wharf, is a boat harbor with 360 slips. In 2001, the reported depth alongside the slips was 9 feet. L-shaped breakwaters protect basins on either side of the pier. The E breakwater is marked by private lights. Electricity, water, ice, and pumpout facilities are available. Limited space is available for transient vessels by appointment only. The **harbormaster** monitors VHF-FM channel 16 0830-1700 daily.

(353) **South Beach Harbor,** extending from 0.85 mile to 1.1 miles SE of the Ferry Building is a marina with 700 slips. Depths in the approach and alongside are reported to be 15 feet. It is protected by a breakwater marked by private lights. Private lights also mark the N and S entrances to the marina. Berths are assigned by the **harbormaster**; VHF-FM channel 16 is monitored 24 hours a day or telephone (415)495-4911. Electricity, water, ice, groceries and pumpout facilities are available.

(354) **Central Basin,** 1.9 miles S of the Ferry Building, has depths of 10 to 24 feet. Limited berthing facilities are on the W shore of the basin. Gasoline, water, covered and open storage, and some small-boat supplies are available. There are a surfaced boat ramp and a portable lift; hull and engine repairs can be made. Hull repairs can also be made at a boatbuilding and maintenance school in the SW corner of the basin.

(355) On the N side of **Hunters Point,** 3.8 miles S of the Ferry Building, are two repair facilities. The largest marine railway can handle craft to 300 tons or 120 feet for hull and engine repairs.

Charts 18651, 18652

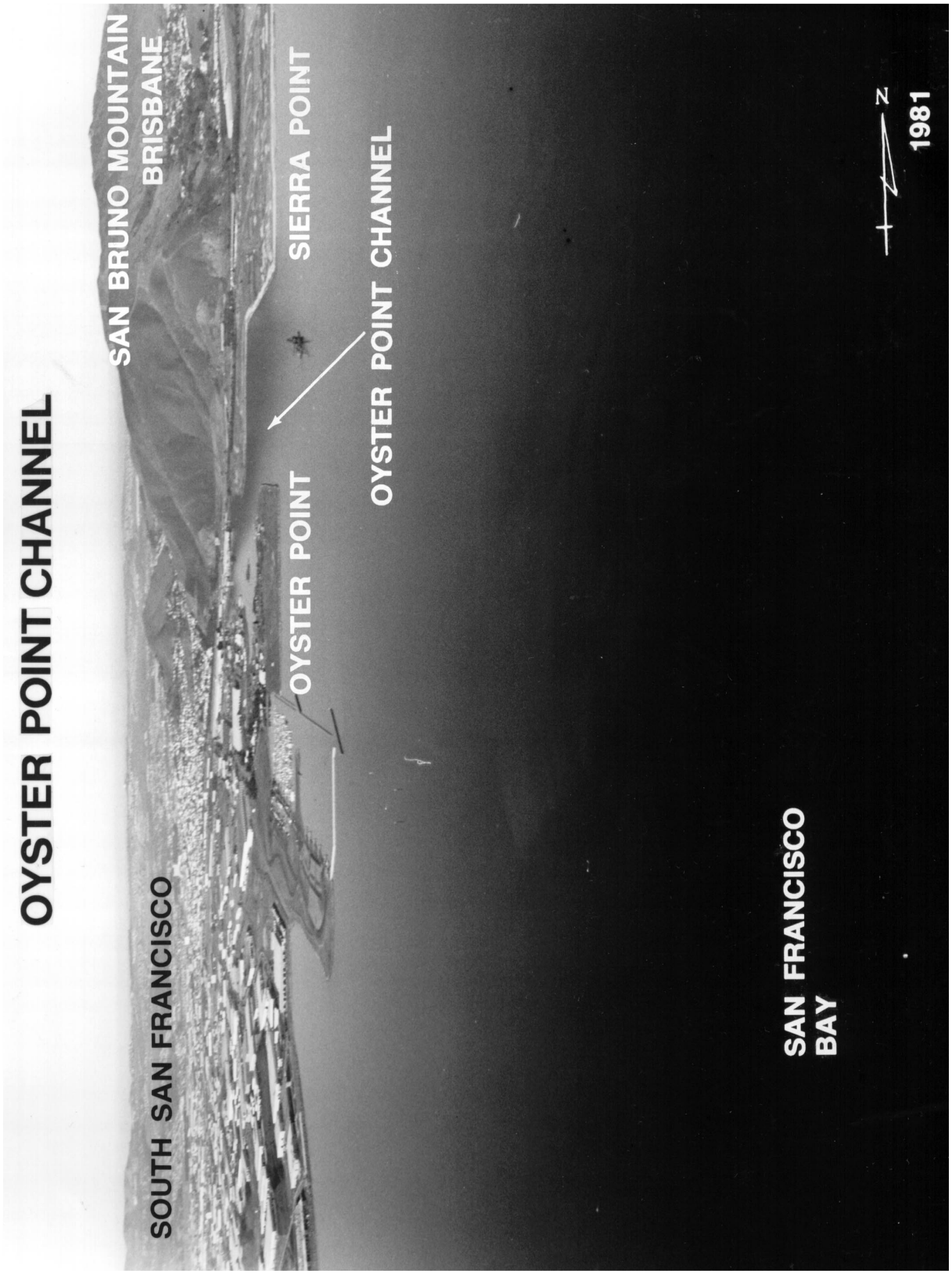
(356) S of San Francisco, **Point Avisadero,** which is the E extremity of Hunters Point, **Sierra Point,** Oyster Point, **Point San Bruno,** and Coyote Point, all on the W shore of the bay, are prominent natural features. A **naval restricted area** is offshore of Hunters Point. (See **334.1010**, chapter 2, for limits and regulations.) In January 1986, a sunken wreck was reported about 1 mile SE of Point Avisadero in about 37°42'59"N., 122°20'30"W. The Bayshore Freeway extends S on a filled area from the vicinity of **Candlestick Point,** and cuts back inland at Sierra Point. Sierra Point is the site of a small-boat harbor which can accommodate about 500 boats. **Oyster Point Channel,** marked by private lights, has depths of about 5 feet, except for a 2-foot shoal in about 37°40'09.5"N., 122°22'47.5"W., and leads to a small basin. A spur channel, marked by private lights, branches off the N side of Oyster Point Channel and leads to the entrance to the small-boat harbor at Sierra Point. The basin at the end of Oyster Point Channel has two private wharves in ruins and sheds on the W side; a marina that can accommodate about 200 boats is on the S side.

(357) **Oyster Point,** a low filled area, is the site of a small-boat harbor accommodating about 570 boats. Depths of about 6 feet are in the harbor. The entrance channels E and NE of the harbor are marked by private lights. In 1981, the E entrance channel had a controlling depth of 6 feet. Transients should report to the harbormaster's office for berth assignment. A prominent sculptured tower is on the hill 0.7 mile S of Oyster Point; the tower is floodlighted.

(358) The area between Point San Bruno and Coyote Point is occupied by **San Francisco International Airport.**

(359) **Coyote Point** is covered by a heavy growth of trees and is raised as an island. It is the most prominent point on the S bay. A small-craft harbor accommodating about 580 boats is on the E side of the point. The entrance channel, marked by a private lighted range and two private lights, had a reported controlling depth of depth of 10 feet in 2002. The front range light is usually difficult to see because of obstructing boats and masts. The harbor, operated by San Mateo County, is composed of two basins having depths of about 8 feet. Transients should report to the harbormaster's office on the NW side of the harbor for berth assignment; guest berths are usually available. A harbor patrol boat is maintained.

(360) (See the small-craft facilities tabulation on chart 18652 for services and supplies available at the small-craft facilities at Oyster Point and Coyote Point.)


OYSTER POINT CHANNEL
SOUTH SAN FRANCISCO
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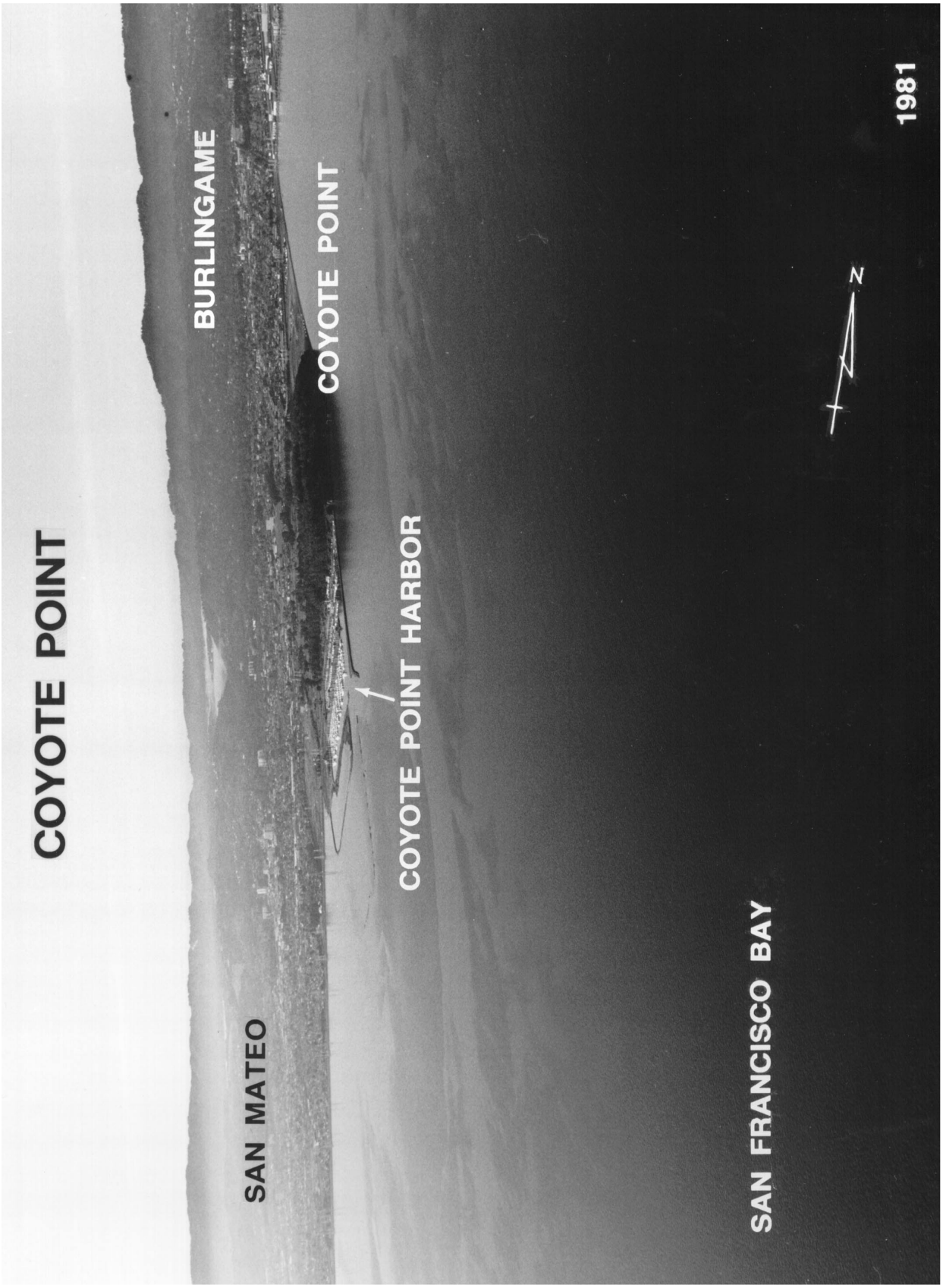
COYOTE POINT
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COYOTE POINT
COYOTE POINT HARBOR
SAN MATEO
SAN FRANCISCO BAY
N
1981

PORT OF REDWOOD CITY

(361) The **San Mateo-Hayward Bridge** crossing the lower part of San Francisco Bay near **San Mateo** has a fixed span with a clearance of 135 feet over the main channel. The bridge is marked at mid span by racon. An overhead power cable with a clearance of 160 feet over the main channel crosses the bay just S of the bridge.

(362) A section of the old San Mateo lift bridge, now used as a fishing pier, extends 4,135 feet from the San Mateo shore just S of the new bridge. A part of the fishing pier extends into the W part of the main channel. A private light, 12 feet above the water, marks the NE leg of a transmission line tower close E of the seaward end of the fishing pier.

(363) In June 1983, a 34-foot shoal was reported to extend from under to just SE of the bridge in about 37°35'N., 122°15'W.

(364) **Redwood Creek,** 4 miles SE of San Mateo Bridge, is entered through a marked channel that leads to the municipal wharves at the **Port of Redwood City,** 2.5 miles above the mouth. Turning basins are to the N and S of the wharves. Federal project depths are 30 feet in the channel and basins. (See Notice to Mariners and latest editions of charts for controlling depths.)

(365) Traffic in the waterway is in bulk cement, gypsum, rock salt, sand, and scrap metal. Overhead power cables across the waterway have a clearance of 155 feet. Prominent silos of a cement plant are at the junction with **Westpoint Slough,** just N of the port.

Wharves

(366) The Port of Redwood City operates five deepwater municipal wharves. Only the wharves with shiphandling facilities are described. For a complete description of the port facilities refer to Port Series No. 30, published and sold by the U.S. Army Corps of Engineers. (See appendix for address).

(367) Wharves 1 and 2 (37°30'47"N., 122°12'35"W.): 1,651 feet of berthing space with dolphins; 32 to 35 feet alongside; deck height, 15 feet; storage silos with a total capacity of 58,000 tons; open storage for 85,000 tons of sand; receipt of sand and bulk cement; various operators.

(368) Wharf 3 (37°30'42"N., 122°12'40"W.): just S of Wharves 1 and 2; 750 feet of berthing space with dolphins; 34 feet alongside; deck height, 15 feet; conveyor systems with up to 500-ton-per-hour capacity; two 40-ton, diesel crawler cranes; open storage for 50,000 tons of scrap metal and 60,000 tons of gypsum; receipt of bauxite, mill scale, gypsum, and sand; shipment of scrap metal; various operators.

(369) Wharf 4 (37°30'34"N., 122°12'43"W.), just S of Wharf 3, is operated by the U.S. Geological Survey,

Department of the Interior, and is used for mooring research vessels. Wharf 5 (37°30'25"N., 122°12'44"W.), just S of Wharf 4, is operated by the Port of Redwood City and is used for mooring cruise vessels.

(370) Cargill Salt, Redwood City Wharf (37°30'16"N., 122°12'55"W.): 620 feet of berthing space; 30 feet alongside; deck height, 16 feet; a loading tower, loading rate 800 tons per hour; open storage for 500,000 tons of salt; shipment of crude bulk salt by vessel and barge; owned and operated by Cargill Salt Inc.

(371) **Redwood City** is 2 miles S of the port facilities. Redwood City Municipal Marina, just S of the port, can accommodate about 225 small craft. Other small-craft facilities are SW of the Municipal Marina. (See the small-craft facilities tabulation of chart 18652 for services and supplies available.)

(372) **Ravenswood Point** and **Dumbarton Point** are at the head of the bay and the mouth of Coyote Creek. Two bridges and an aqueduct cross the bay at this point. The **Dumbarton Highway Bridge,** the NW bridge, has a fixed span with a clearance of 85 feet. About 1,100 yards SE of the Dumbarton bridge, an aqueduct, used to supply the city of San Francisco with water, crosses the bay. On the W shore, the aqueduct is carried on a trestle to a concrete building (charted) where it tunnels the channel to the E shore. The **Dumbarton Railroad Bridge,** just S, has a swing span with a clearance of 13 feet. The bridge is maintained in the open position. (See **117.1 through 117.49**, chapter 2, for drawbridge regulations.)

(373) **Coyote Creek** has many tributary sloughs. The main channel is marked as far as **Calaveras Point,** about 4 miles above the railroad bridge at Dumbarton Point. The power cables, 1.3 miles above Calaveras Point, have a clearance of 65 feet.

(374) A channel, marked by a daybeacon and buoys, leads for about 3 miles through **Guadalupe Slough.** In July 1985, a submerged obstruction with 3 feet over it was about 150 yards NNW of Daybeacon 20; caution is advised when transiting the area. An overhead power cable with a clearance of 65 feet crosses the slough about 1 mile above the entrance.

(375) A dredged channel with its entrance in 37°40'18"N., 122°13'17"W., leads to a small-craft harbor operated by the city of San Leandro just S of the Metropolitan Oakland International Airport. In September 2000, the controlling depths were 3.5 feet (4.4 feet at midchannel) in the entrance channel to the harbor, thence 4.1 feet in the channel that branches E, and 3.9 feet in the interior channel leading N then E. The entrance channel is marked by daybeacons and lights. A seasonal fog signal is at the entrance channel Light 1.

(376) The harbor accommodates about 500 small craft; 15 guest slips are maintained. The harbormaster's office is on the SW side of the basin. A high-speed patrol boat is maintained. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

Charts 18650, 18652

(377) **Alameda** is on an island separated from the mainland by **San Leandro Bay** on the E, and Oakland Inner Harbor and Tidal Canal on the N.

(378) **Encinal Basin,** on the Alameda side of the Oakland Inner Harbor opposite Coast Guard Island, has facilities which are owned by Encinal Terminals. Depths in the basin are about 30 feet.

(379) Encinal Terminals, Berths 4, 3, 2, and 1: S side of Oakland Inner Harbor along the E entrance point to Encinal Basin has 525 feet of berthing space; E side of Encinal Basin has 1,600 feet of berthing space; 35 feet alongside; deck height, 14½ feet; mobile cranes to 150 tons; 75,000 square feet of covered storage; receipt of steel and petroleum products, receipt and shipment of general cargo; operated by Crescent Wharf and Warehouse Co. and Pennzoil Co.

(380) Encinal Terminals, Berth 5: W side of the basin; 750 feet of berthing space; 35 feet alongside; deck height, 14½ feet; two 30-ton container cranes; receipt and shipment of containerized cargo; operated by Eagle Marine Services, Inc.

(381) **Fortmann Basin,** on the Alameda side of the Inner Harbor, just SE of the Encinal Basin has facilities operated by Fore Terminals, Inc. Berth 6, on the E side of the basin: 590 feet of berthing space; 30 feet alongside; receipt and shipment of bulk liquids, including tallow, vegetable and corn oil.

Coast Guard

(382) The Coast Guard Support Center is on **Coast Guard Island** (Government Island).

(383) **Alameda Naval Air Station** is on a filled area just W of the city and S of Oakland Inner Harbor.

(384) Vessels entering Alameda Naval Air Station area with tow are requested to advise Port Services, Alameda, of type of tow, destination, and any assistance that may be required. The station monitors VHF-FM channel 6 (156.30 MHz) 24 hours.

(385) **Ballena Bay Yacht Harbor,** a large small-craft harbor, is on the E side of an island along the S shore of Alameda. This harbor offers safe refuge in storms. A private light marks the entrance to the harbor. In February 2001, a reported depth of 7 feet was in the approach to the harbor; a depth of 8 feet was reported alongside the berths. (See the small-craft facilities

OAKLAND HARBOR

tabulation on chart 18652 for services and supplies available.) A depth of 9 to 10 feet is available in the channel between the island and Alameda. A fixed bridge, with a clearance of 5 feet, crosses the channel about midway along the N shore of the island.

(386) **Oakland,** on the E or mainland shore opposite San Francisco, is the second largest city on San Francisco Bay. It is the main-line terminus of the transcontinental railroads entering the San Francisco Bay area.

(387) The **Port of Oakland** is entirely distinct from the Port of San Francisco; it is a separate customs **port of entry.** The Port of Oakland is the largest general cargo port on the bay, and a leading container-ship terminal on the Pacific coast.

(388) The Port of Oakland encompasses two areas: Outer and Inner Harbors. **Oakland Outer Harbor** is between the Ben E. Nutter Container Terminal on the S and the San Francisco-Oakland Bay Bridge approach on the N. A **restricted area** is in the N end of Oakland Outer Harbor adjacent to the Oakland Army Base. (See **334.1050 and 334.1060**, chapter 2, for limits and regulations.)

(389) **Oakland Inner Harbor** is that part of Inner Harbor Channel extending E from San Francisco Bay to **Tidal Canal.** It is adjacent to the most highly developed section of the city, bordering Oakland to the N and Alameda to the S. At the E end of the harbor, the artificial Tidal Canal leads to San Leandro Bay where a channel continues to the Metropolitan Oakland International Airport. Mariners should exercise caution when transiting Oakland Inner Harbor to prevent wake damage to boats moored at marinas along the waterway.

(390) A **restricted area** is in Oakland Inner Harbor from the entrance to the E boundary of the Naval Air Station. (See **334.1020 and 334.1030** chapter 2, for limits and regulations.)

Channels

(391) A Federal project provides for channel depths as follows: Bar Channel to and including Oakland Outer Harbor, 42 feet; Oakland Inner Channel to the end of Brooklyn Basin South Channel, 42 feet, thence 42 feet to Tidal Canal. (See Notice to Mariners and latest editions of charts for controlling depths.)

(392) Brooklyn Basin North Channel had a controlling depth of 6½ feet in 1976-1986. In 1976, the centerline controlling depths were 16 feet through Tidal Canal and 5 feet in the channel through San Leandro Bay leading to the airport. In July 1984, severe shoaling was reported in the channel through San Leandro Bay.

OAKLAND HARBOR

Bridges

(393) The fixed highway bridge across Brooklyn Basin at the E end of Coast Guard Island has a clearance of 11 feet. The three highway drawbridges across Tidal Canal have a least clearance of 15 feet. The vertical lift railroad bridge across Tidal Canal has a clearance of 13 feet down and 135 feet up. The bridgetenders monitor VHF-FM channel 16 and work channel 9. (See **117.1 through 117.59 and 117.181**, chapter 2, for drawbridge regulations.)

Quarantine, customs, immigration, and agricultural quarantine

(394) (See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(395) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Harbor regulations

(396) The Port of Oakland is under the jurisdiction of the Board of Port Commissioners of the City of Oakland, and is managed by an executive director. The port's general offices are at 530 Water Street, Oakland, CA 94607.

Wharves

(397) The Port of Oakland owns and leases 12 major marine terminals, which have a total of 30 deep-draft berths. The port has 500 acres of container facilities with 22 full container-ship berths, 34 container cranes, and 45 acres of general cargo/special commodity facilities; 459,000 square feet of covered storage is also available. All of the major terminals have railroad trackage that connects to three major railroads and truck connections to the city's freeway system.

(398) The port also has a number of smaller piers and wharves that are used for mooring small vessels, repair work, and for other purposes. There are several privately owned general cargo piers in the Inner Harbor. Most major deep-draft facilities are described. The alongside depths given for each facility described are reported depths. (For information on the latest depths contact the Port of Oakland or the facility operator.)

(399) General cargo at the port is usually handled by ship's tackle; special handling equipment, if available, is mentioned in the description of the particular facility. Floating cranes to 350 tons are available.

(400) For a complete description of the port facilities, refer to Port Series No. 31, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

Facilities in Outer Harbor:

(401) **Burma Road Terminal Berth 7** (37°49'12"N., 122°19'03"W.): 1,459 feet long; 35 feet alongside; deck height, 14 feet; 29 acres of open storage; 100-ton gantry crane; receipt and shipment of break bulk general cargo, including steel products, roll-on/roll-off cargo, and heavy lift items; operated by Marine Terminals Corp.

(402) **Outer Harbor Container Terminal, Berths 20, 21 and 22** (37°49'09"N., 122°18'39"W.): 2,241 feet of berthing space; 42 feet alongside; deck height, 14 feet; 59 acres of open container storage including 362 positions for refrigerated cargo containers; three 30-ton container cranes, receipt and shipment of containerized cargo; operated by Maersk Pacific, Ltd.

(403) **Outer Harbor Container Terminal, Berth 23** (37°49'02"N., 122°18'56"W.): 900 feet long; 42 feet alongside; deck height, 14 feet; 46 acres of open storage area including 256 positions for refrigerated cargo containers; two container cranes to 50 tons; water and electrical shore-power connections; receipt and shipment of containerized general cargo; operated by Yusen Terminals, Inc.

(404) **Outer Harbor Container Terminal, Berth 24** (37°48'53"N., 122°19'04"W.): 1,261 feet long; 42 feet alongside; deck height, 14 feet; 57 acres of open container storage including 261 positions for refrigerated cargo containers; three container cranes to 50 tons; water and electrical shore-power connections; receipt and shipment of containerized general cargo; operated by Maersk Pacific, Ltd.

(405) **Outer Harbor Container Terminal, Berths 25 and 26** (37°48'43"N., 122°19'15"W.): 1,138 feet long; 42 feet alongside; deck height, 14 feet; 40 acres of open container storage including 288 positions for refrigerated cargo containers; two container cranes to 40 tons; water and electrical shore-power connections; receipt and shipment of containerized general cargo; operated by TransBay Container Terminal Company.

(406) **Outer Harbor Container Terminal, Berth 30** (37°48'37"N., 122°19'31"W.): 1,075 feet long; 42 feet alongside; deck height, 14 feet; 33 acres of open container storage including 282 outlets for refrigerated cargo containers; three container cranes to 40 tons; water and electrical shore-power connections; receipt and shipment of containerized general cargo; operated by Trans Pacific Container Service Corp.

(407) **Outer Harbor Container Terminal, Berths 32, 33, and 34** (37°48'39"N., 122°19'53"W.): 1,761 feet long; 38 feet alongside; 65 acres of open storage including 386 outlets for refrigerated cargo containers; container cranes to 40 tons; water connection; receipt and shipment of containerized general cargo; operated by Stevedoring Services of America Terminals.

(408) **Ben E. Nutter Container Terminal, Berths 35, 37, and 38** (37°48'26"N., 122°20'23"W.): Berths 35 and 37, 2,257 feet long; 42 feet alongside; Berth 38, 862 feet long; 38 feet alongside; 58 acres of open storage including 330 outlets for refrigerated cargo containers; water and electrical shore-power connections; container cranes to 50 tons; receipt and shipment of containerized general cargo; operated by Marine Terminals Corp.

Facilities on N side of Inner Harbor:

(409) **Middle Harbor Container Terminal, Berths 55 and 56** (37°47'50"N., 122°19'18"W.): 2,400 feet long; deck height, 14 feet; 42 feet alongside; 120 acres open storage; four container cranes to 60 tons; water and electrical shore-power connections; receipt and shipment of containerized general cargo; operated by Hanjin Shipping Co.

(410) **Middle Harbor Container Terminal, Berths 60, 61, 62, and 63** (37°47'37"N., 122°18'01"W.): 2,743 feet long; deck height, 14 feet; 42 feet alongside; 81 acres open storage including 374 outlets for refrigerated cargo containers; container cranes to 45 tons; water and electrical shore-power connections; receipt and shipment of containerized general cargo; operated by American President Lines.

(411) **Schnitzer Steel Products Co.**, 7th Street Pier, 6th Street Pier, and Bulkhead Wharf (37°47'38"N., 122°17'33"W.): the ends of two adjacent piers and a bulkhead wharf provide 2,075 feet of berthing space; depths of 31 to 36 feet alongside; 33 acres of open storage area; electrical shore-power connection at both piers; shipment of ferrous and shredded scrap metal; receipt of scrap metal; owned and operated by Schnitzer Steel Products Co.

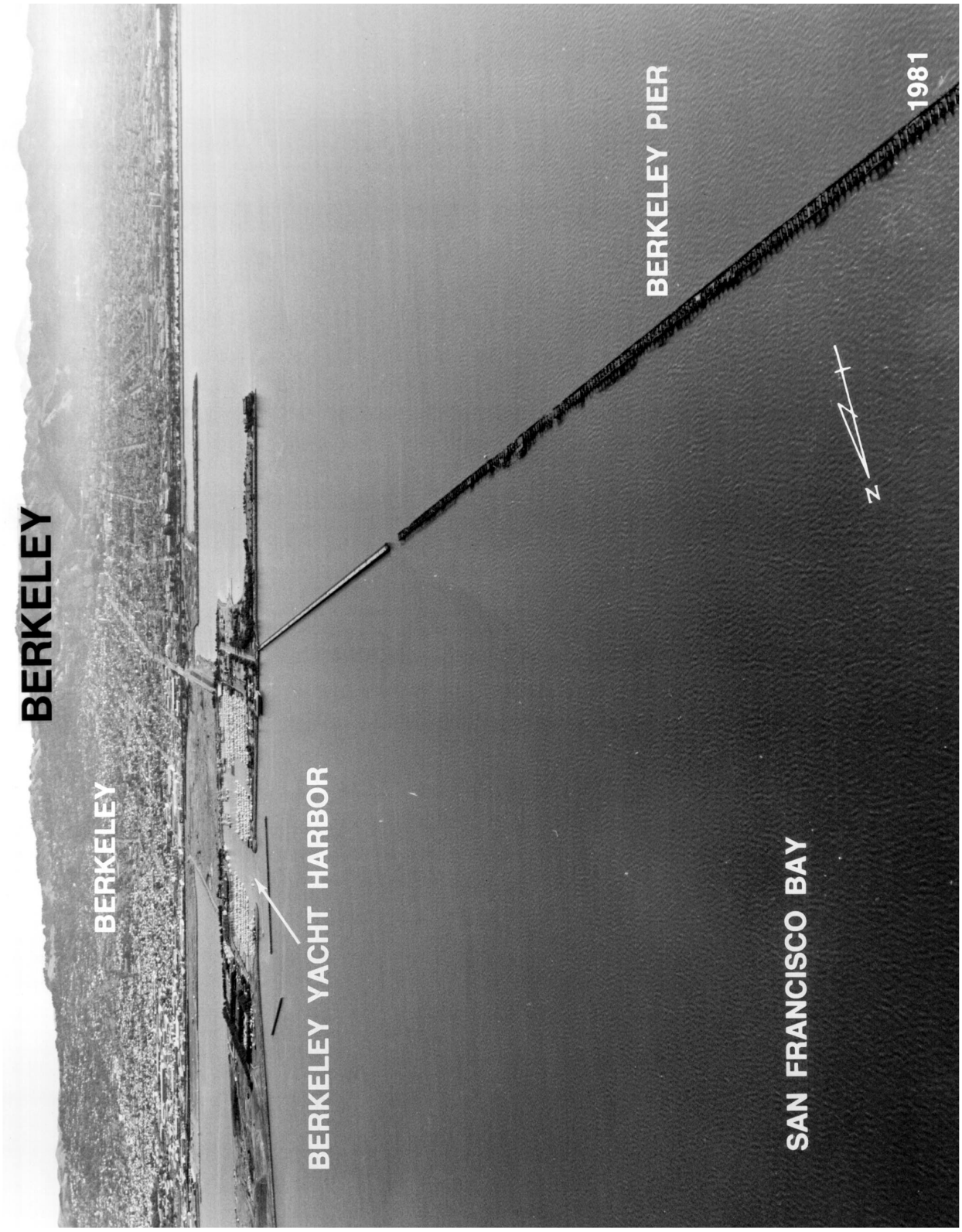
(412) **Charles P. Howard Container Terminal, Berths 67 and 68** (37°47'41"N., 122°17'03"W.): 1,946 feet long; 42 feet alongside; deck height, 14 feet; container cranes to 50 tons; 50 acres open storage space including 234 outlets for refrigerated cargo containers; electrical shore-power connections; receipt and shipment of conventional, containerized, and roll-on/roll-off and general cargo, and heavy lift items; operated by Stevedoring Services of America Terminals.

Supplies

(413) Bunker fuel, diesel oil, gasoline, water, and most other marine supplies and services are available in Oakland. Bunker fuel is usually delivered by barge.

Repairs

(414) A drydock and repair firm in Oakland has a maximum drydock capacity of 2,800 tons; marine railways


BERKELEY
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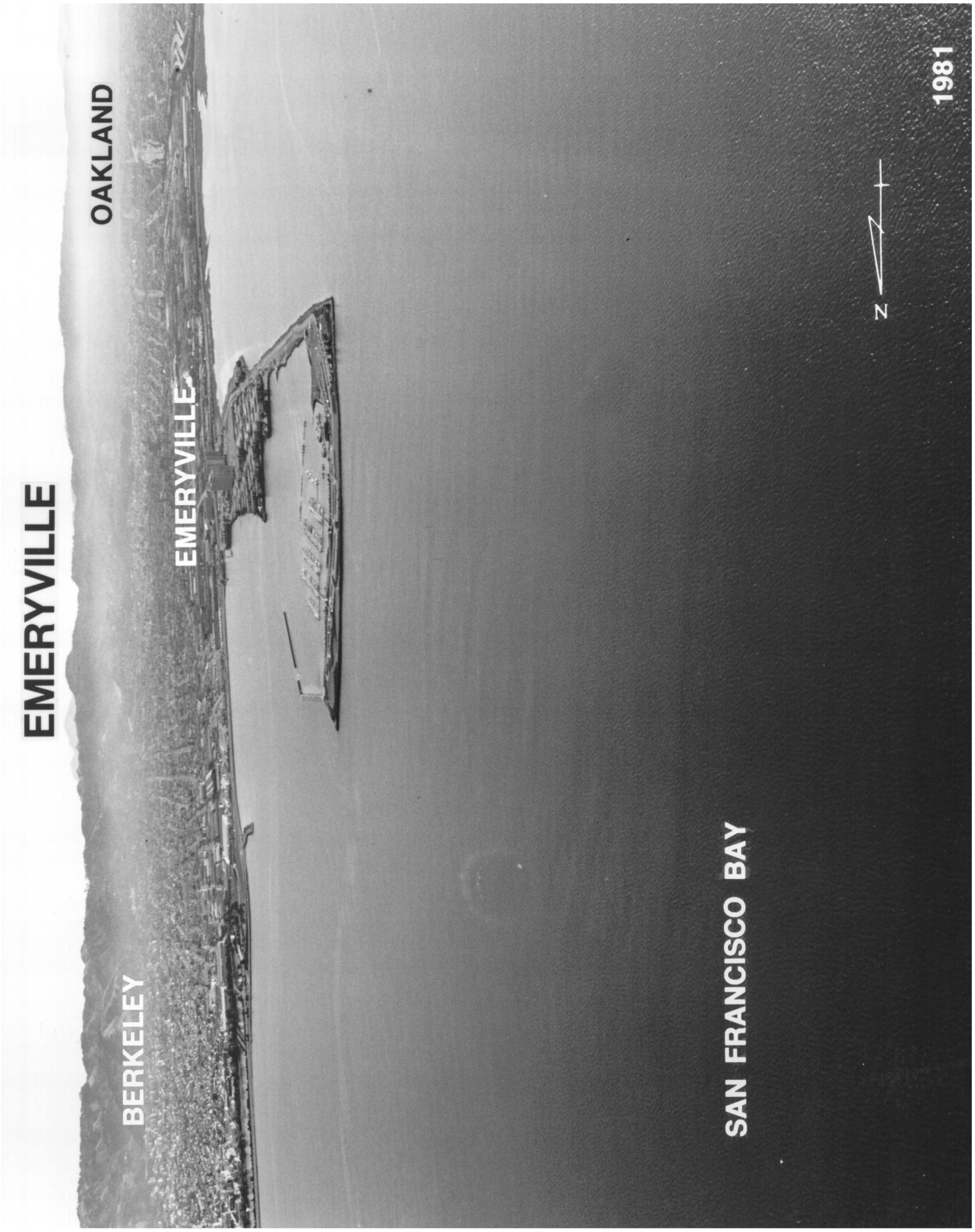
EMERYVILLE
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SAN FRANCISCO BAY
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1981

RICHMOND HARBOR

here are capable of hauling out to 500 tons. All kinds of repairs are made to both hulls and engines.

Small-craft facilities

(415) There are many small-craft facilities on both sides of the channel from Oakland Inner Harbor entrance to the airport at the S end of San Leandro Bay. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.) Mariners should exercise caution when transiting Oakland Inner Harbor to prevent wake damage to boats moored at marinas along the waterway.

Communications

(416) Oakland is served directly by three major highways, with connections to several others. The city is the main-line terminus of three transcontinental railroads. Metropolitan Oakland International Airport, on the bay about 5 miles SE of the city, is served by many airlines.

Chart 18650

(417) **San Leandro Channel** connects San Leandro Bay with San Francisco Bay. The channel is very narrow with shallow uneven depths at the E end. Mariners should seek local knowledge before transiting the channel. Three bascule bridges, operating simultaneously, with a minimum clearance of 20 feet at the S side of the draw, cross the channel at its E end. The bridgetender for the San Leandro Bay bridges at Alameda monitors VHF-FM channel 16, and works on channel 9; call sign: WHX 870, Bay Farm Island Bridge. (See **117.1 through 117.59 and 117.193**, chapter 2, for drawbridge regulations.)

Charts 18649, 18653, 18652

(418) **Berkeley**, the site of the University of California, adjoins Oakland and **Emeryville** to the N. The long pier extending into the bay is marked by a light; the 1.7-mile offshore section of the pier is in ruins, and the inshore 3,000-foot section is used for fishing. In clear weather the Campanile (bell tower) at the university shows prominently from the bay.

(419) **Berkeley Yacht Harbor,** on the N side of the long pier, is protected at the entrance by two detached breakwaters. The S breakwater is marked by a light on the S end, a light at the center, and a light and fog signal at the N end. The N breakwater is marked by a light on the NE and SW ends. The N side of the entrance into the harbor is marked by a private light, and the S side by a private light and fog signal. **Berkeley Reef,** awash, is 0.9 mile NW from the inner harbor entrance; it is

marked by a light. About 925 boats can be accommodated in the harbor, including 20 guest berths. Transients should report to the harbormaster's office on the S side of the harbor.

(420) Two marinas are at Emeryville, about 1.5 miles S of Berkeley Yacht Harbor. The enclosed basin can accomodate about 730 small craft.

(421) (See the small-craft facilities tabulation on chart 18652 for services and supplies available at Berkeley Yacht Harbor and at Emeryville.)

(422) **Southampton Shoal Light** (37°52.9'N., 122°24.0'W.), 32 feet above the water, is shown from a white cylindrical tower near the S end of the 1.6-mile-long shoal. A fog signal is at the light.

(423) Vessels going from San Francisco Bay proper bound for Richmond usually use the 45-foot project channel through the shoal area NW of Southampton Shoal Light.

(424) **Red Rock,** 3.2 miles NNW of Southampton Shoal Light, is 169 feet high and prominent in the S approach. Buoyed **Castro Rocks,** 0.6 mile ENE of Red Rock, are small and low.

(425) **Richmond Harbor,** on the E shore of San Francisco Bay 1.5 miles N of Southampton Shoal Light, includes the port facilities to Point San Pablo. The harbor is the terminus of the Atchison, Topeka, and Santa Fe Railroad and the Southern Pacific Lines, and is an important oil refining center and oil shipping port.

Channels

(426) A federal project provides for a depth of 45 feet in Southampton Shoal Channel to the maneuvering area off Richmond Long Wharf, thence 35 feet in the maneuvering area, through the channels leading to the port facilities at the Port of Richmond, to a point about 2,000 feet in Sante Fe Channel, thence 30 feet in the remainder of Sante Fe Channel and the turning basin. The channel is well marked by navigational aids. (See Notice to Mariners and latest editions of charts for controlling depths.) A 10,000-foot training wall is S of the dredged channel and extends W from Brooks Island.

(427) A Federal project further provides for an approach area 32 feet deep to the wharves at Point Orient and Point San Pablo. (See latest editions of charts for controlling depths.)

Quarantine, customs, immigration, and agricultural quarantine

(428) (See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(429) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Wharves

(430) The city of Richmond owns six deepwater terminals. The city leases two small wharves to private concerns engaged in shipbreaking and construction. There are a number of private deep-draft facilities and barge wharves. All major deep-draft facilities are described. The alongside depths given for each facility described are reported; the operators of the wharves should be contacted for information on the latest depths. Most of the large oil wharves have hose-handling cranes. Of the facilities described, all have truck access and rail connections to the Atchison, Topeka, and Santa Fe Railroad and/or Southern Pacific Lines. Water and electrical shore power are available at most piers.

(431) General cargo at the port is usually handled by ship's tackle; special handling equipment, if available, is mentioned in the description of the particular facility. Floating cranes to 350 tons are available. For a complete description of the port facilities refer to Port Series No. 31, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

Facilities at Richmond:

(432) City of Richmond, Terminal No. 4 Wharf (37°57'50"N., 122°25'41"W.): on the W side of Point San Pablo; 1,047-foot off-shore wharf; 35 feet alongside; deck height, 14½ feet; receipt and shipment of bulk liquids including petroleum products, petrochemicals, and chemicals; operated by Richmond Terminal Agency for Paktank Corp., Pacific Molasses Co., and Modesto Tallow.

(433) Standard Oil, Chevron U.S.A., Richmond Refinery, Point Orient Wharf (37°57'20"N., 122°26'39"W.): 504-foot inactive offshore wharf; 36 feet alongside; deck height, 14½ feet; owned and operated by Standard Oil Co. of California; marked by private lights.

(434) Standard Oil Co., Chevron U.S.A., Richmond Long Wharf (37°55'25"N., 122°24'40"W.): 2,463-foot offshore wharf; 3,065 feet of berthing space with dolphins; 36 feet alongside; deck height, 15 feet; rear of face, north section, 1,660 feet of berthing space; 7 to 9 feet alongside; deck height, 13 feet; rear of face, south section, 630 feet of berthing space; 10 feet alongside; deck height, 15 feet; receipt and shipment of petroleum products, bunkering vessels; owned and operated by Standard Oil Co. of California, Chevron U.S.A., Inc.; marked by private lights.

(435) City of Richmond Terminal No. 1 Wharf (37°54'30"N., 122°23'10"W.): marginal wharf, 557 feet long; 36 feet alongside; deck height, 13½ feet; 34,000 square feet of covered storage; receipt and shipment of vegetable oils and petrochemicals; owned by the City of Richmond and operated by Petromark, Inc.

Facilities on Harbor Channel

(436) City of Richmond, Terminal No. 7 Wharf (37°54'35"N., 122°21'48"W.): 700-foot wharf; 35 feet alongside; deck height, 12 feet; receipt of automobiles; owned by City of Richmond, operated by Pasha Services, a Division of the Pasha Group.

(437) ARCO Tanker and Barge Docks: N of Terminal No. 7 Wharf; offshore wharves joined by walkway, tanker wharf 247 feet long, barge wharf 151 feet long, together provide 710 feet of berthing space; 35 feet alongside; deck heights, 12 feet; receipt and shipment of petroleum products and petrochemicals, bunkering vessels; owned and operated by ARCO Petroleum Products Co.

(438) Union Oil Co., Tanker Dock; N of ARCO docks; 736 feet of berthing space with barge dock; 35 feet alongside; deck heights, 12 feet; receipt and occasional shipment of petroleum products and bunkering vessels; owned by Union Oil Co. of California, operated by Union Oil Co. of California and GATX Terminals Corp.

(439) City of Richmond, Container Terminal No. 3 Wharf (37°54'50"N., 122°21'39"W.): 1,009 feet of berthing space; 35 feet alongside; deck height, 13 feet; two 37-ton container cranes, two 37-ton gantry cranes; 41 acres of open storage; receipt and shipment of containerized cargo; owned by City of Richmond, operated by Matson Terminals, Inc.

(440) City of Richmond, Terminal No. 2, Upper and Lower Wharves; just N of Terminal No. 3; 710 feet of berthing space; 35 feet alongside; deck height, 13 feet; receipt and shipment of liquid chemicals; owned by City of Richmond, operated by Richmond Terminal Agency for California Fats and Oils, and Union Carbide.

Facilities on Santa Fe Channel

(441) Time Oil Co. Wharf (37°55'05"N., 122°21'48"W.): 260 feet of berthing space with dolphins; 36 feet alongside; deck height, 12 feet; receipt and shipment of petroleum products; owned and operated by Time Oil Co.

(442) Levin-Richmond Terminal Berths A, B, and C (37°55'12"N., 122°21'58"W.): deck height, 13 feet; Berth A side fronts on Sante Fe Channel, 650 feet long, 35 to 33 feet alongside; Berths B and C front on Lauritzen Canal, 1,200 feet of berthing space; 35 to 33 feet alongside; 35,000 square feet covered storage; cranes up to 50 tons, equipped with electromagnets, slings, or buckets; receipt and shipment of dry bulk cargoes, chemicals, and steel; owned and operated by Levin Richmond Terminal Co.

(443) Texaco Wharf (37°55'17"N., 122°22'08"W.): 635 feet of berthing space with dolphins; 35 feet alongside; deck height, 8 feet; receipt and shipment of petroleum products; owned and operated by Texaco, Inc.

(444) Gold Bond Building Products Division, National Gypsum Co. Dock (37°55'10"N., 122°22'01"W.): 233 feet long; 30 feet alongside; deck height, 9 feet at dolphins, 11 feet at walkway; center dolphin has receiving hopper for self-unloading vessels, maximum unloading rate, 1,400 tons per hour; receipt of gypsum rock; owned and operated by Gold Bond Building Products Division, National Gypsum Co.

(445) Burmah-Castrol Wharf (37°55'21"N., 122°22'24"W.): 600 feet of berthing space; 32 feet alongside; deck height, 7 feet; receipt and shipment of petroleum products; owned and operated by Burmah-Castrol, Inc.

Repairs

(446) The largest commercial drydock in Richmond has a length of 748 feet, width of 84 feet, and can handle drafts to 31 feet.

Small-craft facilities

(447) Some small-craft facilities are along Santa Fe Channel. A marina and yacht club are in **Richmond Marina Bay,** and a private yacht harbor is on the E side of Point Richmond. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

Bridge

(448) The 21,343-foot **Richmond-San Rafael Highway Bridge,** 8.8 miles above the Golden Gate Bridge, is one of the longest fixed high level double deck bridges. The E 970–foot fixed channel span clearance is 135 feet; the W fixed span has a 1,000–foot opening with a clearance of 185 feet. The centerline of both channels through the bridge spans is marked by a racon. The bridge is well lighted, and the channels leading to it are marked with navigational aids.

(449) A **restricted area** extends 0.3 mile offshore at **Molate Point,** site of a Navy fuel depot 0.8 mile N of Richmond-San Rafael Bridge. (See **334.1090**, chapter 2, for limits and regulations.) In May 2000, shoaling to 16 feet was off the end of the Navy depot in about 37°56'47"N., 122°25'40"W.

(450) **Invincible Rock,** 1.3 miles N of Richmond-San Rafael Bridge, is covered 7 feet. **Whiting Rock,** covered 13 feet, is 0.2 mile NNE of Invincible Rock. Both rocks are buoyed. The buoy marking Whiting Rock is reported to submerge during strong ebb currents caused by the heavy spring runoffs in the area. Large vessels changing course and other craft in this area are advised to use caution.

(451) **The Brothers,** 1.7 miles N of Richmond-San Rafael Bridge, are two small low flat-topped islands. **East Brother Island Light** (37°57.8'N., 122°26.0'W.), 61 feet above the water, is shown from a white square tower on dwelling on the E island. A seasonal fog signal is at the station.

(452) **Point San Pablo,** 0.3 mile NE of East Brother Island Light, is the NW extremity of a low ridge of hills on the E shore of San Francisco Bay at its junction with San Pablo Bay. The point rises abruptly to a height of 140 feet. A dredged channel off the NE shore of the point is used by commercial and sport fishermen. Depths of 8 feet were reported in the channel to the fishery and the former whaling station docks.

(453) A small-boat basin used by commercial and sport fishermen is 0.5 mile SE from Point San Pablo.

(454) A private yacht basin is 1 mile SE from Point San Pablo. A channel leading to the basin has reported depths of about 2 feet.

(455) **Point Cavallo,** on the W side of San Francisco Bay 0.5 mile NE of the Golden Gate Bridge, is sharp and rocky with some visible and covered rocks under its face. **Horseshoe Bay** is a shallow bight W of the point.

Coast Guard

(456) **Golden Gate Coast Guard Station** is located at the entrance to Horseshoe Bay.

(457) From Point Cavallo the steep rocky shore tends N for 0.3 mile to **Yellow Bluff,** thence NW for 1 mile to Sausalito. A rock, covered 5 feet, is about 100 yards ESE of Yellow Bluff in about 37° 50.2'N., 122°28.2'W.

(458) **Richardson Bay,** 2 miles N of the Golden Gate Bridge, is shoal except for the S part fronting Sausalito. In the N part of Richardson Bay, a wildlife sanctuary, established by the National Audubon Society, provides safe refuge for migratory fowl that arrives each fall. The sanctuary is closed to marine traffic from October to March. Seasonal buoys N of a line approximately **097°** True from Strawberry Point to Belvedere, mark the perimeter of the sanctuary. A **special anchorage** is in Richardson Bay. Local authorities control the anchoring of vessels and placement of moorings in Richardson Bay. Mariners should contact the Richardson Bay Regional Agency at (415) 289-4143 for specific information. Richardson Bay is a no discharge zone; it is illegal for vessels to discharge any form of waste into the bay. (See **110.1 and 110.126a**, chapter 2, for limits and regulations.) A channel leading NW through Richardson Bay to facilities at Sausalito is marked by lights, daybeacons, and buoys.

(459) A **no-wake speed limit** is in all channels in Richardson Bay.

(460) **Sausalito** harbors some commercial fishing boats and many pleasure craft. Several boatbuilding and repair yards have marine ways, the largest of which can handle craft up to 350 tons. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

(461) The Corps of Engineers has an operations base and model current-flow basin at Sausalito.

(462) **Belvedere Cove,** 3 miles NNE of the Golden Gate Bridge, is entered between **Peninsula Point** on the S and **Point Tiburon** on the N. Two private yacht clubs are in the cove. There are several small piers used by ferry boats about 0.2 mile W of Point Tiburon. Passenger ferry service is available between Tiburon and San Francisco and between Tiburon and Angel Island. The ruins of an abandoned railroad ferry slip is just W of Point Tiburon.

(463) **Angel Island,** 3 miles NE of the Golden Gate Bridge, is partially wooded and level on top. The irregular-shaped island is separated from the mainland by Raccoon Strait. The island, formerly an immigration detention station, is now a State park. A ferry operates from the island to Tiburon and just S of Pier 1 in San Francisco.

(464) **Point Blunt,** the SE extremity of Angel Island, terminates in a 60–foot-high knob, and is connected with the island by a low neck of land. **Point Blunt Light** (37°51.2'N., 122°25.2'W.), 60 feet above the water, is shown from a white house on the point; a fog signal is at the station. A shoal with visible and covered rocks extends SSE for 0.1 mile. Tide rips and swirls are heavy around the point, especially with a large falling tide.

(465) **Quarry Point,** the E end of Angel Island, is a bold bluff with deepwater close-to. The wharf 0.6 mile N of the point is in ruins. The point is marked by a light.

(466) A lighted buoy is off **Point Stuart**, the W extremity of Angel Island. A shoal area covered 14 to 30 feet, extending SW from **Point Knox,** is marked by a lighted buoy.

(467) **Ayala Cove,** indenting the N side of Angel Island, about 0.6 mile NE of Point Stuart, is reported to afford good anchorage in depths of 10 to 12 feet, mud bottom, and protection from S and W winds. Slips are available for day use only; mooring buoys are available for overnight stays. A pier at the State park facility in the cove is used by ferries and State park personnel.

(468) **Raccoon Strait,** nearly 0.5 mile wide between Angel Island and the mainland, is used by ferry boats and pleasure craft. The tidal currents in the strait have considerable velocity, and rips and swirls are heavy at times. A midchannel course can be followed. **Raccoon Shoal,** covered 29 feet, is 500 yards N of Raccoon Strait Lighted Buoy 4. A strong ebb current sets directly across the channel at the E entrance.

(469) The charted **recreation area** extending SW of Angel Island and including all of Raccoon Strait and Richardson Bay is intended primarily for use by recreation vessels. It should not be utilized by vessels 300 tons or more for through passage or for any other purpose, except in case of emergency or special circumstances.

(470) **Bluff Point,** on the mainland and marked by a light, is the E extremity of Tiburon Peninsula 1.2 miles N of Point Stuart. Point Chauncey, 0.8 miles NW of Bluff Point, is the site of the University of San Francisco Romberg Fisheries Laboratory as well as the National Oceanic and Atmospheric Administration's Tiburon Fisheries Laboratory. Pier ruins at the site are marked by lights.

(471) **Paradise Cay,** a filled real estate project 2.6 miles NW of Bluff Point, has a small-boat harbor that accommodates about 200 boats. The harbor is on the N side of the project.

(472) **Corte Madera Creek,** at the head of a marshy bight about 2 miles NW of Paradise Cay, is the site of a ferry terminal with frequent service to and from San Francisco.

(473) **Corte Madera Channel** leads NW from deep water in the bay over the flats to a turning basin at the mouth of the creek. In December 1999, the controlling depth in the dredged channel was 4 feet (7 feet at midchannel) to the turning basin, thence 4½ to 7 feet in the turning basin; thence in 1984, natural depths in the creek were 3 to 12 feet to the fixed highway bridges, 0.5 mile above the turning basin. The channel is marked by lights and daybeacons.

(474) A railroad bridge, 0.4 mile above the turning basin, has a 38-foot bascule span with a clearance of 10 feet. (See **117.1 through 117.59 and 117.153**, chapter 2, for drawbridge regulations.) The bridge remains in the open position except when trains or rail maintenance equipment are crossing the creek. The fixed highway bridges, 0.1 mile above the railroad bridge, have 35-foot channel spans with a clearance of 21 feet. Submerged obstructions that protrude 3 to 4 feet from the bottom are under the fixed bridges. The obstructions are marked by signs on either side of the bridges. In 1984, a submerged obstruction was reported on the N edge of the channel about 400 yards W of the fixed bridges. The power cables over the turning basin and creek have a least clearance of 120 feet.

(475) **Point San Quentin,** at the W end of the Richmond-San Rafael Bridge, has low land on either side. The buildings of the State Prison S of the bridge and the long wharf N of it are prominent. A State **security zone** extends off the SE side of Point San Quentin. The buoys are orange and white and display the words "San Quentin Prison."

(476) **San Rafael Creek,** 1.8 miles NW of Point San Quentin, is used by many small craft basing at the city of **San Rafael.** A dredged channel leads across the flats in **San Rafael Bay** into San Rafael Creek to a turning basin about 1.1 miles above the mouth, thence for another 0.2 mile above the turning basin. In July-August 1999, the controlling depth in the entrance channel was 3½ feet (5½ feet at midchannel) to the mouth of the creek; thence in December 1997, the midchannel controlling depth was less than 1 foot from the mouth of the creek to the turning basin about 400 feet below the Grand Avenue Bridge. The controlling depth was 2 feet within the limits of the turning basin. The channel entrance is marked by lights and a **293°** lighted range. The overhead power cables near the entrance to the creek have a clearance of 125 feet. The Grand Avenue Bridge has a 30–foot fixed span with a clearance of 4 feet.

(477) The municipal yacht harbor is on the S side of San Rafael Creek, about 400 yards E of the turning basin, and there are numerous small-craft facilities elsewhere along the creek. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

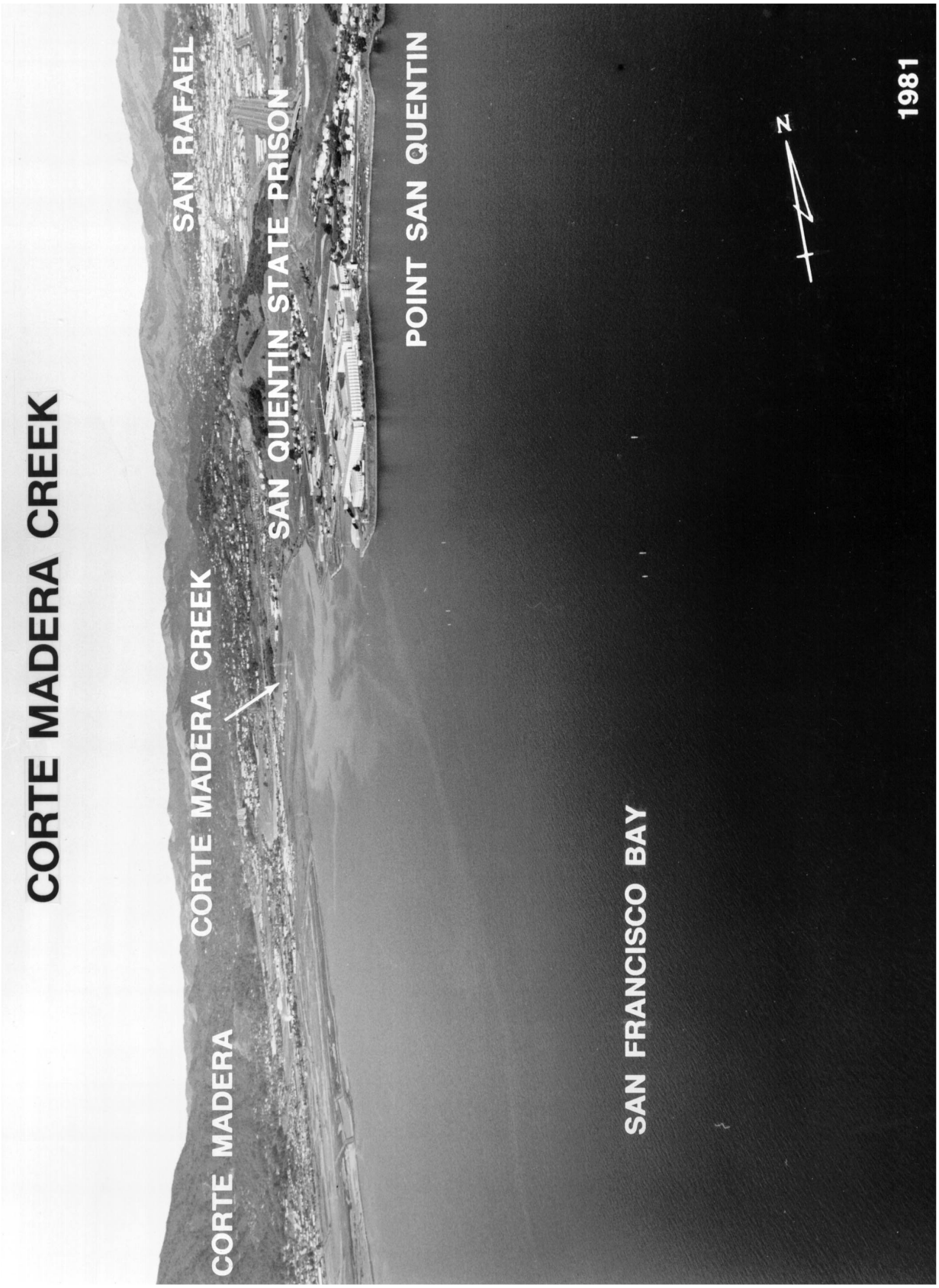
(478) **Point San Pedro,** 3 miles N of Point San Quentin at the W entrance to San Pablo Bay, extends 100 yards E of 356–foot-high **San Pedro Hill.** Three charted brick stacks are just S from the point. There is a large quarry just N from the point.

Charts 18654, 18652, 18658

(479) **San Pablo Bay**, is nearly circular, 10 miles long in a NE direction, with a greatest width of 8 miles. The N part consists of low marshes intersected by numerous sloughs and a large area of shoal water and mudflats that bare at extreme low water. The S shore is bolder, except between Point San Pablo and Pinole Point, where it is low and marshy for about 3 miles. Carquinez Strait joins San Pablo Bay with Mare Island Strait and Suisun Bay at its E extremity. There is considerable traffic through the bay. Deep-draft oil tankers and sugar-laden vessels pass through the bay bound for Crockett and Martinez. Lighter draft vessels pass through bound for points on Suisun Bay, and the Sacramento River to Sacramento, and on the San Joaquin River to Stockton.

(480) Mariners are advised that winds and currents in San Pablo Bay may be particularly strong and must be taken into consideration by tankers bound for the oil terminals. Vessels transiting the Pinole Shoal Regulated Navigation Area westbound on an ebb current should use extra caution to avoid being set down on the aids to navigation following the turn at San Pablo Bay Channel Light 11.

(481) The marked channel through San Pablo Bay extends in a gentle curve N and E from the entrance to the E end. The Federal project depth is 35 feet across Pinole Shoal. (See Notice to Mariners and latest editions of charts for controlling depths.) Pinole Shoal Channel is reserved for use of vessels drawing more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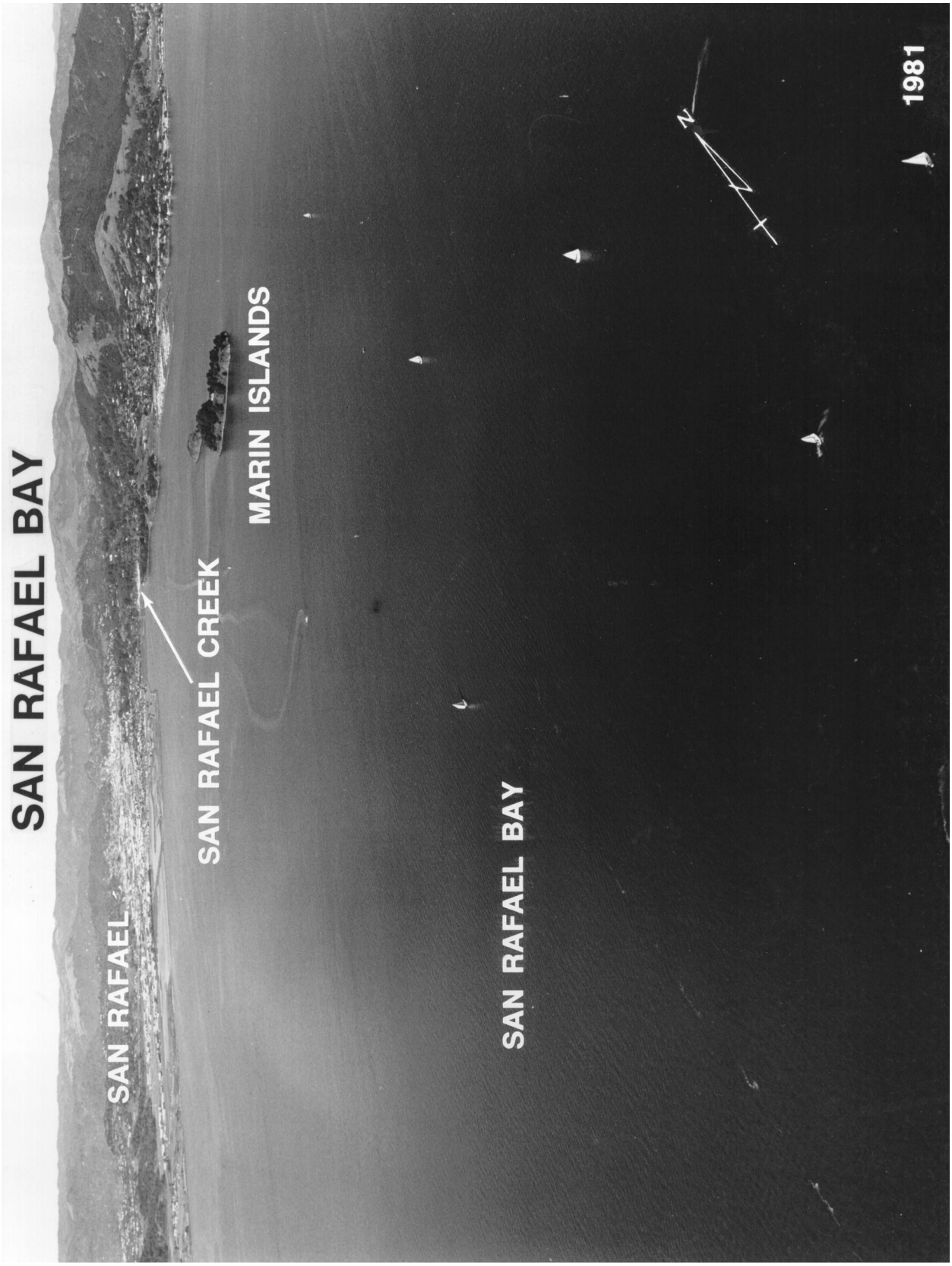
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than 20 feet. (See **165.1114(e)(2)**, chapter 2, for navigation regulations.) Vessels that do not meet the draft requirements to transit the Pinole Shoal Regulated Navigation Area (**165.1114**) follow an informal transit pattern along the 25–foot curve just to the south of Pinole Shoal between San Pablo Bay Channel Lighted Buoy E and the entrance to Carquinez Strait.

Anchorages

(482) **General** and **naval anchorages** are in San Pablo Bay. (See **110.1 and 110.224**, chapter 2, for limits and regulations.)

(483) Shoals and flats, which uncover, extend from Point San Pablo to Pinole Point, thence NE to Lone Tree Point.

(484) **Pinole Point** is a moderately high, rocky bluff, projecting about 1 mile from the SE shore of San Pablo Bay. A T-head fishing pier extends NW from the E side of the point. Piles and a light are off the face of the pier. The ruins of a former wharf extend from the E side of the point, and numerous oil tanks are on the hills about 2 miles in back of it. About 3.5 miles E of Pinole Point, the black and white tank at a chemical fertilizer plant is prominent. A pleasure fishing pier and a small-craft harbor are at **Lone Tree Point,** 4.6 miles E from Pinole Point. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.) A steel skeleton tower is 0.6 mile S of Lone Tree Point. **Oleum,** on **Davis Point,** is an oil town. There are many prominent oil tanks, painted in pastel colors, on the hills back of the town. Six stacks in a line SE of Davis Point are also prominent.

(485) The Tosco., of California, San Francisco Refinery Wharf, a T-shaped wharf, extends out from the Oleum refinery on Davis Point. In October 1998, depths of 32 feet were alongside the 1,250-foot wharf; 1,375 feet of berthing space is available with dolphins. All four corners of the wharf are marked by private lights, and a private fog signal is at the W and E ends; the trestle leading to the wharf is lighted at night. The deck height is 17 feet. Pipelines extend from the wharf to nearby storage tanks. The wharf is used for receipt and shipment of petroleum products and for bunkering vessels.

(486) The Pacific Refining Co. Wharf, 0.5 mile offshore, is about 1,000 yards W of the T-shaped wharf. The wharf is 160 feet long with 1,228 feet of berthing space with dolphins; depths alongside are 35 feet. Deck height is 17 feet. The E and W ends are marked by private lights, and a fog signal is at the center of the wharf. Pipelines lead from the wharf SW to the shore just S of Lone Tree Point. Water and electric shore power connections are available. The wharf is used for the receipt and shipment of petroleum products.

(487) Shore Oil Terminal Wharf, about 1 mile E of the Tosco Wharf, has a 72-foot face with 980 feet of berthing space with dolphins and 40 to 45 feet alongside; deck height, 20 feet. The wharf is used for receipt of petroleum products

(488) **Gallinas Creek** enters San Pablo Bay about 1.5 miles NW of Point San Pedro. The entrance channel, marked by private markers on the N side, leads across flats to the mouth of the creek. In April 1983, the channel had a controlling depth of 2 feet. Local knowledge is advised. Overhead cables crossing the creek have a minimum clearance of 65 feet.

(489) **Petaluma River** enters San Pablo Bay on the NW side. The city of **Petaluma,** 12 miles above the mouth, is the center of an extensive dairy and egg industry. The river is used by pleasure craft and by barges handling gravel, oyster shell, heavy construction equipment, and prestressed concrete products.

(490) A marked dredged channel leads through San Pablo Bay to the mouth of the Petaluma River. In February 2002, the controlling depths were 5.4 feet (7.5 feet at midchannel) in the dredged channel to the mouth of the river, except for shoaling to 2.6 feet in the right outside quarter just NW of channel Light 14; thence in 1996, 5.5 feet at midchannel to Schultz Slough; thence in February 2002, 3.2 feet at midchannel to Haystack Landing in about 38°13'17"N., 122°36'17"W.; thence in February 2003, 5.4 feet to McNear Canal, thence 4.3 feet in the N half to the turning basin at Petaluma, thence depths of 3 to 4 feet were available in the turning basin. With local knowledge, greater depths can be had in the dredged river channel. Least clearances over Petaluma River are: drawbridges, 4 feet; fixed bridges, 8 feet; and power cables, 70 feet. The bridgetender for the D Street highway bridge at Petaluma monitors VHF-FM channel 16, and works channel 9; call sign: WQX 644, D Street Bridge. (See **117.1 through 117.59 and 117.187**, chapter 2, for drawbridge regulations.)

(491) A privately dredged channel with private markers leads SSW from the dredged entrance channel to Petaluma River just below the entrance to the river and thence to **Novato Creek.** In 1985, the reported controlling depth was 2 feet.

Danger zones

(492) Danger zones are in the E part of San Pablo Bay adjacent to the W shore of Mare Island and in the N central part of the bay. (See **334.1160 and 334.1170,** chapter 2, for limits and regulations.)

Charts 18655, 18652

(493) **Mare Island Strait**, at the mouth of the Napa River, is between the mainland and **Mare Island.** Vallejo is on the E side of the strait and the Mare Island Naval Shipyard is on the W side, about 2 miles above the S entrance. The project depth for the Mare Island Strait Channel, from the entrance to the first bridge (Vallejo-Mare Island Causeway Bridge), about 2.9 miles above the entrance, is 30 feet, except for 26 feet at the N end. (See Notice to Mariners and latest editions of charts for controlling depths.) In the 0.6–mile section between the first and second bridges, shoal spots limit the controlling depth to about 13 feet. With local knowledge and use of the chart, drafts of 20 feet can be taken to the second bridge.

(494) **Notice.**–Ships destined for **Mare Island U.S. Naval Shipyard** should await arrival of the Navy pilot at Carquinez Strait. The waters around Mare Island are included in a **restricted area.** (See **334.1100**, chapter 2, for limits and regulations.)

(495) A power cable crossing lower Mare Island Strait between Vallejo and Mare Island has a clearance of 206 feet. If the clearance between the masthead and the cable is less than 10 feet or if the clearance is not known, vessels shall not move under the cable without authority.

(496) The entrance to Mare Island Strait is between two dikes. On the E side of the entrance, Dike No. 9 extends about 700 yards SW from the mainland; and on the W side, Dike No. 14 extends about 500 yards SE from Mare Island. About 110 yards of the outer section of Dike 14 is submerged. In October 1987, the outer section of Dike No. 9 was reported submerged. Both dikes are marked at the outer ends by lights.

(497) In October 1987, a 20-foot shoal spot was reported about 60 yards SW of Pier 35 in about 38°04'08"N., 122°15'17"W. A 5- foot shoal spot, immediately S of the pier, was reported in about 38°04'09"N., 122°15'03"W.

Coast Guard

(498) **Mare Island Coast Guard Station**, about 0.4 mile above the entrance, is at the SE end of Mare Island just NW of Pier 34.

(499) **Vallejo,** on the E shore of Mare Island Strait, is the terminal of a railroad connecting interior N points. A large flour mill is prominent S of the railroad yard. The city of Vallejo supplies a large amount of fresh provisions to the naval shipyard and affords residences for employees and others attached there. It is also a distributing point for a considerable agricultural area in its vicinity. The shipyard, on the W side of Mare Island Strait, has drydocks and extensive facilities for repairing and building vessels of all sizes. A passenger ferry operates between Vallejo and San Francisco.

(500) The Vallejo Marina, S of the Vallejo-Mare Island Causeway on the E side of Mare Island Strait, has accommodations for about 500 boats. Other small-craft facilities are also on the E side of the strait. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

(501) The Vallejo-Mare Island causeway and lift bridge connect Mare Island with the city of Vallejo near the N end of the Naval Shipyard. It has a lift span with a clearance of 100 feet up and 12 feet down. (See **117.1 through 117.59 and 117.169**, chapter 2, for drawbridge regulations.) The bridge is equipped with radiotelephone. The bridgetender monitors VHF-FM channel 16 (156.80 MHz) and works on channel 13 (156.65 MHz); voice call, Mare Island Causeway Bridge. Just above **Sears Point,** 1 mile above Vallejo, a fixed highway bridge with a clearance of 100 feet crosses the strait. A public fishing pier is close S of this bridge and extends about 350 yards from the E side of the strait. A Navy reserve fleet pier is on the W side of the strait between Vallejo-Mare Island causeway lift bridge and the fixed bridge just above Sears Point. If practical, approach the bridges only when running against the current. No passage should be attempted during the periods of peak flood or ebb current.

Charts 18654, 18652

(502) **Napa River**, the continuation of Mare Island Strait above the naval shipyard, is used by barges and pleasure boats. Barge traffic on the river is in crushed rock, salt, and steel. A dredged channel leads from the Vallejo-Mare Island Causeway Bridge to a turning basin at **Jacks Bend,** thence to the head of navigation at the 3rd Street Bridge in **Napa,** 13 miles above the causeway bridge. In April 1999, the midchannel controlling depth was 8 feet from the Vallejo-Mare Island Causeway Bridge to **Horseshoe Bend.** A Federal project provides a depth of 10 feet from Horseshoe Bend to the upstream limit of the channel. (See Notice to Mariners and latest editions of charts for controlling depths.) Napa River is marked to Horseshoe Bend by a buoy and daybeacon, lights, and a **183°** lighted range.

(503) The railroad bridge across Napa River at **Brazos,** about 6.8 miles above the Vallejo-Mare Island Causeway, has a vertical lift span with a clearance of 2 feet down and 97 feet up. (See **117.1 through 117.59 and 117.169**, chapter 2, for drawbridge regulations.) The channel through the bridge crosses from one bank to the other causing a hazardous condition, particularly for downbound loaded barges, because the direction of

CARQUINEZ STRAIT

the ebb current is as much as 50° from the axis of the channel.

(504) A fixed highway bridge with a clearance of 107 feet crosses the Napa River at Suscol, about 9.7 miles above the Vallejo-Mare Island Causeway.

(505) Near **Imola,** 12 miles above Vallejo-Mare Island Causeway Bridge, the Maxwell (State Route 29) bridge crossing the river has a lift span with clearances of 25 feet down and 60 feet up. (See **117.1 through 117.59 and 117.169**, chapter 2, for drawbridge regulations.) In April 2001, a fixed highway bridge was under construction with a design clearance of 60 feet; upon completion, it will replace the bascule bridge. The three fixed bridges in Napa have a minimum width of 47 feet and a clearance of 10 feet. The minimum clearance of the power cables crossing the river below Napa is 125 feet, and in Napa, 40 feet.

(506) A small-craft basin is on the W side of Napa River opposite **Bull Island,** 8 miles above the Vallejo-Mare Island Causeway, and several other small-craft facilities are elsewhere on the river. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

Charts 18656, 18652

(507) Six-mile-long **Carquinez Strait** connects San Pablo and Suisun Bays. For the first 3.5 miles it is a little less than 0.5 mile wide, and then widens to about 1 mile. It is deep throughout with the exception of a small stretch of flats on the N shore, and a small shoal area in the bight on the S shore near the E end. In June 2001, shoaling to 14 feet was in the NW corner of Naval Anchorage No. 21.

Anchorages

(508) **General anchorages** are in Carquinez Strait. (See **110.1 and 110.224,** chapter 2, for limits and regulations.)

(509) **Caution.**–In October 1991, tidal currents in Carquinez Strait were reported to deviate significantly from official predictions published by the National Ocean Service. Mariners should exercise caution and discretion in the use of published tidal current predictions.

Charts 18655, 18652

(510) The **California State Maritime Academy** and pier are in **Morrow Cove,** on the N shore of the W entrance to Carquinez Strait.

(511) Interstate Route 80 fixed highway bridges cross Carquinez Strait near its W entrance at **Semple Point.** The channel on each side of the center pier is 998 feet wide; the clearances are 146 feet through the N span and 134 feet through the S span. Private fog signals are sounded at the bridges; racons are at the center of each span and an aerolight is atop the center pier.

(512) Power cables cross the strait 0.3 mile W of the highway bridges and 1.2 miles E of it; the minimum clearance is 179 feet.

(513) **Crockett,** on the S shore just E of the highway bridges, is built around The California and Hawai'ian Sugar Co. Refinery. The refinery's wharf has a 2,715-foot face with 2,815 feet of berthing space with dolphins, and a deck height of 12 feet. A depth of 30 feet is alongside. Four cranes and a conveyor system serve the wharf, maximum unloading rate is 250 tons per hour each; water is available. The wharf is used for receipt and shipment of sugar products and the transfer of bulk liquid molasses; it is owned and operated by California and Hawai'ian Sugar Co.

(514) A marina is on the S shore just W of the highway bridges, and a small-boat basin is in **Elliot Cove** on the N side of the strait opposite Crockett. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

Charts 18657, 18652

(515) A light and seasonal fog signal are 130 yards off the S side of Carquinez Strait, 1.5 miles E of Interstate Route 80 fixed highway bridges; a light is onshore at **Port Costa,** 0.6 mile to the E. On the N side of the strait, a light is on **Dillon Point** and another is off **Benicia Point.**

(516) A wharf is about 0.7 mile SE of Port Costa. A shed at the wharf is in ruins. A brickyard is back of the wharf.

(517) The Defense Fuel Supply Center Support Point, Ozol Oil Wharf, at **Ozol,** about 1.6 miles SE of Port Costa, is a 270-foot offshore wharf with 880 feet of berthing space with dolphins; 37 feet alongside; deck height is 8 feet; water and electrical shore power connections are available; it is owned by the U.S. Government and operated by Blaiz Co., Inc.

(518) There are three wharves extending out to deep water at **Martinez,** 2 miles SE of Point Carquinez.

(519) The westernmost of these facilities is the municipal fishing pier with a tugboat slip on its W side. A small-boat harbor, protected by breakwaters, is on the E side of the pier. A private light is on the channel end of both breakwaters. In 1994, shoaling to a depth of about 4 feet was reported at the entrance to the marina.

(520) The Shell Oil Co., Martinez Refinery Wharf, E of the municipal fishing pier, is a 900-foot offshore wharf, 1,850 feet usable with dolphins; depth of 42 feet alongside decreasing to 39 feet at the W end; deck height is 15 feet; water and electrical shore power connections are available; owned and operated by Shell Oil Co. The wharf is marked by private lights and a fog signal.

(521) The Tosco Corp., Amorco Upper and Lower Wharves, 400 yards E of the Shell Oil Co. Wharf, have depths of 35 feet alongside and both are used for bunkering vessels as well as the receipt and shipment of petroleum products. The W wharf is a 76-foot offshore wharf with 281 feet usable with dolphins; depth of 35 feet alongside; deck height is 15 feet. The E wharf is a 76-foot offshore wharf with 512 feet usable with dolphins; deck height is 17 feet. The wharves provide 978 feet of continuous berthing space; owned and operated by Tosco Corp. Both wharves are marked by private lights.

(522) **Benicia** is on the N shore at the E end of Carquinez Strait. Most of the smaller piers around the town are in ruins.

(523) A marina, protected by breakwaters, is at Benicia. Private lights on the breakwater mark the entrance. (See the small-craft facilities tabulation on Chart 18652 for services and supplies available.)

(524) In November 1988, a sunken wreck with a least depth of 21 feet was reported about 600 yards WSW of the Port of Benicia in about 38°02'17.5"N., 122°08'39.6"W.

(525) The **Port of Benicia** is at Army Point at the E end of the town. Highway and railroad connections, and water and electrical shore power connections are available at all of the facilities.

(526) Valero-Benicia Refinery (38°02'41"N., 122°07'45"W.): 1,100 feet of berthing space; 40.4 feet alongside; deck height, 15 feet; receipt and shipment of petroleum products; receipt of crude oil; owned and operated by Valero Refining Inc.

(527) Benicia Industries, Wharf No. 95 (38°02'28"N., 122°08'05"W.): 2,404 feet of berthing space; 38 feet alongside; deck height, 11 to 15 feet; receipt of automobiles and crude oil; receipt and shipment of general cargo; shipment of bagged rice, petroleum coke, and petroleum products; owned by Benicia Industries, Inc., and operated by various companies.

(528) Two bridges cross Carquinez Strait at the E end from **Army Point** to **Suisun Point.** The fixed Benicia-Martinez Highway Bridge has a clearance of 135 feet over Suisun Point Reach and is equipped with a racon; the railroad lift bridge has a clearance of 70 feet down and 135 feet up over the channel. (See **117.1**

through 117.49, chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 13 and works on channel 14; call sign KQ-7193, Union Pacific Railroad Bridge. In April 2001, a fixed highway bridge was under construction with a design clearance of 139 feet close east of the bascule bridge. **Bulls Head Point,** just E of the S end of the bridge, shows as a 100-foot rounding hill with a prominent high white stack.

(529) The Tosco Corp., Avon Refinery, Tanker Wharf extends across the flats at **Avon,** 1.5 miles E of the Suisun Point bridges. Total berthing space is 1,320 feet; depths alongside the channel face are 32 feet; deck height is 19 feet, with 14 feet at the center section. Tankers berth along the channel side of the face, and barges along the inshore side of the face; receipt and shipment of petroleum products; owned and operated by Tosco Corp. Private lights and fog signals are on the outer ends of the pier.

(530) The Shore Oil Terminal Wharf, 970 feet of berthing space with dolphins, is 0.5 mile W of the Tosco Corp. Avon Refinery Tanker Wharf; depth alongside, 34 feet; receipt and shipment of petroleum products. The wharf is owned and operated by Shore Terminals Oil Corp.

Charts 18656, 18652

(531) **Suisun Bay** is a broad shallow body of water with marshy shores and filled with numerous marshy islands, many of which have been reclaimed and are now under cultivation. It is practically the delta of the Sacramento and San Joaquin Rivers which empty into the E part of the bay. Two narrow winding channels lead to the mouths of the rivers. They are marked by lights. The rivers and the channels near the mouths have been improved by the Government to increase the depth, remove obstructions, and provide relief during freshet seasons. A Federal project provides for a main channel 35 feet deep through the bay to the San Joaquin River. (See Notice to Mariners and latest editions of charts for controlling depths.)

(532) The bay is used by many light-draft vessels having local knowledge. It is recommended that large vessels take a pilot if bound above Crockett. For information on obtaining an inland pilot contact the San Francisco Marine Exchange or San Francisco Bar Pilots.

(533) A large wind turbine on the NW side of the bay in about 38°09'21"N., 122°07'26"W., is reported to be prominent.

Anchorages

(534) **General anchorages** are in Suisun Bay. (See **110.1 and 110.224,** chapter 2, for limits and regulations.) Mariners are advised that a cable area runs through Anchorage No.23.

(535) **Suisun Slough** empties into the NW side of Suisun Bay 5.5 miles N of Benicia. A dredged channel leads from Suisun Bay into the entrance to the slough. In 1990, the controlling depth was 6½ feet. The entrance channel is marked by lights. Above the dredged channel, river channel had a reported depth of 6.3 feet in July 2001, from the mouth to **Suisun City,** 12 miles above the entrance. The mean range of tide is about 4 feet. Traffic on the slough includes gasoline, jet fuel, and residual fuel oil. Petroleum products are barged to an oil distributor at Suisun City. A power cable with a clearance of 110 feet crosses the slough just S of the city.

(536) Several small-craft facilities are at Suisun City. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

(537) A **restricted berthing area** for Maritime Administration Reserve Fleet vessels is along the W side of Suisun Bay. (See **162.270,** chapter 2, for limits and regulations.)

(538) (See **117.1 through 117.59, 117.151, and 117.185**, chapter 2, for drawbridge regulations for the bridges over the minor tributaries of Suisun Bay.)

Charts 18658, 18652

(539) The site of the **Concord U.S. Naval Weapons Station** is on the S side of the bay. The waterfront along the station is restricted and closed to navigation. (See **334.1110**, chapter 2, for limits and regulations of the **restricted area.**)

Charts 18656, 18652

(540) Two adjacent small-craft basins are on the S side of the flats about 1.6 miles E of **Middle Point,** the E boundary of the Navy weapons station. The basins are connected to the bay by twin canals cut through the flats. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

Charts 18659, 18661, 18652

(541) **Pittsburg**, on the S side of New York Slough 12 miles E of Suisun Point bridges, is a manufacturing city with several deepwater berths.

(542) The PGE-Pittsburg Fuel Pier, about 0.3 mile W of **New York Point,** is an offshore wharf with 1,070 feet of berthing space, 35 feet alongside, and a deck height of

14 feet. It is used for receiving and transshipping petroleum products.

(543) The Diablo Service Corp. Wharf, about 0.6 mile E of New York Point is an offshore wharf with 1,154 feet of berthing space with dolphins, 35 feet alongside, and deck height of 12 feet. There is a conveyer system and crawler tractors. Rail and highway connections, and water and electrical shore-power connections are available. It is owned by Tosco Corp. and is used for the receipt of petroleum coke.

(544) USS-Posco Industries, Pitsburg Wharf, about 1.3 mile E of New York Point, is a 891-foot marginal wharf with depths of 33 feet alongside and a deck height of 11 feet. Three 37½-ton cranes are available, and there are rail and highway connections, and water and electrical shore power connections. It is used for receipt of semi-finished steel.

(545) The Dow Chemical Co., Pitsburg Plant Wharf, about 2 miles E of New York Point, is an offshore wharf with 672 feet of berthing space with dolphins, 40 feet alongside and a deck height of 20 feet. It is used for shipment and receipt of caustic soda.

(546) **Antioch,** on the S side of San Joaquin River 16 miles E of Suisun Point bridges, is a manufacturing city with waterborne commerce.

(547) Georgia-Pacific Corp., Antioch Plant Wharf, about 38°00'56"N., 121°47'08"W., is a 197-foot offshore wharf, 780 feet usable with dolphins, with 31 feet alongside and a deck height of 11 feet. A conveyor system is available for the receipt of gypsum rock. Highway connections, and water and electrical shore power connections are available.

(548) Gaylord Container Corp., California Mill Wharf, about 0.5 mile E of Kaiser Gypsum Co. Pier, is a 291-foot offshore wharf, 766 total berthing space, with depths of 35 feet alongside. Receipt of miscellaneous dry bulk commodities.

(549) There are also barge facilities at Antioch.

(550) The Fulton Shipyard, on the E edge of the city, has a marine railway that can haul out vessels up to 350 tons for general repairs. The yard repairs auxiliary vessels such as towboats and barges.

(551) Several small-craft facilities are at Pittsburg and Antioch. (See the small-craft facilities tabulation on chart 18652 for services and supplies available.)

Charts 18661, 18662

(552) The **Delta Region,** the combined deltas of the San Joaquin and Sacramento Rivers, comprises the feeder rivers, sloughs, and canals that directly or indirectly connect with one or both of the rivers. Hundreds of miles of navigable waterways for small boats are available in the Delta; both local and visiting small craft use these waterways extensively. Common types of pleasure craft peculiar to the Delta include pontoon boats and houseboats, but many conventional powerboats and sailboats use these waters also, especially in summer when San Francisco Bay is foggy and choppy. Some of the more important sloughs are used by tugs and barges.

(553) Bordering the various waterways are levees which are 12 feet or more higher than the land behind them. The levees are built up from dredged material taken from the adjacent waterway, and because of the settlement of the levees, dredging has been done periodically to keep the tops at height and grade. As material is needed for levee work, the dredge pays more attention to the requirements of the levee than to the depth of the channel for navigation purposes. This leaves an uneven bottom. The tops of the levees generally have dirt roads. **Tule** is often found on the channel side of the levees. Tule is the name given to a tall aquatic plant growth similar to bulrush.

(554) Many public and private small-boat harbors, marinas, and boating resorts are spread over the Delta region. All types of facilities and services for small craft are available, though some areas in the Delta are much more developed than others. Groceries are one of the most difficult items to obtain in this region; groceries in any quantity must be obtained from the larger towns on the Sacramento River, at Antioch or Stockton on the San Joaquin River, or at one of the larger resorts. Diesel oil is similarly rather scarce, since most craft on these waters use gasoline. Diesel oil may be obtained at the junction of the Mokelumne and San Joaquin Rivers, on the W side of King Island, at or near the cities of Antioch and Stockton, and at Bethel Island.

(555) Some areas in the Delta in which small-craft facilities are especially concentrated are: most of the perimeter of **Bethel Island (Bethel Tract),** 3.4 miles E from Antioch Bridge; the S side of San Joaquin River on both sides of Antioch Bridge; the W side of the Mokelumne River from its junction with the San Joaquin River to Georgiana Slough; and the San Joaquin River from Fourteenmile Slough through Stockton. (See the small-craft facilities tabulation on charts 18661 and 18662 for services and supplies available at the small-craft facilities in the Delta Region.)

Cable ferries

(556) The Sacramento and San Joaquin Rivers, including some of the feeder rivers, sloughs, and canals that directly or indirectly connect with one or both of the rivers, are crossed by cable ferries (see charts 18661 and 18662). These ferries in the delta region are guided by cables and sometimes propelled by a cable rig

attached to the shore. Cables to the ferries, which extend from both banks of the waterway, may be at, near, or above the water surface. Operating procedures vary and mariners are advised to use extreme caution and seek local knowledge. In 1978, the U.S. Coast Guard advised that cable ferries were not operating in many charted locations in the delta region. These ferries may operate intermittently, so caution is advised while operating in their vicinity. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

(557) Bridge clearances on the Sacramento River above Rio Vista and on other waterways in the delta region are at low water, which is **mean lower low water at low-river stage;** power cable clearances are at high water. Mariners are cautioned, during flood stage levels, bridge and overhead cable clearances may be reduced 29 feet or more.

Charts 18661, 18660, 18663

(558) **San Joaquin River** rises in the Sierra Nevada, flows 275 miles in a W direction, and enters Suisun Bay through **New York Slough**. The winding river is navigable for deep-draft vessels to Stockton. The water is generally fresh at Antioch. The mean range of tide is about 3 feet from the entrance to Stockton. Major floods in the river valley may occur from November to April, caused by intense general storms of several days' duration. At the mouth of the river an ordinary flood will cause a rise of 8 feet and an extreme flood a rise of 10 feet in the river level. At Stockton, ordinary flood will cause a rise of 8.5 feet, and extreme flood a rise of 13.5 feet in the river level. The delta of the river is formed of many marshy islands intersected by sloughs and channels. The islands are reclaimed tule and cattail marshes which have been converted to agriculture. Bordering the river are levees that are 12 feet or more higher than the land behind them.

(559) Reports of gage heights of the San Joaquin River delta can be obtained from the Sacramento National Weather Service Office at any time. The information is published in the Sacramento Bee and, in addition, is reported on radio broadcasts from station KFBK whenever the gage heights are sufficient to be of general interest.

(560) Information on gage heights can also be obtained from the State Department of Water Resources, 1416 9th Street, Sacramento, CA 95814 or by recorded message at (916) 653-6416.

(561) A Federal project provides for a 35-foot channel from the mouth of the San Joaquin River to a turning basin at Stockton, and for suitable passing and turning basins. (See Notice to Mariners and latest editions of charts for controlling depths.)

Anchorages

(562) **General and explosives anchorages** are in the San Joaquin River on the W side of Sherman Island near the mouth, and just N of Venice Cut between Mandeville Island and Venice Island. (See **110.1 and 110.224,** chapter 2, for limits and regulations.)

(563) (See **162.205,** chapter 2, for rules and regulations governing maximum speed, passing, right-of-way, collision, and wrecks in the San Joaquin River.)

(564) **Antioch Bridge,** (State Route 160), a fixed highway bridge with a clearance of 142 feet, crosses San Joaquin River about 3 miles E of Antioch. There are no other bridges over the main channel below the turning basin at Stockton. Power cables over the main channel of San Joaquin River from the mouth to the turning basin at Stockton have a minimum clearance of 125 feet.

(565) There are small-craft facilities on the S side of San Joaquin River on both sides of Antioch Bridge. (See the small-craft facilities tabulation on chart 18661 for services and supplies available.)

(566) The main channel in San Joaquin River to Stockton is marked by a daybeacon, buoys, lights, and lighted ranges. At **Mandeville Cut** and **Venice Cut,** 15 miles above Antioch Bridge, the river still follows its old channel and violent sheers are experienced if the navigator is not prepared to meet the river current when passing from the cuts into the river and from the river into the relatively quiet waters of the dredged channel. Under freshet conditions, vessels tend to sheer off course at the junction of the San Joaquin River and the main ship channel at Channel Point near Stockton.

(567) **Stockton,** 28 miles above Antioch Bridge, is in the center of the fertile San Joaquin Valley. The deep-draft harbor is near the W city limits.

Bridges

(568) A fixed highway bridge with a clearance of 45 feet crosses the upper Stockton channel about 500 yards E of the turning basin.

Tides and currents

(569) The mean range of tide is 3.1 feet, and the tidal current is negligible.

Weather, Stockton

(570) Stockton, the county seat of San Joaquin County, is near the center of the great **Central Valley** of California, on the SE corner of the broad delta formed by the confluence of the San Joaquin and Sacramento Rivers. The

surrounding terrain is flat, irrigated farm- and orchard-land, near sea level, with the rivers and canals of the delta controlled by a system of levees.

(571) About 25 miles (46 km) E and NE of Stockton lie the foothills of the Sierra Nevada, rising gradually to an elevation of about 1,000 feet (305 m). Beyond the foothills, the mountains rise abruptly to the crest of the Sierra, at a distance of about 75 miles (139 km), with some peaks here exceeding 9,000 feet (2745 m) in elevation. On a few days during the year, when atmospheric conditions are favorable, the "downslope" effect of a N or NE wind can bring unseasonably dry weather to the delta area; but on the whole the Sierra Nevada has little or no effect on the weather of San Joaquin County. The Sierra Nevada does affect the area, however, to the extent that the entire economy of the Central Valley depends upon the underground water supplies and rivers which are fed in summer by the melting snows which have piled up during the winter on the windward (W) slopes of the mountains.

(572) To the W and SW, the Coast Range, with peaks above 2,000 feet (610 m), form a barrier separating the Central Valley from the marine air, which dominates the climate of the coastal communities. Several gaps in the Coast Range in the San Francisco Bay Area, however, permit the passage inland of a sea breeze which fans out into the delta and has a moderating effect on summer heat, with the result that Stockton enjoys slightly cooler summer days than communities in the upper San Joaquin and Sacramento Valleys.

(573) Stockton's climate is characterized in summer by warm, dry days and relatively cool nights, with clear skies and no rainfall; and in winter by mild temperatures and relatively light rains, with frequent heavy fogs. The annual average temperature is 62°F (16.7°C) with an average daily maximum of 74°F (23.3°C) and an average daily minimum of 49°F (9.4°C).

(574) The annual rainfall averages between 13 and 14 inches (330 to 356 mm), with 90 percent of this precipitation falling in the winter-half year, i.e., November through April. Thunderstorms are infrequent, occurring on 3 or 4 days a year, generally in the spring, and occasionally in summer, although rainfall with summer thunderstorms is negligible. Measurable rain can be expected on about 52 days a year, and rain exceeding 0.5 inch (13 mm) on about 7 days a year. Since the Pacific storms that bring rainfall to this area are associated with above-freezing temperatures (>0°C) at sea-level elevations, snowfall is practically unknown in the Stockton area with trace amounts happening a few times and measurable snowfall happening only one time; February 1976.

(575) In summer, temperatures exceeding 100°F (37.8°C) can be expected on 6 days in July and about 14 days during the entire summer. During these hot afternoons the air is extremely dry, with relative humidities running generally less than 20 percent. Even on these hot days, however, temperatures will fall into the low sixties (16.1° to 17.2°C) at night. In winter the nighttime temperature on clear nights will fall to, or slightly below, freezing (0°C), and will rise in the afternoon into the low fifties (10.6° to 11.7°C). The all-time recorded maximum for Stockton is 114°F (45.5°C) recorded in July 1972 while the all-time minimum is 16°F (-8.9°C) recorded in January 1949. Each month, April through October, has recorded temperatures in excess of 100°F (37.8°C) while each month, November through April, has recorded temperatures of freezing (0°C) or lower.

(576) In late autumn and early winter, clear still nights give rise to the formation of dense fogs, which normally settle in during the night and burn off sometime during the day. In December and January, the so-called fog season, under stagnant atmospheric conditions the fog may last for as long a 4 or 5 weeks, with only brief and temporary periods of clearing.

Pilotage, San Joaquin River

(577) River pilots, commissioned by the Port of Stockton, are obtained by ship's agents, through the office of the Port of Stockton, or the San Francisco Bar Pilots.

Towage

(578) It has not been necessary for towage companies to operate at this port because all vessels operate under their own power; however, tugs up to 1,200 hp are available.

Quarantine, customs, immigration, and agricultural quarantine

(579) (See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(580) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Wharves

(581) Deep-draft facilities at the Port of Stockton are on the S side of San Joaquin River, along the NE side of **Rough and Ready Island** (West Complex), and along the S side of Stockton Deep Water Channel from the junction with the San Joaquin River E to the turning basin (East Complex). The facilities have highway connections and are served by the port's beltline railroad, which connects with two major railroads. Warehouse facilities are available in the port; the wharves have water and electrical shore power connections. General cargo is usually handled by ship's tackle or by shore side traveling cranes; special handling equipment, if

available, is mentioned in the description of the particular facility. Rental cranes are available locally, and floating cranes for heavy lifts can be obtained from San Francisco. The wharf operator, unless otherwise stated, is the Stockton Port District. Depths alongside are reported; for information on the latest depths contact the Stockton Port District. Only the deep-draft facilities are described. For a complete description of the port facilities refer to Port Series No. 32, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

(582) Port of Stockton (West Complex), on Rough and Ready Island, has a total of 5.5 million square feet of covered storage. Wharves 14-20, are along the NE side of the island. The wharves range in length from 745 to 1,104 feet, and depths alongside are 22 to 25 feet; each wharf has 120,000 square feet of covered storage.

(583) Port of Stockton (East Complex), Wharves 12 and 13 (37°57'02"N., 121°20'05"W.): at Channel Point; 566-foot offshore wharf; 843 feet of berthing space with dolphins; 35 feet alongside; deck height, 13 feet; loading tower served by conveyor system, loading rate 4,000 tons per hour; shipment of dry bulk products and receipt of petroleum products.

(584) Port of Stockton, Wharves 10 and 11; just E of Channel Point; 812-foot marginal wharf, 1,011 feet usable with dolphins; 35 feet alongside; deck height, 15½ feet; two 30-ton traveling cranes; receipt of liquid fertilizer, dry bulk, and general cargo; shipment of general cargo.

(585) Port of Stockton, Wharf 9: E of and in line with Wharves 10 and 11; 645-foot marginal wharf; 35 feet alongside; deck height, 15½ feet; 56,800 square feet covered storage; forklift trucks; receipt of liquid fertilizer and general cargo; shipment of general cargo.

(586) Port of Stockton, Wharf 8: S part of E side of Slip 1, which is about 0.3 mile E of Channel Point; wharf and trestle extension 484 feet long; 35 feet alongside; deck height, 15½ feet; 36,150 square feet covered storage; forklift trucks; receipt and shipment of general cargo, receipt of molasses, liquid fertilizer, and anhydrous ammonia.

(587) Port of Stockton, Wharf 7: immediately N and in line with Wharf 8: 516 feet long; 35 feet alongside; deck height, 15½ feet; 25,100 square feet covered storage; forklift trucks; receipt and shipment of general cargo.

(588) Port of Stockton, Wharf 6: immediately E of entrance to Slip 1; 418-foot marginal wharf; 35 feet alongside; deck height, 15½ feet; 17,650 square feet covered storage; forklift trucks; receipt and shipment of general cargo.

(589) Port of Stockton, Wharf 5: E of and in line with Wharf 6; 429-foot marginal wharf; 35 feet alongside; deck height, 15½ feet, 41,000 square feet covered storage; forklift trucks; receipt and shipment of general cargo.

(590) Port of Stockton, Wharf 4: E of and in line with Wharf 5; 461-foot marginal wharf; 35 feet alongside; deck height, 15½ feet; 41,300 square feet covered storage; receipt and shipment of general cargo.

(591) Port of Stockton, Wharf 3: E of and in line with Wharf 4; 461-foot marginal wharf; 35 feet alongside; deck height, 15½ feet; 30,000 square feet covered storage; forklift trucks and a 30-ton traveling crane; receipt and shipment of general cargo.

(592) Wharves 6, 5, and 4 can provide a total of 1,769 feet of berthing space.

(593) Port of Stockton, Wharf 2: SW corner of turning basin; 585-foot marginal wharf; 35 feet alongside; deck height, 15½ feet; one cargo evacuator; 56,000-ton storage capacity for bulk cargo; 34,000-ton storage capacity for cement; receipt and shipment of general cargo.

(594) Penny Newman Grain Co. Inc., Stockton Elevator Wharf: S side of turning basin, just E of Open Wharf 2; 564-foot marginal wharf; 37 feet alongside; deck height, 15½ feet; unloader consists of a receiving hopper and a conveyor which connects to grain elevator; loader consists of two towers, each with a movable spout, interconnected and also connecting to the grain elevator, combined loading rate of 1,000 tons (33,200 bushels) per hour; grain elevator back of wharf has capacity of over 6.8 million bushels; shipment of grain by ship and barge, receipt of grain by self-unloading barges; owned and operated by Penny Newman Grain Co. Inc.

Supplies

(595) Supplies may be had in any quantity, and water is piped to the wharves. Ships may fuel from barges; alongside bunkering of large vessels may be done at the oil terminals in San Pablo Bay and Carquinez Strait.

(596) Repairs

(597) Some dockside facilities are available here, but major repairs to oceangoing vessels must be done at the drydocks in San Francisco, Oakland, Alameda, and Richmond. Several facilities make repairs to small craft; marine railways up to 200–ton capacity are available.

Small-craft facilities

(598) Several small-craft facilities are at Stockton or nearby. (See the small-craft facilities tabulation on chart 18661 for services and supplies available.)

San Joaquin River above Stockton

(599) From its junction with Stockton Channel, the river has a controlling depth of about 3 feet for 70 miles to Hills Ferry, and is used only by small pleasure craft,

fishermen, and an occasional small barge. The only facilities available are those dispensing gasoline, lubricants, and water at a few points.

Bridges

(600) More than 15 bridges cross San Joaquin River between Stockton and Hills Ferry. The minimum clearance for bridges crossing the river between Stockton and Atchison Topeka and Santa Fe Railway bridge, about 1.4 miles above Stockton, is 8 feet. (See **117.1 through 117.59 and 117.191,** chapter 2, for drawbridge regulations.)

Charts 18661, 18662

(601) The principal tributaries of the San Joaquin River are described as the river is ascended. Bridge clearances are at low water. (See **117.1 through 117.59, 117.143, 117.145, 117.150, 117.157, 117.159, 117.161, 117.167, 117.171, 117.175, and 117.183**, chapter 2, for drawbridge regulations.)

(602) **Threemile Slough,** meets the San Joaquin River 5.8 miles above Antioch Bridge and joins the Sacramento River at the N end of Decker Island. The slough is a route frequently used by tugs and barges making passage between Sacramento and Stockton. Near the junction with the Sacramento River is a highway lift bridge with clearances of 16 feet down and 110 feet up at low water. The bridgetender monitors VHF-FM channel 16 and works on channel 9; call sign KMJ–385, Threemile Slough Bridge. (See **117.1 through 117.49**, chapter 2, for drawbridge regulations.) The power cable E of the bridge has a clearance of 108 feet.

Anchorage

(603) A **restricted anchorage area** is along the E side of **Decker Island**. (See **162.205**, chapter 2, for limits and regulations.).

(604) **Mokelumne River,** one of the principal tributaries of the San Joaquin River, rises in the Sierra Nevada and empties into it 11.8 miles above Antioch Bridge. The river separates, 3.5 miles above its mouth, into two branches, the **North Mokelumne River (North Fork)** and the **South Mokelumne River (South Fork).** The branches continue in a N direction and rejoin 9 miles NNE from the mouth. The river then describes a semicircular route for 7 miles to the N and E to the head of navigation at the Galt-New Hope Bridge.

(605) Corps of Engineers project maps for 1978 show the following controlling depths for Mokelumne River: 12 feet from the mouth to the lower junction of the North and South Mokelumne Rivers, thence 7 feet by North Mokelumne River to Snodgrass Slough; thence 2 feet to upper junction of the North and South Mokelumne Rivers; 7 feet from the lower junction by South Mokelumne River to the upper junction; and thence 2 feet to the Galt–New Hope bridge. Mokelumne River is subject to shoaling; local knowledge is advised.

(606) (See **117.1 through 117.59 and 117.175**, chapter 2, for drawbridge regulations for the swing and removable span bridges crossing Mokelumne River between the entrance and Galt-New Hope fixed bridge at Thornton.) The minimum clearance of the drawbridges is 11 feet. The bridgetender of the Mokelumne River highway swing bridge just S of the junction with Georgiana Slough monitors VHF-FM channel 16, and works channel 9; call sign: KMJ-382, Mokelumne River Bridge. The bridgetender for the Mokelumne River highway bridge near the northern junction of the north and south forks of the river monitors VHF-FM channel 16, and works channel 9; call sign: WBE 8326, Millers Ferry Bridge. Power cables have a minimum clearance of 110 feet. The Galt-New Hope Bridge has a fixed span with clearances of 18 feet at low water and 2 feet at high water.

(607) Twin fixed highway bridges about 3.5 miles above the upper junction of North and South Mokelumne Rivers have a clearance of 24 feet at low water and 5 feet at high water.

(608) The mean range of **tide** in Mokelumne River at the entrance to Georgiana Slough is 2.4 feet; the diurnal range of tide is 3.2 feet. At Galt-New Hope Bridge, during low river stages, the mean range of tide is 2.7 feet; the diurnal range is 3.6 feet.

(609) **Little Potato Slough** (38°06'00"N., 121°29'30"W.) enters the South Fork of the Mokelumne River about 6 miles E of the confluence of the north and south forks and connects the river with other tributaries of the San Joaquin River. The slough is crossed by a highway swing bridge near the junction with the South Fork of the Mokelumne River. The highway bridge has a clearance of 35 feet when closed and unlimited clearance when open. The bridgetender monitors VHF-FM channel 16 and works on channel 9; call sign: KSK 278, Potato Slough Bridge. (See **117.167**, chapter 2, for drawbridge regulations.)

(610) **Georgiana Slough** enters Mokelumne River about 3 miles above the mouth, and connects that river with the Sacramento River at Walnut Grove. The controlling depth through the slough is about 13 feet. Tugs and barges formerly used the slough in making the run from Sacramento to Stockton, but to avoid the snags and sharp turns they now favor the route through Threemile Slough.

(611) The swing bridge crossing Georgiana Slough about 3.5 miles above the junction with Mokelumne River,

has a clearance of 13 feet when closed and unlimited clearance when open. The bridgetender monitors VHF-FM channel 16, and works channel 9; call sign: WHU-246, Tyler Island Bridge. The highway swing bridge near Walnut Grove has a clearance of 17 feet when closed and unlimited clearance when open. The bridgetender monitors VHF-FM channel 16, and works channel 9; call sign: WHU–254, Georgiana Slough Bridge. (See **117.1 through 117.59 and 117.157**, chapter 2, for drawbridge regulations.)

(612) **Old River** flows into the San Joaquin River about 13 miles above the Antioch Bridge after diverging from the latter river about 38 miles above the bridge. It is the most W branch of the interconnecting tidal channels into which San Joaquin River divides in crossing its delta. Old River has many sloughs and canals that connect with Middle River to the E.

(613) In 1978, the controlling depths in Old River were: 10 feet for 10 miles from the mouth to Orwood; thence 10 feet for 9 miles to the lower end of Grant Line Canal; thence 7 feet for 9 miles to the Holly Sugar Factory near Tracy; and from the other end of Grant Line Canal to the head of Old River in San Joaquin River, 5 feet.

(614) The minimum clearances of the bridges crossing Old River are: drawbridges, 10 feet; fixed bridges, 18 feet. The bridgetender at Old River railway bridge near Orwood monitors VHF–FM channel 16, and works channel 9; call sign: WHU–322, Santa Fe Railroad Bridge. Power cables as far as Orwood have a minimum clearance of 110 feet. (See **117.1 through 117.59 and 117.183**, chapter 2, for drawbridge regulations.)

(615) The mean range of **tide** at Orwood on Old River is 2.8 feet, and the diurnal range is 3.7 feet; ordinary flood fluctuations are 15 feet and 5½ feet, respectively, and extreme flood fluctuations are 19 feet and 8 feet, respectively. The Holly Sugar Co. refinery and terminal near Tracy has a large wharf and an unloading basin; a passing basin is about 0.5 mile downstream from the terminal.

(616) **Middle River** enters the San Joaquin River 15.3 miles above Antioch Bridge. The river and connecting channels are a part of a complicated network of tidal canals, some natural and some artificial, in the delta of the San Joaquin River. One of the principal channels, Middle River leaves Old River at the SW corner of Roberts Island about 7 miles SSW of Stockton and roughly parallels Old River to the San Joaquin River.

(617) The controlling depth in Middle River is about 6 feet to the Bacon Island Road swing bridge, about 15.5 miles below the junction with Old River. The channel is not maintained above the bridge, and navigation is obstructed by many snags and shoals.

(618) The least clearance of the bascule and swing bridges across Middle River is 11 feet at low water; three fixed bridges 1 mile, 4 miles, and 8.5 miles below the junction with Old River have a least clearance of 12 feet at high water and a least width of 24 feet. The bridgetender for the Middle River highway bridge near Empire Cut monitors VHF-FM channel 16, and works on channel 9; call sign: WBE 8326, Bacon Island Bridge. (See **117.1 through 117.59 and 117.71**, chapter 2, for drawbridge regulations.) Power cables crossing the river have a minimum clearance of 70 feet.

Cable ferry

(619) Woodward Island Ferry crosses Middle River about 12.5 miles below the junction with Old River. The ferry carries passengers and vehicles, and operates from 0800 to 1700 daily. White warning signs, with black letters and orange borders, are posted about 500 feet on either side of the ferry crossing. Flashing red beacons are shown by the ferry when underway. When the ferry is underway, the cables are 6 to 7 feet above the water surface; when docked, the cables are on or within 1 or 2 feet of the bottom. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

(620) **Empire Cut** enters Middle River about 16.5 miles below the latter's junction with Old River.

Cable ferries

(621) Mildred Island Ferry crosses Empire Cut about 0.6 mile E of the junction with Middle River. This private cable ferry carries passengers, vehicles and farm equipment, and operates during daylight hours. When the ferry is underway, the cables are suspended at an unknown depth below the water surface; when docked, the cables are dropped to the bottom. A sign on each side of the ferry warns of the cables; a flashing red signal is shown when underway. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

(622) The Mandeville Island-McDonald Island Ferry crosses Middle River about 19.5 miles below the junction with Old River. The ferry carries passengers and vehicles, and operates 24 hours. White warning signs with red letters mark the crossing. A revolving red light is shown from the ferry when underway. When the ferry is underway, the cables are at or near the surface. In high winds the cables may rise to about 4½ feet above the water surface. When docked, the cables are dropped to the bottom, except in high winds when the cables may rise to or above the water surface. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

(623) The mean range of **tide** at the Bacon Island Road swing bridge on Middle River is 2.6 feet, and the diurnal range is 3.5 feet.

(624) Gasoline and fishing supplies may be obtained at the town of **Middle River,** about 8.5 miles above the mouth.

(625) **Little Connection Slough** enters the San Joaquin River about 1 mile above the mouth of Middle River.

Cable ferry

(626) Venice Island Ferry crosses Little Connection Slough about 1 mile above the entrance. The ferry carries passengers and vehicles and operates from 0800 to 1700 daily. White warning signs, with black letters and orange borders, are posted about 500 feet on either side of the ferry crossing. Flashing red beacons are shown by the ferry when underway. When the ferry is underway, the cables are 6 to 7 feet above the water surface; when docked, the cables are dropped to the bottom. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

(627) **Turner Cut** enters the San Joaquin River about 7.5 miles below Stockton.

Cable ferry

(628) McDonald Island Ferry crosses Turner Cut about 1.8 miles above the entrance. The ferry carries passengers and vehicles, and operates only in emergencies. White warning signs, with black letters and orange borders, are posted about 500 feet on either side of the ferry crossing. Flashing red beacons are shown by the ferry when underway. When the ferry is underway, the cables are 6 to 7 feet above the water surface; when docked, the cables are on or within 1 or 2 feet of the bottom. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

(629) Turner Cut is crossed about 2 miles above the entrance by a highway bridge with a 30-foot retractable span. The bridge is normally maintained in the open position except when it is being crossed by a vehicle. If it is necessary to maintain the bridge in a closed position for an extended period, a bridgetender monitors VHF-FM channel 16, and works on channel 9; call sign; WHV-959, Zuckerman Brothers Bridge, and can also be contacted by telephone (202-464-1253). The vertical clearance through the closed span is 19 feet.

(630) **Sacramento River** rises in the Trinity Mountains in N central California, flows S for 325 miles, and enters Suisun Bay on the N side of **Sherman Island.** Deep-draft vessels follow the lower Sacramento River to Cache Slough, 1.5 miles above Rio Vista Bridge, thence through a deepwater ship channel to Sacramento, a distance of 37 miles above the mouth of the river. Barges and other small craft also use Sacramento River all the way to Sacramento, a distance of 50 miles. Above Sacramento, small craft go to Colusa, 125 miles above the mouth, but there is no regular navigation above this point.

Cable ferry

(631) A cable ferry crosses **Cache Slough** about 5.6 miles above Rio Vista Bridge. The ferry carries passengers and vehicles, and operates from 0800 to 1630 daily except Saturdays, Sundays, and holidays. When the ferry is underway, the cable is suspended below the water surface at varying depths. When the ferry is docked, the cable is about 14 feet below the water surface at the centerline of the slough decreasing to lesser depths at the banks. A sign on each side of the ferry warns of the cable; a flashing red beacon is shown when underway. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

(632) **Steamboat Slough** enters Cache Slough about 1.8 miles above Rio Vista bridge. The slough is crossed by a highway bascule bridge near its northern confluence with the Sacramento River 1.5 miles S of Courtland. The bridge provides 21 feet of clearance in the closed position and unlimited clearance when open. The bridgetender monitors VHF–FM channel 16 and works channel 9; call sign: WHX–295, Steamboat Slough Bridge. (See **117.1 through 117.59 and 117.199**, chapter 2, for drawbridge regulations).

Cable ferry

(633) Steamboat Slough Ferry crosses Steamboat Slough about 5 miles above the junction with Cache Slough. The ferry carries passengers and vehicles, and operates 24 hours daily. When the ferry is underway, the cable is suspended below the water surface at varying depths. When the ferry is docked, the cable is about 11 feet below the surface at the centerline of the slough decreasing to lesser depths toward the banks. Warning signs are posted at the crossing. When underway, the ferry shows flashing red lights. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

Channels

(634) **Sacramento River Deep Water Ship Channel** extends from Suisun Bay through lower Sacramento River, Cache Slough, and a 22–mile land cut to a triangular harbor and turning basin at the Port of Sacramento. The **William G. Stone Lock** is on the barge canal connecting the Deep Water Ship Channel with the Sacramento River at Sacramento. In November 1987, the lock was closed to all navigation. Project dimensions follow: ship channel, 30 feet deep, 200 to 300 feet wide; barge canal, 13 feet deep, 120 feet wide; navigation lock, usable length of 600 feet, 86 feet wide, 13

feet deep. (See **207.640,** chapter 2, for navigation regulations for the navigation lock and for the deepwater ship canal.)

(635) The project depth in the ship channel is generally maintained. (See Notice to Mariners and latest editions of charts for controlling depths.) In June 1978, shoaling was reported in the vicinity of Sacramento Bend between the lock and the Sacramento River. The best water, marked by buoys, was reported to be along the south shore. Extreme caution is advised when entering or leaving the lock. The controlling depth in the river route is about 10 feet. Above Sacramento, the controlling depth is about 6 feet to Colusa. The sounding datum is **mean lower low water at low-river stage.**

(636) Numerous uncharted piles, snags, pumps, and pipes, some submerged, may exist along the edges of the river. Mariners are advised to exercise extreme caution while navigating close to the banks of the river.

Bridges

(637) State Route 12 vertical lift highway bridge across the Sacramento River Deep Water Ship Channel just above Rio Vista has a clearance of 18 feet down and 144 feet up at high water. The bridgetender monitors VHF-FM channel 16, and works channels 9 and 13; call sign KMJ-384, Rio Vista Bridge. (See **117.1 through 117.59 and 117.189**, chapter 2, for drawbridge regulations.) The highway-railroad bascule bridge across the barge canal just W of the lock at Sacramento has a clearance of 17 feet. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) The bascule bridge operates in conjunction with the William G. Stone Lock. In November 1987, the lock was closed to all navigation.

(638) The Daniel C. Palamidess/Industrial Boulevard Fixed Bridge, with a clearance of 32 feet, crosses the waterway 0.5 mile W of the lock.

(639) The minimum clearance of the power cables across the lower Sacramento River Deep Water Ship Channel is 125 feet at high water.

(640) Clearances of bridges across the shallow route of the Sacramento River above State Route 12 vertical lift bridge are given with the description of the river. (See **117.1 through 117.59 and 117.189**, chapter 2, for drawbridge regulations.) The bridge clearances above Rio Vista are at low water, which is **mean lower low water during low-river stage;** power cable clearances are at high water.

(641) The minimum clearance of the power cables over the Sacramento River below Sacramento is 110 feet.

(642) (See **117.1 through 117.59, 117.141, 117.165, 117.173, 117.195, 117.199, and 117.201**, chapter 2, for drawbridge regulations for bridges over the tributaries to Sacramento River.)

Tides and currents

(643) At low-river stages the mean range of tide is 2.8 feet at the entrance to Sacramento River and 2.3 feet in the river at Sacramento; at other stages the tide is negligible.

(644) Currents in Sacramento River depend on the river stage. During high-river stages, there is little or no flood current and the ebb current is strong to Sacramento. During the dry season a flood current can be carried to Paintersville and from there slack water to Freeport, 30 and 41 miles above the mouth, respectively. At times of extreme low-river stages, flood current may be evident as far as Sacramento. Local knowledge is required to estimate current conditions for a particular time.

(645) Major floods in the Sacramento River valley usually occur from November to April and are generally caused by intense general storms of several days' duration, the runoff from which may be augmented by the melting of snow in the mountains. At the mouth of the river an ordinary flood will cause a rise of 8 feet and an extreme flood a rise of 10 feet in the river level. At Sacramento, ordinary flood will cause a rise in the river level of 20 feet and extreme flood, a rise of 30 feet.

(646) Reports of gage heights of the Sacramento River can be obtained from the Sacramento National Weather Service Office at any time of the year. The information is published in the **Sacramento Bee** and, in addition, is reported on the radio broadcast from station KFBK whenever the gage heights are of sufficient magnitude to be of general interest. Information on gage heights can also be obtained from the State Department of Water Resources, 1416 9th Street, Sacramento, CA 95814 or by recorded message at (916) 653-6416.

(647) The upper 20 miles of Sacramento River Deep Water Ship Channel are free of river current and flood waters. However, the area is still affected by tidal currents.

Weather, Sacramento Valley

(648) The climate of the lower Sacramento Valley is mild, with plenty of sunshine year round. Cloudless skies prevail during the spring, summer, and fall. Winter is the rainy season, with measurable amounts falling on about 10 days per month. Snow is rare, since freezing temperatures are rare. The valley is protected from most severe winter storms by the mountains to the W, N, and E. Sometimes, torrential rains on the slopes can cause flooding along the Sacramento River. The average annual precipitation for the Sacramento Airport is about 17.5 inches (445 mm) with about 90% of this amount falling from November through April.

(649) The mountains are responsible for the predominantly S winds throughout the valley. These are

oceanic winds that have moved through the Carquinez Strait and been turned N by the Sierra ranges. At the port of Sacramento, SE through SW winds prevail, particularly during spring and summer. NW through N winds are also frequent, and bring warm, dry air down the mountains. These winds cause brief heat waves, with temperatures rising to over 100°F (37.8°C) in summer, and they modify cool weather in winter. Strongest winds occur in winter although gales occur less than 1 percent of the time, even in midwinter. Winds of 17 to 28 knots occur 6 to 10 percent of the time from December through March, and less than 5 percent of the time during July, August, and September. Extreme winds have reached 60 knots, with gusts of more than 70 knots; these are most likely during fall or winter.

(650) Dense fog is common in winter, infrequent during spring and fall, and rare in summer. It is a radiation type fog that occurs during the late night and early morning hours. It usually clears by noon. Occasionally stagnant weather conditions will cause the fog to hang on for a few days. Visibilities at Sacramento drop below 0.5 mile (0.9 km) on about 5 to 10 nights per month, from November through February. During this same period, they fall below 7 miles (13 km) on about 10 to 20 occasions per month. During the summer, visibilities are almost always better than 7 miles (13 km). Twenty-two out of 31 days during each month, December and January, can expect fog. This number drops to less than one day for both June and July.

Routes

(651) The deep-draft channel to the Port of Sacramento through Sacramento River Deep Water Ship Channel is marked with navigational aids.

(652) The shallow-draft route continues in Sacramento River from 1.5 miles above State Route 12 vertical lift highway bridge to Sacramento, and for the most part is marked by leading lights.

(653) From Ida Island for a distance of 3.5 miles upstream there are shifting shoals. After passing Ida Island work gradually over to the W half of the channel and favor that side around the next bend. From this point to Clarksburg the channel is clear, and midchannel courses may be followed favoring the falling tide bends. At Clarksburg favor the E shore a little until just past the town, then swing into midchannel again. From just below Freeport the channel is rather shoal and wing dams have been built at several places to scour out the channel. These are covered at high-water stages and may be struck if the shore is approached too closely. By favoring the ebbtide bends no trouble should be encountered from here to Sacramento.

(654) **Note.**–Care should be exercised at all times to keep clear of the levees, as most of them are faced with rock which may damage vessels that drag along them.

Pilotage, Sacramento River

(655) River pilots, commissioned by the Port of Sacramento, are arranged for by the ship's agents, but may be obtained through the office of the port of Sacramento or the San Francisco Bar Pilots

Towage

(656) Tugs up to 1,500 hp are available.

Chart 18661

(657) **Rio Vista**, 10.5 miles above the mouth of the Sacramento River, is the most important town, commercially, below Sacramento. A dredging company is at Rio Vista. An Army storage area and **Rio Vista Coast Guard Station** are just S of the town. A small-craft harbor on the S side of the town has gasoline, water, and berths available. A lift here can handle craft up to 40 feet for hull and engine repairs.

(658) **Ida Island,** on the S bank 13.5 miles above the mouth of the river, is the site of a resort and small-boat basin. Gasoline, water, and moorage are available. A marine railway can handle craft up to 45 feet.

(659) **Isleton,** on the S bank 15 miles above the mouth of the river, has an inactive landing formerly used for oil barge traffic. Gasoline and some supplies are available in town.

(660) In September 1988, a dangerous wreck was reported just NW of the landing in about 38°09'47.5"N., 121°36'41.0"W. A highway bridge with a double-bascule span across the river 0.7 mile above Isleton has a clearance of 18 feet. (See **117.1 through 117.59 and 117.189**, chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 16 and works on channel 9; call sign: KMJ–383, Isleton Bridge.

Chart 18662

(661) **Walnut Grove**, 24 miles above the mouth of Sacramento River, is at the junction with Georgiana Slough. Gasoline, and marine supplies may be obtained in moderate quantities. The river is crossed here by a highway bridge with a double-bascule span having a clearance of 24 feet. (See **117.1 through 117.59 and 117.189**, chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 16 and works on channel 9; call sign: KMJ–491, Walnut Grove Bridge. A marina is on **Snodgrass Slough** just SE of Walnut Grove. Gasoline, water, and berths are

available. The slough connects with North Mokelumne River.

(662) A wharf and a large wooden shed are on the E side of the river 1.2 miles above Walnut Grove; gasoline and some repair work is available. A **measured nautical mile** along the NE side of the river begins 1.2 miles above Walnut Grove. A resort is at the junction of Steamboat Slough with the river. Gasoline and water are available. Five miles above Walnut Grove at the small village of **Paintersville,** a highway bridge with a double-bascule span across the river has a clearance of 24 feet. (See **117.1 through 117.59 and 117.189**, chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 16 and works on channel 9; call sign: KMJ–381, Paintersville Bridge.

(663) **Courtland,** 31 miles above the mouth of the river, has supplies in moderate quantities; gasoline, oil, water, and ice are available.

(664) At **Clarksburg,** 37.5 miles above the mouth of the river, there are two abandoned oil company landings.

(665) **Freeport,** 41.5 miles above the mouth of the river, has gasoline. The highway bascule bridge at Freeport has a clearance of 30 feet. (See **117.1 through 117.59 and 117.189**, chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 16 and works on channel 9; call sign: KMJ–490, Freeport Bridge.

(666) Three bridges cross at Sacramento. A fixed highway bridge 0.6 mile above the junction with the barge canal has a vertical clearance of 84 feet. The Tower Bridge at Capitol Avenue, 1.3 miles above the junction, is a railway and highway vertical-lift bridge with a clearance of 30 feet down and 96 feet up. The decorative lighting on the bridge will be extinguished upon request of the mariner. The bridgetender monitors VHF-FM channel 16 and works on channel 9; call sign: KDO–739, Tower Bridge. The I (Eye) Street Bridge 0.5 mile N of the Tower Bridge is a railway and highway swing bridge with a clearance of 30 feet. The bridgetender monitors VHF–FM channel 16 and works on channel 9; call sign: WHW–554, I (Eye) Street Bridge. The nearby overhead power cable has a clearance of 74 feet over the W draw and 80 feet over the E draw at high water. (See **117.1 through 117.59 and 117.189**, chapter 2, for drawbridge regulations.)

(667) A paved highway between Antioch and Sacramento runs along the levee of the river for nearly its entire distance.

(668) **Sacramento** the State capital, is the head of navigation for most of the shipping on the river, and is a distribution and transportation center for N California and parts of Nevada and Oregon. The **Port of Sacramento,** at the head of the deepwater channel, is an important point for interchange of cargo between rail, highway, and water transportation.

Weather, Sacramento

(669) The lower Sacramento Valley, where Sacramento is located, enjoys a mild climate and abundance of sunshine throughout the year. Cloudless skies prevail during the summer and largely in the spring and autumn. The summers are remarkably dry, with warm days and pleasant nights. In the winter "rainy season" (December, January, and February) over one-half of the total annual precipitation falls, yet rain in measurable amounts occurs only on about 10 days monthly during winter. Snow is rare since freezing temperatures are rare, with trace amounts falling several times and measurable snowfall having fallen on only one occasion, two inches (51 mm) in February 1976. Mountains surround the valley to the W, N, and E. The Sierra Nevada snow fields are only 70 miles E of Sacramento and usually provide a plentiful supply of water in the valley streams during the dry season. Because of the shielding influence of the high mountains around the valley, winter storms reach valley districts in modified form. However, torrential rain and heavy snow frequently fall on the western Sierra slopes, the southern Cascades, and to a lesser extent the Coastal Range. As a result, flood conditions occasionally occur along the Sacramento River and its tributaries. Excessive rainfall and damaging windstorms are rare in the valley. The average annual precipitation for the Sacramento Airport is about 17.5 inches (445 mm) with about 90% of this amount falling from November through April.

(670) Prevailing winds at Sacramento are S all year, due to the N-S direction of the valley and the deflecting effect of the towering Sierra Ranges on the prevailing oceanic winds that move through the Carquinez Strait at the junction of the Sacramento and San Joaquin Rivers. No other tidewater gap exists in the coastal mountains to admit marine air into the Sacramento or the San Joaquin Valley. Occasionally a steep northerly barometric pressure gradient develops and air is forced over the Siskiyou Mountains to the N, warmed dynamically with descent, and reaches the valley floor as a warm, dry, N wind. These occasionally disagreeable winds, known as "northers" in the valley, are the counterpart of the well-known "chinook" winds of the Rocky Mountains, and they, or modifications of them, produce the pronounced heat waves in summer. Fortunately, they are of infrequent occurrence and produce an unstable atmospheric condition that is usually followed within 2 or 3 days by the normally cool S breezes, especially at night. Summer nights in the lower Sacramento Valley are, with few exceptions, cool and invigorating, the result of a prevailing oceanic influence.

While it is true that "northers" cause dry, hot weather for brief periods during the summer, it is equally true they are the modifications of cold waves in the winter. Winter northers, with only a few exceptions, are comparatively warm, drying winds. The average annual temperature for Sacramento is 61°F (16.1°C) with an average maximum of 74°F (23.3°C) and an average minimum of 48°F (8.9°C). The all-time maximum occurred in June 1961 when the mercury climbed to 115°F (46.1°C). The all-time minimum of 18°F (-7.8°C) was recorded in December 1990. Each month, May through October, has seen temperatures in excess of 100°F (37.8°C) while every month, November through April, has recorded temperatures at or below freezing (0°C).

(671) The average annual thunderstorm occurrence is three. They are usually mild and are most likely in February and March. However, they have been documented in each of the twelve months. Snow falls so rarely, and in such small amounts, that its occurrence may be disregarded as a climatic feature. Heavy fog occurs mostly in midwinter, rarely in summer, and seldom in spring or autumn. Light and moderate fog are more frequent and may come anytime during the wet, cold season. The fog is usually the radiational cooling type, and confined to the early morning hours. An occasional winter fog, under stagnant atmospheric conditions, may continue for several days.

(672) (See page T–4 for **Sacramento climatological table.**)

Pilotage, Sacramento

(673) See Pilotage, Sacremento River, indexed as such, earlier in this chapter.

Towage

(674) Tugs up to 1,500 hp are available.

Quarantine, customs, immigration, and agricultural quarantine

(675) (See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(676) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard

(677) **Sacramento Coast Guard Air Station** is NE of Sacramento at McClellan Air Force Base.

Harbor regulations

(678) Copies of the harbor regulations are available from the Port of Sacramento whose office is at 2650 Industrial Blvd., West Sacramento, CA 95691.

(679) The port radio station KPB–386 VHF-FM channel 18 is monitored 24 hours a day.

Wharves

(680) The deepwater facilities of the Port of Sacramento consist of three wharves and three piers, each of which has a berthing length of at least 600 feet with a deck height of 19 feet and reported depths alongside of 30 feet or more. All berths are served by railroad and highway connections, and all berths have water and electrical shore power connections. General cargo at the port is usually handled by ship's tackle; special handling equipment, if available, is mentioned in the description of the particular facility. All of these facilities are owned and most are operated by the Sacramento-Yolo Port District. Several small wharves and piers along the shallower Sacramento River, privately owned or owned by the city of Sacramento, are operated by oil companies, a rice growers association, a tug company, and a cement company. These facilities are used for shipping various commodities by barge, for fueling small craft, and for mooring small vessels and floating equipment. For a complete description of the port facilities refer to Port Series No. 32, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

(681) The port wharves and piers along the NE side of the turning basin are described from W to E.

(682) Wharf 8 (shipment of wood chips and dry bulk) (38°33'57"N., 121°33'00"W.): 227,000 tons covered storage and 27.3 acres open storage; conveyors with loading rate of 600 tons per hour extend from wharf to storage and from storage to rail and truck loading points. (Wharf line is contiguous with Wharves 6 and 7.)

(683) Wharf 7: general cargo; one transit shed with a total cargo floor area of over 57,700 square feet; two portable, 36-inch conveyors with receiving hoppers serving 36 and 48 inch belt conveyors with a rate of 300 tons per hour. (See description of Wharf 8.)

(684) Wharf 6: general cargo and miscellaneous dry bulk commodities; 9.2 total acres of paved open storage; Stevedore equipment is available as required. (See description of Wharf 8.)

(685) Wharf 5 (shipment of grain, feed pellets, and dry bulk materials): grain elevator of 1,227,000 bushel (wheat) capacity connected by conveyor to ship loader on wharf, loading rate 20,000 bushels per hour.

(686) Wharf 2: general cargo; two concrete frame transit sheds with 57,700 square feet of floor space each.

(687) Wharf 1: bulk rice received by barge and shipped by vessel; conveyor extends from wharf to 21,500-ton storage facility. Boulevard in rear, consisting of 20 storage silos and 5 warehouses, has capacity for 87,000 tons of rice (bulk) and 24,000 tons (bagged).

Supplies

(688) Provisions are available in any quantity. Some marine supplies may be obtained. Fuel oil may be obtained by tank truck or barge. Ships do not normally take on fuel or provisions in Sacramento.

Repairs

(689) There are no repair facilities for large oceangoing vessels in Sacramento; the nearest shipyards with large drydocks are at Richmond, Oakland, Alameda, and San Francisco.

Small-craft facilities

(690) There are several small-craft facilities along the Sacramento River at Sacramento. (See the small-craft facilities tabulation on chart 18662 for services and supplies available.)

Communications

(691) Sacramento is served by four railroads, several highways, and two airports.

Chart 18664, 18667

(692) Above Sacramento the prevailing flood conditions are as follows: At Verona at the junction of Feather River, 70 miles above the mouth, 20 feet at ordinary floods and 24 feet at extreme floods; at Colusa, 125 miles above the mouth, 25 feet at ordinary floods and 32 feet at extreme floods.

(693) Between Sacramento and Colusa are numerous warehouses and small landings.

(694) The minimum clearance of the swing and bascule span bridges over the Sacramento River between Sacramento and Colusa is 29 feet at low water, and of the fixed bridges 55 feet at high water and 82 feet at low water. (See **117.1 through 117.59 and 117.189**, chapter 2, for drawbridge regulations.) The minimum clearance of the overhead power cables across the river is 60 feet.

(695) **Feather River** rises in the Sierra Nevada and empties into Sacramento River at **Verona,** 18 miles above Sacramento. The river has been improved by snagging and the construction of wing dams at **Marysville,** 26 miles above the mouth. The controlling depth is usually 3 feet from about February 15 to June 15. Ordinary flood fluctuation is 20 feet, and extreme flood fluctuation is about 25 feet. With the exception of several small privately owned landings, all loading is handled on the banks. There has been no commercial navigation on the Feather River in recent years.

Chart 18665

(696) **Lake Tahoe** (39°06'N., 120°00'W.), California-Nevada, is a recreation area almost surrounded by Tahoe, Toiyabe, and Eldorado National Forests. **Restricted areas** established by Federal regulations are given in **162.210 and 162.215,** chapter 2. Lake Tahoe is to be navigated by leaving all red buoys to starboard when transiting in a counterclockwise direction. Safe water will always be found toward the center of the lake from red federal buoys. Information about facilities may be obtained from one of the local offices of the Forest Service, U.S. Department of Agriculture.

Coast Guard

(697) **Lake Tahoe Coast Guard Station** is on the W shore of the lake about 1.2 miles NE of Tahoe City.