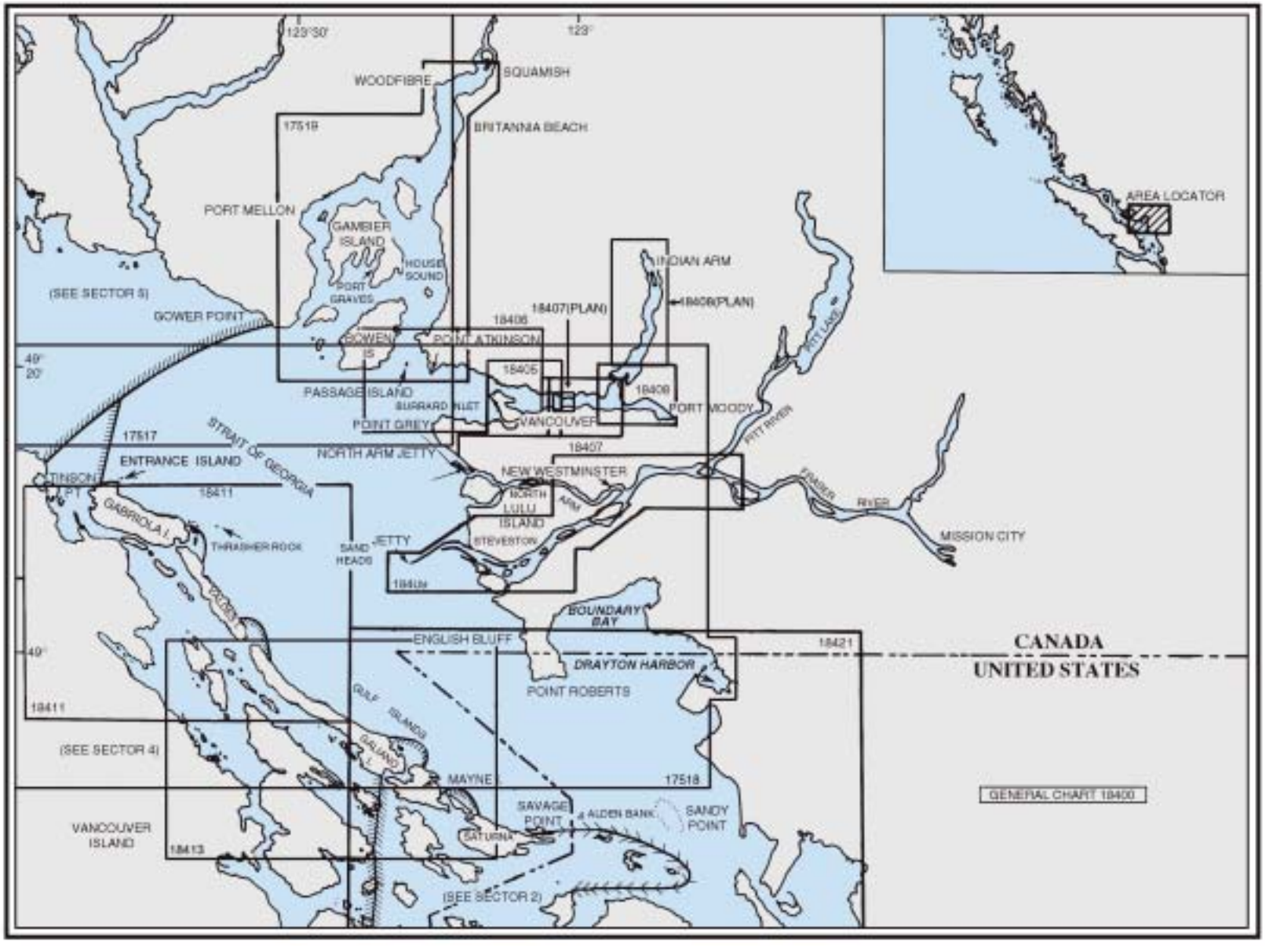
Click on "See Sector" to be hotlinked to that Sector.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **3** — CHART INFORMATION

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SECTOR 3

THE STRAIT OF GEORGIA—SOUTH PART

Plan.—This sector describes the N and S sides of the S part of the Strait of Georgia. On the N side it covers the area from Sandy Point to Gower Point, including the Fraser River and Vancouver Harbor. On the S side it covers the area from Boundary Pass to Fairway Channel, including the outer Gulf Islands.

General Remarks

3.1 The Strait of Georgia extends about 115 miles NW, from the junction of Rosario Strait and Haro Strait, to its NW end near Cape Mudge. The mainland of Canada, on the E side of the strait, is deeply indented by sounds, rivers, and inlets, wherein are contained the principal ports of this region. There are other harbors on Vancouver Island, which forms the W side of the strait.

Several of the Gulf Islands lie in the S part of the Strait of Georgia, off the SE end of Vancouver Island. Other islands lying in the central part and N end of the strait have navigable passages leading between them which are parallel to the strait.

Tides—Currents.—The mean diurnal range in the Strait of Georgia is about 2.9m in the S part and about 3.2m in the N part. A maximum range of about 4.9m may occur at times. The difference in heights of the daily HW is small, but the difference in heights of the successive daily LW is considerable.

The tidal currents at the S end of the Strait of Georgia are not nearly so strong as those in the channels leading to it from the Strait of Juan de Fuca. The currents in this part of the strait reach a velocity of 3 knots at times, particularly during the freshets of summer, when the Fraser River discharges a large volume of water. This fresh river water, which has a peculiar milky color, flows across Roberts Bank and Sturgeon Bank, at the river mouth, and almost directly towards Active Pass. Frequently the fresh water extends entirely across the strait, at times reaching into the inner channels and along the shore of Vancouver Island. At other times, it reaches only to the middle of the strait and forms a striking contrast with the dark blue water of the Strait of Georgia.

In the mid-channel of the Strait of Georgia, to the N of Patos Island and Saturna Island, the velocity of the current varies between 1 knot and 3 knots, but is seldom higher. The velocity is less to the NW of the mouth of the Fraser River, where the width of the strait is about 15 miles. To the SE of the mouth of the Fraser River, the tidal currents are slightly stronger off the S shore of the strait than off the N shore.

The tidal currents are stronger close to the S shore of the Strait of Georgia because of the rapid currents running out of Active Pass, Porlier Pass, and Gabriola Pass.

The S tidal current in the strait sets strongly SW in Active Pass.

The prevailing summer wind in the Strait of Georgia, as on the outer coast, is from NW. Between May and September, the summer wind is strong and steady, beginning about 0900 and dying towards sunset. Usually, these winds do not extend much below Point Roberts, and in the San Juan Archipelago they become variable and baffling. Vessels with a fair wind in the main channels of Rosario Strait and Haro Strait almost always find the wind ahead on entering the Strait of Georgia.

In winter, there is a good deal of quiet weather in the Strait of Georgia, but gales from between SE and SW are also rather common. In the cooler months, strong NW winds often follow the passage of an intense cold front. These winds may achieve gale force, particularly in the S part of the strait. Often they are intensified by offshore winds blowing down the inlets of the mainland.

At Point Atkinson, HW rises 4.4m at average tides and 5m on larger tides.

Tide rips frequently occur off Point Atkinson and are caused by the meeting of the tidal currents from Vancouver Harbor and Howe Sound.

The velocities of the tidal currents in the vicinity of Alden Bank are appreciably less than those to the S in the narrower parts of Rosario Strait.

Tidal currents are scarcely felt within a line joining Sandy Point and Point Roberts. Vessels can take advantage of this, especially since good anchorage can be obtained in the vicinity.

Depths—Limitations.—General depths in the Strait of Georgia are ample for ocean-going vessels. The least depth on the track, between Boundary Pass and a position 3 miles NE of Thrasher Rock, is 110m. The fairway is free of dangers between Boundary Pass and Active Pass.

Regulations.—The waters described in this sector lie within the Vancouver Vessel Traffic Services (VTS) System. For further information on reporting requirements, see paragraph 1.1.

A Traffic Separation Scheme (TSS) is situated in the Strait of Georgia. It commences to the E of the entrance to Boundary Pass and extends SE into Rosario Strait. This scheme lies within U.S. waters and is part of the mandatory Puget Sound Vessel Traffic Service. For further details, see U.S. Coast Pilot 7, Pacific Coast.

Another Traffic Separation Scheme (TSS) lies in the Strait of Georgia. It commences to the NW of the entrance to Boundary Pass and extends N along the E side of the strait into Burrard Inlet and the approaches to Vancouver. This scheme, which may best be seen on the chart, has four precautionary areas situated at points where merging or crossing traffic is encountered.

Caution.—Vessels are advised to stay at least 2 miles from the coast due to numerous fringing rocky shoals and islets.

Vessels are advised to stay at least 2 miles from Sturgeon Bank, between the Fraser River and Point Grey, as possible damage to fishing vessels and their nets could be incurred.

In the area to the W of Sand Heads, vessels should use care as ships may be encountered maneuvering to embark or disembark pilots or to enter or leave the Fraser River.

During the summer months, large concentrations of fishing craft may be encountered in the Strait of Georgia.

Sandy Point to Point Roberts

3.2 **Sandy Point** (48°47'N., 122°42'W.), forming the N entrance point of the drying Lummi Bay, is located on the U.S. mainland, 10.5 miles E of Alden Point. Three piers, serving an oil refinery and an aluminum smelter, extend from the shore about 2.5, 3.5, and 5.5 miles N of the point. The refinery buildings and a tower, standing 0.8 mile inland, are conspicuous. The piers are fully described in U.S. Coast Pilot 7, Pacific Coast.

Point Whitehorn (48°54'N., 122°48'W.) is a high, bold bluff. It is faced on the seaward side by a conspicuous steep cliff of white clay.

Anchorage, sheltered from N and SE storms, can be taken, in depths of 7 to 9m, good holding ground, within Birch Bay, which is entered between Point Whitehorn and **Birch Point** (48°57'N., 122°49'W.).

A general anchorage area, the limits of which are shown on the chart, lies 3 miles NW of Sandy Point and has depths of 38 to 57m.

Alden Bank (48°49'N., 122°50'W.), with a least depth of 5.4m, lies 5 miles W of Sandy Point. Lighted buoys mark the NW and SE ends of this off-lying bank and a buoy is moored at the E side.

Semiahmoo Bay (49°00'N., 122°49'W.) is entered between Birch Point and **Kwomais Point** (49°02'N., 122°52'W.). Range lights, shown from towers standing 1 mile apart at the E side of the bay, mark the International Boundary between the United States and Canada. The Peace Monument, a very conspicuous white masonry arch, is situated close to the easternmost tower.

White Rock (49°01'N., 122°48'W.), a resort, lies on the N side of Semiahmoo Bay, 2.5 miles E of Kwomais Point. It has a public wharf, protected by a breakwater, that is used by pleasure craft. A light is shown from a structure standing close W of the breakwater.

3.3 **Semiahmoo** (48°59'N., 122°46'W.) (World Port Index No. 18060), a town standing at the N end of Semiahmoo Spit, is the site of a cannery. A wharf, with a depth of 9.1m alongside, fronts the town. This wharf may be approached from Semiahmoo Bay through a channel leading N of the spit. Drying sandbanks, marked by a light and buoys, extend from the W side of the spit. This channel, with a controlling depth of 6.4m, leads to Drayton Harbor and Blaine Harbor.

Anchorage, sheltered from S and SE storms, can be taken, in depths of 6.5 to 16.5m, off the NW side of Semiahmoo Spit.

Drayton Harbor, a cove extending S and SE from Semiahmoo Spit, contains a large area of drying sand flats, encircling a central area where there are depths of 6.4 to 9.1m, subject to change. Anchorage is possible, but not recommended, because of floating debris and vegetation.

Blaine (49°00'N., 122°45'W.) (World Port Index No. 18070), a fishing center lying on the N side of Drayton Harbor, is approached through the channel leading close N of Semiahmoo Spit.

For detailed information on Blaine Harbor and Drayton Harbor, see U.S. Coast Pilot 7, Pacific Coast.

Boundary Bay (49°03'N., 122°55'W.) indents the mainland between Kwomais Point and the E side of the promontory forming Point Roberts. Most of this bay is composed of drying mud flats. The International Boundary, marked by range lights situated on Point Roberts, extends E across this bay.

Anchorage, sheltered from W and NW winds, can be taken, in a depth of 9m, good holding ground, about 1 mile ENE of the SE extremity of Point Roberts.

Point Roberts to Point Grey

3.4 **Point Roberts** (48°58'N., 123°05'W.) is the outermost part of a prominent, wooded promontory. A light is shown from a structure standing at the SW extremity. The S part of this promontory appears as an island when approaching from the S.

A large marina is situated at Point Roberts, about 1 mile ENE of the light structure. The marina basin is entered between two piers and the entrance is protected by a detached rock breakwater.

The promontory extends S from the delta of the Fraser River, declining in height to its low S extremities. The E face of Point Roberts is composed of conspicuous high, white cliffs. The W face is formed by bluffs, which extend N for 3.3 miles to **English Bluffs** (49°02'N., 123°06'W.).

The shore to the N of these bluffs merges with the swampy delta of the Fraser River and is barely discernible from the Strait of Georgia.

Boundary Bluff, located 2 miles N of Point Roberts, is surmounted by a monument. Range lights and beacons, marking the International Boundary, also stand on this bluff.

Foul ground extends SE from the SE extremity of Point Roberts; the outer edge is marked by a lighted buoy.

Tsawwassen Ferry Landing (49°00'N., 123°08'W.) is located at the outer end of a long causeway extending SW from English Bluff. The approach to this landing is indicated by a lighted range, bearing 017°. A breakwater, situated close S of the landing, forms a basin that is used exclusively by the ferries. There is a regular passenger and automobile ferry service to Sidney and Gulf Island ports.

Roberts Bank (49°03'N., 123°13'W.) is a large steep-to, partly-drying bank that is formed by the alluvial deposits of the Fraser River. It fronts the shore between Point Roberts and Sand Heads Light, about 12 miles NW. Vessels should remain in depths of over 90m when passing the outer edge of this bank. The bank can be avoided by keeping the S extremity of Point Roberts bearing less than 114°.

Caution.—Submarine cable areas, the limits of which are shown on the area chart, lie in the Strait of Georgia to the S of Roberts Bank.

Several submarine cables, which may best be seen on the chart, extend across the Strait of Georgia from Point Roberts to a point located close E of Active Pass.

3.5 **Westshore Terminals** (49°01'N., 123°10'W.), an offshore coal-loading facility, is situated W of Tsawwassen Ferry Landing. It is connected by railroad over a causeway to the mainland. There is a reclaimed area that is used principally for the bulk storage of coal. The terminal is under the jurisdiction of the Port of Vancouver.

Deltaport Terminal

Depths—Limitations.—Berth No. 1, located at the outer end of an L-shaped pier, is 335m long, with an alongside depth of 21.9m. Mooring buoys are situated off the E and W ends of the pier. Vessels up to 329.2m long, with a maximum beam of 53.2m, can be accommodated.

Berth No. 2, on the SE side of the terminal, is 305m long, with an alongside depth of 19.5m.

The channel leading to Berth No. 2 and Deltaport, described below, is dredged to 20.4m. The turning basin, lying S of the channel, is dredged to 12.2m, but has a least depth of 11.6m. The entrance to the dredged channel is marked by lighted buoys.

At the NE side of the terminal, lighted range beacons, bearing 032˚, indicate the channel leading between the entrance buoys and the deeper NW dredged area.

Deltaport, a container terminal under the jurisdiction of Vancouver, has two berths. It provides a total of 670m of berthage and has a depth of 15.8m alongside.

Anchorage is available in an area, designated R, about 1.3 miles W of the head of Berth No. 1, in a depth of about 40m. Due to weather conditions and the depth, the pilot must remain on board the vessel when using this anchorage.

Caution.—During smaller flood and ebb tides, the velocity and direction of the tidal currents off the berths and approaches may be different from those indicated on the chart.

3.6 Westham Island (49˚05'N., 123˚09'W.) is the southernmost and largest of a group of islands forming the delta of the Fraser River. A mud slough separates this island from Reifel Island.

Pelly Point (49˚07'N., 123˚11'W.) forms the NW extremity of Westham Island.

Canoe Passage (49˚05'N., 123˚08'W.), leading SE of Westham Island, is the southernmost outlet of the Fraser River. This passage joins a small boat channel leading to the Strait of Georgia. The boat channel is used by local fishermen and local knowledge is required. A survey platform stands on piles near the outer end of the passage.

A lighted buoy, equipped with a racon, is moored at the entrance to Canoe Passage, about 4 miles WNW of Westshore Terminals, and marks the edge of Roberts Bank.

Roberts Bank Light is shown from a structure, 11m high, standing about 7 miles NW of Westshore Terminals, close S of the main entrance to the Fraser River. A racon is situated at the light.

A lighted buoy, equipped with a racon, is moored about 3 miles WSW of Roberts Bank Light and marks the junction between the Traffic Separation Schemes (TSS) leading to Burrard Inlet.

3.7 Garry Point (49˚08'N., 123˚12'W.) is the SW extremity of Lulu Island. This island forms the N side of the Fraser River at its principal entrance. The town of Steveston is situated close E of Garry Point.

Sand Heads, located 8 miles NW of Westshore Terminals, forms the N entrance point of the main channel of the Fraser River. A light is shown from a structure standing at the outer end of a jetty projecting from the N side of the river.

Sea Island (49˚12'N., 123˚12'W.), with Iona Island lying close N of it, is located close to the NW side of Lulu Island. It is separated from the latter by Middle Arm, a very shoal outlet of the Fraser River. North Arm, the secondary entrance of the river, separates Sea Island and Lulu Island from the mainland.

Vancouver International Airport is situated on Sea Island and a conspicuous ball-shaped radar dome and a prominent control tower stands in its vicinity.

Sturgeon Bank (49˚10'N., 123˚15'W.), a continuation of Roberts Bank, extends N between Sand Heads and Point Grey. This bank dries in patches and is steep-to. A lighted buoy, moored about 4.5 miles N of Sand Heads, marks the edge of the bank.

The Fraser River

3.8 The Fraser River, second only in commercial importance to the Columbia River in the Pacific NW, trends S and

E for 400 to 500 miles from its source in the Rocky Mountains. At Hope, a town situated 80 miles E of the river mouth (49°06'N., 123°19'W.), the river turns W and flows to the Strait of Georgia through rich alluvial plains.

Tides—Currents.—The river is at its lowest level during January, February, and March. With the melting snows, it begins to rise and in April is about 0.6m above its lowest level. The river rises rapidly in May and reaches its highest level about the end of June. The records show that the year's HW mark is actually reached anywhere between May 24 and July 16. It then maintains this level with only minor fluctuations until the end of July or the middle of August.

The river begins to subside between the middle and end of August and in September the current is not inconveniently strong. September, October, and November are favorable months for river navigation as the water is then sufficiently high for vessels to reach Hope and the strength of the current has considerably abated.

At Fort Langley, about 15 miles above New Westminster, the usual rise of the river during freshets is about 4.3m, but has been known to reach 7.6m.

The river at New Westminster is seldom frozen over. Loose pieces of ice, which do not damage shipping, occasionally come down the river.

The tidal currents in the river are affected by the weather in the Strait of Georgia, the rains, and the amount of water in the river.

During freshets, the current in the channel above Garry Point (at Steveston) runs almost continuously downstream, though the rise of the tide may check it. The strongest current occurs 2 to 3 hours before LW and may attain a velocity of 5.5 knots. After the freshets, the strongest current occurs on the average about 30 minutes before LW and attains a velocity of 3 or 4 knots.

During the low stage of the river, a flood and an ebb occur on all the larger tides. The flood begins soon after HW and commences first along the bottom. At New Westminster, the flood tidal current reverses the river current except during freshet periods.

When the river is at its highest level, the current between Hope and Mission City attains a velocity of 4 to 7 knots and even more in the narrow parts.

Depths—Limitations.—The Fraser River, entered about 10 miles NW of Point Roberts, has a controlling depth of 7.2m between Sand Heads and the port of New Westminster (49°12'N., 122°55'W.).

Vessels up to 229m in length and 10m draft have been accommodated at New Westminster. Vessels, with drafts of up to 4.3m, can proceed to Mission City, about 50 miles from Sand Heads. Vessels of lesser draft, with local knowledge, can proceed another 30 miles to the town of Hope.

The depths and directions of the fairways in the Fraser River are constantly changing due to scouring action, silting, and dredging. The Canadian Department of Public Works conducts surveys each spring and autumn over the navigable river areas. Published depth information resulting from the surveys is available from the Canadian Hydrographic Office.

As depths alongside piers and wharves also vary periodically, vessels should consult the owners of the facilities before arrival.

Pilotage.—Pilots for the Fraser River are embarked about 1 mile seaward of Sand Heads Light (49°06'N., 123°18'W.). Pilots of the Pacific Pilotage Authority that are onboard ships proceeding from sea, British Columbia, or U.S. ports to the Fraser River will arrange for river pilots, if necessary. For further information, see Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Photo copyright Mike Mitchell

Sand Heads Light

Regulations.—Vessels approaching the Fraser River Railway Bridge must make at least two security broadcasts on VHF channel 74 advising other traffic of their intentions.

By-Laws are in force for the Fraser River, as far as Douglas Island; a copy should be obtained from the Fraser River Port Authority.

General regulations, including quarantine, and Vessel Traffic Services (VTS) information for British Columbia are described in Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Signals.—In the event of fire on board a ship at a berth or alongside a facility, five long blasts on the whistle or siren shall be sounded at intervals.

Several bridges, both vehicular and railroad, span the Fraser River. White lights, shown on each side of the span on fixed bridges, mark the passage under the bridge. The railroad bridge, with a moveable swing span, is marked by additional white lights shown from each end of the center pier projection. Semaphore arms are also situated at each end. The semaphore arm raised in a vertical position, or a fixed green light shown at night, indicates that the span is open. The arm extended horizontally, or a fixed red light at night, indicates the span is closed. A red ball displayed by day at the N end of the swing span indicates the span is out of order; at night, a flashing red light is shown.

In fog, with ships moving on the river, the railroad bridge supervisor will sound an air whistle for 4 seconds every 20 seconds when the bridge is closed. A siren sounded for 5 seconds every 24 seconds indicates the swing span is open.

Every vessel requiring an opening of the swing span of the Fraser River Railway Bridge shall contact the bridge attendant

Fraser River Bridges

on VHF channel 74. The calling-points for requesting an opening are the Port Mann Bridge, the Alex Fraser Bridge, the Queensborough Highway Bridge, and prior to departure from any berth situated within these points.

Once contact has been established, vessels should maintain a listening watch on VHF channel 74 until clear of the bridge.

Caution.—The buoys and beacons are frequently shifted to conform with the changes in the river fairway. These aids are liable to be carried away, especially during freshets.

Several submerged pipeline and cable areas are situated in the river and are indicated at their landings. However, floating markers may be adrift or missing during freshets.

3.9 Sand Heads to New Westminster.—Steveston Jetty, consisting of quarried stone, protects the N side of the river channel, between the entrance at Sand Heads and Garry Point, 4.5 miles upriver. Lighted buoys, lighted beacons, and ranges mark the fairway of the river.

Steveston (49˚08'N., 123˚11'W.) (World Port Index No. 18090) is the center of the salmon-canning industry on the river. This harbor extends for 1.5 miles ESE from Garry Point and is available to large fishing vessels at any stage of the tide. A breakwater fronts the harbor channel. During the summer months, a car ferry plies between this harbor and Sydney, on Vancouver Island. A pilot station is situated at the harbor.

Woodward Island (49˚06'N., 123˚08'W.), very marshy and narrow, lies on the S side of the river channel, about 0.5 mile SE of **Steveston Island** (49˚07'N., 123˚10'W.). An extensive training wall fronts this island and connects Woodward Dam with **Rose Island** (49˚06'N., 123˚07'W.).

Woodward Reach extends E from the training wall at Woodward Island to Deas Island, 5 miles above Garry Point.

Woodwards Landing (49˚07'N., 123˚05'W.), on the N side of the channel, is the site of several mills. Several submerged cables and pipelines extend SE across the channel from the landing to the opposite shore. A tunnel is situated close E of the pipelines. Anchorage is prohibited within an area, about 0.5 mile wide, lying in the vicinity of these obstacles.

Deas Island (49˚07'N., 123˚04'W.) lies on the S side of the river and is connected at its NE end to the mainland. A channel, used by small craft, leads to the S side of the island. Two marinas are situated in the vicinity of this channel.

An overhead power cable, with a vertical clearance of 9.8m, spans Deas Slough, on the S side.

Tilbury Island, separated from the mainland by Tilbury Slough, lies on the S side of the river, about 1 mile NE of Deas Island.

3.10 Annacis Island (49˚10'N., 122˚56'W.), lying about 5 miles ENE of Woodward Island, is more than 3 miles long and is located at the head of the river delta. A causeway connects the islands. The Fraser River extends along the S shore of Lulu Island for about 9 miles, passing S and then NE of Annacis Island.

Three overhead power cables, with a minimum vertical clearance of 53m, span the river in the vicinity of Annacis Island and may best be seen on the chart.

Alex Fraser Bridge (Annacis Island Bridge) is a fixed highway bridge, with a vertical clearance of 56m, which spans the river at the center of Annacis Island.

Pattullo Bridge, a fixed highway bridge, spans the river near New Westminster and has a vertical clearance of 45m.

A bridge, with a vertical clearance of 43m, spans the river close SW of Pattullo Bridge.

The Fraser River Railway Bridge (New Westminster Railway Bridge) is a swing bridge which crosses the river close NE of Pattullo Bridge. The bridge, when closed, has a vertical clearance of 6.7m. The swing span has a length of 99m.

New Westminster (Fraser Port) (49˚12'N., 122˚55'W.)

World Port Index No. 18100

3.11 New Westminster is situated on the N bank of the Fraser River, about 21 miles from Sand Heads. The harbor is

engaged in considerable foreign and domestic shipping. Air, railroad, and ferry services are available.

Tides—Currents.—Tide and current information is given in tabular form and text, as well as graphically, on Chart 18409.

Depths—Limitations.—Numerous wharves front the many warehouses, canneries, and sawmills that line the shore of the harbor. The principal facilities are listed below.

Annacis Auto Terminal handles ro-ro vessels and is situated at the N end of Annacis Island. There are two berths, 213m and 170m long, both with depths of 10.7m alongside.

Domtar Gypsum Wharf, situated on the S bank 0.8 mile above Pattullo Bridge, is 186m long and has a depth of 8.2m alongside.

Fraser Surrey Docks, situated on the S bank opposite Annacis Auto Terminal, consists of six berths. These berths provide 1,220m of total quayage and have depths of 9 to 10.7m alongside. They are used for newsprint, containers, general cargo, steel, lumber, and dry chemicals.

Ocean Fisheries Wharf, situated on the N bank opposite Deas Island, is 117m long and has a depth of 9m alongside. It is mainly used for bagged grain and canned goods.

Fraser Wharf, situated about 0.3 mile NE of Ocean Fisheries Wharf, is 152m long and has a depth of 10m alongside. It is used for discharging automobiles.

Tilbury Cement Wharf, situated in the vicinity of Tilbury Island, is 182m long and has a depth of 7.6m alongside.

Chatterton Petro-Chemical Berth is 158m long and has a depth of 9m alongside.

Fraser Richmond, once a landfill, is now being developed to be a third terminal area in Fraser Port. Plans as of 2001 are for it to be a barge berth with other marine-related facilities.

The controlling depth of 7.3m in the Fraser River, between Sand Heads and New Westminster, dictates the draft that can be accommodated in the harbor. Weather and tidal conditions have considerable bearing on the maximum draft that can enter the port. It has been reported that the draft of a vessel is limited to 10m on a 3.7m tide. The entrance channel has a maintained depth of 10.7m on a 4.1m tide. It is reported that vessels of up to 228m in length, 32.3m bean, and 10.6m draft have been accommodated.

Dangers, consisting of numerous shoals, lie close to the main channel of the Fraser River. City Bank, with a least depth of 1m, lies in the middle of the river, off New Westminster. The main river channel leads S of this bank. Sapperton Channel, with a least depth of 6.4m, leads N of the bank.

Aspect.—Landmarks include numerous tanks, water towers, canneries, and sawmills standing along the banks of the river. Several conspicuous radio towers and lights are situated near the causeway opposite Annacis Island. A prominent grain elevator stands on the S side of the river about 1 mile below the harbor.

Numerous lighted buoys mark the river channel and adjacent shoals between Sand Heads and New Westminster. Lighted range beacons indicate the fairways leading through the various cuts and reaches which form the river channel.

Pilotage.—Pilotage is compulsory for vessels over 350 grt. For further information, see paragraph 3.8 and Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Photo courtesy of Fraser Port

Fraser Port

Photo courtesy of Fraser Port

Annacis Terminal—Fraser Port

Photo courtesy of Fraser Port

Fraser Surrey Docks

Photo courtesy of Fraser Port

Fraser Richmond (future development)

Photo courtesy of Fraser Port

Fraser Wharf

Regulations.—See paragraph 3.8 for further information.

The jurisdiction of New Westminster includes the Fraser River from the Strait of Georgia to Langley, a town, standing 15 miles above the harbor. Also included within the limits are the waters between the Pitt River and Pitt Lake and that part of the North Arm that is in contact with New Westminster.

Vessels proceeding in the channel between the E extremity of Annacis Island and Sapperton Dyke (49°13'N., 122°51'W.) shall keep to that side of the channel which lies on the port side. In addition, vessels desiring to pass through the draw of the open railroad bridge shall use the draw on the port side of the vessel.

Vessels proceeding with the tide have precedence over those stemming the tide.

Anchorage.—Anchorage can be taken within an area where the depths are 9 to 14.6m, mud and sand, lying in the channel off New Westminster.

Caution.—Several pipelines and submarine cables, which may best be seen on the chart, cross the river in the vicinity of Tilbury Island and Annacis Island.

Care must be exercised to avoid anchoring in the bridge approaches, pipeline areas, or cable areas. Vessels should also avoid dragging anchor during freshets.

Sapperton Channel is used as a water aerodrome.

The Fraser River (continued)

3.12 Sapperton Dyke (49°13'N., 122°51'W.) is located close E of Sapperton Bar. It diverts the river N and S of the bar and City Bank. The **Coquitlam River** (49°14'N., 122°48'W.) branches N and the **Pitt River** (49°13'N., 122°46'W.) branches NE, respectively, from the W and E ends of Douglas Island. The W end of City Bank is marked by a buoy.

Fraser Mills (49°13'N., 122°52'W.), located on the N bank of the Fraser River adjacent to New Westminster, has the largest sawmill in the area. A very high chimney, backing the long lumber pier, is also conspicuous.

Port Mann (49°13'N., 122°49'W.) extends about 2 miles along the S bank of the river and is fronted by several ferry landings.

Caution.—A highway bridge, with a vertical clearance of 43m and illuminated by floodlights, spans the Fraser River close E of Port Mann.

A railroad barge ferry plies between Port Mann and Vancouver Island.

Several submarine pipelines cross the river in the vicinity of the ferry landing.

An overhead power cable, with a vertical clearance of 43m, spans the river in the vicinity of the ferry landing.

3.13 Douglas Island (49°13'N., 122°46'W.) lies at the mouth of the Pitt River. The main channel of the Fraser River leads S of this island.

Port Coquitlam (49°16'N., 122°47'W.) (World Port Index No. 18130) is a railroad freight terminus situated near the mouth of the Pitt River. Small vessels can transit the latter river as far as **Pitt Lake** (49°22'N., 122°36'W.). The lake is enclosed by sheer mountains and is too deep for anchoring.

Mission City (49°07'N., 122°15'W.) (World Port Index No. 18140), a town, stands on the N bank of the Fraser River, about 30 miles from New Westminster. A government wharf fronts the town and has a least depth of 4.5m alongside. The river channel leading to the town is generally free of obstructions, but local knowledge is required.

Several other landings of minor importance are situated along the river, but traffic to the E of the town is minimal.

North Arm (49°13'N., 123°12'W.) leaves the main channel of the Fraser River below New Westminster. It flows W and NW and passes N of Lulu Island, Sea Island, and **Iona Island** (49°13'N., 123°12'W.).

North Arm Jetty extends about 3 miles NW from the N side of Iona Island across Sturgion Bank to the Strait of Georgia. A breakwater, situated at the N side of the entrance to North Arm, extends SW and forms a haven for fishing vessels.

North Arm is dredged from its outer entrance to the main river channel. A depth of 4.5m is maintained in the channel, except for a stretch, 8 miles long, lying between **Marpole** (49°12'N., 123°08'W.) and **Poplar Island** (49°12'N., 122°56'W.). A depth of 3m, over a width of 45m, is maintained in this latter stretch.

North Arm, also known as North Fraser Harbor, is industrialized, especially for timber products. Most of the traffic consists of tugs towing barges and log booms. Local knowledge is necessary. Copies of the By-Laws and Regulations concerning navigation and special bridge signals should be obtained from the Harbor Commissioners, Vancouver.

Approaches to Vancouver

3.14 Burrard Inlet, extending 17 miles E from the Strait of Georgia, is entered between Point Grey and Point Atkinson. This inlet is easily accessible, free of dangers, and navigable by ocean-going ships as far as Port Moody, at the head.

Two narrows somewhat confine the inlet and its fairway channel. The area lying between these two narrows is considered to be Vancouver Harbor proper. The city of Vancouver backs the S side of the harbor; North Vancouver stands on the N side. The tidal waters of Burrard Inlet, E of a line joining Point Grey and Point Atkinson, form the legal limits of Vancouver Harbor.

Point Grey (49˚16'N., 123˚16'W.), a rounded bluff, forms the W end of a wooded promontory and is the S entrance point of Burrard Inlet. It is very prominent from S. The conspicuous buildings of the university stand on the heights above this point.

Spanish Bank (49˚17'N., 123˚14'W.) extends N from Point Grey and SE around the promontory to English Bay. This hard, drying, and steep-to sandbank is visible only at LW during strong W winds, when a line of small breakers is formed. A lighted buoy is moored close off the NW edge of the bank, about 1.5 miles N of Point Grey. Lights are shown marking the N side of the bank.

English Bay (49˚17'N., 123˚11'W.), lying E of Spanish Bank, is bordered on the E side by Stanley Park Peninsula.

False Creek (49˚17'N., 123˚08'W.), a shoal inlet, leads SE and E from the head of English Bay and is used by small craft, fishing boats, and yachts. Small vessels, with local knowledge, can berth at numerous finger piers on the W side of this inlet. Several prominent buildings stand on the S shore of English Bay, about 2.5 miles W of the entrance to False Creek.

Stanley Park (49˚18'N., 123˚08'W.), a peninsula, is located at the E side of English Bay and extends N. Ferguson Point, the W extremity of this peninsula, is located 1.5 miles NNW of the entrance to False Creek. A lighted buoy, moored about 0.3 mile WNW of Ferguson Point, marks the shoal bank lying on the W side of the peninsula. Prospect Point, a high bluff, forms the N extremity of Stanley Park and is located 1 mile NE of Ferguson Point.

3.15 **Point Atkinson** (49˚20'N., 123˚16'W.), steep-to and radar prominent, is located 3.8 miles N of Point Grey and forms the N entrance point of Burrard Inlet. A light is shown from a structure, 12m high, standing on the point.

Navvy Jack Point (49˚19'N., 123˚16'W.) is located 4 miles E of Point Atkinson. The intervening coast is indented by several shallow coves, with an occasional boat pier. A prominent microwave tower stands close NW of Dundarave, about 3 miles E of the point.

The **Capilano River** (49˚19'N., 123˚08'W.) empties into Burrard Inlet, about 0.3 mile NW of First Narrows and 1.3 miles ESE of Navvy Jack Point.

First Narrows (49˚19'N., 123˚08'W.), the constricted entrance of Vancouver Harbor proper, is spanned by Lions Gate Bridge. This fixed bridge, situated close E of Prospect Point, has a vertical clearance under the center of 61m.

The channel through the narrows was reported to be dredged to a depth of 15m. For the latest depths, vessels should contact the local authorities.

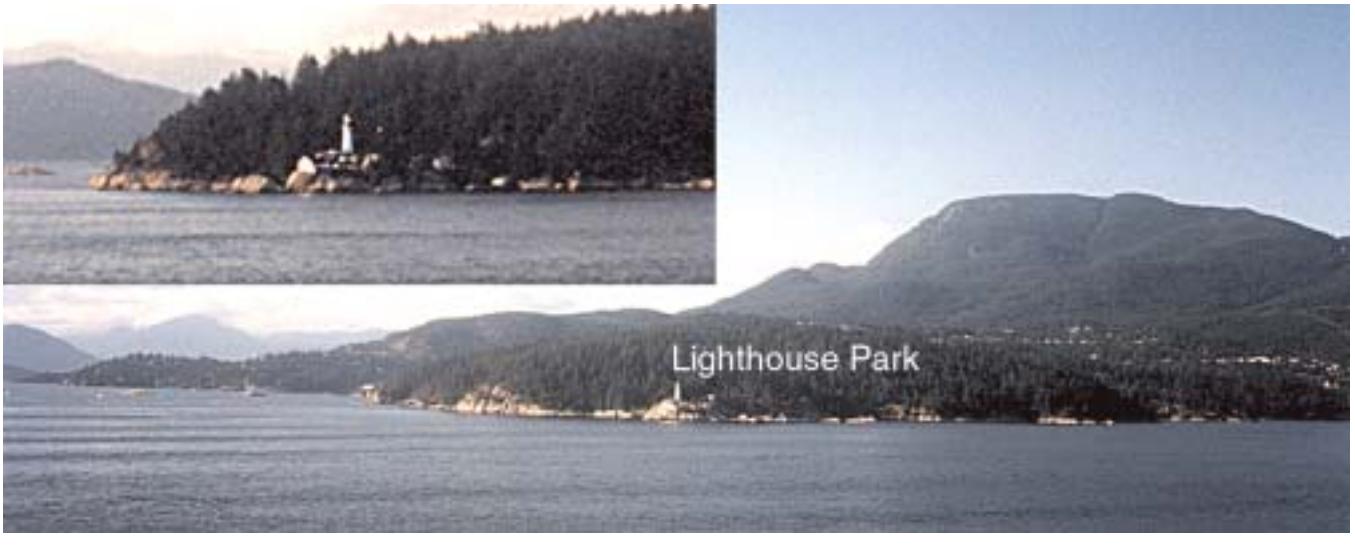

Photo courtesy of Jarrod M. Kushla

Point Atkinson Light from S

Main photo copyright Mike Mitchell

Point Atkinson Light

Prospect Point Light

Brockton Point, located 1.3 miles SE of Lions Gate Bridge, forms the E extremity of Stanley Park Peninsula and the SE entrance point of First Narrows. A sector light is shown from a structure standing on the point. Between this point and Prospect Point, the S shore of First Narrows is fringed by numerous drying ledges.

Regulations.—A Vessel Traffic Services System (VTS) covers Vancouver Harbor and the approaches. For further details, see paragraph 1.1 and Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Traffic Separation Schemes (TSS), the limits of which may best be seen on the chart, are situated on the E side of the Strait of Georgia and in the entrance to Burrard Inlet.

An approach lighted buoy, equipped with a racon, is moored about 2.3 miles WNW of Point Grey and marks the junction between the schemes.

A lighted buoy, equipped with a racon, is moored about 4 miles NE of Point Grey and marks the E end of the TSS leading into the harbor entrance.

Caution.—The Capilano River is subject to sudden and destructive freshets, which can occur at any time during the year. Vessels entering or leaving First Narrows should exercise great care when passing the river mouth as, if the river is in flood, a strong set towards Prospect Point may be experienced.

A drying shingle and boulder flat lies up to about 0.1 mile off the mouth of the Capilano River and extends E for about 1 mile along the N side of the narrows. This flat is marked by a lighted beacon standing 0.4 mile NNW of Prospect Point. A main light is shown from a tower standing on Prospect Point.

Strong tide-rips, caused by the meeting of the tidal currents, frequently occur off Point Atkinson.

Extensive tide rips are reported to occur off Brockton Point on large tides.

Parthia Shoal, a rocky patch, has a least depth of 8.2m and extends up to 0.2 mile offshore, 0.3 mile NW of Brockton Point.

Submarine pipelines extend from the shore SW of Parthia Shoal.

Calamity Point is located on the N side of First Narrows, about 0.5 mile ESE of the Lions Gate Bridge; it is fronted by a ridge of drying boulders. This ridge is marked by a lighted beacon, standing close S of the point, and by a lighted buoy, moored close SSE of it.

Burnaby Shoal, distinguished by kelp, lies about 0.3 mile ESE of Brockton Point and is marked by a lighted beacon.

Photo courtesy of Jarrod M. Kushla

Vancouver Approaches from NW, distant 3 miles

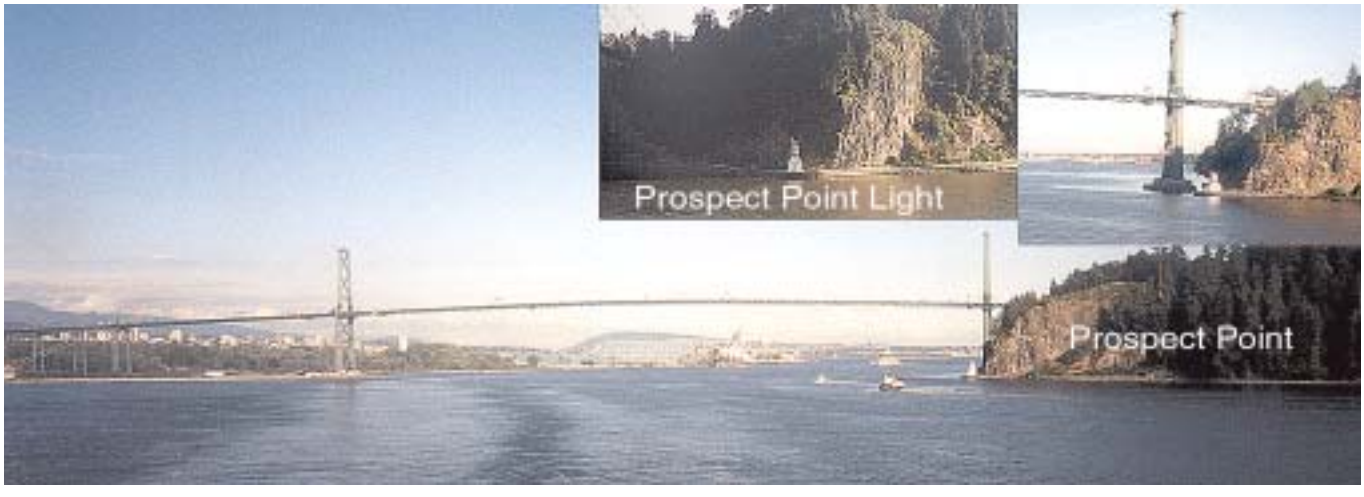

Photo courtesy of J arrod M. Kushla

Lions Gate Bridge from W

Photo courtesy of Jarrod M. Kushla

Lions Gate Bridge from E

Photo courtesy of Jarrod M. Kushla

Brockton Point Light

Far left photo copyright Mike Mitchell

Brockton Point Light

Lions Gate Bridge (49˚19'N., 123˚08'W.) has lighted towers standing at its extremities. Additional lights are shown from each side of the bridge floor and mark the width of the channel. Tri-colored directional lights are exhibited from the bridge and may best be seen on the chart. The white sectors of these lights indicate the recommended channel. Vessels should not use these sectors when E of Brockton Point.

Night signals are displayed from the mast on the bridge:

1. One white light—One or more vessels inbound.
2. Two white lights—One or more vessels inbound with tows.
3. One red light—One or more vessels outbound.
4. Two red lights—One or more vessels outbound with tows.

Photo courtesy of Jarrod M. Kushla

Vancouver Wharves—West Dock

Photo courtesy of Jarrod M. Kushla

Vancouver Wharves Terminal

Vancouver Harbor (49˚17'N., 123˚07'W.)

World Port Index No. 18150

3.16 Vancouver Harbor comprises that part of Burrard Inlet that lies between Brockton Point and Second Narrows (49˚18'N., 123˚01'W.). The port lies within a well-sheltered natural harbor and is open to navigation all year round.

Most of the principal piers and wharves are contained within this area, which is 3.5 miles long and has a maximum width of 2 miles. Ample anchorage is available in the harbor for vessels waiting for tides and berths. The port is the terminus for three major railroads and an international airport is situated 10 miles S of the harbor.

Tides—Currents.—Between Brockton Point and Terminal Dock Pier (49˚18'N., 123˚03'W.), the tidal currents run counterclockwise on the flood and ebb tides. On the ebb, the main current sets W in the central and N part of the harbor, and a weak eddy sets E along the S shore. On the flood, the main current has a strong set from Brockton Point towards the Canadian National piers. After a period of weak velocity and variable direction following slack water, the currents along the N shore form an eddy which continues W and re-enters the main current opposite Brockton Point.

Within the harbor, the strongest currents occur from 1 to 2 hours after the maximum flood. At this time, their velocity may reach 2 knots, with the current setting ESE off the Canadian National piers, and 1 knot setting W along the N shore. The inshore eddies do not always conform to this pattern, so no reliance should be placed on the anticipated direction of the tidal current alongside any wharf and pier.

The tides in First Narrows rise about 3.5m at neaps and 4m at springs.

Depths—Limitations.—Coal Harbor, lying close SW of Brockton Point, is entered via a channel with depths of 2.4 to 4.2m. This harbor is used by small craft, yachts, and seaplanes. Several marinas lie within the harbor.

Photo courtesy of Jarrod M. Kushla

Canada Place

Photo courtesy of Jarrod M. Kushla

Centennial Pier

Photo courtesy of Jarrod M. Kushla

Fibreco Terminal and Seaspan Terminal

Photo courtesy of Jarrod M. Kushla

Vanterm Wharf

Central Vancouver Harbor

The principal facilities listed below are situated on the S side of the harbor and are described from W to E.

CP Railferry Wharves are situated close S of Brockton Point. The berths are from 65 to 120m long and have depths of 5.6 to 6.5m alongside. A heliport is situated in the vicinity of these berths.

Canada Place, situated close E of CP Railferry Wharves, is a cruise ship terminal providing five berths. The largest berth is 163m long and has a depth of 10.3m alongside. A ferry terminal is situated close E of these berths.

Centennial Pier Wharf is situated 0.6 mile E of Canada place. It provides seven berths which are used for containers, forest products, and general cargo. The largest berth is 195m long and has a depth of 11.4m alongside.

Ballantyne Pier, situated close E of Centennial Pier Wharf, provides five berths which are used for general cargo, grain, containers, and cruise liners. The largest berth is 183m long and has a depth of 10.7m alongside.

Burlington North Pier, situated close E of Ballantyne Pier, provides one berth for handling general cargo. The berth is 142m long and has depths of 5.7 to 8.5m alongside.

BC Sugar Wharf is situated close E of Burlington Pier; a fishing pier extends between them. This wharf provides one

Photo courtesy of Jarrod M. Kushla

North Vancouver Grain Terminals

Seaboard Terminal

Lynnterm

berth for the handling of sugar. It is 145m long and has a depth of 9.1m alongside.

No. 3 Jetty of United Grain Growers Wharf is situated 0.3 mile E of Ballantyne Pier. It has two berths for loading bulk grain. The largest berth is 213m long and has a depth of 11.6m alongside.

Vanterm Wharf is situated close E of No 3 Jetty and provides seven berths for handling containers, bulk liquids, grain, and general cargo. The largest berth is 281m long and has a depth of 15.3m alongside.

Pacific Grain Jetty No. 1, situated close E of Vanterm Wharf, provides three berths for loading grain and handling general cargo. The largest berth is 182m long and has a depth of 10.4m alongside.

Alberta Wheat Pool Dock, situated close W of Second Narrows Bridge, provides two berths for loading grain. The largest berth is 244m long and has depths of 10.7 to 15.2m alongside.

The principal facilities listed below are situated on the N side of the harbor and are described from W to E.

Vancouver Wharves, situated on the N shore of First Narrows, provide five berths that are used for the bulk loading of potash, sulfur, and various forest products. The largest berth is 201m long and has a depth of 11m alongside.

Fibreco Terminal, situated close E of Vancouver Wharves, is fronted by a T-shaped jetty. The berthing face is 137m long and dolphins are situated off each end. The jetty has a depth of 11.5m alongside and is used for the bulk loading of wood chips. Vessels of up to 42,000 dwt, 194m in length, and 10.7m draft can be handled at this berth.

Pioneer Grain Terminal, situated 1.5 miles W of Second Narrows Bridge, is a grain loading facility. The berth is 168m long and has a depth of 14.1m alongside.

Saskatchewan Wheat Pool, situated 0.3 mile E of Pioneer Grain Terminal, provides two berths for loading grain in bulk. The largest berth is 290m long and has a depth of 13.8m alongside.

Neptune Terminal, situated close E of Saskatchewan Wheat Pool, provides three berths for handling bulk cargo. The largest berth is 260m long and has a depth of 10.7m alongside.

Seaboard Shipping Terminal, situated close E of Neptune Terminals, provides three berths for handling forest products. The largest berth is 196m long and has a depth of 11.2m alongside.

Lynnterm, situated close W of Second Narrows Bridge, provides four berths for handling general cargo. The largest berth is 213m long and has a depth of 15.2m alongside.

There are general depths of 12.8m to 64m within the harbor. Vessels of up to 259,000 dwt, 298m in length, and 18.5m draft have been accommodated in the port at HW.

Aspect.—Numerous conspicuous terminal buildings, grain elevators, silos, and conveyors stand on both shores of the harbor.

Pilotage.—Pilotage is compulsory. Pilots can be contacted by VHF and board at the Fairway Buoy moored off Victoria, Vancouver Island. Vessels should send an ETA to the pilot station at least 12 hours before arrival with a confirmation message sent 4 hours prior to arrival.

Regulations.—A copy of the harbor regulations should be obtained from the local authorities.

Vessels must request clearance from the Vancouver Traffic Service System Control (VTS) prior to proceeding to or departing from any berth within the harbor area.

Vessels must be assigned a designated anchorage berth by the VTS Control.

Anchorage.—Designated anchorage berths lie within English Bay, SW of Stanley Park Peninsula; off the N shore of Burrard Inlet, E of Point Atkinson; in the W part of the harbor, between First Narrows and Second Narrows; and E of Second Narrows. Vessels are prohibited from anchoring within the harbor except in these designated berths, which may best be seen on the chart.

The anchorage berths within the harbor have depths of 16.5 to 38m and are reserved for vessels awaiting berths or tides. The anchorage berths in English Bay have depths of 14.6 to 29m, good holding ground, and are reserved for vessels with a longer stay in port.

Caution.—The W portion of Vancouver Harbor is a designated water aerodrome area.

A good watch for seaplanes should be kept when in the vicinity of Coal Harbor.

Photo courtesy of Jarrod M. Kushla

Second Narrows Highway Bridge from W

A ferry runs on a regular schedule across the harbor between a point located 1 mile SSE of Brockton Point, on the S side, to a point located 1.5 miles ENE of Brockton Point, on the N side.

3.17 Second Narrows (49˚18'N., 123˚01'W.), located 4 miles E of First Narrows, is longer and more constricted than the latter. The fairway channel varies in width, but at its narrowest, the width is slightly more than 90m. Shoals and drying mud flats encroach on both sides of the narrows, which is spanned near the W end by two bridges.

Depths—Limitations.—Vessels with drafts of up to 12.6m can transit Second Narrows. The best time for large vessels to proceed is at or near HWS.

The shores forming the narrows are similar to those at First Narrows. Several creeks emptying into the narrows on its N side form extensive, drying mud banks. This is particularly true of the deposits carried down by the Seymour River to its creek mouth, lying close E of the Second Narrows bridges.

Due to disturbances, the predicted slack water times may vary from actual conditions by as much as 30 minutes.

Flood currents attain velocities of up to 6.5 knots, but the ebb currents, due to turbulence W of the bridges, seldom exceed a velocity of 5.5 knots.

Aspect.—The Second Narrows Highway Bridge, a fixed span, has a vertical clearance of 44m over the fairway and is situated at the W entrance of the narrows. Fixed lights are shown from both sides of the bridge on its lower chord. The lights on either side of the center of the span mark a channel, 110m wide. A fixed green light, visible from the E and W approaches, and a fixed amber light, visible from the W approach, mark the center of the channel.

The CN Railroad Bridge spans the narrows close E of the Highway Bridge. This bridge has a lift span marked by white lights, shown on piers at each end. Red lights mark the center of the lift span, which has a vertical clearance of 46m when raised and 10.7m when lowered.

Regulations.—A Movement Restriction Area (MRA) lies in the vicinity of Second Narrows. This MRA includes the waters E of a line extending S from Neptune Bulk Terminal to a line extending N from Berry Point Light. The latter light is situated 1.5 miles E of the C. N. Railroad Bridge.

At least 12 hours before entering the MRA, the following vessels should advise the harbormaster at Vancouver of their proposed transit time:

1. Vessels 20m or greater in length.
2. Air cushion vessels 8m or greater in length.
3. Towing vessels, where the breadth of the tow is 20m or greater or the length of the tow is 30m or greater.

The harbormaster should be advised of any changes.

All vessels requiring a pilot intending to pass through the Second Narrows bridges should report their intentions and ETA at the CN Railway Bridge to the bridge operator on VHF channel 12, as follows:

1. When entering the harbor limits.
2. Before leaving a berth or anchorage in the harbor.

The ETA should be confirmed upon arrival at the limit of the MRA.

When transiting the MRA, a maximum speed of 6 knots is prescribed.

In general, vessels must transit the MRA during the restricted periods of HWS or LWS or stemming the current, with a limiting tidal velocity of 2 knots.

In order to provide for the safe and orderly flow of traffic through the MRA, vessels are under the control of the Vessel Traffic Service System (VTS), which is mandatory in this vicinity. For further details of the VTS, see paragraph 1.1 and Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Designated Holding Areas, the limits of which are shown on the chart, are situated E and W of the narrows within the MRA. These areas are used by vessels while awaiting specific times for transit of the narrows.

The VTS Control may order all vessels to clear the narrows when LPG or LNG tankers are transiting the MRA.

Signals.—Vessels requiring the span of the CN Railroad Bridge to be raised should sound three long blasts on whistle or siren, repeating as necessary until acknowledged by one of the following signals from the bridge:

1. Two flashing red lights—Indicates vessel is not to approach the bridge.
2. One flashing green light—Indicates lift span has been raised.
3. Vertical row of white lights—Indicates a vessel is approaching the bridge from the opposite direction.

The CN Railroad Bridge Operator is situated on the bridge. For the purpose of traffic control and requesting the lift span to be raised, vessels may contact the Operator on VHF channel 12.

Caution.—An overhead cable, with a vertical clearance of 65m, spans the Second Narrows close E of the C N Railroad Bridge.

3.18 Second Narrows to Port Moody.—The fairway of Second Narrows continues E for about 1.5 miles to Berry Point, which is considered the SE entrance of the narrows. Burrard Inlet, leading E from this point, is deep and clear of dangers in mid-channel. The terrain extending from Second Narrows to Port Moody is formed by a high bluff. The N shore is consists of a low plateau rising steeply to mountains in the background.

Roche Point (49˚18'N., 122˚57'W.) is located 1.3 miles ENE of Berry Point. Both of these points are marked by lighted beacons. Several mooring buoys are situated on the flats in the vicinity of these points and adjacent installations. A number of deep-water piers are situated opposite Roche Point. Anchorage can be taken in a depth of 16.5m, mud, off the heads of the piers.

3.19 Port Moody (49˚17'N., 122˚53'W.), the E branch at the head of Burrard Inlet, is entered between Gosse Point, located 1.3 miles SE of Roche Point, and Burns Point, about 0.4 mile ENE. Lights are shown from structures standing on Gosse Point and Burns Point. This branch leads about 3 miles E from the constricted entrance to the city of Port Moody, which stands on the S shore at the head.

Depths—Limitations.—At Port Moody, the fairway channel leading to the bulk terminals has a controlling depth of 10.1m.

Pacific Coast Terminal—Port Moody

The principal berths listed below are situated on the S shore between Second Narrows and the city and are described from W to E.

Chevron Wharf, situated 0.8 mile E of the narrows bridge, has a berth, 122m long, with depths of 9.1 to 11.2m alongside.

Goodwin Johnson Wharf, situated close SE of Berry Point, has a berth, 110m long, with a depth of 10.5m alongside It is reported that the shoreline in the vicinity of this wharf is being filled to provide deep-sea berths.

Shell Pier, situated 1 mile E of Berry Point, has a berth, 213m long, with a depth of 12.4m alongside. Vessels of up to 32,000 dwt, 198m in length, and 27m beam can be accommodated at this pier.

Westridge Pipeline Terminal, situated close E of Shell Pier, has a dolphin berth, 283m long, with a depth of 10.8m alongside.

Texaco Jetty, situated close W of Gosse Point, has a berth with a depth of 7.1m alongside.

Petro-Gulf Wharves, situated 1 mile E of Gosse Point, provide two berths. They are 40m and 58m long and have depths of 4.6m and 10.2m alongside, respectively.

Pacific Coast Bulk Terminal, situated at the head of the branch on the S shore, has two berths. Berth No. 1 has 237m of usable berth space, with a depth of 12m alongside, and is used for transfering bulk liquids. Berth No. 2 has 293m of usable berth space, with a depth of 12m alongside, and is used for the transfer of bulk sulfur.

The principal berths listed below are situated on the N shore and are described from W to E.

Occidental Petroleum (Hooker Chemical) Wharf, situated close E of the narrows bridge, has a main berth, 152m long, with a depth of 10.6m alongside.

Ioco Wharf, situated 1.5 miles E of Burns Point, has a berth, 165m long, with dolphins off each end, and a depth of 9.9m alongside. A refinery stands on the shore close N of this wharf.

A large marina complex, protected by an outer breakwater, fronts the S bank opposite Ioco Wharf.

Caution.—Several overhead cables, with a minimum vertical clearance of 45.7m, span the entrance to Port Moody.

A number of submarine pipelines and a submarine cable, which may best be seen on the chart, lie across the inlet in the vicinity of the Ioco Wharf.

3.20 Indian Arm (49°18'N., 122°56'W.) is the N branch of Burrard Inlet. It is entered between Roche Point and Admiralty Point, located 1 mile E. The shores of this arm are densely wooded.

There are no harbors of any consequence within this deep, wide inlet; however, several settlements, fronted by landings, stand along the shores. Generally, vessels only use these landings during the summer months.

Indian Arm differs from Burrard Inlet in that the backing terrain consists of rugged, high, and snow-capped mountains. These peaks enclose the inlet and water cascades down their steep sides when the snow melts in the summer. The water flows into the arm in such quantity as to make the surface fresh.

Caution.—A power cable, with a vertical clearance of 48.8m, spans Indian Arm, 0.8 mile inside the entrance. This cable continues across Bedwell Bay, where it has a vertical clearance of 98.8m.

Turtle Head (49°19'N., 122°56'W.), located about 1 mile within the entrance of Indian Arm, is a cliffy promontory. It extends into the arm and constricts the width of the navigable channel. Rocky shoals, marked on their S side by a beacon, extend from the head into the channel. Hamber Island lies on these shoals.

White Rock (49°19'N., 122°56'W.) lies on the outer edge of a shoal extending from the W shore of the arm. This obstruction constricts the channel to a width of about 0.2 mile in the vicinity of Hamber Island.

3.21 Boulder Island (49°19'N., 122°56'W.), encircled by a reef, lies in the middle of Indian Arm entrance channel about 1 mile NE of Roche Point. A beacon marks the outer edge of the coastal shoal lying E of this island.

Deep Cove indents the W side of the arm, about 0.8 mile NW of Turtle Head. This cove is deep and a pier is situated at its head. Vessels must reduce speed on entering the cove. A speed control lighted buoy is moored close off the entrance to the cove.

Bedwell Bay lies between a large peninsula, extending N from Turtle Head, and the mainland. Rocky shoals fringe the peninsula and extend up to about 0.2 mile N.

Jug Island (49°20'N., 122°55'W.) and **Charles Reef** (49°20'N., 122°54'W.) lie at the seaward extremity of these shoals. A beacon marks a drying ledge lying close S of the reef.

Tupper Rock (49°20'N., 122°54'W.), above-water, lies about 0.3 mile N of the above beacon.

Racoon Island (49°20'N., 122°54'W.) lies in the center of the arm, about 0.8 mile NE of Jug Island. Several above and below-water rocks lie on shoals encircling the island.

Croker Island (49°26'N., 122°52'W.), located 6 miles N of Racoon Island, lies about 1 mile from the head of Indian Arm.

The Indian River flows through a deep and narrow gorge, formed by swift-running streams, and a swampy delta lying at the head of the arm.

Anchorage.—Anchorage can be taken, in depths of 22 to 27m, mud, in the entrance of Indian Arm. This anchorage area is usually used by vessels awaiting berths at Port Moody. Anchorage can also be taken, in depths of 9 to 18m, sand and mud, near the head of Bedwell Bay.

Howe Sound

3.22 Howe Sound leads 24 miles N from the entrance to Burrard Inlet and is entered between Point Atkinson and Gower Point, 11 miles WNW. Four channels lead into the sound between the many islands and islets that encumber the entrance.

The sound is almost entirely enclosed by rugged mountains, which rise abruptly from the water's edge and attain heights of up to 1,830m.

Several local small ports are situated within this ice-free sound. There are also a number of mining and lumber settlements fronted by marine terminals. The settlement of Squamish is situated at the head. The depths in the sound are ample for ocean-going vessels.

Winds—Weather.—The winds in this area are strong and violent, and often bluster down the fjords during the winter months. Howe Sound is typical of these mountain-enclosed fjords through which polar air from the interior blows to the coast. The winds usually lose their intensity after leaving the constricted passages of the fjords and are no longer a source of damage or danger to navigation.

Tides—Currents.—Tide rips frequently occur off Point Atkinson and are caused by the meeting of the tidal currents from Vancouver Harbor and Howe Sound.

Regulations.—Vessels must request clearance before proceeding to or leaving from any berth or terminal within the sound from the Vancouver Traffic Service (VTS) Control.

Caution.—Several ferries cross the entrance channels of Howe Sound.

In the southernmost entrance leading to the main channels, large quantities of logs may be encountered.

3.23 Queen Charlotte Channel (49°20'N., 123°20'W.) leads into Howe Sound between Bowen Island and the mainland, 4 miles E. This channel is deep and clear of dangers, except for Passage Island, a conspicuous island with a shoal lying nearby, located in the middle of the entrance.

Bowen Island (49°22'N., 123°22'W.) forms the W side of Queen Charlotte Channel. This island extends 5.5 miles NNE from Point Cowan, its SE extremity, to Hood Point, its N extremity. A light is shown from a structure standing on Point Cowan.

An island, connected by a drying ledge to Bowen Island, lies close ESE of Hood Point. A light is shown from a structure, 13m high, standing on this island.

Mount Gardner (49°23'N., 123°24'W.), very conspicuous, stands on the island. This peak is 727m high and visible from all quadrants. Several radio masts are situated on the summit of this mountain; a television tower stands 0.8 mile NNE of it.

Snug Cove (49°23'N., 123°20'W.) lies 3 miles NNE of Point Cowan. It affords sheltered anchorage, in a depth of 16.5m, to small vessels with local knowledge. Vessels must stay clear of the submarine cable lying in the vicinity of the entrance.

A light is shown from a structure standing on the N entrance point of the cove. A small wharf, with a depth of 3m alongside, and two marinas are situated within the cove and provide berthing for small craft and ferries.

Anchoring in this cove is not recommended, unless in an emergency, because of the ferries and submarine cables.

Mannion Bay (Deep Bay), very exposed, lies close N of Snug Cove.

Eagle Harbor (49˚21'N., 123˚16'W.) is entered close S of Eagle Island and 1.5 miles N of Point Atkinson. It affords anchorage, in a depth of 11m, near the head. The anchorage is approached from N of Grebe Islets.

White Cliff Point (49˚22'N., 123˚18'W.), steep-to, and **Lookout Point** (49˚23'N., 123˚17'W.) mark a headland which projects into the main channel NW of Eagle Island. A number of facilities for berthing yachts and small craft are situated within Eagle Harbor.

Caution.—Numerous submarine cables cross Queen Charlotte Channel between Batchelor Point (49˚21'N., 123˚17'W.) and Horseshoe Bay, on the E side, and Deep Bay, on the W side.

3.24 Horseshoe Bay (49˚23'N., 123˚16'W.) (World Port Index No. 18197) lies NE of Lookout Point. A wharf is situated in the bay and has a depth of 6.1m alongside. A marina, protected by a log breakwater, lies close NW of the wharf.

Several landing floats and a ferry slip are also situated in the bay. Passenger and automobile ferry service is maintained with Nanaimo, via Departure Bay, and Langdale (49˚26'N., 123˚28'W.). A regular ferry service also runs to Snug Cove.

Collingwood Channel (49˚21'N., 123˚27'W.) leads into Howe Sound between the W side of Bowen Island and several islands and islets. These islands and islets are aligned N and S and form the W side of the channel. The shores of the channel are steep and bold. The fairway channel itself is deep and clear of dangers.

Cape Roger Curtis (49˚20'N., 123˚26'W.) forms the SE entrance point and **Worlcombe Island** (49˚21'N., 123˚27'W.), lying about 1 mile WNW, forms the SW entrance point. A light is shown from a structure standing on the cape and a prominent water tower is situated on the island. The W side of Bowen Island is fringed by rocky shoals.

Hutt Island (49˚24'N., 123˚23'W.) lies about 0.3 mile off the NW side of Bowen Island. A drying rock, marked by a beacon, is located in the channel leading E of this island. Hutt Rock, which dries and is marked by a beacon, lies 0.3 mile SW of Hutt Island. Another rock, marked by a beacon, lies about 0.3 mile off the W coast of Bowen Island, 1.5 miles SW of Hutt Island.

3.25 Barfleur Passage (49˚23'N., 123˚29'W.) leads into Howe Sound, between **Popham Island** (49˚22'N., 123˚29'W.) and **Keats Island** (49˚23'N., 123˚26'W.), where it joins Collingwood Channel. The fairway leading through this passage has a least depth of 23.8m and is clear of dangers.

Home Island (49˚23'N., 123˚30'W.) lies about 1 mile N of Popham Island. It is densely wooded, conspicuous, and connected to Keats Island by foul ground. A light is shown from a structure, 12m high, standing on the NW extremity of the island.

Shoal Channel (49˚23'N., 123˚30'W.) leads into Howe Sound between **Gower Point** (49˚23'N., 123˚32'W.) and the SW extremity of Keats Island. A shingle bar, with a depth of 2.1m, obstructs the S entrance. The fairway extending across the bar has a depth of 1.5m, over a rock bottom, near mid-channel.

Steep Bluff (49˚24'N., 123˚30'W.) marks the narrowest part of Shoal Channel. Foul ground extends N from this bluff. A village stands on the opposite side of the channel from the bluff. A wharf, with a depth of 4m alongside, fronts the village.

Plumper Cove (49˚24'N., 123˚28'W.) lies close E of Steep Bluff. Sheltered anchorage can be taken in the middle of this cove in depths of 13 to 14m, but local knowledge is necessary.

Gibsons Landing (49˚24'N., 123˚30'W.), a small craft pier, and a marina front a small town situated at the head of a bight, close NW of Steep Bluff. The pier has depths of 2 to 6m alongside and is protected by rock breakwaters.

Granthams Landing (49˚25'N., 123˚30'W.), a settlement situated 0.8 mile N of Gibsons Landing, is fronted by a float and a pier.

Soames Hill (49˚25'N., 123˚29'W.), a conspicuous cone, rises behind Soames Point.

Hopkins Landing (49˚26'N., 123˚29'W.), a settlement, is situated 0.8 mile N of Soames Point. It is fronted by a float and a pier, with a depth of 4.6m alongside.

Caution.—A submarine cable, which may best be seen on the chart, lies within Collingwood Channel and Barfleur Passage. It extends from Bowen Bay to the SE side of Keats Island.

Submarine cables, which may best be seen on the chart, lie in Shoal Channel. They extend from Keats Island to Steep Bluff and Gibsons Landing.

A seaplane terminal area, about 1 mile wide, is situated off Gibsons Landing.

Howe Sound—Inner Part

3.26 Gambier Island (49˚30'N., 123˚23'W.), lying in the center of Howe Sound, is enclosed by deep channels that converge to the NE and lead to the head of the sound. Port Graves, Centre Bay, and West Bay indent the S side of the island.

Port Graves (49˚28'N., 123˚22'W.), an inlet, is entered between Hope Point and Gambier Point. It forms the principal anchorage within the sound. The most direct approach into the inlet is via Collingwood Channel. However, the entrance is not easily identified until within a short distance off Hope Point. A shingle spit, with depths of less than 9m, extends into the anchorage from Potts Point. Anchorage can be taken, in depths of 14 to 16.5m, in Port Graves, NE of Potts Point.

Centre Bay (49˚28'N., 123˚23'W.) and **West Bay** (49˚28'N., 123˚24'W.) are summer resorts. A float is situated on the W side of the entrance to West Bay.

Gambier Harbor (49˚26'N., 126˚26'W.) is situated near the SW end of Gambier Island. There is a wharf, with a depth of 2m alongside, and two floats.

New Brighton (49˚27'N., 123˚26'W.) is situated close N of Gambier Harbor. There is a wharf with a depth of 8.2m alongside.

Mount Artaban, 614m high, stands close E of Port Graves. A prominent tower, visible from the E, stands on the summit. Mount Killam, 850m high, rises close N of West Bay.

Lights are shown from structures standing on Hope Point and Elkins Point, the N extremity of Gambier Island.

Thornbrough Channel (49˚32'N., 123˚25'W.), joining Shoal Channel, separates Gambier Island from the mainland.

This channel is entered between Grace Islands, lying close S of the SW extremity of Gambier Island, and Langdale, about 1 mile W. It is deep and clear of dangers. A light is shown from the Grace Islands, which are connected to each other by a drying ledge.

Langdale is the terminus for the ferry originating in Horseshoe Bay. Several landing floats are situated between Langdale and **Witherby Point** (49˚29'N., 123˚28'W.), which is very conspicuous.

Twin Creeks (49˚29'N., 123˚29'W.), a village, stands about 0.8 mile SW of Witherby Point and is fronted by a wharf, with a depth of 7.6m alongside.

Port Mellon (49˚31'N., 123˚29'W.) (World Port Index No. 18235) is the site of a lumber facility and pulpmill. Five conspicuous steel chimneys stand in its vicinity. The main wharf is 152m long and has a least depth of 10.7m alongside. Vessels of up to 181m in length and 10.6m draft have been handled.

Woolridge Island (49˚31'N., 123˚27'W.) lies in the channel opposite the port. Latona Passage, a deep channel, leads between this island and Gambier Island. At Seaside Park, adjoining Port Mellon, there is a landing float, with a depth of 4.2m alongside.

3.27 **Anvil Island** (49˚32'N., 123˚18'W.) lies 2 miles E of **Elkins Point** (49˚32'N., 123˚23'W.), the N extremity of Gambier Island. The summit of this island is 754m high and resembles the horn of an anvil, point up. It is visible from every part of Howe Sound.

Christie Islet (49˚30'N., 123˚18'W.) and **Pam Rock** (49˚29'N., 123˚18'W.), marked by a light, lie 0.8 mile and 1.5 miles, respectively, S of Anvil Island. Both are bare and conspicuous.

Ramillies Channel (49˚30'N., 123˚19'W.) and **Montagu Channel** (49˚31'N., 123˚16'W.) are deep extensions lying N of Queen Charlotte Channel. Anvil Island divides these channels, but they are rejoined with Thornbrough Channel and extend as a single, common channel to the head of the sound.

Defence Islands (49˚35'N., 123˚16'W.) lie about 2 miles NE of Anvil Island. **Watts Point** (49˚39'N., 123˚13'W.), located about 5 miles NNW of the easternmost of the Defence Islands, is a turning point where the sound tends NE for 3.5 miles and then terminates in drying mud flats. These flats front the mouths of the Squamish River and the Manquam River. A conspicuous microwave tower stands about 0.5 mile ENE of Watts Point.

Shannon Falls (49˚40'N., 123˚09'W.), conspicuous, flow over the cliffs about 3 miles NE of Watts Point.

Anchorage can be taken, in depths of 27 to 37m, about 0.3 mile offshore and 1.3 miles NE of Watts Point.

Caution.—Submarine cables, which may best be seen on the chart, lie across Thornbrough Channel and extend from the SW end of Gambier Island to a position located close N of Langdale.

3.28 **Britannia Beach** (49˚37'N., 123˚12'W.), formerly a mining town with facilities for the shipment of copper ore, is situated 1.5 miles SE of Watts Point. The mine has closed down and its loading wharf, which is 143m long, is in a state of disrepair.

Woodfibre (49˚40'N., 123˚15'W.) (World Port Index No. 18220), a village, stands on the opposite shore and 1.5 miles NW of Watts Point. It is fronted by several wharves and mooring buoys, used by lighters, are situated close SW.

South Pulp Loading Dock is 137m long and has a depth of 9m alongside.

North Pulp Loading Dock is 122m long and has a depth of 9m alongside.

Chip Loading Dock is 110m long and has a depth of 4.6m alongside. A railroad freight car landing and a government ferry slip are situated close SW of this dock.

Squamish (49˚42'N., 123˚09'W.) (World Port Index No. 18210), a small port, is situated within the flats at the mouth of the Squamish River. It is approached through a fairway dredged to a depth of 9m. Silting has been occurring in the area and depths of 7.1m were reported (1990) to lie in the channel.

The Canadian Occidental Chemicals Wharf is situated on the W side of the dredged channel. It is 187m long, with a depth of 8.3m alongside, and can accommodate vessels up to 15,000 dwt. A mooring dolphin is situated off each end of the berthing face.

A railroad freight car and barge landing, with guiding dolphins connected by timber walkways, is situated close S of the above wharf.

Squamish Terminals East Berth is 137m long, with a depth of 11.1m alongside. Squamish Terminals West Berth is 153m long and can accommodate vessels up to 213.3m long, with a maximum draft of 12.2m.

Strait of Georgia—Outer Gulf Islands

3.29 The principal outer Gulf Islands consist of Saturna, Mayne, Galiano, Valdes, and Gabriola. These islands form a chain extending 42 miles NW from Boundary Pass to Nanaimo Harbor.

Saturna Island has been described with Boundary Pass in paragraph 2.7. Mayne Island, associated with Active Pass, has been described in paragraph 2.18.

The various passages leading between the outer Gulf Islands are navigable, but local knowledge is required. Information concerning these passages may be obtained from the Vancouver Vessel Traffic Service (VTS) and the Puget Sound Vessel Traffic Service (VTS) systems. Participation in both of these VTS systems is mandatory.

Depths—Limitations.—From Tumbo Island, at the SE extremity of the island chain, to the N end of Valdes Island, all dangers lying on the strait side of the outer Gulf Islands are contained within the 90m curve, which lies between 0.3 mile and 1 mile offshore. The light shown from Georgina Point bearing less than 288˚ leads clear of the dangers lying on the W side of the N entrance to Boundary Pass.

Tumbo Island (48˚48'N., 123˚03'W.) is high, wooded, and encircled to the E and W by reefs. Steep cliffs face the S side of this island.

Tumbo Channel (48˚47'N., 123˚05'W.), deep and clear of dangers, leads between Saturna Island and Tumbo Island, but is foul at both entrances.

Savage Point (48˚48'N., 123˚04'W.), the NE extremity of Tumbo Island, has below-water rocks extending from it as far as **Rosenfeld Rock** (48˚48'N., 123˚02'W.).

Entrance Island Light

Small craft with local knowledge can anchor in **Reef Harbor** (48˚48'N., 123˚06'W.), about 2 miles W of Tumbo Point.

Winter Point (48˚49'N., 123˚11'W.) is the NW extremity of Saturna Island. The N side of Samuel Island closely adjoins Saturna Island and extends NW. Reefs and above and below-water rocks front the N side of both islands.

Belle Chain Islets (48˚50'N., 123˚11'W.), a narrow and rocky ridge, forms the outermost danger in this area.

Edith Point (48˚51'N., 123˚15'W.) is the NE extremity of Mayne Island.

3.30 Campbell Bay (48˚51'N., 123˚16'W.) indents Mayne Island between Edith Point and Campbell Point, about 0.5 mile S. A drying rock lies close off the N shore of this bay. Anchorage can be taken in a depth of 20m, mud, in the middle of the bay, about 200m S of an islet.

Horton Bay (48˚50'N., 123˚15'W.) is entered about 1 mile S of Campbell Point and is fronted by Curlew Island. This bay can be approached from N or S, although the waters are constricted and local knowledge is necessary. Strong tidal currents set across the entrance of the bay, but are not felt inside. Slack water is the best time to enter the bay. The bay affords anchorage for small vessels and is considered to be free of dangers. A drying ledge extends S from the S extremity of Curlew Island.

Galiano Island (48˚55'N., 123˚25'W.) lies about 14 miles NW of Active Pass and about 17 miles from Edith Point. A high mountain ridge runs for almost the entire length of the island.

Active Pass, its entrances, and the SE side of Galiano Island have been previously described in paragraph 2.19.

Salamanca Point (48˚54'N., 123˚21'W.) is rocky and conspicuous from the SE and NW. Trees grow to the water's edge in the vicinity of the point. Heavy tide rips are reported to occur around this point.

3.31 Valdes Island (49˚04'N., 123˚38'W.) extends 8.3 miles NW from Porlier Pass, described in paragraph 4.22, to Gabriola Passage, described in paragraph 4.25. This island is very similar to Galiano Island in outline and is wooded with a few farms. Shoal rocks and above and below-water reefs, which are steep-to on their seaward sides, fringe the island and extend up to about 3.5 miles NNW of it.

Thrasher Rock (49˚09'N., 123˚38'W.), detached and steep-to, except on its W side, lies about 2.8 miles NE of the NE end of Valdes Island. A light is shown from a structure standing on this rock.

Gabriola Reefs (49˚08'N., 123˚38'W.), consisting of above and below-water rocks, extend about 2 miles S and SW of Thrasher Rock. Nanoose Hill, a notched peak, rises on the N side of Nanoose Harbor. Bearing 287˚ and just open to the N of Orlebar Point, this hill leads about 1 mile N of Thrasher Rock.

Gabriola Island (49˚09'N., 123˚48'W.) is located with its E side lying close N of Valdes Island.

Flat Top Islands (49˚09'N., 123˚41'W.), a group of nine, front Gabriola Island and are wooded. They lie on foul ground extending up to 1 mile offshore. Several constricted passages lead between these islands. Some of the passages are deep and unencumbered, but others are shallow and obstructed. Local knowledge is required for all the passengers.

Silva Bay (49˚09'N., 123˚42'W.) is used by small craft.

Orlebar Point (49˚12'N., 123˚49'W.) is the N extremity of Gabriola Island. The bold, wooded N side of the island recedes and vessels should stay at least 0.7 mile from the shore.

Entrance Island (49˚13'N., 123˚48'W.) lies 0.5 mile off Orlebar Point. This barren island has several conspicuous buildings, a radio tower, and a flagstaff situated on it. A light is

shown from a structure standing on the island and buoys, marking foul ground, are moored close SW and NW of it.

Forwood Channel extends between the island and Orlebar Point. This channel is deep, but constricted, and should not be used without local knowledge. Vessels bound for Nanaimo should pass to the N of Entrance Island.

Fairway Channel, one of three navigable channels leading to Nanaimo from the Straits of Georgia, lies on the N side of Tinson Point, the NW extremity of Gabriola Island.

Caution.—A submarine cable extends NE across Forwood Channel between Orlebar Point and Entrance Island.