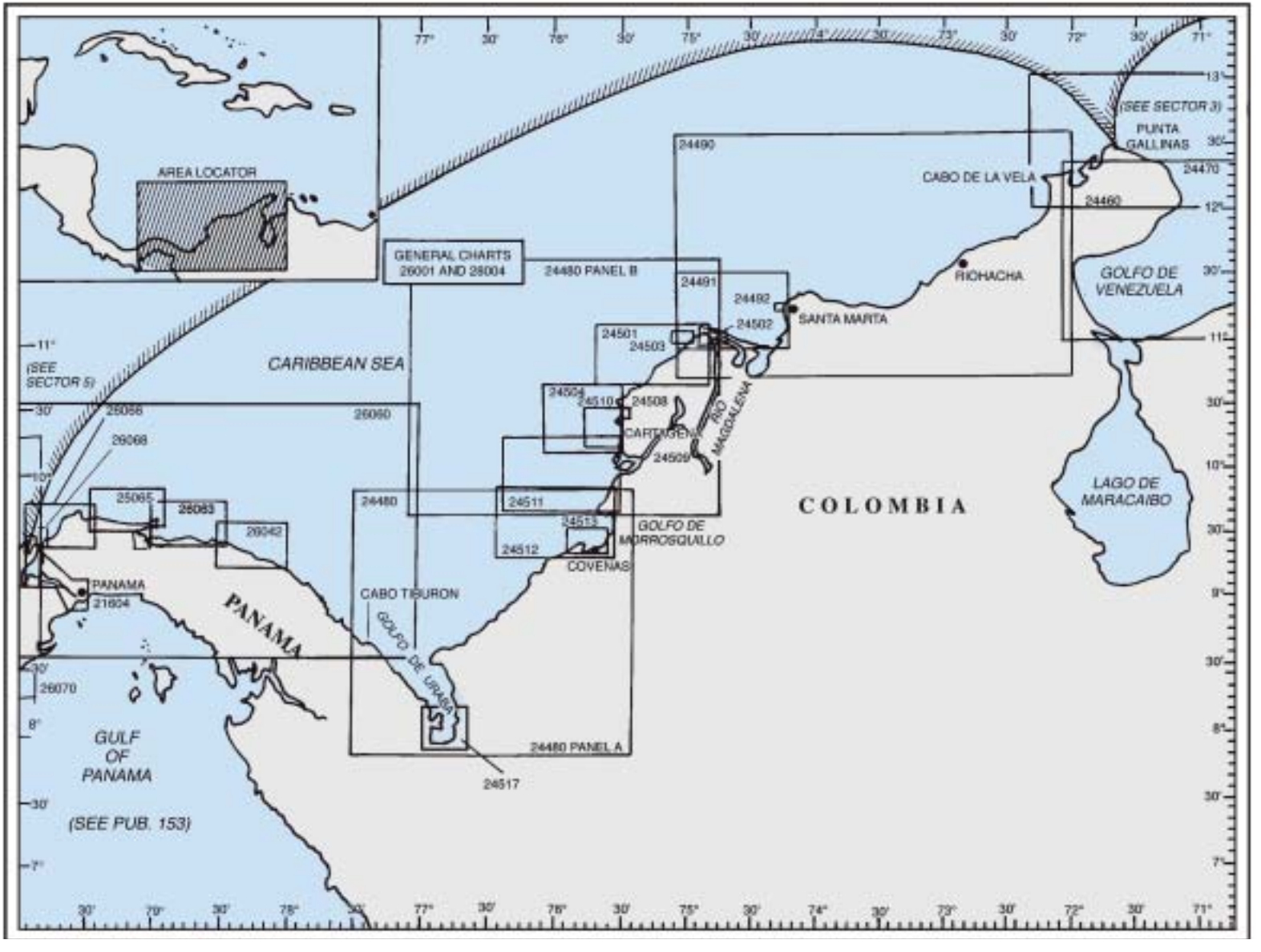
Select "See Sector" to be Hotlinked to that Sector



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

SECTOR **4** —CHAR T INFORMATION

Table of Contents

Table of Contents

SECTOR 4

COASTS OF COLOMBIA AND PANAMA—PUNTA GALLINAS TO AND INCLUDING THE PANAMA CANAL

Plan.—This sector describes the N coasts of Colombia and Panama, from Punta Gallinas to and including the Panama Canal. The descriptive sequence is from E to W.

General Remarks

4.1 Punta Gallinas and the Panama Canal in Panama, the E and W limits of the coastal area described, are about 530 miles apart in an approximate WSW-ENE direction. From Punta Gallinas, the coast first extends generally WSW for 205 miles to the mouth of the Rio Magdalena; then for about 200 miles and with considerable irregularity, it extends SW, sharply S, then SW again to Punta Caribana, the E entrance point of Golfo de Uraba.

Golfo de Uraba, with Bahia Colombia at its head, is a deep-water indentation 25 miles wide at its entrance, which extends 25 miles S from Punta Caribana. From Cabo Tiburon, the gulf's W entrance point, the coast extends NW for about 53 miles to Punta Brava, then WNW and W for 90 miles to Punta Manzanillo, the only indentations of any consequence are Golfo de San Blas, and of lesser importance are Santa Marta and Covenas.

Along this coastal stretch there are several bays of navigational importance and many sheltered anchorages. The major ports are Barranquilla and Cartagena; ports of lesser importance are Santa Marta and Covenas.

The N coast of Panama, between Punta Manzanilla and the entrance to the Panama Canal, extends SW for 27 miles. It is indented by numerous bays and backed by a mountainous topography for the first 22 miles; the remainder is lowlands. All of this coast is bordered by many closely off-lying islands and reefs.

Limon Bay, the principal bay, comprises the N inner approach to the Panama Canal and includes the harbors of Coco Solo, Colon, and Cristobal.

The Panama Canal, traversing the Isthmus of Panama in a SE direction for approximately 45 miles, connects Limon Bay on the Atlantic side to Panama Bay on the Pacific side.

Winds—Weather.— Except for the extreme E portion, this entire area is clear of the usual hurricane paths. The prevailing winds are the NE trades, which frequently assume a N or E direction, also a gusty character close inshore. These winds flow strongly from December to March and to a much lesser degree in the months of July and August. For the most part the winds are of a greater variety. The dry season is from November and December to April and May, often varying considerably and with the period of the E portion not entirely coinciding with that of the W. During the dry season, the winds are stronger and the climate is more favorable.

The wet season, comprising the other months of the year, is hot and humid and there is a great deal of evaporation. During the heavy rain squalls, many of which are of torrential intensity, the wind often flows with great fury for short periods. The annual amount of rainfall is much higher in the W part of this area.

During the dry season, the wind may freshen to a velocity of 15 knots in the vicinity of the Panama Canal, but frequently exceeds 20 knots for a period of 24 hours or more. During the wet season in the same locality, the average wind velocity is about 8 knots, but greater velocities are experienced during passing local rain squalls.

The Northers occasionally reach as far S as Limon Bay, during the NE trade wind season, occurring from October or November to April, inclusive. They are strong and steady from the NE to the NW, blowing toward the equatorial belt of low pressure from an anticyclonic area of high pressure lying to the N. When at their worse, they generally flow from the NW. Their approach cannot be foretold either by barometric readings or otherwise, and they last from 1 to 5 days, but their maximum strength, when the wind velocity may reach 30 to 40 knots, rarely exceeds 24 hours duration. The average occurrence of Northers is barely 1 per year, but the swells and seas that accompany them are heavy.

In the vicinity of Cristobal, fogs rarely average more than 4 or 5 a year and normally are of short duration.

Tides—Currents.—The current along the Caribbean Coast of South America is a continuation of that part of the Equatorial Current which enters the Caribbean Sea by way of the Gulf of Paria and the various passages, which lie between Trinidad and Martinique. Off Punta Gallinas its velocity is between 1 knot and 1.5 knots, at this point its W direction begins to include the S. From Cabo de La Vela the main body of the current sets generally to the W, sometimes inclining to the WSW, and it diminishes in velocity as it expands over a greater area. On nearing the mouth of the Rio Magdalena the current is sometimes diverted to the NE, caused probably by the discharge from that river and by a coastal countercurrent.

West of the Rio Magdalena, a part of the main current is deflected SE into the Golfo de Uraba; between this part and the shore is the countercurrent. Off the Islas San Bernardo the countercurrent has a velocity of 0.4 to 1.5 knots and its direction is usually NE. From Golfo de Morrosquillo, SW and W, the coastal current is the general countercurrent of the area, the average velocity being from 1 to 2 knots, and in confined places 2.5 to 3 knots.

In the approach to Punta Manzanillo and the Panama Canal, from the vicinity of the mouth of the Rio Magdalena, it has been observed that there are various components both of the main Equatorial Current and of the general countercurrent. There also are certain irregularities, largely unpredictable, most probably due in greater or lesser measure to the influences of winds and to the discharge of rain swollen rivers. Occasionally, the normal current circulation may become so strongly affected that its direction may completely reverse

itself while a hurricane is in progress to the N. The N gales which occur from time to time in the W Caribbean are very likely to accelerate the countercurrent, the reaction to such an acceleration may temporarily discharge the normal current pattern over a very wide area.

So complex are the convergence, divergence, and other characteristics of the Caribbean current system that navigators of this area are cautioned to be especially alert at all times, taking nothing for granted and not hesitate to change quickly to a safer course should there seem to be even the slightest possibility of running into danger because of current vagaries.

Punta Gallinas to Cabo de la Aguja

4.2 **Punta Gallinas** (12°28'N., 71°40'W.) has been previously described in paragraph 3.9. A shoal, with a depth of 11.9m, was reported to lie 13 miles W of Punta Gallinas.

Bahia Hondita (12°24'N., 71°44'W.), a small indentation about 5.5 miles SW of Punta Gallinas, is shallow and of no commercial importance. Punta Soldado is the rocky S entrance point to the bay. A conspicuous white house stands on the point.

Anchorage can be taken about 1 mile NW of Punta Soldado, in a depth of 12.8m, sand and gravel.

Bahia Honda, adjoining Bahia Hondita to the SW, is considerably larger and has depths of 9 to 12m in its central part. Anchorage can be taken in this bay, but it is reported to be less sheltered than off Bahia Hondita.

Punta Canon (12°23'N., 71°49'W.), the W entrance point to Bahia Honda, is bordered by very steep cliffs, 30m high, and surmounted by imposing hillocks which are easily identified from seaward. Banco Boca, a rocky area with two rocks with less than 1.8m, lies about 1 mile ENE of Punta Canon. Banco Boca can be seen during a smooth sea. An 11m depth lies 0.5 mile N of Banco Boca. Vessels entering the bay should pass close E of these two dangers. The E shore of this bay is low, sandy, and constantly changing due to high winds and changing sands.

From Punta Canon, the coast trends about 10.5 miles SW to Punta Coco, the NE entrance of Bahia de Portete. This stretch of coast is low, sandy, and bordered by rocky shoals. The coastal bank, as defined by the 30m curve, lies up to 3 miles off this coast.

Puerto Chico, a small bay, lies 1.5 miles SW of Punta Canon. A 4.6m high islet is located in Puerto Chico. Punta Coco rises to a prominent, rocky hill about 18m high.

Punta Gran Tonel, the SW entrance to Bahia de Portete, is bordered on its E and S sides by cliffs, 15 to 27m high.

Bahia de Portete (12°15'N., 71°55'W.), located about 10 miles SW of Bahia Honda, is entered between Punta Coco and Media Luna, a cliffy point 1 mile SSW. Local knowledge is necessary when entering the bay.

Caution.—The Columbian authorities have advised vessels to exercise care when sailing within coastal waters in depths of less than 30m, as the hydrographic information shown on the charts is derived from old survey data.

Puerto Bolivar (12°16'N., 71°57'W.)

World Port Index No. 11946

4.3 Puerto Bolivar is situated on Bahia de Portete's SW entrance point. The harbor has berths which will handle a variety of cargoes, but handles mostly bulk coal.

Winds—Weather.—The prevailing winds here, from the NE or NNE, are usually light in the morning, but may increase to force 6 by evening.

Tides—Currents.— Tidal and current information for the port is not available at present, but the average tidal range is reported to be 0.3m.

Depths—Limitations.—The dredged channel, entered 2 miles NNW of the bay's SW entrance point, shows a least charted depth of 17.4m as far as the coal berth. The channel is 1.9 miles long and 225m wide. A turning basin lies S of the coal berth; it has a radius of 600m and a dredged depth of 11.5m.

The coal pier will handle vessels up to 270m in length and has an alongside depth of 19.5m. A ro-ro berth, 100m long, is situated alongside a floating pontoon SSE of the coal berth. A commodities pier, 280m long, is situated SSE of the coal berth and can handle vessels up to 15,000 dwt and 11m draft.

Tankers up to 25,000 dwt utilize the pier's E face, while general cargo vessels berth along the W face.

Vessels up to 150,000 dwt, 300m in length, 45m beam, and 17m draft can be accommodated in the port.

Aspect.—Punta Coco has already been described in paragraph 4.2. Piles of coal lie on the bays SW entrance point, while two white tanks stand close S of the commodities pier. A conspicuous red and white checkered tank stands 1.3 mile further SSW.

The dredged channel is marked by lighted buoys and a lighted range.

It was reported (1995) that Buoy No. 5, Buoy No. 6, Buoy No. 7, and Buoy No. 8 are missing; that Buoy No. 2 is unlit;and that Buoy No. 3 is off station.

Pilotage.—Pilotage is compulsory. The pilot boards 2.5 miles NW of Buoy No. 2. Vessels should send an ETA 72 hours prior to arrival. Vessels should establish contact on VHF channels 14 or 16 at least 2 hours prior to arrival to obtain berthing assignment.

Regulations.—See Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea for details on regulations pertaining to vessels in Colombian waters.

Entry to the port is restricted. Permission should be obtained from the port authorities before proceeding to the anchorage, quarantine area, or the piers.

Bulk cargo vessels arriving in ballast are restricted to a maximum draft of 9m, as they are swung in the turning basin before being berthed. Arriving vessels must be carrying clean ballast in segregated tanks, with their holds swept clean. Bulk vessels must be gas free.

Signals.—The port authorities may be contacted on VHF channels 14 or 16 for berthing or anchoring instructions.

Anchorage.—The anchorages are open to NE winds. The charted general anchorage area, situated 2 miles NW of the bay's SW entrance point, has depths of 5 to 27m over sand. The

Quarantine Anchorage area, centered 5.3 miles W of the same point, has depths of 11 to 37m over sand.

Caution.—Caution is advised in the entrance channel, as a vessel reported encountering a SW cross-channel set. The current reportedly caused a leeway of 10˚ until Buoy No. 7 and Buoy No. 8 were passed.

4.4 Pilon de Azucar, 10.8 miles W of the entrance to Bahia de Portete, is a very prominent, sharp, rocky hill rising to a height of 81m. A white statute, 6m high, stands on the summit of this hill.

From Pilon de Azucar, the rocky coast trends about 3 miles SW to Cabo de La Vela (12˚13'N., 72˚10'W.), which is bordered by very steep cliffs on its N side. It is topped by a few conspicuous rocky hills, 45 to 81m high. Cabo de La Vela is low and sandy on its S side.

Isla Cusachon, a small low islet, lies close W of the cape. Cerros del Carpentero, a group of hills, rise to a considerable height about 5.5 miles SE of the cape and about 17 miles S. A short distance inland there is an unusual conical hill, mostly chalky in appearance.

Cabo de La Vela is marked by a light and reported to be radar conspicuous. A dangerous wreck lies 2 miles SSW of the cape.

Anchorage.—Anchorage, partially sheltered from the wind and seas, can be taken S of the outer extremity of the cape, in depths of 12 to 16.5m. Care must be taken to avoid the dangerous wreck S of the anchorage.

Punta Carrizal (12˚01'N., 72˚11'W.), located 13.5 miles S of Cabo de La Vela, is a low, rounded point.

Punta Castilletes (11˚50'N., 72˚20'W.) lies 24 miles SSW of Cabo de La Vela. This part of the coast is low and Punta Castilletes can only be recognized by a clump of mangroves near it. Cerro de Los Remedios stands 16 miles inland and 5 miles farther NE is Cerro de Carrizal. These hills are the only elevations between Cerros del Carpintero, near Cabo de La Vela, and Cabo San Augustin, 105 miles SW.

4.5 **Manaure** (11˚46'N., 72˚27'W.), an open roadstead for loading bulk salt, lies about midway between Punta Castilletes and Punta Manaure, about 13 miles WSW. Vessels approach from the N and anchor, as convenient, 2 miles from a pier. Cargo is loaded from lighters at the anchorage. A light is shown, at an elevation of 27m, at Punta Manaure.

The coast between Punta Manaure and Punta de La Cruz, 13 miles WSW, has several small projections. Shallow water extends up to 2 miles offshore and vessels are cautioned to transit the area outside the 20m curve, which lies 3.5 miles from the shore.

Caution.—A submarine gas pipeline extends 6 miles NNW from the coast, originating 8 miles WSW of Punta Manaure. This pipeline is marked by orange buoys and a drilling platform (11˚47'13"N., 72˚46'51"W.) is situated at its seaward end. Precautions must be taken when navigating near this restricted area.

Bajo Pajaro (11˚43'N., 72˚44'W.), 8 miles W of Punta Manaure, is a dangerous sand bank, with depths of 3.7m between it and the shore. The outer edge is reported to lie 2 miles offshore and is reportedly always marked by breakers.

Between Punta La Vela and the mouth of Riohacha, about 11 miles SW, the coast is low and presents no conspicuous features.

Riohacha (11˚34'N., 72˚55'W.), with the town of the same name along its banks, lies 24 miles SW of Punta Manaure. The river is reported to have a navigable depth of 3.7m, but cargo is lightered out to the anchorage to be loaded. Only small coasters frequent this port. A light is shown W of the town.

Anchorage.—Anchorage can be taken off the river mouth, in a depth of 9m, with the church in the town bearing 160˚. This anchorage is exposed and is not recommended from December to May because of the heavy swells which set in.

4.6 Punta Caricare, 16 miles SW of Riohacha, separates two large lagoons. Banco Navio Quebrado, a shoal with a depth of less than 3.7m, lies about 2.5 miles NW of this point.

From Riohacha to Dibulla, the coast extends SW for 30 miles and then takes a W direction for about 39 miles to Cabo San Juan de Guia. This latter cape is radar conspicuous.

Anchorage can be taken off a small town near Dibulla. Vessels anchor more comfortably here than at Riohacha.

La Mesa is a very prominent flat-topped hill standing 2 miles inland, about midway between Cabo San Augustin, 15.5 miles W of Dibulla, and Punta Don Diego, 7.5 miles farther W. A steep-to 14.6m bank is reported to lie about 3 miles N of Punta Don Diego. A dangerous wreck, with two masts above water, lies 2 miles NNW of the point.

Sierra Nevada de Santa Marta (10˚49'N., 73˚48'W.) are remarkable high mountains standing 25 miles S of Cabo San Augustin. The most prominent are two, snow-capped, sugarloaf peaks, the highest having an elevation of 5,700m. These mountains constitute the only really conspicuous landmarks on this coast for over 100 miles in either direction and can be seen clearly for a great distance offshore.

Los Ancones are a group of small islets and coves which lie between Cabo San Juan de Guia and Cabo de La Aguja. The coves are free from dangers and provide good shelter. They are separated by bold, rugged headlands that are steep-to. When viewed from the W, they appear as a group of islands.

Cabo de la Aguja to Punta Canoas

4.7 **Cabo de La Aguja** (11˚18'N., 74˚12'W.) is a short, bold projecting headland, with Islote del Cabo de La Aguja located close N of it. The cape has been reported to be radar conspicuous.

From Cabo de La Aguja to Punta Canoas, about 90 miles SW, the coast is generally low and flat. West of the Rio Magdalena, the flatness is relieved by a series of coastal hills. Puerto de Barranquilla and Santa Marta are the only two ports of any commercial importance along this section of coast.

Ancon De Taganga (11˚16'N., 74˚12'W.), 2.3 miles S of Cabo de La Aguja, is surrounded by high land. Some remarkable white cliffs stand in the vicinity and can be seen for a distance of 10 to 12 miles offshore. These cliffs are good marks for Santa Marta, as there are no others of the same appearance on this part of the coast.

Islote del Cabo de La Aguja, a small irregular islet, lies about 0.5 mile N of Cabo de La Aguja. The fairway between them is fouled by two above-water rocks. Two above-water rocks lie within 0.5 mile W and NW of the islet.

Santa Marta (11˚15'N., 74˚13'W.)

World Port Index No. 11940

4.8 Santa Marta, a small commercially-important port, stands in the NE corner of Bahia Santa Marta. This bay consists of an open roadstead protected from the prevailing NE winds.

Winds—Weather.—The prevailing winds are the Northeast Trade Winds, which assume a gusty character when they reach the port after passing through the hills. Between the months of March and December, a local wind extending 2 to 3 miles offshore blows from the SW between 1000 to 1300 hours.

Tides—Currents.—There is no regular tide in Bahia Santa Marta, but in the month of March the water has been known to rise about 1.2m.

Depths—Limitations.—Except for the shoal on which El Morro stands, the depths in the approach are deep and regular. Banco Pobea, as defined by the 5m curve, is a coastal bank that extends up to 0.3 mile off the E shore of the bay. It was reported extending W because of the silt flowing from the river close S of the town. There are general depths of 9 to 37m and nowhere in the approach to the berthing facilities are the charted depths less than 9m.

The cove at the N end of Bahia Santa Marta has seven quays, numbered 1 through 5 from seaward on the E side and 6 and 7 on the W side.

Quay	Length	Depth
1 (old 6)	100m	4.5m
2 (old 1)	180m	10.9m
3 (old 2)	140m	10.9m
4 (old 3)	240m	12.1m
5	94m	6.1m
6 (old 4)	150m	18.2m
7 (old 5)	156m	10.6m

Aspect.—The town of Santa Marta stands on the E shore of the bay. Isla El Morro (Morro Grande), a precipitous islet, 61m high, with the ruins of a fort on it, lies in the NW part of Bahia Santa Marta. Two rocks, awash, lie close W of the islet. A light, with a racon, is shown from the island

Isla El Morro

Morro Chico, a conical rocky islet, 25m high, stands close W of the N entrance to Santa Marta.

Inland of the extensive plain that fronts the shore are the lofty Sierra Nevada de Santa Marta that rise 40 miles SE of the town. These peaks are good marks for vessels intending to enter the bay. In the event these peaks are obscured, San Quemedo, the highest mountain at the S end of the range behind the town, will be visible and may be used as a mark for entering the bay.

A cathedral, with one dome, situated near the center of the town and a radio tower N of it are conspicuous. A white stone monument stands on the summit of a hill, about 0.8 mile NNW of the cathedral. Several tanks also stand in this vicinity.

Pilotage.—Pilotage is compulsory for all vessels larger than 200 grt. Vessels should send ETA 24 hours in advance. Vessels should contact port control, on VHF channel 11, 4 hours prior to arrival. Pilots usually board vessels 0.4 mile SSW of Isla El Morro light.

Anchorage.—Vessels will find good anchorage as charted SE of Isla el Morro, in depths of 38 to 49m, with the cathedral bearing 090˚ or less. Because of the Northeast Trade Winds, vessels should allow a good scope of chain due to the strong winds, the depths, and the shelving bottom.

4.9 Between Santa Marta and the Rio Magdalena, 37.5 miles WSW, a bay is formed by the coast receding 14.5 miles S to San Juan de Cienaga and then extending regularly WNW an additional 35 miles. The S shore consists of low, marshy land backed by extensive shallow lagoons. There are no known off-lying dangers seaward of the 20m curve.

Punta Gaira (11˚13'N., 74˚14'W.) is a bluff, with two above-water rocks lying close off it. Cliffs, with occasional sandy beaches, border the coast for 0.8 mile in a NE direction from Punta Gaira. There is a quay for barges, 110m long, which has a depth of 5.5m alongside.

4.10 Pozos Colorados (11˚09'N., 74˚15'W.) (World Port Index No. 11935) is an offshore loading berth for oil.

Depths—Limitations.—The berth consists of seven mooring buoys. It can handle vessels up to 70,000 dwt, 250m in length, and 18m draft. Several conspicuous tanks are situated on the shore NE of this offshore berth, and a submarine pipeline extends from the berth NE to the shore near the tanks.

Aspect.—A conspicuous church, with a spire, stands in the town of San Juan de Cienaga, 8 miles S of the oil berth. A lighted range, in line bearing 085.5˚ leads to the berth. A lighted SPM buoy, with a racon, is located NW of the submarine pipeline.

Pilotage.—Pilotage is compulsory and Pozos Colorados is a port of entry. Vessels should provide an ETA at least 24 hours in advance of arrival. The pilot boards from a launch about 1 mile seaward of the offshore berth. Ships will not be berthed at night.

Anchorage.—Anchorage can be taken S of the terminal, in a depth of 7.3m, with the church spire situated 2.5 miles WSW of Cienaga bearing 160˚, distant 2.5 miles. Vessels arriving at night anchor 1 mile seaward of the terminal.

4.11 Puerto Zuniga (11˚08'N., 74˚13'W.) is an open roadstead port for the export of coal located on the coast S of Pozos Colorados. Vessels anchor 1 to 2 miles offshore where they are loaded by barges and floating cranes. The port consists of two additional facilities; Puerto Prodeco (Puerto Carbonero) and Puerto Drummond (Puerto Carbonero de la Loma). Puerto Prodeco has two berths, identified as Alpha Bravo and Alpha Sur. Both are contained in an anchorage 2 to 2.5 miles W and NW of the T-head shore terminal. Puerto Drummond has two lighted mooring buoys on the SW limit of the same anchorage approximately 3.5 miles NW of its pier.

The coast between Puerto Zuniga and Punta Faro, 40 miles to the W, is low and swampy. It fronts the lagoon Cienaga Grande de Santa Marta. The coast is undergoing constant change and charted depths may be inaccurate. Caution is advised in the vicinity of this stretch of coastline.

Puerto de Barranquilla (11˚00'N., 74˚48'W.)

World Port Index No. 11930

4.12 Puerto de Barranquilla comprises the outer 10 miles of the Rio Magdalena, which is the main artery of commercial traffic of Colombia. The wharves and the city are situated 10.5 miles within the river mouth which is navigable under normal conditions for a distance of 800 miles inland. Small local vessels can ascend to the city of Dorada, 592 miles upriver.

Winds—Weather.—The Northeast Trade Winds blow strongly from December to March and again, but to a lesser extent, from July to August. Winds from the other direction are generally light. The locality is out of the hurricane area.

At times, entry cannot be made when the trade winds blow. Generally, these winds and accompanying seas moderate during the night so that the early morning hours are the most desirable time of entry.

Tides—Currents.—The tidal range is about 0.3m at the river entrance, but is very irregular. The rise has very little effect on the river current which always flows out.

When the water level is low in the river, generally from February to April and August to October, the river current does not exceed 2 knots. When the water level is high in the river, generally in July and November, the current attains a velocity of up to 6 knots, and floating debris and logs are encountered. The discolored water discharged from the river may be seen a long distance seaward of the entrance.

An ocean current, which varies according to the direction of the wind, sets across the river entrance. It normally sets E, but during the period of the Northeast Trade Winds, there is a slight increase in the height and a noticeable steeping and shortening of the waves. This is greatest at high river and on a rising tide during the period of the NE trades. At such times, an entering vessel is best navigated at a good speed.

Depths—Limitations.—The approaches are deep and the 20m curve lies close N of the breakwaters at the mouth of the river. A shoal, with a depth of 7.5m, lies 2.3 miles WNW of the head of the W breakwater; and dangerous wrecks lie about 1 mile WSW and close NNE of the W breakwater.

Mariners are cautioned not to attempt to enter the river without the most recent information concerning depths and other conditions from the local authorities, as depths in the entrance are subject to silting. The maximum draft is authorized by the port administration on the basis of soundings taken every other day.

The maximum size vessels allowed to enter Puerto de Barranquilla are 187m in length, 27m in beam, and a draft of 8.5m. Dredging operations are continuous. Extensive shoaling has been reported immediately W of the W breakwater head. Less water than charted was reported (1974) to lie about 1 mile NE of the E breakwater.

It has been reported (1997) that a 150m wide channel, maintained to a depth of 9.4m and marked by lighted ranges and buoys, extends from the river entrance at Bocas de Ceniza (11˚06'N., 74˚51'W.) to Puerto Barranquilla.

Aspect.—The coast E of the river entrance consists of flat sand dunes. To the W of the entrance, the coast consists of flat, partly wooded islands. An old disused lighthouse stands 3 miles SE of the entrance and a conspicuous building stands 2 miles farther E. A conspicuous white sand hill, 8m high, stands 1 mile E of the old lighthouse. A conspicuous pilot house stands 0.3 mile SSE of the W breakwater head. The breakwater heads are reported to be radar prominent.

Pilotage.—Pilotage is compulsory for all merchant vessels. An ETA should be sent 24 hours in advance. The pilot boards 1.5 miles WNW of the breakwater; if the pilot is unable to board because of heavy swell, the pilot vessel will lead the vessel into the river.

Pilots can be contacted on VHF channel 13 and 16. The pilot vessel can be contacted on VHF channel 14.

Anchorage.—Anchorage can be taken, in depths of 18 to 22m, as close as 0.8 mile W of W breakwater. However, vessels are advised that a dangerous wreck lies about 1 mile WSW of the head of the W breakwater. This wreck is not visible and vessels are advised that when anchoring, a safe distance of at least 1.5 miles should be maintained from the W breakwater. Vessels are also advised to obtain good soundings prior to anchoring because the depths increase rapidly to the N and W of this anchorage.

The coast between the Rio Magdalena and Punta Hermosa, 13 miles SW, is formed by a succession of flat, wooded lands.

Isla Verde, the W of these islands, is a low spot of land covered at all stages of the tide, with its S extremity extending SW.

Caution.—Because of the constant changing limits of these islands and the submarine cables in the vicinity, vessels are advised to navigate with care when in this vicinity.

4.13 Bahia de Sabanilla (11˚00'N., 75˚00'W.) recedes 4 miles E between Isla Verde and Punta Morro Hermosa, 2.5 miles S. This point, marked by a light, rises in steps to an elevation of 124m and is yellowish. Depths of 9 to 18m exist in the central part of the bay, but are reported to be much less around the shores because of silting. A stranded wreck is located 4.5 miles W of Punta Sabanilla. Vessels are cautioned not to approach within 1 mile of the pier head at Puerto Colombia, in the SE part of the bay. This port was formerly used by commercial vessels, but is no longer in service.

It has been reported that no shelter is provided from the prevailing winds within the bay in sufficient depths for a vessel to lie with safety. Winds up to 20 to 25 knots can generate seas up to 2.4 to 3m.

Between Punta Morro Hermosa and Punta de La Garita, the coast extends about 4 miles S and then about 15 miles SW. Hills up to 122m high stand close to the coast with higher hills inland. Except for a detached 7.3m shoal lying about 4.5 miles NE of Punta de La Garita, depths of over 9m extend to within 1.5 miles of the shore.

An unnamed point, located 6 miles SW of Punta Hermosa, is reported to be radar prominent.

Punta de La Garita (10˚48'N., 75˚16'W.) is a low, sandy projection. A conspicuous tower and a building stand 0.8 mile S of this point.

Between Punta de La Garita and Punta Canoas, the coast extends 21 miles SW and is bordered by a large coastal bank. This bank, including the detached dangers with depths of 6.4m lying off its outer end, extends up to 8 miles seaward, about 11 miles W of Punta de La Garita.

This section of coast is generally low and sandy, with lagoons close within the beaches in places, but a group of hills approach the coast 8 miles SW of Punta de La Garita and also 15 miles SW of the point.

Punta Canoas to Punta Caribana

4.14 **Punta Canoas** (10˚34'N., 75˚31'W.), low and rocky, is closely backed by hills. Several shoal depths lie within 1.5 miles of the point.

Between Punta Canoas and Punta Caribana, 143 miles SW, the coast extends S for 70 miles to the small port of Covenas, in the S part of Golfo de Morrosquillo. It then extends for 25 miles in a general W direction and continues S for an additional 64 miles. This coast presents a varied aspect of high, steep land, narrow coastal plains, low shores covered with mangroves, and prominent hilly landmarks. There are several bays and inlets off this section of coast, the most important being Bahia de Cartagena, in which lies the port of Cartagena. There are numerous small towns and villages along this stretch of coast, but the aids to navigation are sparse.

Caution.—Several submarine exercise areas, which may best be seen on the charts, lie 13 miles WNW and 18 miles W of the summit of Isla Tierra Bomba, just N of the S entrance point of Bahia de Cartagena. As these areas are reserved for the Colombian Navy, vessels are requested to navigate with care and keep a good lookout in this vicinity.

Between Punta Canoas and the city of Cartagena, 8.5 miles S, the coast is low to Punta Manzanilla, a conspicuous gray and white cliff, 46m high, about 4 miles S. Punta Manzanilla is reported to be radar prominent.

Banco Playa Grande, as defined by the 20m curve, lies between 3 and 5 miles offshore and has depths of less than 9m extending up to 3.5 miles WSW from Cartagena.

Bancos de Salmedina (10˚23'N., 75˚40'W.), two detached shoal areas of sand and coral, lie between 3 and 6.5 miles offshore, about 14 miles SW of Punta Canoas. The W bank has a reported least depth of 4.5m and is separated from the E most bank by a passage, about 1 mile wide. Breakers have been reported over this bank. The E bank has a least depth of 4m and is marked by a light on its NW side.

Cartagena (10˚25'N., 75˚32'W.)

World Port Index No. 11910

4.15 Cartagena, the largest and most secure harbor on the N coast of Colombia, lies in the E part of Bahia de Cartagena to the E of Isla Tierra Bomba and Isla Draga. Boca Chica, the entrance to the bay, lies between these two islands 6.8 miles SSW of the city of Cartagena. Ample alongside berthing facilities are provided for vessels of all classes able to enter.

Bahia de Cartagena is an irregularly-formed bay, sheltered on its E side by the mainland and on the W and S sides by Isla Tierra Bomba. A submerged rock wall extends between Isla Tierra Bomba and the W point of Boca Grande, providing shelter for the N anchorage area. This submerged wall encloses an inner harbor, an outer harbor, the bight in the N part of the bay, the facilities fronting the city, and the oil terminal of Mamonal.

Most of the shoals which lie in the outer parts of both the inner and outer harbor, and which are considered to be obstructions to vessels entering and leaving, are marked by lighted buoys.

Winds—Weather.—In the season of strong winds, from January to June, the sea breeze sets in from the W and then veers NW; at about noon, it blows parallel to the coast.

During the wet season, from April to October, the climate is hot, and in the early morning, land breezes are usually preceded by rain squalls of short duration. During the dry season, from November to March, the winds are stronger and the climate more healthful.

Tides—Currents.—The mean HW interval at Cartagena is 11 hours 42 minutes. The maximum range is about 0.8m and the mean range is 0.3m.

The tidal current off the entrance to the inner harbor sets ESE during the flood at a velocity of 0.5 knot and to the W at the same velocity during the maximum ebb.

Depths—Limitations.—The entrance channel through Boca Chica has a general depth of 11.9m. The general depths in the outer harbor are 23.8 to 29.3m and 10 to 18.3m in the inner harbor. The E channel of the inner harbor has a least depth of 11.9m.

The port authorities at Cartagena would like to prohibit passage of medium and deep-draft vessels through the present channel at Boca Chica due to the deteriorating effect of the channel. The maximum draft allowed via Boca Chica is 11.4m and the channel cannot be easily deepened due to the rock bottom.

Pier facilities at the Maritime Terminal are, as follows:

Berth	Length	Depth alongside
1	202m	6.4m
East Pier	40m	9.5m
2	202m	9.5m
3	184m	9.1m
4	134m	8.3m
West Pier	40m	10.6m
5	202m	11.8m
6	184m	11.8m
7	258m	12.2m
8	268m	12.2m

Mamonal is a zone of privately-owned industrial berths situated 5 miles S of Cartagena. The facilities are, as follows:

Berth	Length	Depth alongside	Remarks
Meat	—	6.7m	Maximum vessel length is 152m.
Cement Factory	150m	12.2m	Maximum vessel length is 170m. Maximum draft is 10.36m.
Soda Solvay Co.	70m	9.4m	
Abocol	152m	7.3m	
Petroquimica	70m	7.6m	
BASF	76m	7.9m	Maximum vessel length is 152m. Vessels enter during daylight hours only.
Dow	—	8.5m	Maximum vessel length is 152m. Vessels enter during daylight hours only.

There are two oil terminals in the bay. Refinery Terminal (Mamonal Oil Terminal) consists of a T-head loading platform connected to the shore by a trestle. Nester Pineda Terminal (Ecopetrol Oil Terminal) consists of an isolated loading platform connected to the shore by seven submarine pipelines. The mooring master boards about 0.5 mile off each facility and remains onboard throughout the stay of the vessel.

The size vessels that can safely berth at each terminal are, as follows

	Maximum	Minimum
Refinery Terminal		
Length	260m	150m
Beam	38m	19.8m
Draft	10.97	—
Size	85,000 dwt	12,000 dwt
Nestor Pineda Terminal		
Length	260m	175m
Beam	38m	25m
Draft	10.97m	—
Size	85,000 dwt	25,000 dwt

Aspect.—Colina de La Popa, a 156m high hill with the ruins of an old convent and an illuminated cross near the top, stands 1 mile E of the city. The city has many conspicuous spires, stacks, and towers. Obstruction lights are displayed from some of these towers. The radio tower at the summit of the hill (10° 20.5'N., 75° 34.7'W.) and the tower at the pilot station are reported to be conspicuous. A hotel, with twin spires which are illuminated at night, stands near the beach on Castillo Grande SW of the city. As there are many high-rise hotels in the area, this hotel is conspicuous in daylight because of its low profile and red tile roof. The summit of Isla Tierra Bomba is 84m high.

Radar prominent landmarks include the cliffs on the W point of Isla Tierra Bomba, Fort San Fernando, the Mamonal oil pier, the water tower E of Isla Bruja, the tank N of the oil pier, Punta Chabo, Punta de La Playa de Viente, and Punta Castillo Grande.

Pilotage.—Pilotage is compulsory for merchant vessels and is available 24 hours. The pilot boards 0.8 mile SW of the fairway light buoy, in the entrance to Boca Chica. The signal for a pilot by day is the prescribed signal from the International Code of Signals and also four long blasts for tankers and three long blasts for all other vessels. It is advisable to notify the pilotage office 24 hours prior to arrival to avoid delay. Pilots can be contacted via VHF channels 11, 13, and 16 at anytime.

Regulations.—Vessels should not pass one another in Boca Chica. Vessels entering the harbor should give way to vessels leaving the harbor.

Anchorage.—There is good anchorage in the outer harbor, in a depth of 27m, mud and good holding ground, SW of Punta Castillo Grande. In the inner harbor there is anchorage, in depths of 14 to 16.5m, mud, about 0.3 mile SW of the W pier. A restricted anchorage for naval vessels is situated E of the naval base and N of Punta Castillo Grande.

There are additional specialized anchorage areas for tankers and vessels using Mamonal Port; these are best seen on the charts.

Caution.—A restricted area, reserved for naval operations of the Colombian Navy, lies in the SW approach to Bahia de Cartagena and may best be seen on the chart. Mariners are requested to navigate with care and to stay clear of the restricted area.

4.16 Islas del Rosario (10° 11'N., 75° 45'W.) consist of several islands standing on the detached banks that extend up to 9.5 miles W through points lying 6.3 miles NW from Punta Baru. Isla Tesoro, marked by a light, the northernmost island of the group, is small, sandy, and surrounded by foul ground which extends up to about 0.8 mile offshore. A bank, with a least depth of 5.5m, lies with its shallowest part about 1.8 miles NNE of Isla Tesoro.

Isla del Rosario, the southernmost island of the group, lies 5 miles W of Punta Baru, is marked by a light, and is covered with palm trees. Isla Grande, the largest of the group, is low and lies 2.3 miles ENE of Isla del Rosario.

The depths between the islands are very irregular and there are many rocks and reefs. The outermost bank lies 3.3 miles W of Isla del Rosario and has a least depth of 11.6m.

Caution.—These banks, as well as Bajio Tortuga, described below, constitute a danger in the S approach to Bahia de Cartagena and should be given a wide berth.

The channel between and inside the islands and shoals should not be attempted without local knowledge.

Depths in the vicinity of Islas del Rosario, Bajio Tortuga, and W of Isla Baru may be less than charted.

4.17 Bajio Tortuga (10° 05'N., 75° 52'W.), with depths of 4.6 to 18.3m, lies between 3 miles and 9.5 miles SW of Isla del Rosario.

Isla San Bernardo are a group of low rocks, wooded cays, and shoal banks that extend up to 13.5 miles W through about 14.5 miles NW from Punta San Bernardo (9°42'N., 75°42'W.). Isla Tintipan, the northernmost cay of the group and the largest, lies 9.3 miles NW of Punta San Bernardo. The southernmost cay, Isla Ceycen, lies 9.8 miles W of the same point.

Canal Salamanquilla is a narrow navigable channel, with depths of 20.1m, between the coastal bank extending N from Punta San Bernardo and the bank surrounding the E cay of the group 3.3 miles NW of the point. Another channel, about 1 mile wide and with a least depth of 29.3m, lies between the latter bank and the shoals surrounding the main group of cays.

Between Punta Baru and Punta San Bernardo, a low sandy point, about 26 miles S, the coast recedes about 9 miles NE to form Bahia de Barbacoas, about 7 miles E. This bay has no commercial importance to shipping.

Golfo De Morrosquillo (9°35'N., 75°40'W.) recedes about 8 to 10 miles E between Punta San Bernardo and Punta Mestizos, 7 miles SSW. The low coast is fringed by mangroves and wooded swamps. A conspicuous tank and a church stand in the town of Tolu, 12.5 miles SE of Punta San Bernardo; several small jetty walls, which are radar conspicuous, extend a short distance from the beach just in front of the town. **Roca Morrosquillo** (9°36'N., 76°00'W.), a coral shoal consisting of two heads, one with a depth of 9.1m, the other, located 0.3 mile N, with a depth of 21m, is marked by a lighted buoy and a racon. The shoal lies in the approaches to Covenas Offshore Oil Terminal

4.18 Covenas (9°25'N., 75°41'W.) (World Port Index No. 11900), an oil-loading port, stands on the S side of Golfo de Morrosquillo. A water tank in the village is a good landmark.

Pilotage.—Pilotage is compulsory. A docking master boards vessels from a tug/pilot boat and leaves the dock on sighting the vessel. The pilot embarks about 2.5 miles NE of Buoy TLU-3, which is marked by a light with a racon, or at the anchorage. An ETA should be sent 72 hours, 48 hours, and 24 hours in advance. Mooring is limited to daylight hours; however, unmooring can be undertaken at any time. A compulsory arrival safety inspection will be conducted by the cargo loading master.

Anchorage.—Vessels awaiting customs and quarantine inspection should anchor in the quarantine anchorage established as best seen on the area chart. After being cleared for entry, vessels may proceed E to the designated anchorage area, as shown on the chart, and anchor in depths of 30 to 36m, mud. Strong SE winds prevail in Golfo de Morrosquillo, during the month of December.

Caution.—Anchorage and all other bottom activity is prohibited in the area spanning Punta Bolivar and Punta de Piedras, extending in a NW direction for a distance of about 10 miles from the pier head. Submarine pipelines have been laid in this area for the purpose of cargo transfer. Reference should be made to the area chart.

4.19 Covenas Offshore Tanker Terminal (9°31.7'N., 75°47.2'W.), lying NW of Puerto Covenas, consists of an SPM. It is situated about 9.8 miles NW of Covenas. A Tanker Loading Unit (TLU), consisting of an SPM, is moored 6.5 miles NNW of Covenas. Two more units are moored 7.8 miles NW of Covenas.

Tankers may berth by day or at night. At the SPM, vessels are limited to 180,000 dwt, a maximum length of 300m, and a maximum draft of 35m. They are also limited to a minimum size of 55,000 dwt, and a minimum length of 220m. At the TLU, vessels are limited to a maximum length of 300m and a maximum draft of 25m.

Pilotage.—Pilotage is as previously described in the section covering Covenas in paragraph 4.18.

Regulations.—Vessels are warned that they risk prosecution if they anchor, travel, or carry out other activities affecting the sea bed within the restricted areas. Such areas, which may best be seen on the chart, are situated in the vicinity of submarine pipelines.

Anchorage.—Anchorage areas were previously described in the discussion for Covenas in paragraph 4.18.

4.20 Bahia de Cispata (Bahia Zispata) (9°25'N., 75°47'W.), with the Rio Sinu flowing into its head, lies between Punta Mestizos and Punta Bello, about 3.4 miles E. A tall prominent stack stands in the ruins of a village on the SE side of the bay. Small craft, with the aid of a pilot from Cartagena, can navigate several miles up the river. It was reported that depths of 4.6m, or less than charted, lie within the 10m curve in Bahia de Cispata.

Between Punta Mestizos and Punta Piedras, 18 miles WSW, the coast is low and fringed by mangroves. The 10m curve lies up to 4 miles offshore.

Isla Fuerte (9°23'N., 76°11'W.), a low, wooded islet, lies about 6.5 miles WNW of Punta Piedras and is surrounded by foul ground that extends up to 2.5 miles from the S side and nearly 1.5 miles from its W side. The islet is difficult to distinguish when approaching from the W. A village stands on its S side. A light is shown from the island.

Bushnell Shoal, with a least depth of 11.9m, lies about 9.5 miles WNW of Isla Fuerte. In addition to the above dangers, there are several detached depths of less than 18m lying seaward of the 20m curve.

4.21 Punta Piedra (9°20'N., 76°05'W.) is the extremity of a bold headland which extends SW for 3 miles and terminates at Punta de La Rada.

Punta Broqueles, a rocky projection fringed by a reef extending about 0.3 mile seaward, lies about 8 miles SW of Punta Piedra. Bajio Toro, with a least depth of 1.2m, lies 1.3 miles N of the point. Farallon, a group of rocks, up to 5m high, lies 1.8 miles SW of the point. Two isolated depths of at least 6m lie 6 miles SW of the point.

Cerro Tortugon, a 208m high, prominent, conical hill, stands close to the coast, 13 miles SSW of Punta Broqueles. Yuca, a village with a conspicuous white church, is situated on the coast 2.5 miles N of Cerro Tortugon.

Isla Tortuguilla (9°02'N., 76°20'W.), a small wooded islet, lies 5 miles W of Cerro Tortugon. Depths of less than 9m lie within 0.8 mile of the islet. A light is shown from the NW extremity of the island.

Punta Arboletes (8°53'N., 76°26'W.), a prominent, low wooded point, lies 14 miles SW of Cerro Tortugon. Cerro Maconda, a prominent hill, stands 5 miles E of the point.

Punta San Juan (8° 48'N., 76° 31'W.), conspicuous from the NE and SW, stands 7 miles SW of Punta Arboletes. A village stands close N of Punta San Juan.

Punta Sabanilla (8° 44'N., 76° 38'W.), a low point, is located 15 miles SW of Punta Arboletes. Cerros de Sabanillas, a group of hills, rises 2.5 miles SSE of the point. The highest hill rises to an elevation of 248m. A bank, with unknown depths, lies about 5 miles W of Punta Sabanilla. Punta Giganton, a low and sandy point, lies 1.3 miles SSW of Punta Sabanilla.

Golfo de Uraba

4.22 **Punta Caribana** (8° 37'N., 76° 53'W.), the E entrance point of Golfo de Uraba, is low, wooded and marked by a light. Cerro Aguila stands close within the point and is an excellent landmark. Foul ground, with some rocks awash, extends 3.8 miles NNW from the point. The 20m curve lies 9 miles N and 4 miles W of the point.

The coast between Punta Caribana and Cabo Tiburon, 28 miles W, recedes 45 miles S to form Golfo de Uraba. The shores of the gulf are generally low, heavily-wooded, and swampy on the E, S, and SW sides, and hilly with coves and sandy beaches on the NW side. The coastline was reported (1985) to have extended seaward on both the E and W shores of Golfo de Uraba, especially between 8° N and 8° 10'N. Loss of depth due to sedimentation from the mouth of the Atrato River has been found in Golfo de Uraba, SE of Isla Los Muertos. Serrania del Darien is a mountain range backing the coastal plain on the W side about 12 to 15 miles inland. Several rivers discharge into the gulf. The delta of the Rio Atrato extends into the gulf from the SW side, forming a bight at its head called Bahia Colombia.

Winds—Weather.—Between Punta Caiman and Punta Revesa, a current has been observed to set N at a velocity of up to 2 knots.

Chocosanas is the name of S storms which are very common from June to October. They occur most frequently from 2200 to 2400 hours and are preceded by light N winds and general lightning around the horizon. The wind gradually shifts from N to S increasing in force. The main storm center lasts about 30 minutes, with winds attaining nearly hurricane force. It is accompanied by heavy rain and electrical disturbances, and as much as 160mm of rain may fall during one storm.

From Punta Caribana, the low coast extends about 5.5 miles SW to Punta Arenas del Norte (8° 33'N., 76° 56'W.), which is the W end of a sandy, steep-to peninsula which is marked by a light. A stranded wreck lies 0.3 mile NW of Punta Arenas del Norte. It has been reported (1994) that this wreck is no longer visible.

Between Punta Arenas del Norte and Punta Caiman (8° 16'N., 76° 46'W.), a low sandy point 19.5 miles SE, the coast recedes 4.5 miles SE and is low, with several hills near the shore. Punta Uraba, a rocky bluff with a village on it, is located midway between the two points. A radar conspicuous stranded wreck lies about 1.5 miles NNW of Punta Caiman.

From Punta Caiman, the coast extends S for 12.8 miles to Punta las Vacas (8° 04'N., 76° 44'W.), the N entrance point of Bahia Turbo. The coast between the latter point and a position lying 5.5 miles N was reported (1983) to be extending W, with considerable reef build up. It also was reported that a point has been formed at this position, and the Rio Turbo flows out at this point.

Depths—Limitations.—There are general depths of 18 to 64m in Bahia Colombia. The 10m curve lies up to 1.8 miles off the E shore of the gulf and up to 1.5 miles off the W shore. In the vicinity of the Rio Atrato, the 10m curve lies up to 2.3 miles offshore; in the W part of the bay, the 10m curve lies up to 3 miles offshore.

There are several small islets along the W side of the gulf, but they all lie within the 10m curve.

Turbo (8° 06'N., 76° 43'W.) (World Port Index No. 11880) is situated 1.5 miles NE of Punta las Vacas.

Pilotage.—Pilotage is compulsory in Bahia Colombia. The pilot embarks at the anchorage W of Punta las Vacas and takes the vessel to the appropriate loading anchorage in the bay. The vessel's ETA messages may be sent through Baranquilla radio.There are no port facilities. Ships load from lighters using mechanical conveyors.

Anchorage.—Vessels anchor about 1.8 miles W of Punta las Vacas, in a depth of 13m, to await the boarding officials. There are two additional charted anchorages in the S and Sw parts of the bay.

4.23 Between Cabo Tiburon, the W entrance point of Golfo de Uraba, and Punta Yerbasal, at the N end of the delta of the Rio Atrato, 35 miles SE, the W coast of Golfo de Uraba is rocky, rugged, and backed by heavily-wooded slopes. There are many bluffs and some sandy beaches and coves. Several islets and rocks lie within 1.5 miles offshore.

Acandi (8° 31'N., 77° 16'W.) (World Port Index No. 11870) lies at the mouth of the Rio Acandi, 11 miles SE of Cabo Tiburon.

Terron de Azucar is an excellent landmark located between Cabo Tiburon and Acandi. It is a precipitous dark rock lying 1.3 miles offshore, about midway between the two positions. A detached 6.8m depth lies 0.3 mile NNW of the rock. A rocky ridge, over which the sea breaks in heavy weather, connects Terron de Azucar with the coast.

Between Acandi and Punta de La Goleta, a steep rocky point 8 miles SE, there is a sandy beach that is broken by the hills extending to the shore nearly 2 miles SE of the town. Two large rocks, 7m high, stand 0.5 mile NNE of the point.

From Punta de La Goleta, the coast resumes its rugged and bold character and continues 13.3 miles SE to Playa Tarena, a low sandy beach that extends an additional 5.5 miles to Punta Yerbasal. Several rocks and islets lie within 1 mile of this coast.

Isla Napu (8° 25'N., 77° 07'W.), a steep and rocky island, covered with brush and small trees, lies 2.8 miles ESE of Punta de La Goleta.

The delta of the Rio Atrato, one of the largest rivers in South America, lies between the vicinity of Punta Revesa (Punta Yerbasal) (8° 16'N., 76° 57'W.) and a position 15 miles S. This large area is mangrove-covered swampy land extending up to 6.5 miles E of the general trend of the coast. Isla Los Muertos (8° 08'N., 76° 50'W.), a small, wooded islet lying 10.5 miles SE of Punta Yerbasal, is the easternmost feature of the delta and is the only solid ground in the whole area. Shoaling was reported (1982) E of Isla Los Muertos. Shoaling was also reported off a salient point located 6.8 miles SSW of the island. The river has

several principal mouths, the largest being the Boca Tarena, 2 miles W of Punta Revesa.

Cabo Tiburon to the Panama Canal

4.24 **Cabo Tiburon** (8°41'N., 77°22'W.), the W entrance point of Golfo de Uraba, is a bold, steep-to promontory, which rises to a height of 123m a short distance inland. On its NW extremity are two concrete beacons which mark the boundary between Colombia and Panama. The seaward beacon stands on a pinnacle rock. A light, with a racon, is shown from the cape.

Between Cabo Tiburon and Punta Carreto, 12 miles NW, the coast recedes about 3.5 miles W then NW to form a bight in which are several small coves. There are few dangers here. With the exception of a 10m shoal and a steep-to 19m coral bank lying 1.5 and 7.5 miles NE of Punta Carreto, respectively, the 20m curve follows the trend of the coast at 1 mile offshore. In heavy weather, the sea breaks on this shoal.

Puerto Obaldia, a small cove in which there is a village, lies 4 miles W of Cabo Tiburon. The intervening coast is rather steep-to and rocky, with steep heavily-wooded hills rising inland. A prominent rock lies 1 mile N of the E entrance point of the cove.

4.25 **Puerto Perme** (8°45'N., 77°32'W.), a narrow cove, lies 8 miles NW of Puerto Obaldia. A village is situated 1 mile SSW of Puerto Perme. The port is abandoned, but anchorage can be taken, in a depth of 9.7m, in the center of the cove.

Puerto Carreto, a small cove, lies close W of Punta Carreto. Two steep-to rocky patches lie 2.5 miles N of Punta Carreto and break with fresh breezes. There are general depths of 5.5 to 16.5m in the cove. A small village stands near the mouth of a river on the W side of the cove.

Between Puerto Carreto and Punta Brava, 39.5 miles NW, the coast is fronted by many dangers which extend up to 5 miles offshore. Some of the projecting headlands and islets make good landmarks. Punta Escoces, a remarkable headland, rises to a 177m summit about 5.5 miles NW of Puerto Carreto.

Between Punta Escoces and Punta Sasardi, another peninsula 9 miles NW, there are several roadsteads which provide anchorage. Islas Sasardi, a group of high islets, lie on the coastal bank within 2.5 miles of the coast between the above points. Bahia Caledonia lies W of Ilha de Oro, a high islet 3.8 miles NW of Punta Escoces. Bahia Sasardi lies SW of Punta Sasardi. The approaches to these roadsteads are intricate.

From Punta Sasardi, the coast extends about 25 miles NW to Punta Brava. About midway between these points, a peninsula projects NW from the coast.

All of the known dangers lie up to 4 miles offshore between Punta Sasardi and Punta Brava. Isla de Pinos, 122m high, lies 0.3 mile offshore about 2.5 miles NW of Punta Sasardi. Isla Pajaros, a low islet surrounded by reefs, lies 2.5 miles farther NW. It was reported that Isla Pajaros is an outstanding landmark as it is densely wooded, with coconut trees about 24m high.

Caution.—Much of the coastal area between Cabo Tiburon and Punta Brava has not been surveyed. Extreme caution should be used in approaching this stretch of coast.

4.26 Between **Punta Brava** (9°15'N., 78°03'W.) and **Punta Mandinga** (9°28'N., 78°58'W.), 57 miles WNW, the coast is fronted by the Archipielago De San Blas, a closely bordered group of cays, reefs, and banks lying within 10 miles of the coast. The village of Rio Diablo stands on two small islands close offshore 34 miles WNW of Punta Brava. Depths in the vicinity are reported to be less than charted.

There are a number of navigable channels in Archipielago de San Blas, and vessels with local knowledge have little trouble navigating them. The E approach to Golfo de San Blas is made through this group via Canal Caobo (9°33'N., 78°40'W.) and Canal Mayflower (9°33'N., 78°45'W.).

Golfo de San Blas (9°30'N., 79°00'W.) lies between Punta San Blas and Punta Mandinga, and is entered from the N by Canal de San Blas, which leads in adequate depths 2.5 miles E of Punta San Blas. There are numerous detached dangers in the S and W parts of the gulf. Numerous creeks and rivers discharge into this gulf, but their entrances are obstructed by bars. The N shore of the gulf is swampy and fringed with mangroves. The S shore is low, but E of Punta Mandinga the high land approaches the coast.

Islas Robeson, a group of small islands, lie in the SW part of the Golfo de San Blas. Between these islands and the W side of the gulf lies Bajo Alden (9°28'N., 79°03'W.). A channel, which is not buoyed, leads through Bajo Alden to a roadstead off the SW shore of the gulf. The entrance of this channel lies 1.3 miles WNW of the westernmost island of Islas Ammen. The channel is about 270m wide and has depths of 18 to 35m. Caution should be exercised to avoid the 1.5m depth lying 1.5 miles W of the westernmost of the Islas Ammen.

An man-made stone and coral island stands on a reef 0.3 mile SW of Sail Rock (9°33'N., 78°57'W.), on the W side of Canal de San Blas. This island shows clearly on radar. A stranded wreck lies close E of Sail Rock.

Isla Porvenir lies 0.3 mile NNW of Sail Rock. A government station compound with two conspicuous, buff-colored buildings and several lesser structures stands on the W side of the islet. All vessels transiting in and out of Golfo de San Blas must contact this station.

Caution.—There are no charted navigation aids in the Golfo de San Blas. Extreme caution is advised when navigating in the area.

4.27 **Punta San Blas** (9°34'N., 78°58'W.) has a low extremity. A hill, 46m high, rises 0.5 mile NW of its E extremity. A 61m hill, which is the highest of a group of four hills, rises 1.5 miles WSW of the E extremity. A conspicuous tower stands 0.8 mile SW of the extremity.

Between Punta San Blas and Punta Macolla, (9°36'N., 79°26'W.), 28 miles W, the coast is low and wooded, but in the vicinity of the latter point, the mountains approach the coast. Two conspicuous peaks stand here and rise to high elevations. Several villages stand along this stretch of coast.

Piedra de Culebra (9°34'N., 79°13'W.) lies 0.5 mile N of the extremity of a projecting peninsula near Palmira. The islet is easily recognized and shows up dark against the mainland.

The depths off this section of coast are very irregular; banks with depths of 9m are found up to 6 miles offshore. A coral area lies, awash, about 2 miles offshore, about 9 miles WNW of Punta San Blas; depths of 3.7 to 5.6m lie within 0.8 mile

NNW of the coral area. Several small islets lie within 0.5 mile of the shore.

Punta Macolla is bold, high, and easily identified. From the W, it appears as a dark bluff.

Punta Pescador (9° 36'N., 79° 28'W.) is a reef-fringed point close W of Punta Macolla. La Providencia Shoal, a bank with a least depth of 8m, lies 3 miles N of the point.

4.28 Bahia San Cristobal (9° 37'N., 79° 30'W.), entered between Punta Pescador and Punta Manzanillo, 5 miles WNW, is divided into several small bights. There are a number of dangers in the bay, the outermost being some rocks, nearly awash, 2.3 miles W of Punta Pescador and some bare black rocks, the highest about 1.4m high, lying 1.8 miles SE of Punta Manzanillo. Depths of 9 to 18m exist within the bay.

Bahia Nombre de Dios (9° 35'N., 79° 28'W.), a small shallow bay with depths of 1.8 to 8.2m, lies about 1 mile SW of Punta Pescador. A narrow channel, with a least depth of 5.8m, leads S into the bay. A village is situated on the S side of the bay.

A pier, about 180m long, is situated on the W side of the entrance to Bahia Nombre de Dios and has a depth of 6.1m alongside its head.

Anchorage can be taken, in a depth of 12m, within Rada Playa de Damas, close N of the entrance to Bahia Nombre de Dios.

Punta Manzanillo (9° 38'N., 79° 33'W.), the N extremity of the coast of Panama, is a high, precipitous projection with two conical hillocks resembling a saddle. It is the termination of a mountain ridge that extends along the coast to the mouth of the Rio Piedras.

Los Magotes De Manzanillo (9° 38'N., 79° 32'W.) consists of two islets and some rocks lying within 1 mile NE of Punta Manzanillo. Mogote de Afuera, the outer islet, has a tree on its summit and is 11m high. Magote de Adentro, the inner islet, is wooded, round topped, and 41m high.

4.29 Bajos Mafu, with a depth less than 1.8m, lies about 0.3 mile NW of Punta Manzanilla within a bank with depths of less than 18m. The sea generally breaks over these rocks.

Isla Grande (9° 38'N., 79° 34'W.), a high, palm tree-covered island, lies 1 mile W of Punta Manzanillo. Foul ground extends along all except its NE side. Isla Grande, marked by a light, is reported to be radar conspicuous.

Cayo Tambor, a small flat-topped islet, lies 0.3 mile NNW of Isla Grande and is connected to it by reefs, some of which are above-water. The islet gives the appearance of an inverted pan from the NE. Its N end is higher than the S end.

A confused sea and tide rips are nearly always found in the vicinity of the islet.

Between Punta Manzanillo and Punta Cacique, a high, steep-to projection backed by twin projections, the coast is indented by several small bays and is fronted by a number of islands and shoals.

4.30 Puerto Garote (9° 36'N., 79° 35'W.), a small harbor entered 0.5 mile W of Isla Grande, is formed by the coast and several off-lying islands. The narrow entrance has depths of 11 to 22m. The inlet leading into the harbor has a depth of 10.3m and there is a depth of 6.1m in the center of the harbor. A small pier extends from the shore of the harbor.

Anchorage can be taken in this harbor by one moderate-size vessel.

La Lavandera (9° 38'N., 79° 36'W.), two rocks with a least depth of 0.9m, lie in the approach to Puerto Garote, 1.3 miles W of the W end of Isla Grande. The sea almost always breaks on La Lavandera; however, when the sea is very smooth, there may not be a break for 15 to 20 minutes.

Las Farallones, a group of rocks, some submerged, lie up to 2 miles offshore NNW of Punta Cacique. Farallon Sucio, 24m high, is the largest of these rocks and displays a light. From a distance, the rocks appear as one and are easily discernible by their bare whiteness. Farallon Sucio is reported to be radar prominent.

The coast between Punta Cacique and Punta Mantilla, about 4.8 miles SW, is high and indented by several bays. With the exception of the coastal bank that extends up to 1 mile offshore, about midway between the above points and on which are the two conspicuous islets of Duarte, the coast is fairly steep-to, the 20m curve lying up to about 0.2 mile offshore.

Punta Esperanza (9° 37'N., 79° 38'W.), located 1 mile WSW of Punta Cacique, and Punta Sabanilla, about 1.5 miles further WSW, are both cliffy.

Piedras La Gallina, two dangerous rocks, lie close together 0.1 mile offshore and 0.5 mile NE of Punta Mantilla. Isla Drake, a small islet 21m high, lies 0.1 mile offshore and 0.3 mile SW of Punta Mantilla. Its W extremity appears as a detached rock. Bajo Salmedina, a coral reef on which the sea breaks, lies on a bank located 0.3 mile WSW of Punta Mantilla.

4.31 Portobelo (9° 33'N., 79° 40'W.) (World Port Index No. 9880), a good harbor of refuge, is entered between Iron Castle Point and Punta Coco, 0.3 mile S. The depths in this bay decrease from 23.8 to 25.6m in the entrance to about 11m in the inner part WNW of the town.

The N and S sides of the harbor rise to hills, 182 to 396m high, which provide shelter. The head of the harbor is swampy. Depths may be less than charted because of silting. A conspicuous church, with a large red roof and a small white tower, stands in Portobelo. Deep-draft vessels can take sheltered anchorage in Portobelo.

Between Punta Coco and Galeta Point, the N extremity of Galeta Island, 14.5 miles SW, the coast extends irregularly and is high for the first 6.5 miles as far as the mouth of the Rio Piedras (9° 27'N., 79° 44'W.). It then gradually diminishes in height and becomes low and fringed by mangroves.

Caution.—Vessels without local knowledge should stay at least 3 miles offshore and even further at night in this area.

Isla Los Mogotes lie close SW of Punta Coco. The outermost and larger of these islands is 48m high. Punta Gorda, which rises to a height of 47m close S of its extremity, lies 4.3 miles SW of Isla Los Mogotes. From Punta Gorda, the coast gradually becomes very low and fringed with mangroves as it trends SW about 6 miles to Cayos Naranjo. Cayos Naranjo are two reef-fringed, heavily-wooded islets.

Bahia de las Minas (9˚24'N., 79˚49'W.)

World Port Index No. 9875

4.32 Puerto de Bahia de las Minas, which is encumbered by numerous islands, islets, and reefs, recedes S about 2.5 miles. Several rivers discharge along the shores of the bay. A large refinery is situated on the E shore of Isla Payardi in the SE part of the bay. Tidal variation in the port is less than 0.3m.

Depths—Limitations.—Tankers up to 60,000 dwt, with a maximum length of 240m and a maximum draft of 11.8m, can be accommodated. The dry cargo quay is 90m long and has an alongside depth of 7.5m; it is used only by ro-ro vessels with a maximum length of 180m.

Aspect.—A stack, which emits a gas flare, is situated near the SE end of Payardi Island. This flare, which has been reported to be visible up to 20 miles seaward, is an excellent landmark.

Pilotage.—Vessels intending to enter should radio their ETA at least 24 hours prior to arrival. Pilotage is compulsory. The pilot boards in the vicinity of the Approach Lighted Buoy. Communications may be established with the pilot on VHF channels 10, 12, 14, or 16.

Anchorage.—Vessels awaiting a pilot can anchor to the E of No. 1 Buoy, in a depth of 18m, taking care to avoid an 11m patch lying about 0.8 mile W of the S end of Cayo Naranjo Abajo. Vessels can also anchor WNW of No. 1 Buoy, avoiding a dangerous wreck lying SW of this buoy and marked on the N side by a lighted buoy.

The coast between Galeta Point and Punta Margarita, 2 miles SW, is formed by the N and W coasts of Galeta and Margarita Islands, and the smaller Isla Palma Media (9˚ 24'N., 79˚ 53'W.) which lies between them. Reefs fringe the shores of these three low, mangrove-covered islands.

Penas Guapas, on which the sea breaks, lies about 0.8 mile ENE of Galeta Point. A rock, with a depth of 1.8m and which also breaks, lies 0.3 mile N of Galeta Point.

Caution.—Vessels without local knowledge should stay at least 3 miles offshore in this area.

Between **Punta Margarita** (9˚ 23'N., 79˚ 53'W.) and Punta Toro, 3.8 miles WSW, the coast recedes 4 miles S to the entrance of the Panama Canal and forms Bahia Limon. The N side of this bay is nearly enclosed by two extensive breakwaters. Bahia Manzanillo, which includes the harbor of Coco Solo, lies in the E part of Bahia Limon. The harbors of Crisobal and Colon lie in Bahia Limon.

Between Punta Toro and Brujas Point (see paragraph 5.2), the coast extends 2.5 miles SW and is fringed by a drying coral reef. The 10m curve extends up to 0.5 mile offshore and the coast is backed by comparatively high wooded land.

The Panama Canal—Atlantic Approach

4.33 The Atlantic approach to the Panama Canal leads from the Caribbean Sea and passes through the length of Bahia Limon, which is protected by two breakwaters known, as East Breakwater and West Breakwater, extending across its N end. The 20m curve trends WSW from a position about 2 miles N of Punta Margarita and lies 1 mile N of the breakwater entrance. This entrance is about 0.3. mile wide and lies in the middle of the bay between the seaward ends of the breakwaters. The entrance channel is buoyed according to the IALA Region B system.

Winds—Weather.—The climatological year in the canal area is customarily divided into a wet season (April through December) and a dry season (December through April). Average rainfall during the dry season is about 110mm, whereas, that of the wet season is about 1,690mm, with the maximum precipitation occurring during daylight hours in both seasons. Uniformly high temperature and humidity make the climate oppressive.

Puerto Cristobal (9˚21'N., 79˚55'W.)

World Port Index No. 9860

4.34 Puerto Cristobal is the Atlantic terminus of the Panama Canal. The harbor of Cristobal consists of the dredged area S of Muelle Cristobal and includes the inlet, S of Cristobal, which leads to the old French Canal. Three piers extend SW from Muelle Cristobal; a signal station is situated near the head of the westernmost of these piers. There are numerous piers, a dry dock, and a marine railway on the E side of the inlet. The harbor of Puerto Colon occupies a 0.5 mile square area just N of Muelle Cristobal. Several piers and wharves are situated along the shore of the city of Colon. Colon has a large international free trade zone.

Tides—Currents.—The greatest variation in range is 0.6m. The range is frequently more affected by the direction of the wind than by any other factor. Fresh NW winds may cause some current setting SE in Bahia Limon.

An E set across the channel outside the entrance is normally encountered. Shallow water effect frequently causes vessels to respond adversely.

Depths—Limitations.—From the 20m curve N of the breakwater entrance, the depths gradually decrease to about 13m between the breakwaters, and to a least depth in the dredged entrance channel of 13m. The S part of Bahia Limon is shallow; this area is also used as a spoil area. A shoal area here uncovers. Several wrecks lie in this part of the bay.

In the harbor of Puerto Cristobal, there are depths of 11.3 to 14m up to the piers of Muelle Cristobal and depths of 7.9 to 11.9m in the fairway leading to those in the inlet S of Cristobal. Muelle Cristobal can accommodate vessels up to 314m in length and 12.2m draft.

The harbor of Puerto Colon has depths of 7.9 to 11.3m. The facilities at Coco Solo are restricted to local traffic; the quays have depths alongside of 2.6 to 7.5m.

Aspect.—There are numerous charted conspicuous tanks, flag staffs, and other marks. The hotel on the NW side of Colon, and the tanks on the S side of Punta Coco Solo (9˚ 23'N., 79˚ 53'W.), are particularly prominent. The entrance between the breakwaters has been reported to be radar prominent.

Pilotage.—Pilotage is compulsory for the Panama Canal, including Puerto Cristobal. Pilots board either on arriving inside the breakwaters or at the anchorage. Pilots leave outbound vessels after passing the lighted beacon W of Muelle Cristobal and when the vessel is steadied on its course;

however, pilots will accompany vessels to a position just inside the breakwater entrance if desired.

An ETA is required to be sent at least 72 hours in advance. Vessels approaching the canal from the Atlantic must report 12 hours before arrival at Puerto Cristobal any change of 1 hour or more in their ETA.

If requested and at extra expense, pilots will meet vessels outside the breakwaters, and will take outgoing vessels out through the breakwaters. Vessels should provide a good lee for the pilot boat if boarding a pilot outside the breakwater.

Regulations.—All vessels must hoist their designator signals during daylight when approaching and entering Bahia Limon. Vessels so equipped must call the signal station on VHF channel 12. All other vessels may use International Code and flashing light. Vessels shall, until a pilot boards, maintain a continuous watch on VHF channel 12.

Vessels approaching the Panama Canal shall communicate by radio with the Navigation Division not less than 48 hours in advance of arrival.

No vessel may approach within 1 mile of the breakwater entrance until it has identified itself.

Anchorage.—During periods of harbor congestion, large deep-draft vessels and/or any vessel so directed may anchor outside the breakwater in the approved area. Vessels will be given a definite time to enter the breakwater, where the vessel will be met by transit pilots and boarding officials.

Anchorage is prohibited in or near the axis of the dredged channel.

Caution.—A submarine telephone cable, which may best be seen on the chart, lies W of the approved anchorage areas. Mariners anchoring W of the approved anchorages should keep clear of this cable. Additional information on the cable can be obtained by contacting the cable landing station at Battery Pratt, which monitors VHF channel 12.

Vessels required to remain underway outside Bahia Limon are cautioned to keep N of the breakwaters until it is clear to enter.

The Panama Canal

4.35 The Panama Canal, a lock-type canal traversing the Isthmus of Panama in a SE direction for approximately 45 miles, connects Bahia Limon on the Atlantic side with Panama Bay on the Pacific side. The ports of entry for the canal are Cristobal, on the Atlantic side, and Balboa, on the Pacific side.

The former Panama Canal Zone, a strip of land 10 miles wide, ceased to exist on 1 October 1979 when the Republic of Panama shared control of the canal with the United States. The administration of the Canal is now the sole responsibility of Panama.

The port of Balboa and its approaches are described in Pub. 153, Sailing Directions (Enroute) West Coasts of Mexico and Central America.

The canal is largely made possible by the Gatun Lake watershed and the Rio Chagres, which lie about in the middle of the Isthmus of Panama. The greater part of the canal channel is at the level of Gatun Lake, the surface of which is 25.9m above sea level.

In transiting the canal, a vessel is raised in three steps, or lockages, to the level of Gatun Lake and is subsequently lowered in three steps to sea level on the other side of the isthmus. The flights of locks are in duplicate, enabling vessels to pass in opposite directions simultaneously.

Depths—Limitations

The project depth for the Panama Canal is 12.8m, but the controlling depth is 12.2m in the Pacific approach and 12.4m in the Atlantic approach channel. There is a depth of 11.9m at mean LW below the Miraflores Locks in the Pacific approach channel.

The maximum draft allowed to transit the canal depends on the depth of water in Gatun Lake. Since the depth of Gatun Lake varies with the seasons, the latest information on draft limitations should be consulted before a deep-draft transit.

At the Atlantic entrance, the tidal flow extends to Gatun Locks, but currents due to their influence alone are slight. Fresh NW winds may cause some current in Limon Bay setting SE toward the harbor berths, and spilling at Gatun Locks causes strong currents for a short time in the channel immediately below the locks.

In the Gatun Lake section, the canal currents may be caused by winds and flood inflow, but they are seldom strong enough to greatly affect shipping. Currents in Gaillard Cut produced by water being drawn at Pedro Miguel Locks, may attain a velocity of 1.5 knots.

At the Pacific entrance, the tidal flow extends to Miraflores Locks, and currents with a velocity of 1 knot or more, usually setting parallel with the channel are frequently observed.

The maximum overall length, including bulbous bow, for commercial or non-commercial vessels acceptable for regular transit is 289.6m; passenger and container vessels may have an overall length of up to 294.1m. The maximum length overall for integrated tug-barge combinations is 274.3m, including the tug. The maximum aggregate overall length for nonselfpropelled vessels, including accompanying tugs, is 259.1m; the tugs must lock through with the vessel.

The maximum beam for commercial or non commercial vessels and integrated tug barge combinations is 32.3m; however, a beam of up to 32.6m may be permitted with prior permission on a one time delivery basis, provided that the deepest point of immersion does not exceed 11.3m Tropical Fresh Water (TFW). The maximum beam for nonselfpropelled vessels is 30.5m.

The maximum allowable height for any vessel transiting the canal or entering the port of Balboa at any state of the tide is 57.9m, measured from the waterline to its highest point; with prior permission on a case-by-case basis, the maximum allowable height may be increased to 62.5m.

The maximum permissible draft for canal transit is 12m TFW at Gatun Lake level 24.8m or higher; however, maximum draft may be reduced, depending on the level of Gatun Lake. Draft limits on vessels are also subject to vessel design criteria (i.e., bilge radius information to determine clearance of rubber fenders on lock walls) and vessel handling criteria.

Vessels should be aware that restrictions other than those described above may be imposed on certain vessels.

Drafts of over 11.3m (TFS) are authorized to individual vessels in reply to written requests to Marine Director, Panama Canal Commission, Balboa, Panama, after the vessels

underwater hull designs have been examined and the handling characteristics have been assessed, based upon actual transit of each vessel.

Hull measurements of vessels, with a draft exceeding 10.8m intending to make an initial transit of the canal, are required by the canal authorities at least 2 weeks in advance so that the vessel's maximum authorized transit draft may he calculated. Specifications and criteria may be received from the Canal Commission upon request.

The factors which limit the lengths of vessels permitted to transit the canal are the radii to turns in reaches of Gaillard Cut and the 305m length of the lock chambers.

The Panama Canal Commission should be informed sufficiently in advance of each expected initial transit of such large vessels and of expected repeated transits.

The canal can handle about 42 vessels through lockages a day, but a greater number of vessels may be accommodated as it is possible to lock through two or more small vessels simultaneously in one chamber.

Gatun Locks and approach.—In transiting the canal from the Atlantic to the Pacific, a vessel passes through a dredged channel, 152m wide and about 6 miles long, leading S from just inside the breakwater entrance to the Gatun Locks.

The lock consisting of three flights of chambers raise a vessel from sea level to Gatun Lake, a distance of 25.9m. They are double locks, about 1 mile long and 33m wide, and have intermediary gates which can shorten the length for smaller vessels, thereby conserving water.

The minimum depth over the sills of the locks is 12.2m in salt water and 13.2m in fresh water. The lock gates and valves are electrically operated from a central control station. A vessel is moored to electric towing locomotives which run on tracks on both sides of the lock, pulling the vessel through and keeping it in position.

The entire operation is directed by a lock master on the center wall. All of the canal lock chambers are similar in dimensions and method of operation.

Gatun Lake.—From the upper of the Gatun Locks, a vessel proceeds under its own power for about 21 miles through an irregular channel in Gatun Lake to Gaillard Cut. Gatun Lake, 163 square miles in area, is one of the artificial lakes and provides water to operate the locks and to generate electrical power for the canal operating area.

The channel through the lake varies in width from 152 to 305m and is 13.7 to 25.9m in depth. There is an anchorage, in a depth of 21.9m, in Gatun Lake, about 1 mile SE of the locks.

Gaillard Cut to Miraflores Locks.—From Gatun Lake, a vessel continues for about 7 miles through Gaillard Cut, where the channel is 152m wide and 13.7m deep, to Pedro Miguel Locks. The single flight of double chambers is about 0.8 mile long and drops 9.4m to the level of Miraflores Lake, through which a channel 229m wide, 13.7m deep, and about 1 mile long, leads to Miraflores Locks.

Miraflores Locks and Pacific approach.— Miraflores Lock consists of two flights of double locks, about 1 mile long and with a drop of 16.4m, depending upon the tide, to the level of the Pacific Ocean.

From these locks, a channel leads about 7 miles E to the Pacific. It is 198m wide at the lock end and 366m wide at the seaward end. The fairway is 12.1m deep at MLWS, but has a least depth of 11.8m.

The total length of the canal from entrance to entrance is about 44.5 miles.

Aspect

The system of lighting and buoyage in the canal utilizes range lights, generally green, in the longest reaches and lighted buoys and beacons along the sides showing, in general, red lights on one side and green lights on the other. The IALA Maritime Buoyage System (Region B) has been implemented in the canal. The direction of buoyage changes at Pedro Miguel Locks (9˚ 01'N., 79˚ 37'W.).

The aids to navigation are numbered in five sections, as follows:

1. The Atlantic entrance to Gatun Locks.
2. Gatun Locks through Gatun Lake to Gaillard Cut.
3. Gaillard Cut to Pedro Miguel Locks.
4. Miraflores Lake.
5. The Pacific entrance to Miraflores Locks.

The range towers are cylindrical, concrete structures or steel towers set a little to the right of the axis of the canal, so that vessels going in opposite directions on their respective head ranges will have room to pass.

Lighted buoys and beacons are placed under the sides of the canal and across Gatun Lake at intervals of less than 1 mile and at all turns. In Gaillard Cut, lights are placed at 152m intervals on each bank. These lights are fixed green on the E bank and fixed red on the W bank.

Detailed descriptions of signals, aids, courses, and distances through the various reaches of the canal and the information on particular currents that may be expected are given in the Pilot Handbook, which is issued by canal authorities to all pilots.

Pilotage

Pilotage is compulsory, except when exempted by the Administrator, and no vessel is allowed to pass through the Canal, enter or leave a terminal port, or maneuver within the Canal Operating Area without having a Panama Canal pilot on board. Pilots will meet vessels just inside the Atlantic breakwaters or off the seaward end of the dredged channel at the Pacific entrance. The pilot assigned to a vessel shall have control of the navigation and movement of such vessel; however, this does not exonerate the master from the precautions required by the practice of seamen, and the master or the master’s qualified representative must be present at all times on the bridge to keep the pilot informed concerning the individual peculiarities in the handling of the vessel. When the master and the pilot assigned to his vessel differ in the interpretation of a rule or regulation, the master must accept and abide by the pilot's interpretation.

A vessel desiring a pilot to meet it outside the Atlantic breakwaters should remain there and contact the canal authorities on VHF; it should be noted that pilots are rarely dispatched outside the breakwater. A charge is made for this service.

Pilotage is free for vessels passing through the canal in transit only, but part pilotage will be charged if the port

facilities at either terminal are used. No pilotage will be charged if a transiting vessel stopping in the stream at either terminal solely for supplies or limited amounts of mail. Specific regulations are in force concerning pilot ladders; mariners should consult current regulations contained in the Code of Federal Regulations, Title 35.

Regulations

Vessels bound for the Panama Canal are required to give the Port Captain at Cristobal or Balboa 48 hours advance notice by radio of their ETA at either terminal port. All items of this required information not previously communicated through agents otherwise shall be transmitted to the Port Captain via shore radio station as shown in Pub. 117, Radio Navigation Aids, using the phonetic alphabet letters to identify the items.

The following additional information shall be transmitted via radio to the Port Captain from all vessels as applicable:

1. Vessels approaching from the Pacific shall report actual time of passing Cape Mala (7˚ 28'N., 80˚ 00'W.) and speed.
2. Vessels approaching from the Atlantic shall report 12 hours prior to arrival any change of 1 hour or more in the ETA.
3. Any other matters of importance and interest.

Timely receipt of the required information will facilitate the transit of docking of your vessel. Failure to comply with this regulation subjects a vessel to costly delay, since vessels which do comply will receive priority over those which do not.

All vessels must hoist their designator signals and otherwise identify themselves to the signal station on Muelle Cristobal Pier No. 6, or to the signal station on Flamenco Island, Balboa before being permitted to enter the harbors.

Before beginning the canal transit, vessels are required to have four mooring lines of suitable strength ready for use during transit. These lines are for emergency use in the event of a power failure in the locomotive or parting of a towing cable. They are to be distributed, as follows:

1. One on each bow.
2. One on each quarter of the vessel.

Vessels must use manila, hemp, or synthetic fiber lines for mooring to piers, lock walls, or buoys during transit. Both anchors are to be ready for letting go at all times.

Bitts, chocks, cleats, and capstans are to be clear for transit. Personnel not engaged with lockage are to stand clear of all gear used; the Panama Canal Commission will not be responsible for injuries resulting from nonobservance of this rule.

All vessels operating in Panama Canal waters must be equipped with bridge-operated VHF R/T.

Boarding party.—Incoming vessels will be boarded inside the Atlantic breakwaters or off the seaward edge of the dredged channel at the Pacific entrance by a boarding officer of the Panama Canal Commission and/or the Republic of Panama. The boarding officer shall perform the duties of admeasurer for the purpose of determining Panama Canal tolls and shall make inspections for the purpose of ensuring compliance with quarantine, immigration, customs laws, and regulations.

When a vessel is not boarded immediately on arrival, it shall anchor in the designated anchorage and await the boarding officer.

Admeasurement.—Vessels shall provide themselves with the proper tonnage certificate based on the rules for Panama Canal measurement. Admeasurement may be made and the required certificate issued by the Admeasurer of the Canal, the U.S. Coast Guard in the largest U.S. ports, and by certain designated officers aboard.

Tonnage Certificates, presented at the Panama Canal, shall be retained by the Canal authorities and shall be subject to review and corrections. Vessels arriving without a current tonnage certificate may be subject to delay for measurement by the Canal authorities.

Quarantine.—All vessels are subject to quarantine and until granted free pratique shall fly a yellow flag from the foremast head and observe all other requirements of vessels actually quarantined. Provisional pratique will be granted those vessels not held in quarantine, but subject to further quarantine procedure or observation. The termination of provisional pratique places the vessel in free pratique. Under certain conditions pratique may be withdrawn by the quarantine officer. Masters of vessels should familiarize themselves with the quarantine regulations and requirements for the Panama Canal and the ports of Colon and Panama.

Vessels carrying dangerous cargoes shall test alarms, safety, and shut down devices within 24 hours prior to arrival. The result of this test including a detailed list of discrepancies or defects is brought to the attention of the boarding offices and is to be recorded in the ship's log which is to be available for inspection.

Ships shall exhibit an all-round red light at night visible for 2 miles, and by day a red flag if carrying flammable or explosive commodities. The International single flag hoist signal "T" is raised if the vessels cargo is toxic or radioactive.

Under certain conditions and at the discretion of the Chief, Division of Preventative Medicine, radio provisional pratique may be granted to vessels intending to transit the canal, without taking or landing either cargo or persons.

The master of a vessel should make application for such pratique by radio to the Chief, Division of Preventative Medicine in time to have the request reach that officer between 0800 and 1600 on the day before pratique is desired. The request shall give the names of the ports visited in the last 15 days, and a statement describing any sickness on board, and that the vessel intends to transit the canal, without taking on or landing either cargo or persons. Such pratique shall not be considered as granted until a reply to that effect has been received from the Chief, Division of Preventative Medicine.

Before a vessel is allowed to proceed through the canal or leave a port of the Panama Canal, the quarantine officer shall furnish the master with a Certificate of Pratique or its equivalent in the form of a radio message.

Hours of operation.—Tankers and vessels carrying hazardous cargoes are dispatched at the discretion of the Port Captain and normally are not permitted until they can clear Gaillard Cut before dark.

Canal authorities may dispatch vessels in any order through the canal and at any time they see fit. Priority of arrival at a terminal does not give any vessel the right to pass through the

canal ahead of another that may arrive later, although, this will be a consideration in determining the order of passage.

Note.—All vessels should have onboard not less than one copy of the current regulations contained in Subchapters A, B, and C of Chapter 1 of the Code of Federal Regulations, Title 35, Panama Canal. Vessels arriving for the first time without such regulations aboard shall obtain them through their agent as soon as practicable after arrival.

Radio communications.—The Panama Canal Commission rigidly controls radio communications in the Canal Operating Areas, so far as it affects navigation in the Canal and contiguous waters. Requirements in this regard are indicated in the Code of Federal Regulations, Title 35, Panama Canal and the Federal Register. Vessels approaching or leaving the area shall communicate to the Port Captain concerned through the Canal Radio Station (call letters HPN), situated at Balboa.

All radio communications between vessels in the Panama Canal Operating Area and other vessels or places within or outside the Canal Operating Area shall be carried on by forwarding through the Balboa radio station.

Vessels in transit.—Except for emergency traffic and routine bridge-to-bridge VHF communications, no vessels in transit through the Canal shall communicate with any other station, local or distant. This restriction does not apply to government vessels of the United States or the Republic of Panama. Radio transmitters, radars, diathermy machines, and all other frequency emitting devices shall be closed down between the N end of Empire Reach and the N end of Pedro Miguel Locks.

Caution

Many factors combine to make the Atlantic terminus of the Panama Canal a difficult area to navigate safely. Mariners must be alert for frequent vessel movements not only to and from the canal, but also to and from anchorages inside and outside of the breakwaters.