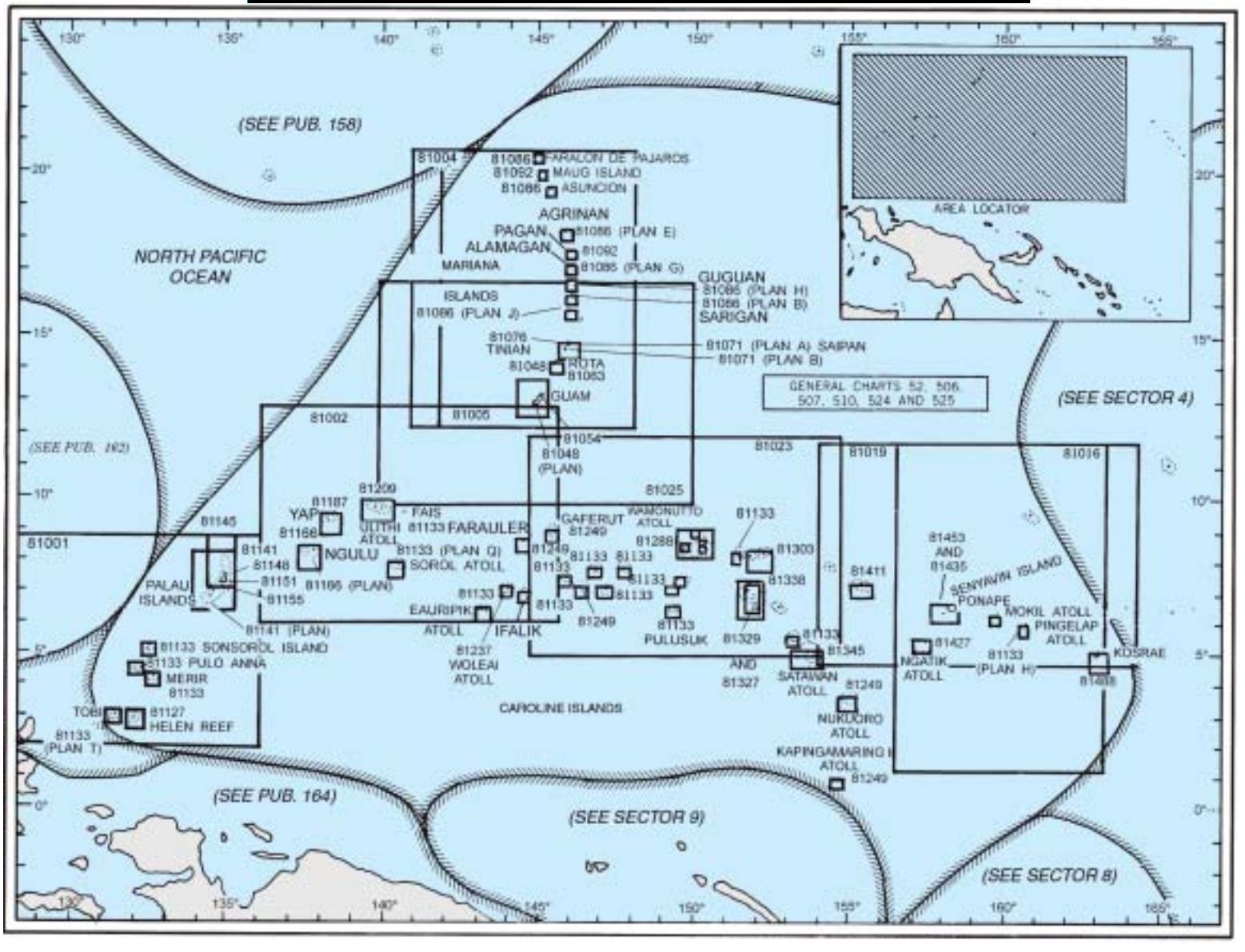
Click on "See Sector" to be hotlinked to that Sector.



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

SECTOR **10** — CHART INFORMATION

Table of Contents

Table of Contents

SECTOR 10

THE FEDERATED STATES OF MICRONESIA, THE REPUBLIC OF PALAU, AND GUAM

Plan.—This sector describes the Federated States of Micronesia (FSM), formerly the Caroline Islands, from E to W, then the Republic of Palau, followed by the island of Guam.

General Remarks

10.1 The Federated States of Micronesia (FSM), formerly the Caroline Islands, was part of the U.S. Trust Territory of the Pacific Islands. The FSM consists of four states (island groups), from the far W there is Yap State, Chuuk State, Phonpei State, and on the far E is Kosrae State.

The FSM contains hundreds of islands and atolls; although, about 40 are of significant size and few of those are uninhabited. All the above four states lie between 4˚N and 10˚N, and between of 137˚E and 164˚ E.

The islands of the FSM vary geographically from high mountain islands to low, coral atolls; volcanic outcrops eject on Pohnpei, Kosrae, and Chuuk. The state capital is Kolonia, on Pohnpei; a new capital is under development, about 5.5 miles SW in the Palikir valley.

Some lagoons in the atolls of the FSM afford sheltered anchorage and have entrances sufficiently deep for large vessels; other atolls are without openings, or may have entrances suitable only for small craft. Many of the harbors are deep, but have inadequate turning room.

The **Republic of Palau** (7˚30'N., 134˚35'E.), at the W end of the FSM, consists of eight islands of significant size and numerous smaller islands. The Republic of Palau is an independent state, in free association with the United States. The United States and the Republic of Palau formally entered into a Compact of Free Association, whereby Palau is a self-governing republic, with the United States maintaining responsibility for Palau's defense.

The Commonwealth of the Northern Mariana Islands consists of 13 islands; they extend N from Rota to Farallon de Pajaros, and the off-lying areas to the E of the chain including Stingray Shoal, Pathfinder Reef, and Arakane Reef, and are a U.S. possession. The Mariana group consists of a chain of steep, volcanic islands extending in a N-S direction for a distance of 380 miles. Guam is the southernmost, largest, and most populous island.

Depths between the islands and the reefs of the Caroline Islands are generally between 1,800m and 3,600m, but an increasing number of seamounts are detected and reported as rising from these depths, with their peaks ranging from a few meters to several hundred meters below surface.

The Mariana Trench, with the deepest recorded soundings lie along the S end and E side of the Mariana Islands, is over 1000 miles long with an average width of about 40 miles. The Magellan Seamount Group lies to the E from the N end of the Mariana Trench; the group extends in an E-W direction.

The Yap Trench and the Palau Trench are deep trenches lying along the E sides of the Yap and Palau groups. These trenches are about 450 miles and 250 miles long, respectively, and have an average width of 25 miles.

Winds—Weather.—Frequent rain occurs in all months in the E Caroline Islands. The Truk Islands average 3,200mm annually with a maximum of 270mm per month occurring in July and August, and a minimum of 135mm in January. January, February, and March show average rainfall somewhat under 255mm per month. Thunderstorms are quite common between May and October. In the Pohnpei Island and Kosrae Island area, rainfall averages 240 to 510mm per month throughout the year.

Much rain occurs throughout the year in the West Caroline Islands, but there is a definite increase between May and October. Thunderstorms are fairly common from June to November.

Rain occurs at all seasons in the Palau Island area, but is at a minimum during the period of the Northeast Monsoon. Squally conditions appear to occur more frequently from November to January, as the Northeast Monsoon is gradually established against the variable S to E drift of preceding months. Thunderstorms are rare from January to April, and fairly common from May through August.

At Palau Island, 4,400mm of rain normally occurs annually, with 510mm in July and slightly over 150mm in March. Rainfall is somewhat lighter over the open sea. Precipitation occurs on about 50 per cent of the days from February through April, and on approximately 75 per cent during July through September. The heaviest rains occur during the early morning with a secondary maximum soon after sunset.

In the Mariana Islands, the rainy season attends the summer monsoon, at which time thunderstorms are fairly common.

Typhoons occur on the average of five times a month in the western North Pacific during the month of September. July, August, and October have almost as many. Two-thirds of all typhoons of this area occur during these four months. Typhoons are least frequent during the month of February. They average about one per month for the entire western North Pacific.

It appears that most of the typhoons of the western North Pacific form to the W of 150˚E longitude. An occasional typhoon occurs farther to the E.

Typhoons rarely occur in the East Caroline Islands. Two or three a year, however, either invade, or pass slightly to the N of the West Caroline Islands. The normal typhoon path is S of Republic of Palau during the period from March to June, and a gain in November and December.

The part of the West Caroline Islands, including the Republic of Palau and the Mariana Islands, which lies N of the parallel of 5˚N is a region of great typhoon frequency.

Typhoons sometime occur in the Yap Island area, usually in May and June, or in the last three months of the year.

An average of two typhoons affect the Palau Island area annually. A considerable number originate in or near the West Caroline Islands. The diameters are small.

Table of Contents

An average of one storm per year originates in or passes over the Mariana Islands. The storms are as a rule relatively small in diameter, though often very intense near the center. They usually occur from July to January.

The Caroline Islands are under the influence of the doldrum's belt, from June through November. During this period, heavy rains, thunderstorms, and violent squalls will sometimes offer hazards. Cumulus and cumulonimbus clouds with ceilings sometimes reduced to 152 to 305m for short periods, poor visibility, lighting, and confused seas accompany the more intense of these storms. Most are of short duration and seldom cover and area larger than 20 or 25 miles in diameter. The storms usually move from E to W and occur most frequently at 0600.

The East Caroline Islands are swept by the Northeast Trades. East, NE, or E winds blow almost constantly from December through April. The average rate is 8 knots. From May until December, E to SE winds increase in frequency and predominate in September through November, with and average rate of 5 knots. Averages were computed from land station records; velocities are higher over the open sea. Gales rarely occur. Over the open sea, winds are usually strongest about 0300 and lightest about 1400.

In the Truk Group, the Northeast Trades are very steady, between November and June; 85 per cent of the winds blow from NNE to E directions. By July, however, the indraft of the summer monsoon carries E to S winds from this area into Asiatic waters; thereafter through October, the trade winds are overshadowed by various S to W breezes, with an average 13 per cent of calms.

In the Ponape Island area, the Northeast Trades predominate at all seasons of the year, and blow with great steadiness over the N part of the area, between November and April. Winds are more variable and are marked by occasional shifts to SE and S between July and November, although winds still predominate.

The West Caroline Islands, including the Republic of Palau, and the Mariana Islands come under the influence of the monsoons and trades with NE winds in the northern winter and winds between E and SE in the summer. As these groups lie on the E margin of the monsoon belt, the Northeast Trades and the Northeast Monsoons merge and create winds averaging 12 to 14 knots in the open sea in the northern winter and early spring. In May, the winds over this section diminish in force and blow mostly from the NE; at this time, the Southwest Monsoon begins to be felt in the vicinity of the Republic of Palau.

In summer and early autumn, the Southwest Monsoon prevails in the vicinity of and N of the Republic of Palau, but S winds predominate in the vicinity of the Admiralty Islands. In October and November, the NE winds become established over the whole area. Winds of 12 to 16 knots are experienced during the winter months.

In the Yap Islands area, NE to ENE winds prevail from November to June, when the trades are reinforced in the cooler months by the Northeast Monsoon. The Southwest Monsoon occurs between July and October, but is less pronounced at Waleae and Lamotrek, where at that season the winds are frequently from the SE as from the SW.

In the Palau Islands area, the Northeast Monsoon is usually well established from December to April, though its appearance is often advanced or delayed by as much as a month. The Southwest Monsoon occurs from the latter part of July to about the middle of October, but E winds often occur. The winds are variable during the remaining parts of the year.

In the Mariana Islands area, which lies near the border between the Asiatic Monsoon and the belt of the Northeast Trades, the steadiest winds, over the open sea, occur; then the winter monsoon and the Northeast Trades reinforce each other (November to April). Ninety per cent of all winds are then experienced from directions between N and SE and 70 per cent from NE to E. At the time of the summer monsoon, which falls into the season between May and October, E winds also predominate, but with considerable percentages from S to W directions.

Gales seldom occur in the East Caroline Islands. Gales occur occasionally in the areas N of Palau and Guam Islands, chiefly in winter, due to the strengthening of the Northeast Monsoon and the Northeast Trades. Sometimes, however, they occur at other seasons in connection with typhoons.

Regulations.—Regulations pertaining to navigation in U.S. Territorial waters may be found in the NOS Coast Pilots, while additional regulations will be cited in the text along with the navigational feature they affect.

Caution.—Large scale coverage for the waters included in this sector are provided by both NOS and NIMA. Mariners are advised to consult the most recent chart catalogs of both agencies, corrected to the latest Notice to Mariners for the proper chart selection and coverage of this region.

Micronesian authorities advise that local fishermen in small canoes may be encountered in the following area within the Caroline Islands, as follows:

a. 8˚20'N, 147˚00'E.
b. 8˚20'N, 148˚00'E.
c. 7˚30'N, 148˚00'E.
d. 7˚00'N, 147˚00'E.
e. 7˚15'N, 146˚00'E.
f. 7˚40'N, 145˚35'E.

Mariners should exercise prudence and caution when transiting this above area, especially during darkness or periods of reduced visibility.

Particular and constant attention must be paid to the currents when navigating among the island groups. As a rule, these currents are deflected and always strengthened near the islands. Strong currents are found in the narrow passages. Many of the islands, which are encircled by reefs that are steep-to on the seaward side, are so low that it is often impossible to see them, except under favorable conditions of light.

The sea around the Truk Islands is reported to be of a pale green color, making it difficult to identify reefs.

Micronesia East of 148˚E

10.2 Winds—Weather.—Kosrae Island, located on the S margin of the NE trades, which dominate from December to April inclusive, is swept by NE winds of 10 to 15 knots. The Northeast Trades shift N in June and July and light variable winds and calms prevail until the SE trades become dominant. The winds during the latter period are less strong and constant than those of the Northeast Trades. In November and December, the wind systems shift S and the island has another period of doldrums.

Return to paragraph: 10.5

Squalls occur almost daily, particularly with E winds during June and July. They are of short duration, with velocities of 15 to 30 knots. November and December are also squally months.

The Northeast Trades blow from December to March over Pohnpei Island. Gales have been reported during the trades, but are estimated to occur less than 5 per cent of the time. During April, E to SE winds increase in frequency and become predominant in September and October. During this season, the winds are light and variable with frequent calms. Sudden violent W to SW winds sometimes occur with the better developed storms. These sometimes attain gale force.

The doldrums belt moves N over Pohnpei Island in June and July, when the Northeast Trades give way to the Southeass Trades. A maximum of squalls and rainfall occurs at this time over the open sea. The doldrums move S in November and December, and cause a secondary increase in squalls and precipitation.

Showers and squalls are frequent, and occur at any time of the year. Squalls are sometimes violent and have an average duration of 20 minutes. Thick cumulonimbus clouds immediately precede these squalls, bringing gusty winds and heavy rain. Thunderstorms are rare. A 5-year average indicates only about 17 annually, fairly evenly distributed during the year.

Northeast and E winds prevail in the vicinity of Kapingamarangi Atoll from December through April, with a frequency of 68 per cent and an average velocity of 11 knots. In May and June, variable winds prevail, with an average velocity of 7 knots. Calms occur about 11 per cent of the time. From July through September, SE winds occur 55 per cent of the time, with an average velocity of 8 knots. Calms occur about 5 per cent of the time. In October and November, winds average 7 knots from varying directions. Southeasterly winds predominate and occur about 24 per cent of the time. Between October and January, W winds of 15 knots are experienced 10 per cent of the time.

Squalls and thunderstorms, with a diameter of 25 to 30 miles, are accompanied by winds averaging 15 to 25 knots, with occasional gusts up to 40 or 50 knots. Thunderstorms occur on an average of 2 days per month from May through November, and once a month for the rest of the year.

The Northeast Trades blow almost constantly from December to May over the Mortlock Islands and the Truk Islands. The average velocity is about 15 knots, with an occasional gust of 30 knots. Light variable winds can be expected from July to December. The influence of the doldrums is felt for a longer period (June to November) over the Mortlock Islands. During May and June, the trades decrease in force and intensity, with increasing ESE winds. As a rule, the winds increase during the morning hours and decrease during the night.

Typhoons sometimes have occurred over Kosrae Island and Pohnpei Island, but they are rare during the winter months. Kapingamarangi Atoll is out of the usual path of the typhoons, however, severe storms have occurred on rare occasions.

A region of typhoon development is located N of the Truk Islands. As a rule, such storms do not reach full development until they pass W of Guam. They occur most frequently in late summer or autumn.

Rain is heavy at Kosrae Island and is fairly evenly distributed throughout the year. Lelu has an average of 4,850mm and Inshiappu, on the W side of the island, has an average of 6,500mm.

Pohnpei Island is very wet, rain falling practically every day from March to December. Twenty-five millimeters of rain falls about 5 days per month. January and February, the so-called dry months, have an excess of 250mm.

Kapingamarangi Atoll has its heaviest rainfall in May and June, and then again in October and November; the average rainfall is about 300mm per month. The rainfall is relatively light from February through April, and from July through September, the average being about 160mm. In December and January the monthly average is 250mm; most of the rain occurs during storms.

The Mortlock Islands usually have their heaviest rainfall between June and October. Winter and early spring, the so-called dry season, has an average of 160mm or 190mm of rainfall per month.

The Truk Islands average 3,300mm of rain annually. The rain falls mostly at night, with a maximum during the early mor-ing hours, usually decreasing rapidly after sunrise. Minimum rainfall and cloudiness can be expected between 0900 and 1400.

Tides—Currents.—Currents in the East Caroline Islands are variable. It is reported that during E winds a strong current, setting N, has been experienced S of Pingelap Atoll. During SE and N winds, a NE current of 1 knot has been reported in this area. An E set occurs at flood tide off the W side of Pingelap Atoll.

An E current has been reported in the vicinity of Ngatik Atoll. The velocity reported is 1.25 to 1.5 knots.

The region of the Chuuk Islands lies within the Equatorial Countercurrent from about March to November. Easterly currents usually predominate during these months. Between December and February, this region lies on or near the N margin of the above countercurrent, so that W currents are usually experienced N of the group and E currents S of them.

The tidal currents are very weak in the East Caroline Islands and are greatly affected by the ocean currents. As a rule, they are not experienced in the open sea. In the passages leading into the atolls, the tidal currents are strong and turn at about the time of HW and LW.

The Caroline Islands which occupy a wide expanse of longitude, come in varying degrees under the influence of the Equatorial Countercurrent, as well as the North Equatorial Current and the South Equatorial Current.

From June to November, the Equatorial Countercurrent flows through the whole of the group, with the exception of the Yap Islands and other islands located N of 9˚N latitude, in the W part of the group. These lie on or near the boundary between this current and the North Equatorial Current.

From December to February, the North Equatorial Current flows through the group N of about 7˚N latitude, so that the Republic of Palau and Yap Island lie in the W current while Truk lies on or near the boundary between the two currents. South of about 7˚N, the Equatorial Countercurrent is found, with predominant directions varying between NE and SE in different parts of the group.

From March to May, E of 140˚E, the countercurrent appears to be confined to a narrow belt between 6˚N and 8˚N. North of

Table of Contents

the latter parallel, the North Equatorial Current flows through the group, and S of the former parallel the South Equatorial Current, if found. During the same months, W of 140˚E, the Equatorial Countercurrent, setting E or NE is found. The Republic of Palau lies on or near the boundary between this countercurrent and the North Equatorial Current; the Yap Islands lie within the latter current.

The ocean currents among the Caroline Islands are rather irregular due to the obstructing islands and banks, the tides, and the monsoon drifts. The irregularity appears to be considerable between 7˚N and 8˚N.

The Mariana Islands lie entirely in the region of the W current. This current is generally strongest and most constant in the S part of the group, from near Saipan Island S, since this is located in the North Equatorial Current. The N part of the group lies in the North Subtropical Current, which is weaker and less constant, particularly from June to August. In the vicinity of the islands the W current changes its direction and the rate is generally increased N of the Mariana Islands, the region of variable currents is found.

In the East Caroline Islands, the rise is small, the diurnal inequality is considerable, and the tides are complicated. In the West Caroline Islands, the diurnal inequality is small, and the tides are regular.

West of 140˚E, there is a slight inequality, except at full and change in spring and fall. The difference in height between successive HW is small; it is from 0.6 to 0.9m between successive LW.

Between 140˚E and 147˚E, and in the Mariana Islands, semidiurnal tides prevail at springs during spring and fall. At other times, the daily inequality in the time and height of successive high and low tides is considerable. The diurnal inequality is greatest when the moon is farthest from the equator. When the diurnal inequality is great, one LW disappears and the other becomes extremely low.

The tides between 147˚E and 160˚E are peculiar and complicated. Here there is considerable diurnal inequality with often a single daily tide, especially in winter.

10.3 **Kosrae Island** (5˚20'N., 163˚00'E.) is one of the most beautiful islands in the western Pacific and is the easternmost island of the Federated States of Micronesia. It is composed of basalt and is so fertile that almost any tropical plant can be grown. It is hilly and covered with dense forests. Mount Buache, located in the N portion of the island, is rounded. Mount Crozer, located near the middle of the island, is steep. A deep valley lies between these two mountains, dividing the island into two parts. The coasts are bordered by a wide belt of mangroves and other trees. The S coast is fringed by mangrove islets, more or less connected by reefs.

Cape Tupinier (5˚16'N., 163˚01'E.), the SE extremity of Kosrae Island, is low, rounded, and backed by wooded areas. A narrow reef fringes the point.

10.4 **Port Lottin** (5˚17'N., 162˚58'E.) (World Port Index No. 56580), situated on the S side of the island, is suitable only for small vessels with local knowledge. It provides good shelter from the Northeast Trades. The entrance is 225m wide between the reefs and is deep. A rock, 0.9m high, stands on the reef on the E side of the entrance. The reefs are hard to identify after heavy rains. Two small wharves and a pier are situated in the harbor.

Coquille Harbor (Okat Harbor) (5˚21'N., 162˚57'E.) is the only commercial port for international trade on Kosrae and is located on the NW side of the island. Large numbers of fishing vessels land catches for export to Japan via Guam. The port also handles container, oil, and bulk cargo.

Depths—Limitations.—The ontrolling vessel dimensions for the approach channel are al length of 152m and a breadth of 30m. The channel, marked by lighted buoys, is 500m long, 91m wide, and has a least depth of 50m.

Vessels of 9,000 grt, with a maximum length of 129m and a maximum draft of 8.2m, regularly use the port. The wharf is 167m long, with a depth of 9.1m alongside.

Aspect.—Range lights, in line bearing 095˚, lead through the approach channel to the entrance of the turning basin. From the turning basin, which has a radius of 457m, the track leads NE for 600m to the berth.

Three mooring buoys on the E edge of the turning basin have been laid for the use of fishing vessels when berths are occupied.

An airstrip is situated N of the wharf.

Pilotage.—Pilotage is compulsory for vessels over 300grt when calling for the first time. Pilots are available from 0600 to 1800 and board in the vicinity of position 5˚21'N, 162˚56'E, about 1 mile W of the entrance to the approach channel.

The vessel's ETA's should be sent via its agents 48 hours and 24 hours prior to arrival. Contact should be made directly with the pilots when within VHF range.

Caution.—The mast height of vessels in excess of 300grt may be higher than the adjacent airport runway approach surface. Vessels must coordinate with the port authority and adjust their arrival and departure times to avoid conflicting with aircraft movements.

Mariners must take care to ensure they correctly identify the new leading lights as the old leading light structures are still in place.

Lele Harbor (5˚20'N., 163˚02'E.)

World Port Index No. 56570

10.5 Lele Harbor, located on the E side of the island, is sheltered from SW winds by the mountains of the interior and from NE winds by Lele Island.

Winds—Weather.—See the beginning of paragraph 10.2 for further information..

Tides—Currents.—The spring range here is about 1.4m, while the mean range is 0.9m.

Currents with velocities up to 1.5 knots are sometimes encountered off the N and S sides of the island. Strong currents have been experienced, setting N or S, off the entrance of Lele Harbor. It is reported that strong currents set SW across the entrance of this harbor during strong NE winds.

The tidal currents, which set in and out of the several harbors, are weak and normally attain velocities up to 0.5 knot.

Depths—Limitations.—The reefs fringing the shores of the harbor can usually be made out at LW, but muddy water, especially after heavy rains, prevents them from being recognized at HW.

The entrance channel of Lele Harbor is about 0.1 mile wide between the reefs on either side, and is easy to recognize as the seas break on these reefs, even at HW.

Eripou, a reef awash at LW and reported to be extending N, lies on the S side of the harbor, close within the entrance, which is marked by a beacon.

The wreck of a minelayer, with mines aboard, lies in the S portion of the harbor, about 90m S of the front range light, and has a charted depth of 19.6m, while a visible wreck is charted about 0.2 mile N of the light. Wrecks with a charted depth of 9.6m are charted about 0.2 mile and 0.1 mile N of the same light.

A concrete wharf, 46m in length, with a depth alongside of 8.2m, is situated on the SW side of Lele Island. A concrete pier is situated on the S shore of the harbor. The pier is used by an oil company and has a permanently-moored barge alongside. The channel leading to the pier was cleared to a depth of 14.9m.

Aspect.—Mount Fenkofuru, which is wooded, occupies the E part of Lele Island, which forms the N side of the harbor. The E spur of this hill slopes down to D'Urville Point, the E extremity of the island. The W end of the island is low and has some scattered houses along the shores. A church, reported to be visible up to 10 miles from seaward, stands near the W end of Lele Island. The hospital is situated at the NE extremity of the island. Mangroves border the SW shore of the harbor.

Anchorage.—Due to limited turning space it is recommended that large vessels do not enter the harbor. The best anchorage, during NE winds, is off the village of Lele in 13.7m, fine, black sand. Anchorage can be taken, in 22m, W of Eripou. Vessels have experienced dragging, especially when E winds blow through the narrow entrance. Entering is difficult during strong E winds.

Directions.—The harbor is marked by beacons and a lighted range.

Caution.—Kosrae Island is fringed by a reef that extends up to 1 mile offshore in one place on the NW side. After heavy rains, muddy water extends some distance offshore and appears as reefs at times. During E winds, heavy swells have been encountered near the entrance of Lele Harbor.

Reefs are reported (1996) to lie off the SW side of Lele Island.

10.6 Pingelap Atoll (6˚13'N., 160˚42'E.) consists of Pingelap Island, Deke Island, and Sukeru Islet (Takai Islet), all lying on the same reef in the lagoon, in which there is a shallow passage usable only at HW. The islands are low and wooded. A village stands on the SW side of Pingelap Island. There is regular air service to Pohnpei.

Mokil Atoll (6˚40'N., 159˚47'E.) consists of three low, wooded coral islands located on a reef enclosing a lagoon. The outer edge of the reef is steep-to. There are no passages into the lagoon except for two boat passages which are only usable at HW. Prominent trees, excellent marks for vessels lying-to W of the islands, stand on the S ends of Urak Island and Mokil Island and on the N end of Manton Island. A stone wall, used as a landing place, is situated on the N part of the W coast of Mokil Island.

A native village is situated on the N part of Mokil Island. A radio station is situated on Mokil Atoll.

The Senyavin Islands, which consist of Pohnpei Island, Ant Atoll, and Pakin Atoll, lie with the E end of Ponape Island, about 88 miles W of Mokil Atoll.

Pohnpei (6˚55'N., 158˚15'E.) is a large island composed of basalt and is surrounded by a barrier reef and by over 25 islets, some of them volcanic. Mountain ranges traverse the island throughout its length and breadth. Totolom, a peak about 4.3 miles N of the S end of the island, is 732m high and is often obscured by clouds. The summit of the island, located about 0.5 mile further N, rises to a height of 778m.

There are many streams, the upper reaches of which are narrow and have a steep slope. They flow through the valleys, forming waterfalls and rapids, and widen greatly at their mouths. During the frequent freshets, quantities of soil are carried down, forming flats off the coast.

Several basaltic islands lie inside the barrier reef, detached from the main island, and many coral islets lie on the reef itself. The main island is covered with luxuriant forests of coconut palms and other trees, which slope up gently from the beaches to the mountain tops. Extensive mangrove swamps, which continue to spread, are found on the S and W side of the island. A number of passages lead through the barrier reef into the reef-studded waters surrounding the island.

Caution.—Vessels are urged to exercise the appropriate caution, as several floats are moored off the island and may best be seen on the chart.

10.7 Ronkiti Harbor (6˚49'N., 158˚10'E.), located on the S shore of Pohnpei, is divided into an outer harbor and an inner harbor by projecting reefs. The entrance of the outer harbor lies between Narlap, a small island covered with a thick growth of trees, and numerous drying rocks which lie near the edge of the reef on the E side of the channel. The entrance channel is about 0.4 mile wide.

The outer harbor is deep, with depths of 82m in the middle of the entrance to 18.3m or 22m at the N end. The narrows, which connect the outer harbor with the inner harbor, has a least charted depth of 14.6m in the fairway, but is only 37m wide. Sunken dangers lie on either side of the approach to the narrows. The inner harbor is snug and affords anchorage to small vessels with local knowledge near its head, in 12 to 14m.

Mudok Harbor (6˚47'N., 158˚17'E.), located on the S shore of Pohnpei, is entered E of Panian Island. The harbor is narrow and deep. The entrance is partially blocked by a 2.7m shoal, leaving a very narrow passage between it and the reefs opposite.

Lot Harbor (6˚48'N., 158˚19'E.), located on the SE extremity of Pohnpei, is a fissure in the reef, and is entered between Ponarakku Cape and Nanpuil, an island 0.2 mile ENE. The navigable channel is only about 90m wide, with a depth of 29m, decreasing as the head of the harbor is approached. Two detached reefs lie in the harbor between the entrance and the anchorage off Lot village.

10.8 Metalanim Harbor (6˚52'N., 158˚21'E.) is entered between the reefs N of Napali Island. The entrance, which is about 0.3 mile wide, can be identified by Takaiu Peak, a prominent sugarloaf rock, located on the N shore, about 2.5 miles WNW of Napali Island. A prominent waterfall is located on

Table of Contents

the SW side of the inner harbor. The ruins of a large castle stand on Nanmatol Island, on the S side of the harbor.

Metalanim Harbor has been swept to 12.8m within the limits shown on the chart. The outer harbor is exposed to the prevailing winds and the inner harbor is suitable only for small craft.

A reef, which dries, lies 0.3 mile WNW of the SW end of Napali Island. Two detached reefs, with depths of 1.2m, lie about 0.8 mile WNW of the same point. These dangers are difficult to identify, even in good light and at LW, unless there is a heavy swell running into the harbor.

Anchorage.—Anchorage can be taken, in 33m, about 1.5 miles within the entrance and to the W of the two detached reefs. Large vessels are recommended to moor, or to anchor E of the two detached reefs, where the depths are over 55m.

Pohnpei Harbor (6˚59'N., 158˚12'E.)

World Port Index No. 56590

10.9 Pohnpei Harbor is irregular in shape, confined, and encumbered with numerous reefs. It forms a natural and protected harbor.

Tides—Currents.—The tidal currents set out of Pohnpei Passage at velocities of 0.5 to 1 knot. The ocean current off the entrance usually has a W set, but E sets have been reported.

Depths—Limitations.—The main channel to the commercial port is Jokaj Passage. The channel is intricate, but marked by buoys, beacons, and lights. Shoals protrude inside the buoyed channel, but these shoals are located at the channel entrance and can be easily avoided, since the channel width at this point is more than sufficient. The controlling depth in the channel is 10m, referenced to LLW.

Pohnpei Passage, about 1.5 miles E of Jokaj Passage, leading to Langer Road, is about 0.2 mile wide between the 10m curves. It has a least charted depth of 7.5m, but general depths are much greater. The inner channel, leading to a small unused pier on the NE side of Not Point, is intricate and requires local knowledge. The commercial pier on the SW side of Takatik is 280m long, with a depth of 10m alongside. A turning basin is situated W of the dock. It has a radius of 463m.

Aspect.—Tolap Peak, the summit of Jokaj Island, has a precipitous E side. Peipalap, a peak shaped like a lion's head, stands near the NE end of the same island. A fixed aeronautical warning light, shown from the peak, is useful for navigation. Tamatamansakir, 586m high and prominent, is located 3 miles S of Tolap Peak.

Sankaku Mountain, located about 3.8 miles S of Not Point, has the appearance of a symmetrical cone when viewed from the N. Upon nearing Pohnpei, the settlement of Kolonia appears to stand at the base of the mountain.

Takatik is a low island with dense mangroves to seaward. The Pohnpei International Airport is situated on this island, with the E-W runway situated approximately in the middle of the island. The commercial port facility is situated about 0.3 mile S of the runway at the beginning of a causeway which connects Takatik with Pohnpei. Four oil tanks stand about 90m E of the commercial wharf.

A rock, 2.4m high and conspicuous, stands on the barrier reef, about 2 miles NE of Pohnpei Passage.

Langar, an island of volcanic rock, lies on the E fringe of Langer Road. The summit is flat and the upper part of the island is covered with vegetation. Clumps of coconut palms and breadfruit trees cover all parts of the island. The shores of the island are fringed by mangroves.

The pier situated at Not Point is no longer used as a commercial facility; it was reported (1995) to be 335m long, with a depth of 9.1m alongside. The pier's warehouse and a 20m high windmill on top are prominent landmarks.

An disused lighthouse stands on the reef on the W side of Pohnpei Passage.

Japutik, an island 40m high and covered with coconut palms, is connected to the N end of Langar by a drying reef.

Pilotage.—A licensed pilot is available. The pilot boat will meet the ship approximately 1 mile off the entrance of Jokaj Passage. Pilotage services must be requested by radio in advance.

Anchorage.—The best anchorage is in Langer Road, in 49m, taking care to avoid the unmarked shoals. It was reported thatl anchorage inside Jokaj Passage, about 0.5 mile NNE of Toletik Point, has good holding ground with little influence from the wind or current.

Vessels anchoring inside Jokaj Passage must ensure not to obscure the leading lights shown seaward.

The lagoon NE of Japutik provides anchorage space for large vessels. It is fully exposed to the NE trades, but the barrier reef offers protection from seas and swells. Scattered shoals and reefs, some of which are marked by buoys or beacons, are found in the lagoon.

Directions.—Jokaj Passage is marked by leading lights fitted on two dayboards, painted black and white vertical stripes, in line bearing 145˚.

Caution.—Caution is advised as numerous uncharted coral heads are known to exist within the waters of the island.

Langer Road may be used for emergency anchorages, but local knowledge is recommended.

Prevailing heavy rain frequently obscure navigational marks.

10.10 Ant Atoll (6˚48'N., 158˚01'E.) consists of two relatively large islets and 12 small islets lying on the E and S sides of an atoll which encloses a lagoon. The W and N sides of the atoll are submerged, except for Wolauna, an islet.

Tauenai Passage, located on the SE side of the atoll, leads into the lagoon between two curved reefs which extend from the entrance points. It is readily identifiable at LW as the reef bares on each side of the channel at that time. The passage is about 90m wide and has depths of over 15.2m. Inside the lagoon there are many detached reefs in the vicinity of the barrier reef, with the central part being relatively clear.

The flood current attains a velocity of 1 knot while the ebb a velocity of 2 knots in the passage. Caution is necessary as eddies are found in the entrance. The best time to enter the passage is reported to be about 5 minutes before LW, when the tidal current is at minimum strength.

Pakin Atoll (7˚04'N., 157˚49'E.) consists of five islands and a number of islets enclosing a lagoon. Nikalap is the largest island and lies at the NW end of the lagoon. The only channel into the lagoon is a boat passage leading through the SW side of the atoll.

Ngatik Atoll (5˚49'N., 157˚16'E.) consists of ten small islands and islets, all of which are low, flat, and densely covered with coconut palms. A radio station is situated on the atoll.

The pass into the lagoon lies on the SE side of the island, is about 114m wide, and clearly defined at LW. This channel should only be attempted by small vessels with local knowledge, under favorable conditions of light and tidal current. A least depth of 11m was reported in the pass entrance. The slack water ebb within the pass is reported to occur about 1 hour 30 minutes after LW at Pohnpei.

Three beacons mark the E side of the pass and indicate the channels leading from the pass to the lagoon proper. The S beacon is a plastic pipe in a concrete base, which marks the S side of a lesser channel. The N two are more substantial structures marking the main channel. In 1986, a vessel recommended making the turn on the beacon with a green triangular daymark, leaving it very close to starboard, and leaving the beacon with a red square daymark very close to port.

Some of the coral heads within the lagoon are marked with old concrete structures, or newer, locally made beacons.

Caution.—It has been reported (1986) that the entire atoll is charted 2.5 miles SSW from its actual position, with the slope of the reefs and the positions of the islands being misrepresented. Depths within the lagoon are reported to be inaccurate, with numerous uncharted and mischarted coral heads being present. An excavated channel shown on the W side of the pass does not exist. Vessels are urged to exercise the appropriate caution.

10.11 Nukuoro Atoll (3˚50'N., 155˚00'E.) consists of more than 40 islets, about 3.6m high, standing on the E side of the barrier reef. Nukuoro, an island covered with palm trees and tropical plants, is the center of activity. A small pier is situated on the lagoon side of Nukuoro, which is reported to be unsafe, even for small vessels. There is a radio station on the island.

Nukuoro Passage, 27 to 37m wide, leads into the lagoon between the reefs fringing the islands of Kaujema and Shenukdei. The passage is deep and is marked by tree branches stuck into the reef, but is fronted by a bar, with a least depth of 8.2m. Numerous coral patches, some of which dry, are scattered throughout the lagoon.

Caution.—The sea is usually high at the bar and becomes choppy when the tidal currents are strong. These currents sometimes attain a velocity of 6 knots on the ebb. In 1978, the passage was reported to have sufficient depth for small boat operations, but it is very narrow and has an uncharted bend of 45˚. The passage should only be attempted at slack water, by small vessels with local knowledge, under the most favorable of conditions.

In 1985, a vessel reported that anchorage within the vicinity of the passage was impossible.

10.12 Kapingamarangi Atoll (1˚04'N., 154˚45'E.) consists of 30 small wooded islets lying on the E side of an atoll reef. The reef on the W end of the atoll is almost submerged at HW. The islands are covered with coconut palms and other trees. Touhou Island, 35m high and connected N to Veilua Island (Ueru Island) by a causeway, is the center of population and the home of a native chief. A stone and coral pier is situated on the lagoon side of Touhou Island.

The seaward side of the atoll is steep-to. The lagoon is deep, but is studded with numerous coral heads and reefs, some of which uncover. A 3m coral head and a 0.3m coral head lie just within the SE channel of Greenwich Passage, located on the SW side of the atoll. A 0.6m shoal is located about 0.5 mile ESE of the NE beacon in Greenwich Passage.

Tides—Currents.—Tidal currents reach a maximum velocity of 5 knots and have a tendency to set toward the reefs on the W side of the passage.

Seas and swell are confused and choppy during local squalls and thunderstorms. From December through April, the sea and swell are from the NE; from May through November, they are from the SE; and from October through January, they are from the W. The heights are 0.6 to 1.2m, 0.6 to 0.9m, and 1.5 to 1.8m, respectively. The last named heights occur about 10 per cent of the time.

Depths—Limitations.—Greenwich Passage (The Passage), which is useable by small vessels with local knowledge at or near slack water, under favorable light and weather conditions, is the only entrance into the atoll from seaward. The passage consists of three channels, two of which are useable. The SE channel, which is not marked, is the narrower, shallower, and straighter of the two, and is reportedly favored by sailing vessels. It has a width of 68m and was reported to have a clear depth of 9.1m. A shoal, with a depth of 4.1m, lies at the channel's inner end.

The W channel, which has a width of 100m, is the deeper channel, and is marked by branches stuck into the reef. The channel contains a 90˚ bend.

Reports have indicated that currents with a velocity up to 6 knots set through the passage. The strongest ebb current was reported to occur at LW, and continues for 1 to 2 hours after LW.

A vessel reported (1985) that after negotiating the turn in the W channel, a vessel should continue to bear right to avoid a shoal. Vessels transiting the SE channel should immediately bear right and favor the reef side once through the entrance.

Anchorage.—Anchorage can be taken by small vessels with local knowledge off the lagoon side of Touhou Island. The reefs and shoals are usually visible under favorable conditions of light.

Caution.—It was reported (1989) that breakers covering an area of 1 mile long in a N-S direction were sighted in position 1˚45'N, 152˚02'E, 170 miles WNW of Kapingamarangi Atoll.

10.13 The **Mortlock Islands** (Nomoi Islands) (5˚25'N., 153˚40'E.) are the general name given to the three atolls, namely Satawan Atoll, Lukunor Atoll, and Etal Atoll. These islands lie within the limits of the Equatorial Countercurrent for most of the year, but in March and April the W or NW sets off the South Equatorial Current spread into the area. However, this current does not normally reach the islands and their vicinity which remain under the influence of the Equatorial Countercurrent.

Satawan Atoll is the largest atoll of the group. Nearly 90 islands and islets lie on the atoll reef. In general, the islands are low and are covered with coconut palms, breadfruit, and other trees. Satawan is the largest and principal island. A wharf, 64m long and 10.6m wide, extends from the lagoon side, about 228m from the N end of the island.

Table of Contents

Tides—Currents.—In South Channel, the current attains a velocity of 0.25 knot at flood and 1.25 knots at ebb. The ebb is reported to run SSW from 3 hours after LW to the following LW. When the currents are strongest, ripples appear at the extremities of the reefs.

In North Channel, the tidal currents attain a maximum velocity of 2.75 knots. The currents turn 2 hours after HW and LW. There are tide rips on the shoals inside this channel at strength of flood.

Depths—Limitations.—Numerous above and below-water dangers exist in the lagoon, some of which are hard to discern. Large areas in the NW and SE parts of the lagoon have been swept to depths of 14.9m. A passage, nearly 1 mile wide and swept to the same depth, connects the two swept areas. Most of the dangers lie outside the swept areas.

South Channel, situated on the S side of the atoll, is the main passage leading into the lagoon and to the anchorage off Satawan. The channel has been swept to a depth of 14.9m over a least width of 270m. Reefs extending out from both sides of the channel and in the lagoon are normally visible under favorable conditions of light. Tide rips are sometimes seen in the channel.

North Channel, situated on the N side of the atoll, is deep, and winding, with a least width of 228m between the reefs. A passage leading to the anchorage in the N part of the lagoon has been swept to depths of 14.6 to 18m, except for isolated shoals and reefs. The reef extending out from More, an islet on the E side of the channel, and the islet itself, can be passed fairly close-to as they are steep-to and usually visible under favorable conditions of light.

Anchorage.—Anchorage is almost unlimited in the lagoon. Vessels can anchor, in 27m, about 0.5 mile W of Satawan. This anchorage is sheltered from E winds.

Good anchorage can be taken during the Northeast Trades, in a position SE of Lalang Islet, located E of North Channel. Anchorage can also be taken SW of Afarene islet located W of North Channel.

10.14 Lukunor Atoll (5˚30'N., 153˚49'E.) consists of 18 low-lying islands and islets on the atoll reef. Most of these are densely covered with coconut palms, breadfruit, and other trees. Coconut palms are scarce on the islets on the S side of the atoll. Lukunor, 1.5m high, is the principal island of the group and has some cultivated land. Two wharves, 30m and 24m long, are situated on the lagoon side of the island. Oneop Island, located on the W side of the atoll, is densely covered with coconut palms, but has some cultivated ground in its middle part. A wharf, 109m long, is situated on the lagoon side of the island.

Depths—Limitations.—The lagoon is deep, but there are a number of dangers scattered throughout. An area in the E part of the lagoon has been swept to 11.9 to 14.9m, as indicated on the chart. The entrance, between the reefs fringing Lukunor Island and Sopunur Island, has a width of 91m and has been swept to 14.9m. Kuchino Shoal, which dries 1.2m, lies close inside the entrance. A black beacon stands on its S side. This shoal divides the inner side of the entrance into two channels. The E channel is recommended. The reefs on either side of the channel are visible under favorable conditions of light. Caution is necessary as strong NE winds create a heavy swell within the entrance and the currents and wind have a tendency to set the vessel towards Sopunur Island.

Anchorage.—Chamisso Harbor, located in the E portion of the atoll, provides protection from E and NE winds. Numerous other berths are available W of Chamisso Harbor in deeper, but more exposed water. Good holding ground has been reported.

During strong W winds, vessels can anchor, in 29m, about 0.3 mile off the E side of Oneop Island.

Etal Atoll (5˚35'N., 153˚34'E.) consists of several low, flat islets which are covered with coconut palms and breadfruit trees. Etal is the largest and principal island. The entrance of the lagoon is located about 45m NNW of the SW tip of Etal. The pass is bordered on either side by coral rock, fish weirs, and is both shallow and narrow.

Namoluk Atoll (5˚55'N., 153˚08'E.) consists of five coral islets on an atoll reef. Namoluk, 30m high and having a church on it, is the highest and NW islet of the group. A church stands on Amas, located on the SE side of the atoll. A jetty is situated at the S end of Namoluk. There is a radio station on Namoluk.

Depths of 20 to 77m are found within the lagoon, but the passage on the SW side of the atoll is suitable only for boats under the most favorable conditions. Another boat passage was reported close SE of Namoluk, but was subject to heavy tidal surge conditions.

10.15 Oroluk Lagoon (7˚30'N., 155˚15'E.) is formed by a chain of reefs which mostly dries and has an average width of 0.5 mile. Oroluk, a densely wooded and prominent island, lies on the NW side of the lagoon. A conspicuous wreck lies close NE of Oroluk. A second wreck is reported to lie about 2 miles further SE.

Depths—Limitations.—The seaward side of Oroluk Lagoon is steep-to, with no apparent off-lying dangers. Mariners should give the reefs surrounding the lagoon a wide berth. Many above and below-water dangers are found within the lagoon.

Pioneer Pass, located on the W side of the lagoon, is narrow and suitable only for small craft. Reefs and shoals encumber both sides of the entrance and a shoal reef lies close inside.

West Pass, 2.75 miles S of Pioneer Pass, is about 0.3 mile wide, with a shoal swept to a depth of 7.3m in the entrance. Tidal current in the pass attain a rate of 1 knot.

Another unnamed pass, 0.3 mile wide, lies 1.25 miles SE of West Pass. A coral patch, with depth of 0.9m, lies on the N side close within the entrance. A channel swept to a depth of 12.8m passes to the S of this patch.

Tides—Currents.—Currents in the vicinity of Oroluk Lagoon are strong and irregular during strong NE winds. A W current of 1 knot is experienced off Keltie Pass on the N side of the lagoon.

Anchorage.—Oroluk Lagoon is reported to afford unlimited anchorages, but offers no protection other than that provided by the atoll reef. Vessels can anchor, in 20m, about 1 mile SSE of Oroluk.

10.16 Minto Reef (8˚10'N., 154˚18'E.), 59 miles NW of Oroluk Island, is an atoll reef, about 4.5 miles long. A sand bank, about 1.8m high, stands on the N side of the reef. This reef is visible only under favorable conditions of light and con-

stitutes a dangerous hazard at all other times. Several wrecks lie stranded on this reef. There are several shoal passages into the lagoon.

Losap Atoll (6˚54'N., 152˚42'E.) consists of about 17 islets on the atoll reef. Laol, 25m high and located at the NE end of the atoll, is the largest island of the group. A pier and a jetty are situated at the W end of Laol. Losap island, which stands on the lagoon side of the atoll reef, just W of Laol, is 31m high. There is a sandy beach on the W side of Losap. A small church stands on this island. There is also a radio station. Alanmwassel Island, on the NW side of the atoll, is 7.9m high. Pis Island, 37m high and having a church on it, is the E island of the group on the S side of the atoll.

Tides—Currents.—High and LW occur at the same time as at Truk Islands. Slack water lasts about 20 minutes and occurs roughly at the time of HW and LW. The tidal currents through the passages attain velocities of 1 to 1.5 knots.

Depths—Limitations.—Depths of 31 to 68m are found in the lagoon. The scattered dangers in the lagoon lie close off the atoll reef and just inside the several entrances. As the atoll reefs are submerged, the entrance cannot be recognized until close-to. It was reported that none of the lagoon entrances are suitable for large vessels.

Several passages are reported to lead into the lagoon, one on the E side and the others on the W side. Morrappu Channel, the third passage from the S, on the SW side of the atoll, is reported to have a least depth of 4.3m and to be about 230m wide. A small, white sandy islet, 0.9m high, stands on the reef on the N side of the channel. Breakers mark each side of the channel. A vessel using Morrappu Channel reported (1968) a depth of 7.3m over the reef and a wreck stranded on the N limit of the channel. In 1978, a vessel 65m long reported using the channel without difficulty.

Morchan Channel, on the SE side of the atoll, is about 90m wide and has a depth of 4.6m in the fairway. It is narrow, tortuous, and is not recommended.

Anchorage.—Small vessels can anchor, in 18.3m, from 0.3 to 0.5 mile off the W side of Losap. Protection is afforded from the prevailing NE winds.

10.17 Nama Island (7˚00'N., 152˚35'E.) is nearly 1 mile long in a NW-SE direction and nearly 0.5 mile wide. It is somewhat higher than most islands in this general area and resembles a fort when viewed from the offing. It is covered with palm, pandanus, and breadfruit trees. A village stands on the W side of the island.

The island is reef-fringed and shoal ground, as defined by the 10m curve, extends 0.5 mile off the N and SE sides. A weak E current has been experienced about 10 miles N of Nama.

Kuop Atoll (7˚02'N., 151˚56'E.) consists of four coral islets standing on the atoll reef enclosing a lagoon.

The lagoon is deep, except for a few scattered coral heads. A deep, but narrow small-craft passage leads across the SE side of the atoll reef. Anchorage can be taken by small craft, in 18.3 to 46m, in the lagoon.

Strong currents are reported in the channel that separates the N end of the atoll from the E part of the S side of the atoll reef that encloses the Truk Islands.

The Chuuk Islands (Truk Islands)

10.18 The **Chuuk Islands** (Truk Islands) (7˚25'N., 151˚50'E.) comprise the largest island group in the Caroline Islands. The group consists of nearly 98 islands and islets, 41 of which are on a great encircling reef ranging in diameter from 30 to 40 miles. There are 11 main islands up to 10 square miles in area. They are mountainous and of volcanic origin, and lie within the encircling barrier reef. The latter is broken by about five principal and numerous lesser passes. Most of the barrier reef is awash at LW. The islets on it are of coral sand, with dense growths of coconut palms. Few exceed 30m high to the tops of the trees.

The large islands within the lagoon are mostly formed of basalt, are wooded, and have some prominent peaks. The low land near the coasts consist mainly of forests of coconut palms and mangrove swamps. Sandy beaches are rare, but a few exist on Moen.

The smaller islands within the lagoon have sandy beaches and low sandy interiors covered with palm trees.

The principal settlement and commercial port is situated on the NW side of Moen.

Tides—Currents.—The range of tides in the lagoon is usually small. The average tidal range is 0.4m at Dublon Island and 0.5m at Moen. The tropic range, which is the increased diurnal range occurring semi-monthly, is 0.6m at Dublon Island and 0.6m at Moen. The maximum tide is about 0.9m. Tides usually occur twice daily within the same 2 hour period, except when the diurnal inequality is greatest and there is one tide.

The tidal currents in the passages turn approximately at HW and LW, with the flood current flowing into the lagoon and the ebb out of it.

It was reported that the currents in Northeast Pass run at a much stronger velocity than shown on the chart. In the vicinity of the pass, the tidal currents are affected by the wind, and a maximum velocity of 5 knots has been obtained. A heavy swell occurs at spring tides with strong NE winds.

Within the lagoon, the currents are complicated and seldom exceed 0.5 knot.

Depths—Limitations.—The barrier reef is broken by numerous passages, many of which have been swept to adequate depths. Extensive areas within the lagoon have been swept to depths indicated on the area chart. Almost the entire N part of the lagoon has been swept to depths of 16.8m, except for the shoals, which have been swept to lesser depths. Swept areas and channels lead from the main passes to the anchorages off the main islands.

Numerous above and below-water dangers are scattered throughout the lagoon. The islands are fringed by reefs and fronted by dangers.

Northeast Pass (7˚30'N., 151˚59'E.), the recommended pass, is marked by breakers and by the white cylindrical light to the S and Mor Island to the N. The charts indicate several swept passages that lead from the various passages to the anchorage areas. Vessels should stay within these areas and navigate through them under only the most favorable conditions of light, due to the numerous scattered reefs and shoals. The channel leading through Northeast Pass to Moen Island is marked by IALA Maritime Buoyage System (Region A) and

Table of Contents

swept to a depth of 11m. The harbor may also be approached through North Pass.

Passages leading into the lagoon are numerous, however, only those passages swept are free of mines for shipping on a risk acceptable basis.

North Pass (7˚41'N., 151˚48'E.) has a channel 0.5 mile wide and swept to a depth of 17m.

Piaanu Pass (7˚20'N., 151˚26'E.) has a channel 0.5 mile wide and swept to a depth of 18m.

South Pass (7˚13'N., 151˚48'E.) has a channel 463m wide and swept to a depth of 17m.

Aspect.—The islands in the lagoon are divided roughly into two groups. The Shiki Islands, in the E half, consists of Moen, Dublon Island, Fefan, Uman, and their adjacent islets. The Shichiyo Islands, in the W half, consists of Udot, Ulalu, Faleosicz, Tol, Onamue, and their adjacent islets.

Moen is first sighted by vessels entering the lagoon through North Pass or Northeast Pass. Moen is a complex mountainous mass of volcanic rock dominated by Mount Teroken. The coastal lowland on the W side is relatively wide and consists mainly of fresh-water marshes and artificial fill. The lowlands in the E part are mainly mangrove swamps and scattered beaches. Moen is the largest of the E group of the high volcanic islands.

Moen consists of two mountain masses separated by a deep gap. North of this gap is Mount Ton Azan, with a double summit. The S summit, Mount Toladjau, culminates in a steep cylinder of rock. The N summit, Mount Vine Pur, is somewhat lower and rounded, but has a rocky promontory on the W side. Moen Island is fringed by reefs and fronted by dangers.

A white cylindrical tower, 12.8m high, stands on a 76m hill at the E end of the island and is visible while entering Northeast Pass. In 1985, a vessel reported that the tower was visible only on certain bearings due to the growth of vegetation. The same vessel also reported that the tower is not readily visible from Northeast Pass.

10.19 Moen (7˚26'N., 151˚50'E.) (World Port Index No. 56600) is a small harbor located in Uola Roads, on the W side of Moen Island. It is a first port of entry. There is a concrete pier, 92m long, dredged to a depth of 7.3m on the W side. The SE side of the pier is 99m long and is reported to have depths of 8.5m alongside. A channel and turning basin, both dredged to a depth of 8.5m, are situated W of the pier. Caution is advised as the channel is unmarked. Although the reefs to the N and S of the channel are readily identifiable during unfavorable winds, a single screw vessel without assistance might experience difficulty backing out from the SE side of the pier due to the closeness of the reef to the S.

An active airfield with scheduled airline service lies on the NW side of the island. Landing aircraft make their approach from the SW and vessels should avoid anchoring in their flight path. A radio antenna is situated at the S end of the airstrip. A prominent tower stands near the airfield on the N side of the island. A beacon is situated on Scheiben Island, about 1.5 miles NW of the airport.

Dublon Island (7˚22'N., 151˚52'E.) is deeply indented on its E side by a bay. Mount Tolomen and Mount Foukenau rise from the main mass of the island. Two peninsulas projecting E from these mountains form the above bay. Volcanic slopes on the island are steep, except in saddles between the above peaks and at the base of each peninsula. A basaltic cliff stands on the S side of Mount Tolomen.

The island is wooded, and except at the NE extremity, there are many dense mangrove forests on the coast. A large part of the coastal lowland is covered with artificial fill which forms an irregular band around most of the island.

A fisheries pier, reported to have a length of 76m on its SSE side and 46m on its W face, lies on the SE side of the island, but no details are presently available on the facility. Except for a large conspicuous petroleum tank at the head of the fisheries pier, most of the facilities shown on the large scale chart have been destroyed or covered with growth.

Eten Island, about 0.5 mile SE of Dublon Island, has a nearly flat plain at the NE end and a flat plain at the SW end. Along the NW side is a flat plain which has been extended by filling out on the reef.

Pilotage.—English-speaking pilots board vessels about 2 miles outside Northeast Pass during daylight hours.

Anchorage.—The area between Dublon Island and Eten Island has been swept to various depths, and is considered to be a good anchorage. Care must be taken when approaching the anchorage to avoid the many wrecks and shoals in the vicinity of Dublon Island and Eten Island..

Anchorage can be taken, in 12.8 to 42m, about 1.5 miles SW of the N end of Moen. The bottom is uneven, but soft. Vessels should avoid anchoring in the flight path for the approach to the runway on the NW side of Moen. Anchorage can also be taken off the SE side of the same island.

Vessels can take temporary anchorage, just inside the barrier reef in the vicinity of North Pass and South Pass.

Caution.—The swept areas and channels, best seen on the chart, that lead from the main passes to the anchorages off the main islands are declared dangerous due to mines. Due to the elapse of time, the risk in this area to surface navigation is now considered no more dangerous than the ordinary risks of navigation; but a very real risk still exists with regard to anchoring, fishing, or any form of submarine or seabed activity.

Ships should veer anchor and cable if anchoring, and submarines should not bottom in the channels due to the danger of detonating inactive mines.

Moen anchorage has been swept and is considered safe for navigation. The area in the vicinity of Eten Island is safe for surface navigation only. Anchoring, dredging, piledriving, trawling, and submarine bottoming should be avoided.

The reefs on each side of **South Pass** (7˚13'N., 151˚48'E.) are hard to identify due to the general color of the water.

Vessels should navigate with caution and only under favorable conditions of light, as most of the dangers in the lagoon are unmarked.

Numerous submarine cables, the positions of which are shown on the charts, are found within the lagoon.

Numerous wrecks lie in the lagoon, especially in the general vicinity of Dublon Island, Fefan Island, and Uman Island. The floor of the lagoon is littered with bombs.

10.20 The **Hall Islands** (8˚40'N., 152˚00'E.) consist of two large atolls, Murilo Atoll and Nomwin Atoll, separated by a deep 6 mile wide channel. Murilo Atoll, the E atoll, has a num-

ber of small islets with coconut palms and other trees on a barrier reef. Nomwin Atoll has a number of low coral islets.

Murilo Atoll has the greater part of its S reef submerged. Most of the islands are found here. The N and NW sides of the atoll consist of a nearly unbroken reef, with openings at the NW end.

Extensive areas in the S and SE part of the lagoon have been swept. Numerous coral patches, some of which almost dry, are found within the lagoon. The passes have been swept to depths indicated on the chart.

A wreck stranded on the NE portion of the reef is reported to give a good radar return. Ruo Island, on the S side of the atoll, is reported to give a good radar return up to 16.5 miles. Stranded wrecks were reported to be on the W and S portions of the reef in.

Murilo Atoll should only be approached during favorable conditions of light, due to the submerged reefs. The reefs fringing the entrances are usually visible by color or by breakers.

Anchorage.—There are extensive anchorage areas within the lagoon, but most of the area is unprotected from the prevailing winds.

Nomwin Atoll consists of some low coral islands, some of which are densely wooded. Nomwin Island, on the S side of the atoll, has a rounded summit. Several islets and sandbanks of a shifting nature stand on the reef W of the island. There are two wooded islets on the W side of the atoll. A radio station stands on Fananu Island on the E side of the atoll. A jetty extends about 90m N from the N shore of Nomwin Island.

The lagoon is encumbered with many coral patches, one of which dries. A large area in the S part of the lagoon has been swept to a depth of 14.9m, with shoal patches swept to lesser depths, as indicated on the area chart. The main and best entrance to the lagoon lies between the edge of the reef 2 miles NW of Nomwin island and the reef 1.5 miles farther NW. The entrance is divided into three passages by South Patch, awash, and North Patch.

Anchorage can be taken off the N side of Nomwin Island, fairly sheltered from S and W winds, but open to the NE. Anchorage can also be taken WSW of Fananu Island. The strength of the NE sea and wind is broken by the barrier reefs.

10.21 Fayu (8˚33'N., 151˚20'E.) is a low, densely-wooded coral island. Reefs fringe the island to a distance of 0.5 mile offshore. The entrance to a small boat passage, with depths of 0.6 to 0.9m, lies on the NW side of the island. Several prominent rocks lie on the reef SW of the island. A stranded wreck of a 3,000 grt vessel lies on the N edge of the reef. The wreck was reported to give a reasonable radar return.

Namonuito Atoll (8˚40'N., 150˚00'E.) is a large triangular-shaped atoll. Pisaras, at the E end of the atoll, Ulul, at the W end of the atoll, and the Magur Islands, at the N end of the atoll, are the most important islands. The atoll reef is submerged for the greater part and is marked by the lighter color of the water over it. The reef appears to be in the process of formation and can be crossed at many places where it is submerged.

Pisaras Island has coconut palms and other trees growing on it. Reefs extend NW and WNW from the island, enclosing a shallow and foul bay.

Ulul Island (8˚35'N., 149˚40'E.) is densely covered with coconut palms. A drying reef fringes the island. There is a radio station on the island.

The reef forming the rim of the atoll has charted depths of 0.9m to over 18.3m and can usually be identified by the discoloration of the water and by the action of the sea. The lagoon is not of uniform depth. Except for a 5.5m patch, located 14 miles W of Pisaras island, and a detached reef, with depths of 2.7 to 3.7m, located about 6 miles NW of Pisaras, there appears to be no less than 9.1m on the scattered coral heads.

Vessels can cross the atoll at any of the swept areas. An excellent place to cross is at a position about 8 miles W of Pisaras Island. Another good position at which to cross the reef is at a position 6 miles SE of Magur Island.

Anchorage.—There is reported to be good anchorage in the swept area NW of Pisaras. Protection is afforded from E and SE winds.

During W winds, vessels can anchor 0.5 mile off the E side of Ulul Island, in 27m.

Vessels can anchor outside the lagoon, in 55m, about 0.3 mile off the S part of the W side of Ulul. There is limited space, but some protection is afforded against the prevailing NE winds.

Caution.—The island has been reported (1993) to lie 1.5 miles SE of its charted position.

10.22 Pulap Atoll (7˚36'N., 149˚25'E.) consists of three low islands lying on the same reef. Pulap Island, the N of the three islands, is fertile and has many coconut trees on it.

Detached reefs, with depths of 9.1 to 13.7m, lie along the atoll reef and inside the lagoon. They are hard to distinguish. The submerged reefs on the E and SW sides can be discerned under favorable conditions of light.

Anchorage.—The lagoon is exposed to strong winds and heavy swells. The best anchorage is about 1 mile S of Pulap Island, in 27m, sand. Vessels can take fair weather anchorage off the N side of Tamatam, the S island of the atoll.

Caution.—Hitchfield Bank, with a least depth of 9.1m on its E edge, is located about 12 miles ENE of Pulap Atoll.

Shoals, with depths of 9.1 to 22m, have been reported to lie up to 16 miles W of the bank.

10.23 Puluwat Atoll (7˚21'N., 149˚11'E.) consists of five coral islands lying on the same reef. Puluwat and Alet, the two largest islands of the group, have breadfruit trees at the middle and coconut palms along the shores. The smaller islets are wooded, but have few coconut palms. A white concrete tower, 40m high, stands on the NW end of Alet. There is a radio station on Puluwat.

A coral patch, with a depth of 18.3m, is located about 1.3 miles NW of the NW end of Alet. Shoaling was reported between this patch and the NW end of the island.

Enderby Bank, with a depth of 16m, coral, lies about 3 miles WNW of Alet. A detached 12.8m patch lies about 1.5 miles SE of Puluwat. Uranie Bank, which extends about 17 miles SE from Puluwat, has depths of 11 to 61m. On its NE part, about 9.5 miles E of Puluwat, there is a depth of 11m which is marked by discoloration.

Anchorage.—Anchorage can be taken outside the lagoon, in 13.7m to 18.3m, about 1.8 miles SSE of Alet. The anchorage

Table of Contents

cannot be approached during the NE trades due to the high seas.

Vessels with a draft of 4.6m occasionally enter the lagoon and anchor. Entry should be made under favorable conditions, and only with local knowledge. Vessels enter by keeping close to the reef on the N side of the pass.

10.24 Pulusuk (6˚42'N., 149˚18'E.), an island on the S end of Manila Reef, is low and densely wooded. A fringing reef extends about 90m from the E side and 0.15 mile from the W side. Shoal ground, as defined by the 5.5m curve, extends 0.25 mile NE from the N end of the island.

Manila Reef (6˚59'N., 149˚02'E.) consists of two detached submerged reefs, together extending about 30 miles in a NNW and opposite direction, with a depth of about 165m between them. The shallowest part, at the NW end, was reported to have depths of 2.7 to 5m, but there may be places where it dries at LW. Discolored water is found over the entire reef and, with the exception of this shoal part and that surrounding Pulusuk, depths of 9.1m or over were found everywhere.

A shoal, about 0.5 mile in diameter and with depths of 1.8m or less, was reported to lie S of the NW end of Manila Reef.

Tides—Currents.—The W tidal current is reported to have a velocity of 1.5 knots, about 0.5 mile W of the N end of Pulusuk. The E tidal current had a velocity of 0.8 knot off the N side of the island, and a velocity of 1.5 knots 0.3 mile from the S end.

10.25 Lady Elgin Bank (6˚18'N., 149˚28'E.) appears to be an incomplete atoll. It has a least depth of 7.3m over its E side and 9.1m over its W extremity. Breakers have been reported on this shoal bank.

Helene Shoal (5˚30'N., 149˚15'E.) has a least depth of 8.8m over its W end and 10m over its E end. Breakers have been reported on this shoal.

Gray Feather Bank (8˚00'N., 148˚47'E.) is an extensive bank that takes the form of a submerged atoll. It has a least depth of 11m at its W extremity, 14.6 to 37m on its outer rim, and from 39 to 70m within.

Shin-Matsuye Bank, with depths of 14.6 to 40m, lies close W of the W extremity of Gray Feather Bank.

Mogami Bank (8˚30'N., 148˚45'E.), an extensive bank separated from the N side of Gray Feather Bank by a very deep passage, has a least depth of 11m over its W edge. At the E and W entrances of the passage, there are two small banks with least depths of 18.3m and 22m, respectively. Mogami Bank has the shape of a submerged atoll, with charted depths of 11 to 37m on the outer rim and 33 to 53m within.

Caution.—Vessels should only attempt to cross these banks under favorable conditions of light, as shoals other than those charted may exist. Breakers are rarely seen on the above-mentioned banks. Under favorable conditions of light, their E edges can be made out. The W edges are hard to discern at depths of more than 20m.

Micronesia West of 148˚E

10.26 Winds—Weather.—From November through May, NE and E winds prevail 78 per cent of the time, with an average velocity of 10 to 12 knots. In June, winds are mostly from the NE, but begin veering toward the E during the latter half of the month; velocities average 10 knots. From July through September, S winds prevail with velocities averaging 8 knots, and calms occur 6 per cent of the time. During this period are occasional brief periods of squally weather. In October, winds begin backing toward the E with SE being the prevailing direction; velocities average 10 knots.

The winds at Ulithi Atoll consist of the Northeast Trades, which blow from late November to May, with greatest force from December to February. In May through July the wind is E and long periods of calm occur. From the end of July to the end of September, the Southwest Monsoon prevails. From September to November calms occur. Typhoons are known in this area. In a typical year, six of ten typhoons that passed between Guam and the Republic of Palau passed to the N of Ulithi Atoll. Two passed directly over the atoll and the remaining two passed to the S of the atoll.

Japanese sources state that from November through March E winds generally prevail. From April through June, and September through October, winds are NE to SE and are comparatively calm. In July and August, the wind direction is changeable; S winds come up quickly and die away in one night. A shifting from N to W is said to be a sign of bad weather.

The doldrums belt oscillates back and forth over the Yap Islands area from July through September, being the principal climatic control during this period. The Northeast Trades are predominant from November through May.

The Northeast Trades are best established in January, when NE or E winds blow 89 per cent of the time, with an average velocity of 6 knots, and occasionally exceeding 25 knots. The trades prevail from February through May, with a gradual decrease in frequency to 68 per cent in May, and with a slight decrease in velocities.

During June, the trades weaken, and winds veer toward the SE. In July through September, light variable winds, mostly with a S component, and frequent calms are prevalent; strong and gusty winds occur with brief periods of squally weather. In October, light SW winds prevail, although NE and E winds are almost as frequent. The Northeast Trades reestablish during November and December.

Gales average one a month in March, and may occur occasionally at other times. Velocities during the entire year are somewhat higher over the open sea.

In the Woleai Atoll area, precipitation is heaviest from June through October, when it averages 300mm per month and is primarily heavy showers. The drier season is from January through March with a monthly average of 150 to 160mm. In November, April, and May, rainfall averages 180mm. The number of rainy days varies from 15 in January to 22 in July.

Ulithi Atoll has the heaviest rainfall, with 380mm in January. December, with 128mm, is the month with the least rainfall. In general, precipitation is greatest during calms.

There is a distinct seasonal variation at the Yap Islands, the wettest season being from July through September, with an average of 150mm per month. Heavy rains are most frequent during the early morning.

The driest season is February through March, when the monthly average is 135mm. The rain during these months is usually of the shower type.

Fog is virtually unknown, and visibility is usually very good except during heavy rains. It has been estimated that visibility below 1.25 miles occurs once or twice a month from July through September, and not more than once a month during the remainder of the year.

The average path of typhoon centers is N of Yap; however, three or four per year pass close enough to affect the weather, usually from September through November. Typhoons centered N of Yap cause heavy showers and increasing winds from the W. The swell is heavy from the NW, and results in a heavy confused sea.

Tides—Currents.—In the West Caroline Islands, the tidal currents usually follow the configuration of the land and set E and W. In places where no effects of the ocean currents are felt, the W tidal current flows from LW to 2 hours after LW until the same times after HW, the E tidal current from HW to 2 hours after HW until the same time after LW. These tidal currents are weak, except in narrow channels.

Inside the lagoons, the directions of the tidal currents are irregular. They seldom flow along the axis of the entrance channels, so that caution is required when entering and leaving.

The Yap Islands lie on or near the boundary between the North Equatorial Current and the Equatorial Countercurrent. Thus a W set should predominate N of the islands and an E set S of them. Ulithi Atoll lies near the boundary between the North Equatorial Current and the Equatorial Countercurrent. Thus the atoll receives NE currents as well as W and SW currents.

Between the Yap Islands and the Republic of Palau, the North Equatorial Current flows from December to May. The current usually sets in a W direction at velocities of 1 knot or more. The Equatorial Countercurrent, which sets E, is usually experienced in the area from June to November.

10.27 Pikelot Island (8˚05'N., 147˚38'E.) is overgrown with shrubs and several coconut palms. Reefs surround the island to a distance of 0.5 mile. Shoal patches, with depths of 9.1 to 18.3m, lie within a radius of 1 mile of the island.

A 16m detached bank lies 14 miles WNW of Pikelot. A detached shoal, about 2 miles in diameter and with a least depth of 11m, lies about 11.5 miles WNW of Pikelot. In 1954, this shoal was reported to lie about 0.8 mile S of its charted position and to have extended SW for about 4 miles.

Condor Reef (8˚07'N., 147˚50'E.) has a least depth of 14.6m, about 4 miles from its E end. The least depth found over the W end of the reef is 22m. Matsuye Bank, a 12.8m patch, lies about 5 miles SE of the SE end of Condor Reef. This patch and the S side of Condor Reef are marked by discoloration.

Tarang Reef (7˚45'N., 147˚41'E.), about 18 miles S of Pikelot Island, is small in extent and has a least depth of 14.6m. A 14.6m bank lies about 4 miles NW of the reef; both are marked by discoloration.

Oraitilipu Bank (8˚10'N., 147˚15'E.), 21 miles W of Pikelot Island, has a least depth of 14.6m at its SE end. The water appears blue over this bank. Banks, with depths of 7.9m, 15.8m, and 11m, have been reported 8 miles ENE, and 10 and 11 miles E, respectively.

McLaughlin Bank (9˚05'N., 148˚05'E.) has a least depth of 12.8m and, like any submerged atoll, has the shallowest water on its outer rim. The bottom consists of white sand.

10.28 West Fayu Island (8˚05'N., 146˚44'E.), densely wooded, stands on the NE side of West Fayu Atoll. A passage, located about 0.6 mile S of the island, is about 0.5 mile wide, but the navigable channel is greatly reduced by a shoal, with a least depth of 1.8m in the middle of the entrance.

A conspicuous stranded wreck lies on the edge of the reef, 0.8 mile W of West Fayu Island,; another is reported to lie 1.25 mile farther W. A conspicuous stranded wreck is reported (1991) to lie on the inside edge of the reef 2 miles WSW of West Fayu Island.

In 1982, the island was reported to lie nearly 1 mile WSW of its charted position.

Several banks and shoal depths are charted or have been reported to lie between West Fayu Island and Oraitilipu Bank, and may best be seen on the chart. A reef surrounded by breakers was reported (1971) to lie 6 miles SE of the island, and was reported to be about 2 miles long in a NE-SW direction.

Satawal (7˚21'N., 147˚02'E.) is a sandy and reef-fringed island. In bad weather, there are breakers all around the island. Coconut palms, sweet potatoes, and breadfruit trees grow on the island. A flagpole and some houses stand on the island. There is a radio station on Satawal.

Anchorage.—Small ships may take anchorage, in 16.5m, on the edge of the reef, about 0.3 mile WSW of the flagpole.

Discolored water has been reported to lie 23 miles NE of the island. Depths of 15 and 40m have been reported to lie 13 miles and 10 miles SW, respectively, of Satawal.

Caution.—Satawal was reported (1987) to lie about 1.75 miles NNW of its charted position.

10.29 Lamotrek Atoll (7˚30'N., 146˚20'E.) has three small wooded islets at its extremities. The atoll is reported to give a good radar return up to 18 miles. Coconut palms and breadfruit trees grow on the islets. A large area in the lagoon has been swept to 14.9m, except for a few isolated shoals.

The passage about 0.8 mile S of Pugue Islet, on the N islet of the atoll, is the widest and best of those leading into the lagoon. A heavy sea sets in through this channel during the NE trades.

A passage, about 0.2 mile wide, leads through the middle part of the atoll's S side. This passage is sometimes used when the NE winds are strong. The entrance is hard to identify from the offing.

Anchorage.—Anchorage may be taken within the lagoon, off the W side of Lamotrek, affording protection from E winds.

10.30 Elato Atoll (7˚27'N., 146˚10'E.) consists of two atolls. On the N atoll are four islets. Elato, flat and sandy, is located at the NE end of the atoll. The S atoll is separated from the N atoll by a 1 mile wide coral ridge, with a least charted depth of 20m.

The N lagoon of the N atoll has depths of up to 27m, but is mostly foul. An entrance, about 90m wide and having depths of 5.5 to 11m, is located on the E side of the atoll, about 1 mile SW of Elato.

Table of Contents

The S lagoon of the N atoll has depths of 6.4 to 29m and is entered through a very narrow channel close S of Kari, an islet that lies between the lagoons.

The passages into the above lagoons are suitable only for small craft with local knowledge.

Olimarao Atoll (7˚41'N., 145˚52'E.) consists of two flat islets on an atoll reef. Olimarao, an islet on the NE side of the atoll, and Falifi, an islet on the W side of the atoll, are covered with coconut palms and other trees.

Shallow depths are found off the NW side of the atoll reef, which is always marked by breakers. On the S side, there are two shallow passages, the E of which is 0.5 mile wide and the W about 0.3 mile. The lagoon has not been closely examined; a 7.3m coral head is reported to lie near its middle part.

A bank, with a depth of 27m and marked by discolored water, was reported to lie in 3.5 miles NNE of Olimarao Atoll. A depth of 16.5m was reported to lie 18 miles SSW of Olimarao Atoll.

10.31 Tarang Bank (8˚23'N., 145˚14'E.), over which there are depths of 25 to 45m, is marked by discolored water on its shallowest part.

A large shoal area lies about 16 miles E of Tarang Bank's E end and has a least charted depth of 42m; depths of 13.7 to 29m have been reported to lie in an area up to 18 miles SW and SE of the shoal area, while a 31m patch lies 13 miles E of the bank.

Earl Dalhouse Bank (8˚07'N., 144˚55'E.), about 20 miles SW of Tarang Bank, has a least charted depth of 25m. A coral bank, with a charted depth of 25m, lies about 8 miles NE of the bank. **Gamen Reef** (7˚24'N., 144˚41'E.), which breaks on its SW end, has a least depth of 5m and is marked by discolored water. The reef lies 9 miles NE of Ifalik Atoll.

Inanthe Shoal (5˚56'N., 145˚27'E.) has a depth of 11.8m, but a 4.5m patch marked by discolored water lies about 5 miles W of the shoal.

Ifalik Atoll (7˚15'N., 144˚27'E.) consists of a circular reef with three small islets on its E and S sides.

A narrow and shallow boat passage leads between the reefs close E of Ella. A small vessel entered through this passage and reported that there was a depth of 5.5m and that the width was about 45m. Anchorage was taken, in 14.6m, off the SW side of the E islet, Ifalik. There are two small piers on this side of the islet.

In 1978, a small ship, 65m in length, took satisfactory anchorage in 40m, sand, about 0.2 mile S of Ella.

10.32 Faraulep Atoll (8˚36'N., 144˚33'E.) consists of three low, wooded islets on a reef enclosing a circular lagoon. Depths of 14.6 to 20m are found in the lagoon. There are three passages into the lagoon on the S side of the atoll. They are narrow and shallow. In 1978, a small ship, 65m in length, reported using the center channel without difficulty.

Anchorage.—Anchorage may be taken, in 18.3m, off the SW end of Eate, an islet on the S side of the atoll.

Gaferut (9˚14'N., 145˚23'E.), a small island, stands on a reef that extends 315m NW and 0.1 mile S from it. The island is wooded, and some of the coconut palms attain a height of 19.8m. Vessels have anchored, in 11m, near the reefs edge, about 0.4 mile SW of the S end of Gaferut.

The island was reported (1969) to lie 2.5 miles W of its charted position. In 1977, the depths encountered S of Gaferut were reported to be less than charted depths. In 1979, a small boat channel with depths of 3 to 4.5m was reported in the S portion of the reef.

10.33 Woleai Atoll (7˚22'N., 143˚55'E.) (World Port Index No. 56610) consists of 18 islands and islets. The atoll, the S side of which is mostly submerged, is divided into two lagoons by a ridge of reefs that extends SE from Tagaulap Island, on the N side of the atoll. Both lagoons are open S, and during strong S winds a swell sets in.

All the islands are covered with coconut palms and other trees, except Woleai, on the NE side of the atoll, which has been cleared. Sand Island and Montegosu Island (Montegos) Island) lie on the S side of the atoll. Both islets are fringed by reefs and fronted by dangers; they divide this side of the atoll into three separate channels.

Anchorage.—The two lagoons offer anchorage, protected from the prevailing NE winds, but exposed to S winds and seas. Large vessels can anchor in East Lagoon, in 27 to 37m, fine sand, about 0.4 mile W of the N part of Raur Island, on the E side of the lagoon.

Vessels sometimes anchor outside the lagoons, N of Tagaulap Island, where there is shelter from S winds.

Eauripik Atoll (6˚42'N., 143˚02'E.) consists of six small islets which lie on the reef, which is mostly low and steep-to. With light SW winds, there are usually breakers on the N side of the atoll, but not on the S side. All the islets, except the W, are covered with coconut palms. The latter is awash at HW.

Sorol Atoll (8˚08'N., 140˚23'E.) consists of 17 low islets lying on the NE side of the atoll reef. The reef on the N side of the atoll dries about 1.2m; the reef on the S side is submerged. Only the larger islets have trees on them; the remainder are low and sandy.

The outer edge of the S side of the atoll is steep-to and there is no suitable anchorage. Vessels can lie off this side and communicate with the islands by boat through a narrow shoal passage in the middle of the S side of the atoll.

A reef, with a depth of 12.8m, lies about 3.5 miles SE of the SE side of the atoll.

10.34 Fais (9˚46'N., 140˚31'E.) (World Port Index No. 56620) is fringed with a reef except at its NE and SW ends, which are steep-to. The middle of the island is cultivated, the remainder being covered with palms. On the NE and SW shores, cliffs rise to a height of 13.7m. Refinery Point, on the NW side of the island, is a sheer cliff, 18.3m high and jutting into the sea.

Anchorage.—There is no safe anchorage; in calm weather vessels lie offshore and load copra from native craft. A W current, with a velocity of 3 knots, has been reported off the S end of Fais.

Ulithi Atoll (9˚55'N., 139˚40'E.) is extensive and has over 30 islets, covered with coconut palms, on its reef. The islets, which are all reef-fringed, do not attain a height of more than

28m to the tops of the trees. The soil consists of broken coral and is not suitable for cultivation. Many of the islets are composed of shifting sand dunes. The main population center for the atoll is on Falalop.

The lagoon has been swept to depths indicated on the chart. Numerous shoal patches exist in the lagoon. It is reported that uncharted shoals may exist outside the swept areas.

Zohhoiiyoru Bank, marked by discoloration and located about 13 miles E of Ulithi Atoll, is submerged except for Gielap and Iar, islets on its NW extremity. Depths of less than 9.1m are found over the greater part of the bank.

A detached shoal, which lies between Ulithi Atoll and the N part of Zohhoiiyoru Bank, has several small islets on it.

A 7m patch has been reported to lie about 8 miles ENE of the atoll's S end.

There are a number of passages leading into the lagoon; some of these have been swept to depths indicated on the chart. Mugai Channel, situated on the E side of the atoll, is reported to be the best. The reef on the NE side of Towachi Channel, situated on the W side of the atoll, is reported to be clearly identifiable.

Tides—Currents.—Tidal currents are strong in the vicinity of Zohhoiiyoru Bank and Ulithi Atoll. Between Falalop and Asor, the currents are reported to be strong. In the lagoon, the tidal currents are weak and erratic.

Aspect.—Asor, an islet on the NE side of the atoll, is reported as being visible from 10 miles under favorable conditions.

A school house stands on Asor. A high school, formerly a Loran station, stands on Falalop. There is a 0.5 mile long E-W runway on the island.

Anchorage.—Urushi Anchorage, in the NE part of the lagoon, provides anchorage space for several vessels, in 27 to 39m, sand, good holding ground. Vessels using this anchorage must avoid several detached shoals.

Anchorage for large vessels has been reported to be available off the N of Falalop, but only under ideal conditions. Keep in mind the strong tidal currents if anchoring here.

Caution.—A fisheries buoy has been established in a position about 50 miles SW of the atoll.

10.35 The **Yap Islands** (9˚32'N., 138˚10'E.) comprise a group of four islands, separated by narrow and shallow channels. The group differs from other islands of the Carolines, inasmuch as they are larger, have a fertile soil, and are not of volcanic nature. The islands are hilly and covered with magnificent forests of coconut and areca palms, bamboos, and croton trees. Tageren Channel, narrow and shoal, separates Yap Island from Gagil-Tamil Island. A bridge spans the channel.

The group is fringed by a reef. There are several breaks in the reef leading to inlets and harbors, but the only one used by shipping is Tamil Harbor. The other entrances are marked by private aids, and are suitable only for small craft under ideal conditions. Garim, a jagged rock on the reef E of the S end of Yap, is prominent when viewed from the NE.

Caution.—Caution is advised if sailing off the W side of these islands, as Fish Aggregating Devices are moored up to 2.5 miles off this coast, and may best be seen on the chart.

Colonia (9˚31'N., 138˚08'E.)

World Port Index No. 56630

10.36 Colonia, the principal settlement on Yap, lies on the W side of Tamil Harbor, a natural harbor of irregular shape. Although the entrance channel is narrow, the harbor widens out somewhat within the entrance.

Tides—Currents.—The spring range here is 1.3m, while the mean range is 0.9m.

Currents set W across the entrance to Tamil Harbor, especially during the NE trades. Tidal currents within the channel entrance range from 0.5 to 0.75 knot, while within Tamil Harbor proper the current rates are less.

Depths—Limitations.—See also the "Caution" topic below. The entrance channel has a least charted width of 45m between the 20m curves. The channel is entered about 0.3 mile E of Entrance Rock, awash at LW, and just E of a 3.6m patch located on the W side of the reef entrance. Once within the reef entrance, the fairway is deep.

A small wharf, 70m long, with depths of 3.9m is situated on the S side of the peninsula charted 2.5 miles N of Entrance Rock. The main berthing facility, 290m long with a depth of 10m alongside, lies on the N side of the peninsula; there is poor protection from S and SE winds.

Aspect.—A visible wreck lies on the reef fringing the SW side of the harbor, while a second exposed wreck lies about 1 mile NE of the reef entrance. A third wreck is charted 0.4 mile SW of the reef entrance.

Donitsch Island, which has been connected to the mainland of Yap by a causeway, has a conspicuous sewage treatment plant on it. The entire area is now charted as a peninsula, directly E of Colonia.

A white dome-shaped building situated in Colonia is prominent. A radio mast showing red obstruction lights lies about 2 miles NNW of Entrance Rock.

The entrance to Tamil Harbor is marked by lights; the channel is marked by beacons.

A light is situated on Baleabaat Island; the light is a directional fixed light with white and green sectors that lead between Lighted Beacon No. 1 and Lighted Beacon No. 2 , marking the entrance.

Pilotage.—Pilotage is reported to be available, and should be ordered at least 24 hours in advance, confirming 12 hours prior to arrival. The boarding ground is reported to lie about 1 mile SE of the reef entrance, but the pilot should be contacted for details.

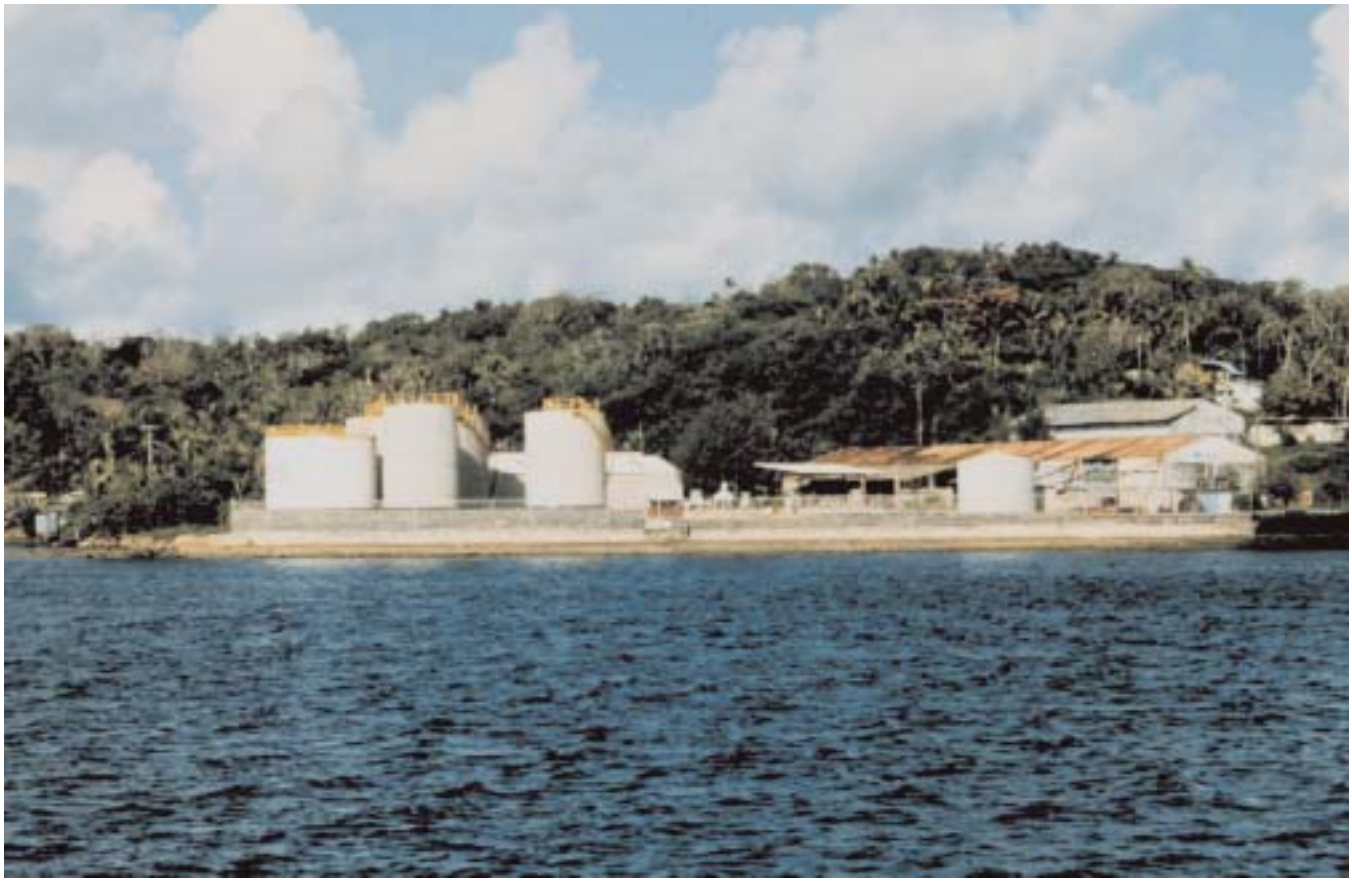
Regulations.—Vessels are urged to contact the local authorities for the latest information on regulations and arrival procedures.

Pratique should be requested at least 24 hours prior to arrival through Yap Radio. Normally ship movements are allowed between 0600 and 1800. Except in case of emergency, arrival and departure will be limited to daylight hours only.

Signals.—The local authorities and the pilot may be contacted through Yap Radio on 5205 kHz, or VHF channels 16 and 22A.

Anchorage.—The bottom S of Donitsch Island is foul. Vessels wishing to anchor will be directed to a safe anchorage upon request to the harbormaster. The recommended anchor-

Table of Contents



Courtesy of Ben Mieremet, NOAA

Colonia

age is between Donitsch Island and Biy Island, in depths of 22 to 35m, mud, however space is limited and is open to S or SE winds.

Caution.—Vessels are urged to contact the local authorities for the latest information on depths, regulations, etc., as dredging was reported (1985) within Tamil Harbor.

It is recommended that large vessels entering or leaving the harbor do so at LW, under the most favorable conditions of light. At such times the reefs are clearly visible. After heavy rains the port's waters become muddy, making it difficult to see the reefs and the channel.

It has been reported that due to the narrow and crooked entrance channel, allowance for leeway should be made in setting the approach course. Allowance for advance and transfer should also be made when considering course changes within the channel.

The commercial wharf is unprotected from S and SE winds. Due to the limited turning and anchorage room here, single screw vessels without a bow thruster may have to lie off the wharf and wait for conditions to improve before attempting to dock.

10.37 Ngulu Atoll (8˚25'N., 137˚30'E.) comprises a number of low islets. Coconut palms and other trees grow on the islets. The chain of reefs on the S and W sides of the atoll protects the lagoon from winds and seas from that direction. The reefs on the E side of the atoll are submerged, so that with strong E winds a swell sets into the lagoon.

Depths—Limitations.—Ngulu Island, on the S side of the atoll, is densely covered with coconut palms. North Island, near the N end of the atoll, is low and covered with coconut palms. Between these two islets, the reef is in detached patches and does not break during W winds. Several passages, some of which have been swept, lead into the lagoon. In 1963, a vessel entered the lagoon through the swept passage situated about 13.8 miles NNE of Ngulu Island, and experienced no difficulties. In 1985, a vessel reported using the swept passage 0.5 miles NW of Ngulu Island, reporting it as easy to negotiate under favorable conditions. A moderate N set was experienced at the beginning of the ebb tide in the month of October.

Anchorage.—The lagoon affords unlimited, but unprotected anchorage. Anchorage can be taken N of Ngulu Island. This area is usually smooth, though a long, rolling swell may set in during SE and NE winds.

Caution.—All navigational aids have been discontinued and no longer exist. Vessels should use caution in approaching the atoll.

The Republic of Palau (including Islands and Reefs to the Southwest)

10.38 The Republic of Palau consist of 243 islands, eight of which are of significant size. All of the islands in the chain are forested. The Palau reef, partly barrier and partly fringing, encloses all the islands except two small atolls to the N and the island of Angaur to the SW. The barrier reef is developed on the W side and extends about 65 miles in a general SW direction from the W entrance of Kossol Passage to the island of Peleliu, where it merges with the fringing reef surrounding that island. The W limit of the reef lies about six miles from the nearest island. Important passages through this part of the reef lie W and NW of the N half of Babelthuap. The barrier reef to the E is poorly developed and has numerous passes. The reef extends NE from the fringing reef around Peleliu to midway along the E coast of Babelthuap, where it merges with the fringing reef along the NE coast of this island. The Palau reef encircles Kossol Passage N of Babelthuap, completing the barrier reef.

Some of the islands appear to be of volcanic origin. They attain a greatest height of 242m in a peak in the NW part of Babelthuap. The islands S of this island are of coral and limestone formation. Peleliu and Angaur are flat, but on the others there are narrow hills sloping steeply down to the sea. On all of these hilly islands there has been erosion at the waters edge by the sea, forming grottoes.

Winds—Weather.—The best weather prevails between 0900 and 1400. Surface winds over the sea and on the lee shores are strongest at 0300 and weakest at 1500.

During the Northeast Monsoon (November through April), the prevailing winds are ENE, with a frequency of 60 per cent in November, 93 per cent in January, and 82 per cent in April. The average velocity is 12 knots in December through February, and from 8 to 10 knots for the remainder of the period. Calms occur from 5 to 10 per cent of the time. Gales occur very rarely. Southwest winds sometimes occur in April.

East winds continue through May and June. July through October is characterized by general light and variable winds, with increasing frequency from the SW and W. Velocities average only 6 to 8 knots. Calms occur from 10 to 15 per cent of the time. Gales are rare. In general, prevailing wind directions are ENE in May and June, SW in August and September, and evenly distributed between ENE and SW in July and October.

Typhoons appear to be more intense during the spring period (March to June).

February through April are the driest months. Two-thirds of the rainfall occurs in May through October. July, with an average of 480mm, has the maximum of any month.

Tides—Currents.—The E countercurrent, between the Republic of Palau and 2˚N, is experienced throughout the year. Velocities up to 2 knots have been frequently experienced and velocities between 2 knots and 3 knots have been reported.

Currents in the Palau area are variable and attain velocities of 1 to 1.5 knots. Eastward of the group the current usually sets S, but E or NE currents, with the same velocities, have been reported. A W set prevails N of the group. Northwest and W currents have been reported W of the group.

Local and tidal currents in the vicinity of Angaur are extremely variable. In the channel between Angaur and Peleliu, W currents of 3 to 4 knots have been reported at spring tides. An earlier report stated that the currents set E through the channel at the same velocity. East sets of 1.5 knots have been reported S and E of Angaur. Northwest sets have been reported W of the island.

The shape of the reef influences the tidal currents off the E and W sides of the islands of Palau. In the various channels and passages, the tidal currents turn at the time of HW and LW.

10.39 Angaur (6˚54'N., 134˚08'E.), the S island of Palau, is densely wooded and rises to a height of 61m on its NW side. A tower stands about 0.1 mile within the E end of the island; another tower is situated about 0.38 mile farther West. An old lighthouse is situated 0.2 mile S of the N end of the island. A white shrine stands on the NW point of the island.

A former Loran station is situated on the NE side of the island. The buildings and nearby airfield are conspicuous. A red water tower stands near the center of the island.

In 1990, it was reported that a light is shown from the S end of the island.

Angaur Harbor is located on the W side of the island. It was the site of a phosphate mining and loading operation. All these facilities have deteriorated and fouled the harbor. A small craft basin is situated on the W side of the island near the main settlement. During the season of W winds, a heavy swell sets in and the harbor is unsafe.

Anchorage.—Anchorage cannot be taken at Angaur; however, a vessel 55m in length has reported anchoring (1985) about 309˚, 0.75 mile from the island's SW extremity, in a depth of 16.4m. Although the vessel reported anchoring under favorable weather conditions, this anchorage cannot be recommended. A vessel has anchored on Hydrographer Bank, but reported a strong set and a risk of dragging.

10.40 Peleliu (7˚00'N., 134˚15'E.) lies at the S end of the reef enclosing the Republic of Palau. The major portion of the island is low and level, but the central and N portions contain numerous high rock ridges. Mangrove swamp areas, extending N and S, divide the island, except for a minor strip on which the single E-W road is built. The coastline is mostly rocky, but has about 2 miles of scattered sandy beaches. Peleliu is heavily wooded. On the SE side of the island, there is an airfield.

A causeway extends from the SW side of Peleliu Island. Several small craft berthing facilities are situated on the NE side of the island.

Barnum Bay (7˚06'N., 134˚16'E.) is an indentation in the coastal reef and is entered about 3 miles N of Peleliu. The bay is nearly 1 mile wide at its entrance and extends about 2 miles NE. Depths in the bay are considerable, and the reef shores are steep-to. Several small islands are located on either side of the entrance, which is further marked by a white beacon on each side.

10.41 Eil Malk (7˚09'N., 134˚22'E.) is a wooded island with an irregular coast, except on the E side, where there is a range of hills about 91m high. A hill, 114m high and wooded on its summit, stands nearly 1 mile S of the N end of the island; the hill is prominent from the S. The SE end of the island is 83m high; its E side, which appears gray, is prominent.

Table of Contents

Schonian Harbor, parts of which have been swept to 16.7m, is an open area, surrounded by reefs, situated off the SW side of Eil Malk.

Denges Passage, which leads into Schonian Harbor from the E, is entered between the reef enclosing Ngeregong islet and the reefs extending from and fronting the S side of Eil Malk. The islet is wooded and low. The passage has been swept to a least depth of 7.9m. Denges Passage has a mean width of 90m and charted depths of 10.1 to 37m. The passage opens to an extensive area known as Schonian Harbor. Inside the harbor there are isolated coral heads. The reefs on either side of the passage and in the harbor are reported to be identifiable under favorable conditions of light.

Tides—Currents.—Currents setting NE are reported off Denges Passage. They flow at a velocity of 1 to 1.5 knots. Off the E central coast of Peleliu, the currents attain velocities of 1.5 to 2 knots.

In the entrance of Denges Passage, the flood current sets NW at a velocity of 2.5 knots; the ebb current sets SE at a velocity of 2.25 knots. In the narrow W part of the passage, these currents attain velocities of 3.5 knots.

Slack water, which lasts about 40 minutes, ends at about the times of HW and LW at Malakal Harbor.

It is reported that the current at the W end of the passage sometimes crosses the course.

Anchorage.—Anchorage can be taken in Schonian Harbor, good holding ground. Except for scattered shoals, the charted depths are 18.3 to 37m.

10.42 Eastward of Eil Malk, there is a large irregular-shaped area entered E through two swept channels. The area has been swept to 16.7m, except for scattered shoals swept to lesser depths. These can usually be distinguished by discoloration.

The S channel, entered between the reefs E of Eil Malk, has several shoal spots of 6.4 to 9.1m at the entrance, but at the S part a channel, 0.1 mile wide is swept to 11m.

The N channel, entered between the reef extending S from the SE end of Urukthapel Island and the two large drying reefs to the S, has a least charted depth of 7.3m and has been swept to various depths over a width of 0.5 mile. The drying reefs, when uncovered, are white.

Tides—Currents.—In the S channel, the flood sets NW at a velocity of 1.25 knots while the ebb sets SE at a velocity of 1.5 knots. The tidal currents in the central part of the anchorage are irregular and apparently weak.

Sar Passage (7˚11'N., 134˚25'E.), which connects with the foul area W of Eil Malk, is deep and intricate. It is seldom used. Tidal currents set W and E through the passage at velocities of 3.25 knots.

Urukthapel (7˚16'N., 134˚27'E.) is densely wooded, rugged, and irregular in shape. There are a few beaches, backed by steep ridges covered with dense growth.

10.43 Malakal (7˚20'N., 134˚28'E.) is situated near the middle of the N side of Malakal Harbor, and is joined by a causeway at its NE end to the N end of Auluptagel Island and Koror Island. The island has been expanded by extensive filling around its perimeter. The main commercial facility lies on the E side of the island and is described in paragraph 10.48. A rusty steel structure stands on the summit of Malakal. A commercial radio tower and construction quarry are conspicuous on the NW side of the island. A 305m quay wal,l with buildings belonging to a marine research center, are conspicuous on the SW side of the island. The depths alongside the quay were dredged to 7.3m, however, miscellaneous debris has reduced the minimum alongside depths of the quay at several locations. It is not used for commercial operations.

Arakabesan (7˚21'N., 134˚28'E.) is wooded at its NW end. A hill, 110m high, stands on the S side of the island. The island consists of limestone rock. The E and SE shores are lined with mangroves and there is some flat swampy land on the N shore. Part of the W shore consists of sharp bluffs. On the N side of the E end of Arakabesan is a seaplane ramp which is in good condition. On the SW side of Arakabesan a concrete pier, 23m wide, extends 146m to the SW where it ties to a small rocky island. At the NE end of the pier a seaplane ramp extends underwater to the W, and at the SW end another seaplane ramp extends underwater to the SE. The concrete pier is in fair condition, and the ramps are in poor condition. The pier is in too shallow water to be used by vessels.

10.44 Koror (7˚20'N., 134˚30'E.) is the national capital of Palau and the administrative center and port of entry for the Republic of Palau. The S part of the island is rugged, steep, and densely wooded. The W part is mostly level, about 30m high, and bordered with mangrove swamps in places. The main settlement is situated on the N and W sides of the island. The charted positions of various buildings and towers are reported (1981) to be inaccurate. A bridge, crossing Toagel Mid, connects Koror with Babelthuap.

Babelthuap (7˚28'N., 134˚32'E.) is the largest island of the Palau group. The coastal lowlands are covered with mangrove, while most of the hilly interior is covered with numerous forests, the largest of which covers the N central and E central parts of the island. Babelthuap has an extensive coastline of 98 miles, of which all but 20 miles is bounded by mangrove. Dense mangrove swamps, ranging from 1m to as much as 0.5 mile or more in width, bound low parts of the coast. Babelthuap has several lines of hills, which attain a maximum elevation of 242m, extending along the middle of the island. Some of the hills in the N part of the island are barren.

An unlighted airfield is situated 2.5 miles N of the SE end of the island and 1.5 miles inland. A green water tank stands on a hill WSW of the W end of the runway.

10.45 Malakal Pass (7˚16'N., 134˚28'E.), which leads from Koror Road N to Malakal Harbor, has a minimum width of 90m and depths of 7.3 to 18.3m. It has been swept to 6.7m and 7m, within the limits shown on the chart. The narrow channel leads between the SE side of Ngadarak Reef and the reefs fronting Urukthapel Island. The pass is marked by day beacons and can be navigated by medium-size ships under favorable conditions of light. The best time for entering the passage is during LWS. Caution is advised as the beacons may be washed away.

The lighthouse that stands on the SW side of the S entrance of Malakal Pass was reported to be a useful daymark for vessels approaching **Koror Road** (7˚16'N., 134˚29'E.) from SE.

A ship report (1977) stated that ships longer than 65.5m should not attempt this passage due to the narrowness and

Return to paragraph: 10.48

Courtesy of Dr. James McVeigh, NOAA

Toachel Midl

bending of the reef-walled channel and the swiftness of the cross-channel currents. An earlier report stated that a strong N set was observed when entering the passage. The ideal time to effect entrance was after 1000.

In Malakal Pass, the N tidal current has a velocity of 2.5 knots and the S tidal current has a velocity of 2 knots; it is reported, however, that they sometimes attain a velocity of 4 to 5 knots. In the narrow part of the channel, the tidal currents set directly through, and outside attain considerable strength. The S tidal current has been observed to set at a velocity of over 3 knots for 5 days after a new moon, causing a strong tidal race for some distance off the entrance. Strong eddies have also been reported to form within the channel itself.

Northeastward of Channel Point, on the E side of Urukthapel, the tidal currents set across the channel. At about HW, the tidal currents do not always set in the direction of the channel.

10.46 Toachel Mid (7˚18'N., 134˚32'E.) is the passage leading between the reefs fringing the E side of Koror and those fronting the S side of Babelthuap. The passage connects Arangel Channel, at the S end, with Koror Harbor and Komebail Lagoon, at the N end. The passage has a least width of 90m. The passage is marked with beacons in addition to the beacons at the S entrance. The beacons are locally maintained and unreliable. The bridge connecting Koror to Babelthuap crosses the passage, with a vertical clearance at the center of the span of 39m at MLW.

Toagel Mlungui (7˚32'N., 134˚28'E.) is the main entrance of Komebail Lagoon and then to Malakal Harbor. The passage, which is deep and narrow, trends about 2 miles in an E direction. A connecting channel trends in a SSW direction and leads to Kobasang Harbor, Malakal Harbor, and Koror Harbor. Ships should attempt the passage only under favorable conditions of light and tide.

The two white entrance range beacons, best seen on the chart, are reported to be small and difficult to identify. The channel is marked by beacons and buoys.

Aiwokako Passage (7˚38'N., 134˚33'E.) has a least depth of 10.1m and has been swept to 7.3 to 8.5m over a width of 348m. The passage leads into Ngardmau Bay.

Kawasak Passage (7˚49'N., 134˚36'E.) extends along the W side of Babelthuap inside the barrier reef. The passage is tortuous and studded with dangers. It has been swept to a depth of 18.3m as far S as Ngardmau Bay, and should be used only by small vessels with local knowledge under the most favorable

conditions of light. The tidal currents in Kawasak Passage are reported as being strong.

Ngardmau Bay, between the barrier reef and the NW part of Babelthuap, has depths of 11m to over 55m. A few scattered shoals lie in the E and S parts of the bay. An irregular-shaped area leading from Aiwokako Passage comprises a fairly large part of the bay and has been swept to 14.9m.

Two shoals lie near the middle of the swept area. There are two piers at Ngardmau, the principal settlement on Babelthuap. The NE pier is reported to have a depth of 2.7m at its head.

10.47 Kossol Passage (7˚53'N., 134˚36'E.), which has been swept to 14.9m within the limits shown on the chart, has general depths of 18.3 to 37m, coral and sand. The swept area is studded with coral heads and dangers which have been swept to lesser depths. Caution is necessary as uncharted shoals may exist.

East Entrance to Kossol Passage is about 3.5 miles wide between the reef extending N from Babelthuap and the S edge of Kossol Reef. A conspicuous wreck stands on the reef, about 1 mile N of the entrance.

Depths of 16.5 to 24m are found in the middle of the passage; much of the area has been swept to 14.9m.

Vessels should approach East Entrance on a course of 290˚ when at least 2 miles seaward of the entrance.

Malakal Harbor (7˚20'N., 134˚28'E.)

World Port Index No. 56660

10.48 Malakal Harbor is formed by Urukthapel on the SW and four islets, the principal being Malakal, on the NE. The harbor has a length of 3 miles and a maximum width of 1.5 miles. The wharves in use are situated on the E side of Malakal. The shores within and outside the harbor are bordered by reefs. The port is entered only during daylight hours, as night aids are not maintained. There is 550m of principal wharfage and about a 100m frontage suitable for small craft.

Winds—Weather.—See the "Winds—Weather" topic under the Republic of Palau description in paragraph 10.38.

Normally, depending on weather, time element, or nature of cargo, vessels will be berthed stern to sea. Sudden high winds and rain squalls occur during the hours of darkness, and masters of transient vessels should be cautioned to use adequate mooring lines.

Tides—Currents.—The current in Malakal Harbor was observed to change directions 1 hour 30 minutes to 2 hours before HW and LW.

Depths—Limitations.—The shore on the SW side of Malakal Harbor should not be approached within 0.5 mile as a number of detached reefs, which are hard to identify, form this side.

The E part of the harbor has been swept to 4.9 to 7.3m within the limits shown on the chart, but is encumbered by a number of detached reefs. Some of these dangers are marked by buoys.

The pier on the E side of Malakal is the principal terminal for ocean vessels entering the Republic of Palau. The SE side of the terminal is about 155m long. The depths along this side of the pier are 7.6m at the NE corner and increasing to 10.7m at the SW corner. Numerous large concrete blocks and other debris have fouled the wharf since construction. The maximum safe depth alongside is 7.9m. The maximum depth alongside the NE side of the wharf is 7.6m. Only the first 137m of the SW side of the wharf is useable due to a sunken barge. The alongside depths of the SW side start at 10.7m at the SW corner and decrease to 8.5m over the sunken barge. Both the NE and SW sides of the wharf shoal abruptly at the extreme inner end of this pier.

The pier is used for containers, general cargo, and unloading bulk petroleum. The NE side of the pier is used by fishing vessels unloading into a refrigerated stowage facility.

Courtesy of PH2 Lewis, USS GERMANTOWN
Malakal Pier

A lighter quay, having a berthing length of 114m, with a depth of 2.1m alongside, is situated on the NE side of Malakal.

A number of small piers and boat basins are situated along the shores of the harbor.

Aspect.—See the Malakal description in paragraph 10.43

Pilotage.—A pilot is available and may be contacted on 5205 kHz. All ships to be boarded by a pilot will furnish a safe and clean pilot ladder with at least one 3-inch line suspended alongside the ladder and extending to the waters edge. The pilot boards from an outboard motor equipped boat, with a white hull and red top, about 1.5 miles off the entrance of Toagel Mlungui.

Regulations.—In the event of fire occurring in or near a ship while secured at a berth or lying at anchor, the ship will sound five prolonged blasts on the whistle. These signals will be repeated at intervals until answered, using visual signals, by the Port Manager.

Signals.—The Port Manager maintains a visual signal station at the Port Manager's office for visual (International Code Flags) communication with ships at anchor.

Anchorage.—Vessels desiring to anchor in Malakal Harbor will be directed to a safe anchorage upon request to the Port Manager. The area W of the W entrance of Malakal Harbor has been used as an anchorage by merchant vessels.

Vessels of all types can anchor in Malakal Harbor, W and WNW of Malakal. Depths of 18.3 to 26m, sand, are found in the anchorage.

Courtesy of Dr. James McVey, NOAA

Malakal Pier

10.49 Kobasang Harbor (7˚21'N., 134˚27'E.), between the N side of Ngargol Island and the SW side of Arakabesan Island, offers anchorage, in 27 to 46m, sheltered from all except W winds.

Komebail Lagoon, the area N of Arakabesan, affords anchorage sheltered from NE winds.

Koror Road is protected from the W and N. Protection from NE seas is provided by Augulpelu Reef. Temporary anchorage can be taken NW of the chain of shoals, in 22 to 31m.

Anchorage can be taken in Kossol Passage or Kawasak Passage.

The **Kayangel Islands** (8˚04'N., 134˚42'E.) consist of four low islets lying on an oval reef. There is a thick growth of coconut palms on them. Two boat piers are situated on the lagoon side of Ngajangel, an islet on the E side of the atoll, which is 28m high to the tops of the trees.

The lagoon has a maximum depth of 9.6m, but is studded with reefs and dangers. Small craft with local knowledge can enter through a boat passage on the W side of the atoll.

Ngaruangl Reef (8˚10'N., 134˚38'E.) is an atoll which is separated from the Kayangel Islands by Ngaruangl Passage, very deep and 5 miles wide. The lagoon is shallow and has a boat passage through the NE part of the barrier reef.

Velasco Reef is a sunken atoll that extends 17 miles N from the N end of Ngaruangl Reef. It has a maximum width of 8 miles. Depths of 11.9 to 22m are found along the outer edges of the atoll, on which there are overfalls when the tidal currents are strong. Vessels are urged to use caution in approaching this reef.

Drying reefs and shoals lie within the lagoon. There are some fairly clear areas in the E and N parts of the lagoon.

10.50 The **Sonsorol Islands** (5˚20'N., 132˚13'E.) consists of two small islands surrounded by fringing reefs that extend from 0.1 to 0.3 mile offshore. Each island is thickly wooded with coconut palms and other trees. The channel, separating the two islands, is about 0.6 mile wide and clear of dangers, however, a vessel reported encountering a disturbed surface in the passage, with rips and eddies present. Vessels are advised to exercise the appropriate caution.

A SSE set at a rate of 2 knots was experienced by a ship approaching from the SW.

Pulo Anna (4˚40'N., 131˚58'E.), a small islet, is fringed by reef to a distance of 463m. The settlement is situated on the NW side of the island.

Tides—Currents.—A strong E tidal current has been experienced NE of the island. It has been reported that in the vicinity of Pulo Anna, a current sets ESE at a velocity of 0.5 knot to 3 knots. Tide rips have been reported N of the island. Pulo Anna lies in the flow of the Equatorial Countercurrent throughout the year. In 1975, a ship approaching from the SE

Table of Contents

experienced a SE set. A constant 2 knot SE current was found off the W side of the island.

Merir Island (4˚20'N., 132˚19'E.) is fringed by reef which extends 0.7 mile from its S end and 0.1 mile from its N end. The edges of the reef are steep-to, except at the N end where a spit, with a depth of 12.8m at its outer end, extends about 0.8 mile North. There is a radio station at the settlement on the NW side of the island.

A current, setting SE at a velocity of 1.5 knots, has been reported S of Merir. A vessel reported a current setting SE at a velocity over 2 knots between Merir and Pulo Anna.

A S set of 2 knots was experienced several miles NE of Merir. The tidal range was about 1.2m.

10.51 Tobi Island (3˚00'22"N., 131˚07'26"E.) is covered with coconut palms. A cultivated area is situated near the middle of the island. Most of the houses are situated on the SW side of the island. A dispensary and radio station are situated on the island.

The island is fringed by a reef, which at the N end, extends nearly 0.5 mile NE. A dredged channel has been reported to have been cut through the reef fringing the SW side of the island.

A SE current with a velocity of 1.25 knots has been reported in the vicinity of the island. Tobi lies in the flow of the Equatorial Countercurrent throughout the year.

Some piers and mooring buoys are reported to be situated on the SW side of the island. It was reported that a medium-size vessel has berthed at one of the piers.

Helen Reef (2˚55'N., 131˚48'E.) is an atoll reef enclosing a lagoon. The reef, on which the seas break heavily, is usually dry at LW. Helen Island, densely wooded, is located near the N end of the reef. The island has a whale-like appearance when viewed from the NNE.

A channel, with a 4.6m shoal in the fairway, leads into the lagoon from near the middle of the W side of the reef. At HW, when the sea is smooth, there are sometimes no breakers on the reef so that caution is necessary when making the approach.

The tidal currents setting over Helen Reef are strong. When the tide is falling, the water flows out of the lagoon and over the reef in all directions until the reef is uncovered, and then flows out through the channel on the W side. On the rising tide, a reverse effect is noted. Toward the end of the ebb and at the beginning of the flood, the tidal currents in the channel are strong, but as only few parts of the reef completely dry, the maximum velocity does not exceed 1.8 knots.

Guam

10.52 Guam, a U.S. Territory since 1898, is not included in the Commonwealth of the Northern Marina Islands, which extends from **Rota** (14˚19'N., 145˚12'E.) to Farallon de Pajaros. The Northern Mariana Islands became a self-governing Commonwealth in political union with, and under the sovereignty of, the United States on 3 November 1986. Refer U.S. Coast Pilot 7 for further information on the Mariana Islands.

Guam, the southernmost and largest in the chain of islands of the Mariana Archipelago, is about 30 miles long and varies from 4 to 8 miles in width.

The N end of the island is a plateau of rolling hills set on vertical cliffs rising about 150m above sea level. The S end of the island consists of high volcanic hills. The plateau is covered with a thick growth of jungle; the volcanic hills support mainly sword grass. The highest hills are found in the W central and S parts of the island.

The capital of Guam is Agana; the chief port is Apra Harbor.

Surface, subsurface, and aircraft operations including firing exercises are conducted at various times in areas within an approximate 220 mile radius of Guam.

Winds—Weather.—The islands of the Marianas Archipelago have similar weather conditions. Under ordinary circumstances, the wind and seas in the vicinity of Guam are E due to the Northeast Trades. Westerly winds are at times experienced during the summer months as Guam is barely within the limits of the Southwest Monsoon. These winds are light as a rule. In the vicinity of Guam, NE and ENE winds prevail for 6 months of the year. These winds blow from the NE to E 65 per cent of the time between December and May, and are strongest during these months. Between June and November, the surface winds are quite variable; calms are rare. In the S islands, the winds show a slight S trend as early as May.

In Guam, the average mean temperature is 27˚C, the mean maximum is 32˚C, and the mean minimum is 21˚C The temperatures for the rest of the Mariana Islands are quite uniform throughout the year. January and February are the coolest months. The nights are cooler in the N islands. Temperatures above 31˚C normally occur from 13 to 22 days a month between April and August. The daily minimums seldom fall below 23˚C during the summer months. The yearly range of temperatures is 16˚C in the S and 14˚C in the North. The daily range is about 12˚C.

Humidity is high throughout the year, but there is somewhat less humidity from December through May. The yearly average is about 76 per cent, the January average is 68 per cent, and the June average is 84 per cent.

Fog and mist are rarely reported in the Guam, Saipan-Tinian areas. Visibility of less than 1.25 miles can be expected on less than 1 day per month.

The yearly average cloud cover is about 0.7. The maximum coverage of 0.8 to 0.9 occurs during the summer months (July to October). Cloudiness is higher over the islands than over the adjacent seas. Clouds are more frequent during the daytime.

Tides—Currents.—Currents in the vicinity of the Mariana Islands are W. They are strongest near to and S of Saipan Island, and gradually become weaker N of that island. In June, the Equatorial Drift Current was reported to be strongest during that season at 13˚N and to run to the NW at a maximum rate of 1 knot.

Variable currents are sometimes encountered near the islands. These are caused by the physical makeup of the island and by the additional force of the tidal currents.

An almost constant SW set has been reported along the NW coast of Guam during the Northeast Trades. This current has been felt up to 10 miles offshore.

Regulations.—See the NOS Coast Pilots and the chart for regulations pertaining to navigation within U.S. waters. Additional regulations will be cited in the text where appropriate.

10.53 Guam (13˚25'N., 144˚44'E.) is the southernmost, largest, and most populous island of the Mariana Archipelago. Guam is a territory of the United States and exercises local self-government under the U.S. Department of Interior.

Aspect.—Guam is reef-fringed, which dries in spots, over a greater part of its shoreline. From a distance the island appears flat and even; its E side is bordered by steep cliffs.

The S part of the island is mountainous, with the highest peaks being Mount Lamlam, 407m high, and Jumullong Manglo, with a height of 391m, lying 5.5 miles NNW of the S end. In the central range are Mount Tenjo, 311m high, about 5.8 miles NNE of Jumullong Manglo. Mount Alutom, about 1 mile NNE of Mount Tenjo, 330m high, and Mount Chachao, close N of Mount Alutom, 318m high, are the highest peaks in that range.

The N part of the island is comparatively low.

Caution.—Submerged submarine operating areas are situated around this island and may best be seen on the chart.

Fish aggregating devices are situated in deep water off the W and N shores of Guam; each device is marked by a special purpose lighted buoy.

A Firing Danger Area is situated off this island's SW coast; a Small Arms Safety Drop Zone is situated off the island's NW coast. Both are best seen on the chart.

10.54 Cocos Island (13˚14'N., 144˚39'E.) is located on the S part of a lagoon-type reef that projects about 2.5 miles SW from the SW end of Guam. A white beacon and a flagstaff stand near the SW end of Cocos Island. Babe Island, on which there is a white beacon, stands on the above reef, about 0.8 mile E of Cocos Island.

Port Merizo, suitable only for small craft, is entered through Manell Channel, on the SE side of the reef, or by Mamaon Channel, at the NW end. Caution is advised as the buoyage in the channel leading to port Merzio is privately maintained.

Ajayan Bay, entered on the W side of Aga Point, the SE end of Guam, is obstructed by reefs and is dangerous to approach if there is any sea.

Agfayan Bay, lying 1.5 miles NNE of Aga Point, open E and small, is only suitable for small vessels with local knowledge. This bay may afford anchorage for vessels with drafts less than 4.6m with local knowledge. There is a prominent rock on the S side of the bay.

Inarajan Bay, entered about 0.5 mile NE of Agfayan Bay, is open SE, but affords shelter to small craft with local knowledge during W winds. The reef fringing the SW side of the harbor is steep-to. There is a sandy beach at the head of the bay. The spire of a church near the village of Inarajan, situated on the SW side of the harbor, is prominent.

The depths decrease sharply from 22 to 5.4m when within about 0.2 mile of the entrance. Reefs and foul ground are found on each side of the inner bay. A shoal, with a depth of 5.2m, lies close offshore, S of the S entrance point.

10.55 Talofofo Bay (13˚20'N., 144˚46'E.), entered nearly 4 miles NNE of Inarajan Bay, affords shelter in its entrance in depths of 14.6m, mud; depths decrease gradually to its head. This bay has steep hills on all sides. Those on the N side rise sharply to 125m, with a prominent cliff forming the summit. There are two white tripod beacons at the head of the port. The Talofofo River, the largest in Guam, discharges into the head of the bay.

The E shore of Guam, from the entrance to Talofofo Bay to Pati Point, about 19.3 miles NNE, is rugged and steep; it affords no shelter; the only openings being Ylig Bay and Pago Bay. This part of coast should be avoided during the Northeast Monsoon.

Ylig Bay is entered through a deep channel, about 60m wide. The reef on either side of the entrance uncovers at half tide and is marked by breakers. The bottom shoals abruptly midway between the outer reef and the head of the bay. Reefs, foul ground, and shoals are found along the side of the channel. The Ylig River discharges into the head of the bay. A narrow, sandy beach extends N from its mouth. A vessel anchored, in 73m, good holding ground, just outside the entrance of the bay.

Pago Bay is only suitable for small craft with local knowledge.

Umatac Bay (13˚18'N., 144˚39'E.), entered about 0.5 miles N of the SW end of Guam, is small and exposed to W winds and seas. A reef extends about 0.1 mile W of the S entrance point of the bay. The N entrance point is an isolated rocky elevation, on which there is a ruined fort. A ruined fort stands on the hill NE of the point. Magellan's Monument stands at the head of the harbor. A prominent church spire is situated NW of the monument.

Anchorage.—Anchorage can be taken, in 13.7m, sand and shells, with Machadgan Point bearing 163˚, distant 0.17 mile. Cetti Bay, entered about 0.8 mile N of Umatac Bay, has depths over 9.1m for about halfway inside the entrance, where it shoals quickly to the head.

Facpi Point (13˚20'N., 144˚38'E.) terminates in an isolated rock joined to the shore by a drying reef; an elevated tank stands near the point.

Agat Bay, entered about 4 miles N of Facpi Point, affords good sheltered anchorage during NE and E winds. Apaca Point stands at the head of the bay. A shoal, with a depth of 4.6m, lies about 0.4 mile W of Apaca Point.

Apra Harbor (13˚27'N., 144˚37'E.)

World Port Index No. 56550

10.56 Apra Harbor is the main berthing facility on Guam, consisting of a commercial harbor, a naval complex, and a repair facility. The harbor is extensive and safe, except during the typhoon season. During this time, vessels should be prepared to get underway at short notice.

Winds—Weather.—Northeast and E winds usually pre-vail in the vicinity of Guam. West winds sometimes prevail during the summer months, as Guam is just within the limits of the Southwest Monsoon. These winds are usually light.

Because of haze and refraction, the beacons here are difficult to identify in the morning when the sun is high.

Tides—Currents.—The mean tidal range at Apra Harbor is 0.5m, while the spring range is 0.7m.

As Orote Point is approached, the SW current associated with the Northeast Trades tends to curve to the S and SE. The rate of the current is greatly affected by the force of the wind. During the typhoon season, the outgoing current from the har-

Table of Contents

Courtesy of Michael Henderson, Port Authority of Guam

Apra Harbor

bor augments the SW current and reduces any NE current that may occur. Strong rips are observed under these conditions.

The prevalent set of the current in the harbor entrance is usually S or SW regardless of the tidal currents, but a set to the N or NE may be experienced, especially during the summer months.

The flood current in the harbor entrance sets N to NNE at a maximum rate of 1.5 knots. The ebb current sometimes attains a maximum rate of 3 knots. Slack water occurs 30 minutes before LW and 45 minutes before HW. The currents and tidal currents within the harbor are weak and variable.

Heavy W swells sometimes make the entrance of Apra Outer Harbor dangerous for several days in a row. This condition occurs when a typhoon builds up in this area, progresses to the NW, and then curves to NE. Beacons and buoys are sometimes destroyed or carried away at such times.

Depths—Limitations.—Vessels are urged to contact the local authorities, and the pilot for the latest information on depths, currents, and regulations concerning entry and navigation of this harbor.

The approaches to the harbor are free and deep, as is the channel between the breakwaters.

Outer Harbor shows depths of 13.4 to 53m in its W portion, but several shoals line the passages through the E portion, and are best seen on the chart. The channel leading from Outer Harbor to Inner Harbor shows a least charted depth of 10m on the range line. Inner Harbor shows depths of 9.1 to 13.4m.

Guam's commercial port is situated on Cabras Island in Outer Harbor. The Port Authority of Guam, an autonomous agency of the Government of Guam, is responsible for the management of the port’s 33-acre site. The facility offers 0.15 mile of docking space for container, break-bulk, fishing, and passenger vessels. The Guam Economic and Development Authority administers the Cabras Island Industrial Park adjacent to the Commercial Port, which includes a fuel wharf and a floating dry dock. The commercial port offers alongside depths of 9.7 to 19.8m.

Tank vessels discharge at the Mobil Pier (Pier G), which has a length of 68m and an alongside depth of 17.6m, and also at the GIROCO Pier (Pier F-1), which has a length of 243m and an alongside depth of 19.8m. The Mobil Pier is situated about 0.2 mile W of the root of Glass Breakwater, while the GIROCO Pier is positioned about 0.3 mile SE of the Mobil Pier.

Courtesy of Michael Henderson, Port Authority of Guam

Apra Harbor—Mobil Pier (Pier G)

Aspect.—Orote Point (13˚27'N., 144˚37'E.) is a sharp bluff, 65m high, that lies at the W end of Orote Peninsula, a narrow tongue of land projecting NW from the shore of Guam. Due to heavy undergrowth, the light on Orote Point is difficult to distinguish from the S even when close at hand. Orote Island lies close off the N side of the point.

Port Authority of Guam

http://www.netpci.com/~pag4

Pilotage.—Pilotage is compulsory for U.S. flag merchant vessels over 1,500 grt, foreign flag merchant vessels over 500 grt, and all merchant vessels after sunset. The pilot, who requires a 4 hours advance notice, boards 2 miles W of the harbor entrance. The pilot boards at this location to insure that the vessel is properly aligned on the entrance range, due to the strong sets in the entrance; this is especially important for larger vessels.

Regulations.—See U.S. Coast Pilots for navigation regulations pertaining to vessels in U.S. waters.

All operations in Outer Harbor are under U.S. Coast Guard Captain of the Port control. Permission to enter or clear harbor must be obtained from U.S. Coast Guard Captain of the Port, Marine Safety Office, Guam. Vessels entering Outer Harbor, shifting berth, or departing harbor are required to give a minimum of 24 hours advance notice to the Captain of the Port. Failure to give such notice is a basis for denying entry.

A U.S. Coast Guard Marine Safety Office is situated at the commercial port.

Regulations from Title 33, Code of Federal Regulations, concerning Security Zones and Regulated Navigation Areas in Apra Harbor are given in the accompanying table. Vessels are urged to contact the local authorities for the latest information on harbor regulations concerning this port.

A Firing Danger Area, with an acoustic range facility close S of it extends up to 1.75 miles SW of Orote Point, and may best be seen on the chart.

A Restricted Area, encompassing Inner Harbor, extends across the S end of Outer Harbor, and may best be seen on the chart.

Anchorage regulations, including those pertaining to the explosives anchorage may be obtained from:

Commander, Fourteenth Coast Guard District
300 Ala Moana Blvd.
Honolulu, HI 96850-4982.

Table of Contents

Speed is limited to not more than 12 knots in Outer Harbor and not more than 5 knots in Inner Harbor, except in emergency situations

Signals.—U.S. Coast Guard Communications Center, Guam is a full-service communications station manned 24 hours. The station's call sign is NRV.

The Harbormaster's Control Tower is manned 24 hours and may be contacted on VHF channel 13. The harbormaster's call sign is WRV-574.

It has been reported that NRV will handle traffic for the Harbormaster's office if the vessel is unable to reach it.

The U.S. Navy Communications Center Guam (NPN) issues facsimile charts on various frequencies. U.S. Coast Guard Communications Center, Guam (NRV) handles storm warnings and weather messages on various frequencies, including VHF channel 22.

Anchorage.—Due to the great depths and rapid shoaling of the bottom in the vicinity of Apra Harbor, anchorage outside the harbor is impossible.

Naval Anchorage A, on the S side of Outer Harbor, shows general depths of 12.8 to 49m over a charted bottom of mud, sand, clay, and coral. Naval Anchorage B, S of Drydock Island, shows depths of 13.4 to 22m, sand and mud bottom.

The explosives anchorage is situated in the W port of the harbor, centered on buoy 702, and is best seen on the chart.

General anchorage is available S of Glass Breakwater, in general depths of 4.5 to 52m, sand, mud, and coral.

Mooring buoys are laid throughout Inner Harbor and Outer Harbor, and may best be seen on the chart.

Extracts from title 33, Code of Federal Regulations concerning Security Zones and Reulated navigtion Areas in Apra Harbor

§ 165.1401 Apra Harbor, Guam—Security Zones.

(a) The following is designated as Security Zone A—The waters of the Pacific Ocean and Apra Outer Harbor within an elliptical area of 0.32 mile radius centered at the SW and N corners of Navy Wharf H. (Southwest corner is at 13˚27'43.6"N, 144˚38'55"E; the N corner is at 13˚27'44.6"N, 144˚39'00"E).

(b) The following is designated as Security Zone B—The 0.34 mile-wide area in Apra Outer Harbor contiguous to and bordering Security Zone A.

(c) Special regulations:

(1) Section 165.33 does not apply to Security Zones A and B, except when Navy Wharf H, or a vessel berthed at Navy Wharf H, is displaying a red (BRAVO) flag by day or a red light by night.

(2) Vessels may enter Security Zone B when transiting the harbor without the permission of the COTP.

(3) Unless the COTP orders the vessel to leave, any vessel berthed at a waterfront facility may remain in Security Zone B without the permission of the COTP.

(4) Vessels under 20m in length may anchor in the Special Anchorage Area as described in Part 110.129(a) of this chapter without the permission of the COTP.

(d) The following is designated as Security Zone C—The waters of Apra Outer Harbor, Guam around Naval mooring buoy No. 702 situated at 13˚27'27.1"N and 144˚38'8.1"E and Maritime Preposition Ships moored thereto. The security zone will extend 90m in all directions around the vessel and its mooring. Additionally a 50m security zone will remain in effect in all directions around buoy No. 702 when no vessels are moored thereto.

(e) Regulations. (1) In accordance with general regulations in 165.33 of this part, entry into Security Zone C is prohibited unless authorized by the Captain of the Port.

§ 165.1402 Apra Outer Harbor, Guam—Regulated Navigation Area.

(a) The following is a Regulated Navigation Area.—The waters of the Pacific Ocean and Apra Outer Harbor enclosed by a line beginning at latitude 13˚26'47"N, longitude 144˚35'07"E; then to Spanish Rocks at latitude 13˚2 7'09.5"N, longitude 144˚37'20.6"E; then along the shoreline of Apra Outer Harbor to latitude 13˚26'28.1"N, longitude 144˚39'52. 5"E (the NW corner of Polaris Point); then to latitude 13˚26'40.2"N, longitude 144˚39'28.1"E; then to latitude 13˚26'3 2.1"N, longitude 144˚39'02.8"E; then along the shoreline of Apra Outer Harbor to Orote Point at latitude 13˚26'42"N, longitude 144˚36'58.5"E; then to the beginning.

(b) Regulations:

(1) Except for public vessels of the United States, Vessels may not enter Apra Outer Harbor without permission of the Captain of the Port if they have on board more than 25 tons of high explosives.

(2) Except for vessels not more than 20m in length, towboats or tugs without tows, no vessel may pass another vessel in the vicinity of the Outer Harbor entrance.

(3) Vessels over 100 grt shall:

(i) Steady on the entrance range at least 2 miles west of the entrance when approaching Apra Outer Harbor and;

(ii) Reserved

(iii) Steady on the range when departing Apra Outer Harbor.

(4) Vessels may not anchor in the fairway. The fairway in the area within 114m on either side of a line beginning at latitude 13˚26'47"N, longitude 144˚35'07"E; then to latitude 13˚27'14.1"N, longitude 144˚39'14.4"E; then to latitude 13˚26'35.2"N, longitude 144˚39'46.4"E; then to latitude 13˚26'30.8"N, longitude 144˚3 9'44.4"E.

(5) Vessels over 2,000 grt may not proceed at a speed exceeding 12 knots within the harbor.

(6) No vessel may leave Apra Outer Harbor until any inbound vessel over 20m in length has cleared the outer Harbor Entrance

Directions.—Vessels from the N should keep 5 miles offshore until Orote Point bears 180˚, then steer for a position 2 miles W of the harbor entrance. Approaching from the W, Mount Alutom, bearing 097˚ and in line with Orote Point, leads to a position 2 miles W of the harbor entrance, but is not easily identified. Vessels should enter Apra Outer Harbor with the entrance range ahead bearing 083˚, passing midway between Entrance Channel Lighted Buoy 1 and Entrance Channel Lighted Buoy 2. Vessels are cautioned to give the breakwater a wide berth because of the currents and of possible submerged broken-off segments.

A crosscurrent is often experienced in the entrance. Care should be taken to keep on the entrance range. A speed of not less than 10 knots is recommended through the entrance to avoid the excessive set by the currents off the entrance.

Range lights, in line bearing 141˚, lead through the channel from Western Shoal towards the entrance of Inner Harbor. Lights, in line bearing 176˚, lead through the entrance to Inner Harbor.

Caution.—It has been reported that a wreck partially obstructs the GIROCO Pier. Vessels have reported fouling lines in this wreck during berthing operations.

10.57 Asan Point (13˚28'N., 144˚42'E.) is rocky, steep, and fringed by a reef upon which stands Camel Rock.

Agana Bay is formed by a slight indentation of the coast between Adelup Point and Oca Point, about 2.5 miles ENE. The shores of the bay are low, sandy, and fringed by a wide reef. Agana, the capital of Guam, stands along the shores of the bay. Agana consists of a large number of buildings, some of considerable height. There are adequate ranges for entrance through the reef to Agana Basin. The channel inside the reef is intricate and narrow; local knowledge is required. The entrance should only be attempted during daylight hours under favorable conditions.

Anchorage.—Anchorage, with winds between the ENE and S, may be obtained in Agana Bay; however, it is an open roadstead with a steep-to bottom and great depths. A strong current has been reported off Adelup Point. A small craft harbor situated in Agana Bay, Agana Basin is approached from the N directly offshore. The entrance through the reef is marked by a lighted range. Small craft up to 13.7m long can be accommodated. The reef passage and channel are narrow and very dangerous for mariners without local knowledge. Mariners unfamiliar with the channel should not attempt entrance without assistance or during other than daylight hours with favorable conditions. Assistance can be requested from the Agana Harbor Patrol on 2136 kHz daily from 0600 to 1400.

The shore between **Oca Point** (13˚30'N., 144˚46'E.) and Ritidian Point, the N extremity of Guam, is rocky and steep. Tumon Bay, entered between Ypao Point and Amantes Point, about 2 miles NNE, is nearly inaccessible because of reefs, except by boats with local knowledge. A white beacon stands on the E shore of Tumon Bay and a water tank, painted red, stands about 0.5 mile inland of the bays head.

The N coast of Guam, between Ritidian Point and Pati Point, is reef-fringed and fully exposed to the Northeast Trades.

Table of Contents