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MILITARY GEOLOGY OF GUAM, MARIANA ISLANDS

WATER RESOURCES SUPPLEMENT

by

Porter E. Ward and Joseph W. Brookhart

Prepared under the direction of the
Chief of Engineers, U. S. Army
by the
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1962

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Foreword

Engineer Intelligence Study -- Guam, Mariana Islands Water Resources Supplement

This study of the water resources of Guam supplements the report, Military Geology of Guam, Mariana Islands, and has been prepared as a part of the Pacific Geological Mapping Program of the Corps of Engineers, U. S. Army.

The program is designed to collect and compile information on the military geology of areas of the Pacific, by field mapping and analyses of selected islands, and to publish the information in a form usable by the Armed Forces and the island civil administrations.

This report deals with the occurrence and availability of water and the development of water supplies in Guam. It describes briefly the streams and includes basic data on the flow of streams. The study outlines the water-bearing properties of the rocks, the occurrence of ground water, and methods of developing ground water, and presents records of wells and springs.

The report was prepared in cooperation with the U. S. Geological Survey, Department of the Interior.

November 1961

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Map 1:50,000 scale
(in pocket)

Plate 1 Water Resources, Guam

MILITARY GEOLOGY OF GUAM, MARIANA ISLANDS

WATER RESOURCES SUPPLEMENT

SUMMARY

All streams in Guam are in the southern half of the island, which is composed largely of volcanic rock having low permeability. No streams exist in the northern half because of the highly permeable limestone terrane, which quickly absorbs the rainfall, and here the flow of water to the sea is underground. Most of the streams in southern Guam are small; the largest is the Talofofu River system, which drains an area of about 21 square miles. A large part of the streamflow is direct runoff from rainfall; consequently, the flow has wide seasonal fluctuations and the greatest flow is during the rainy season from July through November. The dry-season flow in many years is only a small fraction of the average flow.

Because of the wide seasonal fluctuations in flow, the streams are poor sources of dependable large supplies of water, except where the flow can be regulated by dams and reservoirs. In the upper part of the Talofofu River system a dam forms the Fena Valley Reservoir, which has a capacity of about 2,000 million gallons and is capable of supplying about 8 mgd (million gallons a day) to the island water system. Several villages in southern Guam divert small supplies from streams.

The flow of all large streams and several small ones has been gaged since 1951. Records of these measurements to 1958 are shown in Appendix A, which gives a description of each gaging station and tabulations of daily flow and the maximum, minimum, and mean flow at each gage.

The major ground-water supply in Guam is in the basal ground-water body that lies near sea level over a wide area in the highly permeable limestone in northern Guam. The upper part of the basal water body is a lens of fresh to brackish water that floats in and displaces the slightly heavier sea water saturating the rock below sea level. Depths to the water table, which is near sea level, range from a few feet in lowlands near the shore to nearly 600 feet in the high part of the limestone plateau of northern Guam.

The basal water discharges into the sea continuously at springs and seeps at the shore, but most of the water near the shore is brackish or saline. Concentrated flows of fresh water occur at Janum Spring, which discharges 1 to 2 mgd, and at Agana Spring, which has a flow of 2 to 3 mgd.

Numerous wells drilled in the limestone to about sea level and a few horizontal tunnels driven at the water table develop the fresh basal water in northern Guam, but in some areas pumping causes sea-water encroachment and an increase in the salinity of the water. The total supply of fresh basal water in northern Guam, including spring flow, probably is about 15 mgd.

The volcanic rock and associated noncalcareous sediments that make up the most of southern Guam have low permeability and are poor water-bearing materials. The rocks yield water slowly to wells, and in most of the area the yield of drilled wells is less than 1 gallon per minute per foot of drawdown. Because of the low permeability, the water table commonly stands high above sea level, and numerous small springs and seeps flow into streams and contribute to their base flow.

Limestone caps on hills of volcanic rock in southern Guam contain ground water that discharges at springs at the edge of the limestone. Most of the springs are small and have daily flows of only a few thousand gallons during dry seasons. The largest is Almagosa Springs, which occasionally has a dry-season flow of less than 0.5 mgd. The largest springs are diverted into village or military water systems.

Ground water in limestone along the coastal part of southern Guam is mostly brackish. Beach deposits generally yield water readily to wells, but most of the water is brackish.

INTRODUCTION

Location and Extent

Guam lies between latitudes 13°15'N. and 13°39'N. and between longitudes 144°37'E. and 144°57'E. (fig. 1). The largest and southernmost of the Mariana Islands, it has an area of about 212 square miles. The island is 30 miles long, and from a width of 8½ miles in the northern part it tapers to 4 miles at the central waist and widens again to 11½ miles in the southern part.

Purpose and Scope

The purpose of this report is to present information on the water resources of the island that will be useful in the location and development of water supplies and in the planning and management of water-supply installations. The report describes briefly the rocks of the island and their water-bearing properties. It outlines the occurrence of ground water, and the methods of development of ground water. It presents records of wells and a map showing the locations of wells and the sources of ground water in the island. It gives summary descriptions of the streams and drainage basins, and tabular data on the flow of streams.

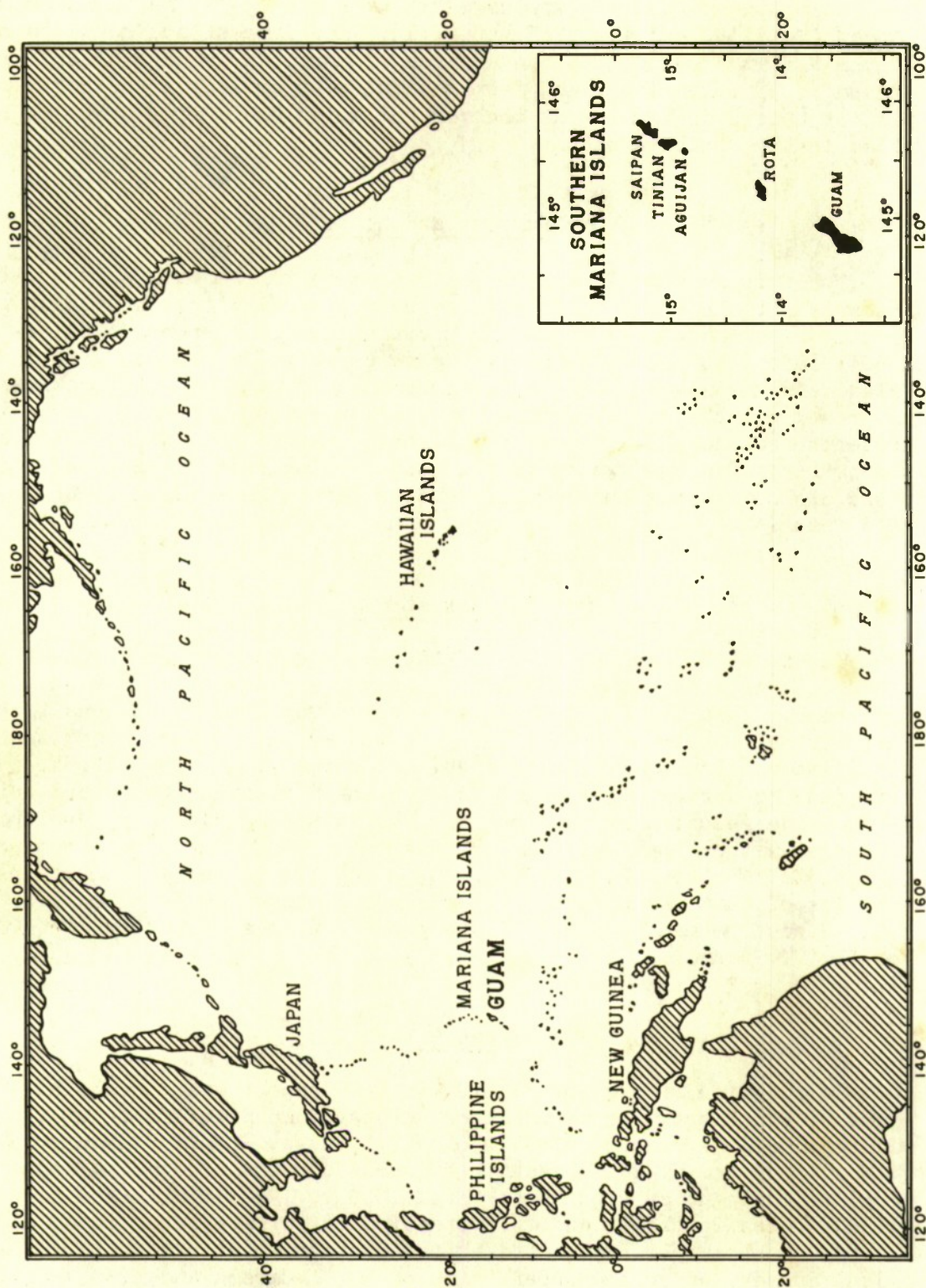
Previous Investigations

The first documented study of the water resources of Guam was by H. T. Stearns, who, in 1937, spent 3 months in the island making a study for the U. S. Navy. An unpublished report submitted by Stearns to Navy authorities in Guam describes the general geology of the island and gives information on wells, springs, and streams. In 1945, P. H. Peterman, Frederick Ohrt, and C. K. Wentworth visited the island briefly and made recommendations to the U. S. Navy regarding the development of ground-water supplies. In an investigation for the U. S. Commercial Company, A. M. Piper (1946-47, p. 20-68) described the ground-water supplies of Guam and compiled records of all known wells. In 1947, R. W. Sundstrom made a study of the ground-water supplies of north Guam for the U. S. Army.

Present Work

Compilation of the information in this report was started in 1951 by J. W. Brookhart, who was a member of the Guam Field Party of the Military Geology Branch, U. S. Geological Survey. In 1954 and 1955, E. W. Bishop and K. J. Takasaki continued the work of observation and compilation begun by Brookhart. From 1955 to 1958, P. E. Ward made field studies in the island. Information on surface water is based on records of streamflow collected by the Surface Water Branch, U. S. Geological Survey, under the supervision of M. H. Carson and H. S. Leak. Stream gaging was done by Raymond Chun, H. H. Hudson, Santos Valenciano, and J. S. Quinata.

Figure 1.--Map of Pacific Ocean showing the location of Guam



Topography and Drainage

The northern half of Guam is a gently undulating limestone plateau bordered on its seaward edges by steep cliffs. The plateau slopes generally southwestward from elevations of approximately 600 feet in the north to less than 100 feet at the narrow midsection of the island. The generally uniform surface is interrupted by three hills--Barrigada Hill (665 feet), which is a broad limestone dome, and Mt. Santa Rosa (858 feet) and Mataguac Hill (630 feet), both of which are underlain by volcanic rocks.

Because of the high permeability of the limestone, no perennial streams exist on the plateau. During heavy rains, water may flow in short channels in the limestone, but the water soon disappears into numerous sinkholes and fissures. The only runoff of consequence in the area is on the steep slopes of the two small volcanic hills, but even here water flows only during rains and disappears rapidly in the limestone that surrounds the hills.

The southern half of Guam is a rugged, deeply dissected upland underlain chiefly by volcanic rocks. The surface has been eroded into peaks, knobs, ridges, and basinlike areas and is deeply channeled by numerous streams. A nearly continuous mountain ridge, running from the highland south of Piti to the southern tip of the island, lies parallel with and 1 to 2 miles inland from the west coast. Eight peaks in the ridge stand at about 1,000 feet above sea level, the highest of which is Mt. Lamlam, 1,334 feet above sea level. Along the west coast an emerged limestone plain 200 to 300 feet high and a little less than a mile wide lies between the ridge and the shore. Two limestone masses projecting westward from the plain at Apra Harbor form Cabras Island and Orote Point. The east slope of the mountain ridge is relatively gentle, and near the east coast it merges with a narrow limestone plateau that stands 100 to 350 feet above sea level and extends from Pago Bay southward to Inarajan.

More than 40 streams flow into the sea in the southern half of Guam. The streams are closely spaced, deeply incised, and have dendritic patterns. The largest streams empty into small bays.

Climate

The following discussion of the climate of Guam is based largely on a report by D. I. Blumenstock (1959). Climatological records for most stations on the island are for short periods. Reliable records of rainfall are available for a few stations, but records for most are for periods of less than 10 years.

Guam is warm and humid and has mean monthly temperatures that vary only slightly through the year. In the Apra Harbor area, for example, the average temperature is 79.2° F. in the coolest month and 82.5° F. in the warmest. In all areas except on the high peaks the daytime temperatures are usually in the middle to high eighties, and the temperatures at night are about 10 degrees lower. The humidity generally ranges between 65 and 80 percent in the late afternoon and 85 and 100 percent at night. The average annual rainfall ranges from about 85 inches in the Apra Harbor area to about 115 inches in the high mountain areas in southern Guam. Rainfall on the northern plateau is about 100 inches. Annual evaporation from a standard Weather Bureau evaporation pan near Fena Reservoir averaged 89.5 inches during the years 1955-1956.

Despite the uniformity of temperature and humidity, Guam has two distinct seasons: a dry season from January through May and a rainy season from July through November. December and June are transitional months. During the dry season, the tradewinds blow from the northeast, commonly in excess of 15 miles per hour, and calms are rare. During the wet season, although tradewinds still are generally dominant, winds commonly blow from any direction, windspeeds seldom are greater than 15 miles per hour, and calms are frequent. Storms may occur at any time of the year, but they are most frequent during the rainy season.

Rainfall during the dry season is mostly from scattered light showers. During the wet season, about one-third of the rainy days have more prolonged and steady rain. About 15 to 20 percent of the annual rainfall occurs during the dry season, 68 to 73 percent during the wet season, and the remainder during the transitional months.

Because Guam is subjected to repeated invasions of very moist, unstable air during the rainy season, and especially because the island is occasionally within the zone of influence of passing typhoons and tropical storms, extreme rainfall intensities are not uncommon. At Sumay, which is in the zone of relatively low rainfall intensity, rainfall of 9 inches or more in a single day may be expected every 10 years on the average. During the early part of July 1956, 2.35 inches of rain were recorded during a 35-minute period at Tamuning.

Drought is common in Guam, and severe drought is not unusual. A drought of several weeks duration may occur any time between the first of December and the end of May, but the period of most frequent drought is February through April.

Geology

The summary of the geology of Guam given here is based on detailed descriptions in the report, Military Geology of Guam, Mariana Islands, by Tracey and others (1959) and is concerned mainly with elements that are important in the hydrology of the island. Brief descriptions of the rocks of the island, their distribution, and water-bearing properties are given in table 1. The geologic names in the table and elsewhere in this report agree with those used in the basic report.

The plateau in the northern half of the island is composed principally of limestone, which lies unconformably on an irregular surface eroded in volcanic rock. The contact between the limestone and the volcanic rocks is below sea level in much of northern Guam, but the top of the volcanic rocks stands above sea level in an area of several square miles in the north-central part and projects through the limestone at Mt. Santa Rosa and Mataguac Hill. Most of the limestone in the plateau is cut by numerous caverns, fissures, and other solution openings, and it therefore has high overall permeability. The volcanic rock under the limestone has low permeability.

The rocks of the southern half of Guam consist mainly of a complex of pyroclastic rocks and lava flows, noncalcareous sediments derived from the volcanic rocks, and minor amounts of interbedded limestone. Overlying parts of this complex are limestone beds that form caps on peaks and ridges, and aprons along the coast of south Guam. The volcanic rocks and associated sediments have low permeability; the limestones lying on them have high permeability.

Surficial deposits consist of calcareous sand and gravel in beach deposits, alluvium in the bottoms of valleys, thin clayey soil on limestone terranes, and an earthy mantle of volcanic terranes.

Table 1.--Rocks of Guam

Geologic age	Formation	General character and distribution	Water-bearing characteristics
Recent and Pleistocene	Beach deposits	Unconsolidated calcareous sand and gravel; consolidated beachrock in intertidal zone. Occurs irregularly along the shore, particularly in beaches in embayments.	Sand and gravel have moderate to high permeability and, below sea level, are saturated, mostly with brackish water but locally with small quantities of fresh water.
	Alluvium	Poorly sorted clay, silt, sand, and small amounts of gravel -- chiefly in the bottoms of valleys, and muck and clay in marshy estuarine deposits along west coast. Maximum thickness about 100 feet.	Most of the material is saturated with water a few feet below the ground surface, but because of low permeability it does not release water readily. Water is fresh except at shore.
Pleistocene and Pliocene	Mariana limestone	A complex of reef and lagoonal limestone consisting of a fore-reef facies, a reef facies, a detrital facies, a molluscan facies, and the Agana argillaceous member. Underlies most of the north half of Guam; forms a broad marginal apron along the east coast between Pago Bay and Inarajan; and forms Orote Peninsula. Agana argillaceous member underlies narrow waist of island and is dominant in the apron along east coast. Maximum thickness greater than 500 feet.	Permeability of nonargillaceous limestone is generally very high but irregular. Where the rock extends below sea level, it commonly contains relatively fresh basal ground water, but numerous solution channels and fissures may promote sea-water intrusion in some places, especially in coastal areas. Permeability of argillaceous limestone is moderate to high.

Table 1.-- Rocks of Guam (continued)

Geologic age	Formation	General character and distribution	Water-bearing characteristics
	Alifan limestone	Generally massive, poorly to well-consolidated detrital limestone, recrystallized in some places. Forms caps on Barrigada Hill, Nimitz Hill, and the high ridge between Mt. Alifan and Mt. Iamlam, and crops out in small patches along the coast in the Apra Harbor area. Maximum thickness about 200 feet.	Permeability is moderate to high. Contains perched ground water in some places in southern Guam where it lies on less permeable volcanic rocks. Is the source of several perennial springs.
Miocene	Janum formation	Well bedded, tuffaceous limestone. Small lenticular deposits crop out in several localities along the northeast coast between Lujuna Point and Anao Point. Maximum thickness about 70 feet.	Permeability low to moderately high, but does not contain water.
	Barrigada limestone	Pure detrital limestone, relatively fine-grained and homogeneous, massive, and well lithified to friable. Underlies most of north half of Guam and crops out over a broad ring-shaped area in north-central part. Width of the outcrop averages about 1 mile. A southern extension of the outcrop encircles all but the west side of Barrigada Hill. Thickness probably greater than 540 feet.	Permeability of the rock is high. Wherever it extends below sea level, it contains relatively fresh basal ground water as much as 7 feet above sea level. This rock is the most widespread basal aquifer in Guam and supplies numerous wells.

Table 1.--Rocks of Guam (continued)

Geologic age	Formation	General character and distribution	Water-bearing characteristics
	Talisay formation	Clay, lenticular clayey gravel, volcanic conglomerate, and interbedded limestone lenses. Crops out in south-central Guam in the Fena valley west of Fena Reservoir and on the east slope of Mt. Alifan. Crops out also in small patches near Santa Rita and along part of the Gantali River near Apra Harbor. Thickness ranges from 2 to 30 feet.	The clay, gravel, and conglomerate contain water in places but are very poor aquifers because of low permeability. Some limestone lenses yield water to small and mostly intermittent springs.
Miocene	Bonya limestone	Friable to compact, clayey, medium- to thick-bedded, jointed and fractured, detrital limestone. Exposed principally in small outliers in the Fena-Talofofu valley and in small patches on southeast side of Ugun River, in the Togcha River valley, and near Mt. Santa Rosa. Maximum thickness about 120 feet.	Generally high permeability, but because of its small extent it contains very little ground water.
	Umatac formation	Predominantly a volcanic formation made up of the following members: Dandan basalt (basalt lava flows), Bolanos conglomerate (breccia, conglomerate, sandstone, and shale), Maamong limestone (limestone and calcareous tuff), and Facpi basalt (basalt lava flows, shale, sandstone). Underlies most of Guam lying south of a line between Talofofu Bay and Agat Bay. Total stratigraphic thickness greater than 2,000 feet. Extends below sea level throughout area.	Largely saturated with water below depths of a few tens of feet to a few hundred feet beneath the surface, but because of low permeability the rocks are very poor water-bearing materials. A surficial mantle of granular weathered material commonly contains thin bodies of perched water that discharge in seeps.

Table 1.--Rocks of Guam (continued)

Geologic age	Formation	General character and distribution	Water-bearing characteristics
Eocene and Oligocene	Alutom formation	<p>Fine-to coarse-grained, well-bedded, tuffaceous shale and sandstone, lenses of tuffaceous limestone, and interbedded lava flows. Includes the Mahlac member consisting of thin-bedded to laminated, friable, calcareous shale. The rocks cover a large area in central Guam from the vicinity of Asan and Piti villages to Mt. Jumullong Manglo and the northern environs of the Fena basin. Underlies younger rocks in north half of Guam and crops out at Mt. Santa Rosa and Mataguac Hill. Stratigraphic thickness greater than 2,000 feet. Extends below sea level throughout area.</p>	<p>Permeability is moderate in a few places but mostly is low. Saturated with water at variable depths below the surface, but yields water slowly to wells. Surficial mantle of weathered material contains small perched supplies in many places.</p>

WATER RESOURCES

In an average year, the rainfall on Guam amounts to nearly half a billion gallons a day, but most of the water runs off rapidly to the sea or escapes to the atmosphere, and only a small fraction is available for development and use by man.

The streams of the island, which are all in the southern half, have wide seasonal fluctuations in flow and are poor sources of dependable large supplies of water, except where the flow can be regulated by dams and reservoirs. In southern Guam the discontinuous limestone deposits contain only small bodies of high-level ground water or they contain brackish water, and the widespread volcanic rock has low permeability that precludes development of large quantities of ground water. In northern Guam much of the limestone contains great quantities of ground water at sea level, but most of the fresh water is subject to sea-water encroachment, which occurs under natural conditions or is induced by pumping from wells.

Surface Water

Perennial streams in Guam appear only south of the narrow waist of the island (pl. 1). North of the waist, where the highly permeable limestone quickly absorbs the rainfall, the flow of water to the sea is largely underground, and no streams have developed.

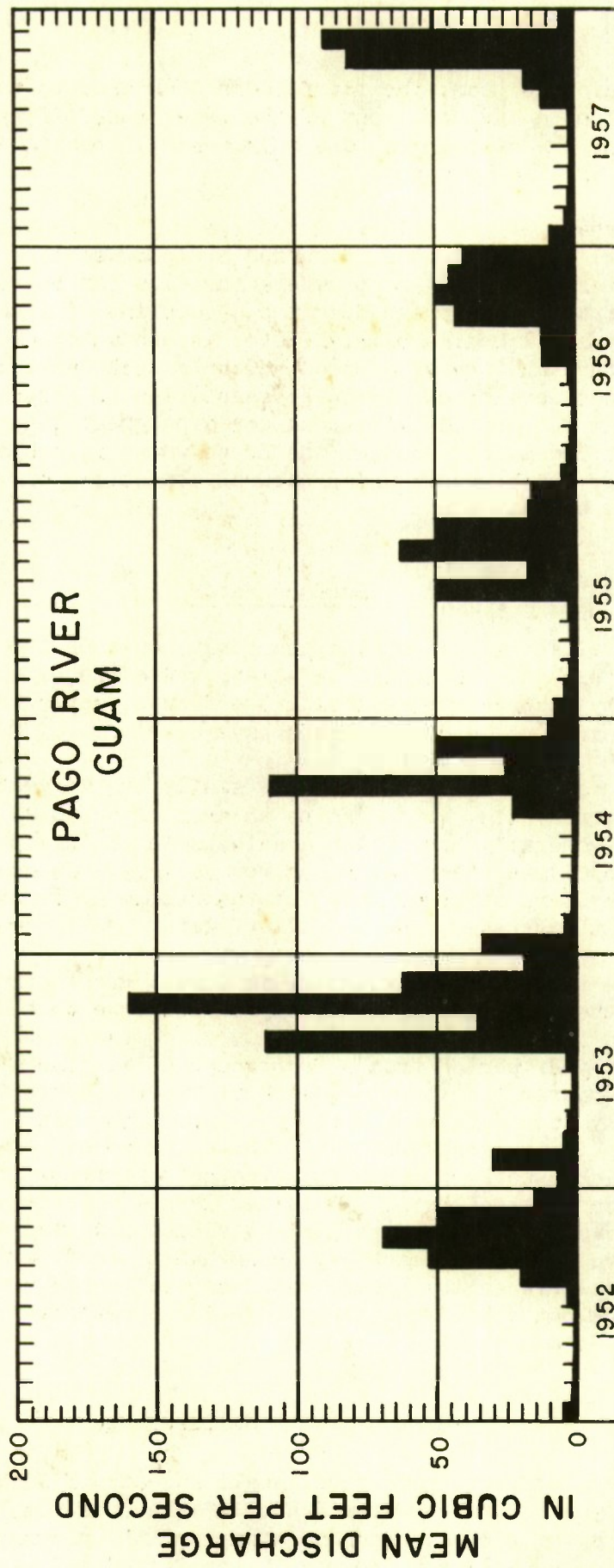
The streams in southern Guam are small, the largest being the Talofofu River system, which drains an area of about 21 square miles. The streams generally have steep gradients in their upper reaches, where they flow mostly in steep-walled narrow valleys. In coastal areas most of the valleys are steep-walled, but the stream gradients are relatively gentle, and the streams flow in valley flats.

A large part of the streamflow is direct runoff from rainfall; consequently, the flow fluctuates widely in response to the seasonal rains. The graph in figure 2 shows the monthly discharge of the Pago River during the 6-year period from 1952 through 1957. The average discharge of the river during the period was about 22 cfs (cubic feet per second), and the daily discharge ranged from 0.10 to 2,540 cfs. The high discharge shown in the graph from July through November of each year results from the quick runoff of heavy and frequent wet-season rainfall. During the dry seasons, the flow is maintained largely by the discharge of ground water at many small springs and seeps, and the lowest discharge occurs toward the end of each dry season when the flow from the springs and seeps declines as the ground water stored in the rocks is depleted. The discharge pattern of the Pago River is representative of the streams in southern Guam.

Records of Stream Discharge

All large streams and several small streams in Guam have been gaged since 1951 by the Surface Water Branch of the U. S. Geological Survey. The stream-gaging program began as a part of the program of compilation of information on military geology in the island and has continued since 1953 in cooperation with the Government of Guam. Records of discharge of the streams up to 1958 and information on the stream-gaging stations

Figure 2.--Graph of monthly discharge in the Pago River, 1952-1957



are compiled in Appendix A. The records are from an open file report by the U. S. Geological Survey (1959).

Major Streams

The following discussion describes briefly the principal stream basins of Guam and gives summary information on the flow of the streams. Figures in parenthesis after references to stream-gaging stations and springs indicate the identifying symbols that show locations of gages and springs on plate 1.

La Sa Fua River: The La Sa Fua River flows in a narrow gorge eroded in volcanic rock consisting mainly of lava flows. The gradients of the river and its tributaries are steep, and the basin is generally rugged. Numerous small springs and seeps flow into the stream. The largest spring is Alatgue Spring (140) which has a discharge of about 40,000 gpd (gallons per day).

The flow of the river is measured at a gaging station (10-12) at an altitude of 130 feet. The average discharge from 1953 to 1958 was 4.43 cfs, and the range in daily discharge was from 0.35 to 403 cfs.

The stream once was used as a source of water for Umatac village.

Umatac River: The basin of the Umatac River includes about 2 square miles and is underlain largely by lava flows containing a few beds of limestone. The basin is in mountainous land, and the gradients of the river and its tributaries are steep, except for the lower part of the main stream, which flows on a gentle gradient in a valley flat underlain by alluvium.

Small springs and seeps issuing from the lava flows maintain the base flow of the stream. Piga Spring (94), which is the largest in the basin with a flow of 80,000 to 100,000 gpd, supplies about 16,000 gpd to the village of Umatac.

The Umatac River is gaged at a point 12 feet above sea level and 0.2 mile upstream from the mouth. The drainage area above the gaging station (10-11) is 2.0 square miles. During the 5-year period from 1953 to 1958, the average discharge was 7.34 cfs, and the daily discharge ranged from 0.50 to 500 cfs.

Geus River: The Geus River drains about 1.5 square miles of mountainous land underlain by lava flows, breccia and conglomerate. The upper half of the stream has a steep gradient and flows in a narrow, steep-walled valley. The lower half flows on a relatively gentle gradient in a narrow valley flat underlain by alluvium. Numerous springs maintain the flow of the stream during dry seasons. The largest, Siligan Spring (141), which is in limestone interbedded in lava flows, discharges at rates of 30,000 to 70,000 gpd. The discharge of the Geus River is measured at a gaging station (10-13) 85 feet above sea level and about a mile upstream from the mouth. The average discharge from 1953 to 1958 was 2.95 cfs, and the range in daily discharge was from .07 to 550 cfs.

About 16,000 gpd is diverted from the river into the domestic water system of Merizo village.

Inarajan River: The basin of the Inarajan River is about $3\frac{1}{2}$ miles long and 2 miles wide at the widest part and includes about 5 square miles of

rolling to mountainous land that is underlain by breccia, conglomerate, sandstone, and shale derived from volcanic rock. The main stream of the river is formed by the confluence of two branches about 0.8 mile upstream from the mouth. Through much of their length, the branches flow in small gorges. The valley flat of the main stream is half a mile wide and is underlain by alluvium. Numerous small springs and seeps at the heads of gullies in the mountainous part of the basin contribute substantially to the base flow of the stream.

The Inarajan River is gaged at a point about half a mile upstream from the mouth (10-10). The average discharge at the gaging station from 1953 to 1958 was 16.1 cfs, and the range in daily discharge was from 1.43 to 1,580 cfs.

The water supply for the village of Inarajan is obtained from the east fork of the north branch of the river. The average daily use is about 32,000 gallons.

Pauliluc River: The basin of the Pauliluc River includes about 2 square miles of rolling terrain, which is underlain mostly by deposits of breccia, conglomerate, sandstone, and shale derived from volcanic rock. The upper part of the basin is an area of relatively gentle slopes in which the main stream and its tributaries have gentle gradients. A mile upstream from the mouth the gradients steepen, and the stream flows in a steep-walled narrow valley in which there are a few small waterfalls. Near the mouth, the stream flows in a flat-bottomed valley cut through the narrow limestone plateau.

During dry weather, water discharging from marshy areas in the upper part of the basin makes up a large part of the base flow of the stream. The marsh water commonly has a red color caused by suspended material.

The flow of the Pauliluc River is gaged at a point about 20 feet above sea level and a third of a mile upstream from the mouth. The drainage area above the gaging station (10-9) is about 1.9 square miles. The average discharge of the stream during the 5-year period ending in 1958 was 5.4 cfs, and the range in daily discharge was from 0.23 to 1,080 cfs.

Talofofu River System: The Talofofu River system is the largest in Guam and drains an area of about 21 square miles in the central part of the southern half of the island. The name "Talofofu River" applies to that part of the main stem downstream from the confluence of the Mahlac and Maagas Rivers. A large tributary, the Ugum River, which enters the Talofofu River about a mile from the mouth, is described separately.

The area drained by the system is underlain largely by volcanic rocks and noncalcareous sediments, which are deeply weathered. On the north side of the basin, Talisay, Maemong, Bonya, and Tolaeyuus Rivers flow across limestone terranes, and short sections of the Maemong and Tolaeyuus Rivers flow underground in caverns in the limestone. Limestone occurs as caps on hills on the west side of the basin and forms steep valley walls in the lower reach of the Talofofu River. Alluvium occupies long stretches of the valley floors of the main stem and the larger tributaries.

The alluvial valley floors and the limestone terranes are covered by dense jungle vegetation. Grasses and scattered shrubs cover the areas underlain by volcanic rocks and associated noncalcareous sediments.

The flow of the Talofofu River is gaged just below the confluence of the Maagas and Mahlac Rivers (10-1). Stream-gaging stations on tributaries to the Talofofu River are located as follows: on the small stream below Almagosa Springs (10-2); on the Tolaeyuus River just below the confluence of the Bonya and Maemong Rivers (10-3); and at the spillway of the Fena Valley Reservoir (10-4). The average discharge of the Talofofu River at station 10-1 was 50.2 cfs during the 6-year period between 1952 and 1958. The daily discharge ranged from 0.85 to 4,360 cfs during that period. The measured flow at station 10-1 does not include water diverted into water-supply systems at points upstream.

A dam across the main valley a short distance above the confluence of the Tolaeyuus and Maagas Rivers forms the Fena Valley Reservoir with a capacity of about 2,000 million gallons. The reservoir is capable of supplying about 8 mgd to the Navy water system in south Guam. The flow from Almagosa Springs (1), on the west side of the basin above the reservoir, is diverted into the Navy water system and supplies about 1.5 mgd. The flow from Bona Spring (114), at the head of Talisay River, supplies about 0.5 mgd to the Navy system.

Ugum River: The Ugum River, which joins the Talofofu River near the east shore of the island, drains an area of about 7 square miles. The basin is underlain generally with deeply weathered, consolidated, non-calcareous sediments derived from volcanic rocks, except along the lower reach of the stream where valley flats are underlain by alluvium. Garden crops, coconut trees, and jungle growth cover the alluvial flats; grass is the principal cover over the rest of the basin.

The flow of the Ugum River is gaged at a station (10-5) near its confluence with the Talofofu River. During the 6-year period from 1952 to 1958, the average discharge of the Ugum River was 28.0 cfs, and the daily discharge ranged from 3.85 to 1,380 cfs.

Ylig River: The Ylig River basin is about 5 miles long and, at the broadest part, 3 miles wide, and includes an area of about 9.6 square miles. In the upper part of the basin, the stream and its tributaries flow on steep gradients across deeply weathered volcanic rock. In the lower part, the stream has cut a steep-walled valley across the narrow limestone plateau that lies along the east coast of the island. Here the stream has a gentle gradient and flows in a narrow valley flat underlain by alluvium.

The discharge of the stream is measured at a point about 2 miles upstream from the mouth and about 20 feet above sea level. The drainage area above the gaging station (10-6) is about 6.6 square miles. The average discharge during the 6-year period ending in 1958 was 23 cfs, and the daily discharge during the period ranged from 0.28 to 2,050 cfs.

In the lower part of the valley near the mouth, small basal springs flow from the limestone into the stream. Much of this spring water is brackish because of mixing with the sea water.

The river is a source of domestic water for the villages of Talofofu, Yona, and Camp Witek. Water is pumped from the stream at a point about 1.5 miles upstream from the mouth at rates of 100,000 to 120,000 gpd.

Pago River System: The Pago River system is made up of the main stem of the Pago River and two principal branches, the Lonfit and Sigua Rivers, which join to form the Pago about 2.5 miles upstream from the mouth at

Pago Bay. The area drained by the system is about 8.8 square miles. The Lonfit and Sigua Rivers flow in mountainous to rolling terrain that is underlain mostly by deeply weathered volcanic rock. The north slope of the Pago River valley is in limestone; the south slope is in volcanic rock, except at the coast where the river has cut through the narrow limestone plateau. Below the confluence of the Lonfit and Sigua Rivers, the stream channel is in a valley flat underlain by alluvium. Near the mouth, some brackish water flows into the stream from small springs in limestone.

Streamflow is gaged on the Lonfit River (10-8) just upstream from the confluence with the Sigua River and on the Pago River (10-7) just below the confluence. The average discharge past the Lonfit River gage, which measures the runoff from 3.1 square miles, was 10.6 cfs during the 6-year period from 1952 to 1958. The daily discharge ranged from 0.03 to 1,200 cfs. The drainage area above the Pago River gaging station, which is made up of the basins of the Lonfit and Sigua Rivers, is 6.2 square miles. The average discharge at the Pago River gage during the 6-year period was 22.6 cfs; the range in daily discharge was from 0.10 to 2,540 cfs.

Ground Water

In northern Guam, the major water supply is in the basal ground-water body, which lies near sea level over a wide area in the highly permeable limestone. The upper part of the basal water body is a lens of fresh to brackish water that floats in and displaces the slightly heavier sea water saturating the rock below sea level. This lens is maintained by recharge from rainfall, which moves downward through openings in the limestone to the water table. The water table forms a low dome that stands 5 to 7 feet above sea level in the central part of the area and slopes gradually to sea level at the shore.

Because of the difference between the specific gravities of fresh and salt water, the fresh-water lens has a theoretical depth below sea level equal to about 40 times the height of the fresh water table above sea level. However, the actual thickness of the fresh water is always less than the theoretical thickness of the lens because of a transition zone between fresh and salt water at the bottom of the lens. This transition zone is produced by mixing of fresh and sea water, which occurs largely as the result of tidal movement in the ground water. In the highly permeable limestone of northern Guam, the transition zone occupies a considerable part of the theoretical thickness of the fresh lens, and in large areas near the shore, where tidal fluctuations are greatest, it extends up to the water table and makes the whole lens brackish.

The recharge of fresh water occurs intermittently over the whole lens, mainly during the wet seasons. Natural discharge of the water takes place continuously into the sea in a narrow zone along the shore. Because of mixing with sea water, most of the water discharging at the shore is brackish (fig. 3).

Ground water may be developed readily in the limestone of northern Guam in wells drilled to about sea level. In many areas, however, the water is brackish to saline, and in others, where the water is fresh, pumping commonly causes the encroachment of sea water.

In southern Guam the volcanic rock and noncalcareous sediments contain large amounts of ground water, but the permeability of these

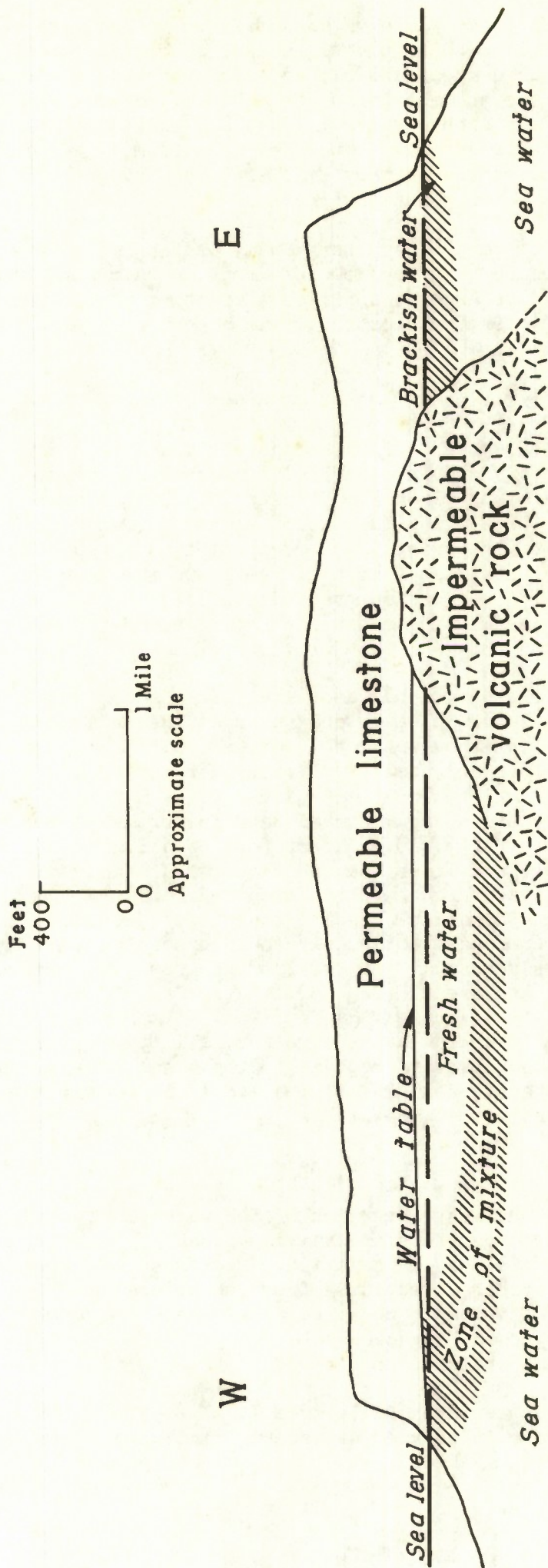


Figure 3.--Schematic section showing occurrence of basal ground water in northern Guam

materials is low and they yield water slowly to wells. The water table is an irregular surface that commonly stands several hundred feet above sea level under upland areas and slopes steeply toward lowlands in valleys and along the shore. Because of the low permeability of the rock, recharge of the ground water is low, and most of the rainfall on southern Guam runs off quickly to the sea in streams. Natural discharge of the ground water occurs at many small springs and seeps that flow into streams or into the sea along the shore.

In the interior part of southern Guam, beds of limestone that overlie or are interbedded with the volcanic rock contain small amounts of ground water that discharge at springs. Limestone in coastal areas contain basal ground water, but most of it is brackish.

Ground-Water Areas

On the basis of known or inferred geologic and ground-water conditions, Guam may be divided into several ground-water areas, which are outlined in figure 4 and plate 1. Descriptions of the areas that follow give estimates of the availability and the quantity and quality of ground water and outline briefly the development of ground water. The locations of the boundaries of most of the areas are approximate. In some areas a lack of information precludes precise definition, and in some parts of the island the transition from one area to another is gradual.

Descriptions of the ground-water areas are based largely on information that is available on wells and springs. Records of wells and springs in Guam, which show data on locations, altitudes, depths, casing logs, pumpage and flow and quality of water, are given in Appendix B.

Area 1: Area 1 forms a sharply curved band in north-central Guam, which almost encloses area 7 (pl. 1). Except for a small area of the Mariana limestone, the Barrigada limestone underlies area 1 and probably extends to and below sea level throughout the area. Relatively impermeable rocks of the Alutom formation underlie the limestone. The contact between the limestone and the volcanic rocks probably is an irregular surface that slopes generally outward from the roughly circular boundary between area 1 and area 7 (fig. 5).

The limestone in the area has high permeability, and a large part of the rainfall moves downward rapidly to the basal water table, which stands 5 to 7 feet above sea level. The limestone yields water readily to wells drilled below the water table.

The comparative remoteness of the area from the shore and the presence of relatively impermeable volcanic rocks beneath the limestone apparently prevent the easy intrusion of sea water into the basal water. The ground water is, therefore, relatively fresh, containing less than 100 ppm (parts per million) of chloride. The freshness is maintained also by augmented recharge resulting from subsurface runoff of ground water from a mass of volcanic rock that lies above sea level in area 7. Wells pumped at rates as high as about 200 gpm (gallons per minute) yield water having a chloride content of 30 to 80 ppm.

Ten wells have been drilled in area 1. In 1957 the pumpage from the 5 wells that were in service was about 1 mgd. An estimated 3 to 4 mgd is available in the area.

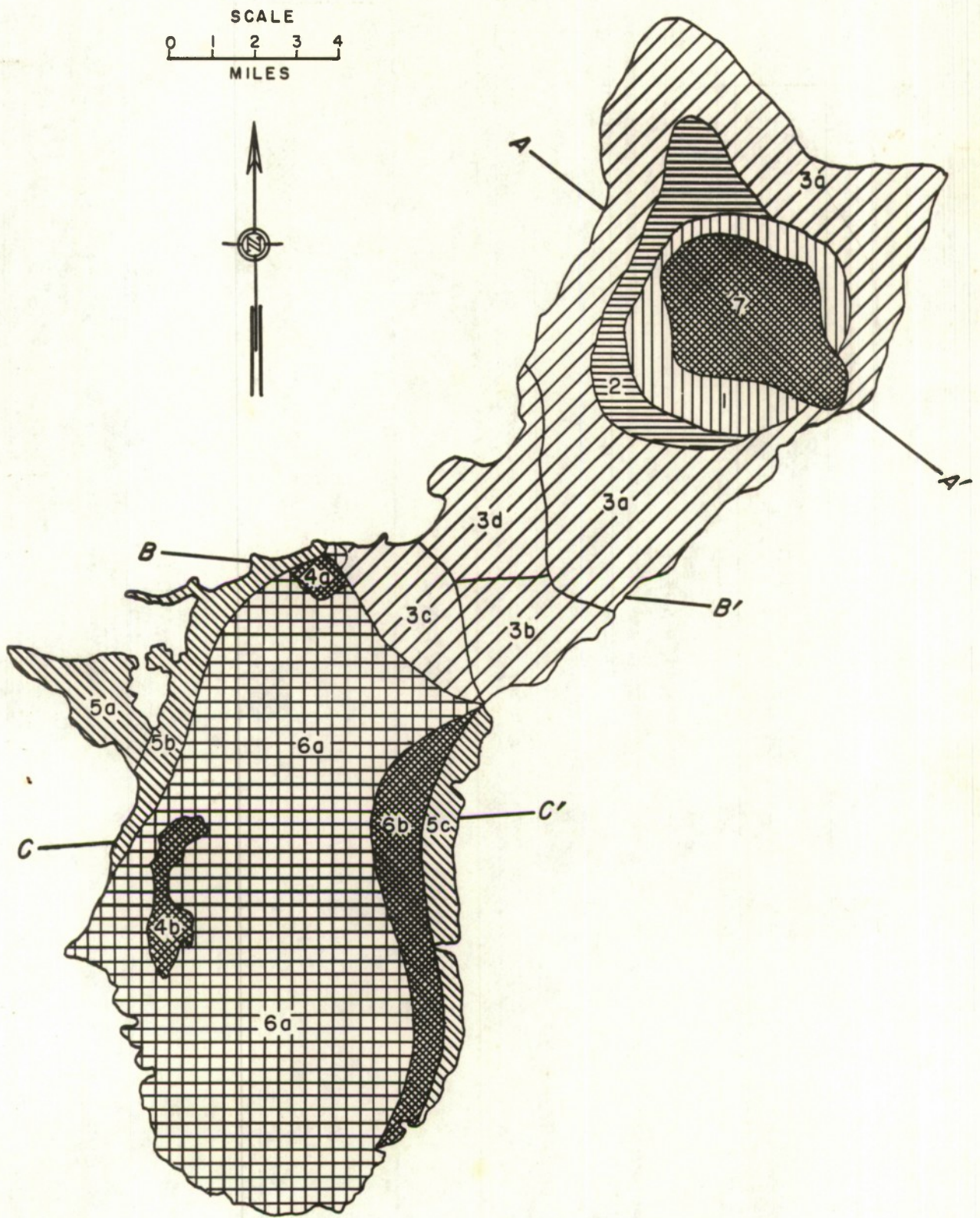
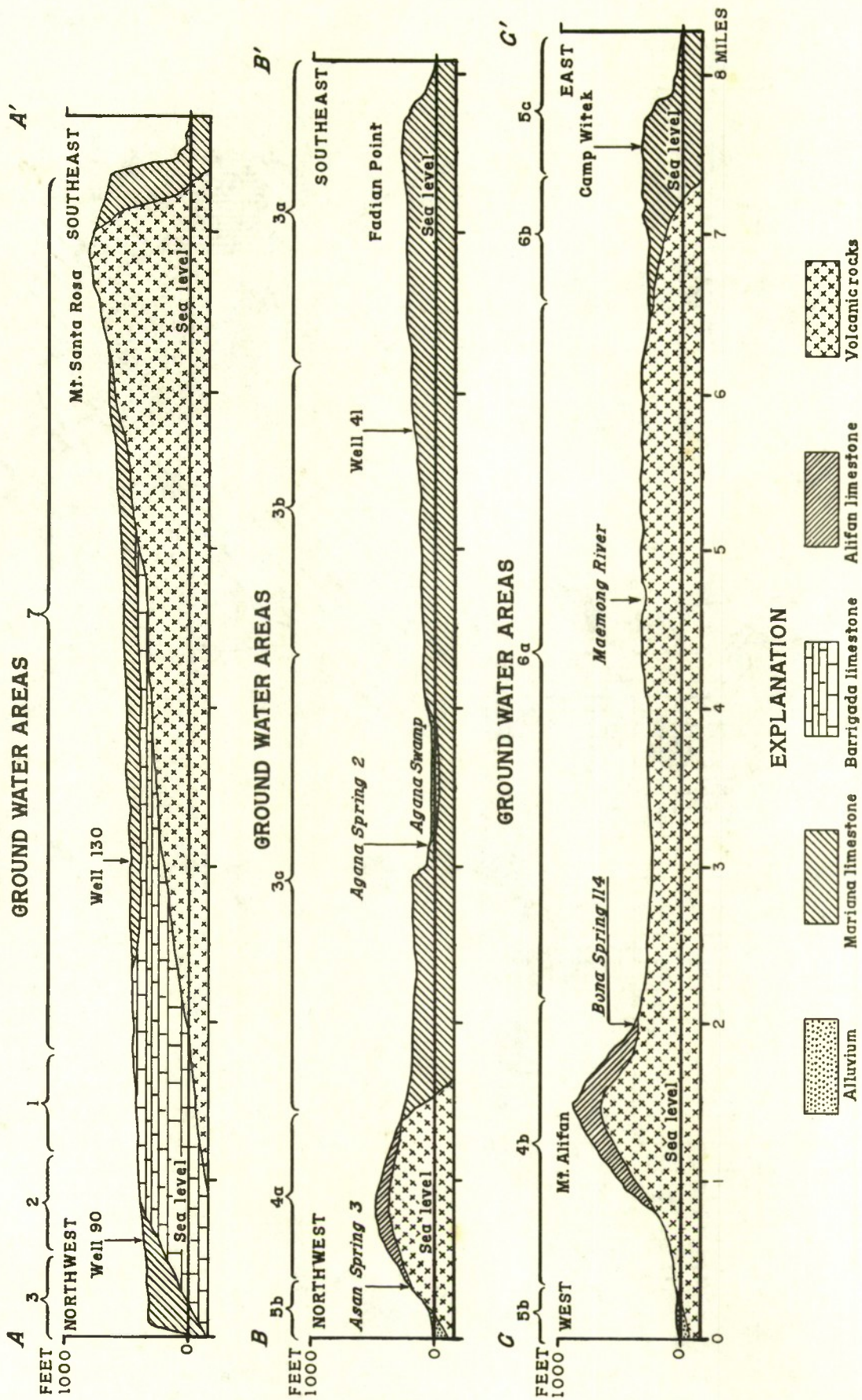


Figure 4.--Map showing ground-water areas in Guam and the locations of geologic sections shown in figure 5.

Figure 5.--Geologic sections in the ground-water areas in Guam. Locations of the sections are shown in figure 4.



Area 2: Area 2 is a crescent-shaped strip lying on the west and north-west side of area 1. The rocks at the surface are the Mariana and Barrigada limestones, but at and below sea level the rock probably is the Barrigada limestone. Volcanic rocks of the Alutom formation underlie the limestone at unknown depths below sea level. Basal ground water standing 3 to 7 feet above sea level is present throughout the area. The permeability of the water-bearing limestone is high.

Sea-water intrusion apparently can occur throughout the area, but the salinity of the basal water generally is low. Most wells will yield as much as 200 gpm of water having a chloride content less than about 250 ppm. Higher pumping rates probably would cause the chloride content to rise above 250 ppm in many wells.

Nine wells have been drilled in the area. In 1957 pumpage from 7 wells in use totaled about half a million gallons a day. It is estimated that 2.5 to 3.5 mgd of water having a chloride content less than 250 ppm can be pumped in the area.

Area 3: That part of Guam lying north of a line across the island between Pago Bay and Adelup Point, except for the smaller parts occupied by areas 1, 2, and 7, makes up area 3. The area is underlain by the Mariana and Barrigada limestones, which extend below sea level and contain basal ground water. Area 3 is divided into four subareas.

Subarea 3a.--This subarea forms a coastal band around the northern part of the island and occupies a broad segment in the part north of the narrow waist of the island. The rock at the surface is largely the Mariana limestone, but at and below sea level the rock is mostly the Barrigada limestone. On the eastern side of the island in a part of the subarea between Pagat and Mati Points, the contact between the limestone and underlying volcanic rocks probably is only a few feet below sea level and may be above sea level in places. The limestone at sea level has high permeability and contains basal ground water standing 1 to 5 feet above sea level.

The chloride content of basal water from wells in subarea 3a ranges from about 30 to 1,400 ppm. The most saline ground water commonly is near the shore, where the chloride content of water in wells usually increases during pumping. An exceptional condition exists in a small area on the eastern side of the island, where the low salinity of the water flowing at the shore from Janum Spring (96) indicates that local geologic conditions prevent the intrusion of sea water into and mixing with the fresh basal water. The chloride content of the water is about 30 ppm, and the flow ranges between approximately 1 and 2 mgd. The limestone aquifer at Janum Spring probably is underlain at a shallow depth below sea level by relatively impermeable volcanic rocks.

One basal tunnel and about 25 wells have been constructed in subarea 3a; in 1957 the tunnel and 5 of the wells were in use. The tunnel (80), which is on the west coast near Tumon Bay, is about 1,000 feet long and has supplied about 1 mgd to the Air Force water system in the north end of the island. The chloride content of water from the tunnel ranges from 80 to 140 ppm. The 5 drilled wells have supplied about 1.4 million gallons of water a day having a chloride content ranging from 130 to 500 ppm. Several near-shore caverns in the limestone, which extend below the water table, have been used as sources of water. The water in most of the caverns has high salinity and has been used only for emergency supplies. Tarague Spring 4 (109) at the northern end of the island yields water containing 350 to 830 ppm of chloride at pumping

rates of about 1.5 mgd and has been a source of water in the Air Force system since about 1947.

The total pumpage of ground water in subarea 3a in 1957 was about 4 mgd. Probably an additional 2 mgd can be obtained in drilled wells in the southern part of the subarea near the boundaries of areas 1 and 2. Because of its low salinity and large flow, the Janum Spring (96) appears to be a good source of water, but an expensive installation would be required to lift the water 500 feet up the cliff that stands above the spring. Wells drilled inland from the spring might intercept the ground-water supply, but considerable exploratory drilling might be needed to find the best locations for wells.

Subarea 3b:--This subarea, which lies on the southeast side of the waist of the island, is underlain by Mariana limestone containing basal ground water that stands 1 to 5 feet above sea level. The ground water undisturbed by pumping has a chloride content ranging from 30 to 400 ppm, but in most wells the chloride content rises sharply when the pumping rate is greater than about 50 gpm. Two to fivefold increases in chloride content are common when wells are pumped at rates as high as 100 gpm.

Seventeen wells have been drilled in subarea 3b. In 1957 the total pumpage from 5 wells in service was about 1.5 mgd, containing 400 to 1,200 ppm of chloride. It is estimated that an additional 1 mgd of water having a similar range in quality can be obtained if the pumpage is spread among new wells or unused wells.

Subarea 3c:--A strip across the waist of the island between Pago Bay and Agana forms subarea 3c. It is underlain by the Mariana limestone, which abuts against the volcanic rocks of the Alutom formation along much of the southwest boundary. The basal water table in the limestone ranges from about 1 foot above sea level near the shore to more than 20 feet in the interior part of the subarea. The high water table probably is caused by low permeability resulting from clayey material in the limestone. The chloride content of the water is low, generally less than about 40 ppm.

One well and several test holes have been drilled in the subarea, but none have been pumped as a source of water. Agana Spring (2) near the west coast has been an important source of water in central Guam for many years. The flow of the spring has not been measured, but pumpage into the island water system between 1951 and 1957 ranged from 0.5 to 2.5 mgd and averaged about 1.5 mgd.

Subarea 3d:--This subarea, on the west side of the waist of the island, is underlain by the Mariana limestone, which contains basal ground water standing 1 to 4 feet above sea level. The chloride content of water undisturbed by pumping ranges from about 30 to 1,300 ppm. A few wells yield water containing less than 200 ppm of chloride, but most wells yield water containing 400 to 700 ppm, and in some the chloride content is more than 1,000 ppm.

At least 37 drilled and dug wells are in the area, most of which were constructed in 1944 and 1945 by military forces. Pumpage from the wells in 1944 was about 0.3 mgd, in 1945 about 1.1 mgd, and in 1946 about 1.3 mgd. Most of the water had a chloride content of more than 500 ppm, and the wells were largely abandoned after 1946, when the demand for troop use declined and sources of fresher water became adequate.

The ACEORP basal tunnel (79) at Tamuning was constructed in 1947 by the U. S. Navy as a source of water in central Guam. In 1947 and 1948, the tunnel was pumped at rates ranging from 0.3 to 1.1 mgd and produced water containing 400 to 600 ppm of chloride. In 1957 the tunnel was not in use but was maintained as a standby source of water.

It is estimated that 1 mgd, having a chloride content of about 500 ppm, is available in subarea 3d.

Area 4: Water-bearing limestone that forms caps on hills of volcanic rock in the south half of Guam constitutes area 4. The limestone has high permeability, and a large part of the precipitation on the area moves quickly downward to the contact with the less permeable volcanic rock and along it to high-level seeps and springs that discharge at the edges of the limestone caps. The flow from the seeps and springs fluctuates through a wide range, being large during rainy seasons and small during dry seasons.

Subarea 4a.--A limestone cap covering half a square mile in the Nimitz Hill area makes up subarea 4a. Seeps along the south and southwest edges of the cap contribute to the flow of the Fonte and Asan Rivers. Asan Spring (3), on the northwest side, which supplies water to Asan village, has a recorded flow ranging from 0.1 to 0.8 mgd. Maina Spring (27), on the northeast side, supplies .007 to .03 mgd to Maina village. The average discharge of ground water from the subarea probably is about 0.25 mgd, but most of the flow is during the rainy seasons, and the flow in dry seasons probably is frequently less than .05 mgd.

Subarea 4b.--The limestone cap covering about $2\frac{1}{2}$ square miles on the ridge between Mt. Alifan and Mt. Lamlam forms subarea 4b. High-level ground water in the limestone discharges at numerous seeps and several springs around the periphery of the cap and contributes to the flow of small streams on the flanks of the ridge.

Almagosa Springs (1), on the east side of subarea 4b, has an average discharge of more than 2 mgd, but during dry seasons the flow drops occasionally to less than 0.5 mgd. Water from these springs has been pumped into the Navy system at rates ranging from 0.3 to 2.5 mgd. Bona Spring (114), also on the east side of the subarea, has an average flow of 1 to 2 mgd and has occasionally supplied 0.5 to 1.2 mgd to the Navy water system. Faata (20), Auau (151), and Mao (152) Springs, discharging from the limestone on the west side of the subarea, have a combined flow of about 0.3 mgd.

Area 5: Area 5 is made up of narrow bands along the west and east shores of the south half of the island, which are underlain by the Mariana limestone, alluvium, beach deposits, and artificial fill containing basal ground water. The water in the limestone is mostly brackish. Locally the alluvium, beach deposits, and fill contain meager amounts of fresh water.

Subarea 5a.--Orote Peninsula forms subarea 5a. It is underlain by limestone, which on the low northwest side is covered by a veneer of alluvium and artificial fill. Basal ground water having high salinity occurs in the limestone. In places the less permeable alluvium and fill contain meager supplies of basal water having a chloride content less than 250 ppm. The water from a few wells in the limestone has been used for cooling or for other purposes that did not require fresh water.

Subarea 5b.--A narrow strip underlain by limestone, alluvium, and beach deposits along the west coast of the island between Asan and Agat villages forms subarea 5b. Wells in the limestone and beach deposits have been reported as yielding supplies ranging from .01 to 0.1 mgd, but the chloride content of the water was 500 to more than 1,000 ppm. The alluvium contains water having a chloride content commonly less than 100 ppm, but wells in the alluvium generally yield only meager amounts of water.

Subarea 5c.--This subarea is a narrow band along the east side of the island between Pago Bay and Inarajan, which is underlain by limestone and discontinuous beach deposits containing basal ground water. Meager supplies of water having a chloride content less than 500 ppm may be available in wells dug near the inland edge of beach deposits. Most of the water in the limestone has a chloride content greater than 500 ppm.

Area 6: Area 6 occupies most of southern Guam. It is underlain by volcanic rock, and noncalcareous sediments derived from the volcanic rock, that have low permeability and are poor aquifers, and by permeable limestone containing only meager to small quantities of ground water. The area is divided into two subareas.

Subarea 6a.--The rocks of subarea 6a are mostly lava flows, pyroclastic materials, and noncalcareous sedimentary deposits. The northern part of the subarea is underlain by tuffaceous shale and sandstone, conglomerate, and lava flows of the Alutom formation, and clayey gravel and conglomerate of the Talisay formation. In the southern part the rocks are lava flows, tuffaceous shale and sandstone, conglomerate, and scattered lenticular limestone beds that constitute the Umatac formation. Small patches of the Bonya limestone overlie the noncalcareous rock in the central part of the subarea. Thin deposits of unconsolidated alluvium underlie valley flats, and discontinuous beach deposits of calcareous sand and gravel lie along the shore.

The volcanic rock and noncalcareous sedimentary deposits are thoroughly weathered to depths of 50 feet or more in much of the area. All the rock, both fresh and weathered, has low permeability.

Because of the low permeability of the rock, the water table has high relief, standing high under the uplands and sloping steeply toward lowlands in valleys and along the shore. Water levels that have been measured in test holes and wells range from about a foot to more than 400 feet above sea level. Locally, ground water under artesian pressure is found in rock that is confined by less permeable beds.

Although thick sections of the volcanic rock and noncalcareous sediments are saturated with ground water, the low permeability of these materials causes wells in subarea 6a to draw down excessively during pumping. The following tabulation shows pumping rates and drawdown that are representative of the wells in the subarea. Locations of wells are shown on plate 1.

Well No.	Pumping rate (gpm)	Drawdown (ft)	Specific capacity (gpm per ft)	Water-bearing rock (from driller's logs)
208	133	131	1.0	Tuff
210	90	260	.3	Tuff, basalt
212	145	180	.8	Basalt
213	86	91	.9	Tuff, basalt
216	15	11	1.4	Agglomerate

The figures shown above are based on the results of short pumping tests, and they do not show the decline of water levels that would result as ground water stored in the rock is depleted during prolonged pumping.

Locally, the weathered rock is slightly more permeable than the underlying fresh rock. In upland flats and in poorly drained areas, the weathered rock commonly contains ground water that discharges at seeps and flows into streams or marshes. Shallow wells dug into weathered rock containing water will produce a few hundred to a few thousand gallons of water a day, but no large supplies are available.

Limestone lying on and interbedded with the volcanic rock and non-calcareous sediments generally has relatively high permeability, but the areas of limestone are small and scattered, and the amount of water available in this rock at any locality is small. Ground water is contained in some of the small areas of the Bonya limestone, which overlies the volcanic rock in the central part of subarea 6a. Test wells 204 and 214 in the valley of the Talofofu River found water in limestone in which the water table is about 18 feet above sea level. The limestone penetrated by these wells extends below sea level, and in well 204 the water contains nearly 800 ppm of chloride. Springs and seeps discharge from some limestone lenses that are interbedded in the volcanic rock. The measured flow of the largest of these springs ranges from 25 to 65 gpm, and probably all the springs have wide seasonal fluctuations in flow.

The water table commonly stands a few feet below the surface of the ground in alluvial fill under the bottoms of valleys, but the alluvium has low permeability and it yields water slowly to wells. Alluvial deposits at the coast may contain only saline water.

Most of the calcareous beach deposits have high permeability, but the ground water is mostly saline.

No large supplies of ground water have been developed in subarea 6a. The greatest recorded pumping rate was from well 209, which reportedly yielded 90 gpm during the dry seasons of 1948, 1949, and 1950. All other drilled wells apparently were abandoned because of large drawdown at pumping rates that ranged from 15 to 145 gpm. A few shallow wells dug in weathered rock have been used for local domestic supply, and one dug well (93) has supplied small amounts of water for the dry-season irrigation of garden crops. A few springs provide domestic supplies for villages. The flow of Piga Spring (94) is piped to Umatac, where it supplies about 16,000 gpd, and Siligin Spring (141) supplements the water supply at Merizo at the rate of about 10,000 gpd.

Ground water can be found in deep wells drilled in all parts of subarea 6a, but, because of the low permeability of the rock, a large number of wells probably would be required to obtain a moderate to large supply of water. The specific capacities of wells drilled in the volcanic rock and noncalcareous sediments range from 0.3 to 1.4 gpm per foot of drawdown (p. 24). Based on these figures, and if the maximum initial drawdown in each well during pumping were held at 100 feet, the production of 1 mgd (about 700 gpm) would require the drilling and continuous pumping of between 5 and 23 wells.

Ground water above sea level in the rocks of subarea 6a is fresh, but in some places wells extending below sea level may enter saline water. Well 204, which extended about 70 feet below sea level in

limestone, yielded water having 500 to 780 ppm of chloride, and well 215, which penetrated volcanic rock, yielded water having 1,100 to 1,500 ppm of chloride at 90 to 115 feet below sea level. These wells are nearly 3 miles from the shore, and water levels in them are 11 to 19 feet above sea level. It is possible, therefore, that the high salinity is due to ancient sea water or connate water that has not yet been flushed out by the slow circulation of fresh ground water in the poorly permeable rock. Saline water may occur at similar depths below sea level in other interior parts of the subarea.

Subarea 6b.--Subarea 6b forms a long, narrow band, which lies a short distance inland from the east shore of the island between Pago Bay and Inarajan. It is underlain by the permeable Mariana limestone, which rests upon an eastward-dipping eroded surface of volcanic rock and non-calcareous sediments. Precipitation on the limestone moves quickly downward to the surface of the relatively impermeable volcanic rock and then down the slope of the surface into the basal ground-water body of subarea 5c. Ground water in the limestone probably is in only meager quantities in small bodies perched on the volcanic rock.

At least two wells, 21 and 134, have been drilled in the subarea. Well 21 entered weathered volcanic rock at 47 feet above sea level and was reported to be dry. No records are available for well 134, and it is presumed to be dry. The water table in the volcanic rock and non-calcareous sediments beneath the limestone probably stands high, but the permeability of these materials is low.

Area 7: Area 7 covers a crudely circular area of about 13 square miles in northern Guam. The rocks at the surface are mainly the Mariana and Barrigada limestones, which are cut by numerous openings formed by solution. Beneath the limestone lie the volcanic rock and noncalcareous sediments of the Alutom formation, which project through the limestone at Mt. Santa Rosa and Mataguac Hill. The top of the Alutom formation under the limestone is an irregular eroded surface that slopes generally away from high points at Mataguac Hill and Mt. Santa Rosa. Throughout the area, the surface of the Alutom formation probably is above sea level and about the basal water table of the surrounding areas. The slope of the buried surface is variable and in places probably is as steep as 1,000 feet per mile.

Rainfall on the limestone of area 7 moves rapidly downward to the surface of the relatively impermeable volcanic rock. Some water may be impounded in depressions in the impermeable rock, but most of it moves down the slopes to basal water bodies in the adjacent areas 1 and 3a. The flow of Janum Spring (96) in subarea 3a possibly is supplied largely by underground runoff from the impermeable slopes under the limestone of area 7.

Four wells have been drilled completely through the limestone in area 7. Three were dry and one (well 55) yielded so little water that it was abandoned. No place in the area appears favorable for the development of ground water in limestone, but test drilling on a closely spaced pattern of holes would be needed to determine the availability of water.

A few small springs flow from the volcanic rock on the slopes of Mt. Santa Rosa and Mataguac Hill. Santa Rosa Spring (76), which issues from tuffaceous sandstone, reported fluctuates in discharge between 1,000 and 85,000 gpd, depending on the rainfall. In 1945 and 1946 the spring supplied 1,800 to 4,500 gpd to military units. Chunge Spring (127), also on Mt. Santa Rosa, is much smaller and probably has a

maximum flow of about 10,000 gpd and a minimum of less than 1,000 gpd. Mataguac Spring (58) flows from fragmental volcanic rock on the east slope of Mataguac Hill. In 1945 and 1946 this spring reported supplied water at rates ranging from 1,000 to 18,000 gpd.

The volcanic rock and noncalcareous sediments under area 7 have low permeability, and wells drilled in them would have large drawdown.

Methods of Development of Ground Water

Basal ground water in limestone: The drilled well is the most common method of developing ground water in Guam, and more than 100 wells have been drilled on the island, mainly in basal ground-water areas in the limestone of northern Guam. Most of the wells were drilled with percussion (cable-tool) drilling machines. Casing in the wells ranges in diameter from 6 to 14 inches. In most wells the casing extends to the bottom of the hole and is perforated below the water table with slots an eighth of an inch or more in width. In consolidated limestone, the perforated casing generally is satisfactory, but locally the limestone contains lenses of calcareous sand that is fine enough to pass through the slots and enter the well.

Advantages of the drilled well are speed and economy of installation and relative simplicity of design and operation. In some basal ground-water areas, the drilled well has the disadvantage of penetrating so deep into the fresh-water lens that it causes rapid encroachment of sea water during pumping. Saline-water encroachment is inevitable whenever a well is pumped, but in some wells it can be kept at a reasonable level by control of the pattern and rate of pumping. In yielding a given amount of water, intermittent pumping at a high rate causes greater saline encroachment than continuous pumping at a low rate. Experimentation, during which the salinity of the water is observed at various pumping rates, is the best method of determining the optimum rate.

Two basal tunnels have been constructed in Guam, the ACEORP tunnel (79) and the Tumon tunnel (80), which tap basal ground water in northern Guam. This type of development in basal water is superior to the drilled well in having only shallow penetration into the fresh-water lens and the ability to yield a maximum amount of water with a minimum of sea-water encroachment. Its great disadvantage is the high cost of construction.

A basal-tunnel installation consists of a shaft excavated from the ground surface to the water table and one or more horizontal tunnels at about sea level extending from the bottom of the shaft. Pumps are installed at the bottom of the shaft in a sump into which water flows over a weir from each tunnel. The pump sump should have a watertight lining, and weirs should be adjustable so that the drawdown in the tunnels can be controlled. In Guam the floor of a tunnel should not be below the level of mean lower low water.

Basal ground-water supplies in some lowland areas have been developed in shallow wells dug in limestone, beach deposits, or alluvium. The advantage of the dug well in the lowlands is the ease with which it can be constructed. However, most areas in which the digging of shallow wells is practicable lie near the shore, where the basal water is brackish or where pumping even at low rates causes saline-water encroachment.

Ground water in volcanic rock: Because of the generally low permeability of the volcanic rock and noncalcareous sediments, ground water in them

has not been developed on a large scale. Drilled wells probably are the quickest and cheapest means of developing the water, but their yields are low, and the low permeability requires that a well have considerable depth below the water table to accommodate large drawdown during pumping.

In some volcanic islands horizontal tunnels are used successfully to tap ground water that is impounded in moderately to highly permeable rocks by dikes or other structures. In Guam, however, it appears unlikely that this method could be used to develop large amounts of water at a reasonable cost in the volcanic rock and associated sediments. Because of the uniformly low permeability of these materials, long tunnels or complex systems of tunnels and vertical wells probably would be needed to develop daily flows of a million gallons or more. Properly designed short tunnels at some springs and seepage zones might be useful in channeling and recovering the total daily flow for beneficial use, but such structures would not regulate or increase the discharge.

Chemical Analyses of Water

Chemical analyses of water from 24 sources in Guam are given in table 2. The analyses data include: 7 samples of surface water from 6 streams and 1 reservoir in southern Guam; 6 samples of ground water from 2 high-level springs and 3 basal springs; and 12 of ground water from wells in northern Guam.

The samples from streams were collected at times of low to moderate flow, and the dissolved-solids contents shown in the table probably are representative of low-flow water in the streams. The Almagosa and Mataguac Springs discharge from high-level aquifers, and the quality of the water that flows from them probably does not vary greatly from that shown by the analyses. The Agana and Janum Springs discharge from basal aquifers, but the water apparently does not have large fluctuations in dissolved-solids content. The basal aquifers that supply water to Tarague Spring 4 and the 12 wells listed in table 2 in northern Guam are subject to the intrusion of sea water. At times, therefore, the quality of the water from these sources may depart considerably from that shown in the analyses, owing to sea-water intrusion that results from heavy pumping and seasonal changes in recharge.

The dates shown in table 2 are the dates that the water samples were collected. After the term "analyst" the initials indicate the government agency that performed the chemical analyses. The analyses labeled "USGS" were made by the Quality of Water Branch of the U. S. Geological Survey, and those labeled "USN" were made by the U. S. Navy in Guam.

Table 2.--Chemical analyses of water, Guam
(Results in parts per million)

Source	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Date	12-30-52	7-11-57	6-16-57	12-29-52	12-30-52	6-11-57	12-29-52	12-29-52
Analyst	USGS	USN	USN	USGS	USGS	USN	USGS	USGS
Silica (SiO ₂)	40	25	54	15	30	25	33	7.1
Aluminum (Al)	-	.0	.0	-	-	.0	-	-
Iron (Fe)	.04	.40	.35	.01	.99	.00	.03	.19
Calcium (Ca)	48	17	18	27	7.2	62	40	49
Magnesium (Mg)	11	5.4	2.4	5.5	6.6	3.9	7.8	2.7
Sodium (Na)	24	22.1	24.1	9.4	11	26.1	14	7.8
Potassium (K)	3.0	-	-	3.2	2.5	-	1.5	.8
Bicarbonate (HCO ₃)	243	95	80	122	60	237	176	158
Sulfate (SO ₄)	2.6	4.1	3.0	1.1	1.5	.0	1.6	2.0
Chloride (Cl)	14	22	28	10	13	24	12	12
Phosphate (PO ₄)	-	.2	-	-	-	-	-	-
Dissolved solids (Residue on evaporation at 180°C)	262	160	160	135	105	240	199	168
Hardness as CaCO ₃ (Calcium, magnesium)	165	64	56	90	45	172	132	133
pH	7.8	7.6	7.2	7.5	7.4	7.9	7.7	7.7

1. Umatac River near gaging station (10-11).
2. Inarajan River near gaging station (10-10).
3. Pauliluc River near gaging station (10-9).
4. Fena Reservoir near gaging station (10-4).
5. Ugum River near gaging station (10-5).
6. Ylig River 1½ mile upstream from Ylig Bay.
7. Pago River near gaging station (10-7).
8. Almagosa Springs(1).

1/ Calculated as sodium plus potassium and expressed as sodium.

Table 2.--Chemical analyses of water, Guam (continued)
(Results in parts per million)

Source	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Date	1-16-51	12-12-56	5-12-52	6-13-56	5-2-52	2-19-53	1-31-56	5-14-52
Analyst	USN	USN	USGS	USN	USGS	USN	USN	USGS
Silica (SiO ₂)	8.2	71	6.2	6.1	1.5	6.8	1.5	0.6
Aluminum (Al)	.0	.0	-	.2	-	.1	.1	-
Iron (Fe)	.02	.05	.05	-	.08	.12	.40	.03
Calcium (Ca)	101	36	63	60	92	90	76	77
Magnesium (Mg)	6.6	5	17	21	48	6.4	12	4.9
Sodium (Na)	26	281	12	191	380	45	401	19
Potassium (K)	2.4	-	.4	-	13	2.8	-	.6
Bicarbonate (HCO ₃)	388	171	272	284	238	281	298	232
Sulfate (SO ₄)	11	3.4	4.8	5.2	98	13.4	3.8	6.1
Chloride (Cl)	36	19	20	28	680	76	26	35
Phosphate (PO ₄)	-	.6	.0	.1	.1	.0	.1	.1
Dissolved solids (Residue on evaporation at 180°C)	389	226	244	248	1,470	476	318	267
Hardness as CaCO ₃ (Calcium, magnesium)	279	112	227	235	427	251	240	212
pH	7.4	7.5	7.3	7.2	7.5	7.3	7.9	7.5

9. Agana Spring (2).
 10. Mataguac Spring (58).
 11. Janum Spring (96).
 12. Janum Spring (96).
 13. Tarague Spring 4 (109).
 14. NAS Agana well 3 (24).
 15. MarBo well 3 (31).
 16. Northwest well 2 (33).

Table 2.--Chemical analyses of water, Guam (continued)
(Results in parts per million)

Source	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Date	12-7-56	1-16-51	1-31-56	1-31-56	1-31-56	5-14-52	1-31-56	1-31-56	1-31-56
Analyst	USN	USN	USN	USN	USN	USGS	USN	USN	USN
Silica (SiO ₂)	1.7	3.0	1.4	1.5	1.2	1.4	1.2	1.6	1.5
Aluminum (Al)	.04	.04	.05	.07	.1	-	.1	.1	.1
Iron (Fe)	.00	.10	.02	.01	.3	.04	.02	.03	.01
Calcium (Ca)	83	135	80	70	77	86	74	82	80
Magnesium (Mg)	16	40	27	10	13	34	14	11	36
Sodium (Na)	89	257	79	21	32	238	60	138	214
Potassium (K)	-	11	-	-	-	9.2	-	-	-
Bicarbonate (HCO ₃)	298	449	373	271	298	240	278	303	300
Sulfate (SO ₄)	19	62	7.2	3.7	6.1	60	8.6	25	52
Chloride (Cl)	143	455	118	25	43	431	90	192	360
Phosphate (PO ₄)	.3	-	.1	.2	.2	.1	.6	.1	.2
Dissolved solids (Residue on evaporation at 180°C)	490	1,343	414	204	200	1,040	364	602	998
Hardness as CaCO ₃ (Calcium, magnesium)	274	502	312	218	244	354	240	248	350
pH	7.6	7.6	7.7	7.8	8	7.4	7.7	7.7	7.8

17. North Field well 4 (75).
 18. ACEORP tunnel (79).
 19. Tumon tunnel (80).
 20. MarBo well 5 (83).
 21. MarBo well 1 (84).
 22. NCS well 1 (90).
 23. Northwest 4 (110).
 24. Harmon new well 3 (113).
 25. North Field well 5 (126).

$$\begin{array}{r} 238 \\ \sqrt{9.200} \\ \underline{9.52} \end{array}$$

$$\begin{array}{r} 310 \\ \sqrt{940} \\ \underline{340} \end{array}$$

$$\begin{array}{r} 79 \\ \sqrt{104} \\ \underline{316} \end{array}$$

GLOSSARY OF TERMS

- agglomerate - Pyroclastic rock containing a predominance of rounded or angular fragments greater than 32 mm in diameter.
- aquifer - A geologic formation, group of formations, or part of a formation that is water bearing.
- argillaceous - An adjective meaning clayey; applied to all rocks or substances composed of clay, or having a notable proportion of clay in their composition.
- artesian water - Ground water that is under sufficient pressure to rise above the level at which it is encountered by a well, but which does not necessarily rise to or above the ground surface.
- basal ground water - In islands, ground water occurring near sea level in aquifers that extend below sea level. Basal ground water may range from fresh to nearly as saline as sea water. Fresh basal water, because of its slightly lower density, forms a lenslike body floating on sea water in the aquifer.
- basal tunnel - A horizontal tunnel excavated near sea level for the development of fresh basal ground water. Also called a Maui-type well.
- base flow - The discharge entering stream channels from ground water or other delayed sources.
- calcareous - Composed of or containing calcium carbonate.
- drawdown - The lowering of the ground-water level by pumping or artesian flow.
- facies - A lithologic or biologic variation of rocks within a geologic formation.
- ground water - That part of subsurface water that is in the zone of saturation.
- permeability - The capacity of a rock or soil to allow the passage of water under the pressure ordinarily found in subsurface water.
- pyroclastic - A general term applied to detrital volcanic materials that have been explosively or aeriually ejected from a volcanic vent; also a general term for the class of rocks made up of these materials.
- recharge - The processes by which water is absorbed and is added to the zone of saturation. Used also to designate the quantity of water added to the zone of saturation.
- regulation - The artificial manipulation of the runoff of a stream or the discharge of a spring.
- runoff - The discharge of water through streams.
- salinity - The amount of solid material dissolved in water. The saltiness of water.

seep - A spot where water oozes slowly from the earth.

specific capacity - The discharge of a well expressed as rate of yield per unit of drawdown, generally gallons per minute per foot of drawdown.

spring - A place where, without the agency of man, water flows from a rock or soil onto the land or into a body of surface water.

tuff - An indurated rock of fine-grained fragmental material explosively ejected from a volcano.

tuffaceous - Characteristic of, containing, or resembling tuff.

water table - The upper surface of a zone of saturation except where that surface is formed by an impermeable rock.

zone of saturation - The zone in which permeable rocks are saturated with ground water under hydrostatic pressure.

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APPENDIX A

RECORDS OF FLOW OF STREAMS ON GUAM

This appendix contains records of daily flow of streams at 13 gaging stations on Guam during the period 1951 to 1958. Collection of the records was started by the Surface Water Branch, U. S. Geological Survey, as a part of the program of compilation of information on the military geology of the island, and since 1953 has continued under cooperative agreements between the Geological Survey and the Government of Guam.

Records are given for stations shown in the following list. Numbers in parenthesis after the station names refer to the symbols on plate 1 showing the locations of the gaging stations.

La Sa Fua River near Umatac (10-12)
Umatac River at Umatac (10-11)
Geus River near Merizo (10-13)
Inarajan River near Inarajan (10-10)
Pauliluc River near Inarajan (10-9)
Tolaeyuus River near Agat (10-3)
Almagosa Springs near Agat (10-2)
Fena Dam spillway near Agat (10-4)
Talofoyo River near Talofoyo (10-1)
Ugum River near Talofoyo (10-5)
Ylig River near Yona (10-6)
Lonfit River near Ordot (10-8)
Pago River near Ordot (10-7)

Definition of Terms and Abbreviations

The terms of streamflow and other hydrologic data, as used in this appendix, are defined as follows:

Cubic foot per second (cfs) is the rate of discharge of a stream whose channel is 1 square foot in cross-sectional area and whose average velocity is 1 foot per second.

Acre-foot is the quantity of water required to cover an acre to the depth of 1 foot and is equivalent to 43,560 cubic feet. The term is commonly used in relation to storage for irrigation.

Cfs-day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, 1.983471 acre-feet, or 646,317 gallons, and represents a runoff of 0.0372 inch from 1 square mile.

Stage-discharge relation is the relation between gage height and the amount of water flowing in a channel, expressed as volume per unit of time.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, a long reach of the channel, or an artificial structure.

The drainage area of a stream at a specified location is that area, measured in a horizontal plane, which is so enclosed by a topographic divide, that direct surface runoff from precipitation normally would drain by gravity into the river above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

Explanation of Data

The base data collected at gaging stations consist of records of stage and measurements of discharge. In addition, observations of factors affecting the stage-discharge relation, weather records, and other information were used to supplement base data in determining the daily flow. The records of stage were obtained from a water-stage recorder that gives a continuous record of fluctuations. Measurements of discharge were made with a current meter by the methods adopted by the Geological Survey on the basis of experience in stream gaging since 1888. These methods are described in U. S. Geological Survey Water-Supply Paper 888 (Corbett, 1943) and also are outlined in standard textbooks on the measurement of stream discharge.

Rating tables giving the discharge for any stage were prepared from stage-discharge relation curves defined by discharge measurements. If extensions to the rating curves were necessary to define the extremes of discharge, they were made on the basis of indirect measurements of peak discharge (such as slope-area or contracted-opening measurements, computation of flow over dams or weirs, and by other methods), velocity-area studies, and logarithmic plotting. The application of the daily mean gage heights to the appropriate rating tables gave the daily mean discharges, from which the monthly and the yearly mean discharges were computed. If the stage-discharge relation was subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge was determined by the shifting-control method, in which correction factors based on individual discharge measurements and notes by engineers were used in applying the gage heights to the rating tables. If the stage-discharge relation for a station was temporarily changed by the presence of aquatic growth or debris on the control, the daily mean discharge was computed by what is essentially the shifting-control method.

The data presented generally comprise a description of the station, a skeleton rating table, and a table showing the daily discharge and monthly and yearly discharge and runoff of the stream. Records are published for the fiscal year, which begins on July 1 and ends on June 30.

The description of the station gives the location, drainage area, records available, type and history of gages, average discharge, extremes of discharge, and general remarks. The location of the gaging station and the size of the drainage area were obtained from the most accurate maps available. Under "Records available", are given the periods for which there are published records. Under "Gage", are given the type of gage in use and the datum of the gage above mean sea level. Under "Average discharge", is given the average discharge for the number of years indicated. Under "Extremes", are given the maximum discharge and gage height; the minimum discharge if there is little or no regulation; the minimum daily discharge if there is extensive regulation (also the minimum discharge if useful). Unless otherwise qualified, the maximum discharge corresponds to the crest stage obtained by use of a water-

stage recorder. If the maximum gage height did not occur at the same time as the maximum discharge, it is given separately. Information pertaining to the accuracy of the records and conditions which affect the natural flow at the gaging station is given under "Remarks".

Skeleton rating tables are published for all stations except for spring stations.

The daily discharge table gives, in general, the discharge corresponding to the daily mean gage height. For stations subject to sudden fluctuations, the daily mean gage height may not indicate the true daily mean discharge, which must be obtained by averaging the discharge for parts of the day.

In the table of daily discharge, the figures for the maximum and the minimum day in each month are underlined. If the figure is repeated, it is underlined only on the first day of its occurrence.

In the monthly summary below the daily table, the line headed "Total" gives the sum of the daily figures; it is the total cfs-days for the month. The line headed "Mean" gives the average flow in cubic feet per second during the month. The line headed "Ac-ft" gives the runoff for the month in acre-feet.

In the yearly summary below the monthly summary, the values of maximum are the maximum daily discharges, not the momentary discharges when the water was at crest stage. Likewise, the minimums in this summary are the minimum daily discharges.

Peak discharges and the times of their occurrence and corresponding gage heights for most stations are listed below the table of daily and monthly discharge. All independent peaks above the selected base are given. The base discharge, which is given in parentheses, is selected so that an average of about three peaks a year will be presented. Peak discharges are not published for springs, or for any stream for which the peaks are subject to substantial control by man.

Footnotes to the tables of daily discharge indicate periods when discharge was computed or estimated by unusual or special methods because of no gage-height record or because other effects were present that reduce the degree of accuracy of the records. Days on which discharge measurements were made are indicated by asterisk and footnote.

Discharge measurements made at sites other than gaging stations are listed at the end of the appendix.

Accuracy of Field Data and Computed Results

The accuracy of streamflow data depends primarily on (1) the stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements; and (2) the accuracy of observations of stage, measurements of discharge, and interpretation of records.

The station description states the degree of accuracy of the records. "Excellent" indicates that, in general, the error in the daily records probably is less than 5 percent; "good", less than 10 percent; "fair", less than 15 percent; and "poor", more than 15 percent. The records of monthly and yearly mean discharge and runoff are, in general, more accurate than the daily records.

Computations are carried to not more than three significant figures, except that monthly and yearly total runoff (cfs-days and acre-feet) above 10,000 are carried to four significant figures.

SURFACE WATER SUPPLY OF GUAM, 1951-58

GAGING-STATION RECORDS

La Sa Fua River near Umatac

Location.--Lat 13°18'25" N., long 144°39'45" E., on left bank 0.6 mile northeast of Umatac, 3.1 miles north of Merizo, and 5.5 miles south of Agat.

Drainage area.--1.93 sq mi.

Records available.--April 1953 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 130 ft (by barometer).

Average discharge.--5 years, 4.43 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1954-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1953†	June 23, 1953	1.45	0.74	June 14, 1953	0.37	0.42
1954	Oct. 15, 1953	‡1,050	5.47	(††)	.37	.42
1955	Sept. 6, 1954	‡610	4.62	May 6, 1955	.45	.46
1956	Sept. 10, 1955	‡505	4.31	May 23, 24, 1956	.35	.41
1957	Aug. 28, 1956	650	4.72	June 15, 16, 17, 18, 1957	.39	.43
1958	Sept. 2, 1957	730	4.93	May 16, 19, 1958	.29	.38

† Period April to June.

‡ From rating curve extended above 13 cfs by test on model of station site.

†† July 9, Aug. 1, 1953, June 2-4, 20, 21, 1954.

1953-58: Maximum discharge, 1,050 cfs Oct. 15, 1953 (gage height, 5.47 ft), from rating curve extended above 13 cfs by test on model of station site; minimum, 0.29 cfs May 16, 19, 1958 (gage height, 0.38 ft).

Remarks.--Records good except those for periods of no gage-height record, which are poor.

Rating table, Apr. 11, 1953, to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)

0.4	0.33	1.3	5.6
.5	.55	1.5	13.0
.6	.85	2.0	55
.7	1.25	3.0	193
.8	1.75	4.0	405
1.0	2.95		

Discharge, in cubic feet per second, 1953

Day	Apr.	May	June	Day	Apr.	May	June	Day	Apr.	May	June	Day	Apr.	May	June
1	-	0.64	0.47	9	-	0.58	0.45	17	0.76	0.55	0.43	25	0.73	0.58	0.49
2	-	.61	.49	10	(*)	.61	.43	18	.76	.67	.45	26	.67	.47	.43
3	-	.61	.47	11	0.79	.55	.45	19	.73	.52	.49	27	.64	.47	.47
4	-	*.61	.45	12	.79	.55	.43	20	.70	.52	.47	28	.64	.47	.85
5	-	.58	*.54	13	.79	.55	.43	21	.70	.49	.49	29	.64	.47	.76
6	-	.61	.58	14	.76	.52	.41	22	.67	.49	.52	30	.64	.49	.52
7	-	.58	.47	15	.76	.55	.47	23	.67	.49	.79	31	-	.58	-
8	-	.61	.47	16	.76	.70	.49	24	.70	.52	.49				
Total.....													-	17.24	15.15
Mean.....													-	0.556	0.505
Runoff in acre-feet.....													-	34	30

Peak discharge (base, 500 cfs).--No peak above base.

* Discharge measurement made on this day.

La Sa Fua River near Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.45	0.43	9.0	4.1	3.5	5.6	2.2	1.45	1.09	0.70	0.76	0.43
2	.43	.43	17	3.4	3.1	5.5	2.25	1.40	1.05	1.25	.64	.43
3	.45	.85	11	2.8	2.8	6.6	2.15	1.45	1.05	.85	.62	.39
4	.58	.49	7.5	2.5	2.75	8.7	2.15	1.40	.97	.93	.58	.41
5	.49	.45	5.5	2.45	2.55	5.8	1.97	1.40	1.01	.76	.54	.47
6	.52	.55	4.5	2.25	2.5	4.6	2.15	1.40	.93	.79	.54	.61
7	.49	.45	4.0	8.6	2.35	*4.1	1.86	1.40	.97	.73	.56	.55
8	.45	.91	3.5	4.4	2.55	3.55	1.97	1.35	1.01	.70	.54	.82
9	.41	.79	3.0	3.0	2.25	3.4	57	1.30	.93	.64	.54	.76
10	.43	17.1	2.8	2.5	7.9	3.2	6.6	1.25	.93	.64	.58	.58
11	.43	104	2.4	2.5	4.4	3.1	4.4	1.21	1.05	.68	.58	.52
12	.49	47	2.1	2.9	108	3.25	3.55	1.21	.93	.68	.66	.73
13	.92	19.9	1.9	2.5	137	2.8	3.2	1.21	.89	.64	*.54	.52
14	.55	5.6	1.8	2.45	28.5	8.1	2.8	1.17	.85	.64	.52	.47
15	.55	17.9	1.7	403	10.3	7.0	3.1	1.13	.97	.60	.52	.45
16	.52	42	*1.6	174	7.0	8.4	2.6	1.13	.89	.60	.49	.43
17	.64	29.5	1.50	63	5.3	9.2	2.45	1.13	1.05	.60	.49	.41
18	5.0	60	2.45	22	4.5	4.9	*2.2	1.13	.89	.60	.52	.45
19	.67	16	2.75	11.9	3.95	3.95	2.2	1.09	.93	.70	.52	.52
20	*.72	9.0	2.5	*7.6	3.55	3.5	2.1	1.50	.82	.60	.49	.43
21	.55	7.0	5.0	6.0	3.4	3.2	2.15	1.13	.79	.70	.49	.39
22	.55	5.5	3.95	4.8	3.1	3.6	1.97	1.35	.89	.70	.47	6.1
23	.47	4.3	2.5	4.2	2.95	3.6	1.92	1.09	*.79	.70	.67	1.40
24	.61	13	2.2	3.7	19.8	3.2	1.86	1.05	.76	.70	.85	*.64
25	.95	8.0	4.4	3.5	6.2	3.2	1.75	1.05	.76	.60	.55	2.55
26	.73	5.0	16.3	3.1	4.3	2.8	1.70	1.17	.73	.58	.49	.89
27	.70	4.0	4.6	2.8	3.6	3.55	1.70	1.65	.73	.58	.47	.70
28	.61	60	36	8.6	3.2	2.95	1.65	1.40	.73	.58	.47	.73
29	.52	36	9.2	7.0	2.95	2.6	1.60	-	.73	.50	.49	.64
30	.49	3.0	5.5	4.9	5.6	2.5	1.60	-----	.70	.64	.47	.61
31	.45	12	-----	3.95	-----	2.3	1.55	-----	.76	-----	.43	-----
Total	21.82	531.15	178.15	780.40	399.85	138.75	128.35	35.60	27.58	20.61	17.08	25.03
Mean	0.704	17.1	5.94	25.2	13.3	4.48	4.14	1.27	0.890	0.687	0.551	0.834
Ac-ft	43	1,050	353	1,550	793	275	255	71	55	41	34	50

Calendar year 1953: Max - Min - Mean - Ac-ft -
 Fiscal year 1953-54: Max 403 Min 0.39 Mean 6.31 Ac-ft 4,570

Peak discharge (base, 500 cfs).--Oct. 15 (10 a.m.) 1,050 cfs (5.47 ft); Nov. 13 (3 p.m.) 610 cfs (4.60 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Aug. 18 to Sept. 16, Apr. 8 to May 13; discharge estimated on basis of records for Umatac River at Umatac.

La Sa Fua River near Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.86	1.01	10.5	8.4	30	3.55	1.35	*1.55	1.01	0.86	0.58	1.01
2	4.8	1.86	*5.9	5.2	10	3.2	1.40	1.45	.93	.73	.52	.79
3	1.18	1.36	27.5	5.1	6.5	2.8	1.61	1.60	.89	.73	.58	.70
4	1.09	1.05	22	4.2	6.5	2.6	1.64	1.62	.97	.73	.73	.76
5	1.08	.93	28	8.5	4.8	2.5	*1.69	1.35	.89	.67	.55	.86
6	.85	1.19	53	4.3	4.0	2.55	1.35	1.30	.85	.64	.52	.82
7	.76	2.2	18.0	3.5	3.6	2.7	1.30	1.25	.82	.88	.64	.79
8	.70	1.22	18.2	4.0	3.4	2.25	1.85	1.25	.82	.73	.87	.73
9	.67	1.67	20	3.3	3.0	2.25	1.40	1.17	.82	1.17	2.15	1.76
10	.67	1.21	13	3.0	2.8	2.2	3.05	1.17	.89	.73	.70	.97
11	.61	1.09	6.0	3.8	17	2.2	2.5	1.26	1.04	.67	.64	.79
12	.58	7.4	4.5	4.4	5.7	1.97	2.0	1.22	.93	.67	.64	.82
13	.70	3.5	4.7	3.4	3.6	1.86	1.75	1.05	.85	.67	.58	1.00
14	.86	2.8	44	3.0	3.2	1.86	3.85	1.17	.76	.64	.82	.76
15	.64	2.0	32	2.8	2.95	1.80	4.5	1.25	.79	.64	9.3	.73
16	.64	1.86	12.1	2.7	2.7	1.80	2.35	1.17	.82	.70	1.42	.67
17	2.25	3.95	6.6	3.1	9.2	1.75	6.1	1.17	*.73	.64	.93	.84
18	4.9	3.0	4.9	2.7	37	2.7	2.75	1.05	.79	*.64	.79	.70
19	2.95	7.7	4.2	*2.2	6.6	1.75	2.4	1.01	.79	.81	.76	.64
20	1.25	26	28.5	2.1	8.3	1.65	2.1	.97	.76	.91	.73	.79
21	1.05	9.0	29	2.8	4.5	1.65	1.86	3.25	.89	.64	.70	.73
22	1.22	4.0	19.9	4.3	5.3	1.77	1.75	1.88	.79	.61	.67	.61
23	.89	2.85	10.8	6.7	8.0	1.60	1.65	1.25	.76	.58	.64	.58
24	.97	8.7	8.2	4.4	12.0	1.55	1.60	1.13	.90	.58	.64	.61
25	.89	25	5.7	6.2	11.0	1.50	2.0	1.05	.76	.61	.61	.55
26	.79	11.5	5.1	7.6	6.8	1.50	9.4	1.01	.92	.55	.65	.61
27	.73	6.4	4.2	6.4	23.5	1.40	2.25	1.37	1.01	.52	*1.89	.85
28	.73	4.1	12.3	4.9	6.8	1.40	1.92	1.09	.76	.58	1.09	.58
29	.83	3.1	5.2	3.9	5.1	1.55	1.80	-	.76	.52	.79	.79
30	*.68	2.55	11.9	3.4	*4.3	1.40	1.65	-----	.76	.52	.73	1.14
31	1.56	2.75	-----	65	-----	1.40	1.60	-----	.76	-----	.70	-----
Total	38.38	152.95	475.9	195.3	258.15	62.66	74.42	37.06	26.22	20.57	33.56	23.96
Mean	1.24	4.93	15.9	6.30	8.60	2.02	2.40	1.32	0.846	0.686	1.08	0.799
Ac-ft	76	303	944	387	512	124	148	74	52	41	67	48

Calendar year 1954: Max 65 Min 0.39 Mean 3.94 Ac-ft 2,850
 Fiscal year 1954-55: Max 65 Min 0.52 Mean 3.83 Ac-ft 2,780

Peak discharge (base, 500 cfs).--Sept. 6 (5:30 p.m.) 610 cfs (4.62 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Sept. 9-12, Oct. 5-18, Nov. 1-11; discharge estimated on basis of records for Umatac River at Umatac.

La Sa Fua River near Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.85	3.75	5.4	6.6	3.4	2.8	2.0	0.97	0.67	0.85	0.55	0.64
2	.70	2.3	4.2	6.7	3.1	*2.15	1.55	.85	.70	.79	.58	.67
3	.64	2.05	3.4	9.7	2.6	1.92	5.0	1.25	.76	.73	.52	.64
4	.81	1.86	2.35	4.4	4.3	1.70	1.70	.97	.64	.73	.93	.67
5	.61	1.60	2.45	3.55	2.55	1.65	1.40	.89	.64	*.73	.55	.70
6	20.5	1.50	2.5	3.1	2.5	1.70	2.45	.82	.64	.73	.49	.52
7	*7.9	1.35	2.15	3.0	2.4	1.55	1.55	1.05	.61	.70	.49	.52
8	11.8	1.25	1.80	2.55	2.3	1.65	1.35	1.30	.61	.64	.55	1.23
9	8.5	1.21	3.9	2.25	2.2	1.45	1.30	1.52	.61	.70	.49	.61
10	2.9	1.25	21.5	2.1	3.65	1.45	1.21	1.09	2.2	.64	.47	.52
11	6.9	*1.39	11.8	2.2	2.2	1.45	*1.30	.97	.97	.64	.47	.61
12	9.6	1.17	6.1	1.92	1.92	6.5	1.21	.89	.73	.64	.47	.52
13	5.2	1.01	4.2	2.95	1.86	2.7	1.21	.85	.67	.64	.52	.49
14	3.2	.97	4.1	1.92	1.75	2.4	1.13	.89	.64	.76	.45	.67
15	2.35	.97	2.8	1.70	2.35	1.97	1.13	.85	.73	.67	.45	.49
16	14.5	1.27	16.6	1.70	1.65	33	1.17	1.76	.97	.61	.49	.52
17	3.45	1.09	8.5	1.60	1.65	4.3	1.21	.93	.70	.79	.49	6.1
18	2.45	2.1	18.8	1.55	1.75	2.75	1.09	.85	.76	.64	.45	4.4
19	2.0	1.93	5.8	3.55	1.50	2.25	1.05	.82	.67	.61	.47	1.80
20	1.80	1.82	4.1	9.5	1.40	2.2	1.01	*.76	.64	.70	.55	1.13
21	1.60	1.44	*6.9	1.92	1.50	1.97	1.01	.76	.82	.64	.45	.89
22	1.78	1.38	19.1	52	1.96	1.80	1.01	.76	.67	.55	.45	.79
23	1.86	1.44	7.3	9.5	2.9	1.80	1.09	.76	.70	.61	.43	.76
24	1.40	1.64	5.9	14.9	1.55	1.65	1.01	.76	.61	.52	.41	1.38
25	2.1	1.88	12.2	11.2	1.40	1.55	.97	.93	.61	.52	.45	1.67
26	4.1	1.21	7.8	7.4	1.60	1.50	1.13	.73	.61	.52	.89	2.25
27	2.3	1.13	33.5	17.4	1.45	1.40	1.01	.70	.89	.61	.70	1.58
28	1.86	1.01	70	*13.6	16.3	1.40	.93	.67	8.1	.58	*.49	1.17
29	1.55	1.09	47	9.2	7.2	1.30	.93	.67	1.60	.82	.70	.97
30	2.5	.97	10.9	5.0	6.7	1.25	.89	-----	1.01	.67	1.15	.97
31	3.6	1.38	-----	3.9	-----	1.21	.93	-----	1.12	-----	.85	-----
Total	131.31	46.41	401.65	218.56	89.59	94.37	41.93	27.02	32.30	19.98	17.40	35.88
Mean	4.24	1.50	13.4	7.05	2.99	3.04	1.35	0.932	1.04	0.666	0.561	1.20
Ac-ft	260	92	797	434	178	187	83	54	64	40	35	71

Calendar year 1955: Max 70 Min 0.52 Mean 3.28 Ac-ft 2,380
 Fiscal year 1955-56: Max 70 Min 0.41 Mean 3.16 Ac-ft 2,300

Peak discharge (base, 500 cfs).--Sept. 10 (6:30 p.m.) 505 cfs (4.31 ft).

* Discharge measurement made on this day.

La Sa Fua River near Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.01	3.7	14.5	5.5	2.4	3.45	2.45	1.60	1.01	1.29	0.87	0.55
2	.97	3.55	13.3	3.55	2.15	18.5	2.2	1.45	1.01	2.65	.64	.52
3	.93	2.7	10.4	2.9	2.2	9.3	2.3	1.65	1.01	1.41	.61	.49
4	.82	2.35	*10.7	3.6	1.92	5.0	1.97	2.3	2.75	.97	.64	.49
5	.82	1.97	10.5	3.45	1.80	6.5	1.92	2.4	1.40	.97	.61	.49
6	.79	1.75	4.9	2.45	1.75	8.2	1.80	1.65	1.17	.89	.58	.52
7	.82	3.3	5.9	2.25	2.15	3.55	1.65	1.55	1.05	.82	2.25	.49
8	1.32	14.9	7.2	2.3	1.65	2.95	1.60	3.3	1.01	.82	1.02	.61
9	3.2	8.6	5.3	1.97	1.80	2.7	1.65	1.60	1.17	.85	.73	.49
10	1.86	3.45	6.5	2.3	12.2	2.45	19.2	1.50	1.01	.82	.64	.56
11	1.21	3.05	8.9	13.3	6.4	*2.2	4.8	1.40	1.01	.82	.61	.49
12	1.78	2.8	7.8	25	21	2.15	3.4	*1.40	1.01	.79	.61	.49
13	6.4	2.25	4.4	5.7	20.5	2.1	2.35	1.30	1.01	.76	.61	.91
14	13.4	1.72	3.5	5.4	5.7	70	2.1	1.25	.93	1.07	.61	.52
15	3.4	3.05	33	21	3.5	69	2.15	1.17	.93	.76	.58	.47
16	2.1	1.75	5.8	27	19.8	8.2	2.0	1.17	.89	.70	.58	.45
17	1.80	5.9	8.7	5.4	13.6	5.5	5.5	1.13	.89	.73	.55	.45
18	1.50	3.65	8.2	6.0	33.5	3.8	2.15	1.17	.89	.70	1.08	.45
19	*1.55	2.15	6.4	7.8	8.9	3.4	1.97	2.05	.93	.70	.55	.55
20	1.30	1.75	11.0	4.3	5.5	2.95	4.7	1.30	.89	.67	.52	4.3
21	1.17	1.70	8.0	3.3	4.4	2.95	1.92	1.17	.85	.82	.49	.90
22	1.42	1.70	4.7	2.8	4.3	2.5	1.70	1.17	.79	.70	*9.6	.64
23	1.22	1.70	19.6	2.6	7.7	2.55	1.65	1.81	.79	.73	.89	.61
24	5.4	1.85	9.4	2.3	4.1	2.2	1.65	1.65	.79	.70	.90	.55
25	2.4	1.55	4.7	6.3	3.2	2.65	1.60	1.25	.82	.70	.73	1.57
26	23.5	4.7	4.0	2.7	3.25	7.2	1.50	1.17	.76	.67	.70	.67
27	7.9	21	5.0	2.55	2.8	5.1	1.40	1.13	2.6	.64	.61	.58
28	5.3	44	11.5	16.6	2.45	2.55	1.45	1.09	*1.22	.74	.61	.61
29	5.0	43	4.5	*4.4	2.8	2.2	5.6	-	.89	.73	.73	.52
30	23.5	9.8	33.5	3.85	2.6	2.15	1.65	-----	.85	.64	.64	.52
31	5.7	4.8	-----	2.6	-----	2.65	2.45	-----	.79	-----	.55	-----
Total	129.49	210.14	291.8	201.17	206.02	266.40	90.43	42.78	33.12	26.26	31.34	21.46
Mean	4.18	6.78	9.73	6.49	6.87	8.59	2.92	1.53	1.07	0.875	1.01	0.715
Ac-ft	257	417	579	399	409	528	179	85	66	52	62	43

Calendar year 1956: Max 70 Min 0.41 Mean 4.04 Ac-ft 2,940
 Fiscal year 1956-57: Max 70 Min 0.45 Mean 4.25 Ac-ft 3,080

Peak discharge (base, 500 cfs).--Aug. 28 (1 p.m.) 650 cfs (4.72 ft); Dec. 15 (1 a.m.) 540 cfs (4.42 ft).

* Discharge measurement made on this day.

La Sa Fua River near Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.52	0.55	14.9	2.15	18	1.80	1.05	1.31	0.82	0.49	0.47	2.0
2	.56	.49	<u>36.5</u>	1.86	6.0	2.0	.97	1.30	.73	.49	.41	.58
3	.49	.49	7.0	<u>1.65</u>	4.0	1.70	<u>.93</u>	1.17	.73	.49	.39	.49
4	.58	<u>.47</u>	*6.8	<u>1.67</u>	3.4	1.65	<u>.93</u>	1.05	.76	.47	.68	.45
5	.61	<u>.67</u>	4.4	23	3.0	1.55	.97	1.01	.79	.45	.45	<u>.41</u>
6	.58	.52	4.7	<u>100</u>	2.8	1.45	.93	1.01	.73	.49	.39	.43
7	.52	.52	6.3	51	2.8	1.50	1.05	1.01	*.84	.47	*.39	.59
8	.47	.52	4.8	12	<u>160</u>	1.40	3.0	.97	.74	.47	.41	.49
9	<u>.45</u>	.56	3.5	8.0	25	1.48	1.05	.97	.67	.43	.41	.47
10	.88	1.01	2.95	6.0	13	1.35	1.01	.97	.67	.52	.41	22.5
11	1.22	.52	4.1	4.5	10	1.30	1.25	.93	.70	.47	.39	3.25
12	* <u>14.7</u>	.70	2.75	5.4	92	1.35	1.21	.89	.73	.47	.39	*1.52
13	3.5	2.4	2.7	4.8	13.9	1.25	2.9	.89	.61	<u>1.01</u>	.39	14.9
14	1.21	2.7	2.3	4.4	7.5	1.30	64	.85	.67	<u>.58</u>	.37	56
15	.93	.97	2.0	4.0	147	<u>3.25</u>	*6.5	.82	.61	.47	.37	7.1
16	.89	3.6	2.5	3.2	67	2.5	3.0	.82	.61	.45	<u>.35</u>	3.55
17	.85	3.25	2.15	2.8	15	1.40	2.3	.79	.58	.89	<u>.35</u>	2.45
18	.82	3.0	<u>1.86</u>	2.5	10	1.25	2.0	1.39	.55	.49	.37	1.92
19	.76	16.1	<u>6.8</u>	2.4	7.0	1.21	2.0	.92	.55	.66	.37	1.65
20	1.03	5.1	2.7	2.3	5.0	1.17	2.8	.82	.52	.49	.39	1.50
21	.76	4.7	2.1	2.7	3.8	1.30	1.92	.79	.52	.49	.39	1.35
22	.82	3.2	13.2	10	*2.9	1.13	1.65	<u>.76</u>	<u>.49</u>	.49	.86	1.25
23	.67	6.6	3.8	6.3	2.6	1.09	1.50	.89	.52	.43	.53	1.34
24	.58	13.5	3.1	3.0	2.45	1.09	1.45	<u>1.91</u>	.49	.45	.45	1.29
25	.58	8.8	4.4	3.5	2.75	1.01	1.40	.89	.58	<u>.41</u>	.39	1.24
26	.55	5.6	2.55	3.7	2.4	1.01	1.25	.82	.52	.43	.37	1.02
27	.52	3.4	3.2	5.6	3.55	.97	1.95	.79	.52	.43	.37	1.27
28	.73	<u>35.5</u>	2.35	*15	2.35	<u>1.13</u>	1.40	.82	.49	.45	.48	1.05
29	.76	<u>10.3</u>	2.0	2.45	2.2	1.35	1.45	-	.52	.76	<u>1.52</u>	.97
30	.58	5.6	2.85	23.5	<u>1.97</u>	1.01	1.40	-----	<u>1.04</u>	.45	<u>.49</u>	.82
31	.61	3.9	-----	3.8	-----	1.01	1.21	-----	.52	-----	.47	-----
Total	38.73	145.24	161.26	323.18	639.37	43.96	116.43	27.56	19.82	15.54	14.47	133.85
Mean	1.25	4.69	5.38	10.4	21.3	1.42	3.76	0.984	0.639	0.518	0.467	4.46
Ac-ft	77	288	320	641	1,270	87	231	55	39	31	29	265

Calendar year 1957: Max 160 Min 0.45 Mean 4.38 Ac-ft 3,170
 Fiscal year 1957-58: Max 160 Min 0.35 Mean 4.60 Ac-ft 3,330

Peak discharge (base, 500 cfs).--Sept. 2 (2 p.m.) 730 cfs (4.93 ft); Oct. 6 (7:30 a.m.) 505 cfs (4.29 ft); Nov. 15 (8 p.m.) 575 cfs (4.48 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Oct. 8-28, Nov. 1-12, 17-21; discharge estimated on basis of records for Umatac and Geus Rivers.

Umatac River at Umatac

Location.--Lat 13°17'45" N., long 144°39'50" E., on left bank 0.2 mile upstream from mouth, 0.3 mile southeast of Umatac, 5.7 miles northwest of Inarajan, and 6.0 miles south of Agat.

Drainage area.--2.0 sq mi.

Records available.--September 1952 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 12 ft (from topographic map). Prior to Oct. 16, 1953, at same site at datum 0.62 ft higher.

Average discharge.--5 years (1953-58), 7.34 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1953-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1953†	Feb. 22, 1953	††800	3.42	June 11, 13, 14, 1953	0.41	0.27
1954	Oct. 15, 1953	††2,370	‡5.08	June 3,21,1954	.43	.19
1955	Oct. 31, 1954	‡‡750	2.68	June 25,26,1955	.50	.20
1956	Sept.27, 1955	1,360	3.39	May 24,25,1956	.32	.19
1957	Aug. 29, 1956	‡‡2,200	4.09	June 17,18,1957	.49	.19
1958	Nov. 15, 1957	‡‡1,680	3.66	Aug. 3, 1957	.49	.19

† Period September to June.

‡ From floodmarks.

†† From rating curve extended above 15 cfs by test on model of station site.

‡‡ From rating curve extended above 230 cfs on basis of slope-area measurement at gage height 3.51 ft.

1952-58: Maximum discharge, 2,370 cfs Oct. 15, 1953 (gage height, 5.08 ft, from floodmarks), from rating curve extended above 15 cfs by test on model of station site; minimum, 0.32 cfs May 24, 25, 1956.

Remarks.--Records good except those for period of no gage-height record, which are poor.

Umatac River at Umatac--Continued

Rating tables, Sept. 10, 1952, to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)

Sept. 10, 1952, to Oct. 15, 1953				Mar. 24, 1954, to Oct. 28, 1956				Oct. 29, 1956, to June 30, 1958			
0.3	0.52	1.5	44	0.2	0.50	0.8	28.5	0.2	0.56	0.9	39
.4	1.10	1.7	74	.3	1.57	.9	39.0	.3	1.80	1.1	66
.5	1.95	1.9	113	.4	3.7	1.0	51	.4	4.0	1.3	108
.6	3.1	2.1	172	.5	7.0	1.1	66	.5	7.6	1.5	159
.7	4.7	2.4	280	.6	12.1	1.3	108	.6	12.5	1.7	220
.9	9.2	2.7	400	.7	19.5	1.5	159	.7	19.6	1.9	295
1.1	16.5	3.0	550								
1.3	27.5										

Discharge, in cubic feet per second, September 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			-	10.2	8.0	10.2	6.2	1.95	4.4	1.68	0.91	0.67
2			-	7.8	6.8	15.4	5.1	1.86	4.2	1.51	.85	.67
3			-	7.8	*6.2	12.1	4.4	1.86	3.9	1.51	.91	.67
4			-	6.6	5.5	8.7	3.9	2.05	5.5	1.59	*.91	*.61
5			-	8.4	21.5	7.3	4.1	1.77	4.2	1.51	.79	.73
6			-	5.8	9.3	6.8	3.75	2.05	*3.6	1.51	.85	.67
7			-	16.0	12.5	12.7	4.4	2.6	3.4	1.68	.85	.67
8			-	8.9	27	6.8	4.2	2.15	4.9	1.43	.85	.62
9			-	18.2	23	6.2	3.1	1.77	4.2	1.34	.79	.62
10			-	12.7	80	6.4	2.85	1.77	3.6	1.51	.79	.57
11			8.5	8.0	16.1	6.5	2.85	1.86	3.25	1.34	.73	.52
12			8.0	7.3	11.5	5.8	*2.75	2.15	3.25	1.43	.73	.62
13			40	*7.6	9.2	4.9	2.75	1.95	2.85	1.34	.73	.57
14			45	10.5	8.2	5.3	2.75	1.68	2.75	1.26	.67	.57
15			12.2	9.5	7.5	5.0	2.75	1.59	2.75	1.18	.67	.62
16			8.7	7.3	29	4.4	2.75	1.68	2.5	1.26	.91	.62
17			7.0	12.5	10.8	*4.4	2.6	1.68	2.5	1.18	.79	.62
18			6.3	33	8.5	4.2	2.4	1.59	2.4	1.18	.91	.62
19			5.1	18.4	11.5	3.9	2.3	1.51	2.3	1.10	.79	.62
20			4.4	10.8	12.9	3.6	2.3	1.68	2.3	1.10	.79	.62
21			3.9	8.7	9.9	3.6	2.3	*1.51	2.15	.97	.73	.62
22			3.75	7.5	8.7	3.6	2.15	138	2.05	.97	.79	.91
23			19.3	6.8	12.8	11.1	2.75	27.5	2.15	.97	.79	.67
24			7.3	15.9	8.0	4.5	2.3	11.8	1.95	.97	.79	.62
25			5.1	8.0	16.2	5.4	2.15	8.0	1.95	.97	.85	.57
26			4.4	15.2	8.7	4.2	1.95	6.4	1.86	.91	.73	.62
27			4.4	6.8	7.5	4.1	2.15	5.8	1.77	.91	.79	.97
28			14.7	6.0	8.3	3.6	2.05	4.7	1.77	.97	.67	1.03
29			31	5.3	13.4	6.0	2.05	-	1.77	.91	.67	.97
30			19.6	18.0	14.9	3.9	2.6	-----	1.68	.91	.67	.79
31			-----	14.1	-----	25.5	2.15	-----	1.68	-----	.79	-----
Total			-	339.4	433.4	216.1	92.80	240.91	89.53	37.10	24.49	20.27
Mean			-	10.9	14.4	6.97	2.99	8.60	2.89	1.24	0.790	0.676
Ac-ft			-	673	860	429	184	478	178	74	49	40

Calendar year : Max Min Mean Ac-ft
 Fiscal year : Max Min Mean Ac-ft

Peak discharge (base, 850 cfs).--No peak above base.

* Discharge measurement made on this day.

Umatac River at Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.73	<u>0.62</u>	14.4	9.9	6.2	8.0	3.7	<u>2.4</u>	<u>1.4</u>	1.04	<u>1.16</u>	0.74
2	.73	.79	28.5	8.2	5.8	7.8	4.0	<u>2.3</u>	<u>1.3</u>	<u>1.73</u>	.93	.65
3	.91	1.18	19.5	7.3	5.4	9.0	3.6	2.4	1.3	<u>1.42</u>	.93	.74
4	.79	.79	13.3	6.4	5.4	11	3.5	2.3	1.3	1.57	.83	.74
5	.73	.85	10.2	6.2	5.2	8.0	3.1	2.3	1.4	1.16	.74	.65
6	.85	.85	9.0	5.5	4.9	7.2	3.5	2.2	1.3	1.16	.74	.83
7	.67	.85	7.8	9.7	4.7	*6.4	2.9	2.1	1.3	1.16	.74	.83
8	.67	1.10	7.0	6.6	5.0	5.8	3.0	2.0	1.4	1.04	.74	1.04
9	.57	1.03	6.2	5.5	<u>4.5</u>	5.4	90	1.9	1.3	.93	.74	1.16
10	.57	15.5	6.0	<u>4.9</u>	10	5.0	<u>15</u>	1.9	1.3	.93	.83	1.04
11	.57	<u>147</u>	5.3	4.9	7.0	5.0	7.0	1.9	1.4	.93	.83	.93
12	.67	<u>52</u>	4.9	5.1	150	5.6	5.4	1.9	1.3	.93	1.04	.93
13	.91	27	4.5	5.1	200	5.0	4.6	1.9	1.2	.93	*.77	.93
14	.73	13.3	4.4	5.1	<u>50</u>	10	4.2	1.8	1.2	.93	.74	.74
15	.79	21	4.4	<u>500</u>	16	9.0	4.5	1.8	1.3	.83	.74	.74
16	.79	48	4.1	250	11	10	4.0	1.8	1.2	.83	.65	.74
17	<u>4.2</u>	30	<u>3.9</u>	90	9.0	<u>12</u>	3.7	1.8	1.4	.83	.74	.65
18	<u>1.77</u>	108	<u>5.8</u>	32	8.0	<u>9.0</u>	3.5	1.8	1.2	.83	.74	.65
19	1.03	27	6.0	15	7.2	7.4	3.5	1.7	1.3	.93	.74	.74
20	*1.03	16.1	5.1	11	7.0	6.6	3.3	2.1	1.1	.83	.74	.65
21	.97	12.6	8.0	9.4	6.6	6.0	3.3	1.8	1.1	.93	.83	*.57
22	.97	10.5	6.6	8.0	6.4	6.6	3.1	2.0	1.2	.93	.83	<u>4.2</u>
23	.85	8.2	5.1	7.4	6.2	6.6	3.1	1.7	*1.1	.93	.93	1.90
24	.91	23	4.5	7.0	28	6.0	3.0	<u>1.6</u>	<u>1.04</u>	.93	1.04	1.16
25	.97	*13.4	7.2	6.6	10	6.0	2.9	<u>1.6</u>	<u>1.04</u>	.83	.83	3.45
26	.85	9.0	17.6	6.2	8.0	5.6	2.9	1.7	1.04	.83	.74	1.42
27	.85	7.5	8.0	5.8	7.2	6.6	2.9	2.2	1.04	.83	.83	1.16
28	.73	103	<u>58</u>	12	6.6	5.4	2.8	1.8	1.04	.83	.83	1.04
29	.73	66	18.5	8.8	6.2	4.8	2.7	-	1.04	<u>.74</u>	.74	1.04
30	.67	56	12.9	7.4	9.0	4.3	2.7	-----	1.04	.93	.74	.93
31	.62	21.5	-----	6.6	-----	<u>4.0</u>	<u>2.5</u>	-----	1.04	-----	.74	-----
Total	28.83	843.66	316.7	1,073.6	616.5	215.1	207.9	54.7	37.62	29.65	25.19	32.99
Mean	0.930	27.2	10.6	34.6	20.6	6.94	6.71	1.95	1.21	0.988	0.812	1.10
Ac-ft	57	1,670	628	2,130	1,220	427	412	108	75	59	50	65

Calendar year 1953: Max 500 Min 0.52 Mean 9.86 Ac-ft 7,140
 Fiscal year 1953-54: Max 500 Min 0.57 Mean 9.54 Ac-ft 6,900

Peak discharge (base, 850 cfs)--Oct. 15 (2:30 a.m.) 2,370 cfs (5.08 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Oct. 15 to Mar. 23; discharge estimated on basis of records for nearby stations.

Umatac River at Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.16	0.93	*13.8	16.8	60	7.4	2.5	*2.2	1.73	1.28	0.93	1.16
2	4.2	1.42	6.6	9.9	18.6	6.2	2.9	1.90	1.57	1.04	.93	1.16
3	1.57	1.57	14.9	15.3	12.1	5.8	3.2	2.1	1.42	1.04	1.04	.93
4	1.57	1.57	39	9.4	11.8	5.1	3.2	1.90	1.42	1.16	1.42	.93
5	2.3	1.16	38.5	17.8	8.9	4.8	2.9	1.73	1.28	.93	1.16	.93
6	1.42	1.28	87	9.4	7.4	5.1	2.3	1.57	1.28	.93	.93	1.04
7	1.28	1.42	28.5	7.0	6.6	5.1	*1.90	1.57	1.16	1.28	.83	*1.16
8	1.16	1.25	30	8.8	6.2	4.5	2.3	1.73	1.16	1.16	1.16	.93
9	1.04	2.5	36.5	6.6	5.4	4.5	2.1	1.73	1.16	1.90	4.6	1.71
10	1.16	1.57	23.5	5.8	5.1	4.2	2.9	1.57	1.28	1.16	1.28	1.28
11	1.16	1.57	11.5	7.9	30.5	4.2	2.5	1.73	1.42	1.04	1.04	1.04
12	1.04	2.2	8.4	9.3	10.2	3.7	2.3	1.73	1.28	.93	.93	1.04
13	1.16	2.1	8.6	6.8	7.0	3.4	2.3	1.57	1.28	1.04	.83	1.04
14	1.28	1.90	57	*5.8	6.2	3.4	4.9	1.73	1.04	.93	1.16	.93
15	1.16	1.90	65	5.4	6.1	3.4	5.2	1.90	1.16	.83	10.1	.83
16	1.16	1.42	26.5	5.1	5.4	3.4	2.7	1.73	1.16	.93	2.3	.83
17	1.77	2.65	15.1	6.0	4.8	3.2	11.6	1.73	1.04	.83	1.57	1.04
18	2.75	5.3	10.4	5.1	63	3.4	3.7	1.57	*1.04	*.83	1.28	.83
19	1.73	21	8.4	*4.2	10.9	3.2	3.2	1.42	1.04	1.28	1.42	.83
20	1.28	39.5	52	3.95	13.7	2.9	2.7	1.42	1.04	1.73	1.73	.93
21	1.28	11.9	48	5.9	8.4	2.7	2.5	2.7	1.57	1.28	2.1	.83
22	1.42	4.8	36	6.9	14.9	2.9	2.3	2.1	1.28	1.04	1.28	.74
23	1.28	3.4	21.5	8.9	11.7	2.7	2.1	1.73	1.16	.93	1.04	.74
24	1.16	7.4	15.1	5.8	19.3	2.5	1.90	1.57	1.94	.83	1.04	.74
25	1.16	32	11.5	9.8	16.6	2.5	3.6	1.42	1.28	.93	.93	.74
26	1.16	10.9	14.4	11.8	11.8	2.5	11.5	1.42	1.16	.83	.83	.65
27	1.04	7.0	9.4	9.9	39	2.5	3.2	2.1	1.57	.74	1.92	.74
28	1.04	4.8	29.5	10.1	12.8	2.5	2.7	1.90	1.16	.83	1.42	1.28
29	1.16	3.7	10.4	7.0	*9.9	2.9	2.5	-	1.04	.74	1.04	1.28
30	*.83	3.4	18.5	5.8	8.4	2.9	2.1	-----	1.04	.93	.93	1.04
31	1.35	3.7	-----	*121	-----	2.5	2.3	-----	1.04	-----	.83	-----
Total	44.23	187.21	795.5	369.25	452.7	116.0	104.00	49.47	39.20	31.33	50.00	29.35
Mean	1.43	6.04	26.5	11.9	15.1	3.74	3.35	1.77	1.26	1.04	1.61	0.978
Ac-ft	88	371	1,580	732	898	230	206	98	78	62	99	58

Calendar year 1954: Max 121 Min 0.57 Mean 6.45 Ac-ft 4,670
 Fiscal year 1954-55: Max 121 Min 0.65 Mean 6.21 Ac-ft 4,500

Peak discharge (base, 850 cfs).--No peak above base.

* Discharge measurement made on this day.

Umatac River at Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.04	4.9	81	12.8	7.0	4.2	3.7	1.42	0.83	1.16	0.74	1.04
2	.93	3.2	6.5	13.3	6.2	*3.2	2.5	1.16	.93	1.04	.74	.93
3	.83	3.2	6.1	16.5	5.4	2.9	7.6	1.90	1.04	.93	.65	.93
4	1.16	2.6	3.7	8.4	5.9	2.7	2.9	1.73	.83	*.93	1.35	.96
5	.83	2.1	4.1	6.6	4.8	2.5	2.3	1.28	.83	.83	.74	.98
6	26	1.90	5.5	6.2	4.8	2.7	5.6	1.16	.83	.83	.65	.74
7	8.3	1.73	3.95	5.8	4.7	2.3	2.7	1.57	.83	.83	.57	.72
8	13.5	1.57	2.7	4.5	4.2	2.7	2.3	2.3	.83	.74	.74	1.8
9	9.0	1.42	3.0	4.2	4.2	2.3	2.1	2.7	.83	.74	.57	.86
10	3.4	1.57	32.5	3.95	9.7	2.3	1.90	1.90	2.05	.74	.57	.73
11	7.6	*1.73	19.6	3.95	4.5	2.3	*2.1	1.42	1.28	.74	.57	.85
12	12.7	1.57	16.2	3.4	3.7	9.6	1.90	1.28	1.16	.74	.65	.72
13	6.2	1.28	9.2	7.4	3.4	5.8	1.73	1.28	1.04	.74	.65	.67
14	3.95	1.28	6.5	3.95	3.4	4.2	1.57	1.42	1.04	.74	.57	.92
15	2.9	1.16	4.5	3.4	3.2	3.2	1.57	1.16	1.16	.74	.57	.67
16	17.9	1.42	24.5	3.2	2.9	47	1.73	1.73	1.57	.74	.65	.73
17	4.2	1.28	11.7	2.9	3.2	6.9	1.90	1.16	1.16	.83	.57	8.5
18	2.9	3.2	18.3	2.9	3.3	4.5	1.90	1.16	1.16	.74	.57	6.0
19	2.5	2.75	7.9	9.2	2.7	3.7	1.57	1.04	1.16	.74	.57	2.5
20	2.3	3.0	8.4	16.3	2.7	3.95	1.57	*1.04	1.04	.83	.65	1.6
21	1.90	1.90	*12.6	3.7	2.7	3.2	1.42	1.04	1.16	.74	.57	1.2
22	1.90	1.73	20	89	3.3	2.7	1.42	1.04	1.04	.65	.57	1.1
23	2.1	1.96	15.8	15.5	4.3	2.7	1.73	1.04	1.04	.65	.50	1.0
24	1.73	1.57	13.1	17.9	2.7	2.5	1.42	1.04	.93	.65	.50	1.6
25	1.73	1.57	24.5	15.2	2.3	2.5	1.28	1.42	.83	.65	.50	*1.9
26	2.65	1.42	14.8	10.9	2.5	2.3	1.42	1.16	.83	.65	1.16	2.3
27	2.1	1.28	57	*37.5	2.7	2.3	1.42	1.04	1.21	.74	1.04	1.73
28	1.90	1.28	119	25	13.8	2.3	1.28	1.04	9.6	.74	*.74	1.57
29	1.73	1.70	71	19.9	5.5	2.1	1.28	.93	2.1	.83	1.16	1.28
30	1.90	1.28	19.8	10.4	13.5	1.90	1.28	-----	1.28	.83	1.28	1.16
31	11.7	1.91	-----	8.4	-----	1.90	1.28	-----	1.42	-----	1.28	-----
Total	159.48	60.46	643.45	392.25	143.2	145.35	66.37	39.56	43.04	23.48	22.64	47.69
Mean	5.14	1.95	21.4	12.7	4.77	4.69	2.14	1.36	1.39	0.783	0.730	1.59
Ac-ft	316	120	1,280	778	284	288	132	78	85	47	45	95

Calendar year 1955: Max 119 Min 0.65 Mean 5.06 Ac-ft 3,670
 Fiscal year 1955-56: Max 119 Min 0.50 Mean 4.88 Ac-ft 3,550

Peak discharge (base, 850 cfs)--Sept. 27 (11 p.m.) 1,360 cfs (3.39 ft); Oct. 22 (6 a.m.) 1,020 cfs (3.07 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record June 4-25; discharge estimated on basis of records for La Sa Fua River near Umatac.

Umatac River at Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.42	5.8	18.5	9.4	6.0	15.4	6.9	3.0	1.97	1.97	1.63	0.84
2	1.42	5.3	23	6.6	5.3	34.5	5.0	2.75	1.97	3.6	1.18	.84
3	1.42	3.7	12.4	5.8	6.8	20.5	5.3	3.25	1.97	2.35	1.06	.84
4	1.16	3.8	16.4	10.6	5.0	15.2	4.3	5.2	2.75	1.63	1.18	.74
5	1.16	3.2	*16.3	9.6	4.3	10.5	4.0	6.7	3.0	1.63	1.06	.74
6	1.04	2.7	8.4	5.8	4.0	21.5	3.75	3.5	2.35	1.63	.94	.74
7	1.28	4.7	14.3	4.8	5.9	8.5	3.5	3.2	1.97	1.47	1.76	.84
8	1.40	27	13.5	6.2	4.0	6.8	3.5	8.1	1.97	1.47	1.80	.94
9	5.6	13.1	a15.3	4.5	4.3	6.4	3.8	3.25	2.15	1.47	1.32	.84
10	4.0	6.2	a21	5.9	21.5	*5.6	40	3.0	1.80	1.47	1.32	.84
11	2.9	4.5	a30	21.5	7.7	5.0	7.6	3.0	1.63	1.32	1.06	.84
12	3.25	3.4	a23	38	55	5.0	5.3	*2.75	1.80	1.32	.94	1.18
13	9.6	3.2	7.4	9.0	26	4.6	4.3	2.55	1.63	1.32	1.06	1.32
14	24.5	2.9	6.2	10.1	10.0	160	3.75	2.35	1.63	1.63	1.06	.84
15	4.8	5.9	*48	41	6.8	*127	3.75	2.35	*1.63	1.32	.94	.74
16	3.2	3.2	9.9	22.5	67	19.0	5.2	2.15	1.47	1.18	.94	.94
17	2.5	11.4	10.3	8.9	41	12.5	13.4	2.15	1.47	1.18	.84	1.06
18	2.3	5.6	16.7	10.3	54	9.5	4.6	2.15	1.63	1.06	1.76	.64
19	*2.1	3.4	11.7	16.8	16.5	8.5	3.75	3.5	1.63	1.18	.94	.84
20	1.90	2.9	21	7.9	13.7	7.2	5.7	2.55	1.47	1.18	.94	4.2
21	1.57	2.9	14.3	6.2	9.0	7.6	3.75	2.35	1.47	1.47	.84	1.32
22	1.57	2.9	8.4	5.4	11.9	6.0	3.5	2.15	1.47	1.18	*13.6	.94
23	1.42	5.1	42	5.1	18.0	5.3	3.25	2.75	1.47	1.32	1.32	.84
24	4.5	4.9	46	4.5	9.0	5.3	3.25	3.0	1.47	1.18	1.18	.84
25	5.0	3.2	11.5	11.1	7.2	5.3	3.25	2.55	1.63	1.18	1.06	1.18
26	44	11.2	9.4	4.8	7.2	9.9	3.0	2.15	1.47	1.18	1.18	.94
27	9.7	44	12.6	4.4	6.4	8.4	3.0	2.15	3.85	1.06	1.06	.94
28	11.3	48	17.6	*65	5.6	5.0	3.0	1.97	*2.35	1.18	.94	1.06
29	14.0	141	8.4	14.1	6.5	4.6	11.8	-	1.63	1.18	.94	.94
30	40	21	28	9.7	11.5	4.3	3.25	-----	1.47	1.18	.94	1.06
31	9.4	10.8	-----	6.4	-----	5.5	3.5	-----	1.32	-----	.84	-----
Total	219.41	416.9	541.5	391.9	457.1	570.4	181.95	86.52	57.49	43.49	47.63	30.86
Mean	7.08	13.4	18.0	12.6	15.2	18.4	5.87	3.09	1.85	1.45	1.54	1.03
Ac-ft	435	827	1,070	777	907	1,130	361	172	114	86	94	61

Calendar year 1956: Max 160 Min 1.04 Mean 7.76 Ac-ft 5,630
 Fiscal year 1956-57: Max 160 Min 0.64 Mean 8.34 Ac-ft 6,030

Peak discharge (base, 850 cfs).--Aug. 29 (2 p.m.) 2,200 cfs (4.09 ft); Sept. 24 (8:30 a.m.) 860 cfs (2.85 ft); Oct. 15 (6:30 p.m.) 1,120 cfs (3.13 ft); Oct. 28 (1 p.m.) 1,460 cfs (3.51 ft); Nov. 16 (7 p.m.) 1,800 cfs (3.75 ft); Dec. 14 (8 a.m.) 1,210 cfs (3.23 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for La Sa Fua River near Umatac.

Umatac River at Umatac--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.06	0.74	37	3.2	21	5.0	2.6	3.25	1.97	1.47	1.06	5.0
2	1.32	.74	46	2.8	7.2	5.3	2.3	3.0	1.97	1.32	.94	1.47
3	.94	.74	14.6	2.6	7.1	5.0	2.2	3.0	1.80	1.32	.84	1.06
4	1.18	.74	*16	2.5	6.0	4.6	2.2	2.75	1.80	1.47	1.47	.94
5	1.32	.84	10	37	5.6	4.3	2.4	2.55	1.80	1.80	1.18	.94
6	1.18	.94	8.0	200	5.0	4.0	2.2	2.55	1.80	1.32	.94	.84
7	1.06	.64	11	70	5.0	4.0	2.6	2.35	*1.77	1.06	*.84	1.06
8	.94	.74	8.4	20	209	3.75	4.0	2.35	1.80	1.06	.84	1.06
9	.94	.74	7.6	12	35	4.0	2.5	2.35	1.47	1.06	.94	1.18
10	1.32	1.18	5.4	9.0	19.7	3.75	2.3	2.35	1.47	1.32	.94	23
11	.94	.74	7.0	7.0	13.7	3.5	2.8	2.35	1.47	1.47	.84	5.8
12	*15.2	.74	4.5	8.0	120	3.75	2.8	2.35	1.80	1.32	.84	3.5
13	5.0	1.85	3.7	7.4	31.5	3.4	6.0	2.35	1.47	1.63	.74	27.5
14	1.97	2.75	3.2	6.8	20.5	3.5	*80	2.35	1.47	1.47	.74	.94
15	1.47	1.18	3.0	5.8	295	6.0	13.7	2.15	1.47	1.47	.74	13.2
16	1.32	3.4	4.0	5.0	123	5.0	8.0	2.15	1.47	1.18	.64	7.2
17	1.06	4.1	3.3	4.8	29.5	3.7	6.4	2.15	1.47	1.47	.64	5.0
18	.94	9.8	2.9	4.4	18.1	3.4	5.3	2.75	1.47	1.47	.64	3.75
19	.94	13.1	9.0	4.2	14.3	3.1	5.0	2.35	1.32	1.80	.84	3.25
20	1.32	6.3	4.5	4.0	12.0	2.9	7.2	2.15	1.32	1.32	.94	3.0
21	.94	5.6	3.5	4.5	10.0	3.8	5.0	2.15	1.47	1.18	1.18	2.55
22	.94	5.4	17	13	9.0	2.8	4.3	2.15	1.32	1.18	1.80	2.55
23	.94	7.4	6.0	8.2	*7.6	2.7	3.75	2.15	1.32	.94	1.18	2.55
24	.84	18.6	4.5	5.0	7.2	2.7	3.5	3.05	1.47	1.06	.84	2.55
25	.84	12.0	6.0	5.4	7.6	2.5	3.5	2.15	1.63	.94	.84	2.35
26	.74	7.8	3.5	5.8	6.4	2.5	3.25	1.97	1.47	.94	.84	2.15
27	.84	4.6	4.0	8.0	6.8	2.4	3.75	1.97	1.32	.94	.74	2.7
28	1.06	56	3.2	*18	6.0	2.7	3.25	1.97	1.32	.94	.84	2.35
29	.94	19.1	2.7	8.5	5.6	3.2	3.0	-	1.32	1.32	2.35	2.15
30	.74	9.0	4.0	9.2	5.3	2.4	3.0	-----	1.80	.94	1.18	1.80
31	.74	5.6	-----	7.6	-----	2.4	3.0	-----	1.47	-----	1.18	-----
Total	50.98	203.10	263.5	509.7	1,069.7	112.05	201.80	67.16	48.29	38.18	30.56	226.45
Mean	1.64	6.55	8.78	16.4	35.7	3.61	6.51	2.40	1.56	1.27	0.986	7.55
Ac-ft	101	403	523	1,010	2,120	222	400	133	96	76	61	449

Calendar year 1957: Max 295 Min 0.64 Mean 7.28 Ac-ft 5,270
 Fiscal year 1957-58: Max 295 Min 0.64 Mean 7.73 Ac-ft 5,590

Peak discharge (base, 850 cfs).--Sept. 2 (1:30 p.m.) 1,070 cfs (3.11 ft); Nov. 8 (3 p.m.) 1,360 cfs (3.45 ft); Nov. 15 (8 p.m.) 1,680 cfs (3.66 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Sept. 4 to Oct. 28, Dec. 13 to Jan. 14; discharge estimated on basis of records for La Sa Fua River near Umatac and Geus River near Merizo.

Geus River near Merizo

Location.--Lat 13°16'15" N., long 144°40'40" E., on left bank 0.7 mile northeast of Merizo, 2.2 miles southeast of Umatac, and 4.7 miles west of Inarajan.

Drainage area.--0.95 sq mi.

Records available.--April 1953 to June 1958.

Gage.--Water-stage recorder and broad-crested concrete weir. Altitude of gage is 85 ft (by barometer).

Average discharge.--5 years (1953-58), 2.95 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1954-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1954†	Oct. 15, 1953	*2,260	3.62	July 17, 1953	(a)	-
1955	Oct. 31, 1954	*302	2.42	June 23-26, 1955	0.04	0.10
1956	Oct. 27, 1955	*430	2.60	June 16, 1956	.04	.10
1957	Aug. 29, 1956	*1,520	3.33	June 15, 1957	.06	.12
1958	Nov. 8, 1957	*1,240	3.20	July 26, 1957	.06	.12

† Period April 1953 to June 1954.

* From rating curve extended above 55 cfs by test on model of station site.

a No flow part of day.

1953-58: Maximum discharge, 2,260 cfs Oct. 15, 1953 (gage height, 3.62 ft), from rating curve extended above 55 cfs by test on model of station site; no flow part of day July 17, 1953.

Remarks.--Records good except those for periods of fragmentary or no gage-height record and those above 55 cfs, which are poor. Water is diverted half a mile upstream for domestic use and at station for irrigation and municipal use.

Rating table, Apr. 17, 1953, to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Sept. 7 to Oct. 14, 1955)

0.1	0.04	1.0	10.0
.2	.18	1.2	20
.3	.47	1.4	34
.4	.93	1.7	70
.5	1.57	2.0	118
.6	2.4	2.3	230
.7	3.5	2.6	430
.8	5.0	3.0	900
.9	7.0		

Discharge, in cubic feet per second, 1953

Day	Apr.	May	June	Day	Apr.	May	June	Day	Apr.	May	June	Day	Apr.	May	June
1	-	0.16	0.16	9	-	0.10	0.12	17	†0.31	0.23	0.23	25	0.25	0.23	0.14
2	-	.16	.14	10	-	.10	.08	18	.25	*.25	.26	26	.25	.20	.13
3	-	.16	.10	11	-	.20	.10	19	.28	*.18	.31	27	.25	.20	.29
4	-	*.18	.12	12	-	.23	.10	20	.28	.18	.31	28	.23	.25	.44
5	-	.12	*.17	13	-	.06	.12	21	.31	.23	.34	29	.20	.17	.43
6	-	.12	.24	14	-	.12	.10	22	.28	.23	.37	30	.18	.18	.25
7	-	.12	.16	15	-	.14	.16	23	.28	.23	.47	31	-	.27	-
8	-	.12	.14	16	-	.25	.20	24	.25	.25	.20				
Total													-	5.62	6.38
Mean													-	0.181	0.213
Runoff in acre-feet													-	11	13

Peak discharge (base, 350 cfs).--No peak above base.

* Discharge measurement made on this day.
† Result of discharge measurement.

Geus River near Merizo--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.25	0.62	3.5	3.0	1.98	2.5	0.98	0.59	0.55	0.25	0.38	0.18
2	.18	1.35	8.0	2.4	1.82	2.5	.93	.55	.47	.51	.25	.16
3	.20	2.2	4.5	2.0	1.74	3.1	.98	.47	.43	.37	.30	.14
4	.20	1.24	3.2	1.7	1.50	*4.0	.87	.51	.47	.40	.23	.18
5	.25	1.02	2.5	1.6	1.48	2.95	.82	.47	.43	.37	.19	.25
6	.23	.87	2.1	1.4	1.38	1.82	.82	.47	.40	.34	*.18	.25
7	.23	.40	1.9	3.0	1.32	1.48	.77	.40	.40	.31	.14	.23
8	.23	.63	1.7	1.8	1.76	1.29	.82	.40	.62	.31	.18	.63
9	.14	.82	1.5	1.4	1.36	1.22	24	.37	.47	.36	.23	.40
10	.16	10.4	1.4	1.3	2.2	1.20	5.0	.31	.40	.28	.23	.37
11	.16	84	1.3	1.3	1.74	1.12	2.2	.31	.43	.28	.16	.28
12	.25	6.6	1.2	1.6	60	1.96	1.5	.34	.40	.28	.25	.25
13	.28	2.6	1.1	1.4	80	1.36	1.3	.28	.34	.44	.25	.25
14	.31	2.05	1.1	1.4	15	5.4	1.2	.28	.34	.28	.14	.25
15	.31	5.4	1.1	550	5.5	4.4	1.3	.28	.31	.28	.18	.25
16	.28	5.4	*1.0	100	3.7	5.6	1.1	.23	.31	.34	.18	.18
17	.30	6.8	.98	30	2.8	5.4	1.0	.23	.40	.28	.18	.14
18	3.4	30	1.84	12	2.3	2.6	*.93	.23	.34	.25	.18	.18
19	.57	8.0	2.3	6.5	2.0	1.74	.93	.18	.34	.34	.23	.20
20	.87	4.0	2.15	*4.3	1.8	1.36	.82	.47	.25	.25	.25	.14
21	*.69	2.8	4.3	3.3	1.7	1.10	.93	.23	.25	.28	.25	*.16
22	.23	2.3	2.95	2.85	1.6	5.8	.82	.51	.34	.28	.18	1.77
23	.63	1.8	2.3	2.6	1.5	2.3	.72	.55	*.40	.31	.33	.78
24	.62	7.0	2.1	2.25	8.0	1.57	.72	.51	.37	.25	.47	.47
25	.37	3.8	3.4	2.15	2.8	1.64	.72	.51	.37	.25	.31	1.55
26	.30	2.2	12.0	1.90	2.1	1.36	.68	.59	.37	.23	.23	.43
27	.43	1.7	3.4	1.82	1.8	1.36	.68	.68	.28	.25	.23	.31
28	.63	29	14.0	2.6	1.6	1.16	.68	.81	.31	.25	.20	.25
29	.54	15	5.8	3.05	1.5	1.04	.63	-	.34	.23	.25	.23
30	.49	1.3	4.0	2.75	2.5	1.04	.59	-	.31	.18	.20	.23
31	.63	6.0	-----	2.05	-----	.98	.63	-----	.28	-----	.18	-----
Total	14.36	247.30	98.62	755.42	216.48	72.35	56.07	11.76	11.72	9.03	7.14	11.09
Mean	0.463	7.98	3.29	24.4	7.22	2.33	1.81	0.420	0.378	0.301	0.230	0.370
Ac-ft	28	491	196	1,500	429	144	111	23	23	18	14	22

Calendar year 1953: Max - Min - Mean - Ac-ft -
 Fiscal year 1953-54: Max 550 Min 0.14 Mean 4.14 Ac-ft 3,000

Peak discharge (base, 350 cfs).--Aug. 11 (2 p.m.) 350 cfs (2.50 ft); Oct. 15 (1 a.m.) 2,260 cfs (3.62 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Aug. 18 to Sept. 16, Sept. 30 to Oct. 20, Nov. 12 to Dec. 4, Jan. 10-18; discharge estimated on basis of records for nearby stations.

Geus River near Merizo--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.28	0.12	*10	6.6	29.5	2.4	0.83	0.59	0.43	0.51	0.31	0.14
2	2.6	.28	3.0	4.2	6.2	2.15	.85	.59	.40	.40	.23	.20
3	.64	.43	2.2	10.0	3.75	1.82	.90	.68	.40	.37	.20	.12
4	.61	.46	10	6.6	2.95	1.74	.90	.68	.34	.31	.18	.10
5	1.65	.28	17	3.9	2.5	1.65	*.83	.51	.51	.25	.14	.12
6	.63	.35	20	2.95	2.15	1.57	.77	.55	.34	.23	.12	.18
7	.37	.44	6.4	2.25	1.82	1.7	.77	.55	.34	.28	.14	.16
8	.28	1.23	5.6	3.15	1.74	1.4	.93	.55	.28	.25	.24	.16
9	.25	2.85	6.6	2.6	1.57	1.4	.77	.51	.31	.52	1.93	.73
10	.23	1.64	5.0	2.05	1.50	1.4	.82	.43	.37	.34	.42	.25
11	.20	.72	2.05	2.05	10.4	1.4	.82	.51	.40	.25	.23	.18
12	.24	.72	1.65	1.90	4.4	1.2	.72	.43	.37	.25	.18	.14
13	.70	.91	1.90	1.65	2.5	1.2	.90	.55	.37	.25	.18	.20
14	.50	1.45	9.5	*1.48	2.4	1.2	1.31	.55	.31	.25	.23	.16
15	.28	1.22	14.0	1.36	2.2	1.2	1.87	.55	.28	.23	2.6	.16
16	.25	.68	4.8	1.22	2.15	1.1	.98	.43	.40	.16	.78	.14
17	.32	.55	2.05	2.05	1.65	1.1	3.5	.51	.34	.18	f.40	.12
18	1.13	1.82	1.74	1.43	29.5	1.6	1.49	.47	*.37	*.23	f.25	.12
19	.68	18	1.74	1.22	5.8	1.1	1.04	.40	.31	.37	f.77	.09
20	.37	25	16.7	1.16	5.2	1.1	.82	.37	.34	.40	f.93	.12
21	.31	5.0	14.0	2.2	3.15	1.1	.77	.68	.43	.31	f.51	.14
22	.31	2.0	9.1	2.3	3.7	1.2	.68	.55	.40	.23	f.25	.12
23	.23	1.4	4.2	1.94	5.5	1.0	.68	.37	.31	.23	f.25	.07
24	.28	4.0	2.95	1.57	8.0	1.0	.63	.40	1.03	.18	f.14	.07
25	.25	20	2.25	1.98	7.5	.95	1.22	.43	.37	.23	f.25	.07
26	.23	5.0	2.85	3.65	4.5	.95	3.9	.37	.40	.23	f.25	.07
27	.20	2.8	2.4	4.6	15	.90	1.29	.55	.47	.20	*f3.9	.09
28	.20	2.0	10.0	6.0	4.5	.90	.93	.47	.40	.20	.21	.10
29	.18	1.5	3.9	3.3	3.2	1.0	.77	-	.37	.14	.14	.20
30	*.18	1.2	3.9	2.05	*2.6	.90	.68	-----	.34	.16	.12	.16
31	.14	1.4	-----	63	-----	.90	*.68	-----	.40	-----	.12	-----
Total	14.70	105.45	197.48	152.41	177.53	40.23	34.05	14.23	11.93	8.14	16.60	4.68
Mean	0.474	3.40	6.58	4.92	5.92	1.30	1.10	0.508	0.385	0.271	0.535	0.156
Ac-ft	29	209	392	302	352	80	68	28	24	16	33	9.2

Calendar year 1954: Max 63 Min 0.12 Mean 2.18 Ac-ft 1,580
 Fiscal year 1954-55: Max 63 Min 0.07 Mean 2.13 Ac-ft 1,540

Peak discharge (base 350 cfs).--No peak above base.

* Discharge measurement made on this day.
 f Fragmentary gage-height record; discharge computed from partly estimated gage heights.
 Note.--No gage-height record Aug. 19 to Sept. 6, Nov. 22-30, Dec. 7 to Jan. 5; discharge estimated on basis of records for nearby stations.

Geus River near Merizo--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.16	2.35	35	6.2	1.98	1.92	0.88	0.37	0.28	0.34	0.16	0.28
2	.14	1.34	3.0	7.6	1.74	1.10	.63	.34	.31	.28	.23	.18
3	.10	1.29	2.4	6.6	1.50	.82	1.94	.47	.34	.23	.16	.14
4	.12	.93	1.5	3.8	1.50	.77	.77	.40	.28	*.28	.29	.23
5	.10	.59	1.6	3.75	1.22	.63	.59	.34	.28	.20	.14	.23
6	*5.3	.43	2.0	4.0	1.16	.72	.92	.34	.25	.26	.14	.16
7	2.35	.34	1.5	3.65	1.26	.63	.63	.52	.23	.24	.12	.12
8	6.2	.28	1.1	2.3	1.16	.77	.55	.59	.23	.20	.18	.29
9	3.9	.25	1.3	1.84	1.04	.63	.51	.93	.25	.20	.14	.12
10	1.04	.25	12	1.50	2.45	.59	*.43	.59	.43	.16	.12	.08
11	2.75	*.28	7.0	1.43	1.29	.59	.66	.43	.37	.19	.12	.12
12	6.6	.25	4.5	1.29	1.10	3.0	.51	.40	.31	.14	.10	.12
13	2.9	.16	3.2	3.5	.98	2.15	.51	.40	.23	.20	.08	.08
14	1.30	.14	3.0	1.81	.87	1.82	.40	.40	.23	.20	.08	.08
15	.77	.16	2.2	1.5	.87	1.10	.47	.37	.28	.23	.09	.08
16	7.0	.20	9.0	1.3	.87	20	.51	.47	.43	.18	.08	.08
17	1.73	.16	6.0	1.2	.82	3.75	.51	*.37	.28	.25	.08	6.8
18	.87	1.67	10	1.1	1.48	1.82	.55	.37	.37	.20	.07	.19
19	.59	.48	4.7	2.5	.82	1.16	.47	.37	.34	.16	.07	.69
20	.43	.44	3.5	7.0	.77	1.10	.43	.34	.23	.25	.21	.37
21	.37	.31	*5.0	1.5	.77	.87	.44	*.37	.37	.23	.13	.25
22	.37	.40	10	*40	.87	.77	.40	.37	.25	.16	.09	.20
23	.28	.51	5.8	5.0	1.24	.72	.51	.40	.23	.25	.08	.22
24	.25	.46	5.0	*9.0	.77	.68	.47	.37	.18	.25	*.08	.44
25	.25	.37	15.1	4.6	.72	.63	.43	.51	.20	.25	.12	1.14
26	.23	.25	9.2	3.8	.68	.59	.37	.40	.20	.17	.28	1.06
27	.20	.18	27.5	21.5	.77	.55	.40	.37	.41	.16	.18	.63
28	.20	.18	46	11.8	2.75	.51	.34	.34	3.6	.16	.14	.40
29	.16	.16	25	5.6	1.84	.55	.40	.28	.73	.23	.26	.43
30	.77	.23	6.0	4.7	4.2	.51	.40	-----	.37	.31	.41	.25
31	4.6	.20	-----	2.8	-----	.47	.40	-----	.43	-----	.36	-----
Total	52.03	15.24	269.1	174.17	39.49	51.92	17.43	12.22	12.92	6.56	4.79	15.46
Mean	1.68	0.492	8.97	5.62	1.32	1.67	0.562	0.421	0.417	0.219	0.155	0.515
Ac-ft	103	30	534	345	78	103	35	24	26	13	9.5	31

Calendar year 1955: Max 46 Min 0.07 Mean 1.89 Ac-ft 1,370
 Fiscal year 1955-56: Max 46 Min 0.07 Mean 1.83 Ac-ft 1,330

Peak discharge (base, 350 cfs).--Oct. 27 (2:30 a.m.) 430 cfs (2.60 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Sept. 1-21, Oct. 15-24; discharge estimated on basis of records for nearby stations.

Geus River near Merizo--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.43	1.62	2.7	4.0	1.9	5.6	2.25	1.04	0.68	0.47	0.62	0.20
2	.37	1.59	5.7	2.5	1.7	11.3	1.82	.93	.55	<u>1.12</u>	.40	.20
3	.40	1.10	4.2	2.0	1.8	11.7	2.0	1.33	.59	.68	.37	.16
4	.31	.82	*6.8	2.6	1.6	9.8	1.57	1.65	.72	.51	.31	.16
5	.38	.72	6.5	2.4	1.5	4.3	1.50	2.2	.82	.47	.43	.18
6	.56	<u>.55</u>	2.75	1.7	1.4	7.7	1.36	1.16	.72	.43	.34	.14
7	.59	1.22	4.6	1.5	*1.6	3.05	1.22	1.26	.59	.47	.63	.16
8	.52	12.9	6.2	1.6	<u>1.36</u>	2.25	1.22	<u>2.55</u>	.55	.43	.55	.16
9	3.5	10.0	14.0	1.4	<u>1.50</u>	1.90	1.25	<u>1.16</u>	.63	.55	.34	.18
10	1.35	2.6	5.5	1.6	3.85	*1.65	<u>9.8</u>	1.04	.59	.59	.31	.18
11	1.10	1.70	4.9	10	2.15	1.50	3.5	.93	.59	.43	.28	.18
12	1.10	1.16	*4.9	17	18.4	1.50	2.15	*.85	.59	.40	.28	.20
13	3.25	.93	2.6	4.5	14.8	<u>1.43</u>	1.65	.82	.55	.40	.28	.34
14	6.3	.68	<u>2.05</u>	4.0	3.75	<u>67</u>	1.36	.77	.55	.51	.28	.18
15	2.05	.84	<u>17.1</u>	19	2.25	47	1.29	.77	.51	.43	.28	.14
16	.87	.63	5.3	15	16.5	7.4	1.54	.72	.51	.37	.23	.12
17	.55	2.05	3.35	4.5	14.5	4.3	3.4	.72	.51	.37	.26	<u>.10</u>
18	.40	2.7	3.4	5.0	<u>22.5</u>	2.95	1.57	.72	.51	.37	<u>.18</u>	.12
19	*.40	1.10	3.05	9.2	8.3	2.5	1.36	1.59	.47	.37	.20	.28
20	.31	.72	9.8	3.3	6.0	2.25	2.4	1.02	.47	.34	.23	<u>.85</u>
21	.28	.73	4.6	2.15	3.45	2.3	1.50	.82	.43	.47	.23	.31
22	.23	.73	2.85	1.92	3.4	1.98	1.16	.82	.43	.37	*.72	.20
23	<u>.18</u>	1.06	9.1	1.67	8.3	1.82	1.04	.98	.37	.31	<u>.28</u>	.25
24	.34	8.0	14.7	<u>1.36</u>	3.4	1.65	.98	.98	.37	.28	.25	.20
25	.46	3.65	4.6	1.70	2.5	1.65	.96	.77	.43	.34	.23	.31
26	<u>17.5</u>	3.25	3.65	1.36	2.7	2.7	<u>.93</u>	.72	.37	.28	.20	.20
27	<u>3.9</u>	20.5	4.4	1.37	1.98	2.3	<u>.93</u>	<u>.68</u>	<u>.96</u>	<u>.25</u>	.20	.18
28	5.2	9.3	6.2	<u>42</u>	1.82	1.74	.93	.68	*.61	.28	.20	.18
29	5.9	<u>111</u>	3.4	<u>10.2</u>	1.78	1.57	3.6	-	.43	.40	.20	.16
30	16.2	<u>10.7</u>	14	3.45	9.6	1.50	1.22	-----	.40	.34	.20	.20
31	4.0	4.7	-----	2.1	-----	1.57	1.43	-----	.40	-----	.18	-----
Total	78.93	219.25	182.90	182.08	166.29	217.86	58.89	29.68	16.90	13.03	9.69	6.42
Mean	2.55	7.07	6.10	5.87	5.54	7.03	1.90	1.06	0.545	0.434	0.313	0.214
Ac-ft	157	435	363	361	330	432	117	59	34	26	19	13

Calendar year 1956: Max 111 Min 0.07 Mean 3.05 Ac-ft 2,220
 Fiscal year 1956-57: Max 111 Min 0.10 Mean 3.24 Ac-ft 2,350

Peak discharge (base, 350 cfs).--Aug. 29 (1 p.m.) 1,520 cfs (3.33 ft); Oct. 28 (12:30 p.m.) 886 cfs (2.99 ft); Dec. 14 (9 a.m.) 676 cfs (2.83 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Sept. 30 to Oct. 18, Oct. 31 to Nov. 7; discharge estimated on basis of records from nearby stations.

Geus River near Merizo--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	M.P.S.	Apr.	May	June
1	0.23	0.12	23.5	0.77	12.7	1.50	0.72	0.98	0.59	0.31	0.31	1.79
2	.23	.10	10.8	.72	2.45	1.57	.72	.93	.55	.31	.28	.51
3	.16	.12	4.5	.63	1.65	1.43	.68	.98	.51	.31	.23	.34
4	.14	.14	*11.0	.59	1.36	1.36	.79	.77	.51	.34	.46	.31
5	.18	.18	5.1	13.4	1.29	1.29	.77	.77	.51	.31	.34	.28
6	.18	.16	4.5	121	1.10	1.22	.72	.72	.47	.34	.31	.27
7	.14	.18	6.3	23	1.10	1.16	.72	.72	.58	.28	*.25	.42
8	.09	.14	4.5	7.1	129	1.16	1.86	.72	.55	.28	.25	.34
9	.10	.14	3.3	4.9	16.0	1.16	.82	.72	.47	.28	.20	.31
10	.22	.18	4.4	3.7	5.5	1.10	.77	.72	.47	.48	.20	12.8
11	.25	.12	2.65	2.4	3.3	1.10	1.08	.72	*.40	.34	.20	2.75
12	*3.7	.14	1.74	3.4	72	1.16	1.16	.68	.40	.34	.20	2.0
13	1.71	.49	1.57	3.15	11.9	1.04	2.25	.68	.37	.62	.20	16.9
14	.43	.83	1.22	2.9	6.7	1.04	*45	.63	.40	.40	.16	57
15	.28	.25	1.04	2.15	172	1.39	*6.3	.63	.34	.34	.16	4.7
16	.23	.23	1.55	1.57	49	1.29	2.6	.59	.37	.31	.18	2.3
17	.18	.48	1.65	1.36	8.4	1.16	1.74	.59	.31	.43	.14	1.29
18	.18	1.96	1.29	1.16	4.9	.98	1.43	.77	.34	.31	.16	.98
19	.16	1.54	3.55	1.10	3.65	.93	1.36	.72	.34	.34	.20	.77
20	.24	1.02	2.05	1.04	2.9	.87	3.2	.63	.37	.31	.20	.68
21	.18	1.19	1.16	1.38	2.45	.93	1.98	.59	.37	.34	.25	.59
22	.18	1.27	8.0	6.8	2.25	.87	1.43	.55	.32	.28	.50	.59
23	.12	2.4	2.95	4.3	*2.05	.82	1.16	.63	.34	.25	.43	.68
24	.12	10.3	3.65	1.08	1.90	.82	1.04	1.13	.34	.31	.38	.61
25	.12	4.7	4.7	1.65	1.98	.77	.98	.68	.31	.28	.28	.64
26	.12	2.35	2.1	1.66	1.77	.77	.93	.59	.31	.25	.25	.51
27	.10	1.04	1.43	2.65	2.25	.72	1.10	.55	.37	.25	.25	.59
28	.18	27.5	1.16	*10.5	1.98	.82	.98	.59	.34	.25	.34	.59
29	.18	9.0	1.24	2.7	1.82	.87	.87	-	.31	.34	.93	.51
30	.12	2.4	.87	1.65	1.57	.77	.87	-----	.55	.28	.47	.40
31	.12	1.22	-----	1.75	-----	.72	.93	-----	.34	-----	.57	-----
Total	10.57	71.89	123.47	232.16	526.92	32.79	86.96	19.98	12.75	9.81	9.28	112.45
Mean	0.341	2.32	4.12	7.49	17.6	1.06	2.81	0.714	0.411	0.327	0.299	3.75
Ac-ft	21	143	245	460	1,050	65	172	40	25	19	18	223

Calendar year 1957: Max 172 Min 0.09 Mean 3.10 Ac-ft 2,250
 Fiscal year 1957-58: Max 172 Min 0.09 Mean 3.42 Ac-ft 2,480

Peak discharge (base, 350 cfs).--Oct. 6 (6 a.m.) 1,100 cfs (3.12 ft); Nov. 8 (1:30 p.m.) 1,240 cfs (3.20 ft); Nov. 12 (12 m.) 500 cfs (2.67 ft); Nov. 15 (7 a.m.) 1,100 cfs (3.12 ft).

* Discharge measurement made on this day.

Inarajan River near Inarajan

Location.--Lat 13°16'40" N., long 144°44'15" E., on right bank 0.6 mile northwest of Inarajan and 4.9 miles east of Merizo.

Drainage area.--4.5 sq mi.

Records available.--September 1952 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 25 ft (by barometer).

Average discharge.--5 years (1953-58), 16.1 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1953-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)*	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1953†	Feb. 22, 1953	(**)	(**)	June 14, 1953	††1.51	-
1954	Oct. 15, 1953	2,110	12.31	July 11, 1953	1.25	0.39
1955	Sept. 6, 1954	1,640	10.21	June 23,28,1955	1.34	.38
1956	Sept.10, 1955	2,080	12.25	June 7-9,1956	1.34	.38
1957	Oct. 28, 1956	2,060	12.13	June 27, 1957	1.43	.39
1958	Oct. 6, 1957	2,110	12.27	Aug. 6, 1957	1.25	.37

† Period September to June.

* From rating curve extended above 620 cfs on basis of velocity-area studies.

†† Minimum daily.

** Unknown.

1952-58: Maximum discharge, 2,110 cfs Oct. 15, 1953, Oct. 6, 1957, from rating curve extended above 620 cfs on basis of velocity-area studies; maximum gage height, 12.31 ft Oct. 15, 1953; minimum discharge, 1.25 cfs July 11, 1953, Aug. 6, 1957.

Remarks.--Records good except those for periods of fragmentary or no gage-height record and those for period of indefinite stage-discharge relation, which are poor.

Inarajan River near Inarajan--Continued

Rating tables, Sept. 12, 1952, to June 30, 1958, except period of indefinite stage-discharge relation (gage height, in feet, and discharge, in cubic feet per second)

Sept. 13, 1952, to Sept. 6, 1954

0.4	1.32	1.6	72
.5	2.45	2.0	148
.6	4.05	3.0	295
.8	9.1	4.0	460
1.0	17.0	6.0	820
1.2	28	8.0	1,200
1.4	47	10.0	1,600

Sept. 7, 1954, to June 30, 1958

0.3	0.72	1.0	19.0
.4	1.53	1.2	32.5
.5	2.8	1.4	51
.6	4.5	1.6	75
.7	6.9	2.0	148
.8	9.9	3.0	295
.9	13.6		

Discharge, in cubic feet per second, September 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			-	20	12.6	23.5	12.2	4.3	7.1	e3.4	e2.3	2.05
2			-	13.5	11.2	44	10.2	4.2	6.2	e3.4	e2.3	2.05
3			-	11.9	9.8	21.5	8.5	4.1	5.7	e3.4	e2.2	1.95
4			-	11.6	13.5	17	7.9	4.2	13.3	e3.2	e2.2	1.83
5			-	9.8	f73	14	10.5	4.1	6.5	e3.2	e2.2	2.05
6			-	9.1	18.5	13	8.5	4.2	5.9	e3.2	e2.1	2.45
7			-	22.5	23	35	7.6	4.5	6.8	e3.2	e2.1	1.83
8			-	*12.6	f44	14	8.8	4.3	8.2	e3.1	e2.1	1.72
9			-	42	f43	12	7.1	4.1	6.2	e3.1	e2.0	1.61
10			-	18.0	f35	25	6.5	4.1	6.0	e3.1	e2.0	*1.67
11			-	12.6	31	13	6.2	4.1	e5.6	e2.9	*e2.0	1.95
12			-	10.5	18.5	14	*6.2	4.3	e5.4	e2.9	2.2	2.05
13			68	10.5	13.9	11	6.2	4.1	e5.2	e2.9	2.05	1.61
14			54	15.2	12.7	12	5.8	4.0	e5.0	e2.9	2.05	1.51
15			15.2	11.2	13.0	10	5.8	3.9	e5.0	e2.8	2.05	2.6
16			10.8	8.8	f41	10	5.6	3.9	e4.9	e2.8	2.45	4.0
17			9.8	32.5	17	*9.3	5.6	3.8	e4.9	e2.8	2.2	2.7
18			8.5	82	13.5	9.1	5.4	3.7	e4.9	e2.8	2.7	2.6
19			7.1	58	19.3	8.2	5.2	3.8	e4.7	e2.6	2.3	2.6
20			6.2	16.6	30	7.6	5.2	*3.7	e4.6	e2.6	2.3	2.45
21			5.7	20	18.0	7.6	5.0	3.7	e4.4	e2.6	2.2	2.6
22			5.7	13.2	15.2	9.7	5.0	f338	e4.3	e2.6	2.05	2.45
23			56	10.8	23	26.5	6.4	60	e4.3	e2.5	2.05	2.85
24			12.2	33.5	13.5	10.2	5.2	14.8	e4.1	e2.4	2.05	2.05
25			9.1	12.2	37.5	18.7	4.5	10.5	e4.0	e2.4	2.2	1.83
26			8.5	21.5	16.6	9.4	4.4	8.8	e3.8	e2.4	1.95	1.61
27			9.1	17.3	13.9	9.1	4.3	8.5	e3.8	e2.4	1.83	1.83
28			18.4	11.6	12.7	8.8	4.3	6.8	e3.8	e2.4	1.95	2.7
29			68	10.2	42	10.2	4.3	-	e3.6	e2.3	1.95	2.85
30			64	44	23.5	7.6	4.5	-----	e3.6	e2.3	2.05	2.05
31			-----	20	-----	49	4.4	-----	e3.6	-----	2.45	-----
Total			-	643.2	709.4	490.0	197.3	532.5	165.4	84.6	66.53	66.10
Mean			-	20.7	23.6	15.8	6.36	19.0	5.34	2.82	2.15	2.20
Ac-ft			-	1,280	1,410	972	391	1,060	328	168	132	131
Calendar year			: Max	Min	Mean	Mean	Ac-ft	Ac-ft				
Fiscal year			: Max	Min	Mean	Mean	Ac-ft	Ac-ft				

* Discharge measurement made on this day.

e Stage-discharge relation indefinite; discharge estimated on basis of records for nearby stations.

f Fragmentary gage-height record; discharge computed from partly estimated gage heights.

Note.--No gage-height record Nov. 17, Dec. 4-17, Jan. 13 to Feb. 19; discharge estimated on basis of records for nearby stations.

Inarajan River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.72	1.83	28	16	19	21.5	10.5	7.1	4.8	2.6	3.2	1.72
2	1.51	1.95	28	15	18	26	10.5	6.5	4.6	4.6	2.2	1.72
3	1.83	2.7	180	14	18	20.5	10.5	6.2	4.8	3.5	2.2	1.72
4	1.95	2.05	30	16	17	22	9.8	6.5	4.4	3.35	2.05	1.61
5	2.05	1.83	24	14	16	17.5	9.1	6.2	4.4	2.85	2.05	1.72
6	1.95	2.7	20	13	15	16.1	9.8	6.5	4.0	2.85	1.95	1.95
7	1.95	2.85	19	13	15	15.7	9.1	6.2	4.0	2.85	1.83	1.95
8	1.51	2.45	18	20	17	13.9	8.8	6.0	5.1	2.85	1.72	2.6
9	1.61	2.85	17	15	15	13.5	275	5.7	4.6	2.6	1.95	2.6
10	2.2	28	16	13	26	13.5	22	5.5	3.85	2.45	*1.95	2.05
11	1.72	470	15	12	18	13.9	14.4	5.5	4.8	2.3	1.95	2.05
12	4.8	191	14	17	400	20.5	13.5	5.5	4.2	2.45	2.45	1.83
13	2.3	53	13	13	600	14.4	12.6	5.1	4.4	3.2	1.95	1.72
14	2.2	21.5	12	17	50	154	10.5	5.1	3.85	2.6	1.95	1.83
15	2.2	36	13	1,580	36	27	*32.5	5.1	3.85	2.45	2.05	1.72
16	2.2	80	15	917	34	42	11.9	4.8	3.7	2.3	2.05	1.72
17	2.2	38	12	234	28	29	10.5	4.8	4.8	2.3	2.05	*1.72
18	2.1	180	17	60	26	19.0	9.8	4.8	*3.85	2.45	2.05	1.61
19	2.45	34	16	75	24	15.7	9.1	4.6	3.7	2.3	2.2	1.72
20	1.83	22	18	50	22	14.4	9.1	8.6	3.5	2.2	2.05	1.61
21	*1.77	20	22	*40	22	13.5	9.8	5.3	3.2	2.3	2.2	1.61
22	2.7	18	*20	32	20	67	8.8	6.5	3.35	2.3	1.95	11.5
23	1.95	15	14	30	20	16.1	8.5	4.8	3.5	2.6	2.3	4.3
24	2.2	44	14	26	*50	13.9	8.2	4.6	3.0	2.2	3.5	2.6
25	2.3	24	20	24	21	14.8	7.9	4.6	3.0	2.2	2.45	8.0
26	2.85	18	44	22	18.0	13.0	7.6	4.6	2.85	2.05	2.3	2.7
27	2.6	15	20	22	18.0	13.5	8.2	6.8	2.7	2.05	1.95	2.45
28	2.05	369	90	40	17.0	11.9	7.6	6.8	2.7	2.05	1.95	2.45
29	2.05	150	36	28	15.7	11.6	7.4	-	2.85	2.05	1.95	2.05
30	1.83	100	24	22	32	11.2	7.1	-----	2.7	2.2	1.83	2.2
31	1.72	40	-----	20	-----	10.5	7.4	-----	2.7	-----	1.72	-----
Total	85.20	1,987.71	829	3,430	1,647.7	727.1	597.5	160.3	117.75	77.05	65.95	77.03
Mean	2.75	64.1	27.6	111	54.9	23.5	19.3	5.72	3.80	2.57	2.13	2.57
Ac-ft	169	3,940	1,640	6,800	3,270	1,440	1,190	318	234	153	131	153

Calendar year 1953: Max 1,580 Min 1.51 Mean 26.9 Ac-ft 19,470
 Fiscal year 1953-54: Max 1,580 Min 1.51 Mean 26.9 Ac-ft 19,440

Peak discharge (base, 1,500 cfs).--Aug. 11 (3 p.m.) 1,730 cfs (10.60 ft); Aug. 18 (1 a.m.) 1,730 cfs (10.63 ft); Aug. 28 (10 a.m.) 1,780 cfs (10.81 ft); Oct. 15 (3:30 a.m.) 2,110 cfs (12.31 ft); Nov. 13 (time and discharge unknown); Jan. 9 (11 a.m.) 1,560 cfs (9.76 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Aug. 15 to Oct. 14, Oct. 18 to Nov. 24; discharge estimated on basis of records for nearby stations.

Inarajan River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.3	1.95	39.5	18	138	12.5	6.4	4.7	3.25	3.25	2.65	3.05
2	11.0	5.1	15.0	15	22	12.1	5.9	4.5	3.1	2.8	1.95	3.35
3	2.85	2.85	9.1	28	19.1	11.0	6.6	4.7	2.95	2.65	1.84	1.95
4	3.6	2.3	123	16	17.4	10.3	7.2	4.9	*3.1	2.5	1.95	1.84
5	4.5	2.2	138	26	14.1	9.9	7.8	4.1	3.1	2.35	1.84	1.95
6	2.45	7.4	147	16	12.9	10.6	6.2	4.1	2.95	2.2	1.84	2.1
7	2.2	4.4	41	15	12.1	10.6	5.9	4.1	2.95	2.8	1.84	*2.3
8	2.05	9.6	42	17	11.8	10.3	7.9	3.95	2.8	2.5	2.95	2.2
9	2.05	11.1	49	16	11.0	9.3	5.9	3.75	2.95	4.4	10.1	3.6
10	1.95	4.4	44	15	10.6	9.3	6.4	3.75	3.1	2.65	2.65	2.5
11	1.83	3.2	18.5	28	58	9.6	6.2	3.95	3.4	2.35	2.2	1.84
12	1.95	7.7	14.8	*17	17.2	8.7	5.6	3.95	3.25	2.2	2.05	1.84
13	3.35	9.4	16.9	14.0	13.2	8.4	6.2	3.75	3.1	2.5	1.95	1.95
14	3.5	29.5	142	13.2	12.5	8.4	8.2	3.95	2.8	*2.35	2.5	1.84
15	2.2	5.3	175	12.1	13.0	8.1	8.3	4.1	2.65	2.2	9.8	1.84
16	2.05	3.85	42	11.8	12.8	8.4	5.6	3.75	3.5	2.2	3.1	1.63
17	1.95	3.85	28	11.8	10.3	8.4	16.2	3.95	3.1	2.05	2.35	1.95
18	3.55	4.0	20	11.0	126	9.8	6.9	3.75	2.95	2.05	2.05	2.05
19	9.3	115	17	10.3	21.5	7.8	6.2	3.4	2.8	3.1	1.95	1.74
20	3.65	78	169	9.9	25	7.5	5.9	3.4	2.65	3.25	2.2	1.74
21	2.6	25	60	10.3	13.6	7.2	5.4	5.4	3.1	2.5	1.84	1.84
22	2.85	11	90	12.0	16.9	7.2	5.2	4.9	3.3	2.2	1.84	1.63
23	2.2	7.6	36	12.9	61	7.2	4.9	3.75	2.5	2.05	1.84	1.53
24	3.0	32	24	9.9	15.8	6.6	5.2	3.25	4.2	2.05	1.74	1.63
25	2.3	71	20	16.4	21	6.6	8.5	3.25	2.95	2.2	1.74	1.63
26	2.2	14.8	22	15.6	13.6	6.6	13.5	2.95	3.4	1.95	1.74	1.53
27	1.95	10.1	18	16.5	68	6.4	6.2	4.7	2.95	1.84	6.2	1.84
28	1.95	7.9	55	12.1	17.9	6.2	5.6	3.75	2.65	2.05	3.2	1.63
29	*2.2	7.4	90	10.3	*14.7	6.6	5.4	-	2.5	1.95	2.2	2.8
30	2.05	9.2	28	9.3	15.2	*6.6	4.9	-----	2.5	1.95	1.95	1.95
31	1.95	*6.5	-----	140	-----	6.2	*5.2	-----	2.5	-----	1.84	-----
Total	93.53	513.60	1,733.8	586.4	836.2	264.4	211.5	112.45	93.00	73.09	85.89	61.27
Mean	3.02	16.6	57.8	18.9	27.9	8.53	6.82	4.02	3.00	2.44	2.77	2.04
Ac-ft	186	1,020	3,440	1,160	1,660	524	420	223	184	145	170	122

Calendar year 1954: Max 275 Min 1.61 Mean 14.0 Ac-ft 10,170
 Fiscal year 1954-55: Max 175 Min 1.53 Mean 12.8 Ac-ft 9,250

Peak discharge (base, 1,500 cfs).--Sept. 4 (9:30 p.m.) 1,600 cfs (9.99 ft); Sept. 6 (7 p.m.) 1,640 cfs (10.21 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Aug. 21-24, Sept. 15 to Oct. 12, June 6, 7; discharge estimated on basis of records for nearby stations.

Inarajan River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.95	<u>8.1</u>	188	52	11.8	*8.7	7.5	3.75	2.2	2.35	1.95	*2.5
2	1.84	4.5	7.9	30.5	12.5	7.2	5.9	3.4	2.35	2.05	2.05	1.84
3	<u>1.63</u>	3.75	9.5	51	11.4	6.6	<u>10.7</u>	4.3	2.65	1.95	1.84	1.84
4	1.84	7.2	18.7	16.5	11.0	6.4	5.4	3.95	2.2	*2.35	3.0	1.95
5	1.63	3.55	36.5	24	9.6	6.2	4.9	3.25	2.2	2.2	1.95	2.2
6	*32.5	3.25	5.1	16.4	9.9	6.9	9.8	3.1	2.05	2.65	1.95	1.84
7	9.1	2.95	11.3	12.6	10.1	5.9	5.9	4.1	2.05	2.35	1.84	1.63
8	27.5	2.8	<u>5.4</u>	11.0	10.4	6.4	5.2	4.7	1.95	2.2	1.84	1.84
9	11.6	2.8	<u>5.9</u>	10.6	9.8	5.4	4.7	<u>6.1</u>	1.95	2.2	1.84	4.7
10	4.1	*2.8	196	9.3	16.7	5.2	*4.5	<u>4.3</u>	6.2	1.95	2.05	<u>1.43</u>
11	30	3.25	66	11.0	9.3	5.9	8.1	3.55	3.1	1.95	<u>1.74</u>	2.2
12	29	2.95	14.7	9.3	8.4	30	4.7	3.25	2.65	2.2	<u>1.74</u>	1.74
13	9.3	2.5	9.0	9.5	8.4	10.8	4.5	3.1	2.35	2.35	1.74	1.63
14	5.2	2.35	7.9	8.7	7.8	9.1	4.3	3.4	1.95	<u>2.8</u>	1.99	1.63
15	3.95	2.35	6.6	8.1	7.8	6.6	4.3	3.1	2.2	<u>2.5</u>	2.2	1.74
16	25.5	2.5	29	7.8	7.5	<u>132</u>	4.7	3.85	3.05	2.05	2.2	1.63
17	5.2	2.35	17.1	8.7	7.5	<u>13.4</u>	4.9	*2.95	2.35	2.65	2.2	<u>4.4</u>
18	4.1	5.8	22	<u>7.5</u>	11.3	9.3	4.5	2.95	2.75	2.35	1.88	<u>39.5</u>
19	3.4	3.0	9.5	<u>14.0</u>	6.9	7.8	4.1	2.8	2.8	1.95	1.84	5.2
20	4.0	3.9	29	89	6.6	9.8	3.95	2.65	1.95	2.35	2.6	3.75
21	3.1	2.5	14.2	10.0	6.6	6.9	3.95	2.5	2.9	2.35	1.95	3.4
22	3.1	3.25	23	<u>191</u>	7.5	6.4	3.95	2.5	1.95	1.95	1.84	3.25
23	2.95	2.8	24.5	<u>42</u>	9.8	6.2	4.7	2.35	1.95	<u>1.84</u>	1.84	3.1
24	2.95	3.1	11.9	*32.5	6.4	5.6	4.1	2.2	<u>1.84</u>	<u>1.84</u>	*1.74	8.2
25	2.8	*2.5	*61	33	<u>6.2</u>	5.4	3.75	2.95	1.95	1.84	1.95	6.3
26	4.0	2.35	25	30	6.2	5.2	3.75	2.5	1.95	1.84	3.1	6.6
27	3.25	2.2	162	105	7.5	5.2	3.75	2.35	2.45	2.35	2.5	3.95
28	2.8	<u>2.05</u>	<u>218</u>	52	30	4.9	<u>3.55</u>	2.2	<u>14.8</u>	2.35	1.84	3.1
29	3.25	<u>2.2</u>	<u>76</u>	28.5	10.3	4.9	<u>3.55</u>	2.2	<u>3.2</u>	2.8	<u>4.6</u>	2.65
30	10.8	2.25	24	17.1	26	4.9	3.55	-----	2.35	2.8	<u>3.65</u>	2.5
31	28	6.7	-----	13.2	-----	<u>4.7</u>	3.55	-----	2.95	-----	2.65	-----
Total	280.34	104.55	1,338.7	961.8	311.2	359.9	154.70	94.30	89.24	67.36	68.10	164.77
Mean	9.04	3.37	44.6	31.0	10.4	11.6	4.99	3.25	2.88	2.25	2.20	5.49
Ac-ft	556	207	2,660	1,910	617	714	307	187	177	134	135	327

Calendar year 1955: Max 218 Min 1.53 Mean 10.9 Ac-ft 7,930
 Fiscal year 1955-56: Max 218 Min 1.43 Mean 10.9 Ac-ft 7,930

Peak discharge (base, 1,500 cfs).--Sept. 10 (7:30 p.m.) 2,080 cfs (12.25 ft).

* Discharge measurement made on this day.

Inarajan River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.7	7.8	55	11.8	7.8	32.5	13.6	5.4	3.95	*3.25	4.8	1.95
2	3.1	6.4	36	14.6	7.2	89	10.6	5.2	3.55	6.6	2.8	1.95
3	3.25	5.4	18.0	11.0	25	43	10.1	6.9	3.55	4.4	2.65	1.84
4	2.8	4.9	18.8	28	7.8	28	8.4	7.5	4.7	3.25	2.35	1.74
5	2.8	4.7	18.7	22.5	6.6	17.5	7.8	7.4	5.4	3.25	2.5	1.84
6	2.5	4.1	9.6	9.3	6.4	32	7.2	5.4	4.3	3.1	2.2	1.74
7	2.35	6.4	23	8.4	*15.8	11.0	6.9	5.3	3.95	3.1	3.95	1.74
8	3.15	79	29	15.3	6.9	9.3	6.6	13.9	3.55	2.95	4.2	1.95
9	8.0	27.5	86	8.4	7.5	8.4	6.8	5.9	3.95	3.1	2.35	1.84
10	3.7	12.0	21	10.6	58	7.8	61	5.4	3.55	2.95	2.2	1.84
11	5.2	14.2	85	27	9.0	7.5	12.0	5.2	3.4	2.8	2.05	1.74
12	5.3	16.5	22.5	91	120	7.2	9.3	5.2	3.95	2.8	2.2	1.95
13	17.7	7.7	12.5	21	60	7.2	7.8	4.7	3.55	2.65	2.35	3.0
14	70	6.2	11.4	15.2	17.4	402	7.2	4.5	3.4	3.4	2.5	1.84
15	8.0	8.2	129	14.9	9.0	195	7.8	4.3	3.25	2.8	2.2	1.84
16	5.4	6.0	26	10.5	151	a24	7.2	4.1	3.25	2.65	1.95	1.74
17	4.3	15.5	13.6	8.8	46	a16	20	4.1	3.25	2.65	1.95	1.74
18	*5.7	17.6	13.1	13.2	124	*11.8	7.5	*4.0	3.25	2.5	2.05	1.74
19	3.95	5.9	16.1	24	19.4	11.4	6.6	9.9	3.25	2.65	1.95	2.35
20	3.4	4.7	127	9.6	17.3	10.6	12.2	5.4	3.4	2.5	1.95	7.3
21	3.1	5.4	14.2	8.1	12.5	11.7	7.5	4.3	3.1	3.1	1.95	3.4
22	2.8	6.2	11.0	7.6	17.3	9.3	6.2	4.3	3.1	2.5	5.1	2.35
23	2.65	16.4	92	10.7	27.5	9.0	5.9	5.9	2.95	2.35	2.2	2.35
24	2.8	66	90	7.2	11.8	8.7	5.9	5.6	2.95	2.5	1.95	2.35
25	3.25	10.8	13.6	10.5	9.3	8.3	5.9	4.7	3.25	2.5	2.05	2.65
26	29	15.9	14.7	7.9	10.8	14.0	5.4	4.1	3.25	2.35	1.84	1.95
27	11.2	126	20.5	7.5	8.4	13.3	5.2	4.1	8.6	2.2	*1.84	1.74
28	12.8	63	23	204	7.8	8.7	5.4	3.95	4.1	2.5	1.84	1.95
29	37.5	*207	13.1	36	8.4	8.8	11.9	-	3.25	2.95	1.95	1.74
30	49	*51	32	10.7	33.5	8.1	5.6	-----	2.95	2.65	1.95	1.84
31	10.7	16.6	-----	8.1	-----	8.4	5.9	-----	2.95	-----	1.95	-----
Total	329.10	845.0	1,095.4	693.4	869.4	1,079.5	307.4	156.65	114.85	88.95	75.77	65.99
Mean	10.6	27.3	36.5	22.4	29.0	34.8	9.92	5.59	3.70	2.96	2.44	2.20
Ac-ft	653	1,680	2,170	1,380	1,720	2,140	610	311	228	176	150	131

Calendar year 1956: Max 402 Min 1.43 Mean 15.2 Ac-ft 11,010
 Fiscal year 1956-57: Max 402 Min 1.74 Mean 15.7 Ac-ft 11,350

Peak discharge (base, 1,500 cfs).--Aug. 27 (12:30 p.m.) 1,600 cfs (10.02 ft); Aug. 29 (4 p.m.) 2,040 cfs (12.03 ft); Oct. 28 (1 p.m.) 2,060 cfs (12.13 ft); Nov. 16 (8 p.m.) 1,860 cfs (11.24 ft); Dec. 14 (8:30 a.m.) 2,000 cfs (11.78 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of records for nearby stations.

Inarajan River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.74	1.43	30	5.2	73	11.0	5.6	6.6	4.3	2.35	2.35	5.8
2	1.74	1.43	23	4.9	10.6	13.9	5.4	6.2	3.95	2.35	2.05	2.2
3	1.74	1.43	66	4.5	9.3	11.0	5.2	6.2	3.95	2.2	1.95	1.84
4	1.95	1.63	17.1	4.3	8.7	10.6	6.4	5.4	3.95	2.5	2.9	1.84
5	2.35	1.95	11.6	73	9.4	9.6	7.0	5.2	4.1	2.35	2.05	1.74
6	2.35	1.53	12.1	393	7.5	9.6	5.2	5.2	3.55	2.35	1.95	1.74
7	1.84	1.74	12.9	*77	8.1	9.3	5.9	5.2	4.7	2.2	1.84	2.7
8	1.74	1.63	9.2	27.5	*316	9.0	17.4	5.2	4.8	2.2	1.84	1.95
9	1.74	1.43	12.5	34.5	a35	9.0	5.9	5.2	3.75	2.35	1.84	1.84
10	2.75	1.77	9.5	17.6	a22	9.0	5.6	5.2	*3.55	3.05	1.84	54
11	*2.85	1.43	8.6	12.9	a18	8.4	6.4	4.9	3.25	2.5	1.84	8.3
12	10.1	1.43	6.2	14.8	310	9.3	6.9	4.7	3.4	2.35	*1.74	6.2
13	5.5	2.3	7.8	13.5	a30	8.4	83	4.9	3.1	4.5	1.74	59
14	2.2	4.2	5.6	11.4	a20	8.1	149	4.9	3.25	2.8	1.63	197
15	1.84	1.84	4.7	10.3	544	12.0	19.2	4.5	3.1	2.35	1.63	16.5
16	1.74	1.63	*6.3	9.3	239	9.7	11.0	4.3	2.95	2.35	1.63	9.1
17	1.63	2.85	6.4	8.4	a40	8.1	9.3	4.3	2.8	2.8	1.63	6.6
18	1.63	6.5	5.2	7.8	a30	7.5	8.1	5.6	2.8	2.35	1.63	5.4
19	1.63	5.4	13.3	9.0	*a25	7.2	8.1	5.2	2.8	3.35	1.63	4.9
20	2.75	2.8	6.4	7.8	21	6.9	*24	4.3	2.65	2.5	1.63	4.5
21	1.84	3.55	5.9	10.1	18.5	7.5	9.3	4.1	2.65	2.5	1.74	4.3
22	1.84	5.6	31.5	42	16.8	6.9	7.8	4.1	2.65	2.35	3.55	4.6
23	1.74	5.4	11.8	17.1	15.2	6.6	7.2	4.7	2.65	2.2	2.8	4.7
24	1.63	17.4	17.1	12.3	14.1	6.4	6.6	7.5	2.65	2.2	1.95	4.9
25	1.63	8.3	51	9.3	15.7	6.2	6.4	4.5	2.65	2.05	1.84	*4.9
26	1.74	6.4	9.4	9.6	13.2	5.9	6.2	4.1	2.5	2.2	1.63	4.3
27	1.53	3.4	7.2	37	*16.5	5.6	7.5	3.95	2.8	2.2	1.63	5.6
28	1.84	63	6.4	22.5	13.2	6.4	6.4	4.1	2.5	2.2	2.25	4.8
29	1.84	24.5	6.7	*10.8	12.5	6.9	5.9	-	2.5	2.65	11.3	3.95
30	1.63	8.8	5.6	9.0	11.4	5.6	5.6	-----	4.1	2.05	3.15	3.75
31	1.53	4.9	-----	11.1	-----	5.4	5.9	-----	2.5	-----	2.95	-----
Total	70.60	197.60	427.0	937.5	1,923.7	257.0	469.4	140.25	100.85	74.35	72.13	438.95
Mean	2.28	6.37	14.2	30.2	64.1	8.29	15.1	5.01	3.25	2.48	2.33	14.6
Ac-ft	140	392	847	1,860	3,820	510	931	278	200	147	143	871

Calendar year 1957: Max 544 Min 1.43 Mean 12.7 Ac-ft 9,180
 Fiscal year 1957-58: Max 544 Min 1.43 Mean 14.0 Ac-ft 10,140

Peak discharge (base, 1,500 cfs).--Oct. 6 (7 a.m.) 2,110 cfs (12.27 ft); Nov. 15 (9 p.m.) 2,080 cfs (12.23 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for nearby stations.

Pauliluc River near Inarajan

Location.--Lat 13°17'05" N., long 144°45'00" E., on right bank 0.3 mile upstream from mouth, 0.9 mile northeast of Inarajan, and 3.8 miles south of Talofof.

Drainage area.--1.9 sq mi.

Records available.--October 1952 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 20 ft (by barometer).

Average discharge.--5 years (1953-58), 5.40 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1953-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)*	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1953†	Feb. 22, 1953	325	4.04	May 11, 1953	0.20	0.27
1954	Oct. 15, 1953	2,980	13.11	June 2, 1954	.16	.25
1955	Sept. 20, 1954	385	4.36	Apr. 27, May 1, 1955	.16	.25
1956	Sept. 10, 1955	630	5.66	May 18, 1956	.16	.25
1957	Dec. 14, 1956	734	6.21	June 18, 1957	.23	.28
1958	Nov. 15, 1957	1,130	7.80	Aug. 11, 1957	.18	.26

† Period October to June.

* From rating curve extended from 50 cfs to 300 cfs by test on model of station site, and extended above 300 cfs by logarithmic plotting.

1952-58: Maximum discharge, 2,980 cfs Oct. 15, 1953 (gage height, 13.11 ft), from rating curve extended from 50 cfs to 300 cfs by test on model of station site, and extended above 300 cfs by logarithmic plotting; minimum, 0.16 cfs June 2, 1954, Apr. 27, May 1, 1955, May 18, 1956.

Remarks.--Records fair except those for periods of fragmentary or no gage-height record and those above 50 cfs, which are poor.

Pauliluc River near Inarajan--Continued

Rating tables, Oct. 4, 1953, to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 4, 1953, to June 30, 1955				July 1, 1955, to Dec. 15, 1956				Dec. 16, 1956, to June 30, 1958			
0.3	0.29	1.5	50	0.2	0.08	0.6	2.25	0.2	0.08	0.7	4.6
.4	.66	2.0	90	.3	.29	.7	4.4	.3	.29	.8	8.0
.5	1.26	3.0	187	.4	.68	.8	7.7	.4	.68	1.0	17.7
.6	2.25	4.0	325	.5	1.33	1.0	17.1	.5	1.33	1.2	29
.7	4.1	5.0	490					.6	2.55		
.8	7.4	7.0	910								
1.0	17.1	8.0	1,190								
1.2	29										

Note.--Same as preceding table above 1.0 ft.

Note.--Same as preceding table above 1.2 ft.

Discharge, in cubic feet per second, October 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1				-	5.2	7.0	5.8	1.57	1.86	0.76	0.38	0.35
2				-	3.8	15.1	2.85	1.49	1.75	.66	.38	.35
3				-	3.3	8.4	2.7	1.33	1.65	.66	.38	.35
4				5.5	2.9	4.1	2.4	1.19	3.85	.61	.45	.32
5				4.9	3.0	3.6	2.7	1.19	2.25	.57	.38	.38
6				3.6	*8.0	3.2	4.6	1.41	1.86	.57	.38	.38
7				*3.85	18.9	7.0	2.7	1.65	1.75	.57	.38	.35
8				3.6	19.2	3.85	2.55	1.75	2.25	.57	.38	.35
9				10.6	26	3.2	2.25	1.65	2.4	.57	.38	.32
10				8.4	13.3	3.85	2.1	1.49	1.99	.57	.38	*.38
11				4.5	18.3	3.85	1.86	1.41	1.99	.61	.38	.35
12				3.8	7.9	4.6	1.57	1.41	1.69	.57	.38	.35
13				3.8	5.2	2.85	*1.53	1.26	1.65	.57	.38	.38
14				5.0	4.1	3.4	1.41	1.12	1.41	.57	.38	.38
15				3.8	4.1	3.0	1.49	1.12	1.12	.57	.38	.38
16				3.5	20	2.7	1.49	1.12	1.05	.53	.38	.41
17				10	6.2	*2.55	1.49	.91	1.12	.53	.38	.38
18				35	4.4	2.55	1.65	.91	1.05	.53	.45	.38
19				17	8.8	2.55	1.49	.81	.86	.53	.38	.38
20				6.4	13.4	2.25	1.41	*.81	.98	.49	.38	.38
21				7.5	7.4	2.1	1.12	.81	.91	.49	*.38	.38
22				6.0	6.6	2.1	1.12	98	.86	.49	.38	.38
23				5.2	10.8	11.3	3.0	25	.81	.53	.38	.49
24				20	5.2	3.2	2.25	4.9	.86	.53	.38	.38
25				6.1	13.7	5.2	1.86	2.55	.98	.45	.38	.38
26				8.0	6.6	3.6	1.57	2.25	.91	.45	.35	.38
27				6.0	4.6	2.85	1.41	2.4	.81	.41	.35	.41
28				5.0	4.4	2.7	1.05	1.99	.76	.41	.35	.53
29				4.2	13.0	3.0	1.33	-	.71	.38	.35	.49
30				16	8.7	2.55	1.86	-----	.66	.38	.38	.41
31				8.0	-----	2.2	1.57	-----	.76	-----	.38	-----
Total				-	304.0	150.20	64.18	163.50	43.56	16.13	11.80	11.53
Mean				-	10.1	4.85	2.07	5.84	1.41	0.538	0.381	0.384
Ac-ft				-	603	298	127	324	86	32	23	23

Calendar year : Max Min Mean Ac-ft
Fiscal year : Max Min Mean Ac-ft

* Discharge measurement made on this day.
Note.--No gage-height record Oct. 11-22, Oct. 24 to Nov. 6, Dec. 31; discharge estimated on basis of records for nearby stations.

Pauliluc River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.38	0.41	9.8	6.6	6.6	8.4	2.85	1.99	1.75	0.52	0.60	0.38
2	.35	.45	7.9	5.8	4.9	6.6	2.85	1.86	1.65	.95	.41	.38
3	.38	.53	50	4.9	4.9	6.6	2.85	1.75	1.57	.80	.40	.38
4	.38	.41	17.7	5.8	4.6	6.6	2.85	1.65	1.41	.74	.39	.38
5	.38	.41	12.2	4.9	4.6	4.9	2.55	1.57	1.26	.56	.40	.38
6	.38	.49	8.4	4.4	4.4	4.4	2.7	1.65	1.05	.56	.36	.41
7	.38	.68	7.0	4.6	4.1	5.2	2.55	1.57	1.12	.56	.32	.41
8	.41	1.65	7.9	9.8	7.9	4.6	2.4	1.57	1.05	.56	.30	.45
9	.38	1.05	5.2	4.9	4.6	3.85	91	1.65	.98	.52	.39	.41
10	.38	7.1	5.2	3.85	10.8	4.1	7.9	1.57	.91	.47	*.40	.41
11	.35	113	4.4	3.6	6.2	4.1	4.9	1.49	.98	.45	.41	.38
12	1.05	66	4.1	5.5	209	5.5	4.6	1.57	.98	.50	.45	.45
13	.61	17.6	4.1	4.4	241	4.4	4.9	1.41	1.12	.60	.41	.41
14	.71	7.0	3.6	5.5	17.6	28.5	3.85	1.41	1.12	.55	.41	.41
15	.66	28.5	3.6	1,080	13.2	9.3	*12.3	1.33	1.19	.50	.41	.38
16	.57	16.8	6.6	327	15.0	12.7	3.85	1.33	1.12	.45	.41	.38
17	.49	*10.9	3.85	72	9.3	10.8	3.0	1.26	1.19	.45	.41	*.32
18	2.7	49	8.7	26.5	7.9	5.8	2.85	1.12	*.86	.48	.57	.32
19	1.65	12.2	8.8	51	7.0	4.9	2.7	1.05	.81	.46	.66	.35
20	.81	7.4	f9.5	19.8	6.2	4.4	2.7	2.25	.81	.43	.41	.29
21	.61	5.2	*f12	*f16	5.8	4.1	2.55	2.1	.86	.45	.41	.29
22	.66	4.1	8.4	13.7	7.4	15.1	2.7	1.86	.86	.45	.41	1.4
23	.53	3.2	4.6	11.7	*6.2	5.5	2.7	1.86	.76	.50	.53	.80
24	.61	21	4.9	10.3	33.5	4.9	2.55	1.65	.71	.45	.53	.48
25	.49	8.4	12.8	9.3	8.4	4.6	2.4	1.49	.71	.45	.45	1.0
26	.45	4.1	22.5	7.9	5.5	3.85	2.25	1.33	.61	.40	.41	.52
27	.41	3.0	5.8	7.4	5.5	4.6	2.1	1.86	.57	.40	.49	.52
28	.45	90	55	17.6	4.9	3.6	1.99	1.99	.57	.40	.41	.47
29	.41	52	15.1	10.3	4.4	3.4	2.1	-	.57	.40	.41	.42
30	.49	49	9.8	8.4	8.8	3.0	2.1	-----	.57	.40	.38	.45
31	.38	14.2	-----	5.8	-----	3.0	1.99	-----	f.53	-----	.38	-----
Total	18.89	595.78	339.45	1,769.25	680.2	201.30	191.58	45.19	30.25	15.41	13.33	14.03
Mesn	0.609	19.2	11.3	57.1	22.7	6.49	6.18	1.61	0.976	0.514	0.430	0.468
Ac-ft	37	1,180	673	3,510	1,350	399	380	90	60	31	26	28

Calendar year 1953: Max 1,080 Min 0.32 Mean 10.7 Ac-ft 7,760
 Fiscal year 1953-54: Max 1,080 Min 0.29 Mean 10.7 Ac-ft 7,760

Peak discharge (base, 320 cfs).--Aug. 11 (6:30 p.m.) 510 cfs (5.06 ft); Aug. 28 (12 m.) 370 cfs (4.33 ft); Sept. 3 (3:30 p.m.) 325 cfs (3.97 ft); Oct. 15 (3:30 a.m.) 2,980 cfs (13.11 ft); Nov. 13 (5 p.m.) 1,790 cfs (10.00 ft); Jan. 9 (12 m.) 430 cfs (4.70 ft).

* Discharge measurement made on this day.
 f Fragmentary gage-height record; discharge computed from partly estimated gage heights.
 Note.--No gage-height record Apr. 1 to May 10, June 21-30; discharge estimated on basis of records for nearby stations.

Pauliluc River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.50	0.41	16.3	14.7	22.5	3.6	1.33	1.26	0.91	0.66	0.35	0.45
2	<u>2.5</u>	.49	4.8	10.3	5.8	3.2	1.49	1.26	<u>.98</u>	.66	.32	*.49
3	.70	.41	3.0	7.0	5.2	2.85	1.57	1.19	.86	.57	.32	.41
4	.64	<u>.58</u>	<u>23.5</u>	6.4	5.2	2.55	1.86	1.12	.81	.57	.32	.58
5	1.2	.38	<u>82</u>	15.2	4.4	2.4	2.1	1.12	.81	.53	<u>.29</u>	.38
6	.53	.72	48	7.7	3.6	2.55	1.99	1.12	.71	.57	.29	.38
7	.49	1.26	16.1	7.5	3.4	2.85	1.75	1.19	.66	.66	.32	.41
8	.46	1.39	12.1	16.4	3.2	3.0	1.86	1.05	.57	.53	.46	.41
9	.44	6.1	8.7	13.4	3.0	2.7	1.75	.91	.71	.71	1.22	1.27
10	.52	1.32	18.6	5.8	<u>2.85</u>	2.55	1.65	.86	.81	<u>.76</u>	1.41	<u>1.41</u>
11	.41	.81	5.8	11.3	13.6	2.55	1.99	.86	.76	.66	.81	.81
12	.45	1.69	4.1	*13.3	6.3	2.7	1.99	<u>.76</u>	.76	.61	.57	.57
13	.80	2.4	5.4	5.5	4.4	2.25	1.86	.81	.61	.61	.45	.49
14	.90	10.8	65	12.9	3.0	2.1	2.25	.76	.61	*.57	.49	.45
15	.50	3.15	64	5.8	3.2	1.99	3.0	.76	.57	.57	2.0	.45
16	.47	1.99	20.5	4.4	3.6	2.1	1.99	.86	*.65	.59	<u>2.6</u>	.41
17	.45	1.75	10.3	3.85	2.85	1.99	6.2	.91	.61	.49	<u>.98</u>	.49
18	.82	1.86	7.4	3.4	58	4.0	2.5	.91	.66	.45	.61	.49
19	2.2	10.6	7.0	3.2	<u>11.8</u>	<u>2.4</u>	1.86	1.05	.66	.53	.49	.45
20	.95	25	67	3.0	7.2	2.1	1.65	.91	.61	.53	.45	.41
21	.56	7.6	25	2.85	3.6	1.99	1.57	1.19	.57	.45	.35	.58
22	.60	2.1	37.5	3.6	3.2	1.86	1.49	<u>1.65</u>	<u>.53</u>	.41	.32	.58
23	.52	1.49	17.6	4.9	24.5	1.75	1.33	<u>1.41</u>	.53	.46	.32	.42
24	.72	9.1	12.6	3.2	4.9	1.75	<u>1.19</u>	1.26	.57	.38	.29	.58
25	.54	<u>34</u>	8.4	5.2	7.7	1.65	<u>1.41</u>	1.12	.53	.38	.29	.58
26	.47	5.1	10.7	7.0	4.6	1.57	<u>12.0</u>	1.05	.61	.58	.32	<u>.32</u>
27	.43	4.3	10.3	4.9	22.5	1.57	<u>1.99</u>	1.05	.57	<u>.55</u>	.73	.55
28	.41	2.4	20	3.85	5.8	1.57	1.65	.86	.57	.38	.71	.52
29	*.44	2.1	20.5	3.0	*4.4	1.41	1.65	-	.57	.35	.71	.58
30	.41	2.1	8.8	2.7	4.6	*1.26	1.49	-----	.57	.35	.49	.41
31	<u>.38</u>	*1.86	-----	<u>46</u>	-----	1.33	*1.41	-----	.57	-----	.45	-----
Total	21.41	145.06	661.0	258.25	258.90	70.14	69.82	29.26	20.52	15.72	19.73	14.73
Mean	0.691	4.68	22.0	8.33	8.63	2.26	2.25	1.04	0.662	0.524	0.636	0.491
Ac-ft	42	288	1,310	512	514	139	138	58	41	31	39	29

Calendar year 1954: Max 91 Min 0.29 Mean 4.72 Ac-ft 3,420
 Fiscal year 1954-55: Max 82 Min 0.29 Mean 4.34 Ac-ft 3,140

Peak discharge (base, 320 cfs).--Sept. 20 (8:30 p.m.) 385 cfs (4.36 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record July 1-29; discharge estimated on basis of records for nearby stations.

Pauliluc River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.42	3.8	55	14.3	2.8	*3.35	1.74	0.85	0.58	0.54	0.29	0.58
2	.42	1.49	2.9	6.8	3.55	2.05	2.05	.85	.58	.50	.29	.54
3	.46	1.41	3.0	4.4	3.8	1.85	3.4	.85	.63	*.46	.29	.54
4	.50	1.86	6.3	8.7	3.8	1.85	1.95	.79	.63	.46	.46	.46
5	.46	1.77	4.5	9.1	3.5	1.85	1.57	.91	.68	.42	.42	.42
6	*8.5	1.33	2.35	3.8	3.35	1.95	3.25	.97	.68	.46	.38	.42
7	6.9	1.18	5.3	4.8	2.8	1.77	2.5	1.04	.63	.42	.32	.35
8	10.8	1.04	2.85	3.5	4.0	1.66	1.57	1.11	.50	.38	.29	.38
9	9.9	.91	1.77	2.8	2.8	1.66	1.49	1.72	.50	.38	.29	.32
10	1.77	*.79	5.4	2.6	3.25	1.66	*1.33	1.77	1.19	.35	.32	.29
11	8.4	.85	25.5	2.45	2.25	1.57	1.63	1.49	1.52	.38	.26	.35
12	22	.85	9.7	2.45	2.15	6.8	1.41	1.33	.85	.35	.26	.32
13	6.0	.85	3.6	2.35	2.05	4.7	1.41	1.18	.63	.35	.26	.26
14	2.45	.85	2.6	2.25	2.05	4.3	1.25	1.04	.58	.38	.26	.29
15	1.57	.79	2.35	2.15	2.05	2.15	1.18	.97	.58	.38	.23	.29
16	21	.68	9.7	1.95	1.95	50	1.11	1.04	.68	.35	.26	.26
17	2.7	.73	8.8	2.45	2.05	4.6	1.11	*.87	.58	.38	.26	.84
18	1.49	.85	7.5	2.05	2.85	2.8	1.04	.79	.68	.32	.26	6.8
19	1.25	.67	4.4	2.05	1.85	2.25	.97	.85	.58	.29	.26	2.8
20	1.63	1.25	*26	6.9	1.85	3.1	.97	.97	.58	.32	.33	.85
21	1.41	1.04	5.5	2.6	1.77	2.15	1.04	.85	.73	.35	.26	.58
22	1.04	1.11	7.7	16.1	1.95	1.95	1.04	.73	.58	.29	.23	.42
23	1.18	1.04	10.7	6.0	2.6	1.77	1.18	.73	.54	.29	.23	.35
24	1.25	1.04	4.1	*5.9	1.85	1.66	1.11	.73	.50	.29	*.24	.82
25	1.04	.97	5.6	13.9	1.66	1.66	1.18	.63	.50	.29	.26	.58
26	1.04	1.04	4.6	11.1	1.66	1.57	1.18	.73	.50	.29	.35	.85
27	1.11	.85	34	19.4	1.77	1.49	1.18	.68	.52	.29	.35	.63
28	1.04	.73	66	24.5	f23.5	1.49	1.18	.63	2.1	.32	.32	.50
29	1.70	.73	23.5	7.0	3.8	1.41	.97	.63	1.92	.35	.56	.38
30	8.2	.58	7.7	5.0	f16.6	1.33	.97	-----	.91	.32	.68	.35
31	5.9	.60	-----	3.8	-----	1.25	.91	-----	.73	-----	.63	-----
Total	133.53	33.68	407.52	242.75	111.91	119.65	44.87	27.73	23.39	10.95	10.10	22.82
Mean	4.31	1.09	13.6	7.83	3.73	3.86	1.45	0.956	0.755	0.365	0.326	0.761
Ac-ft	265	67	808	481	222	237	89	55	46	22	20	45
Calendar year 1955: Max	66			Min	0.29	Mean	3.34	Ac-ft	2,420			
Fiscal year 1955-56: Max	66			Min	0.23	Mean	3.25	Ac-ft	2,360			

Peak discharge (base, 320 cfs).--Sept. 10 (8:30 p.m.) 630 cfs (5.66 ft); Oct. 3 (6:30 p.m.) 325 cfs (3.95 ft).

* Discharge measurement made on this day.

f Fragmentary gage-height record; discharge computed from partly estimated gage heights.

Pauliluc River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.46	1.66	3.8	4.0	2.45	6.1	3.3	1.63	0.91	*0.71	0.75	0.32
2	.42	2.65	10.1	2.35	1.85	36.5	3.7	1.52	.85	1.03	.73	.32
3	.46	1.57	9.1	2.35	8.5	7.4	2.7	1.63	.73	<u>1.87</u>	.73	.29
4	.42	1.18	6.1	6.6	2.5	4.3	2.7	1.87	.90	1.11	.58	.32
5	.38	1.25	*5.3	9.7	*1.66	3.8	2.4	2.4	1.11	.85	.50	.26
6	.35	1.11	<u>2.45</u>	2.45	<u>1.57</u>	4.1	2.25	1.75	1.11	.79	.42	.26
7	.35	.97	11.9	2.25	5.9	2.45	2.1	1.52	1.04	.68	.63	.26
8	.58	7.0	10.9	2.15	2.15	2.15	1.87	<u>3.2</u>	1.04	.68	1.25	.35
9	1.96	<u>19.8</u>	21.5	2.05	1.77	1.95	1.63	1.99	1.11	.68	1.11	.32
10	1.58	2.45	4.6	3.55	18.3	1.95	<u>19.5</u>	1.52	1.04	.68	.68	.32
11	1.48	2.05	13.3	16.0	3.1	*1.82	3.7	1.42	.91	.63	.54	.29
12	1.89	1.57	*9.9	<u>31</u>	16.2	<u>1.57</u>	2.4	1.42	.91	.54	.46	.32
13	2.25	1.25	4.4	4.6	<u>46</u>	<u>1.57</u>	2.1	1.25	.85	.54	.50	.35
14	<u>60</u>	1.11	5.0	3.5	<u>3.05</u>	<u>124</u>	1.99	1.18	.73	.54	.46	.29
15	2.6	1.38	<u>84</u>	11.2	2.25	75	1.99	1.11	.73	.42	.42	.32
16	1.18	2.05	7.3	7.8	26.5	9.2	1.87	1.04	.68	.42	.42	.29
17	.73	2.55	4.1	2.7	17.0	4.4	8.0	.91	.63	.42	.42	.29
18	*.66	10.5	3.25	3.05	45	3.3	2.4	*.79	.63	.42	.38	.26
19	.63	1.77	3.1	4.4	5.9	3.3	1.87	1.41	.68	.38	.38	.35
20	.58	1.41	47	2.6	3.25	3.1	1.99	2.2	.63	.38	.38	.67
21	.58	1.45	5.0	2.15	2.8	3.7	2.25	1.18	.58	.50	.35	.58
22	.58	2.1	3.5	2.05	2.8	2.9	1.99	1.11	.58	.42	.76	.91
23	.58	4.8	21.5	2.45	7.0	2.4	1.75	1.25	.54	.38	<u>1.87</u>	.63
24	.58	11.2	32	<u>1.95</u>	3.8	2.25	1.63	1.63	.54	.38	.79	.50
25	.63	2.8	5.4	<u>2.25</u>	2.25	2.25	1.52	1.52	.54	.38	.58	.54
26	2.15	2.8	3.05	2.05	2.15	4.2	<u>1.42</u>	1.33	.50	.38	.42	.46
27	1.46	*18.9	7.0	2.05	2.05	6.0	1.42	1.25	1.34	<u>.35</u>	*.38	.38
28	2.25	5.8	6.7	17.4	2.05	2.9	1.42	1.11	<u>1.63</u>	.42	.38	.35
29	4.5	15.3	4.2	10.1	2.45	3.5	2.1	-	.97	.42	.35	.32
30	33.5	8.0	14.5	2.45	2.8	2.55	1.87	-----	.79	.42	<u>.32</u>	.32
31	3.5	6.8	-----	2.05	-----	2.7	1.63	-----	.63	-----	.35	-----
Total	129.27	145.23	369.95	171.25	245.05	333.31	89.46	42.14	25.86	17.82	18.29	11.44
Mean	4.17	4.68	12.3	5.52	8.17	10.8	2.89	1.50	0.834	0.594	0.590	0.381
Ac-ft	256	288	734	340	486	661	177	84	51	35	36	23

Calendar year 1956: Max 124 Min 0.23 Mean 4.19 Ac-ft 3,040
 Fiscal year 1956-57: Max 124 Min 0.26 Mean 4.38 Ac-ft 3,170

Peak discharge (base, 320 cfs).--July 14 (7:30 a.m.) 590 cfs (5.53 ft); Sept. 15 (10 a.m.) 355 cfs (4.22 ft); Sept. 20 (9 a.m.) 325 cfs (3.96 ft); Dec. 14 (9 a.m.) 734 cfs (6.21 ft).

* Discharge measurement made on this day.

Pauliluc River near Inarajan--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.29	0.26	5.3	1.99	9.6	3.1	1.63	1.42	0.85	0.42	0.38	1.58
2	.29	.26	5.1	1.52	2.9	3.9	1.42	1.42	.68	.42	.35	1.50
3	.26	.26	26.5	1.33	2.7	3.3	1.52	1.63	.54	.42	.35	.68
4	.35	.23	5.9	1.25	2.4	3.3	1.75	1.52	.68	.38	.42	.46
5	.38	.32	2.9	19.2	2.7	3.1	2.7	1.42	.63	.38	.38	.38
6	.32	.26	3.65	130	2.4	2.9	1.75	1.18	.58	.38	.38	.38
7	.29	.29	2.9	27.5	2.4	2.7	1.75	.91	.73	.35	.35	.50
8	.29	.26	3.15	9.0	66	2.7	7.3	.85	.85	.35	.32	.38
9	*.29	.32	1.87	11.1	13.1	2.55	2.25	.73	.68	.35	.32	.38
10	.44	.26	1.99	6.5	4.9	2.4	1.87	.85	*.63	.38	.32	*9.6
11	.41	.23	2.2	3.7	5.2	2.25	2.1	.85	.63	.35	.32	4.7
12	.63	.26	2.1	3.5	108	2.4	2.4	.85	.63	.35	*.32	1.52
13	1.49	.35	2.1	3.3	12.7	2.7	2.9	.91	.63	.53	.29	7.9
14	1.25	.46	1.52	2.9	7.8	2.7	3.8	.91	.63	.46	.29	a40
15	.68	.42	1.25	3.3	330	3.3	5.8	.85	.54	.54	.29	5.8
16	.50	.50	*1.33	2.9	104	3.5	3.3	.85	.50	.46	.26	3.1
17	.42	.42	1.99	2.7	11.8	2.9	2.7	.85	.42	.46	.29	2.1
18	.32	.42	1.63	2.4	8.9	2.4	2.55	.97	.42	.38	.29	1.52
19	.29	.92	3.25	2.25	*6.8	1.99	2.55	1.04	.42	.50	.26	1.18
20	.44	2.35	2.25	1.99	5.5	1.75	*7.7	.91	.42	.46	.26	1.04
21	.32	1.12	1.75	2.25	4.9	1.63	2.7	.91	.42	.42	.26	.97
22	.32	1.01	10.4	13.0	4.4	1.52	2.1	.85	.42	.38	.47	1.11
23	.32	3.4	3.7	6.7	4.4	1.75	1.99	.97	.42	.35	.35	1.33
24	.29	2.35	9.1	3.7	4.2	1.75	1.87	1.33	.42	.35	.32	1.52
25	.26	2.85	14.9	3.1	4.2	1.63	1.75	1.42	.38	.35	.29	*1.63
26	.32	1.18	2.7	3.9	4.2	1.33	1.52	1.04	.38	.38	.26	1.18
27	.26	.79	2.1	8.3	4.9	1.18	1.63	.97	.38	.35	.26	2.15
28	.32	9.2	2.25	4.9	3.7	1.23	1.52	.91	.38	.35	.32	1.63
29	.32	10.1	2.4	*2.9	3.5	1.52	1.52	-	.38	.38	1.91	1.25
30	.29	3.0	2.1	2.4	3.3	1.52	1.52	-----	.51	.35	1.84	1.04
31	.26	1.56	-----	3.1	-----	1.63	1.42	-----	.38	-----	.85	-----
Total	12.91	45.61	130.28	292.58	751.5	72.53	113.48	29.32	16.56	11.98	13.57	98.51
Mean	0.416	1.47	4.34	9.44	25.0	2.34	3.66	1.05	0.534	0.399	0.438	3.28
Ac-ft	26	90	258	580	1,490	144	225	58	33	24	27	195

Calendar year 1957: Max 330 Min 0.23 Mean 4.14 Ac-ft 2,990
 Fiscal year 1957-58: Max 330 Min 0.23 Mean 4.35 Ac-ft 3,150

Peak discharge (base, 320 cfs).--Oct. 6 (8 a.m.) 910 cfs (7.00 ft); Nov. 12 (1 p.m.) 370 cfs (4.27 ft); Nov. 15 (9:30 p.m.) 1,130 cfs (7.80 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of records for nearby stations.

Tolaeyuus River near Agat

Location.--Lat 13°21'55" N., long 144°42'40" E., on right bank 3.7 miles southeast of Agat and 4.8 miles southwest of Yona.

Drainage area.--6.5 sq mi.

Records available.--September 1951 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 90 ft (by barometer).

Average discharge.--6 years (1952-58), 22.0 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1952-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1952†	Oct. 13, 1951	(*)	10.58	May 2, 3, 1952	0.39	0.22
1953	Sept. 8, 1952	(*)	8.13	June 26,27,1953	††.68	-
1954	Oct. 15, 1953	(*)	(a)	June 21,22,1954	.27	.19
1955	Sept. 1, 1954	(*)	12.25	July 1, 8-10, 12-17, 1954	.50	.24
1956	Sept.29, 1955	(*)	18.30	May 15-17, 1956	.35	.21
1957	Nov. 13, 1956	(*)	10.28	June 19, 1957	.76	.28
1958	Nov. 16, 1957	(*)	19.24	July 26,27,1957	.50	.24

† Period September to June. * Unknown. †† Minimum daily. a About 22.5 ft.

1951-58: Maximum discharge not determined, occurred Oct. 15, 1953 (gage height, about 22.5 ft); minimum, 0.27 cfs June 21, 22, 1954.

Remarks.--Records good except those for period of faulty or no gage-height record or indefinite stage-discharge relation, which are poor. Occasional backwater caused when capacity of underground channel outlet is exceeded.

Discharge, in cubic feet per second, September 1951 to June 1952

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			-	*a4.6	82	7.5	6.8	3.25	2.8	1.09	0.50	1.62
2			-	a4.3	28.5	8.8	6.8	4.3	3.0	1.00	.44	1.19
3			-	a4.6	38	5.2	6.2	4.3	1.87	1.00	.44	1.00
4			-	4.8	e270	4.3	6.2	3.9	1.74	.92	.56	1.86
5			-	5.4	56	3.95	6.2	3.45	1.62	.84	1.01	1.50
6			-	5.9	43	109	5.9	*3.25	1.50	.76	6.1	1.29
7			-	6.0	35.5	21	5.4	4.6	1.39	.76	10.3	1.29
8			-	67	23.5	14.3	*5.2	4.1	1.39	*.76	2.45	1.29
9			-	112	19.5	11.7	5.2	3.65	1.29	.69	1.50	1.19
10			-	51	17.5	9.7	5.4	3.65	*1.29	.69	1.29	1.00
11			-	43	17.2	8.2	5.0	3.45	1.19	.62	1.09	1.00
12			-	e250	30	5.9	4.8	3.25	1.19	.62	1.00	1.00
13			-	e359	15.7	4.8	4.8	3.1	1.19	.62	.84	.84
14			-	96	15.2	4.3	4.6	3.1	1.19	.69	.69	.84
15			-	62	13.4	4.1	5.0	2.9	1.09	.62	.69	1.00
16			-	45	12.9	4.1	5.7	2.75	1.09	.56	.69	1.33
17			-	27.5	15.2	28.5	4.8	2.6	1.09	.56	.56	1.62
18			-	21.5	16.4	15.8	7.7	2.6	1.00	.56	.56	1.19
19			-	18.9	41	12.1	5.2	2.6	1.00	.62	6.4	1.00
20			-	25	10.3	9.0	4.8	2.6	1.00	.76	2.0	.92
21			-	18.9	7.1	8.1	4.3	2.6	1.09	.62	1.19	.84
22			-	28	5.4	7.4	4.1	2.75	1.09	.56	*1.00	.76
23			-	17.0	5.2	6.8	5.2	2.6	1.00	.56	.76	.92
24			-	23.5	4.3	6.8	4.6	2.4	1.00	.62	.69	1.39
25			-	18.9	4.3	6.8	4.1	2.15	1.33	.56	.76	1.19
26			-	31	4.1	6.8	3.9	2.15	3.05	.56	.76	1.19
27			-	a5.2	42	8.0	6.8	3.9	2.25	1.50	.62	.69
28			-	a5.0	23.5	16.3	7.4	3.65	2.25	1.62	.76	1.09
29			-	a5.8	19.5	6.8	7.1	4.1	1.87	1.50	.62	1.65
30			-	a5.2	18.2	5.4	7.1	3.65	1.29	.56	3.15	.69
31			-	15.7	15.7	7.1	3.45	1.19	1.19	1.19	1.87	1.87
Total			-	1,469.7	867.7	368.45	156.65	88.42	44.58	20.78	52.39	33.96
Mean			-	47.4	28.9	11.9	5.05	3.05	1.44	0.693	1.69	1.13
Ac-ft			-	2,920	1,720	731	311	175	88	41	104	67

Calendar year : Max Min Mean Ac-ft
Fiscal year : Max Min Mean Ac-ft

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for nearby stations.

e Stage-discharge relation indefinite; discharge estimated on basis of records for nearby stations.

Tolaeyuus River near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	9.4	120	12.9	39.5	29	95	28.5	5.7	15.2	4.1	2.25	1.29
2	3.45	30	20.5	31	27	60	17.5	5.7	14.3	3.9	2.15	1.09
3	4.0	50	17.5	30	26	33.5	16.1	5.7	12.9	3.9	2.15	*1.00
4	4.2	39	12.9	32	24	31.5	14.3	5.7	13.4	3.9	2.0	1.19
5	9.5	32	11.3	26	26	23.5	22.5	*5.2	11.7	3.65	2.0	1.19
6	7.1	25	11.0	31.5	24	21	16.6	5.0	10.6	3.45	*2.0	1.19
7	7.1	20	11.7	59	28	98	13.4	13.8	10.2	3.9	1.87	1.1
8	4.3	*30	e187	28.5	65	27.5	*12.1	9.8	9.8	3.65	1.87	1.1
9	3.1	116	88	34	166	23	11.3	6.5	9.4	3.45	1.87	1.0
10	6.2	54	52	42	67	26.5	10.6	5.7	9.0	3.45	1.74	.90
11	4.6	e227	26	37	48	21	10.2	5.4	8.4	3.45	1.74	.85
12	2.4	e145	77	28.5	37	17.5	9.8	10.2	8.1	4.1	1.74	.80
13	2.0	44	170	23	36	16.6	9.4	6.8	7.4	4.1	1.62	.80
14	1.87	29	81	22.5	36	22.5	9.0	5.4	7.1	3.45	1.62	.78
15	2.9	52	48	21.5	35	16.6	8.7	5.2	6.8	3.25	1.62	.78
16	2.25	38.5	35	20	79	14.7	8.4	5.2	6.5	3.1	2.15	.76
17	1.87	28.5	27	18.9	41	14.7	8.1	5.7	6.5	2.9	2.15	.74
18	7.7	19.5	28.5	20	35	*14.7	7.8	5.0	8.1	2.9	2.25	.72
19	4.3	17.5	21	19.5	34	13.4	7.4	5.0	6.5	2.75	2.15	.76
20	3.45	18.9	16.6	18.9	31	12.5	7.1	5.0	6.2	2.75	1.87	.76
21	4.0	14.3	15.2	18.2	29	11.7	7.4	4.8	5.9	2.75	1.87	.73
22	4.8	12.5	14.3	66	28	11.3	7.1	e349	5.7	2.75	2.75	.70
23	4.0	28	103	59	28	33	7.1	e109	5.4	2.6	1.87	.74
24	3.0	19.6	42	44	*27.5	13.8	6.8	46	5.2	2.6	2.0	.74
25	2.5	12.5	25	40	30	20	6.5	31.5	5.2	2.75	2.15	.70
26	2.3	12.1	20	40	31.5	14.7	6.5	24.5	5.0	2.75	2.0	.68
27	2.1	12.1	19.5	38	22.5	16.1	6.2	22.5	4.8	2.6	1.87	.68
28	5.0	14.7	47	36	34	13.6	6.2	17.0	4.8	2.4	1.74	.80
29	10	17.0	e176	34	111	35	5.9	-	4.6	2.25	1.62	1.0
30	8.0	16.6	66	69	50	14.3	8.1	-----	4.3	2.25	1.50	1.0
31	25	13.4	-----	36	-----	107	6.2	-----	4.1	2.25	1.50	-----
Total	200.19	1,308.7	1,482.9	1,063.5	1,285.5	894.2	322.8	732.0	243.1	95.80	59.68	26.57
Mean	6.46	42.2	49.4	34.3	42.8	28.8	10.4	26.1	7.84	3.19	1.93	0.886
Ac-ft	397	2,600	2,940	2,110	2,550	1,770	640	1,450	482	190	118	53

Calendar year 1952: Max 227 Min 0.44 Mean 18.1 Ac-ft 13,150
 Fiscal year 1952-53: Max 349 Min 0.68 Mean 21.1 Ac-ft 15,300

* Discharge measurement made on this day.
 e Stage-discharge relation indefinite; discharge estimated on basis of records for nearby stations.
 Note.--Faulty or no gage-height record July 21 to Aug. 8, Sept. 13-16, Oct. 24 to Nov. 23, June 7-30; discharge estimated on basis of recorded graph and records for nearby stations.

Tolaeyuus River near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.90	3.65	52	20	27	40	11	5.7	3.45	1.29	1.09	0.50
2	.70	3.25	72	17.0	24	33	11	5.2	3.1	1.74	.84	.44
3	.60	3.25	47	14.7	23	29	11	5.0	2.9	1.74	.76	.44
4	.60	2.9	39.5	14.3	22	26	11	5.0	2.75	1.74	.76	.39
5	.50	2.4	34	13.8	21	24	10	4.8	2.75	1.50	*.69	.39
6	.60	5.0	27.5	12.9	19	22	10	4.6	2.6	1.39	.62	.56
7	.80	6.6	23	13.4	18	20	9	4.6	2.4	1.29	.56	.69
8	.70	6.5	21	12.1	18	18	9	4.3	2.4	1.62	.56	.69
9	.60	6.8	18.2	51	18	17	190	4.3	2.4	1.29	.56	.84
10	.50	e145	16.6	16.1	29	18	45	4.1	2.25	1.19	.62	.69
11	.50	e431	16.1	14.3	53	16	20	3.9	2.4	1.19	.62	.56
12	.50	e378	17.5	23	280	16	15	3.9	2.4	1.09	1.09	.50
13	.80	98	14.7	14.7	400	15	13	3.9	2.15	1.09	.84	.50
14	8.0	72	*13.4	14.7	160	38	*12	3.65	2.0	1.09	.62	.50
15	*4.8	80	13.8	1,000	65	30	12.5	3.45	2.0	1.09	.56	*.39
16	3.6	137	16.1	800	47	45	11.0	3.45	2.0	1.00	.56	.39
17	5.9	81	12.5	400	40	40	9.8	3.25	2.0	.92	.56	.35
18	18.9	369	23	210	35	23	9.0	3.25	2.0	.92	.56	.31
19	5.0	96	39.5	180	30	21	8.7	3.1	1.87	1.00	.62	.35
20	4.3	53	56	280	27	20	8.1	3.65	1.87	1.00	.62	.35
21	4.8	47	102	170	27	18	8.4	3.45	1.74	.92	.56	.31
22	2.75	35	47	78	25	23	8.1	3.25	*1.74	.92	.50	1.80
23	2.15	31.5	31	66	24	19	7.1	3.1	1.74	.92	.62	1.95
24	7.9	343	24.5	56	62	17	7.1	2.9	1.62	.92	1.19	.92
25	30.5	74	23	47	43	17	6.8	2.75	1.50	.92	.76	.92
26	38.5	43	46	40	28	16	6.5	2.75	1.39	.84	.62	.76
27	33	33.5	21	36	25	15	5.9	5.2	1.29	.84	.62	.69
28	15.2	250	77	37	23	14	5.9	4.3	1.29	.84	.56	.56
29	8.7	200	33.5	36	21	13	5.7	-	1.29	.76	.56	.50
30	5.7	100	23.5	35	*65	13	5.4	-----	1.29	.69	.56	.50
31	4.6	80	-----	28.5	-----	12	5.9	-----	1.29	-----	.50	-----
Total	212.60	3,217.35	1,001.9	3,751.5	1,699	688	508.9	110.80	63.87	33.75	20.76	18.74
Mean	6.86	104	33.4	121	56.6	22.2	16.4	3.96	2.06	1.12	0.670	0.625
Ac-ft	422	6,380	1,990	7,440	3,370	1,360	1,010	220	127	67	41	37
Calendar year 1953: Max	1,000	Min	0.50	Mean	33.0	Ac-ft	23,900					
Fiscal year 1953-54: Max	1,000	Min	0.31	Mean	31.0	Ac-ft	22,460					

* Discharge measurement made on this day.
 e Stage-discharge relation indefinite; discharge estimated on basis of records for nearby stations.
 Note.--No gage-height record July 1-14, Aug. 17-19, 24, 25, 28-31, Oct. 15-20, Nov. 1 to Jan. 14;
 discharge estimated on basis of records for nearby stations.

Tolaeyus River near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.56	0.92	e259	38	59	25	5.2	3.9	2.6	1.50	1.50	4.9
2	1.42	1.14	110	31	36.5	21	5.0	3.6	2.4	1.39	1.19	5.3
3	.92	.92	67	32	29.5	17.5	5.4	3.9	2.25	1.39	1.09	2.75
4	.62	.92	e182	25	27.5	15.7	7.8	4.5	2.15	1.39	1.09	2.1
5	.62	1.00	119	37	21	14.7	10.2	4.0	2.25	1.29	1.00	4.3
6	.56	1.00	73	*28	18.2	14.7	6.8	3.5	2.15	1.29	1.00	2.8
7	.56	3.2	57	31.5	18.2	15.6	5.9	3.3	2.0	1.50	1.00	13
8	.56	3.7	126	76	22	20	11.4	3.1	2.0	1.62	1.62	5.0
9	.50	30	68	91	21.5	13.4	8.4	3.1	1.87	1.50	5.5	40
10	.76	5.9	61	35	21.5	13.4	14.0	3.1	1.87	1.50	2.6	9.0
11	.76	3.65	34	49	e154	12.5	9.8	3.1	2.15	1.39	1.74	4.5
12	.56	15.3	25	53	41	11.3	8.1	2.9	2.0	1.29	1.39	3.5
13	.50	8.0	25.5	34.5	28.5	10.6	7.0	2.75	2.0	*1.19	1.39	2.8
14	.62	15.7	e273	28.5	22.5	9.8	16.6	2.75	*1.74	1.19	1.29	2.4
15	.56	6.6	e294	24.5	17.0	9.4	19.6	2.75	1.62	1.19	8.1	2.1
16	.50	4.3	78	21	16.6	10.6	9.4	2.75	1.19	1.19	4.0	1.9
17	1.83	13.2	48	17.0	14.7	12.6	8.4	4.0	1.19	1.09	2.4	2.0
18	9.2	8.5	38.5	15.7	120	10.6	7.4	4.1	1.09	1.09	1.87	1.8
19	13.8	48	33.5	14.3	27.5	9.4	6.5	2.9	1.09	1.19	1.50	1.6
20	4.1	60	167	12.9	46	9.0	6.2	2.75	1.09	5.4	1.29	1.7
21	2.0	24.5	151	34.5	22.5	8.4	5.7	4.0	1.09	1.87	1.19	1.7
22	1.62	11.6	151	22.5	18.2	8.1	5.2	3.9	1.19	1.87	1.00	1.5
23	1.39	*7.4	66	16.1	e189	9.3	5.0	3.25	1.09	1.74	.92	1.4
24	1.50	53	53	13.4	52	7.4	4.6	2.9	1.29	1.50	.84	1.3
25	1.39	165	42	12.5	34	7.1	5.0	2.75	5.0	1.74	.84	1.2
26	*1.09	28.5	61	45	27.5	6.8	16.0	2.6	1.74	1.62	*.76	1.3
27	.92	18.4	37.5	44	74	6.5	*6.4	2.6	1.74	1.39	2.4	1.4
28	.92	12.9	174	*25.5	32.5	5.9	5.2	2.75	1.74	1.19	1.39	1.3
29	.92	36	82	18.9	28.5	*6.2	5.0	-	1.50	1.09	1.19	1.4
30	1.00	25	47	50	36.5	5.9	4.5	-----	1.50	1.19	1.00	2.0
31	.92	26.5	-----	247	-----	5.4	4.0	-----	1.39	-----	.92	-----
Total	53.18	640.75	3,003.0	1,224.3	1,277.4	353.8	245.7	91.50	55.97	45.78	55.01	127.95
Mesn	1.72	20.7	100	39.5	42.6	11.4	7.93	3.27	1.81	1.53	1.77	4.26
Ac-ft	105	1,270	5,960	2,430	2,530	702	487	181	111	91	109	254

Calendar year 1954: Max 294 Min 0.31 Mean 20.0 Ac-ft 14,500
 Fiscal year 1954-55: Max 294 Min 0.50 Mean 19.7 Ac-ft 14,230

* Discharge measurement made on this day.
 e Stage-discharge relation indefinite; discharge estimated on basis of records for nearby stations.
 Note.--No gage-height record Jan. 29 to Feb. 10, June 4-30; discharge estimated on basis of records for nearby stations.

Tolaeyuus River near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	a3.0	20	e188	e138	29.5	15.9	6.8	2.75	1.87	1.39	0.84	1.50
2	a3.5	15.2	28.5	57	32.5	12.1	7.1	2.6	1.87	1.29	.76	1.29
3	a2.2	12.1	64	e133	23	10.2	7.2	2.75	2.0	1.29	.76	1.19
4	a2.0	13.3	23.5	46	21.5	9.0	*5.7	3.1	1.87	1.29	.76	1.29
5	a1.9	11.0	18.9	36	19.5	8.4	5.2	2.6	1.87	1.19	.76	1.29
6	a62	10.3	18.4	30	16.6	7.8	5.2	2.4	1.87	.92	.69	*1.09
7	a85	9.8	16.8	25	15.2	7.4	5.2	3.45	1.74	.92	.62	1.00
8	a180	8.1	13.8	21.5	18.9	12.7	5.0	5.2	1.74	1.00	.56	2.05
9	a58	7.4	17.3	20	15.2	8.1	4.6	7.8	1.62	.92	.99	1.62
10	a20	6.8	e159	17.5	37	7.8	4.3	5.4	1.74	1.34	.56	1.29
11	a37	7.1	76	20.5	16.6	8.7	4.3	4.3	1.74	.92	.50	1.48
12	a85	7.8	57	16.6	14.7	15.7	4.1	3.45	1.74	.84	.39	2.2
13	*a40	6.5	27	32.5	13.4	17.9	3.9	3.1	1.62	.84	.39	1.29
14	21.5	5.9	22	17.3	12.1	19.9	3.65	*2.9	1.50	.76	.39	1.19
15	16.6	*5.4	18.5	13.8	11.3	11.6	3.45	2.75	1.39	.69	.35	1.00
16	50	5.2	22	12.1	11.0	e147	3.45	3.65	1.50	.69	.35	.84
17	18.4	5.2	29.5	27	11.0	31	3.45	2.9	1.50	.76	.68	7.2
18	14.3	17.0	48	15.5	14.7	17.6	3.45	2.9	1.39	.76	.44	5.1
19	11.7	7.8	19.3	*19.6	10.6	14.7	3.25	2.6	1.50	.69	.44	2.3
20	9.0	10.1	14.7	77	9.8	12.5	3.1	2.4	1.39	.62	1.08	1.50
21	7.1	28.5	13.9	16.6	9.0	15.2	3.1	2.4	2.15	.62	*.70	1.19
22	5.4	18.8	e146	e365	9.4	11.3	2.9	2.15	1.74	.62	.50	1.00
23	5.0	9.4	41	48	12.1	9.8	3.1	2.15	1.62	.62	.44	1.00
24	4.6	52	27.5	52	10.2	9.0	3.1	2.15	1.50	.76	.44	2.9
25	26.5	26	72	82	7.8	8.4	2.9	2.25	1.62	.69	.50	1.74
26	28	11.7	49	e138	9.0	8.1	2.9	2.25	1.62	.62	.76	1.62
27	12.9	9.8	114	e165	13.8	7.8	3.1	2.15	1.87	.69	1.19	1.50
28	.4	9.0	e483	121	100	7.1	2.9	2.0	*2.6	.76	.76	1.29
29	e98	8.1	e1000	69	*20.5	7.1	2.75	2.0	1.87	.84	.62	1.19
30	e103	64	94	43	38	6.5	2.6	-	1.50	1.19	1.29	1.09
31	27.5	49	-----	33.5	-----	6.5	2.6	-----	1.39	-----	1.39	-----
Total	1,046.5	478.3	2,922.6	1,909.0	583.9	492.8	124.35	88.50	52.94	26.53	20.90	52.23
Mean	33.8	15.4	97.4	61.6	19.5	15.9	4.01	3.05	1.71	0.884	0.674	1.74
Ac-ft	2,080	949	5,800	3,790	1,160	977	247	176	105	53	41	104

Calendar year 1955: Max 1,000 Min 0.76 Mean 22.1 Ac-ft 15,990
 Fiscal year 1955-56: Max 1,000 Min 0.35 Mean 21.3 Ac-ft 15,480

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of records for nearby stations.
 e Stage-discharge relation indefinite; discharge estimated on basis of records for nearby stations.

Tolaeyuus River near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.3	14.3	24	42	16.1	16.1	12.5	12.1	5.4	5.0	3.1	1.62
2	2.0	10.2	54	28.5	15.2	56	13.4	9.8	5.2	7.7	3.1	1.62
3	1.87	8.1	45	23	25.5	32	*12.1	9.8	5.2	7.6	2.9	1.50
4	2.75	6.5	45	37	16.1	18.7	11.7	11.7	5.4	4.8	2.75	1.39
5	2.25	5.4	67	26.5	13.8	18.9	11.3	12.1	6.8	4.3	2.75	1.39
6	1.87	4.6	37.5	19.5	13.4	23	10.6	9.8	6.5	3.9	2.9	1.29
7	1.50	3.9	41	17.0	13.8	17.5	9.8	9.4	5.4	3.65	3.1	1.19
8	1.74	25	46	16.6	12.5	14.7	9.4	16.0	4.6	3.45	4.6	1.39
9	21.5	56	78	16.6	12.1	13.8	9.4	10.2	5.2	3.9	3.9	1.50
10	5.9	12.1	34	17.1	25.5	12.5	142	8.7	5.2	3.65	3.1	1.29
11	3.45	11.4	40	17.8	43	12.1	19.3	*8.4	5.0	3.65	2.75	1.09
12	*3.45	9.4	44	160	61	*11.2	16.1	8.4	5.4	3.25	2.6	1.00
13	5.3	8.7	31	32	*218	10.6	13.8	8.4	5.0	2.9	2.4	1.00
14	5.4	6.8	25	46	42	270	12.1	8.1	4.6	3.45	2.4	1.00
15	4.3	30	118	43	25.5	310	11.7	7.8	4.6	3.65	2.25	.92
16	3.65	12.0	43	36	50	46	11.3	7.1	4.3	3.1	2.25	.84
17	2.75	103	60	e100	44	31.5	52	7.1	4.3	2.9	2.25	.84
18	2.25	40	29	62	216	24.5	15.7	6.8	4.3	2.75	2.4	.84
19	2.15	15.7	31.5	68	49	21.5	13.4	8.5	4.3	2.9	2.4	1.29
20	1.87	12.1	105	34.5	40	19.5	26.5	7.8	4.6	2.6	2.6	2.45
21	1.74	9.4	42	27	43	18.9	15.4	6.8	4.3	3.25	*1.79	2.4
22	1.74	15.1	34	36.5	31.5	16.1	12.5	6.2	4.1	3.45	4.7	1.74
23	1.62	25	102	47	34.5	14.7	11.3	6.2	3.9	3.25	2.4	1.39
24	*16.5	16.6	133	27	24.5	13.8	11.0	6.8	3.45	3.1	2.15	1.29
25	*23.5	12.9	46	39	21.5	16.7	10.2	6.2	4.1	2.75	2.15	1.19
26	74	10.2	34	21.5	18.9	35.5	8.7	5.4	*3.9	2.75	2.0	1.87
27	35.5	60	97	19.5	18.2	29.5	8.1	6.0	17.1	2.75	1.74	2.0
28	28	*102	63	20	17.0	16.6	7.8	5.7	6.2	3.45	1.62	1.87
29	26.5	43	36	18.2	17.0	14.3	23	-	5.0	3.45	1.62	1.19
30	85	33	106	15.7	17.5	12.9	11.3	-----	4.3	3.25	1.62	1.09
31	25.5	26	-----	26	-----	13.8	30	-----	4.1	-----	1.62	-----
Total	398.85	748.4	1,691.0	1,140.5	1,196.1	1,182.9	583.4	237.3	161.75	110.55	79.91	41.48
Mean	12.9	24.1	56.4	36.8	39.9	38.2	18.8	8.48	5.22	3.68	2.58	1.38
Ac-ft	791	1,480	3,350	2,260	2,370	2,350	1,160	471	321	219	158	82
Calendar year 1956: Max	310											
Min	0.35											
Mean	18.4											
Fiscal year 1956-57: Max	310											
Min	0.84											
Mean	20.7											
Ac-ft	13,330											
	15,020											

* Discharge measurement made on this day.

e Stage-discharge relation indefinite; discharge estimated on basis of records for nearby stations.

Tolaeyuus River near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.00	0.62	46	*10.6	39.5	18.9	8.1	7.8	4.1	1.87	1.87	2.6
2	1.00	.56	70	8.7	21.5	22.5	8.4	7.4	4.1	1.50	1.62	2.0
3	.84	.56	25	7.8	19.5	18.2	8.1	6.8	3.85	1.39	1.50	1.74
4	.76	.62	14.3	7.1	16.6	19.5	7.4	7.1	3.65	1.39	1.50	1.62
5	.92	.76	18.4	24	14.7	18.9	7.4	6.8	4.3	1.74	1.74	1.62
6	.92	.76	31	e230	16.7	15.2	7.1	6.5	3.85	1.74	1.50	1.50
7	.84	.84	40	e260	14.3	18.9	8.1	6.2	3.85	1.74	1.39	1.62
8	.84	3.15	21	70	188	15.2	12.3	6.2	4.8	1.87	1.39	1.74
9	.69	1.19	30.5	44	106	14.3	10.7	5.9	3.85	2.0	1.39	1.87
10	*.69	1.00	14.3	33.5	114	14.3	7.8	5.9	3.65	2.4	1.39	48
11	1.29	1.00	12.6	28.5	52	13.4	8.7	5.9	4.1	2.85	1.39	12.3
12	1.62	1.00	11.3	25	207	12.5	8.7	5.7	*4.3	2.15	1.29	5.4
13	2.0	1.93	9.8	46	119	12.1	9.8	5.2	4.3	3.7	1.29	34
14	1.09	4.3	8.7	86	72	11.7	239	5.2	4.1	2.75	*1.24	243
15	.92	2.75	7.8	50	e420	12.1	35	5.0	3.9	2.4	1.19	37
16	.84	2.25	17.9	30	e460	14.7	21	4.8	3.9	2.25	1.09	16.5
17	.76	2.25	42	21	99	11.7	16.6	4.6	3.9	2.75	1.09	11.3
18	.69	5.7	14.3	17.5	60	10.2	14.7	5.4	3.65	2.75	1.09	8.4
19	.69	5.2	14.3	18.9	48	9.8	14.7	6.2	3.45	2.25	1.09	6.8
20	.62	5.1	13.3	14.7	41	9.4	16.0	5.0	3.1	2.25	1.09	6.2
21	.62	3.9	9.8	15.2	*35.5	9.4	*12.9	4.6	2.75	2.25	1.19	5.7
22	.69	3.4	39	*34	31	9.0	11.0	4.3	2.6	2.15	1.29	8.3
23	.62	4.8	49	48	27.5	8.4	9.8	4.6	2.6	2.0	2.15	6.2
24	.62	19.5	22.5	23	24.5	7.8	9.0	9.1	2.6	2.0	1.87	5.4
25	.56	18.0	16.6	31.5	23	7.1	8.7	5.4	2.6	1.87	1.50	8.9
26	.56	14.5	15.2	24.5	*25.5	6.8	8.1	4.8	2.6	1.62	1.39	*7.4
27	.56	5.9	12.5	21.5	66	6.2	9.8	4.6	2.4	1.87	1.29	6.2
28	1.84	*101	11.7	e150	25	6.2	8.7	4.1	2.4	1.74	1.50	5.4
29	1.09	61	10.6	32	22.5	20.5	7.8	-	2.25	2.0	6.0	5.2
30	.84	18.8	11.3	29	20	9.4	7.4	-----	2.25	2.0	2.4	4.6
31	.76	10.6	-----	33.5	-----	8.1	7.4	-----	2.0	-----	2.15	-----
Total	27.78	302.94	660.7	1,475.5	2,429.3	392.4	570.2	161.1	105.75	63.24	49.87	508.51
Mean	0.896	9.77	22.0	47.6	81.0	12.7	18.4	5.75	3.41	2.11	1.61	17.0
Ac-ft	55	601	1,310	2,930	4,820	778	1,130	320	210	125	99	1,010
Calendar year 1957: Max	460			Min	0.56	Mean	17.8	Ac-ft	12,900			
Fiscal year 1957-58: Max	460			Min	0.56	Mean	18.5	Ac-ft	13,390			

* Discharge measurement made on this day.

e Stage-discharge relation indefinite; discharge estimated on basis of records for nearby stations.

Almagosa Springs near Agat

Location.--Lat 13°20'45" N., long 144°40'45" E., on left bank 3.5 miles southeast of Agat and 3.5 miles northeast of Umatac.

Records available.--September 1951 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 620 ft (by barometer).

Average discharge.--6 years (1952-58), 3.51 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1952-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)*	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1952†	Oct. 12, 1951	162	3.24	Sept. 28 to Oct. 2, 1951	††0.02	-
1953	Feb. 22, 1953	173	3.33	{ a a a	0	-
1954	Oct. 15, 1953	760	5.02		0	-
1955	Nov. 23, 1954	79	2.13		††.01	-
1956	Sept. 29, 1955	240	3.81		††.01	-
1957	Aug. 28, 1956	103	2.51	Apr. 27 to May 3, 1956	.04	0.13
1958	Nov. 16, 1957	198	3.53	Mar. 26, 1957 (a)	††.01	-

† Period September to June.

* From rating curve extended above 20 cfs on basis of tests on model of station site.

†† Minimum daily.

a Many days.

1951-58: Maximum discharge, 760 cfs Oct. 15, 1953 (gage height, 5.02 ft), from rating curve extended above 20 cfs on basis of tests on model of station site; no flow at times.

Remarks.--Records good except those for periods of fragmentary or faulty or no gage-height record, which are poor. Several pipelines above station divert water for domestic use.

Discharge, in cubic feet per second, September 1951 to June 1952

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			-	*0.02	0.59	1.52	C.26	0.03	0.04	0.06	0.07	0.07
2			-	.02	.87	1.42	.22	.04	.04	.05	.07	.06
3			-	1.62	3.25	1.16	.24	.05	.04	.05	.12	.06
4			-	.03	30	.88	.18	.03	.04	.05	.14	.06
5			-	.03	13.6	.70	.16	.04	*.06	.05	.14	.06
6			-	.93	6.5	35.5	.18	.03	.05	.05	.15	.07
7			-	1.07	4.1	17.5	*.16	.76	.05	.06	.12	.07
8			-	9.5	2.95	7.9	.09	*.05	.06	.06	.08	.07
9			-	20.5	2.05	4.7	.07	.04	.06	.06	.10	.07
10			-	19.9	1.52	3.4	.24	.04	.06	.07	.08	.08
11			-	14.6	1.24	2.8	.04	.04	.06	.06	.08	.10
12			-	58	1.62	1.93	.18	.04	.06	.07	.10	.06
13			-	56	.88	1.42	.04	.04	.06	.07	.08	.06
14			-	32	.64	1.08	.04	.05	.07	.08	.10	.06
15			-	14.6	.34	.82	.54	.06	.10	.07	.07	.07
16			-	8.9	.10	.64	.04	.06	.12	.07	.06	.06
17			-	5.6	.75	5.1	.04	.05	.05	.08	.07	.06
18			-	4.1	.10	2.1	.08	.05	.05	.07	.07	.06
19			-	3.1	3.1	1.01	.05	.06	.06	.07	.07	.06
20			-	2.4	1.18	.76	.04	.04	.06	.06	.07	.06
21			-	1.82	.64	.49	.04	.04	.07	.06	.07	.06
22			-	1.42	.33	.27	.04	.04	.06	.07	.07	.07
23			-	1.16	.10	.08	.05	.05	.06	.07	.06	.07
24			-	1.08	.07	.07	.05	.05	.06	.08	.06	.06
25			-	.82	.07	.05	.05	.04	.08	.10	.06	.06
26			-	f1.6	.06	.08	.04	.05	.05	.08	.06	.06
27			-	2.5	.94	.09	.03	.05	.05	.08	.06	.06
28			-	0.02	1.72	4.2	.22	.03	.05	.06	.07	.06
29			-	.02	1.24	2.05	.42	.03	.04	.05	.07	.06
30			-	.02	.94	1.33	.29	.03	.05	.07	.08	.06
31			-	-----	.64	-----	.27	-----	.05	-----	.07	-----
Total			-	267.86	85.17	94.67	3.31	2.01	1.83	2.01	2.58	1.94
Mean			-	8.64	2.84	3.05	0.107	0.069	0.059	0.067	0.083	0.065
Ac-ft			-	531	169	188	6.6	4.0	3.6	4.0	5.1	3.8
Calendar year	: Max			Min		Mean		Ac-ft				
Fiscal year	: Max			Min		Mean		Ac-ft				

* Discharge measurement made on this day.

f Fragmentary gage-height record; discharge computed from partly estimated gage heights.

Almagosa Springs near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.15	11.5	0.30	3.0	7.0	4.0	4.7	0.10	1.52	0.14	0.12	0
2	.07	6.0	1.40	2.4	6.0	3.5	3.1	.10	1.08	.12	.14	0
3	.08	14.2	1.37	2.1	5.0	3.0	2.3	.12	.76	.12	.14	0
4	.11	11.9	.94	1.8	4.0	2.5	1.62	*.12	.54	.12	.14	0
5	.08	10.4	2.35	1.5	12	2.5	1.69	.12	.33	.12	.12	0
6	.08	5.3	2.05	1.3	8.0	2.0	1.24	.14	.18	.12	*.12	0
7	.08	3.55	1.15	9.0	5.0	4.0	.88	.18	.55	.12	.14	0
8	.08	*2.45	9.5	5.0	11	1.5	*.62	.30	.21	.12	.14	0
9	.07	9.3	*19.9	8.0	18	1.5	.37	.30	.21	.12	.14	0
10	.08	17.4	8.6	6.0	6.0	1.5	.21	.30	.30	.12	.12	0
11	.07	17.7	4.7	7.0	15	1.5	.10	.33	.33	.12	.12	0
12	.08	24	4.7	6.5	*10	1.5	.08	.33	.70	.16	.10	0
13	.07	16.2	13.1	6.0	7.0	1.5	.10	.21	.33	.14	.10	0
14	.07	7.1	13.4	7.5	5.1	2.0	.17	.16	.30	.14	.10	0
15	.08	4.9	8.5	7.0	4.7	1.5	.41	.16	.27	.14	.12	0
16	.09	3.7	8.5	6.5	19.8	1.1	.41	.16	.18	.14	.01	0
17	.08	2.3	4.1	6.0	11.0	1.1	.35	.16	.18	.14	.01	0
18	.08	1.42	3.4	15	7.0	*1.1	.33	.16	.16	.14	.01	0
19	.08	.95	2.5	11	10	1.06	.24	.16	.16	.14	0	0
20	.07	1.25	2.0	8.0	20	.64	.18	.18	.16	.44	0	0
21	.06	.78	1.5	9.0	8.0	.45	.14	.18	.16	.79	0	0
22	.08	.73	.8	8.0	5.0	.33	.12	.84	.16	.14	0	0
23	.08	4.9	2.0	7.0	4.0	4.8	.12	.30	.54	.14	0	0
24	.10	1.72	1.5	14	4.5	1.24	.10	14	.16	.14	0	0
25	.07	1.16	1.1	8.5	4.0	2.55	.10	7.8	.16	.14	0	0
26	.07	.59	.8	9.0	3.5	1.24	.10	4.5	.16	.14	0	0
27	.06	.21	.7	8.0	3.2	1.34	.12	3.1	.16	.12	.02	0
28	.10	.10	1.5	7.0	3.0	1.00	.10	2.05	.16	.12	0	.04
29	.10	1.47	5.0	6.0	15	3.55	.10	-	.16	.12	0	.02
30	.99	.82	3.0	11	3.5	1.16	.10	-----	*.15	.12	0	0
31	.42	.54	-----	9.0	-----	9.6	.10	-----	.14	-----	0	-----
Total	3.78	184.54	130.36	217.1	245.3	66.26	20.30	149.42	10.56	4.89	1.91	0.06
Mean	0.122	5.95	4.35	7.00	8.18	2.14	0.655	5.34	0.341	0.163	0.062	0.002
Ac-ft	7.5	366	259	431	487	131	40	296	21	9.7	3.8	0.1

Calendar year 1952: Max 24 Min 0.03 Mean 2.35 Ac-ft 1,710
 Fiscal year 1952-53: Max 84 Min 0 Mean 2.85 Ac-ft 2,050

* Discharge measurement made on this day.
 Note.--Faulty or no gage-height record Sept. 19 to Nov. 12, Nov. 19 to Dec. 18, June 4-30; discharge estimated on basis of records for nearby stations.

Almogosa Springs near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	a0	0.01	14.2	4.1	4.7	5.6	0.76	0.27	0.01	1.42	1.33	0.01
2	a0	.01	13.6	2.95	4.3	*5.8	.64	.21	.01	1.52	1.33	.01
3	a0	.01	14.6	2.3	3.95	5.8	.49	.16	.01	1.62	1.24	0
4	a0	0	10.4	1.72	3.4	6.1	.45	.16	.01	1.52	1.24	0
5	a0	0	7.3	1.33	3.1	5.1	.33	.14	.01	1.52	*1.16	0
6	a0	.01	5.6	1.08	2.8	4.5	.33	.12	.01	1.52	1.24	0
7	a0	.01	4.3	.88	2.55	3.75	.21	.08	.01	1.52	1.16	0
8	a0	.06	3.6	.76	2.3	2.95	.12	.07	.03	1.52	1.16	0
9	a0	.01	2.95	.54	2.15	2.65	13.5	.06	.01	1.42	1.16	.01
10	a0	7.3	2.4	.37	3.75	2.4	17.8	.05	.01	1.42	1.08	.02
11	a0	86	2.05	.30	3.1	2.05	6.8	.04	.01	1.42	1.16	.02
12	a0	71	1.82	.33	48	2.15	3.6	.04	.01	1.42	1.24	.03
13	a0	25.5	1.42	.33	74	1.82	2.4	.03	.01	1.42	1.24	.02
14	a0	15.0	*1.08	.33	41	2.4	*1.72	.03	.01	1.42	1.16	.02
15	0	15.1	.82	243	19.2	3.25	1.52	.02	.84	1.33	1.16	*.17
16	0	33.5	1.08	212	13.0	4.7	1.08	.02	1.62	1.33	1.08	.01
17	0	31	.70	90	10.7	10.1	.88	.01	1.62	1.33	1.08	.39
18	1.27	41	.88	38	8.8	6.8	.70	.01	1.62	1.33	1.16	.39
19	.02	24.5	1.62	28.5	7.3	4.9	.54	.01	1.62	1.33	1.16	.01
20	.02	13.4	2.05	24.5	5.8	3.6	.59	.02	1.62	1.33	1.08	.02
21	.02	9.1	2.55	20	5.3	2.8	.54	.02	1.62	1.33	1.08	.01
22	.01	5.8	3.1	16.4	4.5	2.95	.45	.02	1.62	1.42	1.01	.04
23	.01	6.2	2.15	14.2	4.3	2.4	.27	.01	1.62	1.42	.43	.02
24	.01	25	1.62	12.6	7.3	2.15	.18	.01	1.62	1.42	.18	.02
25	.01	20	1.72	11.5	8.1	1.93	.33	.01	1.52	1.42	.45	.02
26	.14	11.5	12.2	*10.7	7.0	1.72	.41	.02	1.52	1.42	.02	.01
27	1.55	7.5	6.5	10.4	6.5	1.62	.33	.07	1.52	1.42	.02	.02
28	1.19	43	7.3	11.1	4.7	1.42	.30	.01	1.52	1.42	.01	.01
29	.10	52	8.5	10.4	3.95	1.24	.27	-	1.52	1.42	.01	.01
30	.02	38	5.8	9.4	4.5	1.08	.27	-----	1.52	1.42	.01	.01
31	.01	23	-----	5.3	-----	.88	.27	-----	1.42	-----	.01	-----
Total	4.38	584.52	143.91	785.32	320.05	106.61	58.08	1.72	26.12	42.77	26.85	1.30
Mean	0.141	18.9	4.80	25.3	10.7	3.44	1.87	0.061	0.843	1.43	0.866	0.043
Ac-ft	8.7	1,160	285	1,560	635	211	115	3.4	52	85	53	2.6
Calendar year 1953: Max	243			Min	0	Mean	5.84	Ac-ft	4,230			
Fiscal year 1953-54: Max	243			Min	0	Mean	5.76	Ac-ft	4,170			

* Discharge measurement made on this day.
a No gage-height record; discharge estimated on basis of records for nearby stations.

Almogosa Springs near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.01	0.03	9.0	5.9	21.5	2.8	0.30	0.27	0.04	0.07	0.14	0.07
2	.09	.03	6.4	4.1	11.2	2.05	.30	.83	.04	.02	.14	.02
3	.01	.02	4.4	4.4	6.3	1.42	.30	.24	.05	.02	.14	.02
4	.01	.08	10.5	2.8	4.5	1.01	.30	.24	.07	.07	.12	.03
5	.01	.07	28.5	*3.8	2.8	.76	.33	.21	.07	.07	.07	.06
6	.01	.13	21	2.95	1.93	.59	.30	.18	.06	.07	.07	.02
7	.01	.54	21.5	3.25	1.52	.64	.27	.18	.06	.07	.08	.14
8	.01	.26	17.7	5.1	1.46	.41	.56	.21	.05	.07	.05	.07
9	.01	1.70	4.6	4.1	.24	.33	.33	.21	.05	.08	.04	5.2
10	.01	.59	11.2	3.25	.47	.33	.33	.10	.05	.06	.02	*.41
11	.01	.33	6.7	4.3	5.7	.54	.37	.06	.05	.05	.03	.17
12	.01	5.5	4.1	4.5	3.0	.82	.37	.06	.05	.05	.04	.08
13	.01	6.1	3.15	5.6	1.52	.64	.37	.06	.06	.05	.03	.08
14	.03	1.62	18.7	7.0	3.8	.54	.74	.06	.05	.06	.02	.07
15	.01	.64	43	6.1	5.1	.54	1.64	.07	.06	.06	.32	.06
16	.01	.49	18.3	3.9	3.3	.45	.64	.08	.07	.06	.03	.06
17	.01	.33	10.7	1.16	.64	.45	.79	.08	.10	.06	.02	.06
18	.04	.30	6.8	.88	9.4	.45	.59	.09	.10	.06	.03	.04
19	.06	.83	4.7	.59	7.5	.37	.59	.08	.10	.06	.04	.04
20	.01	8.1	12.3	.84	5.6	.30	.59	.10	.12	.14	.02	.05
21	.01	9.1	24	1.04	3.75	.30	.49	1.29	.10	.06	.02	.05
22	.01	2.75	26	1.96	*2.8	.27	.33	.15	.10	.06	.02	.06
23	.01	*.92	15.1	1.29	20	.27	.27	.06	.10	.07	.02	.04
24	.01	1.94	10.4	.76	12.3	.27	.24	.05	.12	.05	.04	.03
25	.01	18.8	7.3	.70	7.3	.30	.27	.05	.10	.05	.01	.03
26	.01	8.4	6.4	.76	4.9	.30	2.2	.05	.08	.04	.01	.03
27	.01	3.8	4.9	.76	11.0	.30	*.41	.05	.10	.06	.02	.03
28	.01	1.93	9.9	.70	8.1	.27	.33	.05	.10	.08	.03	.03
29	.02	1.01	6.5	.54	5.3	*.30	.30	-	.12	.10	.01	.03
30	.02	.73	10.7	1.65	3.75	.30	.24	-----	.12	.14	.01	.03
31	.03	.76	-----	32	-----	.30	.27	-----	.12	-----	.01	-----
Total	0.53	77.83	394.45	116.68	176.68	18.62	15.36	5.16	2.46	1.96	1.65	7.11
Mean	0.017	2.51	13.1	3.76	5.89	0.601	0.495	0.184	0.079	0.065	0.053	0.237
Ac-ft	1.1	154	782	231	350	37	30	10	4.9	3.9	3.3	14

Calendar year 1954: Max 43 Min 0 Mean 2.58 Ac-ft 1,870
 Fiscal year 1954-55: Max 43 Min 0.01 Mean 2.24 Ac-ft 1,620

* Discharge measurement made on this day.

Almagoosa Springs near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.04	4.3	20.5	a20	5.0	1.42	0.51	0.27	0.12	0.10	0.01	1.08
2	.03	2.55	5.0	a10	4.6	.88	.44	.24	.12	.10	.01	1.01
3	.04	1.52	1.70	a18	3.25	.64	.52	.27	.12	.10	.01	1.01
4	.05	.94	.76	6.3	2.9	.59	*.36	.24	.10	.10	.03	1.08
5	.04	.41	.49	4.5	2.5	.54	.33	.21	.12	.10	.02	1.08
6	11.1	.36	.41	3.6	1.82	.54	.33	.21	.12	.10	.02	1.01
7	9.9	.54	.74	2.95	3.35	.59	.30	.24	.12	.12	.03	.94
8	*16.8	.70	.45	2.15	3.45	.59	.30	.27	.12	.12	.04	1.08
9	16.9	.54	1.12	1.72	1.08	.50	.27	.35	.12	.12	.04	.94
10	5.6	.33	9.5	1.33	1.71	.65	.27	.21	.14	.12	.05	.88
11	2.7	.27	9.0	1.16	.82	.60	.33	.18	.16	.12	.06	.82
12	5.1	.18	7.0	.82	.59	1.73	.33	.18	.14	.12	.06	.29
13	6.4	.12	3.75	9.1	.41	1.01	.33	.18	.14	.12	.07	.02
14	4.1	.10	2.3	4.9	.30	.67	.30	*1.05	.14	.12	.07	.05
15	2.05	*.10	1.42	2.55	.27	.57	.30	.83	.14	.12	.05	.05
16	7.6	.10	2.95	1.72	.38	20	.33	.16	.16	.12	.05	.07
17	2.8	.08	1.95	2.15	.63	8.1	.33	.14	.16	.12	.05	.19
18	1.42	.21	8.2	1.24	1.00	3.75	.30	.14	.16	.12	.04	.17
19	.60	.27	3.75	3.8	.76	2.3	.30	.14	.16	.12	.04	.10
20	.33	.21	2.55	13.9	.70	1.33	.30	.14	.16	.12	.08	.12
21	.76	.76	1.62	3.6	.70	.88	.27	.14	.18	.10	*.07	.12
22	.70	.38	9.3	.44	.59	.49	.27	.14	.16	.12	.07	.14
23	.76	.14	*5.4	16.9	.64	.27	.30	.14	.16	.10	.07	.14
24	.41	1.22	3.1	17.0	.56	.37	.30	.14	.16	.10	.50	.18
25	3.35	.41	7.2	*17.2	.64	.33	.27	.16	.14	.10	.82	.16
26	2.5	.21	5.5	15.6	.52	.45	.30	.14	.14	.04	.94	.21
27	1.01	.12	11.3	19.5	.60	.60	.30	.12	*.16	.01	1.08	.21
28	.47	.12	60	21	11.4	.61	.30	.12	.38	.01	.94	.18
29	.22	.10	83	12.6	1.77	*.52	.27	.12	.16	.01	1.02	.18
30	12.8	.10	a15	9.1	3.35	.41	.27	-----	.57	.01	1.42	.18
31	9.1	.54	-----	6.3	-----	.39	.27	-----	.69	-----	1.33	-----
Total	127.68	17.93	284.96	294.69	56.29	52.32	9.90	6.87	5.62	2.88	9.09	13.69
Mean	4.12	0.578	9.50	9.51	1.88	1.69	0.319	0.237	0.181	0.096	0.293	0.456
Ac-ft	253	36	565	585	112	104	20	14	11	5.7	18	27

Calendar year 1955: Max 83 Min 0.01 Mean 2.38 Ac-ft 1,720
 Fiscal year 1955-56: Max 83 Min 0.01 Mean 2.41 Ac-ft 1,750

* Discharge measurement made on this day.
 a Faulty or no gage-height record; discharge estimated on basis of records for nearby stations.

Almagosa Springs near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.18	7.5	12.4	13.0	0.94	1.16	1.08	3.5	1.72	0.12	0.76	1.42
2	.16	6.1	15.0	9.4	.64	5.2	.88	2.8	1.62	.18	.70	1.33
3	.16	5.1	15.1	7.3	.64	4.8	.82	2.8	1.52	.17	.70	1.33
4	.16	4.3	16.4	7.0	.41	3.4	.76	3.0	1.72	.08	.70	1.33
5	.18	3.6	17.4	5.8	.33	3.1	.64	3.2	2.15	.10	.64	1.33
6	.18	3.25	12.3	5.1	.27	4.9	.49	2.8	1.21	.14	.64	1.33
7	.18	3.1	10.1	4.7	.27	3.9	.41	2.7	.08	.14	.82	1.33
8	.18	6.3	9.4	4.1	.28	1.52	.37	3.5	.07	.18	1.08	1.33
9	.51	9.5	9.3	3.75	.29	1.57	.33	2.9	.08	.21	.76	1.33
10	.22	6.1	8.1	3.1	3.4	.94	1.6	2.5	.07	.18	.64	1.24
11	.16	5.8	8.8	7.0	1.79	.64	8.0	*2.4	.07	.77	.59	1.24
12	*.10	13.4	9.8	19.9	10.0	*.44	4.1	2.4	.07	1.62	.59	1.24
13	.94	12.8	8.5	10.1	23	.33	3.6	2.3	.07	1.62	.54	1.24
14	1.47	8.1	7.0	11.2	11.4	33	3.2	2.15	.06	1.82	.54	1.24
15	.48	7.0	24.5	8.8	5.5	43	2.9	2.15	.06	1.72	.49	1.24
16	.24	5.6	13.8	17.8	10.2	19.1	2.7	2.05	.06	1.62	.49	1.16
17	.18	14.7	11.6	14.0	10.2	11.1	6.0	1.82	.07	1.52	.45	1.16
18	.18	15.8	9.2	8.2	30	7.0	4.5	1.82	.07	.59	.54	.95
19	.37	7.0	9.7	9.6	18.6	4.5	3.5	2.3	.07	.05	.45	.83
20	.54	3.3	15.9	6.3	12.7	3.4	5.5	2.05	.07	.06	.58	1.62
21	.59	1.82	13.4	4.5	8.5	2.95	4.0	1.82	.07	.07	*1.16	1.62
22	.41	1.49	10.1	3.2	5.6	2.3	3.3	1.82	.07	.52	4.5	1.33
23	.30	2.4	14.5	3.3	6.1	1.72	3.0	1.93	.07	.88	2.15	1.24
24	7.5	3.3	12.6	3.1	4.3	1.33	2.8	2.4	.07	.88	1.82	1.24
25	5.9	4.1	9.7	8.2	3.4	1.08	2.6	2.05	.07	.82	1.62	1.01
26	21	4.3	8.1	3.25	2.65	1.33	2.5	1.82	*.04	.82	1.52	.49
27	16.5	13.2	9.1	2.55	2.15	2.05	2.4	1.82	.57	.76	1.42	.41
28	11.9	25	10.2	3.4	1.72	1.93	2.3	1.72	.16	.76	1.42	.64
29	8.8	*16.7	7.8	2.45	1.42	1.72	4.8	-	.12	.76	1.42	1.01
30	19.4	10.1	18.2	*1.60	1.33	1.52	3.3	-----	.12	.76	1.42	1.01
31	15.6	8.8	-----	1.78	-----	1.24	6.0	-----	.12	-----	1.42	-----
Total	114.65	239.56	358.0	213.48	178.03	172.17	102.78	66.52	12.39	19.92	32.57	35.22
Mean	3.70	7.73	11.9	6.89	5.93	5.55	3.32	2.38	0.400	0.664	1.05	1.17
Ac-ft	227	475	710	423	353	341	204	132	.25	40	65	70

Calendar year 1956: Max 43 Min 0.01 Mean 3.62 Ac-ft 2,620
 Fiscal year 1956-57: Max 43 Min 0.04 Mean 4.23 Ac-ft 3,060

* Discharge measurement made on this day.
 Note.--Faulty or no gage-height record Jan. 10 to Feb. 10; discharge estimated on basis of records for nearby stations.

Almagosa Springs near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.01	0.76	12.6	0.79	7.3	1.42	0.28	0.27	0.02	0.42	0.05	0.01
2	1.01	.76	34.5	.70	5.8	1.42	.26	.18	.02	1.24	.05	.01
3	1.16	.76	25	.50	4.1	1.24	.20	.18	.02	1.24	.05	.01
4	1.08	.76	13.0	.37	2.8	1.01	.15	.14	.02	.48	.04	.01
5	1.08	.82	8.8	3.75	2.15	.82	.12	.10	.02	.01	.02	.01
6	1.01	.82	8.1	50	2.3	.64	.08	.07	.02	.01	.03	.01
7	1.01	.82	8.8	44	1.42	.49	.10	.04	.02	.01	.02	.01
8	1.01	.88	9.7	25.5	34.5	.33	.41	.04	.02	.01	.03	.01
9	1.01	.82	9.7	16.3	28	.27	.23	.04	.01	.01	.04	.01
10	*1.01	.82	8.1	14.0	17.6	.21	.15	.04	.30	.02	.02	2.8
11	1.16	.82	6.8	8.5	13.8	.21	.21	.04	.76	.02	.02	.61
12	1.33	.76	6.5	6.3	31.5	.18	.23	.03	*.76	.01	.02	.08
13	1.52	.88	6.3	18.4	25	.16	.33	.03	.48	.02	.01	1.79
14	1.16	1.08	5.8	15.3	15.1	.14	29	.03	.02	.02	.01	42
15	1.08	.94	5.1	10.6	67	.21	15.3	.03	.02	.02	.01	12.9
16	1.01	.88	5.8	7.8	91	.30	6.3	.03	.02	.01	.01	4.6
17	.94	1.01	5.3	5.1	29	.27	3.6	.03	.01	.01	.01	1.66
18	.94	1.85	4.9	3.6	18.9	.18	2.15	.04	.01	.01	.01	.42
19	.94	8.5	6.0	2.55	13.4	.27	1.33	.03	.01	.01	.01	.08
20	.94	5.0	5.1	1.93	9.4	.27	1.01	.02	.01	.01	.01	.75
21	.94	2.8	4.9	1.95	7.3	.33	*.59	.02	.01	.01	.01	.12
22	.88	2.15	5.6	*5.5	6.8	.32	.33	.02	.01	.01	.02	.12
23	.88	2.4	5.1	11.5	5.1	.30	.16	.02	.01	.01	.01	.09
24	.82	4.8	4.9	6.8	4.1	.22	.14	.04	.01	.02	.02	.07
25	.82	5.0	2.0	5.7	3.4	.20	.13	.02	.01	.20	.02	2.5
26	.76	5.9	.60	5.5	2.95	.22	.21	.02	.01	.01	.02	*3.6
27	.76	3.75	.65	3.95	4.1	.15	.17	.02	.01	.01	.01	1.80
28	.82	*15.7	.80	16.4	2.55	.15	.28	.02	.01	.02	.01	.02
29	.82	26	.85	9.6	2.15	1.21	.37	-	.01	.04	.04	.08
30	.82	13.8	.85	6.5	1.82	.33	.30	-----	.01	.04	.01	.04
31	.76	8.8	-----	6.5	-----	.17	.27	-----	.01	-----	.01	-----
Total	30.49	120.84	222.15	315.89	460.34	13.64	64.39	1.59	2.68	3.96	0.65	76.22
Mean	0.984	3.90	7.40	10.2	15.3	0.440	2.08	0.057	0.086	0.132	0.021	2.54
Ac-ft	60	240	441	627	913	27	128	3.2	5.3	7.9	1.3	151
Calendar year 1957: Max	91			Min	0.04	Mean	3.93	Ac-ft	2,840			
Fiscal year 1957-58: Max	91			Min	0.01	Mean	3.60	Ac-ft	2,600			

* Discharge measurement made on this day.

Fena Dam spillway near Agat

Location.--Lat 13°21'30" N., long 144°42'10" E., on left bank 4.0 miles southeast of Agat and 5.5 miles southwest of Yona.

Drainage area.--5.8 sq mi.

Records available.--September 1951 to July 1952, November 1952 to June 1958.

Gage.--Water-stage recorder and concrete dam control. Datum of gage is 111.35 ft above mean sea level (from U. S. Navy construction plans).

Average discharge.--5 years (1953-58), 16.7 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1952-58 are contained in the following table:

Fiscal year	Maximum			Minimum	
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)
1952†	Feb. 8, 1952	‡261	0.62	(a)	0
1953††	Nov. 16, 1952	‡626	1.11	(a)	0
1954	Oct. 15, 1953	(**)	-	(a)	0
1955	Nov. 23, 1954	‡634	1.12	(a)	0
1956	Sept. 29, 1955	‡1,100	1.62	(a)	0
1957	Dec. 14, 1956	‡964	1.48	(a)	0
1958	Nov. 15, 1957	‡1,420	1.92	(a)	0

† Period September to June.

‡ From rating curve extending above 53 cfs on basis of broad-crested weir formula.

†† Period July, November to June.

** Unknown.

a Many periods.

1951-58: Maximum discharge, not determined, occurred Oct. 15, 1953; no flow many times.

Remarks.--Records poor. Fena Valley Reservoir impounds low flow for domestic use. Records include only flow over spillway.

Fena Dam spillway near Agat--Continued

Rating table, Sept. 28, 1951, to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)

0	0	0.8	383
.1	16.9	.9	457
.2	48	1.0	535
.3	89	1.2	703
.4	136	1.4	886
.5	189	1.6	1,080
.6	248	1.8	1,290
.7	313		

Discharge, in cubic feet per second, September 1951 to June 1952

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			-				0	108				
2			-				0	112				
3			-				0	141				
4			-				0	141				
5			-				0	136				
6			-				0	136				
7			-				0	236				
8			-				0	254				
9			-				0	248				
10			-				0	248				
11			-				0	236				
12			-				0	213				
13			-				0	189				
14			-				0	157				
15			-				0	127				
16			-				0	103				
17			-				.54	75				
18			-				9.9	55				
19			-				34	52				
20			-				48	41				
21			-				55	34				
22			-				63	25				
23			-				79	22				
24			-				89	25				
25			-				98	9.9				
26			-				98	2.8				
27			-				103	1.50				
28			0				108	0				
29			0				122	0				
30			0				112	-----				
31			-----				112	-----				-----
Total			-	0	0	0	1,131.44	3,128.20	0	0	0	0
Mean			-	0	0	0	36.5	108	0	0	0	0
Ac-ft			-	0	0	0	2,240	6,200	0	0	0	0
Calendar year	: Max			Min		Mean		Ac-ft				
Fiscal year	: Max			Min		Mean		Ac-ft				

Fena Dam spillway near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1					-	52	76	0				
2					-	59	19.5	0				
3					-	31	7.9	0				
4					-	28	6.0	0				
5					-	14.4	7.9	0				
6					-	9.9	9.9	0				
7					-	125	4.3	0				
8					-	37.5	1.50	0				
9					-	14.4	1.50	0				
10					-	12.1	.54	0				
11					-	16.9	0	0				
12					48	16.9	0	0				
13					28	9.9	0	0				
14					14.4	14.4	0	0				
15					14.4	9.9	0	0				
16					279	9.9	0	0				
17					94	7.9	0	0				
18					28	9.9	0	0				
19					28	14.4	0	0				
20					31	7.9	0	0				
21					34	6.0	0	0				
22					22	4.3	0	400				
23					22	44	0	90				
24					14.4	16.9	0	40				
25					14.4	16.9	0	28				
26					12.1	14.4	0	12.1				
27					7.9	7.9	0	6.0				
28					7.9	6.0	0	.54				
29					52	30.5	0	-				
30					63	7.9	0	-----				
31			-----		-----	122	0	-----		-----		-----
Total	0	-	-	-	-	778.1	135.04	576.64	0	0	0	0
Mean	0	-	-	-	-	25.1	4.36	20.6	0	0	0	0
Ac-ft	0	-	-	-	-	1,540	268	1,140	0	0	0	0

Calendar year : Max Min Mean Ac-ft
 Fiscal year : Max Min Mean Ac-ft

Note.--No gage-height record Jan. 20 to Feb. 24; discharge estimated on basis of records for nearby stations.

Fena Dam spillway near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		0	122	28	37.5	60	19.5	9.9				
2		0	113	24	37.5	50	19.5	6.0				
3		0	122	21	34	45	19.5	4.3				
4		0	75	20	34	40	22	6.0				
5		0	55	20	31	37.5	16.9	6.0				
6		0	41	19	28	31	19.5	6.0				
7		0	37.5	20	28	31	19.5	6.0				
8		0	31	18	28	31	14.4	4.3				
9		0	28	65	28	28	205	2.8				
10		0	25	23	48	25	74	1.50				
11		0	25	21	75	22	41	1.50				
12		0	25	31	350	25	31	.54				
13		0	22	21	480	25	25	.54				
14		98	19.5	21	220	49	25	0				
15		98	19.5	1,200	90	37.5	28	0				
16		188	28	1,000	65	58	25	0				
17		223	22	500	55	65	22	0				
18		458	31	250	46	37.5	22	0				
19		222	48	210	40	31	*18.4	0				
20		110	55	320	37	28	14.4	0				
21		63	67	200	37	25	19.5	0				
22		44	67	95	35	31	19.5	0				
23		37.5	38	80	34	28	14.4	0				
24		275	28	59	80	25	12.1	0				
25		197	28	55	55	28	12.1	0				
26		78	28	52	40	25	9.9	0				
27		41	28	44	35	25	12.1	.20				
28		529	60	67	33	22	12.1	0				
29		811	40	55	30	22	9.9	-				
30		489	28	44	85	22	9.9	-----				
31		228	-----	41	-----	19.5	7.9	-----				
Total	0	4,189.5	1,356.5	4,624	2,256.0	1,029.0	821.0	55.58	0	0	0	0
Mean	0	135	45.2	149	75.2	33.2	26.5	1.98	0	0	0	0
Ac-ft	0	8,310	2,690	9,170	4,470	2,040	1,630	110	0	0	0	0
Calendar year 1953: Max 1,200 Min 0 Mean 38.8 Ac-ft 28,090												
Fiscal year 1953-54: Max 1,200 Min 0 Mean 39.3 Ac-ft 28,420												

* Discharge measurement made on this day.

Fena Dam spillway near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		0	0.54	44	84	16.9	0					
2		0	25	25	34	14.4	0					
3		0	37.5	47	25	12.1	2.8					
4		0	88	31	19.5	9.9	6.0					
5		0	165	35.5	16.9	7.9	6.0					
6		0	103	*28	14.4	7.9	4.3					
7		0	92	19.5	12.1	14.4	.54					
8		0	96	41	12.1	12.1	12.1					
9		0	77	31	6.0	12.1	9.9					
10		0	66	22	6.0	12.1	9.9					
11		0	34	32.5	59	9.9	9.9					
12		0	22	41	30.5	7.9	9.9					
13		0	19.5	25	12.1	6.0	2.8					
14		0	133	14.4	14.4	4.3	9.9					
15		0	240	12.1	12.1	4.3	16.9					
16		0	74	7.9	9.9	6.0	7.9					
17		0	41	7.9	7.9	6.0	12.1					
18		0	31	7.9	120	9.9	7.9					
19		0	25	6.0	41	7.9	2.8					
20		0	90	6.0	31	4.3	.54					
21		0	125	12.1	19.5	2.8	0					
22		0	130	14.4	14.4	2.8	0					
23		.20	59	16.9	178	2.8	0					
24		0	44	12.1	47	.54	0					
25		.54	28	9.9	31	0	0					
26		0	31	19.5	25	0	19.7					
27		0	25	14.4	77	0	2.8					
28		0	87	12.1	34	0	.75					
29		0	37.5	7.9	22	0	0					
30		0	46	16.6	19.5	0	0					
31		0	-----	218	-----	0	0	-----		-----		-----
Total	0	0.74	2,072.04	838.6	1,035.3	195.24	155.43	0	0	0	0	0
Mean	0	0.024	69.1	27.1	34.5	6.30	5.01	0	0	0	0	0
Ac-ft	0	1.5	4,110	1,660	2,050	387	308	0	0	0	0	0
Calendar year 1954: Max		240		Min	0	Mean	13.7	Ac-ft		9,950		
Fiscal year 1954-55: Max		240		Min	0	Mean	11.8	Ac-ft		8,520		

* Discharge measurement made on this day.

Fena Dam spillway near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			18.6	80	16.9	14.4						
2			14.4	41	25	4.3						
3			6.0	62	14.4	1.50						
4			.54	25	12.1	.54						
5			.54	16.9	14.4	0						
6			0	9.9	9.9	0						
7			.75	4.3	7.9	0						
8			0	4.3	6.0	.88						
9			4.8	4.3	6.0	.32						
10			60	2.8	22	0						
11			73	2.8	9.9	0						
12			22	1.50	2.8	4.0						
13			6.0	19.0	2.8	10.8						
14			0	12.1	1.50	12.1						
15			0	4.3	.75	2.8						
16			7.4	1.50	0	173						
17			16.9	.54	0	31.5						
18			54	1.50	2.8	14.4						
19			12.1	13.7	1.50	6.0						
20			1.50	101	0	2.8						
21			0	9.9	0	1.50						
22			70	295	0	.54						
23			31	48	4.3	0						
24			7.9	49	1.50	0						
25			47	80	.54	0						
26			20.5	92	0	0						
27			71	94	.54	0						
28			396	99	93	0						
29			385	41	22.5	0						
30			70	25	38	0						
31			-----	19.5	-----	0						
Total	0	0	1,396.93	1,260.84	317.03	281.38	0	0	0	0	0	0
Mean	0	0	46.6	40.7	10.6	9.08	0	0	0	0	0	0
Ac-ft	0	0	2,770	2,500	629	558	0	0	0	0	0	0
Calendar year 1955: Max			396	Min	0	Mean	9.35	Ac-ft	6,760			
Fiscal year 1955-56: Max			396	Min	0	Mean	8.90	Ac-ft	6,460			

Fena Dam spillway near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		0	24.5	42	7.9	14.4	12.1	6.0				
2		0	36	12.1	4.3	54	14.4	4.3				
3		0	28	6.0	6.0	44	14.4	4.3				
4		0	25	21	2.8	25	12.1	6.0				
5		0	36.5	22	.54	22	9.9	7.9				
6		0	16.9	7.9	1.50	22	7.9	4.3				
7		0	12.1	2.8	1.50	12.1	7.9	2.8				
8		0	19.5	2.8	1.50	9.9	4.3	14.4				
9		0	22	2.8	.54	12.1	4.3	4.3				
10		0	9.9	7.9	27.5	12.1	114	6.0				
11		0	12.1	30.5	28	4.3	37.5	2.8				
12		0	22	159	70	2.8	22	2.8				
13		0	9.9	28	171	2.8	14.4	.54				
14		0	4.3	39	59	321	12.1	0				
15		0	152	19.5	22	314	12.1	0				
16		0	31	38	52	66	7.9	0				
17		0	28	34	56	34	51	0				
18		0	12.1	37.5	194	22	19.5	0				
19		0	14.4	37.5	75	19.5	9.9	0				
20		0	50	22	44	16.9	16.9	0				
21		0	28	12.1	31	19.5	14.4	0				
22		0	16.9	7.3	25	14.4	6.0	0				
23		0	66	19.	34	12.1	2.8	0				
24		0	49	14.6	25	12.1	2.8	1.50				
25		0	22	68	16.9	12.1	1.50	2.8				
26		0	9.9	14.4	14.4	34	1.50	0				
27		0	23	14.4	12.1	44	2.8	0				
28		0	36	34.5	9.9	19.5	2.8	0				
29		43	16.9	25	7.9	16.9	21.5	-				
30		44	115	*15.8	12.1	14.4	7.9	-----				
31		16.9	-----	12.1	-----	14.4	14.4	-----				
Total	0	103.9	948.9	810.0	1,011.38	1,244.3	483.00	70.74	0	0	0	0
Mean	0	3.35	31.6	26.1	33.7	40.1	15.6	2.53	0	0	0	0
Ac-ft	0	206	1,880	1,610	2,010	2,470	958	140	0	0	0	0

Calendar year 1956: Max 321 Min 0 Mean 11.3 Ac-ft 8,180
 Fiscal year 1956-57: Max 321 Min 0 Mean 12.8 Ac-ft 9,270

* Discharge measurement made on this day.

Fena Dam spillway near Agat--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1				0	31	9.9	2.8					
2				0	14.4	14.4	.54					
3				0	9.9	16.9	0					
4				0	7.9	14.4	0					
5				0	6.0	12.1	0					
6				51	9.9	9.9	0					
7				205	4.3	9.9	0					
8				71	216	12.1	4.3					
9				37.5	116	12.1	6.0					
10				28	75	12.1	4.3					
11				16.9	52	9.9	1.50					
12				12.1	205	7.9	2.8					
13				127	96	9.9	7.9					
14				52	52	12.1	181					
15				44	408	16.9	49					
16				28	548	25	14.4					
17				12.1	98	14.4	6.0					
18				6.0	55	6.0	2.8					
19				2.8	37.5	7.9	6.0					
20				2.8	31	7.9	7.9					
21				1.50	22	7.9	4.3					
22				31	22	9.9	2.8					
23				*37.5	22	9.9	0					
24				22	19.5	4.3	0					
25				25	22	4.3	0					
26				22	19.5	4.3	0					
27				12.1	22	4.3	0					
28				83	19.5	4.3	0					
29				25	16.9	32.5	0					
30				16.9	16.9	14.4	0					
31				25	-----	9.9	0					
Total	0	0	0	997.20	2,275.2	347.7	304.34	0	0	0	0	0
Mean	0	0	0	32.2	75.8	11.2	9.82	0	0	0	0	0
Ac-ft	0	0	0	1,980	4,510	690	604	0	0	0	0	0

Calendar year 1957: Max 548 Min 0 Mean 11.4 Ac-ft 8,280
 Fiscal year 1957-58: Max 548 Min 0 Mean 10.8 Ac-ft 7,780

* Discharge measurement made on this day.

Talofofu River near Talofofu

Location.--Lat 13°21'05" N., long 144°43'50" E., on left bank 1.5 miles southwest of Talofofu and 5.3 miles north of Inarajan.

Drainage area.--16.2 sq mi.

Records available.--November 1951 to June 1958.

Gage.--Water-stage recorder and steel weir. Altitude of gage is 40 ft (by barometer).

Average discharge.--6 years (1952-58), 50.2 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1952-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)*	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1952†	Dec. 6, 1951	2,300	††8.60	Feb. 25,26,1952	0.82	0.59
1953	Feb. 22, 1953	2,550	8.83	June 18, 1953	1.06	.65
1954	Oct. 15, 1953	8,560	12.69	June 21, 1954	1.17	.54
1955	Sept.15, 1954	2,300	8.62	July 1, 1954	1.51	.63
1956	Sept.29, 1955	2,550	8.78	May 24,25, 1956	1.14	.53
1957	Dec. 14, 1956	2,550	8.77	June 18, 1957	1.32	.58
1958	Nov. 16, 1957	3,700	9.56	May 27,28, 1958	1.39	.60

† Period November to June.

* From rating curve extended above 80 cfs by test on model of station site.

†† From floodmark.

1951-58: Maximum discharge, 8,560 cfs Oct. 15, 1953 (gage height, 12.69 ft), from rating curve extended above 80 cfs by test on model of station site; minimum, 0.82 cfs Feb. 25, 26, 1952.

Remarks.--Records good except those for Dec. 6, 1951, and Oct. 17-20, 1954, which are fair, and for periods of faulty or no gage-height record in 1952-53, which are poor. Water for domestic use is diverted from Fena Valley Reservoir.

Talofoto River near Talofoto--Continued

Rating tables, Nov. 15, 1951, to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 30 to May 23, 1956)

Nov. 14, 1951, to Oct. 15, 1953				Oct. 16, 1953, to Aug. 17, 1956				Aug. 18, 1956, to June 30, 1958			
0.6	0.85	2.0	65	0.5	1.03	1.1	7.1	0.6	1.39	1.2	11.2
.7	1.27	2.5	129	.6	1.39	1.2	9.8	.7	1.85	1.3	15.0
.8	1.77	3.0	195	.7	1.78	1.3	13.8	.8	2.4	1.5	25.5
.9	2.4	4.0	365	.8	2.2	1.5	23	.9	3.8	1.7	40
1.0	4.1	5.0	565	.9	3.1	1.7	35	1.0	5.9	2.0	69
1.1	6.1	7.4	1,150	1.0	5.0			1.1	8.3	2.5	129
1.2	8.8	7.7	1,400								
1.3	12.5	8.3	1,950								
1.4	17.0	9.0	2,800								
1.7	35	11.0	5,800								

Note.--Same as preceding table above 1.7 ft.

Note.--Same as preceding table above 2.5 ft.

Discharge, in cubic feet per second, November 1951 to June 1952

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1					-	22	6.1	1.67	1.23	30	29	3.4
2					-	28	6.1	2.75	5.3	30	29	2.55
3					-	18.6	5.9	3.6	3.4	30	30	2.15
4					-	15.2	4.9	2.9	3.1	30	30	3.6
5					-	15.2	3.95	1.96	2.9	30	32	3.25
6					-	f280	4.3	1.77	2.75	30	37.5	2.75
7					-	54	3.95	5.2	2.55	30	47	2.75
8					-	33	4.5	3.75	2.55	30.5	9.0	2.75
9					-	28	*6.3	2.4	2.4	30.5	4.1	2.35
10					-	28	7.7	1.96	2.25	30.5	2.9	2.2
11					-	25	6.6	4.1	2.25	30.5	2.25	2.15
12					-	22	5.9	*3.75	2.35	30.5	2.0	2.2
13					-	16.6	5.7	3.6	2.25	30.5	1.90	*1.77
14					-	18.6	6.1	4.7	2.2	30.5	1.72	1.42
15					19.1	15.6	5.7	5.1	2.2	30.5	1.67	1.57
16					15.2	14.8	6.1	4.5	2.1	30.5	1.62	1.72
17					19.1	52	2.9	2.4	2.0	30	1.47	2.4
18					21	20	5.5	2.1	1.96	30	1.42	2.1
19					74	16.1	5.5	1.23	1.96	30	8.2	1.83
20					39	14.3	4.7	1.06	9.0	30	5.1	1.62
21					23.5	12.1	3.75	1.02	30.5	30	2.75	1.57
22					19.6	10.6	3.25	1.02	30.5	30	2.25	1.47
23					19.6	9.5	6.9	1.02	30	30	1.90	1.67
24					17.0	8.3	4.1	.98	30	30	1.67	2.35
25					16.6	6.6	2.55	.89	30.5	30	1.77	2.2
26					16.1	7.2	2.2	.85	33	30	1.67	2.0
27					22.5	4.9	2.0	.93	30.5	30	1.57	1.96
28					38.5	5.9	1.72	.98	30.5	30	1.62	1.77
29					23	5.3	2.4	.98	31.5	30	2.9	1.77
30					19.1	4.1	4.5	-----	30.5	30	5.9	1.62
31					-----	4.7	1.77	-----	30	-----	3.95	-----
Total					-	816.2	143.54	69.17	394.20	904.5	305.80	64.91
Mean					-	26.3	4.63	2.39	12.7	30.2	9.86	2.16
Ac-ft					-	1,620	285	137	782	1,790	607	129
Calendar year					: Max	Min	Mean			Ac-ft		
Fiscal year					: Max	Min	Mean			Ac-ft		

* Discharge measurement made on this day.

f Fragmentary gage-height record; discharge computed from partly estimated gage heights.

Talofofo River near Talofofo--Continued

Discharge, in cubic feet per second, fiscal year July 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	17.1	60	28	80	60	170	104	10.6	29	9.4	4.5	3.1
2	8.5	60	32	200	55	110	49	10.3	26.5	9.2	4.1	2.6
3	6.9	140	28	80	50	76	37	10.6	26	8.8	3.95	2.4
4	120	180	24	120	50	73	29	11.0	28.5	8.6	3.75	2.4
5	24	85	22	85	160	52	35.5	9.9	26.5	8.0	3.75	2.0
6	11	80	20	75	55	47	*35	9.9	26	8.0	3.75	2.0
7	11	40	19	120	80	227	26.5	22	23	8.0	3.6	2.0
8	7.0	38	360	70	220	74	23.5	18.1	20.5	7.6	3.6	1.7
9	5.6	100	460	90	300	52	22	13.4	22.5	7.4	3.4	1.5
10	4.7	75	120	140	180	58	22	11.4	21	6.8	3.25	1.3
11	4.5	140	50	80	140	51	20	10.6	19.6	6.8	3.1	*1.19
12	3.8	223	110	65	95	46	20	*15.9	18.6	8.0	3.1	1.14
13	3.5	76	440	60	75	36	20	13.0	18	8.0	3.0	1.14
14	3.3	41	110	90	65	46	20	10.6	17	6.9	3.0	1.10
15	6.0	71	70	75	60	37	19	9.9	16	6.4	3.0	1.14
16	10	73	130	65	170	33	18	9.9	16	6.1	3.4	1.14
17	5.0	37.5	50	120	90	30	17	10.6	15	5.9	4.1	1.10
18	10	30.5	44	85	60	32	16	9.5	16	5.9	3.6	1.10
19	8.6	26	38	70	55	33.5	16	9.2	14	5.7	*3.6	1.27
20	5.2	26	34	60	140	28	16	8.8	14	5.7	3.2	1.27
21	5.4	22	30	130	65	25.5	16	8.5	13	5.5	3.2	1.14
22	9.0	20	28	340	75	24	15	1,510	13	5.7	3.2	1.14
23	6.6	60	170	101	160	73	16	436	12	5.3	2.9	1.19
24	5.4	26	75	167	70	41	15	142	12	5.3	2.7	1.27
25	6.0	22	48	71	65	44	14	80	12	5.3	2.7	1.19
26	4.5	20	40	65	55	38.5	13	54	11	5.5	2.6	1.42
27	4.3	20	36	55	50	41	13	46	11	4.9	2.5	1.27
28	5.5	24	50	48	75	27	13	34.5	10	4.7	2.4	2.35
29	20	30	220	46	150	77	12	-	10	4.5	2.4	3.4
30	10	26	120	240	70	33.5	16	-----	9.6	4.5	2.6	3.6
31	12	30	-----	100	-----	215	11.4	-----	9.6	-----	3.3	-----
Total	364.4	1,902.0	3,006	3,193	2,995	1,951.0	719.9	2,546.2	536.9	198.4	101.25	50.56
Mean	11.8	61.4	100	103	99.8	62.9	23.2	90.9	17.3	6.61	3.27	1.69
Ac-ft	723	3,770	5,960	6,330	5,940	3,870	1,430	5,050	1,060	394	201	100

Calendar year 1952: Max 460 Min 0.85 Mean 41.8 Ac-ft 30,320
 Fiscal year 1952-53: Max 1,510 Min 1.10 Mean 48.1 Ac-ft 34,830

Peak discharge (base, 2,300 cfs).--Feb. 22 (1 p.m.) 2,550 cfs (8.83 ft).

* Discharge measurement made on this day.
 Note.--Faulty or no gage-height record July 4 to Aug. 11, Aug. 21 to Oct. 22, Oct. 26 to Dec. 2, Jan. 10-30, Mar. 13 to Apr. 11, May 11-15, and May 20 to June 10; discharge estimated on basis of records for nearby stations.

Talofofu River near Talofofu--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.0	5.7	142	58	73	122	29.5	17.8	9.3	3.0	2.4	1.43
2	1.57	5.1	151	47	67	88	32	16.0	7.9	4.8	2.2	1.39
3	1.42	5.3	181	40	62	*79	31	13.8	7.4	4.8	2.05	1.32
4	1.42	4.5	117	37	61	80	32	13.8	6.9	4.6	1.99	1.32
5	1.42	3.95	89	35	54	69	27	12.6	6.5	4.0	1.95	1.32
6	1.47	6.6	70	33	52	60	28	13.4	6.3	3.85	1.91	1.43
7	1.62	6.6	60	36	49	57	27.5	13.4	6.0	3.65	1.82	1.66
8	1.47	12.1	62	42	48	52	26.5	12.6	5.8	4.0	1.78	1.70
9	1.32	8.0	46	82	49	47	71.4	11.4	5.6	3.85	1.74	1.82
10	1.27	80	*43	42	91	51	131	10.2	5.4	3.1	1.78	1.70
11	1.23	756	42	34.5	109	42	58	9.8	5.6	2.9	1.91	1.58
12	1.32	1,200	46	48	1,040	42	*43	9.5	5.4	2.85	*2.15	1.55
13	1.90	228	37.5	39.5	1,770	41	37	9.3	5.2	2.75	2.2	1.51
14	15.6	146	33	37	536	110	33	9.0	5.0	2.85	1.86	1.47
15	11.1	168	33	4,360	181	80	37	9.0	5.0	2.65	1.78	1.43
16	6.1	267	41	2,800	136	146	30	8.7	4.8	2.45	1.74	*1.39
17	7.7	210	33.5	1,670	116	136	27.5	8.4	5.0	2.3	1.70	1.28
18	22.5	696	52	468	110	71	26.5	8.4	5.0	2.3	1.70	1.28
19	8.8	236	87	310	90	57	25	8.2	5.0	2.2	1.74	1.28
20	5.3	137	110	991	77	56	24	9.3	4.8	2.4	1.74	1.25
21	7.7	96	192	403	75	47	26.5	10.6	4.2	2.4	1.66	1.21
22	5.1	73	127	195	67	74	26.5	9.8	4.6	2.4	1.58	2.15
23	3.75	63	71	162	70	51	22.5	9.0	4.8	2.2	1.62	5.3
24	9.4	565	56	136	241	46	21.5	7.9	4.2	2.2	2.3	2.45
25	34.5	209	55	116	103	47	21	7.1	3.85	2.15	2.05	2.3
26	47	110	133	103	77	42	19.6	7.4	3.65	2.1	1.78	1.99
27	40	76	77	96	69	41	19.6	15.8	3.3	2.15	1.66	1.86
28	24	910	194	122	62	37	20.5	13.0	3.1	2.2	1.58	1.62
29	12.5	957	134	110	58	33	18.2	-	3.5	2.05	1.55	1.55
30	8.5	545	77	96	147	34.5	17.3	-----	3.1	1.99	1.55	1.51
31	6.6	224	-----	82	-----	30	16.9	-----	3.1	-----	1.51	-----
Total	295.58	8,007.85	2,582.0	12,831.0	5,740	1,968.5	1,649.6	305.2	159.30	87.14	56.98	51.05
Mean	9.53	258	86.1	414	191	63.5	53.2	10.9	5.14	2.90	1.84	1.70
Ac-ft	586	15,880	5,120	25,450	11,390	3,900	3,270	605	316	173	113	101
Calendar year 1953.	Max	4,360	Min	1.10	Mean	97.5	Ac-ft	70,560				
Fiscal year 1953-54:	Max	4,360	Min	1.21	Mean	92.4	Ac-ft	66,900				

Peak discharge (base, 2,300 cfs).--Aug. 12 (3 a.m.) 2,420 cfs (8.67 ft); Aug. 28 (4:30 a.m.) 2,420 cfs (8.73 ft); Oct. 15 (11 a.m.) 8,560 cfs (12.69 ft); Oct. 20 (5:30 p.m.) 2,300 cfs (8.60 ft); Nov. 13 (5 p.m.) 3,250 cfs (9.32 ft).

* Discharge measurement made on this day.

Talofofu River near Talofofu--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.66	1.62	275	115	187	41	11.0	8.4	5.4	2.9	2.15	6.6
2	3.4	2.05	162	75	90	*36.5	10.2	*7.9	5.2	2.85	1.99	6.7
3	2.75	*1.96	115	114	63	31	12.1	8.7	4.8	2.75	1.82	4.8
4	1.95	1.91	194	77	55	27.5	17.3	9.8	5.0	2.65	1.78	3.25
5	1.86	1.99	509	96	44	25.5	20	8.2	5.0	2.55	1.78	8.3
6	1.70	2.3	193	76	36	25.5	*15.1	7.6	4.6	2.55	1.74	4.6
7	1.66	7.0	184	64	35	32	11.4	7.1	4.4	3.1	1.74	23.5
8	1.62	3.85	245	150	35	33	21.5	6.9	4.2	3.1	2.15	7.0
9	1.55	29.5	173	179	32	27.5	21	6.9	4.0	3.1	6.9	69
10	1.66	8.4	182	76	32	27	24	6.9	3.85	2.9	4.2	15.8
11	1.82	5.6	71	107	274	24.5	22	6.5	4.8	2.85	2.85	8.3
12	1.62	14.2	49	122	97	22	19.2	6.5	4.2	2.55	2.45	6.3
13	1.62	11.7	50	78	48	19.6	15.6	6.3	4.0	2.45	2.45	5.6
14	1.70	18.5	441	58	41	17.8	23.5	6.3	3.85	2.65	2.2	4.8
15	1.74	9.9	888	48	33.5	17.8	37	6.3	3.85	*2.45	8.6	4.2
16	1.66	6.7	199	41	30	20.5	20	6.3	*3.2	2.4	6.6	3.65
17	1.80	13.4	103	a38	26.5	23	21	8.5	4.5	2.15	4.0	3.85
18	8.5	11.4	77	a32	310	22.5	17.6	7.9	2.9	2.05	3.0	3.5
19	15.6	38.5	65	a32	85	20	13.4	6.3	2.85	2.2	2.65	3.1
20	8.3	81	333	a30	100	17.3	11.8	6.0	2.65	7.0	2.45	3.5
21	3.65	30.5	307	58	49	16.0	10.6	7.6	2.75	3.4	2.1	3.5
22	2.85	16.0	348	44	37.5	15.6	9.3	7.6	2.85	2.85	2.05	3.3
23	2.45	11.0	155	39.5	521	16.5	8.7	6.5	2.55	2.55	1.95	2.75
24	2.55	29	120	31	121	13.4	8.4	5.8	2.85	2.3	1.86	2.4
25	2.65	186	84	28.5	84	12.6	9.0	5.8	6.6	2.55	*1.74	2.2
26	2.15	33.5	123	84	60	12.2	36	5.4	3.3	2.45	1.66	2.55
27	1.91	24.5	83	80	183	11.4	16.6	6.0	3.3	2.1	3.45	2.85
28	1.78	18.2	342	47	74	10.6	11.4	6.0	3.1	1.99	2.6	2.4
29	1.82	28.5	209	35	53	12.9	10.6	-	2.9	1.91	2.05	2.45
30	1.70	*38.5	138	46	59	12.6	9.0	-----	2.9	1.91	1.91	4.3
31	1.66	26.5	-----	714	-----	11.0	8.4	-----	2.75	-----	1.78	-----
Total	89.34	713.68	6,417	2,815.0	2,895.5	656.3	502.7	196.0	119.10	81.21	86.65	225.05
Mean	2.88	23.0	214	90.8	96.5	21.2	16.2	7.00	3.84	2.71	2.80	7.50
Ac-ft	177	1,420	12,730	5,580	5,740	1,300	997	389	236	161	172	446

Calendar year 1954: Max 888 Min 1.21 Mean 43.6 Ac-ft 31,520
 Fiscal year 1954-55: Max 888 Min 1.55 Mean 40.5 Ac-ft 29,350

Peak discharge (base, 2,300 cfs).--Sept. 15 (2 a.m.) 2,300 cfs (8.62 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of recorded range in stage and records for Ylig River.

Talofoto River near Talofoto--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.0	29.5	309	262	44	35	10.6	5.0	2.9	2.75	2.3	2.05
2	4.3	21.5	58	128	62	21	10.6	4.8	3.0	2.55	2.2	1.95
3	2.9	18.2	107	235	41	17.3	10.2	5.6	3.1	*2.45	2.15	1.78
4	2.45	18.7	35	95	32	16.0	8.7	5.8	3.0	2.3	2.2	1.86
5	2.2	16.9	28	61	35	*13.4	8.4	5.0	2.9	2.2	2.2	1.99
6	89	16.0	25.5	45	27.5	12.2	9.0	6.4	2.85	2.1	2.1	1.78
7	103	16.9	23.5	37	25	11.0	8.7	5.4	2.75	2.05	2.1	1.62
8	249	13.0	21.5	33.5	26	17.7	8.4	7.9	2.65	2.05	2.1	2.35
9	95	11.4	25	30	24.5	14.2	*7.4	12.0	2.55	2.05	2.15	2.45
10	27	10.6	198	28	68	11.4	6.9	9.3	2.75	2.3	2.1	1.86
11	39.5	11.0	230	30	27	11.8	7.4	7.4	3.0	2.1	2.05	2.05
12	113	11.8	108	26.5	22	19.1	6.9	5.8	2.85	2.05	1.99	2.85
13	55	9.5	48	55	20	31	6.7	5.2	2.65	2.05	1.99	2.05
14	*28	8.7	31.5	36	18.2	36	6.5	5.0	2.55	2.05	1.91	1.91
15	21.5	8.4	27	24	17.3	20.5	6.0	4.8	2.45	2.05	1.91	1.66
16	49	*7.9	33.5	21	17.3	495	6.3	*5.6	2.65	2.05	1.91	1.51
17	24	7.1	66	31	17.3	72	6.3	4.6	2.55	2.15	1.99	11.2
18	18.2	19.7	127	*22.5	23	32	6.5	4.2	2.45	2.3	1.91	9.1
19	15.1	11.4	46	38.5	16.9	24.5	5.8	3.85	2.4	2.1	1.91	4.6
20	14.2	13.0	28	202	15.1	20	5.6	3.65	2.3	2.1	2.05	2.75
21	12.6	29	24.5	32	14.2	19.9	5.4	3.5	3.05	2.15	2.05	2.1
22	12.2	37	319	801	15.6	16.0	5.2	3.3	2.85	2.05	1.86	1.91
23	12.6	16.9	106	119	19.2	14.2	5.6	3.3	2.55	2.05	*1.95	1.82
24	11.0	47	49	109	14.7	12.6	5.6	3.1	2.4	2.1	1.21	4.7
25	25.5	34.5	147	217	12.2	11.4	5.2	3.65	2.3	2.1	1.14	3.3
26	33	17.3	80	322	13.0	11.0	5.6	3.5	2.4	2.05	1.30	2.9
27	20.5	13.8	241	270	15.4	10.2	5.6	3.1	2.65	2.2	1.86	2.55
28	16.0	13.4	1,330	305	216	9.5	5.2	3.0	4.2	2.2	1.58	2.1
29	92	11.0	1,230	125	44	9.3	5.0	3.0	3.85	2.3	1.51	1.99
30	118	73	196	75	79	9.0	4.8	-----	2.9	2.55	1.84	1.95
31	43	41	-----	52	-----	8.7	4.8	-----	2.75	-----	2.1	-----
Total	1,352.75	615.1	5,298.0	3,868.0	1,022.4	1,062.9	210.9	146.75	86.20	65.55	59.62	84.69
Mean	43.6	19.8	177	125	34.1	34.3	6.80	5.06	2.78	2.18	1.92	2.82
Ac-ft	2,680	1,220	10,510	7,670	2,030	2,110	418	291	171	130	118	168

Calendar year 1955: Max 1,330 Min 1.66 Mean 39.5 Ac-ft 28,620
 Fiscal year 1955-56: Max 1,330 Min 1.14 Mean 37.9 Ac-ft 27,520

Peak discharge (base, 2,300 cfs).--Sept. 29 (4 a.m.) 2,550 cfs (8.78 ft); Oct. 22 (11 a.m.) 2,300 cfs (8.57 ft).

* Discharge measurement made on this day.

Talofofo River near Talofofo--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.65	17.2	76	101	26	30.5	22	49	8.1	6.6	*4.0	2.4
2	2.9	12.2	121	45	23	115	25	19.0	7.6	8.3	3.8	2.4
3	2.65	9.5	89	35	30.5	76	23	16.0	7.6	11.9	3.8	2.25
4	3.05	8.4	90	61	22	48	22	16.5	8.1	7.3	3.65	2.2
5	3.3	7.6	112	59	17.5	40.5	20.5	21	9.8	6.4	3.5	*2.25
6	2.55	7.9	*61	34	17.5	43	18.0	20	8.9	5.9	3.65	2.05
7	2.2	6.7	58	27.5	18.0	34	17.0	16.0	7.8	5.5	4.6	1.90
8	2.2	27.5	74	25.5	17.5	26	16.0	16.2	6.9	5.3	6.9	2.0
9	22	82	146	25.5	16.0	26	14.2	31	7.6	5.7	5.3	2.1
10	8.7	17.3	51	29.5	49	24.5	282	17.0	7.3	5.5	4.2	1.80
11	5.0	15.6	68	57	71	21	62	15.5	6.9	5.3	3.8	1.71
12	4.8	12.2	90	444	135	18.5	41	a14	7.6	4.8	3.8	1.67
13	7.4	10.6	50	70	631	18.5	29	a12	7.1	4.4	3.5	1.67
14	9.1	8.7	38	97	106	905	24.5	10.6	6.6	4.8	3.4	1.57
15	6.8	28	415	60	49	966	22	10.0	6.4	5.5	3.25	1.53
16	5.4	15.8	97	73	108	121	20.5	9.5	6.4	4.6	3.1	1.44
17	*3.85	157	108	139	94	68	99	9.2	6.1	4.4	3.1	1.39
18	3.3	81	52	120	553	*47	52	8.9	6.1	4.2	3.5	1.39
19	2.9	23	62	111	130	42	26	*11.9	6.1	4.0	3.4	1.57
20	2.7	17.5	204	56	89	37	24	10.9	6.1	3.8	3.25	2.85
21	2.55	15.5	86	40	82	38	56	9.5	6.1	4.4	2.8	3.65
22	2.45	20.5	60	38	56	31	24.5	9.2	5.7	4.6	6.5	2.25
23	2.2	32	200	83	66	28.5	19.0	9.2	5.5	4.4	4.6	1.96
24	12.1	24.5	225	45	49	25.5	17.0	12.0	5.3	4.2	*4.0	1.80
25	20	18.0	78	113	38	23.5	16.5	11.6	5.7	3.8	3.5	1.80
26	62	16.5	50	40	35	65	14.6	9.2	5.7	3.65	3.1	1.85
27	33	71	129	47	32.5	71	13.1	8.9	21.5	3.8	2.8	2.05
28	26	131	126	74	29.5	33	13.5	8.3	10.0	4.2	2.7	2.0
29	29	118	62	45	28.5	27	19.0	-	*7.3	4.6	2.55	1.90
30	104	93	210	33	31	25	40	-----	6.4	4.0	2.55	1.67
31	31	56	-----	*38.5	-----	26	22	-----	6.1	-----	2.4	-----
Total	428.75	1,161.7	3,287	2,266.5	2,650.5	3,101.0	1,114.9	412.1	230.4	155.85	115.00	59.07
Mean	13.8	37.5	110	73.1	88.4	100	36.0	14.7	7.43	5.20	3.71	1.97
Ac-ft	850	2,300	6,520	4,500	5,260	6,150	2,210	817	457	309	228	117

Calendar year 1956: Max 966 Min 1.14 Mean 37.0 Ac-ft 26,880
 Fiscal year 1956-57: Max 966 Min 1.39 Mean 41.0 Ac-ft 29,720

Peak discharge (base, 2,300 cfs).--Nov. 13 (1:30 a.m.) 2,300 cfs (8.64 ft); Dec. 14 (11 a.m.) 2,550 cfs (8.77 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for nearby stations.

Talofoto River near Talofoto--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.57	2.1	43	13.9	87	28.5	11.6	9.5	9.2	4.2	2.35	3.4
2	1.57	2.05	69	12.0	42	32.5	12.4	8.6	8.9	3.1	2.1	2.3
3	*1.48	2.0	53	10.9	35.5	31	10.3	10.0	8.3	2.25	2.0	1.96
4	1.53	2.05	28	10.0	*29	28.5	9.5	8.9	8.3	2.2	2.25	1.76
5	1.57	2.25	19.7	30.5	25.5	25	9.5	8.3	9.2	2.25	2.25	1.67
6	1.67	2.35	35	774	29	22	8.9	8.1	8.9	2.3	2.05	1.53
7	1.67	2.55	49	728	24	25	9.8	7.8	8.6	7.8	1.90	1.67
8	1.67	5.7	29.5	185	522	22	18.8	8.1	8.9	2.55	1.80	1.80
9	1.53	3.65	46	91	360	21	17.5	7.8	8.9	2.7	1.85	2.0
10	1.53	2.95	21	74	233	21	12.7	7.8	8.3	3.1	1.80	45
11	1.87	2.8	17.5	51	132	19.5	12.3	7.6	8.9	3.8	1.76	17.4
12	2.45	2.95	16.5	43	696	17.0	12.7	7.6	9.2	3.25	1.71	6.9
13	3.25	3.65	14.2	180	234	18.0	14.6	7.8	*9.2	5.1	*1.67	27.5
14	2.3	6.6	12.7	147	179	18.0	676	7.8	8.9	4.2	1.62	301
15	1.90	6.1	10.9	95	1,410	21.5	105	7.8	8.6	3.4	1.53	38
16	1.71	5.3	19.5	75	2,040	27	41	7.8	8.3	3.1	1.48	18.0
17	1.67	5.3	*48	42	236	20	27.5	7.8	8.3	3.5	1.44	11.6
18	1.67	7.3	20	34	129	14.6	21.5	8.9	8.1	3.65	1.44	8.9
19	1.62	9.8	18.0	27.5	91	13.9	23.5	9.5	8.1	3.4	1.48	7.3
20	1.67	9.5	17.5	24.5	74	13.5	26	7.6	7.3	3.1	1.44	6.6
21	1.71	7.6	12.7	24.5	61	12.7	21	7.3	7.1	3.1	1.48	6.1
22	1.71	6.9	42	70	*54	12.7	*17.2	7.8	7.3	3.1	1.71	7.9
23	1.71	8.3	84	95	47	12.3	13.9	9.2	7.3	2.8	2.25	6.9
24	1.67	19.1	35.5	52	42	10.9	12.0	13.6	7.6	2.55	2.1	5.9
25	1.67	28.5	22	54	42	9.5	10.9	10.3	7.6	2.4	1.71	10.4
26	1.67	19.3	20.5	59	38.5	9.2	10.6	8.9	7.6	2.3	1.53	8.8
27	1.71	8.9	17.0	38.5	106	8.6	11.6	9.2	7.6	2.35	1.44	6.9
28	3.2	89	15.5	274	43	8.6	10.6	8.9	7.6	2.3	1.57	5.9
29	3.5	98	13.5	66	38.5	4.1	10.0	-	7.3	2.4	5.9	5.5
30	2.55	28	13.9	51	34	19.5	9.8	-----	6.9	5.5	3.5	4.6
31	2.25	15.0	-----	58	-----	13.9	9.8	-----	5.5	-----	2.55	-----
Total	59.25	415.55	864.6	3,490.3	7,114.0	598.4	1,218.5	240.3	251.8	97.75	61.66	575.19
Mean	1.91	13.4	28.8	113	237	19.3	39.3	8.58	8.12	3.26	1.99	19.2
Ac-ft	118	824	1,710	6,920	14,110	1,190	2,420	477	499	194	122	1,140

Calendar year 1957: Max 2,040 Min 1.39 Mean 40.1 Ac-ft 29,010
 Fiscal year 1957-58: Max 2,040 Min 1.44 Mean 41.1 Ac-ft 29,720

Peak discharge (base, 2,300 cfs).--Nov. 16 (about 2 a.m.) 3,700 cfs (9.56 ft).

* Discharge measurement made on this day.

Ugum River near Talofoto

Location.--Lat 13°20'00" N., long 144°44'55" E., on left bank 0.3 mile upstream from mouth, 1.3 miles south of Talofoto, and 4.2 miles north of Inarajan.

Drainage area.--7.20 sq mi.

Records available.--June 1952 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 30 ft (by barometer).

Average discharge.--6 years, 28.0 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1953-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)†	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1953	Feb. 22, 1953	1,400	10.04	July 26,27,1952	3.4	0.44
1954	Oct. 15, 1953	1,620	11.72	June 21, 1954	3.85	.46
1955	Sept. 4, 1954	1,450	10.41	June 25-29,1955	3.85	.46
1956	Sept.10, 1955	1,580	11.42	July 5, 1955	3.85	.46
1957	Dec. 14, 1956	1,570	11.30	June 16,17,1957	4.1	.47
1958	Oct. 6, 1957	1,610	11.63	Aug. 6, 1957	3.6	.45

† From rating curve extended above 200 cfs on basis of slope-area measurement at gage height 11.3 ft.

1952-58: Maximum discharge, 1,620 cfs Oct. 15, 1953 (gage height, 11.72 ft), from rating curve extended above 200 cfs on basis of slope-area measurement at gage height 11.3 ft; minimum, 3.4 cfs July 26, 27, 1952.

Remarks.--Records good except those for periods of fragmentary, doubtful or no gage-height record, and those above 200 cfs, which are poor.

Rating table, June 18, 1952, to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)

0.4	2.6	2.0	200
.5	4.8	2.5	290
.6	8.0	3.0	375
.8	17.5	4.0	530
1.0	32	6.0	830
1.3	66	8.0	1,120
1.6	115	10.0	1,400

Discharge, in cubic feet per second, 1952

June 18.....	†3.7	June 25.....	4.5
19.....	4.5	26.....	4.8
20.....	3.85	27.....	4.3
21.....	4.1	28.....	4.3
22.....	4.8	29.....	4.1
23.....	5.3	30.....	4.1
24.....	4.5		

* Discharge measurement made on this day.

† Result of discharge measurement.

Ugum River near Talofoto--Continued

Discharge, in cubic feet per second, fiscal year July 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	18.3	112	12.7	*39.5	29	37	31	12.7	17.5	10.4	7.6	5.6
2	7.3	26.5	33.5	49	26.5	59	24	12.2	17.0	10.4	7.6	5.6
3	6.2	54	18.8	30.5	24	37	22.5	12.2	15.9	10.4	7.3	5.6
4	13.7	40	13.8	28	22.5	32	21	12.7	23	10.0	7.3	5.6
5	10.0	25	29.5	23.5	119	27	24	12.2	18.2	10.0	7.3	5.3
6	6.6	14.3	15.4	22.5	33	26.5	22	12.7	15.4	10.0	7.0	5.3
7	7.0	10.0	13.3	67	50	50	20	15.4	15.4	10.0	7.0	5.3
8	6.2	12.2	119	29	95	28	19.4	13.8	17.5	10.0	7.0	5.1
9	5.6	62	137	45	88	25.5	18.8	12.2	18.2	10.0	6.6	4.5
10	4.8	44	38.5	34	91	38	17.5	12.2	16.4	10.0	6.6	*4.5
11	4.5	29.5	24	35	49	26.5	17.0	12.2	15.4	9.6	6.6	4.8
12	4.3	24	32.5	23.5	37	29	17.0	13.8	15.4	9.6	6.6	4.8
13	4.1	20	111	23.5	a31	24	17.0	12.2	14.3	9.6	6.2	4.8
14	4.1	13.7	109	38	a28	25.5	16.4	11.7	13.3	9.6	6.2	4.8
15	4.5	27	38	31	a28	23.5	16.4	11.2	13.3	9.2	6.2	5.1
16	4.3	25	29	29	a70	22	15.9	11.2	12.8	9.2	6.2	5.3
17	4.1	13.8	22	28	a40	22	15.9	*10.8	13.3	9.2	6.2	4.8
18	3.85	12.2	20	143	a30	22.5	15.4	10.0	13.3	9.2	6.2	5.1
19	4.1	10.8	18.2	59	a45	22	14.8	9.6	12.7	8.8	6.2	5.3
20	4.5	13.3	17.0	36	a55	21	14.8	10.4	12.2	8.8	6.2	5.3
21	5.1	11.2	15.9	43	a42	20	14.8	10.0	11.7	8.8	*5.9	5.1
22	5.3	11.7	14.8	31	a38	20	14.8	528	11.7	8.8	5.9	5.1
23	4.3	16.4	48	28	a50	41	17.5	94	11.7	8.4	5.6	5.9
24	4.1	10.0	33.5	82	a33	23.5	15.9	37	11.2	8.0	5.6	5.9
25	3.85	9.6	21	32	a55	30	14.8	25.5	11.2	8.0	5.6	4.8
26	3.85	10.4	18.8	35.5	a35	23.5	*13.7	22	11.2	8.0	5.6	4.8
27	3.6	11.7	18.8	28	29.5	22	13.3	20	10.8	8.0	5.9	5.1
28	5.1	10.8	25	24	29	20	13.8	18.2	10.8	8.0	5.6	6.6
29	10.8	14.8	124	24	41	25.5	13.3	-	10.8	7.6	5.6	7.6
30	7.4	21.5	105	62	48	21	14.8	-----	10.8	7.6	5.6	6.2
31	17.5	14.8	-----	46	-----	162	13.3	-----	10.8	-----	5.6	-----
Total	198.95	732.2	1,277.0	1,249.5	1,391.5	1,006.5	540.8	996.1	433.2	275.2	196.6	159.6
Mean	6.42	23.6	42.6	40.3	46.4	32.5	17.4	35.6	14.0	9.17	6.34	5.32
Ac-ft	395	1,450	2,530	2,480	2,760	2,000	1,070	1,980	859	546	390	317

Calendar year 1952: Max - Min - Mean - Ac-ft -
 Fiscal year 1952-53: Max 528 Min 3.6 Mean 23.2 Ac-ft 16,780

Peak discharge (base, 1,400 cfs).--Feb. 22 (10 a.m.) 1,400 cfs (10.04 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of records for Talofoto and Inarajan Rivers.

Ugum River near Talofoto--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.1	4.3	63	43	54	50	33	15.9	11.7	7.3	8.4	4.5
2	4.8	4.8	64	39	50	48	33	15.9	11.7	11.2	5.9	4.5
3	5.1	6.2	114	35	49	46	32	15.4	11.7	10.0	6.2	4.3
4	5.6	5.1	69	34	48	45	31	15.4	11.2	10.0	7.3	4.3
5	5.3	4.5	54	32	46	45	30	15.4	10.8	8.4	5.3	4.5
6	5.3	5.6	48	31	46	44	31	15.4	10.8	8.8	5.3	5.1
7	5.3	6.2	44	38	46	43	30	15.4	10.4	8.0	5.3	5.3
8	5.1	6.2	42	59	51	42	30	14.8	10.4	8.0	5.1	5.9
9	4.5	5.3	39	40	46	41	300	14.8	10.0	7.3	5.1	6.2
10	4.5	16.9	37	33	68	40	100	13.8	10.0	7.3	5.3	5.6
11	4.3	430	35	30.5	50	40	50	13.8	10.0	7.0	*5.3	5.1
12	9.4	440	33	30.5	555	45	35	13.8	9.6	7.0	8.4	5.3
13	8.0	66	30.5	30.5	624	40	*30	13.3	9.6	7.0	6.2	5.1
14	6.6	42	29	30.5	174	150	25	13.3	9.6	7.0	5.3	4.8
15	5.9	64	29.5	1,380	92	60	60	12.7	9.2	6.6	5.3	4.5
16	5.3	142	34	1,220	80	80	25	12.7	9.2	6.6	5.3	4.3
17	5.3	62	27	540	69	60	22.5	12.7	9.2	6.6	5.3	4.3
18	19.5	290	*38	266	63	50	22	12.7	8.8	6.2	5.6	4.5
19	7.6	62	36	253	*58	47	21	12.7	8.8	6.5	5.3	5.1
20	5.9	45	39	231	56	45	20	12.2	8.8	5.9	5.3	4.5
21	5.3	40	50	138	56	42	21	12.7	8.8	6.6	5.1	4.3
22	5.6	36	42	101	52	140	20	12.7	8.4	6.6	5.1	14.5
23	5.1	29.5	31	89	51	60	19.4	12.7	8.4	7.0	5.6	12.2
24	6.2	96	30.5	81	121	47	18.8	12.7	*8.2	6.6	7.3	*6.6
25	5.3	49	42	75	65	50	18.8	12.2	7.6	5.9	5.6	9.6
26	9.7	35	99	69	52	45	18.2	12.2	7.6	5.6	5.3	6.2
27	9.2	29.5	43	63	50	41	17.5	11.7	7.3	5.9	5.1	5.1
28	6.2	436	278	122	50	38	17.5	11.7	7.6	5.9	4.8	5.3
29	5.3	328	70	72	50	36	16.4	-	7.6	5.6	5.1	4.8
30	4.8	242	50	63	56	35	16.4	-----	7.3	5.9	4.8	4.8
31	4.8	83	-----	57	-----	34	16.4	-----	7.6	-----	4.5	-----
Total	195.9	3,112.1	1,640.5	5,326.0	2,928	1,629	1,160.9	380.7	287.9	214.4	174.8	171.1
Mean	6.32	100	54.7	172	97.6	52.5	37.4	13.6	9.29	7.15	5.64	5.70
Ac-ft	389	6,170	3,250	10,560	5,810	3,230	2,300	755	571	425	347	339

Calendar year 1953: Max 1,380 Min 4.3 Mean 47.8 Ac-ft 34,570
 Fiscal year 1953-54: Max 1,380 Min 4.3 Mean 47.2 Ac-ft 34,150

Peak discharge (base, 1,400 cfs).--Oct. 15 (11 a.m.) 1,620 cfs (11.72 ft); Nov. 13 (5 p.m.) 1,580 cfs (11.39 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Dec. 1 to Jan. 13; discharge estimated on basis of records for Inarajan and Talofoto Rivers.

Ugum River near Talofoto--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.6	4.3	58	58	*164	*28	17.0	13	9.2	7.0	4.8	5.6
2	14.8	7.6	34	50	45	28	16.4	12	8.8	7.0	4.3	*5.6
3	7.6	6.4	33	78	39	26.5	18.2	*12	8.4	7.0	4.3	4.8
4	6.2	5.3	170	51	35	25.5	18.8	12.7	8.8	6.6	5.1	4.8
5	7.6	4.8	242	76	32	25	20	10.8	8.8	6.2	4.5	5.1
6	5.6	8.0	219	50	29.5	25.5	*17	10.4	8.4	6.2	4.3	5.3
7	5.1	7.3	91	48	28	27	15	10.4	8.0	6.2	4.5	5.6
8	4.8	9.5	112	52	27	25	20	10.4	8.0	6.6	5.9	5.1
9	4.8	20.5	104	51	26.5	25	15	10.4	8.0	7.0	13.2	8.6
10	5.1	8.8	80	40	25.5	25.5	17	9.6	8.0	7.3	6.2	7.0
11	4.5	7.0	46	80	109	24	16	10.0	8.4	7.0	5.1	5.3
12	4.5	10.5	40	57	40	24	15	10.4	8.8	6.6	4.8	5.1
13	4.8	13.2	35.5	*38	30.5	24	17	9.6	8.4	6.2	4.5	5.9
14	6.2	22	270	35	28	23.5	22	9.6	8.0	6.2	5.3	5.1
15	4.8	10.8	374	32	27	23.5	23	10.0	7.6	*5.9	19.2	4.5
16	4.8	8.0	91	31	26.5	22.5	15	9.6	7.6	5.9	9.1	4.5
17	5.4	10.6	57	29.5	25	22.5	38	10.4	7.6	5.3	5.9	5.1
18	11.7	11.7	45	29.5	257	27.5	20	9.6	*7.3	5.3	5.1	4.5
19	14.3	184	40	29	48	21	17	9.2	7.3	6.2	4.8	4.3
20	9.0	167	247	28	45	21	16	9.2	7.3	7.0	4.5	4.8
21	6.2	49	149	28	35	20	15	13.0	7.3	5.6	4.3	4.8
22	6.2	27	177	31	30.5	21	14	13.8	8.0	5.3	4.3	4.5
23	5.6	22.5	82	31	166	20	14	10.4	7.6	5.1	4.1	4.1
24	5.9	47	63	26.5	40	18.2	14	9.6	7.6	5.1	4.1	4.1
25	5.6	174	52	37	42	18.2	16	9.2	8.0	5.1	4.1	4.1
26	5.3	40	57	39.5	35	17.5	45	9.2	7.6	4.8	4.1	4.1
27	4.8	27	50	33	103	17.5	17	9.6	8.0	4.8	10.4	4.8
28	*4.5	19.4	133	30.5	39	17.0	15	10.4	8.0	4.8	6.2	4.3
29	4.8	17.5	213	28	35	17.5	14	-	7.3	4.8	5.1	5.7
30	4.5	20	77	29	30.5	17.5	13	-----	7.3	4.8	4.5	5.3
31	4.3	*13.3	-----	291	-----	17.0	14	-----	7.3	-----	4.3	-----
Total	194.9	984.0	3,441.5	1,547.5	1,641.5	695.9	564.4	294.5	246.7	178.9	180.9	152.4
Mean	6.29	31.7	115	49.9	54.7	22.4	18.2	10.5	7.96	5.96	5.84	5.08
Ac-ft	387	1,950	6,830	3,070	3,260	1,380	1,120	584	489	355	359	302

Calendar year 1954: Max 374 Min 4.3 Mean 29.8 Ac-ft 21,610
 Fiscal year 1954-55: Max 374 Min 4.1 Mean 27.7 Ac-ft 20,090

Peak discharge (base, 1,400 cfs).--Sept. 4 (10 p.m.) 1,450 cfs (10.41 ft).

* Discharge measurement made on this day.

Note.--Doubtful or no gage-height record Aug. 21-30, Sept. 4, 18-20, Sept. 30 to Oct. 12, Nov. 12-30, Jan. 5 to Feb. 3; discharge estimated on basis of records for Inarajan and other nearby stations.

Ugum River near Talofoto--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.3	18	334	116	36	22.5	18	9.6	7.0	6.6	5.3	6.6
2	5.1	12	36	67	32	19.4	15	8.8	7.3	*5.9	5.1	5.9
3	4.3	11	29	108	30	17.5	30	9.6	7.3	5.9	5.1	5.3
4	4.5	13	21.5	41	29	17.0	16	10.4	7.0	5.6	6.8	5.6
5	4.1	9.0	29	60	28	15.9	14	9.2	7.0	5.9	5.1	5.6
6	84	8.5	22	39	25	*16.2	20	8.8	7.0	5.9	4.8	5.1
7	29.5	8.0	23	32	22.5	15.4	15	10.0	6.6	5.3	4.8	4.5
8	34.5	7.5	19.4	30	24.5	17.0	13	12.7	6.2	5.1	5.1	7.6
9	34.5	7.5	14.3	27	22	15.4	*13	14.3	6.2	5.1	4.8	5.1
10	12.2	7.7	179	25	28.5	14.3	11.7	10.8	11.4	5.1	4.5	4.5
11	17.7	8.5	87	28	21.5	14.3	13.3	9.6	8.0	5.1	4.5	5.3
12	38.5	7.9	43	24	20	34.5	11.7	9.2	7.6	5.1	4.5	4.8
13	23	7.3	28	25	20	24	11.7	8.8	7.0	4.8	5.1	4.5
14	*13.4	7.0	22	23	19.4	23	11.2	9.6	6.2	5.1	4.5	5.3
15	10.0	7.0	19.4	21	18.8	18.2	10.8	8.8	6.6	5.6	4.3	4.5
16	65	8.5	60	20	18.8	211	11.2	*11.0	7.3	4.5	4.3	4.3
17	20	*7.5	43	22	19.4	40	10.8	9.6	7.0	5.6	4.3	17.9
18	14	10.0	59	19	19.4	28	11.2	9.2	6.6	5.1	4.3	35
19	11	8.4	28	25	17.0	22	10.8	9.2	6.6	4.5	4.3	12.2
20	10	10.9	24	75	17.0	22	10.4	8.8	5.9	4.8	4.8	7.0
21	9.0	8.0	22.5	27	17.0	19	10.4	8.8	7.0	5.1	4.3	6.6
22	9.5	8.4	*91	210	18.2	18	10.0	8.8	5.9	4.5	*4.3	5.3
23	10	8.0	44	57	21	18	10.8	8.4	5.9	4.8	4.3	5.1
24	8.5	11.5	28.5	51	17.0	16	10.4	8.4	5.3	4.5	4.3	7.6
25	11	8.8	75	89	15.9	15	9.6	9.6	5.3	4.5	4.5	8.2
26	13	7.6	33.5	58	17.0	14	10.4	8.4	5.3	4.5	6.2	8.4
27	11	7.3	127	*108	17.5	14	10.4	7.6	6.6	5.1	6.2	7.0
28	9.0	7.0	*427	98	112	13	9.6	7.3	20.5	5.1	5.1	6.6
29	11	7.0	236	75	28	12	9.6	7.0	9.2	6.6	6.2	5.9
30	20	9.1	53	45	52	12	9.6	-----	7.0	7.0	7.0	5.3
31	40	22	-----	38	-----	12	9.6	-----	6.6	-----	7.3	-----
Total	592.6	289.9	2,258.1	1,683	784.4	770.6	389.2	272.3	226.4	158.3	156.0	222.6
Mean	19.1	9.35	75.3	54.3	26.1	24.9	12.6	9.39	7.30	5.28	5.03	7.42
Ac-ft	1,180	575	4,480	3,340	1,560	1,530	772	540	449	314	309	442

Calendar year 1955: Max 427 Min 4.1 Mean 21.9 Ac-ft 15,870
 Fiscal year 1955-56: Max 427 Min 4.1 Mean 21.3 Ac-ft 15,490

Peak discharge (base, 1,400 cfs).--Sept. 1 (4:30 a.m.) 1,450 cfs (10.37 ft); Sept. 10 (9 p.m.) 1,580 cfs (11.42 ft).

* Discharge measurement made on this day.
 Note.--Doubtful or no gage-height record July 16 to Aug. 17, Oct. 4-21, 23, 24, 26, Oct. 29 to Nov. 4, Dec. 17 to Jan. 9; discharge estimated on basis of recorder graph and records for Talofoto and Inarajan Rivers.

Ugum River near Talofoto--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.9	15.4	f72	35	25	31	23	15.4	10.4	9.6	8.0	5.3
2	5.6	11.2	f48	27	22.5	102	26	14.3	10.0	12.2	6.2	5.1
3	5.9	9.6	f60	25	48	42	23.5	15.4	9.6	12.7	6.2	4.8
4	5.3	8.4	a35	30	24	34	22	18.8	11.6	9.2	6.2	5.1
5	5.1	8.8	f37.5	39.5	21.5	29.5	20	22	*14.5	8.8	7.0	4.8
6	5.1	7.3	a24	25	21	43	20	15.4	11.7	8.4	5.9	4.8
7	5.1	7.3	f42	22.5	26.5	26.5	19.4	14.3	10.4	8.0	8.1	4.8
8	6.5	44	a33	24	21	23.5	18.8	20.5	10.0	7.6	9.6	5.6
9	14.4	54	a90	22.5	22	22.5	18.8	14.8	10.8	8.0	7.0	5.1
10	11.1	19.3	a28	25.5	74	22	88	13.8	10.0	7.6	5.9	4.8
11	11.9	17.5	a80	62	34	20	29	13.3	9.6	7.6	5.6	5.3
12	10.5	11.2	f45	171	148	20	23.5	13.3	10.4	7.3	5.6	5.9
13	16.2	10.4	a28	34	f135	19.5	20	12.7	9.6	7.3	5.6	6.6
14	f50	9.2	f23	36	f45	*402	18.8	12.2	9.2	8.0	5.6	*4.8
15	15.5	12.7	240	55	*f26.5	351	18.8	11.7	9.2	7.6	5.6	4.5
16	9.6	10.0	38	39.5	123	55	*18.8	11.2	8.8	7.0	5.6	4.3
17	7.6	25	35.5	29	65	*37	37.5	11.2	8.8	7.0	5.3	4.3
18	*7.3	21	30.5	41	183	32	19.4	11.2	8.8	7.0	9.2	4.3
19	5.9	11.2	32.5	46	*46	30.5	18.8	14.3	8.8	7.0	5.9	4.8
20	5.6	9.6	143	29.5	37	29	21	14.8	8.8	6.6	5.3	13.4
21	5.3	8.8	39	25.5	31	29.5	18.8	11.7	8.4	7.3	5.1	8.4
22	5.3	10.0	30.5	25	30.5	26.5	17.0	11.7	8.4	7.0	18.2	5.6
23	5.1	13.0	115	26.5	43	25.5	16.4	13.8	8.0	7.0	8.0	5.1
24	4.8	10.4	121	25.5	29.5	25	16.4	14.3	8.0	7.0	7.0	4.8
25	5.6	9.2	39	41	25.5	24	15.9	12.7	8.4	6.6	6.2	7.6
26	33.5	16.5	30.5	26.5	26.5	35.5	15.9	11.7	8.0	6.6	5.9	5.6
27	18.3	132	35.5	25.5	25	35	15.4	11.2	16.6	6.2	5.6	4.8
28	22.5	75	61	160	23.5	25.5	14.8	10.8	10.8	7.0	5.3	4.5
29	28.5	*226	33	46	25	24	24.5	-	8.8	6.6	5.3	4.5
30	107	f55	84	33.5	25.5	22.5	15.9	-----	8.4	*6.2	5.3	4.5
31	*25	f33.5	-----	30	-----	23.5	16.4	-----	8.4	-----	5.1	-----
Total	471.0	912.5	1,753.5	1,284.0	1,433.0	1,668.5	692.5	388.5	303.2	232.0	206.4	163.8
Mean	15.2	29.4	56.4	41.4	47.8	53.8	22.3	13.9	9.78	7.73	6.66	5.46
Ac-ft	934	1,810	3,480	2,550	2,840	3,310	1,370	771	601	460	409	325

Calendar year 1956: Max 402 Min 4.3 Mean 24.4 Ac-ft 17,750
 Fiscal year 1956-57: Max 402 Min 4.3 Mean 26.1 Ac-ft 18,860

Peak discharge (base, 1,400 cfs).--Aug. 29 (5:30 p.m.) 1,460 cfs (10.52 ft); Sept. 15 (9 a.m.) 1,400 cfs (10.02 ft); Dec. 14 (9 a.m.) 1,570 cfs (11.30 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of records for Inarajan River.
 f Fragmentary gage-height record; discharge computed from partly estimated gage heights.

Ugum River near Talofoto--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.5	4.1	55	11.7	35.5	29	15.4	13.3	9.2	6.6	5.6	20.5
2	4.8	3.85	78	10.4	20	30.5	14.3	12.2	8.8	6.6	5.6	7.6
3	4.3	3.85	58	9.6	19.2	28	14.3	12.2	8.4	6.2	5.3	5.6
4	4.5	3.85	33	9.6	17.0	27	14.3	11.2	8.4	6.2	6.2	5.1
5	5.1	4.5	26	87	16.4	25.5	14.8	11.2	8.4	5.9	6.2	4.8
6	5.1	4.1	22	404	15.4	25	13.8	10.8	8.0	5.9	5.6	4.5
7	4.8	4.3	19.9	128	15.4	25	14.8	10.8	8.8	5.9	5.3	5.3
8	4.5	4.3	19.4	51	276	23.5	24.5	11.2	9.6	5.9	5.3	5.1
9	4.5	4.1	15.9	*51	65	23.5	14.8	10.8	8.0	5.6	5.0	5.3
10	4.8	5.1	18.1	34	55	22.5	13.8	10.8	8.0	6.2	5.0	53
11	7.0	4.1	17.2	28.5	43	22	14.8	10.8	*8.0	5.9	5.0	24
12	12.7	4.1	15.4	25	372	22.5	14.8	10.8	8.4	5.6	4.8	10.8
13	17.4	5.1	14.8	40	66	21.5	16.4	10.4	7.6	9.4	*4.5	32
14	7.0	9.0	12.7	32.5	48	21.5	177	10.4	7.6	7.0	4.3	249
15	5.3	5.1	10.8	29.5	578	26.5	37.5	10.0	7.6	5.9	4.3	29.5
16	4.8	4.5	11.7	26.5	479	25.5	22.5	10.0	7.3	5.9	4.3	16.7
17	4.5	6.3	11.7	21.5	81	21.5	*19.4	9.6	7.3	7.9	4.1	12.3
18	4.3	16.2	10.4	20	62	20	17.5	10.8	7.3	7.0	4.3	10.4
19	4.3	23	20.5	20	54	18.8	17.5	11.7	7.0	7.0	4.3	9.2
20	4.8	13.7	15.4	18.8	51	18.8	27	9.6	7.0	5.9	4.3	8.8
21	4.3	9.2	11.2	21	45	19.4	19.4	9.2	7.0	6.2	4.3	9.2
22	4.5	9.6	40	62	41	18.2	16.4	9.2	7.0	5.9	5.3	8.8
23	5.1	13.7	24.5	33.5	39	17.5	15.4	9.6	6.6	5.6	6.7	8.8
24	4.3	21	29.5	26	38	17.0	14.3	12.2	6.6	5.6	4.8	9.2
25	4.3	21	34.5	*23	40	16.4	13.8	10.8	7.0	5.3	4.3	8.8
26	4.1	19.3	17.5	25	35	15.9	13.3	9.2	6.6	5.3	4.3	7.6
27	4.3	*10.0	15.4	23	37	15.4	14.8	9.2	6.6	5.6	4.1	9.6
28	4.5	80	14.3	29.5	34	15.9	13.8	8.8	6.2	5.6	5.1	8.4
29	5.1	48	12.2	21	32	18.8	12.7	-	6.6	7.3	14.5	8.0
30	4.3	19.6	13.3	31.5	30.5	15.9	12.2	-----	9.5	5.6	8.0	7.0
31	4.1	12.2	-----	22	-----	15.4	12.2	-----	7.3	-----	7.5	-----
Total	167.9	396.75	696.3	1,372.1	2,740.4	663.9	677.5	296.8	237.7	186.5	168.2	604.9
Mean	5.42	12.8	23.2	44.3	91.3	21.4	21.9	10.6	7.67	6.22	5.43	20.2
Ac-ft	333	787	1,380	2,720	5,440	1,320	1,340	589	471	370	334	1,200

Calendar year 1957: Max 578 Min 3.85 Mean 22 Ac-ft 15,920
 Fiscal year 1957-58: Max 578 Min 3.85 Mean 22.5 Ac-ft 16,280

Peak discharge (base, 1,400 cfs).--Oct. 6 (8:30 a.m.) 1,610 cfs (11.63 ft); Nov. 15 (10:30 p.m.) 1,600 cfs (11.52 ft).

* Discharge measurement made on this day.

Ylig River near Yona

Location.--Lat 13°23'20" N., long 144°45'00" E., on right bank 2 miles upstream from mouth, 2.1 miles southwest of Yona, and 5.8 miles south of Agana.

Drainage area.--6.58 sq mi.

Records available.--June 1952 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 20 ft (by barometer).

Average discharge.--6 years, 23.0 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1953-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)†	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1953	Sept. 8, 1952	2,520	14.47	June 14, 1953	0.51	0.23
1954	Oct. 15, 1953	4,040	19.36	June 21,22,1954	.36	.20
1955	Sept. 1, 1954	2,400	14.01	July 31, Aug. 1, 1954	.56	.24
1956	July 6, 1955	2,020	11.87	May 12-16, 1956	.56	.24
1957	Oct. 17, 1956	2,150	12.45	June 28,29,1957	.36	.20
1958	Nov. 15, 1957	2,810	14.70	July 27, 28, Aug. 3-5,1957	.28	.18

† From rating curve extended above 260 cfs on basis of slope-area measurement at gage height 14.01 ft.

1952-58: Maximum discharge, 4,040 cfs Oct. 15, 1953 (gage height, 19.36 ft), from rating curve extended above 260 cfs on basis of slope-area measurement at gage height 14.0 ft; minimum, 0.28 cfs July 27, 28, Aug. 3-5, 1957.

Remarks.--Records good except those for periods of no gage-height record, which are fair for 1953-55, and poor for 1956.

Rating tables, June 17, 1952, to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)

June 17, 1952, to June 30, 1955						July 1, 1955, to June 30, 1958	
0.2	0.36	0.7	7.4	3.0	233	3.0	233
.3	.96	.9	13.5	5.0	500	4.0	363
.4	1.93	1.1	21.5	7.0	830		
.5	3.3	1.4	42	10.0	1,420		
.6	5.1	1.8	95	13.0	2,150		

Note.--Same as preceding table below 3.0 ft.

Discharge, in cubic feet per second, 1952

June 17.....	†0.78	June 24.....	0.82
18.....	.51	25.....	.82
19.....	.41	26.....	.75
20.....	.36	27.....	.75
21.....	.36	28.....	.61
22.....	.36	29.....	.56
23.....	.46	30.....	.61

† Result of discharge measurement.

Ylig River near Yona--Continued

Discharge, in cubic feet per second, fiscal year July 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.8	30	18.8	38	30.5	90	21	6.0	15.4	4.7	2.3	1.51
2	2.05	28.5	23.5	116	26.5	38	17.8	5.8	14.3	4.5	2.3	1.23
3	1.71	57	19.0	35.5	24	27	15.4	5.8	13.2	4.1	2.05	1.14
4	68	71	16.6	59	23.5	24	13.5	6.0	16.2	4.1	1.93	*1.14
5	8.3	39	14.3	39	107	22	25	5.3	12.9	3.9	1.93	.96
6	4.1	37	12.9	33.5	33.5	21	15.4	5.8	11.6	3.9	1.81	.96
7	4.3	19.0	11.6	57	51	74	13.5	18.2	10.9	3.9	1.81	.96
8	2.85	17.4	323	30.5	134	24	12.5	8.6	10.9	3.75	*1.71	.89
9	2.3	42	78	47	187	22.5	11.9	6.7	10.6	3.6	1.71	.82
10	1.93	33	99	65	98	21	11.3	6.0	10.0	3.45	1.61	.75
11	1.81	51	29	33.5	72	20.5	10.9	5.8	9.7	3.45	1.51	.68
12	1.51	76	75	28.5	48	19.0	10.6	8.6	8.8	5.1	1.51	.61
13	1.32	27	353	26.5	36.5	17.8	10.3	6.2	8.3	4.7	1.41	.61
14	1.23	20.5	78	40	31	19.0	10.3	5.6	7.7	3.3	1.41	.56
15	2.55	41	44	32.5	28.5	17.4	9.7	5.1	7.7	3.3	1.41	.56
16	4.6	27	74	27.5	87	15.4	9.1	*5.8	7.2	3.15	1.71	.56
17	2.05	23	30.5	58	43	14.7	8.8	5.3	6.9	3.0	1.93	.61
18	4.6	17.8	26.5	43	30	14.7	8.3	4.7	8.6	3.0	1.71	.56
19	3.75	15.4	22.5	31	26.5	13.5	8.3	4.5	7.0	2.85	1.93	.75
20	2.15	15.4	19.9	25.5	71	13.2	8.0	4.7	6.7	2.7	1.61	.75
21	2.3	12.9	17.8	74	31	12.5	8.0	4.7	6.2	2.7	1.61	.68
22	4.3	11.9	16.2	233	33.5	*12.2	7.4	431	6.2	2.55	1.61	.68
23	2.7	38.5	102	50	82	52	7.7	122	6.2	2.55	1.51	.82
24	2.3	13.5	33.5	86	32	14.3	7.4	40	5.8	2.55	1.41	.96
25	2.55	11.9	*24.5	36.5	*29	43	6.9	26.5	5.8	2.55	1.41	.89
26	1.93	11.6	21	33.5	26.5	16.2	*6.7	21.5	5.3	2.55	1.32	.89
27	1.81	10.9	19.4	27	23	13.5	6.5	19.9	5.3	2.4	1.23	.61
28	2.3	16.6	35	23.5	34	13.5	6.5	17.0	5.1	2.15	1.14	1.81
29	10.1	20.5	161	21.5	77	25	6.2	-	4.9	2.05	1.14	3.0
30	4.7	16.4	73	166	31	13.2	8.6	-----	4.7	2.05	1.23	1.81
31	5.6	19.6	-----	48	-----	90	6.2	-----	4.7	-----	1.61	-----
Total	166.50	872.3	1,872.5	1,665.5	1,587.5	834.1	329.7	813.1	264.8	98.55	50.52	28.76
Mean	5.37	28.1	62.4	53.7	52.9	26.9	10.6	29.0	8.54	3.28	1.63	0.959
Ac-ft	330	1,730	3,710	3,300	3,150	1,650	654	1,610	525	195	100	57

Calendar year 1952: Max - Min - Mean - Ac-ft -
 Fiscal year 1952-53: Max 431 Min 0.56 Mean 23.5 Ac-ft 17,010

Peak discharge (base, 2,000 cfs).--Sept. 8 (9 p.m.) 2,520 cfs (14.47 ft); Sept. 13 (1 p.m.) 2,020 cfs (12.52 ft).

* Discharge measurement made on this day.

Ylig River near Yona--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.05	3.15	47	20.5	20.5	35	12	6.9	4.5	1.61	1.32	0.56
2	.82	3.6	41	18.6	18.6	28	15	6.7	3.9	2.4	1.23	.56
3	.75	3.75	95	17.0	18.2	25	13	6.5	3.75	2.55	.96	.51
4	.82	3.0	45	16.6	17.8	25	15	6.2	3.45	2.3	.82	.46
5	.82	2.55	35.5	15.8	16.2	23	11	6.0	3.5	1.95	.82	.51
6	2.05	4.9	28.5	14.7	16.2	20	13	6.0	3.0	1.71	.82	1.93
7	1.71	4.5	25.5	16.4	14.7	19	12	5.8	3.0	1.61	.75	1.93
8	1.05	3.75	23	15.4	13.9	18	11	5.6	3.0	1.71	.75	1.23
9	.82	5.8	20.5	14.3	13.5	17	540	5.6	2.85	1.61	.68	1.41
10	.82	96	20.5	12.9	49	19	90	5.1	3.0	1.51	.68	1.23
11	.75	588	18.6	13.2	36	17	*25	4.9	3.45	1.32	*.82	.89
12	.96	464	19.4	19.6	261	15	17.4	4.9	3.15	1.23	1.61	.82
13	.89	86	16.6	14.7	988	15	15.8	4.7	3.0	1.41	1.61	.75
14	7.8	63	15.4	15.4	129	39	14.7	4.7	2.85	1.61	.96	.68
15	10.1	71	15.4	2,050	61	30	14.7	4.5	2.4	1.32	.82	.68
16	*6.3	154	20	1,120	41	66	12.9	4.5	2.55	1.23	.75	*.56
17	17.0	82	15.1	379	34	56	12.5	4.5	2.55	1.14	.75	.51
18	10.0	308	*26	182	*30.5	30	11.6	4.5	2.55	1.14	.75	.46
19	4.7	86	46	114	26	23	11.3	4.1	2.7	1.23	1.05	.46
20	3.0	47	55	208	23.5	21	10.9	5.3	2.55	1.23	.89	.41
21	2.85	36.5	110	80	22	19	10.9	4.5	2.3	1.14	.82	.36
22	2.3	28.5	50	*52	21	27	10.3	3.9	2.3	1.14	.75	1.33
23	2.15	25	32	44	18	20	9.4	3.75	2.3	1.14	.82	4.1
24	2.85	114	26	38	300	18	9.1	3.6	*2.05	1.14	1.61	1.61
25	2.15	63	32	32.5	100	19	8.6	3.6	1.81	1.14	1.32	1.61
26	20	36.5	28.5	28.5	40	18	8.3	3.75	1.71	1.14	.89	1.51
27	21	28.5	26	26	25	17	8.0	8.4	1.61	1.05	.75	1.14
28	10.3	307	41	26	22	15	8.0	6.0	1.61	.96	.61	.82
29	5.8	207	25	26.5	21	14	7.4	-	1.61	.82	.61	.75
30	4.5	171	23	26	63	17	7.4	-	1.61	.82	.68	.68
31	3.75	72	-----	21	-----	14	6.9	-----	1.61	-----	.61	-----
Total	149.86	3,169.00	1,022.5	4,676.6	2,460.6	739	973.1	144.50	82.02	42.29	28.31	30.46
Mean	4.83	102	34.1	151	82.0	23.8	31.4	5.16	2.65	1.41	0.913	1.02
Ac-ft	297	6,290	2,030	9,280	4,880	1,470	1,930	287	163	84	56	60

Calendar year 1953: Max 2,050 Min 0.56 Mean 37.8 Ac-ft 27,390
 Fiscal year 1953-54: Max 2,050 Min 0.36 Mean 37.0 Ac-ft 26,830

Peak discharge (base, 2,000 cfs).--Aug. 11 (8:30 p.m.) 2,050 cfs (12.57 ft); Oct. 15 (9 a.m.) 4,040 cfs (19.36 ft); Nov. 13 (4 p.m.) 3,660 cfs (18.34 ft).

* Discharge measurement made on this day.
 Note.--No gage-height record Nov. 21 to Jan. 11; discharge estimated on basis of records for stations on nearby streams and rainfall records.

Ylig River near Yona--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.75	0.61	*329	56	53	36	7.2	6.0	3.45	1.93	3.3	2.75
2	1.86	.68	81	36.5	34	*21	6.9	*5.3	3.15	1.93	1.61	2.55
3	1.68	.68	69	58	29	18.6	8.0	5.6	2.85	1.81	1.32	1.61
4	1.05	.68	134	30.5	27.5	17.4	*13.5	6.0	2.85	1.71	1.32	2.55
5	1.05	.75	85	51	23	16.6	14.6	4.9	3.15	1.71	1.23	2.8
6	1.05	1.38	78	31	22	16.6	8.3	4.7	2.85	1.61	1.05	1.71
7	2.5	2.7	53	29	20.5	17.7	7.2	4.7	2.7	1.81	1.05	*12.6
8	1.32	2.1	102	75	19.9	16.6	14.4	4.5	2.55	2.15	1.84	3.5
9	.96	10.8	89	*97	18.2	15.1	8.8	4.5	2.55	2.55	6.7	65
10	.86	3.0	69	34	17.8	18.2	14.4	4.3	2.55	2.3	2.7	10.4
11	.76	1.93	35.5	57	140	17.5	11.3	4.3	3.0	1.71	1.71	5.8
12	.68	4.4	28.5	45	30.5	13.5	9.2	4.1	2.85	1.51	1.41	4.5
13	.68	4.8	35.5	30	22.5	12.5	8.6	3.9	2.7	1.41	1.41	4.3
14	.74	18.8	327	25	20.5	12.2	14.8	3.9	2.55	*1.41	1.41	3.6
15	.78	5.5	321	22	18.6	11.9	14.7	4.5	*2.3	1.71	7.5	3.0
16	.75	3.15	98	20.5	18.2	12.5	10.6	4.3	2.3	1.61	3.9	2.55
17	.90	2.7	52	19.0	16.6	12.2	10.3	8.1	2.3	1.41	2.15	2.85
18	1.7	16.5	39.5	17.8	92	12.2	8.8	6.2	2.15	1.32	1.61	2.55
19	2.0	31	33.5	16.2	25	10.9	8.0	4.1	2.15	1.61	1.41	2.3
20	1.6	39	213	15.4	34	10.3	8.3	3.75	2.05	2.15	1.41	2.4
21	1.2	17.3	100	31.5	21.5	10.3	7.7	4.9	2.15	1.71	1.32	2.3
22	1.0	8.3	150	22	20.5	9.7	6.9	4.9	2.4	1.41	1.23	2.15
23	.90	5.8	71	19.9	118	9.4	6.7	4.1	2.15	1.23	1.05	1.93
24	.95	*47	49	17.0	42	8.6	6.5	3.75	2.05	1.14	.96	1.81
25	1.0	153	38.5	16.1	28.5	8.6	11.7	4.1	2.05	1.51	.96	1.81
26	.84	28.5	85	39	23	8.3	13.6	3.6	2.15	1.61	.96	2.75
27	.74	26	39.5	36.5	58	8.0	7.7	3.6	2.4	1.14	2.1	2.15
28	*.68	17.0	112	22.5	26.5	7.7	6.7	3.9	2.55	1.05	1.93	1.93
29	.68	162	138	31.5	23.5	8.3	6.7	-	2.05	1.05	1.41	2.3
30	.68	52	68	90	22.5	7.7	6.2	-----	1.93	1.40	1.05	7.7
31	.68	27.5	-----	190	-----	7.2	6.0	-----	1.81	-----	.89	-----
Total	33.02	695.56	3,123.5	1,281.9	1,066.8	413.3	294.3	130.50	76.69	48.61	59.90	166.15
Mean	1.07	22.4	104	41.4	35.6	13.3	9.49	4.66	2.47	1.62	1.93	5.54
Ac-ft	65	1,380	6,200	2,540	2,120	820	584	259	152	96	119	530

Calendar year 1954: Max 540 Min 0.36 Mean 21.7 Ac-ft 15,700
 Fiscal year 1954-55: Max 329 Min 0.61 Mean 20.2 Ac-ft 14,660

Peak discharge (base, 2,000 cfs).--Sept. 1 (11:30 a.m.) 2,400 cfs (14.01 ft).

*. Discharge measurement made on this day.
 Note.--No gage-height record July 10-27; discharge estimated on basis of recorded range in stage and records for nearby stations.

Ylig River near Yona--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.8	28.5	130	a75	25	14.3	9.2	3.75	2.15	1.41	1.14	2.15
2	5.7	21	23	a50	25	12.5	8.3	3.45	2.15	*1.23	.89	1.51
3	3.15	18.6	46	a75	22.5	11.6	8.0	4.1	2.15	1.23	1.05	1.51
4	2.4	16.6	19.4	47	21.5	10.6	6.7	4.5	2.05	1.14	1.05	1.41
5	2.15	14.7	17.8	34	21	10.0	*6.4	3.3	2.05	1.05	1.14	1.61
6	291	13.9	16.6	50	18.2	9.4	6.9	3.15	1.93	1.05	.96	1.32
7	*62	13.5	21.5	.31	16.6	9.4	6.7	4.5	1.81	1.05	.75	1.05
8	177	11.9	13.9	25.5	16.2	11.6	6.0	7.0	1.71	1.23	.75	1.05
9	74	11.3	13.2	23.5	14.7	9.4	6.0	13.8	1.61	1.14	.75	1.14
10	26	10.9	31.5	21	29	10.4	5.8	6.3	1.93	1.14	.75	.82
11	73	11.3	38.5	22.5	15.4	10.0	6.0	4.5	2.05	1.05	.61	.75
12	98	10.0	40	19.4	13.5	20	5.6	3.6	1.81	.89	.56	4.9
13	46	9.1	19.4	91	13.5	16.2	5.3	3.45	1.71	.89	.56	1.78
14	28.5	8.6	18.2	26.5	12.2	13.3	4.9	3.3	1.61	.89	.56	1.23
15	21.5	8.3	17.4	21.5	11.6	10.0	4.9	*3.1	1.61	.89	.56	1.05
16	67	*8.0	17.6	18.2	12.8	102	5.3	3.75	1.81	.82	.56	.96
17	24	7.7	22.5	17.0	12.8	18.3	4.9	3.15	1.81	1.14	.68	.89
18	20.5	14.3	20.5	19.6	13.5	14.7	4.9	3.0	1.71	1.32	1.05	6.7
19	17.0	9.1	*15.1	16.3	10.0	14.8	4.7	2.85	1.81	1.14	.96	15.5
20	16.2	13.9	14.3	22	9.4	11.9	4.5	2.7	1.71	.89	5.2	3.15
21	14.3	12.0	20	15.4	9.7	11.9	4.3	2.7	2.05	.89	2.45	2.05
22	13.9	12.2	132	189	13.1	10.3	4.1	2.55	2.15	.89	*1.23	1.71
23	12.9	9.4	36.5	45	16.3	10.0	4.3	2.55	1.81	.89	1.23	1.51
24	11.6	32.5	26	35	9.4	9.4	4.1	2.4	1.61	.89	.82	1.71
25	11.8	46	33	66	8.7	8.8	3.75	3.15	1.41	.75	.75	2.15
26	21.5	15.4	40	*35.5	9.8	8.6	4.3	2.85	1.41	.68	3.0	3.15
27	14.6	17.0	59	133	30.5	8.0	4.1	2.4	1.61	.75	2.7	2.7
28	11.9	10.9	330	100	89	7.7	3.75	2.3	2.4	.89	1.71	1.81
29	124	9.4	a300	53	20	7.4	3.6	2.15	2.7	1.05	1.51	1.51
30	69	39.5	a60	37.5	*21.5	7.2	3.45	-----	1.71	1.32	8.5	1.41
31	37.5	37.5	-----	28.5	-----	6.9	3.45	-----	1.41	-----	3.0	-----
Total	1,406.90	503.0	1,592.9	1,443.9	562.4	436.6	164.20	110.30	57.45	30.59	47.43	70.19
Mean	45.4	16.2	53.1	46.6	18.7	14.1	5.30	3.80	1.85	1.02	1.53	2.34
Ac-ft	2,790	998	3,160	2,860	1,120	866	326	219	114	61	94	139

Calendar year 1955: Max 330 Min 0.89 Mean 18.4 Ac-ft 13,330
 Fiscal year 1955-56: Max 330 Min 0.56 Mean 17.6 Ac-ft 12,750

Peak discharge (base, 2,000 cfs).--July 6 (5 p.m.) 2,020 cfs (11.87 ft).

* Discharge measurement made on this day.
 a.No gage-height record; discharge estimated on basis of records for nearby stations.

Ylig River near Yona--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.4	15.8	61	25.5	15.4	18.8	11.6	8.0	3.75	2.85	1.51	1.14
2	3.6	12.5	68	21	16.9	49	11.6	7.2	3.6	7.3	1.51	1.14
3	2.4	11.3	40	19	38.5	44	10.9	7.2	3.75	8.0	1.41	1.05
4	3.0	10.0	40	22.5	16.2	19.0	10.3	8.0	3.9	3.45	1.32	.89
5	3.25	9.4	46	19.9	13.9	17.4	10.0	8.0	5.1	3.0	1.41	.89
6	2.4	8.6	27.5	22	12.9	17.0	9.7	6.7	4.3	2.7	1.61	.89
7	2.15	8.0	*52	16.2	13.2	15.1	9.1	6.5	3.6	2.55	2.35	.89
8	2.9	27.5	29	19.6	12.2	13.9	8.6	9.5	3.6	2.3	4.9	1.14
9	42	48	43	23	11.6	12.9	11.5	6.5	3.75	2.7	2.85	1.23
10	11.9	14.3	23	17.8	20	12.2	126	6.0	3.6	2.55	1.81	1.05
11	5.8	15.6	73	28	21.5	11.6	14.7	5.8	3.45	2.4	1.61	.89
12	5.7	29	40	*265	99	11.6	13.2	5.8	4.1	2.15	1.51	.82
13	5.3	13.8	37	34	231	*10.9	11.3	5.6	3.6	2.05	1.51	.82
14	6.3	11.2	25	37.5	43	262	10.0	*5.1	3.15	2.55	1.51	.82
15	5.3	34	140	22.5	24.5	336	9.7	4.9	3.0	2.85	1.41	.68
16	*5.1	14.4	44	21	54	35	9.4	4.7	3.0	2.15	1.41	.61
17	3.9	22.5	48	196	38.5	25.5	39.5	4.7	2.85	2.05	1.32	.56
18	4.3	21.5	26.5	71	211	21.5	11.6	4.7	2.85	1.93	1.61	.56
19	3.45	33.5	30.5	71	43	20.5	10.0	6.2	2.85	1.81	1.61	.61
20	3.0	17.0	68	29	31	18.6	31	5.6	3.0	1.71	1.23	1.50
21	2.85	12.5	38	38.5	36.5	17.8	12.5	4.5	3.15	2.05	1.14	1.61
22	2.7	14.7	28.5	*34.5	30	16.2	10.0	4.5	2.85	1.93	1.82	1.51
23	2.4	31	84	30	34.5	15.1	9.1	5.3	2.4	1.71	1.23	1.05
24	7.3	16.6	81	22.5	22	14.3	8.8	6.7	2.4	1.88	1.14	*.75
25	28	13.2	33.5	22	19.9	14.6	8.6	5.6	2.55	1.81	1.14	.46
26	17.2	11.9	26.5	22.5	19	35.5	8.3	4.5	2.4	1.61	1.14	.41
27	15.4	37.5	149	18.6	17.8	20.5	7.7	4.1	*9.0	1.51	1.14	.41
28	27	63	40	23.5	16.6	14.7	7.7	3.9	3.9	1.93	1.05	.36
29	63	22.5	27	18.2	16.6	13.2	15.6	-	3.15	2.05	1.05	.36
30	57	19.5	49	16.2	17.4	12.5	8.3	-----	2.85	1.61	1.14	.61
31	22	19.9	-----	35	-----	12.5	13.8	-----	2.7	-----	1.14	-----
Total	372.00	640.2	1,518.0	1,263.0	1,197.6	1,159.4	490.1	165.8	108.15	77.14	48.54	25.71
Mean	12.0	20.7	50.6	40.7	39.9	37.4	15.8	5.92	3.49	2.57	1.57	0.857
Ac-ft	738	1,270	3,010	2,510	2,380	2,300	972	329	215	153	96	51

Calendar year 1956: Max 336 Min 0.56 Mean 18.1 Ac-ft 13,160
 Fiscal year 1956-57: Max 336 Min 0.36 Mean 19.4 Ac-ft 14,020

Peak discharge (base, 2,000 cfs).--Oct. 17 (5 p.m.) 2,150 cfs (12.45 ft); Nov. 13 (12:30 a.m.) 2,080 cfs (12.13 ft); Dec. 15 (8 a.m.) 2,050 cfs (12.04 ft).

* Discharge measurement made on this day.

Ylig River near Yona--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.51	0.51	46	13.9	27	15.8	6.5	8.0	3.75	1.71	1.05	2.3
2	.56	.36	109	12.2	22.5	21	6.2	7.4	3.6	1.61	.96	1.71
3	.51	.28	42	11.6	21	16.2	6.0	8.0	3.45	1.61	.96	1.23
4	.51	.28	19.4	10.3	19.0	15.1	6.6	6.7	3.3	1.71	.96	1.23
5	.68	.46	17.0	22	17.8	13.9	6.5	6.2	3.9	1.61	1.14	1.14
6	.75	.56	29	320	*17.0	13.5	*5.5	6.0	*3.45	1.51	.96	.89
7	.68	.68	60	242	16.2	20.5	6.6	6.0	3.55	1.41	.82	1.32
8	.51	.68	26	72	93	12.9	10.4	6.0	4.9	1.41	.82	1.71
9	.51	.56	61	48	138	12.2	6.7	5.8	3.45	1.32	*.79	3.7
10	.64	.56	20.5	34	78	12.2	6.9	6.5	3.15	1.51	.75	47
11	2.05	.61	20.5	31	45	11.3	6.5	6.0	3.3	1.81	.75	14.4
12	2.8	.51	16.2	47	186	11.3	6.7	5.3	3.45	1.51	.82	6.0
13	2.55	.61	21	34	92	10.9	7.7	5.1	3.15	3.25	.96	45
14	1.14	1.41	15.4	44	59	10.3	257	5.1	3.0	2.3	.82	244
15	.82	1.14	12.9	68	658	10.3	28.5	4.7	3.15	1.71	.75	33
16	.56	.75	33	64	731	10.6	17.0	4.5	2.85	1.61	.68	18.6
17	.56	.61	35	29	101	9.4	*13.9	4.5	2.7	2.05	.61	13.2
18	.51	f18.0	18.6	23.5	61	8.6	12.9	5.8	2.55	2.15	.56	10.6
19	.41	5.6	17.0	21	45	8.3	12.9	7.0	2.4	1.71	.56	8.8
20	.46	2.15	14.3	19.9	37.5	8.0	16.8	4.7	2.3	1.41	.61	8.0
21	.51	5.2	12.5	19.9	32.5	8.3	12.2	4.3	2.3	1.61	.61	7.4
22	.51	2.85	34.5	50	27.5	7.7	10.6	4.1	2.15	1.51	.82	8.1
23	.46	6.8	48	37	25.5	7.4	9.7	4.5	2.05	1.23	1.51	6.9
24	.41	25	*28.5	23.5	22.5	6.9	8.8	13.5	2.05	1.14	1.32	6.9
25	.36	24	22.5	30	21	6.9	8.6	5.8	2.15	1.05	1.05	8.2
26	.32	8.4	18.6	27.5	22	6.5	8.0	4.5	2.05	1.05	.89	7.7
27	.28	4.5	16.2	25.5	33	6.2	10.0	3.9	2.05	1.23	.75	6.9
28	.41	123	14.7	219	19.0	6.9	8.6	3.75	1.81	1.14	.82	6.0
29	.56	60	13.5	35	*20	28.5	7.7	-	1.71	1.23	11.9	5.3
30	.61	20	19.4	34	16.6	8.6	7.2	-----	2.05	1.14	3.15	4.7
31	.51	12.5	-----	30	-----	7.2	7.2	-----	1.93	-----	2.05	-----
Total	22.66	328.57	862.2	1,698.8	2,704.6	353.4	546.4	163.65	87.65	47.25	41.20	531.93
Mean	0.731	10.6	28.7	54.8	90.2	11.4	17.6	5.84	2.83	1.58	1.33	17.7
Ac-ft	45	652	1,710	3,370	5,360	701	1,080	325	174	94	82	1,060

Calendar year 1957: Max 731 Min 0.28 Mean 18.9 Ac-ft 13,650
 Fiscal year 1957-58: Max 731 Min 0.28 Mean 20.2 Ac-ft 14,650

Peak discharge (base, 2,000 cfs).--Nov. 15 (11 p.m.) 2,810 cfs (14.70 ft).

* Discharge measurement made on this day.
 f Fragmentary gage-height record; discharge computed on basis of partly estimated gage heights.

Lonfit River near Ordot

Location.--Lat 13°26'05" N., long 144°45'10" E., on left bank at confluence of Lonfit and Sigua Rivers, 0.9 mile south of Ordot, 2.6 miles south of Agana, and 3.5 miles southeast of Asan.

Drainage area.--3.1 sq mi.

Records available.--September 1951 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 30 ft (by barometer).

Average discharge.--6 years (1952-58), 10.6 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1952-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1952†	Nov. 4, 1951	*1,520	12.09	June 13,14,30, 1952	0.11	0.09
1953	Feb. 22, 1953	*1,200	9.79	June 26,27,1953	.17	.11
1954	Oct. 15, 1953	(**)	††17.46	June 21,22,1954	.07	.07
1955	Sept. 1, 1954	*1,520	12.09	July 28, 1954	.17	.11
1956	Sept.29, 1955	*1,540	12.27	May 16, 1956	.11	.09
1957	Dec. 15, 1956	*1,460	11.74	June 17,18,1957	.09	.08
1958	Oct. 28, 1957	*2,070	††15.79	July 28, 1957	(a)	-

† Period September to June.

* From rating curve extended above 90 cfs on basis of slope-area measurement at gage height 12.27 ft.

†† From floodmark.

** Not determined.

a No flow part of day.

1951-58: Maximum discharge not determined, occurred Oct. 15, 1953 (gage height, 17.46 ft, from floodmark); no flow July 28, 1957.

Remarks.--Records fair for 1951-54 and good thereafter except those for periods of doubtful or no gage-height record and those above 100 cfs, which are poor.

Lonfit River near Ordot--Continued

Rating table, Sept. 26, 1951, to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)

0	0	0.9	27
.1	.14	1.1	48
.2	.69	1.4	90
.3	1.80	2.0	187
.4	3.55	3.0	335
.5	6.0	5.0	580
.6	9.4	10.0	1,230
.7	14.0		

Discharge, in cubic feet per second, September 1951 to June 1952

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			-	*2.3	113	18.0	2.3	1.05	0.69	0.61	0.30	0.30
2			-	2.1	11.2	8.0	2.45	1.17	.77	.61	.30	.25
3			-	1.80	38	5.0	2.1	1.29	.69	.61	.35	.21
4			-	6.3	262	4.2	2.1	1.05	.61	.87	.61	.25
5			-	18.6	18.8	4.0	2.3	1.05	.96	.87	.77	.35
6			-	4.0	12.2	63	2.1	.96	.96	.87	1.00	.47
7			-	3.35	12.6	9.2	1.96	.96	.69	.77	2.3	.47
8			-	106	8.4	6.0	*1.90	.96	.69	.96	.77	.30
9			-	83	7.4	8.1	1.96	.96	.69	1.17	.47	.30
10			-	37	6.3	9.3	1.96	1.05	.54	.69	.41	.25
11			-	13.5	6.6	11.2	1.65	.96	.47	.47	.47	.25
12			-	79	10.6	5.5	1.80	.96	.61	.61	.47	.21
13			-	120	5.5	4.7	1.96	.87	.54	.41	.47	.17
14			-	20.5	4.7	4.2	1.80	.87	.54	.41	.41	.21
15			-	12.6	4.5	4.0	2.3	.77	.77	.41	.47	1.54
16			-	10.8	4.2	4.5	2.1	.77	.77	.41	.47	.54
17			-	8.7	7.3	70	1.65	.77	.77	.35	.47	.35
18			-	7.4	19.3	6.3	7.0	.77	.69	.35	.47	.30
19			-	6.3	17.9	5.0	1.96	.77	.61	.41	.61	.25
20			-	7.6	6.3	4.2	1.65	.87	.69	.54	.54	.21
21			-	6.3	5.2	3.8	1.53	.96	.77	.41	.30	.25
22			-	5.0	4.5	3.35	1.53	.96	.69	.30	.30	.25
23			-	11.7	4.0	3.15	1.41	.87	.61	.30	.25	.30
24			-	15.6	4.0	3.0	1.29	.77	.61	.35	.25	.41
25			-	5.7	5.0	2.8	1.29	.77	.61	.30	.25	.30
26			3.0	5.2	4.0	2.6	1.29	.69	.96	.30	.25	.30
27			2.45	7.0	6.5	2.45	1.17	.69	.69	.47	.25	.35
28			2.45	4.7	17.2	3.0	1.29	.96	.77	.61	.25	.30
29			2.45	4.2	5.2	2.6	1.53	.96	1.41	.41	.40	.25
30			3.0	3.8	3.8	2.1	1.17	-----	.77	.30	.61	.17
31			-----	4.0	-----	2.1	1.05	-----	.61	-----	.30	-----
Total			-	624.05	636.2	285.35	59.55	26.51	22.25	16.15	15.54	10.06
Mean			-	20.1	21.2	9.20	1.92	0.914	0.718	0.538	0.501	0.335
Ac-ft			-	1,240	1,260	566	118	53	44	32	31	20
Calendar year			: Max	Min	Mean			Ac-ft				
Fiscal year			: Max	Min	Mean			Ac-ft				

* Discharge measurement made on this day.

Lonfit River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.89	5.6	9.0	18	17	11	10.5	2.3	5.5	1.53	0.77	0.47
2	.69	13.3	9.0	66	15	7.5	15.0	2.1	5.0	1.41	.77	.49
3	.41	23	7.0	19.1	13	7.0	6.7	2.1	4.5	1.41	.77	.41
4	2.1	41	6.5	63	12	7.0	6.0	2.3	5.5	1.41	.69	.41
5	2.1	18.6	6.0	26	80	6.5	15.6	1.96	4.5	1.41	.69	.41
6	1.65	20	5.2	17.5	20	7.5	7.4	2.1	4.0	1.41	.69	.41
7	3.5	7.4	4.5	29	35	22	5.7	6.4	3.7	1.41	.59	.41
8	1.29	4.7	130	13.5	120	7.5	5.0	2.8	3.6	1.29	.47	.35
9	.87	10.6	35	24	60	7.4	4.7	2.3	3.5	1.29	.41	.35
10	.69	8.0	50	22	40	7.0	4.5	2.1	3.2	1.29	.41	.30
11	.61	10.9	14	21.5	21	6.6	4.2	1.96	3.0	1.29	.41	.35
12	.47	21	30	13.5	16	6.4	4.0	2.3	2.8	1.29	.41	.30
13	.41	7.4	150	14.9	13	6.2	3.8	2.1	2.6	1.29	.41	.30
14	.47	5.7	40	27.5	12	7.0	3.8	1.80	2.5	1.29	.41	.25
15	.54	4.5	15	15.9	11	5.7	3.35	1.80	2.5	1.29	.41	.25
16	1.35	4.7	45	13.1	30	5.0	3.35	1.80	2.3	1.29	.54	.25
17	.54	4.0	16	88	17	4.7	3.15	1.80	2.2	1.29	.54	.30
18	.47	3.55	14.0	110	11	4.5	3.0	1.65	2.6	1.29	1.05	.30
19	.54	3.15	12	20	10	4.2	3.0	1.53	2.2	1.29	.54	.54
20	.47	3.15	9.0	14	30	4.0	2.8	2.1	1.96	1.29	.54	.47
21	.47	3.15	7.5	45	13	3.8	2.8	1.96	1.96	1.17	.47	.41
22	.69	3.0	6.5	140	14	3.55	2.6	303	1.80	1.17	.41	.35
23	.69	17.4	17.8	22	70	29	2.8	57	1.80	1.05	.41	.41
24	.61	4.5	18.8	35	20	4.5	3.15	15	1.65	.96	.41	.41
25	.69	3.35	8.7	20	15	17.2	2.8	10	1.65	.96	.47	.30
26	.54	3.35	7.4	18	10	5.2	2.45	8.0	1.53	.96	.35	.25
27	.54	3.0	7.0	14	8.6	7.4	2.45	7.0	1.53	.87	.35	.25
28	.69	5.0	15.6	12	8.5	4.2	2.45	6.0	1.53	.87	.30	.61
29	1.61	8.0	84	11	21	4.9	2.45	-	1.53	.77	.25	1.17
30	.77	8.5	38.5	100	8.0	3.55	2.8	-----	1.53	.77	.47	.47
31	.96	15	-----	25	-----	60	2.45	-----	*1.53	-----	.61	-----
Total	51.22	294.50	819.0	1,078.5	771.1	288.00	144.75	453.26	85.70	36.31	16.02	11.95
Mean	1.65	9.50	27.3	34.8	25.7	9.29	4.67	16.2	2.76	1.21	0.517	0.398
Ac-ft	102	584	1,620	2,140	1,530	571	287	899	170	72	32	24

Calendar year 1952: Max 150 Min 0.17 Mean 9.43 Ac-ft 6,840
 Fiscal year 1952-53: Max 303 Min 0.25 Mean 11.1 Ac-ft 8,030

Peak discharge (base, 1,200 cfs).--Feb. 22 (4 a.m.) 1,200 cfs (9.79 ft).

* Discharge measurement made on this day.
 Note.--Doubtful or no gage-height record Aug. 27 to Sept. 17, Sept. 19-22, Oct. 1, Oct. 18 to Dec. 14, Feb. 23 to Mar. 19; discharge estimated on basis of records for Ylig River.

Lonfit River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.30	0.87	18.0	*11.2	5.0	20	3.7	2.45	1.53	0.54	1.05	e0.17
2	.25	.96	24	10.2	4.2	12	3.6	2.45	1.41	.87	.47	e.17
3	.30	1.17	15.1	8.4	4.2	8.0	3.5	2.3	1.41	.87	.30	e.14
4	.41	.87	12.2	7.4	4.2	8.0	3.4	2.3	1.29	.69	.35	e.09
5	.69	.96	10.3	6.3	3.8	7.0	*3.3	2.1	1.17	.61	.30	e.14
6	.47	3.05	8.7	5.7	3.8	6.6	3.3	2.1	1.05	.54	.30	e.60
7	.35	1.41	8.0	16.2	3.35	6.0	3.2	2.1	1.05	.54	.25	e.60
8	.30	24	7.0	6.7	3.15	5.5	3.2	2.1	1.05	.54	.25	e.40
9	.21	5.5	6.7	16.0	3.15	5.2	250	2.1	1.05	.54	.25	e.45
10	.25	74	6.0	6.7	13.9	6.0	40	2.1	.96	.47	.21	e.40
11	.35	400	6.7	5.7	7.4	5.2	12	1.96	.96	.47	.35	e.18
12	.41	216	5.5	5.5	120	4.8	8.5	1.96	.96	.41	.54	.14
13	*.69	50	5.2	5.2	315	4.8	7.5	1.96	.96	.41	.54	.17
14	2.95	17.6	4.7	6.0	40	12.0	7.0	1.80	.96	.41	.30	.14
15	4.1	28.5	*5.7	1,200	18	9.0	6.3	1.65	.87	.41	.25	.11
16	8.0	83	5.2	650	12	21	5.5	1.65	.87	.41	e.35	.09
17	7.5	41	4.2	120	*9.9	18	5.0	1.53	.87	.41	e.26	.14
18	4.2	196	8.8	60	8.7	9.0	4.5	1.53	.87	.41	e.26	.17
19	1.96	35	30	35	8.4	7.0	4.2	1.53	.87	.54	e.28	.17
20	1.41	18.6	27	70	7.0	6.0	4.0	1.53	.87	.47	e.26	.25
21	1.29	13.1	70	26	6.7	5.5	4.0	1.65	.77	.54	e.23	.09
22	1.17	10.8	33	16	6.7	7.5	4.0	1.53	.69	.47	e.19	2.45
23	1.05	8.7	15.7	13	5.7	6.0	3.55	1.53	.69	.41	e.19	1.17
24	.96	41	12.6	11	143	5.5	3.35	1.41	.69	.41	e.54	.35
25	1.30	17.4	47	9.0	40	5.0	3.15	1.29	.69	.41	e.43	.54
26	3.3	12.2	32	7.8	15	4.7	3.15	1.29	.61	.41	e.28	.41
27	2.45	9.9	15.1	7.0	9.0	4.5	3.0	1.29	.61	.35	e.24	.30
28	2.1	184	19.7	7.0	8.0	4.3	3.0	1.41	.61	.35	e.19	.21
29	1.41	100	35	7.0	7.2	4.1	2.8	-	.54	.35	e.19	.17
30	1.05	78	14.6	6.7	9.7	4.0	2.6	-----	.54	.35	e.21	.17
31	.96	28	-----	5.2	-----	3.8	2.6	-----	.54	-----	e.19	-----
Total	52.14	1,681.59	513.5	2,367.9	846.15	236.0	416.90	50.60	28.01	14.61	10.00	10.58
Mean	1.68	54.2	17.1	76.4	28.2	7.61	13.4	1.81	0.904	0.487	0.323	0.353
Ac-ft	103	3,340	1,020	4,700	1,680	468	827	100	56	29	20	21

Calendar year 1953: Max 1,200 Min 0.21 Mean 17.7 Ac-ft 12,800
 Fiscal year 1953-54: Max 1,200 Min 0.09 Mean 17.1 Ac-ft 12,360

Peak discharge (base, 1,200 cfs).--Aug. 11 (about 6 p.m.) 1,390 cfs (about 11.25 ft); Aug. 18 (2:30 a.m.) 1,420 cfs (11.38 ft); Oct. 15 (probably 5 a.m.) discharge unknown (17.46 ft); Nov. 13 (4 p.m.) 1,310 cfs (10.65 ft); Nov. 24 (6 a.m.) 1,680 cfs (13.15 ft); Jan. 9 (12:30 p.m.) 1,330 cfs (10.81 ft).

* Discharge measurement made on this day.
 e Stage-discharge relation indefinite; discharge estimated on basis of records for Pago River.
 Note.--No gage-height record Aug. 11, 12, Oct. 15-26, Nov. 12-16, Nov. 25 to Jan. 13; discharge estimated on basis of records for Pago River and other nearby stations.

Lonfit River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.46	0.54	150	25	*15.1	18	2.1	2.3	1.29	0.69	1.17	0.30
2	.96	.35	25	15	9.4	9.5	1.96	2.1	1.17	.69	.54	.69
3	.54	.25	19	14	7.7	10	3.65	2.3	1.05	.77	.41	.54
4	.30	.25	33	10	7.0	8.5	5.8	2.45	1.05	.96	.47	.30
5	.69	.70	23	15	6.7	7.5	4.6	2.3	1.17	.77	.47	.35
6	.41	6.7	40	10	7.8	6.8	2.6	1.96	1.05	.69	.35	.54
7	1.17	5.7	24	*8.4	6.0	6.6	2.3	1.96	.96	.69	.35	.69
8	.47	1.96	45	13.7	5.0	6.5	5.8	1.80	.96	.77	.69	.69
9	.30	9.5	47	11.5	4.7	6.5	2.8	1.96	.96	.77	2.1	9.6
10	.47	2.1	30	8.7	5.0	7.5	3.2	1.80	.87	.69	.77	1.92
11	.35	3.1	17	9.5	85	7.0	3.0	1.65	.96	.61	.54	.87
12	.21	3.55	13	10.7	14	5.5	2.6	1.65	1.05	.54	.41	.69
13	.30	2.2	28	8.0	10	5.0	2.45	1.65	.96	.54	.41	.61
14	.30	11.6	250	6.7	8.5	4.7	3.55	1.65	.96	.54	.54	.54
15	.21	3.0	200	6.3	7.5	4.3	3.8	1.80	.87	.54	2.6	.47
16	.21	1.80	41	5.5	7.0	5.0	2.8	1.65	.87	.54	1.26	.35
17	.21	1.53	22	5.0	6.5	4.1	2.6	5.0	.87	.47	.54	.47
18	.65	1.53	17	4.7	60	4.1	2.45	2.5	.77	.41	.41	.47
19	.87	17.2	14	4.2	14	3.6	2.3	1.65	.77	.47	.41	.35
20	.54	25	100	4.0	15	3.5	3.8	1.53	.77	.77	.41	.35
21	.35	9.0	45	4.0	9.5	3.5	2.3	1.53	1.05	.77	.41	.35
22	.30	4.5	85	4.0	25	3.5	1.96	1.65	1.29	.54	.35	.35
23	.25	2.6	30	4.2	80	3.1	1.80	1.53	.87	.54	.35	.35
24	.25	28	20	3.55	*35	2.8	1.80	1.41	.77	.41	.35	.35
25	.30	70	15	3.55	17	2.8	12.1	1.53	.77	.61	.35	.35
26	.21	20	27	9.5	16	2.6	10.3	1.41	.77	.61	.30	.35
27	.25	11	19	6.7	45	2.4	3.35	1.53	.87	.54	.69	.47
28	.17	7.0	80	5.0	16	2.3	3.0	1.53	.87	.54	.69	.47
29	.21	40	60	4.5	12	2.3	4.7	-	.69	.54	.47	.47
30	.35	12	25	23	11	2.3	2.6	-----	.69	.61	.35	.69
31	.25	6.7	-----	76	-----	2.1	2.45	-----	.61	-----	.30	-----
Total	12.51	309.36	1,544	339.90	568.4	163.9	110.52	53.78	28.63	18.63	19.46	24.99
Meas	0.404	9.98	51.5	11.0	18.9	5.29	3.57	1.92	0.924	0.621	0.628	0.833
Ac-ft	25	614	3,060	674	1,130	325	219	107	57	37	39	50

Calendar year 1954: Max 250 Min 0.09 Mean 9.50 Ac-ft 6,880
 Fiscal year 1954-55: Max 250 Min 0.17 Mean 8.75 Ac-ft 6,340

Peak discharge (base, 1,200 cfs).--Sept. 1 (11 a.m.) 1,520 cfs (12.09 ft).

* Discharge measurement made on this day.

Note.--Doubtful or no gage-height record Aug. 20-30, Sept 1 to Oct. 6, Nov. 12 to Dec. 26; discharge estimated on basis of records for Ylig River.

Lonfit River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.96	13.8	57	17.4	10.3	5.5	a3.5	1.41	0.69	0.47	0.35	0.87
2	.69	8.7	9.4	32	8.7	a10	a3.1	1.29	.77	.47	.35	.61
3	.41	6.3	10.4	53	8.4	5.2	a3.0	1.65	.69	.41	.41	.61
4	.35	5.5	6.3	13.5	8.0	4.0	a2.4	1.65	.69	.41	.47	2.5
5	.30	4.7	7.6	12.5	7.1	3.55	2.3	1.41	.69	.41	.54	1.17
6	105	4.5	5.2	45	5.7	3.35	2.45	1.29	.69	.47	.41	.77
7	15.1	4.2	5.7	21.5	5.5	3.35	2.3	1.70	.69	.61	.30	.54
8	109	3.55	4.5	17.0	5.2	4.8	2.1	1.80	.69	.61	.30	.47
9	25	3.35	4.0	12.2	5.5	3.35	1.96	13.4	.54	.87	.35	.47
10	7.7	3.35	13.8	8.4	11.5	3.15	1.96	2.3	.61	.54	.21	.41
11	93	3.55	13.3	10.0	6.1	3.0	1.96	1.53	.69	.41	.21	.59
12	33.5	3.15	34.5	7.0	4.5	a8.0	2.1	1.29	.61	.35	.17	2.05
13	24	2.8	8.2	6.3	4.2	4.3	2.8	1.17	.47	.35	.17	.54
14	12.5	2.6	6.1	10.9	4.0	7.7	3.0	1.17	.47	.35	.14	.47
15	9.9	2.6	29	6.0	3.8	4.0	2.1	1.05	.47	.35	.14	.35
16	12.9	2.45	7.0	8.1	4.9	71	1.65	1.05	.61	.35	.14	.41
17	8.7	2.3	7.5	5.2	5.0	9.6	1.53	1.05	.61	.54	.21	.41
18	6.7	6.9	9.8	5.2	3.35	6.7	1.53	1.05	.47	.61	.25	1.88
19	5.5	5.3	6.7	15.4	3.15	5.2	1.41	.96	.54	.35	.17	1.33
20	4.7	17.8	6.8	14.2	3.0	4.5	1.41	.96	.47	.35	1.72	.54
21	4.0	4.9	9.3	5.5	3.0	4.2	1.29	.96	.47	.41	.61	.41
22	3.8	11.9	46	121	3.15	a3.5	1.29	.77	.54	.41	.35	.35
23	3.35	4.7	20.5	20	3.35	a3.3	1.41	.87	.54	.41	.41	.35
24	3.15	4.2	11.2	17.2	2.8	a3.2	1.41	.87	.47	.47	.41	.41
25	2.8	59	11.5	23.5	2.6	a3.0	1.41	1.05	.47	.41	.35	1.20
26	21	10.6	28.5	*9.9	2.6	a2.9	1.65	.87	.47	.47	1.79	4.9
27	4.3	6.7	25.5	98	8.8	a2.8	1.41	.77	1.17	.69	.96	1.17
28	3.0	5.2	236	46	48	a2.7	1.29	.69	1.65	.54	.54	.69
29	88	4.2	*223	33	21	a2.7	1.29	.69	1.06	.69	.74	.54
30	14.6	35	26.5	15.7	9.3	a2.6	1.17	-----	.54	.54	5.0	.54
31	47	6.4	-----	13.3	-----	a2.5	1.41	-----	.47	-----	1.53	-----
Total	670.91	260.20	890.8	723.9	222.50	203.65	59.59	46.72	20.01	14.32	19.70	27.55
Mean	21.5	8.39	29.7	23.4	7.42	6.57	1.92	1.61	0.645	0.477	0.635	0.918
Ac-ft	1,330	516	1,770	1,440	441	404	118	93	40	28	39	55

Calendar year 1955: Max 236 Min 0.30 Mean 8.84 Ac-ft 6,410
 Fiscal year 1955-56: Max 236 Min 0.14 Mean 8.63 Ac-ft 6,270

Peak discharge (base, 1,200 cfs)--Sept. 29 (1:30 a.m.) 1,540 cfs (12.27 ft).

* Discharge measurement made on this day.
 a Doubtful or no gage-height record; discharge estimated on basis of range in stage and records for Ylig River.

Lonfit River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.77	a5.5	5.2	7.0	5.0	12.1	4.0	1.80	0.96	0.54	0.47	0.25
2	.77	4.0	4.6	5.5	4.7	20	3.8	1.65	.96	.87	.41	.30
3	.93	3.15	14.7	5.2	21	10.8	4.0	1.65	.87	1.50	.35	.17
4	.87	2.8	14.6	5.2	5.2	8.7	3.55	1.96	.96	.69	.41	.17
5	.61	2.9	17.0	4.7	4.5	7.0	3.35	2.3	1.41	.54	.47	.14
6	.47	3.4	8.7	31	4.0	7.9	3.35	1.80	1.05	.47	.41	.17
7	.41	4.3	12.6	6.0	5.8	6.0	3.15	1.80	.96	.47	.54	.17
8	.35	20.5	14.5	25.5	4.0	5.5	3.0	2.3	.96	.47	.61	.30
9	21	16.3	11.8	10.4	3.8	5.0	2.8	1.80	.96	.87	.41	.47
10	2.55	5.7	11.0	15.2	4.0	5.0	20.5	1.65	.96	.54	.35	.30
11	1.29	4.5	66	53	3.8	4.7	3.55	1.65	.96	.47	.30	.21
12	1.05	4.6	22	46	136	4.5	3.15	1.53	1.53	.41	.25	.25
13	.87	3.55	17.5	14.3	88	4.2	3.0	1.53	1.05	.41	.25	.21
14	1.05	3.0	11.2	14.5	*32.5	148	2.8	1.29	.96	.47	.25	.17
15	1.17	5.6	a95	9.4	9.1	172	2.6	1.17	.87	.61	.25	.17
16	1.04	3.35	a15	15.4	41	13.7	2.45	1.05	.87	.54	.25	.11
17	.77	3.3	a20	100	34	9.4	4.1	1.05	.87	.47	.21	.09
18	.77	3.15	a10	39	152	8.0	2.6	1.05	.87	.47	.69	.09
19	.77	4.6	a12	48	27.5	7.0	2.45	1.41	.87	.41	.47	.21
20	.69	3.5	*a22	13.1	19.4	6.3	4.8	1.29	1.05	.47	.30	.61
21	.77	2.45	13.6	77	24	5.7	3.0	1.05	1.05	.54	.25	1.05
22	.96	2.6	9.4	14.0	23	5.2	2.45	1.05	.96	.47	.25	.41
23	.87	*14.6	11.9	12.1	17.6	5.0	2.3	1.29	.77	.41	.20	.25
24	1.87	4.5	23	9.4	12.2	4.5	2.1	2.2	.69	.54	.17	.25
25	28.5	3.35	9.9	8.4	10.3	7.0	1.96	1.53	.77	.47	.21	.30
26	*12.5	3.0	8.0	9.8	9.9	14.9	1.96	1.05	.77	.41	.30	.30
27	6.9	6.0	65	7.0	8.0	10.2	1.80	1.05	.77	.41	.25	.17
28	16.7	9.6	16.1	15.6	7.4	5.5	1.80	.96	.69	.54	.21	.14
29	31	5.0	9.1	6.3	9.0	4.7	3.55	-	.61	.54	.21	.11
30	a28	6.7	8.4	6.0	7.0	4.7	2.1	-----	.54	.47	.17	.11
31	a9.0	5.0	-----	7.7	-----	4.5	1.96	-----	.54	-----	.21	-----
Total	175.27	170.50	621.2	641.7	733.7	537.7	107.98	41.91	28.11	16.49	10.08	7.65
Mean	5.65	5.50	20.7	20.7	24.5	17.3	3.48	1.50	0.907	0.550	0.325	0.255
Ac-ft	348	338	1,230	1,270	1,460	1,070	214	83	56	33	20	15

Calendar year 1956: Max 172 Min 0.14 Mean 8.38 Ac-ft 6,090
 Fiscal year 1956-57: Max 172 Min 0.09 Mean 8.47 Ac-ft 6,140

Peak discharge (base, 1,200 cfs),--Nov. 12 (11:30 p.m.) 1,200 cfs (9.85 ft); Nov. 18 (1 a.m.) 1,240 cfs (10.06 ft); Dec. 15 (8 a.m.) 1,460 cfs (11.74 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of records for Pago River.

Lonfit River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.17	0.11	<u>31</u>	*4.5	14.6	5.0	1.96	2.45	1.17	0.47	0.30	1.73
2	.17	*.09	<u>29.5</u>	4.0	12.6	5.2	1.96	2.3	1.17	.54	.30	.54
3	.14	.09	11.6	3.8	10.8	4.7	1.65	2.3	1.05	.54	.25	.41
4	.17	.11	6.7	<u>3.35</u>	9.9	4.2	<u>1.53</u>	1.96	1.05	.47	.25	.35
5	.30	.21	4.5	<u>10.3</u>	9.1	4.0	<u>1.65</u>	1.80	*1.29	.47	.35	.30
6	.25	.35	17.7	169	8.4	3.8	1.53	1.65	1.17	.47	.25	<u>.21</u>
7	.21	.14	24.5	167	8.0	3.8	1.65	1.65	1.17	.54	.21	<u>.54</u>
8	.14	.21	11.0	*37.5	53	3.35	1.65	1.80	<u>1.41</u>	.47	.21	.54
9	.09	.30	11.6	35.5	88	3.35	1.96	1.65	<u>1.17</u>	.47	.21	1.43
10	.11	.21	6.7	16.8	45	3.15	1.53	1.80	1.05	.69	.21	10.6
11	.54	.14	6.3	32	23	3.15	1.65	1.80	1.05	.61	.17	*6.8
12	.87	.14	*5.6	a66	100	3.0	1.65	1.65	1.05	.54	.17	2.45
13	<u>1.01</u>	.52	6.8	a23	*26	3.0	*2.6	1.53	.96	.87	.17	19.6
14	.30	.87	6.0	a21	15.1	3.0	a140	1.65	.96	.69	.17	<u>123</u>
15	.21	.61	5.0	a40	<u>346</u>	3.0	a12	1.65	.96	.61	.17	<u>20</u>
16	.17	*.25	6.0	a36	283	3.0	a6.0	1.53	.77	.54	.21	9.6
17	.14	.21	5.0	a22	a35	2.6	4.0	1.53	.69	<u>.99</u>	.17	5.7
18	.14	10.3	4.0	a13	a21	2.45	3.35	1.96	.77	.87	<u>.14</u>	4.2
19	.11	*1.87	*4.0	a12	16.3	2.45	4.2	2.1	.77	.54	<u>.14</u>	3.35
20	.25	.77	3.35	a9.0	13.1	2.3	6.2	1.41	.69	.47	.21	3.0
21	.35	1.46	<u>3.15</u>	a9.5	11.2	2.7	3.8	1.17	.69	.61	.30	2.8
22	.17	1.80	9.2	a76	9.9	2.45	3.15	1.17	.69	.46	*.35	5.6
23	.14	3.05	*15.6	a21	8.7	2.3	2.8	1.17	.69	<u>.30</u>	.87	3.35
24	.11	9.9	13.1	*a13	8.0	2.1	2.6	<u>3.35</u>	.87	<u>.30</u>	.41	3.15
25	.06	7.9	7.9	16.0	7.4	1.96	2.45	<u>1.53</u>	.77	.30	.25	3.35
26	.05	4.8	5.5	15.2	6.7	1.80	2.3	1.17	.67	.30	.21	3.5
27	<u>.03</u>	2.1	5.2	33	8.4	<u>1.65</u>	2.6	1.17	.67	.35	.17	3.55
28	.43	89	4.7	<u>230</u>	6.9	<u>1.96</u>	2.3	<u>1.05</u>	.61	.30	.35	3.15
29	.41	<u>34.5</u>	4.2	<u>22.5</u>	7.8	<u>9.2</u>	2.1	-	.61	.30	<u>3.95</u>	2.45
30	.21	10.5	5.7	16.3	<u>5.5</u>	<u>2.6</u>	2.1	-----	.69	.30	<u>.96</u>	2.45
31	.14	5.5	-----	18.8	-----	2.1	2.1	-----	<u>.54</u>	-----	.69	-----
Total	7.59	188.01	281.10	1,197.05	1,218.4	99.32	227.02	47.95	27.87	15.38	12.77	247.70
Mean	0.245	6.06	9.37	38.6	40.6	3.20	7.32	1.71	0.899	0.513	0.412	8.26
Ac-ft	15	373	558	2,370	2,420	197	450	95	55	31	25	491

Calendar year 1957: Max 346 Min 0.03 Mean 8.78 Ac-ft 6,350
 Fiscal year 1957-58: Max 346 Min 0.03 Mean 9.78 Ac-ft 7,080

Peak discharge (base, 1,200 cfs).--Oct. 28 (6 a.m.) 2,070 cfs (15.79 ft); Nov. 15 (10:30 p.m.) 1,430 cfs (11.49 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of records for Pago River.

Pago River near Ordot

Location.--Lat 13°26'10" N., long 144°45'15" E., on left bank three-quarters of a mile south of Ordot, 2.5 miles south of Agana, and 3.6 miles southeast of Asan.

Drainage area.--6.2 sq mi.

Records available.--September 1951 to June 1958.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 25 ft (by barometer).

Average discharge.--6 years (1952-58), 22.6 cfs.

Extremes.--Maximum and minimum discharges for the fiscal years 1952-58 are contained in the following table:

Fiscal year	Maximum			Minimum		
	Date	Discharge (cfs)*	Gage height (feet)	Date	Discharge (cfs)	Gage height (feet)
1952†	Oct. 12, 1951	2,390	9.62	June 13, 30, 1952	††0.35	-
1953	Sept. 8, 1952	2,530	**10.0	May 29, June 14-16, 26, 27, 1953	††.45	-
1954	Oct. 15, 1953	5,310	16.76	June 4, 1954	.16	0.09
1955	Sept. 1, 1954	3,790	13.37	May 25-27, 30, 31, June 1, 4, 5, 1955	.41	.13
1956	Sept. 29, 1955	3,710	13.22	May 15-17, 1956	.34	.12
1957	Oct. 17, 1956	4,500	15.01	June 29, 30, 1957	.12	.08
1958	Oct. 28, 1957	5,000	16.13	July 26, 27, 1957	††.10	-

† Period September to June.

* From rating curve extended above 190 cfs on basis of slope-area measurements at gage heights 13.22 and 15.01 ft.

†† Minimum daily.

** From floodmark.

1951-58: Maximum discharge, 5,310 cfs Oct. 15, 1953 (gage height, 16.76 ft), from rating curve extended above 190 cfs on basis of slope-area measurements at gage heights 13.22 and 15.01 ft; minimum daily, 0.10 cfs July 26, 27, 1957.

Remarks.--Records poor for 1951-52; fair for 1952-53, except those for periods of doubtful or no gage-height record, which are poor; good for 1953-54, except those for periods of shifting control and no gage-height record, which are poor; good for 1954-56, except those for periods of doubtful or no gage-height record, which are fair; good for 1956-58 except those for periods of indefinite stage-discharge relation, fragmentary, doubtful, or no gage-height record, which are poor.

Pago River near Ordot--Continued

Rating tables, Sept. 27, 1951, to June 30, 1958, except periods of shifting control and indefinite stage-discharge relation (gage height, in feet, and discharge, in cubic feet per second)

Sept. 27, 1951, to Mar. 15, 1954				Mar. 16, 1954, to June 30, 1958			
0.1	0.32	1.1	53	0.1	0.21	1.0	60
.2	1.32	1.3	100	.2	1.17	1.2	110
.3	3.05	1.5	145	.3	3.2	1.4	160
.4	5.6	2.5	333	.4	6.4	1.7	205
.5	9.0	4.0	671	.5	11.0	2.0	256
.6	13.2	6.0	1,210	.6	17.3	3.0	455
.7	18.2	8.0	1,830	.8	35	4.0	681
.9	31.2	11.0	2,880				

Discharge, in cubic feet per second, September 1951 to June 1952

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			-	6.2	f220	39.5	5.3	2.1	1.2	1.2	0.60	0.70
2			-	5.9	25	16.0	5.3	2.65	1.3	1.2	.60	.50
3			-	5.0	40	12.4	5.0	2.85	1.2	1.2	.70	.40
4			-	13.5	f440	10.3	5.0	2.45	1.1	1.7	1.3	.50
5			-	35.5	39.5	10.3	5.0	*2.1	*1.8	1.7	1.5	.70
6			-	10.1	29	100	4.7	1.94	1.8	1.7	2.2	*.90
7			-	9.5	29	19.4	4.2	2.1	1.2	1.5	5.0	.90
8			-	240	21.5	13.7	*4.1	2.1	1.2	1.9	1.6	.60
9			-	160	18.8	16.9	4.2	1.94	1.2	2.3	.90	.60
10			-	74	17.2	18.0	4.2	2.25	1.1	*1.3	.80	.50
11			-	29	16.7	19.6	3.7	1.94	1.0	.90	.90	.50
12			-	242	26.5	11.9	3.7	1.78	1.2	1.1	.90	.40
13			-	f277	14.7	10.7	3.5	1.6	1.1	.80	.90	.35
14			-	48	13.2	9.8	3.25	1.6	1.1	.80	.80	.40
15			-	31	12.8	9.8	4.1	1.5	1.5	.80	.90	3.0
16			-	27	11.9	14.1	4.5	1.5	1.5	.80	.90	1.1
17			-	22.5	15.4	82	3.5	1.5	1.5	.70	.90	.70
18			-	18.8	48	14.7	12.4	1.5	1.3	.70	.90	.60
19			-	16.7	45	11.9	4.2	1.5	1.2	.90	1.2	.50
20			-	17.5	14.2	10.7	3.7	1.7	1.3	1.1	1.1	.40
21			-	15.7	11.3	9.8	3.25	1.9	1.5	.80	.62	.50
22			-	13.2	9.8	9.4	3.25	1.9	1.3	.80	.60	.50
23			-	19.9	8.6	8.6	3.2	1.6	1.2	.60	.50	.60
24			-	31	9.0	7.6	2.85	1.3	1.2	.70	.50	.80
25			-	13.7	10.2	6.9	2.85	1.3	1.2	.60	.50	.60
26			†8.5	13.2	9.0	6.5	2.65	1.2	2.0	.60	.50	.60
27			6.2	14.2	17.2	6.2	2.65	1.2	1.3	.90	.50	.70
28			5.9	11.5	55	7.2	2.65	1.9	1.5	1.1	.60	.60
29			5.9	10.7	12.9	5.9	3.5	1.9	2.6	.80	.80	.50
30			6.6	9.8	9.8	5.6	2.65	-----	1.6	.60	1.3	.35
31			-----	9.8	-----	5.3	2.1	-----	1.2	-----	.70	-----
Total			-	1,451.9	1,251.2	530.7	125.15	52.80	42.4	31.60	31.72	20.00
Mean			-	46.8	41.7	17.1	4.04	1.82	1.37	1.05	1.02	0.667
Ac-ft			-	2,880	2,480	1,050	248	105	84	63	63	40

Calendar year : Max Min Mean Ac-ft
Fiscal year : Max Min Mean Ac-ft

* Discharge measurement made on this day.

† Result of discharge measurement.

f Fragmentary gage-height record; discharge computed from partly estimated gage heights.

Note.--Stage-discharge relation indefinite Feb. 13 to June 30; discharge estimated on basis of records for Lonfit River.

Pago River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1952 to June 1953

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.0	13.7	18.2	35.5	33	22	17	3.5	11	2.6	1.2	0.72
2	2.15	24	17.7	150	27	14.2	21	3.25	10	2.2	1.2	*.76
3	1.07	55	14.7	38.5	25	13.2	10	3.05	9.0	2.2	1.2	.64
4	34.5	81	13.2	130	24	13.2	9.0	3.5	11	2.2	1.0	.64
5	6.7	38	11.9	50	160	12.4	22	3.05	9.0	2.2	1.0	.64
6	4.5	32	10.3	35	40	13.9	12	3.5	7.0	2.2	1.0	.64
7	7.5	16.2	9.0	55	70	44	9.5	13.2	6.2	2.2	*.90	.64
8	3.05	11.5	180	28	240	14.2	8.2	5.3	6.1	1.9	.80	.55
9	1.94	19.2	70	47	110	14.2	7.6	3.7	5.8	1.9	.68	.55
10	1.62	17.7	109	45	80	13.2	7.2	3.5	5.5	1.9	.68	.50
11	1.47	20.5	29	42	40	13.2	7.0	*3.25	5.2	1.9	.68	.55
12	1.07	39	57	28	30	11.9	6.6	4.5	4.8	1.9	.68	.50
13	.74	16.7	300	30	25	11.1	6.4	3.7	4.5	1.9	.68	.50
14	d.85	13.2	85	55	*24	11.9	6.4	3.25	4.2	1.9	.68	.45
15	d.95	15.1	30	32	21.5	9.8	5.8	3.05	4.0	1.9	.68	.45
16	2.7	13.4	94	28	63	9.4	5.6	3.0	4.0	1.9	.86	.45
17	.95	9.8	*32.5	150	d35	8.6	5.4	3.0	3.5	1.9	.86	.50
18	.88	8.3	30	200	d22	8.6	5.2	2.8	4.0	1.9	1.8	.50
19	1.40	7.2	24	40	d20	*8.3	4.9	2.6	3.6	1.9	.85	.80
20	d.87	8.3	20	30	61	7.9	4.7	3.4	3.2	1.9	.85	.70
21	d.87	6.5	17.2	90	d24	7.9	*4.7	2.6	3.2	1.7	.74	.62
22	1.07	5.6	15.2	300	d27	7.6	4.5	600	3.0	1.7	.65	.55
23	d1.0	39.5	43	45	d120	50	4.7	110	3.0	1.6	.65	.64
24	d.90	9.8	42	70	29	8.6	5.3	30	2.8	1.5	.65	.64
25	d1.0	8.3	19.4	40	26	40	4.5	20	2.8	1.5	.72	.54
26	d.85	8.3	15.7	35	19.4	11.5	3.95	16	2.6	1.5	.55	.45
27	d.85	6.9	15.2	28	16.7	12.4	3.95	14	2.6	1.3	.55	.45
28	d1.0	10.4	41	24	16.7	9.0	3.95	12	2.6	1.2	.50	1.0
29	3.5	16.2	165	22	42	11.5	3.7	-	2.6	1.2	.45	1.9
30	1.62	16.9	73	200	15.7	8.6	4.5	-----	2.6	1.2	.72	.75
31	2.25	32.5	-----	50	-----	82	3.95	-----	2.6	-----	.95	-----
Total	93.82	620.7	1,602.2	2,153.0	1,487.0	524.3	229.20	882.70	152.0	54.9	25.41	19.22
Mean	3.03	20.0	53.4	69.5	49.6	16.9	7.39	31.5	4.90	1.83	0.820	0.641
Ac-ft	186	1,230	3,180	4,270	2,950	1,040	455	1,750	301	109	50	38

Calendar year 1952 : Max 300 Min 0.35 Mean 18.5 Ac-ft 13,460
 Fiscal year 1952-53 : Max 600 Min 0.45 Mean 21.5 Ac-ft 15,560

Peak discharge (base, 2,400 cfs).--Sept. 8 (8:30 p.m.) 2,530 cfs (10.0 ft).

* Discharge measurement made on this day.
 d Doubtful gage-height record; discharge estimated on basis of Ylig and Lonfit Rivers.
 Note --No gage-height record Sept. 8, 13, Oct. 4 to Nov. 13, Jan. 1-21, Feb. 16 to June 30; discharge estimated on basis of Ylig and Lonfit Rivers.

Pago River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1953 to June 1954

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.60	1.7	44	*25	11	30	8.0	4.9	3.1	1.84	2.0	0.49
2	.50	1.9	51	22	9.2	23	7.7	4.9	2.8	1.50	1.0	.41
3	.60	2.3	33	18.8	9.2	20	7.3	4.6	2.8	1.67	.62	.27
4	.80	1.7	28	17.2	9.2	20	7.0	4.6	2.6	1.67	.72	.21
5	1.4	2.0	24.5	15.2	8.5	17	*6.7	4.2	2.3	1.50	.62	.27
6	1.0	5.0	21.5	14.2	8.5	16	6.5	4.2	2.1	1.67	*.62	.79
7	.70	*2.2	18.8	28.5	7.5	15	6.4	4.2	2.1	2.7	.49	.91
8	.60	36	17.2	15.7	7.0	14	6.2	4.2	2.1	2.05	.49	*1.04
9	.40	7.4	15.7	27.5	7.0	13	600	4.2	2.1	2.05	.49	1.50
10	.47	148	14.7	13.7	30	15	80	4.2	1.9	1.67	.49	1.17
11	.62	890	15.2	12.8	18	13	25	3.9	1.9	1.33	.58	.68
12	*.74	438	14.2	13.2	250	12	19	3.9	1.9	1.33	.91	.58
13	1.3	60	12.8	12.4	700	12	17	3.9	1.9	1.33	.91	.68
14	6.0	34.5	11.9	13.7	95	30	15	3.6	1.9	1.50	.68	.68
15	8.0	48	*12.0	2,540	45	24	13	3.4	*1.9	1.50	.79	.58
16	14	150	10.3	1,350	30	54	12	3.4	1.84	1.17	1.01	.58
17	14	75	8.6	230	*25	45	10	3.1	1.84	1.17	.58	.58
18	8.0	400	15.9	120	21	23	9.5	3.1	2.05	1.17	.58	.49
19	4.0	70	62	70	20	18	8.5	3.1	1.84	1.33	.58	.49
20	2.8	35	54	150	16	15	8.0	3.1	1.84	1.33	.58	.68
21	2.6	25	140	55	16	14	8.0	3.3	2.25	1.33	.49	.41
22	2.4	24.5	70	35	16	19	8.0	3.1	1.84	1.04	.41	3.4
23	2.1	21.5	30	28	14	15	7.0	3.1	1.67	1.04	.41	3.25
24	2.0	96	25	24	300	14	6.5	2.8	1.84	.91	1.04	1.33
25	2.5	38.5	100	21	90	12	6.5	2.6	1.84	.91	.91	1.84
26	5.1	28	70	18	35	11	6.5	2.6	1.84	.91	.68	1.50
27	5.0	22.5	35	15	23	10	6.0	2.6	1.67	1.04	.49	1.04
28	4.2	378	40	15	20	10	6.0	2.8	1.50	1.04	.41	.79
29	2.9	199	75	15	18	9.5	5.5	-	1.33	1.04	.41	.79
30	2.1	175	30	14	50	9.0	5.0	-----	1.33	1.04	.41	.68
31	1.9	71	-----	11	-----	8.5	5.0	-----	1.33	-----	.49	-----
Total	99.33	3,487.7	1,100.3	960.9	1,909.1	561.0	942.8	101.6	61.25	41.78	20.89	28.11
Mean	3.20	113	36.7	160	63.6	18.1	30.4	3.63	1.98	1.39	0.674	0.937
Ac-ft	197	6,920	2,180	9,340	3,790	1,110	1,870	202	121	83	41	56

Calendar year 1953: Max 2,540 Min 0.40 Mean 36.9 Ac-ft 26,740
 Fiscal year 1953-54: Max 2,540 Min 0.21 Mean 36.5 Ac-ft 26,410

Peak discharge (base, 2,400 cfs).--Aug. 11 (6 p.m.) 3,120 cfs (11.69 ft); Oct. 15 (4:30 a.m.) 5,310 cfs (16.76 ft); Nov. 24 (5:30 a.m.) 4,460 cfs (14.92 ft); Jan. 9 (1 p.m.) 3,120 cfs (11.67 ft).

* Discharge measurement made on this day.
 Note.--Shifting-control method used Aug. 8-15, Aug. 22 to Sept. 20, Oct. 2-16, 1953. No gage-height record July 1 to Aug. 7, Aug. 16-21, Sept. 21 to Oct. 1, Oct. 17 to Mar. 15, Apr. 30 to May 6; discharge estimated on basis of records for nearby stations.

Pago River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1954 to June 1955

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.04	1.84	367	58	*37	40	4.6	4.9	2.7	1.33	1.67	0.49
2	2.7	1.50	58	34	21.5	17.1	4.6	4.6	2.45	1.50	.91	1.04
3	1.67	1.33	43	33	17.3	17.5	7.3	4.9	2.25	1.50	.68	.79
4	1.17	1.33	73	24.5	15.8	14.0	11.8	5.3	2.25	1.50	.68	.49
5	1.67	2.25	50	33.5	14.6	12.8	11.6	4.3	2.45	1.17	.68	.58
6	1.33	8.2	89	24	18.5	12.2	6.0	4.0	2.05	1.04	.58	.91
7	2.4	8.5	54	*19.2	12.8	12.2	5.3	4.0	2.05	1.17	.58	1.33
8	1.33	3.7	99	29.5	11.0	12.2	11.3	3.7	2.05	1.17	1.04	1.04
9	1.78	18.0	104	22.5	10.5	12.0	6.0	3.7	2.05	1.33	3.55	18.3
10	2.25	4.0	63	17.3	10.5	14.7	8.1	3.45	2.05	1.17	1.50	4.1
11	1.17	4.4	32.5	23.5	273	13.4	6.8	3.2	2.25	1.04	.79	2.05
12	.91	7.9	24	25.5	34	10.0	6.0	3.2	2.25	*1.04	.68	1.50
13	1.50	4.7	61	15.8	24	9.0	5.6	3.2	2.25	1.04	.68	*1.33
14	1.17	34.5	504	14.6	19.8	8.5	8.4	3.45	2.05	1.33	.79	1.17
15	.79	5.6	403	14.0	16.5	8.0	8.5	3.45	*1.84	1.17	4.4	1.04
16	.68	3.7	91	11.6	15.2	9.5	6.4	3.7	1.84	1.17	2.2	.91
17	.68	3.2	46	10.0	14.0	7.6	6.4	9.6	1.67	1.04	1.04	1.17
18	1.98	5.6	34	10.0	154	7.6	5.6	5.0	1.67	.91	.79	1.04
19	2.7	37.5	27.5	9.5	28.5	6.8	5.3	3.45	1.67	1.04	.68	.91
20	1.84	58	214	*8.5	32	6.4	6.9	3.2	1.67	1.33	.68	1.04
21	1.17	18.1	90	8.5	18.9	6.4	4.9	3.2	2.25	1.33	.68	1.04
22	1.04	8.5	177	9.5	48	6.4	4.6	3.45	2.45	1.04	.58	.91
23	.91	6.0	62	9.7	264	6.0	4.6	3.2	1.67	.79	.58	.79
24	1.04	66	42	9.0	*110	5.6	4.3	2.95	1.50	.79	.58	.68
25	1.17	184	32	7.8	37	5.6	22	2.95	1.50	.91	.49	.79
26	.91	45	68	17.8	32	5.3	15.8	2.7	1.67	.91	.49	.79
27	*.68	26	39	13.3	113	4.9	6.8	2.95	2.05	.79	.79	.79
28	.68	15.8	165	10.0	33.5	*4.9	*5.6	3.2	2.05	.68	.91	.68
29	.91	87	124	9.3	25.5	4.9	7.2	-	1.50	.79	.68	.79
30	1.17	*26.5	54	100	21.5	4.9	5.3	-----	1.50	.79	.58	1.50
31	1.17	15.8	-----	174	-----	4.6	4.9	-----	1.33	-----	.49	-----
Total	41.61	714.45	3,290.0	807.4	1,483.9	311.0	228.5	108.90	60.98	32.81	31.45	49.99
Mean	1.34	23.0	110	26.0	49.5	10.0	7.37	3.89	1.97	1.09	1.01	1.67
Ac-ft	83	1,420	6,530	1,600	2,940	617	453	216	121	65	62	99

Calendar year 1954: Max 600 Min 0.21 Mean 21.5 Ac-ft 15,560
 Fiscal year 1954-55: Max 504 Min 0.49 Mean 19.6 Ac-ft 14,210

Peak discharge (base, 2,400 cfs).--Sept. 1 (11 a.m.) 3,790 cfs (13.37 ft); Nov. 11 (3:30 p.m.) 3,090 cfs (11.58 ft); Nov. 23 (1 p.m.) 3,200 cfs (11.90 ft).

* Discharge measurement made on this day.

Pago River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1955 to June 1956

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.0	30.5	133	42	22	11	8.0	2.7	1.33	0.91	0.7	1.50
2	1.4	19.8	16.9	70	20.5	18	7.2	2.45	1.50	.91	.7	1.17
3	.9	15.2	13.9	113	18	11	6.8	2.95	1.50	.91	.8	1.04
4	.8	12.8	10.0	33	17	9.2	5.2	2.95	1.33	.79	1.0	2.5
5	*.7	10.5	11.4	29	15	8.2	*5.0	2.25	1.33	.79	1.1	1.67
6	240	10.0	8.0	103	13	7.6	5.3	2.05	1.17	.79	.8	1.04
7	32	10.0	12.7	43	12	7.6	4.9	2.7	1.33	.91	.7	.79
8	260	7.6	7.2	31	12	11	4.6	3.45	1.17	.91	.6	.79
9	60	*7.2	6.0	25	13	8.0	4.6	18.8	1.04	.79	.7	.68
10	18	7.2	17.1	18.1	25	7.3	4.3	4.3	1.17	.79	.5	.49
11	210	7.2	20	20	13	7.0	4.3	2.95	1.33	.68	.45	1.28
12	80	6.8	79	15.2	10	18	4.0	2.45	1.33	.68	.40	3.7
13	56	6.0	17.3	18.3	9.5	8.0	4.0	2.25	1.04	.68	.37	1.04
14	25.5	5.6	13.3	25.5	9.0	13	4.0	2.25	1.04	.68	.35	.79
15	19.9	5.6	44	16.0	8.5	7.5	3.7	*2.25	1.17	.68	.34	.68
16	37	6.0	13.4	16.7	10	191	3.7	2.45	1.33	.68	.34	.68
17	18.9	5.3	19.2	11.6	11	19.8	3.7	2.25	1.33	1.04	.49	.68
18	14.0	12.0	*21	11.6	8.0	13	4.0	2.25	1.04	1.17	.49	3.95
19	11.0	8.2	13.4	22	7.0	11	3.45	2.05	1.04	.79	.41	2.8
20	9.5	30.5	13.2	26.5	6.5	10	3.45	2.05	1.04	.7	3.3	1.04
21	8.5	8.7	14.1	12.2	6.7	9.2	2.95	1.84	1.04	.8	1.33	.79
22	8.5	17.5	112	241	7.0	8.2	2.95	1.84	1.04	.8	.68	.68
23	7.2	8.5	38.5	47	7.2	7.7	3.2	1.84	1.04	.8	.68	.68
24	6.8	10.2	23	31	6.5	7.3	2.95	1.84	.91	.9	.79	.79
25	6.4	132	24	62	5.8	7.0	2.7	2.45	.79	.8	*.68	3.6
26	26	21	65	*23.5	5.8	6.6	3.2	1.84	.79	.9	3.4	9.7
27	8.6	10	45	214	17	6.4	2.95	1.67	1.33	1.2	1.84	2.7
28	6.4	7.2	502	94	101	6.2	2.7	1.50	2.25	1.0	1.04	1.67
29	178	5.6	*533	63	34	5.9	2.7	1.50	*1.67	1.2	1.08	1.33
30	44	82	62	35.5	*18.3	5.7	2.45	-----	1.04	1.0	8.8	1.04
31	94	14.2	-----	30.5	-----	5.6	2.7	-----	1.04	-----	2.45	-----
Total	1,490.0	540.9	1,908.6	1,544.2	469.3	473.0	125.65	84.12	37.50	25.68	37.31	51.29
Mean	48.1	17.4	63.6	49.8	15.6	15.3	4.05	2.90	1.21	0.856	1.20	1.71
Ac-ft	2,960	1,070	3,790	3,060	931	936	249	167	74	51	74	102

Calendar year 1955: Max 533 Min 0.49 Mean 19.0 Ac-ft 13,760
 Fiscal year 1955-56: Max 533 Min 0.34 Mean 18.5 Ac-ft 13,470

Peak discharge (base, 2,400 cfs).--July 11 (3 p.m.) 2,640 cfs (10.30 ft); Sept. 29 (2 a.m.) 3,710 cfs (13.22 ft).

* Discharge measurement made on this day.
 Note.--Doubtful or no gage-height record July 1-13, Nov. 3-27, Dec. 1-15, Dec. 18 to Jan. 5, Apr. 20 to May 16; discharge estimated on basis of records for Lonfit and Ylig Rivers.

Pago River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1956 to June 1957

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.67	11.6	10.5	13.4	11.0	25.5	9.5	4.0	2.05	1.67	1.04	e0.58
2	1.50	8.5	102	11.6	10.0	58	*9.0	3.7	1.84	2.7	.91	e.66
3	1.67	7.2	32.5	10.0	45	32.5	9.5	3.7	1.84	3.95	.79	e.47
4	1.84	6.8	30.5	10.0	11.6	20.5	8.5	4.0	1.84	1.67	.91	e.47
5	1.33	6.8	37.5	10.0	9.5	17.3	8.5	4.3	2.7	1.33	.91	e.41
6	1.04	6.4	20.5	65	8.5	17.3	8.0	3.45	2.25	1.33	.79	e.47
7	.91	6.9	42	10.5	10.1	14.0	7.6	3.45	1.84	1.17	1.33	e.47
8	.79	29.5	39	40	8.0	12.8	7.2	4.8	1.84	1.17	1.67	e.70
9	55	27.5	28	19.6	7.6	11.6	7.9	3.45	2.05	1.84	1.33	e.90
10	6.0	10.0	15.8	19.2	10.3	11.0	4.9	3.2	1.84	1.50	1.04	e.60
11	3.45	8.0	123	112	8.0	10.5	7.6	2.95	2.45	1.33	.91	e.43
12	3.2	10.1	38	118	244	10.5	6.4	2.95	3.2	1.17	.79	e.50
13	2.7	7.2	30	32	135	*10.0	6.0	2.95	2.25	1.04	.79	e.43
14	2.95	6.8	22	28	59	363	5.6	*2.7	1.67	1.35	.79	e.34
15	2.7	15.7	197	18.1	18.9	406	5.3	2.7	1.67	1.50	.79	e.34
16	*2.25	7.6	28.5	28.5	77	34.5	5.3	2.45	1.67	1.04	.79	e.23
17	2.05	7.2	39.5	*365	58	24	9.9	2.45	1.67	1.04	.68	e.17
18	1.84	6.4	19.8	82	286	18.9	5.3	2.45	1.50	.91	1.50	e.17
19	2.05	23.5	23.5	118	52	17.3	5.3	3.2	1.67	.91	1.04	e.45
20	1.67	9.1	*44	31	*36	15.8	11.1	2.7	1.84	1.04	.79	e1.00
21	1.50	7.2	26.5	168	49	14.6	6.4	2.45	1.84	1.17	.68	1.33
22	1.33	7.6	19.8	33	40	12.8	4.9	2.45	1.50	1.04	.79	.58
23	1.33	39.5	29.5	29	*42	11.6	4.6	2.95	1.33	.91	*.58	.41
24	4.8	12.2	52	21.5	26.5	11.0	4.3	4.0	1.33	1.17	.49	.34
25	61	8.5	20.5	18.9	22	10.2	4.3	3.7	1.67	1.04	.58	.41
26	*30.5	7.6	15.8	24	22	35.5	4.3	2.7	1.84	.91	.68	.41
27	14.0	16.2	*159	15.8	17.3	21	4.0	2.25	*2.25	.91	.58	.27
28	31	23	28	33.5	15.8	12.2	4.0	2.25	1.84	1.17	e.49	.16
29	64	*13.4	17.3	14.0	18.9	11.0	8.2	-	1.50	1.17	e.49	.12
30	61	16.0	18.0	15.0	16.5	10.5	4.3	-----	1.33	1.04	e.45	.12
31	18.3	12.8	-----	20	-----	10.5	4.3	-----	1.33	-----	e.50	-----
Total	385.37	386.8	1,310.0	1,534.6	1,375.5	1,291.9	246.1	88.30	57.44	40.17	25.90	13.94
Mean	12.4	12.5	43.7	49.5	45.8	41.7	7.94	3.15	1.85	1.34	0.835	0.465
Ac-ft	764	767	2,600	3,040	2,730	2,560	488	175	114	80	51	28

Calendar year 1956: Max 406 Min 0.34 Mean 18.2 Ac-ft 13,180
 Fiscal year 1956-57: Max 406 Min 0.12 Mean 18.5 Ac-ft 13,400

Peak discharge (base, 2,400 cfs).--Oct. 17 (4:30 p.m.) 4,500 cfs (15.01 ft); Nov. 12 (12 p.m.) 2,840 cfs (10.90 ft); Nov. 18 (1 a.m.) 2,920 cfs (11.10 ft); Dec. 15 (8 a.m.) 3,510 cfs (12.69 ft).

* Discharge measurement made on this day.

e Stage-discharge relation indefinite; discharge estimated on basis of records for Lonfit River.

Pago River near Ordot--Continued

Discharge, in cubic feet per second, fiscal year July 1957 to June 1958

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.34	0.21	56	9.0	29.5	9.5	4.3	4.9	2.45	0.79	0.58	3.25
2	.34	.16	67	7.6	24	12.0	4.0	4.9	2.25	.91	.58	1.33
3	.28	.16	23.5	7.2	20.5	9.0	3.7	4.9	2.25	.91	.58	.91
4	.34	.16	13.4	6.4	18.1	8.3	3.7	4.0	2.45	.79	.68	.79
5	.40	.21	10.0	16.9	15.8	7.6	3.7	3.7	*2.45	.79	.79	.68
6	.38	.68	28	391	14.6	7.6	3.45	3.7	2.05	.79	.68	.58
7	.35	.41	47	333	13.4	7.6	3.7	3.7	2.05	.91	.49	1.17
8	.25	.68	21	78	107	6.8	3.7	3.7	2.7	.79	.49	1.17
9	*.18	.79	22.5	92	170	6.8	4.3	3.7	1.84	.68	.49	3.15
10	.34	.68	13.4	41	103	6.8	3.45	3.7	1.84	1.17	.41	22
11	1.04	.34	17.7	63	46	6.0	4.0	3.45	1.84	1.04	.49	13.4
12	1.33	.27	*13.4	150	191	6.4	3.7	3.2	1.84	.91	.41	4.9
13	1.84	.68	14.4	44	*53	6.4	*5.4	3.2	1.67	1.67	.41	42
14	.79	1.17	12.2	40	36	6.0	302	3.2	1.67	1.33	.41	257
15	.49	.68	10.0	79	821	6.0	25.5	2.95	1.67	1.04	*.34	38.5
16	.41	.49	13.5	66	680	6.0	12.8	2.7	1.50	1.04	.34	*18.8
17	.27	.41	10.5	41	81	5.3	9.5	2.95	1.50	2.05	.34	11.6
18	.27	f17	9.0	26.5	47	4.9	8.0	4.1	1.50	1.50	.27	8.5
19	.21	3.8	9.0	24	36	4.9	9.5	4.6	1.33	1.04	.27	7.2
20	.40	1.50	8.0	18.1	28.5	4.9	13.3	2.95	1.17	.91	.34	6.0
21	.55	2.8	6.8	18.9	24	5.3	9.0	2.95	1.17	1.17	.49	6.0
22	.40	4.0	15.1	156	19.8	4.6	7.6	2.7	1.17	.91	.58	9.1
23	.32	5.5	*32	41	17.3	4.3	6.8	2.95	1.17	.79	1.84	6.0
24	.21	19.7	22.5	*26.5	15.2	4.0	6.4	8.7	1.33	.68	1.04	6.0
25	.12	16.2	15.5	28	14.6	4.0	6.0	3.7	1.17	.68	.68	6.4
26	.10	7.9	11.6	28	14.0	3.7	5.6	2.95	1.17	.68	.49	6.8
27	.10	4.0	10.0	48	19.5	3.45	6.4	2.7	1.04	.68	.41	6.0
28	.92	193	9.0	557	13.3	4.0	5.6	2.45	.91	.68	.79	5.8
29	.91	62	8.0	48	15.8	20	5.3	-	.91	.79	9.6	4.3
30	.49	18.8	13.1	36	10.5	5.6	4.9	-----	1.04	.68	2.45	4.0
31	.34	10.0	-----	39.5	-----	4.3	4.9	-----	.91	-----	1.67	-----
Total	14.71	374.38	563.1	2,560.6	2,699.4	202.05	500.20	103.30	50.01	28.80	29.43	503.13
Mean	0.475	12.1	18.8	82.6	90.0	6.52	16.1	3.69	1.61	0.960	0.949	16.8
Ac-ft	29	743	1,120	5,080	5,350	401	992	205	99	57	56	998

Calendar year 1957: Max 821 Min 0.10 Mean 18.9 Ac-ft 13,660
 Fiscal year 1957-58: Max 821 Min 0.10 Mean 20.9 Ac-ft 15,130

Peak discharge (base, 2,400 cfs).--Oct. 6 (8:30 a.m.) 2,640 cfs (10.27 ft); Oct. 28 (5:30 a.m.) 5,000 cfs (16.13 ft); Nov. 15 (11 p.m.) 3,550 cfs (12.75 ft).

* Discharge measurement made on this day.
 f Fragmentary gage-height record; discharge computed on basis of partly estimated gage heights.
 Note.--Doubtful or no gage-height record July 1-9, 18-28; discharge estimated on basis of records for Lonfit River.

DISCHARGE MEASUREMENTS AT POINTS OTHER THAN GAGING STATIONS

Discharge measurements made at points other than gaging stations on the Island of Guam during the period February 1951 to June 1958

Stream	Tributary to	Location	Date	Discharge (cfs)
Agat River.....	Pacific Ocean....	Above falls, about 2 miles east of Agat.	1952 Jan. 12 Feb. 13 Mar. 26	0.43 .181 .280
Do.....	....do.....	At altitude 150 ft, at Agat.	1953 May 15 June 12	.341 .263
Springs.....	Unnamed stream...	1 mile south of Agat, above proposed FHA housing project.	1952 Sept.24	.153
Do.....	....do.....	1.25 miles south of Agat, above proposed FHA housing project.	1952 Sept.24	.747
Umatac River.....	Pacific Ocean....	50 ft above highway bridge, at Umatac.	1951 Oct. 2	2.21
Toguan River.....	....do.....	100 ft below highway bridge, near Umatac.	1951 Oct. 2	.309
Geus River.....	....do.....	At headwaters, above upper Merizo Dam, near Merizo.	1951 Oct. 2 1952 Oct. 27	.372 .108
Inarajan River...	....do.....	500 ft above highway bridge, at Inarajan.	1951 Oct. 2	3.88
Pauliluc River...	....do.....	200 ft above highway bridge, near Inarajan.	1951 Oct. 2	1.00
Asalonso River...	....do.....	100 ft below highway bridge, near Talofoyo.	1951 Oct. 2	.481
Maemong River....	Tolaeyuus River..	At cavern outlet, 100 ft above site of gaging station on Tolaeyuus River, near Agat.	1951 May 27	2.89
Tolaeyuus River..	Maagas River.....	At entrance to last cavern, $\frac{1}{2}$ mile below site of gaging station on Tolaeyuus River, near Agat.	1951 May 27	2.51
Maagas River.....	Talofoyo River...	At final cavern outlet at Lost River Pumping Station No. 1, near Agat.	1951 May 27 June 10	2.41 .484
Talofoyo River...	Pacific Ocean....	At site of gaging station, near Talofoyo.	1951 Feb. 1	32.2
Ugum River.....	Talofoyo River...	At site of gaging station, 0.7 mile above confluence with Talofoyo River, near Talofoyo.	1952 Feb. 12 Mar. 12	9.12 8.53
Sigua River.....	Pago River.....	500 ft above confluence with Pago River.	1952 Dec. 3	4.70
Pago River.....	Pacific Ocean....	At site of gaging station, near Yona.	1951 Feb. 2	8.87
Janum Springs....	....do.....	At outlet of cave, near Yigo.	1952 Mar. 27 Apr. 11 May 12 June 10 July 9 Aug. 6 Sept. 4 1953 Apr. 14 May 14 June 12	1.93 1.80 2.27 2.07 2.04 2.34 1.89 1.93 2.03 2.12

APPENDIX B

RECORDS OF WELLS, TUNNELS, AND SPRINGS

This appendix contains information on the sources of ground water in Guam that are shown on plate 1. The records were obtained from unpublished material compiled by H. T. Stearns in 1937 and A. M. Piper in 1946, from the files of military and civil agencies in Guam, and from field investigations.

The numbering system is based on one that was started by military forces during World War II and used by Piper in his compilation in 1946. Numbers 1 through 154 are assigned to wells, springs, and tunnels, and 201 to 216 are assigned to test holes. The unassigned block from 154 to 200 is left for new installations.

The figures in parenthesis immediately after each number indicate the location in the 1,000-meter Universal Transverse Mercator Grid on plate 1. Altitudes are approximate and indicate the height above the mean lower low water datum plane. The figure after the term "water level" gives the approximate height of the water level above the same datum. The diameter of a well is the diameter of the casing in the well at the surface of the ground. In tabulated figures, a dash indicates that no record is available.

- 1 (BQ482765) Almagosa (Chepak or Dobo) Springs. Water issues from three small caves in limestone at contact with underlying volcanic rock. Altitude, 700 ft. Chloride (ppm), Oct. 10, Nov. 8, Dec. 10, 1946, Jan. 16, 1947, 35. Water in excess of that diverted for military use is included in that measured at gaging station 10-2.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1951	-	-	-	-	-	-	-	-	-	-	69.11	65.65
1952	42.13	31.29	35.81	24.91	28.38	-	-	72.15	65.61	68.21	66.30	66.03
1953	58.58	41.48	50.09	27.83	24.87	19.96	31.51	41.92	-	44.44	68.74	77.50
1954	77.50	70.00	14.41	0.00	9.07	12.43	26.13	67.24	78.28	70.76	22.16	-

- 2 (BQ573893) Agana Spring. Water issues from argillaceous limestone. Altitude, 5 ft. Water flows into a small concrete reservoir. Use, municipal. Pumps first installed, 1914. Pumpage (mgd), 1937, 0.8; 1945, 1.5. Chloride, 20 to 35 ppm.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1951	-	-	-	-	-	-	-	-	-	-	73.83	75.83
1952	74.96	59.66	54.31	49.31	48.61	-	-	54.09	58.14	66.66	70.48	75.64
1953	59.40	56.84	64.02	52.34	45.82	38.73	44.19	61.67	-	68.32	79.84	80.42
1954	60.70	61.30	57.20	53.37	60.31	29.02	59.05	55.41	53.55	40.52	27.58	27.00
1955	27.50	46.07	24.32	23.34	17.43	19.46	20.31	38.41	22.16	18.68	18.67	19.41
1956	21.04	19.62	23.78	27.82	25.44	24.21	19.21	19.77	21.24	20.44	18.98	21.04
1957	30.56	17.62	17.23	23.17	21.31	-	-	-	-	-	-	-

3 (BQ529902) Asan Spring. Water issues from the limestone at contact with underlying volcanic rock. Altitude, 140 ft. Use, municipal supply for Asan. Pumps first installed, 1915. Pumpage (mgd), 1937, 0.80; Jan. 1946, 0.14; Nov. 1955, 0.56; Dec. 1955, 0.78; Jan. 1956, 0.49. Chloride, 16 to 35 ppm.

4 (BQ479808) Santa Rita Spring. Water issues from limestone at contact with underlying volcanic rock. Altitude, 284 ft. Reported minimum flow, 100,000 gpd. Water flows into a 100,000-gallon reservoir. Use, municipal supply for lower Santa Rita and old Agat.

5 (BQ468843) Orote well (5th Field Depot, Orote well 5). Aquifer, coral and sand. Drilled, 1944 by 5th N.C.B. Altitude, 40 ft. Depth, 63 ft. Diameter, 6 in. Casing, 57 ft. Pumping rate in 1945, 65 gpm. Pumpage, Sept. 1945 to Oct. 1946, 18,000-20,000 gpd. Reported abandoned because of high salinity.

Driller's log

	Depth (ft)
Coral, quartzlike - - - - -	0-15
Coral, broken - - - - -	15-45
Sand - - - - -	45-50
Coral, quartzlike - - - - -	50-53
Coral and fine sand - - - - -	53-60
Lower 3 ft. plugged with cement	

6 (BQ633902) Barrigada School well. Aquifer, limestone and sand. Drilled, May 1937 by U. S. Navy. Altitude, 294 ft. Depth, 350 ft. Diameter, 6 in. Water level, +4 ft. Chloride (ppm), May 15, 1937, 32; Jan. 16, 1947, 35.

Driller's log

	<u>Depth</u> (ft)
Soil, and colored loose reef limestone - - - - -	0-6
Limestone, hard but not dense - - - - -	6-10
Limestone, white, dense - - - - -	10-36
Limestone, porous, loose - - - - -	36-46
Limestone, alternating hard and soft - - - - -	46-101
Limestone, soft - - - - -	101-138
Limestone, soft, with marine sand - - - - -	138-240
Limestone, soft, sandy - - - - -	240-270
Sand (marine), small rocks and reef limestone - - -	270-350
Encountered water at 291 feet.	

7 (BQ612900) 72nd N.C.B. well 1. Aquifer, limestone. Drilled, 1944 by 72nd N.C.B. Altitude, 220 ft. Depth, 238 ft. Diameter, 8 in. Casing, 226 ft.; bottom 10 ft. perforated. Water level, +6 ft. Pumping rate, 33 gpm. Pumpage, Sept. 1944, 23,000 gpd. Chloride (ppm), Sept. 7, 1944, 218; Oct. 2, 1946, 360; Nov. 8, 1946, 530; Jan. 16, 1947, 708.

Driller's log

	<u>Depth</u> (ft)
Clay, yellow - - - - -	0-28
Coral, firm - - - - -	28-120
Coral, broken - - - - -	120-130
Coral, firm, hard - - - - -	130-238

8 (BQ601908) Tiyan well. Aquifer, limestone. Drilled, 1944(?). Depth, 230 ft. Pumpage, Sept. 8, 1944, 25,000 gals. at a rate of 25 gpm; Nov. 25, 1944, 12,000 gals. at a rate of 8.5 gpm. Chloride, Sept. 8 and Nov. 25, 1944, 26 ppm.

9 (BQ634952) Dededo (Harmon) well. Aquifer, limestone. Drilled, June 1937 by U. S. Navy. Altitude, 202 ft. Depth, 222 ft. Diameter, 6 in. Casing, 247 ft.; bottom few feet perforated. Water level, +2 ft. Pumpage, Aug. 1944, 35,000 gpd at a rate of 25 gpm; July 1, 1945 to Mar. 17, 1946, 82,800 gpd at a rate of 60 gpm. Chloride (ppm), June 8, 1937, 57; July 1, 1945 to Mar. 17, 1946, 71.

Driller's log

	<u>Depth</u> (ft)
Limestone (reef), finely divided - - - - -	0-54
Limestone, soft, with hard layers - - - - -	54-103
Limestone, soft, with very hard layers of dense white limestone from 199 to 208 feet - - - - -	103-222

- 10 (BQ619943) Tumon School well. Aquifer, coralline limestone and sand. Dug, Dec. 1937 by U. S. Navy. Altitude, 13 ft. Depth, 33 ft. Casing, 33 ft. Water level, +1 ft. Driller's log; beach sand, 0-14 ft.; coral and sand, 14-33 ft.

Observations

Date	Pumping rate (gpm)	Pumpage (thousand gallons)	Drawdown (ft)	Chloride (ppm)
Sept. 4, 1944	30	10	6	52
14	14	15	9	52
22	25	28	9	52
Nov. 24	25	28	14	47

- 11 (BQ622943) Army well 1. Aquifer, loose coral. Dug, 1944 by U. S. Army. Altitude, 14 ft. Depth, 19 ft. Diameter, 8 ft. by 14 ft. Water level, +2 ft. Drawdown, Sept. 14, 1944, 3 ft. while pumping at 25 gpm. Pumpage (gpd), Sept. 14, 1944, 20,000; 1946, 30,000. Chloride (ppm), Aug. 1945, 230; Jan. 1946, 175.
- 12 (BQ606921) N.A.S. Agana well 1 (N.A.B. Agana well 1). Aquifer, limestone. Drilled, 1944(?) by 72nd N.C.B. Altitude, 25 ft. Depth, 70 ft. Water level, +2 ft. Pumping rate, 30 gpm. Drawdown, 0.4 to 0.5 ft. at pumping rate of 30 gpm. Pumpage, Jan. 1946, 40,000 gpd. Chloride, Jan. 1946, 245 ppm.
- 13 (BQ594919) 56th N.C.B. well. Aquifer in coral and sand. Drilled, 1944 by 56th N.C.B. Altitude, 30 ft. Two 8-in. wells 17 ft. deep in bottom of a 15-ft. pit. Water level, +2 ft. Drawdown, 0.4 ft. while pumping 85 gpm. Pumpage, Mar. 1946, 86,000-100,000 gpd. Chloride (ppm), 1945, 484; Jan. 1946, 490; Mar. 1946, 500. Driller's log; dirt, 0-1 ft.; coral, 1-28 ft.; sand, 28-32 ft.
- 14 (BQ591915) Torres well 1. Aquifer, limestone. Dug many years ago. Depth, 10-15 ft. Diameter, 10 ft. Cased to bottom with masonry. Altitude, 11 ft. Water level, +3 ft. Pumpage, Sept. 1944, 30,000 gals. Chloride, Jan. 1946, 210 ppm.
- 15 (BQ590914) Air Strip well. Aquifer, limestone. Dug, 1944 by 72nd N.C.B. Altitude, 5-10 ft. Depth, probably less than 20 ft. Diameter, 4 ft. Pumpage, Jan. 1946, 50,000 gpd. Drawdown, 2.6 ft. Chloride (ppm), 1944, (before pumping) 32; Jan. 1946, 740; Oct. 9, 1946, 510.
- 16 (BQ597858) Pago Spring well 1. Aquifer, limestone. Drilled 1944(?) by 72nd N.C.B. Reported yield, 25 gpm. Chloride, 430 ppm. Reported abandoned because of low yield and high salinity.
- 17 (BQ478832) 53rd N.C.B. well 1. Aquifer, volcanic shale. Drilled, Aug. 1944. Altitude, 60 ft. Depth, 346 ft. Diameter, 8 in. Reported yield, about 3 gpm. Abandoned because of low yield. A well drilled nearby in shale reportedly had a water level of 7 ft. below sea level and a yield of 5 gpm.

Driller's log

	<u>Depth (ft)</u>
Clay, red and yellow - - - - -	0-88
Shale, sandy - - - - -	88-96
Shale, blue - - - - -	96-148
Shale, sandy - - - - -	148-155
Shale, black - - - - -	155-198
Shale, sandy - - - - -	198-206
Shale, black - - - - -	206-247
Shale, sandy - - - - -	247-254
Shale, blue - - - - -	254-325
Shale, black - - - - -	325-346

18 (BQ494884) 76th N.C.B. well. Aquifer, limestone. Drilled, 1938 by U. S. Navy. Altitude, 17 ft. Depth, 28 ft. Diameter, 6 in. Water level, +2 ft. Drawdown, 1 ft. while pumping at 55 gpm. Pumpage, Aug. 1944, 11,000 gpd. Chloride (ppm), July 13, 1944, 495; Aug. 1945, 510; Jan. 1946, 480.

19 (BQ594863) Price well 1. Aquifer, limestone. Drilled, July 1937 by U. S. Navy. Altitude, 126 ft. Depth, 170 ft. Diameter, 6 in. Casing, 150 ft. Water level, July 1937, +5 ft. Pumping rate, 1944, 3 gpm. Chloride, July 1937, 28 ppm.

Driller's log

	<u>Depth (ft)</u>
Cascajo (rubbly limestone), dirty - - - - -	0-64
Formation (limestone), hard - - - - -	64-115
Mud - - - - -	115-140
Limestone, dirty - - - - -	140-160
Cascajo, dirty - - - - -	160-170

20 (BQ472800) Faata Springs. Water issues from three orifices in limestone at contact with underlying volcanic rock. Altitude, about 450 ft.

Discharge (gpd)

	May 20, 1937	Feb. 26, 1957
Orifice 1	7,000	15,000
Orifice 2	14,000	50,400
Orifice 3	<u>144,000</u>	<u>151,200</u>
	165,000	216,600

21 (BQ592837) Yona well. Aquifer, limestone. Drilled, Sept. 1937 by U. S. Navy. Altitude, 305 ft. Depth, originally 264 ft.; plugged back to 258 ft. Diameter, probably 6 in. Driller's log; limestone, white, hard, 0-258 ft.; clay, blue, green, and brown, 258-264 ft. Dry hole.

- 22 (BQ597918) N.A.S. Agana well 2, (N.A.B. Agana well 2). Aquifer, limestone. Dug, 1944 by 48th N.C.B. Altitude, 27 ft. Depth, 28 ft. Diameter, 10 ft. Water level, Dec. 1945, +4 ft. Drawdown, Oct. 6, 1944, 0.25 ft.; Oct. 22, 1945, 0.75 ft.; Dec. 2, 1945, 0.5 ft. Reported pumped dry, Jan. 21, 1946. Driller's log; soil, 0-1 ft.; coral, 1-28 ft.

Observations

Date	Chloride (ppm)	Pumpage (gallons)
Oct. 24, 1944	141	7,500
Nov. 18	194	48,000
Dec. 23	318	160,000
Aug. 18, 1945	426	-
Sept. 17	426	376,000
Oct. 22	426	353,000
Nov. 17	389	353,000
Dec. 17	354	353,000
Jan. 14, 1946	354	353,000

- 23 (BQ593915) C.B.M.U. 515 well. Aquifer, limestone. Drilled, 1944. Altitude, 20 ft. Depth, 25 ft. Water level, +1 to +3 ft. Pumping rate, 40-50 gpm. Drawdown, 4 ft.

Observations

Date	Chloride (ppm)	Pumpage (gallons)
Sept. 13, 1944	-	3,000
Dec. 6, 1945	-	25,500
21	-	25,500
Jan. 3, 1946	510	24,000
10	510	24,000
17	510	24,000
24	510	24,000
Feb. 1	510	24,000
7	-	24,400
14	600	24,400
21	-	24,400
28	530	24,400
Mar. 1	-	24,400
7	530	30,000
14	530	26,800
21	530	29,200
28	530	39,000
Apr. 1	530	39,000

- 24 (BQ624918) N.A.S. Agana well 3 (N.A.B. Agana well 3). Aquifer, limestone. Drilled, Mar. 1945 by 5th N.C.B. Altitude, 323 ft. Depth, 350 ft. Diameter, 12 in. Casing, 348 ft.; lower 24 ft. perforated. Pumping rate, 200 gpm. Drawdown, 18-20 ft.

Driller's log

	Depth (ft)
Coral, white, soft - - - - -	0-130
Coral, hard - - - - -	130-290
Coral, broken, and yellow clay - - - - -	290-320
Coral, hard - - - - -	320-322
Water strata - - - - -	322-350

Observations

Date	Chloride (ppm)	Pumpage (gallons)
Aug. 21, 1945	-	153,000
28	-	158,000
Sept. 1	-	158,000
7	-	152,000
16	-	60,000
21	-	158,000
Oct. 8	-	158,000
22	354	288,000
28	-	288,000
29	408	-
30	-	222,000
Nov. 1	-	252,000
4	500	-
7	-	242,000
11	354	-
14	-	252,000
19	336	-
21	-	252,000
26	374	-
28	-	252,000
Dec. 3	230	-
23	194	-
Sept. 24, 1946	212	-
Oct. 9	177	-
Nov. 11	177	-
Dec. 10	212	-
Jan. 16, 1947	212	-
June 18, 1949	185	-
Oct. 18, 1950	142	-
Feb. 19, 1953	76	-

25 (BQ594849) Andersen dug well. Depth, about 10 ft. Diameter, 6 ft. by 7 ft. Reported pumpage, 1944, 6,000 gpd.

26 (BQ604937) Tumon Farm well. Aquifer, limestone. Drilled, Dec. 1937 by U. S. Navy. Altitude, 17 ft. Depth, 26 ft. Diameter, 6 in. Casing, 26 ft. Water level, +2 ft. Chloride, Dec. 16, 1937, 155 ppm; Aug. 1945, 385 ppm; Jan. 1946, 455 ppm.

Pumpage

Date	Rate (gpm)	Gallons
Sept. 22, 1944	20	20,000
July 1, 1945	60	47,000
7	90	101,000
14	60	71,000
21	60	75,000
28	60	71,000
Aug. 1	60	70,000
7	60	71,000
11	60	70,000
Dec. 21	45	23,000
28	45	24,000
Jan. 1, 1946	45	22,000
7	45	12,000
14	45	18,000
19	45	24,000

27 (BQ545896) Maina Spring. Water issues from limestone at contact with underlying volcanic rock. Altitude, 264 ft. Concrete reservoir with capacity of 58,000 gal. installed in 1937 by U. S. Navy. Use, municipal supply for Maina. Pumping rate, Apr. 1946, 40 gpm. Pumpage, Apr. 1946, 26,800 gpd; 1957, 6,650 gpd.

28 (BQ617943) 48th N.C.B. well. Aquifer, limestone. Dug, 1944 by 48th N.C.B. Altitude, 11 ft. Depth, 21 ft. Diameter, 8 ft. Casing, 9 ft. Water level, Oct. 1944, +3 ft. Driller's log; sand, 0-8.5 ft.; coral, 8.5-21 ft.

Observations

Date	Pumping rate (gpm)	Pumpage (gallons)	Chloride (ppm)
July 2, 1945	66	92,000	390
7	61	80,000	406
14	59	71,000	406
21	63	80,000	424
28	63	72,000	424
Aug. 1	57	71,000	424
7	53	67,000	406
14	56	71,000	406
21	61	74,000	424
26	43	56,000	424
Sept. 2	42	52,000	410
7	45	45,000	410
14	45	54,000	407

- 29 (BQ635944) Harmon Field old well 1 (Army Depot Field well 1). Aquifer, limestone. Drilled, Oct. 1944 by 72nd N.C.B. Altitude, 196 ft. Depth, 194 ft.; deepened to 216 ft., July 1945. Diameter, 6 in. Casing, 188 ft.; 5 in. perforated liner from 188 to 216 ft. Pump setting, 197 ft. Water level, Oct. 1944, +12 (?) ft. Drawdown, 15.5 ft. while pumping at 50-60 gpm. Pumpage, July-Dec. 1945, 82,000 gpd. Chloride (ppm), Oct. 29, 1944, 36; July 1, 1945, 71; Aug.-Dec. 1945, 88; Dec.-Feb. 1945, 61.

Driller's log

	<u>Depth (ft)</u>
Clay, red - - - - -	0-2
Limestone, hard - - - - -	2-95
Coral, porous - - - - -	95-185
Coral, soft (water bearing) - - - - -	185-216

- 30 (BQ636959) Harmon well 2 (Army Depot Field, well 2). Aquifer, limestone. Drilled, Nov. 1944. Altitude, 264 ft. Depth, 306 ft. Diameter, 12 in. Casing, 281 ft.; 10 in. liner from 281 to 306 ft.; bottom 30 ft. perforated. Pump setting, 300 ft. Well was originally 281 ft. deep, and was equipped with a 45-gpm pump; in May 1945 it was deepened to 306 ft. and equipped with a 250-gpm pump.

Driller's log

	<u>Depth (ft)</u>
Clay, red - - - - -	0-6
Coral limestone - - - - -	6-35
Coral, hard - - - - -	35-155
Coral limestone - - - - -	155-220
Coral, porous - - - - -	220-260
Coral, soft - - - - -	260-306

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	5.36	6.56	6.01	4.63	9.00	14.82	-
1954	-	11.60	12.90	12.32	10.39	10.93	14.88	15.23	17.33	17.76	16.80	-
1955	13.88	15.81	-	23.31	18.02	13.56	12.23	15.82	12.37	15.14	15.84	16.62

Chloride
(ppm)

July 7, 1945	173	Feb. 23, 1954	400
Aug. 4	173	Mar. 10	386
Sept. 8	225	18	370
Oct. 6	225	Feb. 1955	245
Nov. 10	225	Mar.	250
Dec. 8	225	Apr.	138
Jan. 6, 1946	179	May	270
Feb. 17	179	June	270
Mar. 17	179	July	160
July 16, 1953	430	Aug.	170
Dec. 23	460	Sept.	165
Jan. 2, 1954	400	Oct.	163
18	410	Nov.	166
19	420	Dec.	165
21	415	Jan. 1956	163
26	415	Feb.	163
29	415	Mar.	162
Feb. 3	415	Apr.	165
8	405	May	163
17	386	June	165

31 (BQ677955) MarBo well 3 (A.G.F. well 1). Aquifer, limestone. Drilled, Nov. 1944 by 72nd N.C.B. Altitude, 410 ft. Depth, 428 ft. Diameter, 12 in. Casing, 428 ft.; lower 20 ft. perforated. Pump setting, 420 ft. Water level, Nov. 1944, +5 ft.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	0.66	-	-	-	1.13	4.26	-
1954	-	-	-	1.16	2.58	2.43	3.43	4.27	5.05	5.47	4.11	-
1955	3.65	5.12	-	6.90	7.67	3.35	3.11	2.74	2.40	2.41	2.02	2.28

Chloride
(ppm)

July 7, 1945	39	Dec. 21, 1953	30
Aug. 5	39	28	40
Jan. 1946	40	Jan. 3, 1954	30
Apr. 23, 1947	24	Feb.	38
Mar. 1, 1953	30	Mar.	34
7	30	Apr.	34
14	40	May	38
21	50	June	41
28	50	July	42
Apr. 1	30	Aug.	30
May 19	35	Jan. 31, 1956	26
Dec. 10, 1953	30	Aug. 1	26
14	30		

32 (BQ564709) Malajlo Spring. Altitude, about 220 ft. Water issues from limestone at contact with underlying tuff. Water collects in a small tank and is used occasionally by local farmers.

Discharge
(gpm)

June 29, 1955	0.9	July 20, 1955	11.1
30	0.9	27	7.9
July 1	1.3	Aug. 5	8.3
5	1.7	24	6.8
13	13.0	Aug. 10, 1956	8.0
15	13.0	June 15, 1957	Trickle

33 (BR694065) Northwest well 2 (NWAAB well 2). Aquifer, limestone. Drilled, 1945 by 56th N.C.B. Altitude, 486 ft. Depth, 520 ft. Diameter, 12 in. Casing, 520 ft.; lower few feet perforated. Water level, 1945 +6 ft. Drawdown, Aug. 12-Sept. 22, 1945, 14.5 ft. while pumping at 150 gpm. Pumpage (gpd), Aug. 1945, 159,000; Sept. 1945, 146,000; Feb. 1946, 24,000.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	4.12	4.36	5.33	2.71	4.64	2.32	-
1954	-	1.75	2.00	1.85	4.37	8.99	8.50	7.86	7.37	6.78	6.91	-
1955	11.17	10.08	-	3.96	6.48	3.55	-	7.50	-	1.51	6.69	7.15

Chloride
(ppm)

Jan. 1946	35	May 1955	110
May 14, 1952	35	June	60
June 30, 1953	35	July	64
July 7	35	Aug.	100
16	35	Sept.	67
Jan. 1954	88	Oct.	65
Feb. 8	39	Nov.	67
Mar. 11	27	Dec.	67
Mar. 1955	116	Jan. 31, 1956	106
Apr.	56		

- 34 (BR735008) Army North Field well 1. Drilled, Jan. 1945 by 854th E.A.B. (U. S. Army). Altitude, 550 ft. Depth, 546 ft. Reported dry hole. Driller's log; red clay, 0-1 ft.; limestone and coral, 1-304 ft.; shale, blue 304-546 ft.
- 35 (BQ656987) J.C.A. well 1. Aquifer, limestone. Drilled, 1945. Altitude, 377 ft. Depth, 410 ft. Diameter, 12 in. Casing, 410 ft.; lower few feet perforated. Water level, 1945, +5 ft. Drawdown, 10.8 ft. while pumping at 165 gpm. Chloride, Oct. 1945-May 1947, about 106 ppm.

Pumpage

Date	Rate (gpm)	Gallons
Oct. 1945	50	52,000
Nov.	200	247,000
Dec.	200	285,000
Jan. 1946	200	284,000
Feb.	130	176,000
Mar.	110	140,000
June	-	37,000
July	110	31,000
Aug.	112	36,000
Sept.	110	44,000
Oct.	102	31,000
Nov.	80	22,000
Dec.	80	25,000
Jan. 1947	85	37,000
Mar.	85	56,000
May	80	29,000

- 36 (BQ638905) Radio Barrigada well. Aquifer, limestone. Drilled, Nov. 1944. Altitude, 299 ft. Depth, 308 ft. Diameter, 8 in. Water level, Nov. 1944, +5 ft. Drawdown, about 2 ft. while pumping at 25 gpm. Pumpage (gpd), July 1945, 15,000; March 1946, 17,200; Apr. 1946, 19,400; May 1946, 27,300; June 1946, 26,500. Chloride (ppm), July 8, 1945, 35; Jan. 1946, 70.

- 37 (BQ626874) B.P.M. well 5 (115th Fleet Hospital well 1). Aquifer, limestone. Drilled, Jan. 1945 by 72nd N.C.B. Altitude, 210 ft. Depth, 232 ft. Diameter, 12 in. Casing, 232 ft.; lower 20 ft. perforated. Pump setting, 230 ft. Water level, 1944, +5 ft.; Aug. 29, 1945, +3 ft. Chloride (ppm), March 1954, 198; Dec. 14, 1954, 192; Apr. 26, 1955, 204.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1945	-	-	-	-	-	-	9.63	10.31	10.33	8.93	7.07	-
1954	6.84	6.20	6.66	6.66	7.22	6.87	6.76	6.99	6.62	6.94	6.84	6.92
1955	6.77	6.15	6.56	6.50	6.31	6.06	6.25	6.26	6.06	6.20	6.00	6.26

- 38 (BQ597928) 111th Fleet Hospital well 1. Aquifer, limestone. Drilled, Nov. 1944 by 56th N.C.B. Altitude, 77 ft. Depth, 81 ft. Diameter, 14 in. Casing, 81 ft. Pump setting, 79 ft. Water level, Nov. 1944, +3 ft. Drawdown, July 1, 1945, 1.5 ft. while pumping at 250 gpm. Pumpage (gal.), Dec. 29, 1944, 72,000; Jan. 26, 1945, 200,000; July 1, 1945, 360,000; Jan. 20, 1946, 200,000; Feb. 1, 1946, 243,000; Mar. 8, 1946, 360,000.

Chloride
(ppm)

Dec. 19, 1944	88	Jan. 1, 1946	455
29	109	Sept. 24	424
Jan. 15, 1945	125	Oct. 2	389
26	125	Nov. 8	445
July 1	510	Dec. 10	457
4	495	Jan. 16, 1947	449
12	510		

- 39 (BQ599858) Pago Spring well 2. Aquifer, limestone. Drilled, 1944, by 72nd N.C.B. Reported never used because of inaccessability. No other records available.

- 40 (BQ602938) 111th Fleet Hospital well 2. Aquifer, limestone. Drilled, 1944 by 56th N.C.B. Altitude, 15-20 ft. Depth, probably less than 30 ft. Water level, Jan. 1946, 13.6 ft. below ground surface. Chloride (ppm), Oct. 1, 1945, 1,400; Jan. 1, 1946, 705.

Pumpage

Date	Rate (gpm)	Gallons
July 2, 1945	70	71,000
7	70	76,000
14	60	72,400
21	60	70,600
28	60	72,500
Aug. 1	60	63,200
7	60	67,300
14	60	65,800
19	60	1,500
Sept. 4	-	70,500
7	-	69,500
14	150	57,200
21	150	73,400
28	150	55,900
Oct. 1	150	61,300
8	150	59,600
15	150	73,100
22	150	64,800
29	150	69,100
Nov. 1	150	67,400
7	150	72,000
19	150	69,900
24	150	40,300
Jan. 1, 1946	-	55,000

41 (BQ612885) Price well 2. Aquifer, limestone. Drilled, Aug. 1937 by U. S. Navy. Altitude, 130 ft. Depth, 138 ft. Diameter, 6 in. Casing, 138 ft. Water level, July 23, 1937, +7 ft.; Aug. 4, 1937, +6 ft. Chloride, July 23, 1937, 28 ppm.

Driller's log

	<u>Depth</u> <u>(ft)</u>
Mud, clay, grading downward into dirty cascajo (limestone) - - - - -	0-20
Cascajo (limestone), dirty - - - - -	20-77
Limestone, white, solid ledge - - - - -	77-106
Limestone, white, and marine sand - - - - -	106-138

42 (BQ598892) Canada well 1. Aquifer, weathered limestone and sand. Dug, June 1937 by U. S. Navy. Altitude, 37 ft. Depth, 37 ft. Diameter, about 5 ft. Water level, June 28, 1937, +5 ft. Chloride, Aug. 8, 1937, 14 ppm. Driller's log; soil and marine sand, no hard rocks or ledges (sample showed weathered fragments of hard limestone mixed with brown dirt), 0-37 ft.

43 (BQ596891) Canada well 2. Aquifer, limestone. Dug, July 1937 by U. S. Navy. Altitude, 11 ft. Depth, 30 ft. Diameter, about 5 ft. Water level, July 1, 1937, +6 ft. Driller's log; mud and clay, 0-10 ft.; muddy cascajo (limestone), 10-20 ft.

44 (BQ579911) 136th N.C.B. well. Aquifer, limestone. Dug, Nov. 1944 by 136th N.C.B. Altitude, 19 ft. Depth, 16 ft. Diameter, 7 ft. from surface to 11 ft.; 3 ft. from 11 to 16 ft. Water level, Nov. 1944, +7 ft. Drawdown, Dec. 29, 1944, 1 ft. while pumping at 50 gpm. Pumpage (gal.), Dec. 29, 1944, 30,000; July 1, 1945, 78,000; Jan. 7, 1946, 70,000; Apr. 6, 1946, 51,000. Chloride (ppm), Nov. 18, 1944, 83; Dec. 29, 1944, 94; July 1945, 460; Aug. 4, 1945, 450; Jan. 1946, 350; Oct. 9, 1946, 530; Nov. 8, 1946, 425.

45 (BQ598892) Canada well 3. Aquifer, limestone. Dug, July 1937 by U. S. Navy. Altitude, 12 ft. Depth, 25 ft. Water level, July 9, 1937, +6 ft. Driller's log; earth, reddish brown, 0-4 ft.; cascajo (limestone), dirty, 4-25 ft.

46 (BQ585804) 9th Marines well 3. Aquifer, sand. Drilled, 1944 by 56th N.C.B. Altitude, 25 ft. Depth, 30 ft. Reported dry hole.

47 (BQ586808) 9th Marines well 4. Aquifer, sand. Drilled, 1944 by 56th N.C.B. Altitude, 26 ft. Depth, 32 ft. Driller's log; top soil and clay, 0-10 ft.; coral, soft, 10-28 ft.; sand, water bearing, 28-32 ft. Reported never used.

- 48 (BQ585799) 9th Marines well 2. Aquifer, sand. Drilled and dug, 1944 by 56th N.C.B. Altitude, 25 ft. Depth, 30 ft. Drilled well in bottom of 10-ft. pit. Driller's log; coral, 0-28 ft.; sand, water bearing, 28-30 ft.
- 49 (BQ584796) 9th Marines well 1. Aquifer, sand. Drilled, 1944 by 56th N.C.B. Altitude, 15 ft. Depth, 16 ft. Water level, 1944, above sea level. Pumpage, 1944, 40,000 gpd, at 40 gpm. Chloride, 1944, 550 ppm. Driller's log; top soil, 0-4 ft.; coral, broken, 4-11 ft.; coral, 11-15 ft.; sand, water bearing, 15-16 ft.
- 50 (BQ594905) 5th Field Depot Agana well 1. Aquifer, limestone. Drilled, 1944 by U.S.M.C. Altitude, 208 ft. Depth, 214 ft. Diameter, 12 in. Casing, 214 ft. Water level, 1944, +4 ft. Chloride, reported to have increased from about 150 ppm in 1944 to 700 ppm in 1946.

Pumpage

Date	Rate (gpm)	Gallons
Dec. 20, 1944	35	10,500
Jan. 3, 1945	35	23,100
June 28	40	43,200
July 1	40	28,800
Aug. 1	40	43,400
Sept. 1	35	33,600
Oct. 11	40	19,200
Nov. 1	32	72,000
Dec. 1	50	48,000
Jan. 1, 1946	50	30,000
Feb. 1	45	22,000
Mar. 1	45	22,000
Apr. 1	40	39,000

- 51 (BQ588905) 5th Field Depot Agana well 2. Aquifer, limestone. Drilled, 1944 by U.S.M.C. Altitude, 180 ft. Depth, 187 ft. Diameter, 12 in. Water level, 1944, +3 ft. Pumping rate, 1945-1947, 40-50 gpm.

Observations

Date	Pumpage (gallons)	Chloride (ppm)
June 28, 1945	51,000	398
Aug. 1	51,000	398
Sept. 1	69,000	424
Oct. 4	50,000	355
Nov. 1	34,000	355
Dec. 1	41,000	459
Jan. 1, 1946	31,000	-
Feb. 7	29,000	500
Mar. 7	39,000	500
Apr. 4	39,000	490
Jan. 2, 1947	43,000	460
Feb. 6	43,000	460
Mar. 1	43,000	-

52 (BQ582905) 5th Field Depot Agana well 3. Aquifer, limestone. Drilled, about 1945. Altitude, 152 ft. Depth, 153 ft. Diameter, 12 in. Water level, 1945, +4 ft. Pumping rate, 1945-1947, 40-50 gpm.

Observations

Date	Pumpage (gallons)	Chloride (ppm)
June 28, 1945	51,000	362
July 1	54,000	362
Aug. 1	43,000	389
Sept. 1	72,000	442
Oct. 16	72,000	354
Nov. 1	72,000	354
Dec. 1	48,000	354
Jan. 4, 1946	49,000	424
Feb. 14	49,000	495
Mar. 28	39,000	460
Apr. 4	39,000	480
Jan. 2, 1947	-	495

53 (BQ596895) 5th Field Depot Agana well 4 (Toto well). Aquifer, limestone. Drilled, 1945. Altitude, 171 ft. Depth, about 175 ft. Diameter, 8 in. from surface to 166 ft.; 3 in. from 166 to 175 ft. Water level, 1945, +10 ft. Drawdown, reported 7-9 ft. Pumping rate, 1945-1946, 40-50 gpm. Chloride (ppm), Jan. 1, 1946, 222; Feb. 7, 1946, 247; Feb. 21, 1946, 159; Apr. 1946, 187.

Pumpage
(gallons)

June 28, 1945	26,000	Dec. 1, 1945	58,000
July 1	48,000	Jan. 1, 1946	58,000
Aug. 1	58,000	Feb. 1	58,000
Sept. 1	58,000	Mar. 1	59,000
Oct. 1	58,000	Apr. 1	59,000
Nov. 1	58,000		

54 (BQ622943) Army well 2. Aquifer, limestone. Altitude, 10-15 ft. Depth, probably less than 20 ft. Diameter, 22 in. Cased to bottom with oil drums. Pumpage (gpd), Mar. 1946, 9,300; Apr., May, June 1946, 18,600. Chloride, Jan. 1946, 220 ppm.

- 55 (BR704023) 373rd Army Station Hospital well 1. Aquifer, limestone. Drilled, 1945, by 72nd N.C.B. Altitude, 545 ft. Depth, 560 ft. Diameter, 10 in. Casing, 560 ft.; perforated from 510-550 ft. Well would not produce sufficient water, so it was deepened to 575 ft. and shot with dynamite but with no increase in yield.

Driller's log

545

	Depth (ft)
Limestone - - - - -	0-505
Sand, water bearing - - - - -	505-522
Sand, and shale streaks - - - - -	522-530
Sand, and coral (mixed) - - - - -	530-545
Shale, blue - - - - -	545-560
Shale - - - - -	560-575

- 56 (BR677051) Northwest well 1 (NWAAB well 1). Aquifer, limestone. Drilled, 1945 by 56th N.C.B. Altitude, 491 ft. Depth, 1945, 515 ft.; 1956, 511 ft. Diameter, 10 in. Casing, 515 ft.; lower 30 ft. perforated. Water level, 1945, +3 ft.; May 3, 1956, +6 ft. Pumping rate, 37-45 gpm. Pumpage (gpd), Aug. 1945, 38,000; Feb. 1946, 4,400; Apr. 1946, 6,900. Chloride (ppm), 1945, 53; Jan. 1946, 70.

- 57 (BQ592934) Fleet Hospital 103 well. Aquifer, limestone. Drilled, 1945 by 56th N.C.B. Altitude, about 80 ft. Depth, 86 ft. Diameter, 13 in. Water level, 1945, +2 ft. Chloride (ppm), July 6, 1945, 1,476; July 14, 1945, 1,325; Aug. 3, 1945, 1,320; Oct. 7, 1945, 1,300.

Pumpage

Date	Rate (gpm)	Gallons
July 1, 1945	225	257,000
Aug. 1	200	189,000
Sept. 1	200	189,000
Oct. 1	200	162,000
Nov. 1	200	153,000
Dec. 1	200	129,000
Jan. 1, 1946	300	333,000
Feb. 10	300	148,000
Mar. 3	300	178,000
Apr. 1	250	165,000

- 58 (BQ708982) Mataguac Spring. Water issues from volcanic rock on the east side of Mataguac Hill. Altitude, 460 ft. Water collects in two 4-ft.-sq. concrete reservoirs. Flow, Aug. 9, 1946, 6.6 gpm (9,500 gpd).

Pumpage
(gallons)

July 1, 1945	17,300	Nov. 1, 1945	18,500
Aug. 1	18,000	Dec. 1	5,500
Sept. 2	15,500	Jan. 1, 1946	1,000
Oct. 1	17,600	Feb. 1	1,200

59 (BQ601866) Father Duenas Memorial School well (103rd N.C.B. well). Aquifer, limestone. Drilled, 1945 by 72nd N.C.B. Altitude, 121 ft. Depth, 132 ft. Diameter, 8 in. Casing, 132 ft.; lower 16 ft. perforated. Water level, Jan. 1945, +4 ft.; Nov. 1953, +5 ft. Drawdown, Jan. 1945, 0.7 ft. Chloride (ppm), Oct. 9, 1946 and Jan. 16, 1947, 35; June 25 and July 18, 1956, 14. Pumpage 1956, less than 35,000 gpd.

Pumpage

Date	Rate (gpm)	Gallons
July 3, 1945	62	75,000
Aug. 1	62	75,000
Sept. 1	60	55,000
Oct. 1	60	57,000
Nov. 6	75	74,000
Dec. 1	75	62,000
Jan. 1, 1946	60	68,000
Feb. 1	90	117,000
Mar. 1	75	79,000
Apr. 1	85	97,000
May 1	-	98,000

60 (BQ603878) F.E.A. Dairy well (U. S. Commercial Co. dairy well). Aquifer, limestone. Drilled, 1945 by 72nd N.C.B. Altitude, 185 ft. Depth, Feb. 1945, 210 ft.; Nov. 1953, 190 ft. Diameter, 6 in. Casing, 208 ft.; lower 20 ft. perforated. Water level, Feb. 13, 1945, +2 ft. Drawdown, 0.4 ft. while pumping at 60 gpm. Chloride (ppm), Oct. 9 and Nov. 8, 1946 and Jan. 16, 1947, 35. Driller's log; dirt, red, 0-60 ft.; coral, broken, 60-183 ft.; coral, water bearing, 183-210 ft.

61 (BR766015) Army North Field well 2 (Andersen well 2). Aquifer, limestone. Drilled, 1945 by 854th E.A.B. (U. S. Army). Altitude, 547 ft. Depth, 586 ft. Diameter, 10 in. Bottom of hole shot with dynamite. Casing, 570 ft.; lower 40 ft. perforated. Water level, 1945, +1 ft. Drawdown, 3.7 ft. while pumping at 125 gpm. Pumpage, July 1945, 40,000 gpd, at a rate of 150 gpm. Chloride (ppm), July 1, 1945, 880; July 2, 1945, 915; July 3, 1945, 1,060; July 4, 1945, 1,100; July 5, 1945, 1,220; July 6, 1945, 1,270; Jan. 1946, 1,400.

Driller's log

	Depth (ft)
Coral - - - - -	0-65
Coral, hard - - - - -	65-133
Coral, soft - - - - -	133-225
Coral, hard - - - - -	225-269
Coral, soft - - - - -	269-357
Coral, sandy - - - - -	357-522
Coral, very hard - - - - -	522-533
(Record missing) - - - - -	533-555
Sand, water-bearing - - - - -	555-570
Coral, hard - - - - -	570-573
Coral, sandy - - - - -	573-577
(Record missing) - - - - -	577-586

62 (BQ614900) 72nd N.C.B. well 2. Aquifer, limestone. Drilled, 1945 by 72nd N.C.B. Altitude, 214 ft. Depth, 226 ft. Diameter, 8 in. Water level, 1945, +4 ft. Drawdown, 1945, 0.75 ft. while pumping 50 gpm.

Pumpage
(gallons)

June 25, 1945	40,500	Nov. 1, 1946	15,000
July 1	42,800	Dec. 10	16,500
Aug. 6	45,800	Jan. 1, 1947	18,000
Sept. 1	21,800	Feb. 1	25,500
Jan. 1, 1946	26,300	Mar. 1	34,500
Feb. 1	13,500	Apr. 1	39,000
Mar. 1	31,500	May 1	36,000
Apr. 1	22,500	June 1	33,000
May 1	10,500	July 1	18,000
June 2	25,500	Aug. 1	7,000
July 11	9,000	Sept. 1	15,000
Aug. 1	10,500	Oct. 1	11,500
Sept. 1	13,500	Nov. 3	12,000
Oct. 1	13,500	Dec. 17	27,000

Chloride
(ppm)

June 25, 1945	600	Aug. 21, 1945	630
July 2	565	28	445
7	565	Sept. 3	535
15	530	10	566
25	600	June 6, 1946	620
Aug. 8	636	Nov. 8	700
14	668	Dec. 10	750

63 (BQ586908) 41st N.C.B. well. Aquifer, limestone. Drilled, 1945, by U.S.M.C. Altitude, 179 ft. Depth, more than 179 ft. Water level, 1945, +3 ft. Drawdown, Jan. 19, 1946, 6.2 ft. while pumping at 20 gpm; Feb. 14, 1946, 8.4 ft. while pumping at 40 gpm. Chloride (ppm), Dec. 6, 1945, 700; Jan. 3, 1946, 670; Feb. 7, 1946, 700; Mar. 20, 1946, 770; Mar. 21, 1946, 760.

Pumpage
(gallons)

July 1, 1945	53,600	Dec. 6, 1945	28,800
Aug. 1	46,100	Jan. 1, 1946	24,000
Sept. 1	51,000	Feb. 1	57,600
Oct. 22	20,300	Mar. 1	53,700
Nov. 1	41,100	Apr. 1	9,700

64 (BQ596891) Canada well 4. Aquifer, limestone. Dug, 1937, by U. S. Navy. Altitude, 13 ft. Depth, 30 ft. Casing, 30 ft. Water level, July 6, 1937, +7 ft. Chloride, July 6, 1937, 92 ppm. Driller's log; earth, reddish brown, 0-6 ft.; cascajo (limestone), 6-30 ft.

65 (BQ673949) MarBo well 2 (204th General Hospital well 1). Aquifer, limestone. Drilled, March 1945, by 72nd N.C.B. Altitude, 351 ft. Depth, 379 ft. Diameter, 10 in. Casing, 379 ft.; lower 30 ft. perforated. Water level, March 1945, +2 ft. Drawdown, July 1, 1945, 0.5 ft. while pumping at 164 gpm.

Driller's log

	Depth (ft)
Coral, sandy - - - - -	0-29
Coral, hard - - - - -	29-42
Coral, firm - - - - -	42-55
Coral, hard - - - - -	55-80
Lime, and hard coral - - - - -	80-120
Coral, coarse - - - - -	120-248
Cavity (lost water and mud) - - - - -	248-251
Lime - - - - -	251-280
Coral, soft - - - - -	280-325
Coral, hard - - - - -	325-349
Water strata - - - - -	349-379

Pumpage

Date	Rate (gpm)	Gallons
July 1, 1945	164	228,000
Aug. 1	160	211,000
Sept. 2	154	205,000
Dec. 20	333	20,000
Jan. 1, 1946	333	320,000
Feb. 1	333	260,000
Mar. 1	333	280,000
Apr. 1	300	252,000
May 1	300	252,000
June 1	300	252,000
July 1	300	432,000
Aug. 1	300	396,000
Sept. 1	180	173,000

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	13.55	15.39	13.78	12.05	15.10	14.19	-
1954	-	13.42	14.16	13.66	11.41	13.75	13.63	14.69	15.37	14.48	11.32	-

Chloride
(ppm)

July 1, 1945	35	Aug. 1955	40
Jan. 1, 1946	35	Sept.	68
Mar. 1, 1953	60	Oct.	65
7	80	Dec.	68
14	70	Jan. 1956	65
21	75	Mar.	65
28	30	Apr.	67
Apr. 1	65	May	65
19	55	June	69
July 16	60	Aug.	40
Dec. 10	60	Sept.	40
14	60	Oct.	24
21	60	Nov.	60
28	60	Dec.	60
Jan. 3, 1954	65	Jan. 1957	60
Feb. 1955	44	Feb.	68
Mar.	51	Mar.	68
Apr.	50	Apr.	68
May	53	May	60
June	56	June	60
July	50	July	60

66 (BQ703956) MarBo well 4 (Marine Transit Center well 1). Aquifer, limestone. Drilled, 1945 by U.S.M.C. Altitude, 407 ft. Depth, 1945, 421 ft.; May 4, 1955, 378.6 ft. Diameter, 13 in. Water level, 1945, +4 ft. Drawdown, 20.5 ft. while pumping at 170 gpm. Chloride (ppm), Sept. 10, 1945, and Jan. 1, 1946, 35.

Pumpage
(gallons)

Sept. 1, 1945	166,000	Nov. 21, 1945	194,000
7	165,000	28	194,000
14	137,000	Dec. 1	145,000
21	235,000	7	78,000
28	235,000	14	115,000
Oct. 1	145,000	21	122,000
7	179,000	28	138,000
14	148,000	Jan. 1, 1946	102,000
20	179,000	7	224,000
28	87,000	14	224,000
Nov. 1	179,000	21	122,000
7	148,000	28	71,000
14	189,000		

67 (BQ703949) Marine Transit Center well 2. Aquifer, limestone. Drilled, 1945 by U.S.M.C. Altitude, 402 ft. Depth, 409 ft. Diameter, 10 in. Casing, 409 ft. Water level, 1945, +13 ft. Drawdown, 0.4 ft. while pumping at 55 gpm. Chloride (ppm), 1945, 35; Jan. 1, 1946, 40.

Pumpage
(gallons)

Sept. 2, 1945	79,000	Nov. 21, 1945	48,000
7	76,000	29	20,000
14	40,000	Dec. 1	50,000
21	76,000	7	26,000
28	76,000	14	35,000
Oct. 1	46,000	21	41,000
7	56,000	28	65,000
14	49,000	Jan. 1, 1946	47,000
21	49,000	7	86,000
28	51,000	14	43,000
Nov. 2	33,000	21	14,000
7	53,000	26	40,000
14	63,000		

68 (BR747032) Army North Field well 3. (Andersen well 3). Aquifer, limestone. Drilled, March 1945 by 72nd N.C.B. Altitude, 512 ft. Depth, 520 ft. Reported never used because four sections of pipe were stuck in the well during construction.

Driller's log

	<u>Depth</u> <u>(ft)</u>
Soil, red - - - - -	0-2
Coral, loose - - - - -	2-20
Coral, hard - - - - -	20-100
Coral, soft - - - - -	100-110
Coral, hard - - - - -	110-205
Lime, hard - - - - -	205-300
Coral, loose - - - - -	300-328
Lime, hard - - - - -	328-330
Cavity - - - - -	330-340
Lime, hard - - - - -	340-348
Cavity, and gravel - - - - -	348-370
Lime, hard - - - - -	370-378
Cavity - - - - -	378-380
Lime, hard - - - - -	380-384
Cavity - - - - -	384-390
Lime, hard - - - - -	390-394
Cavity - - - - -	394-400
Lime, hard - - - - -	400-435
Coral, medium - - - - -	435-488
Lime, hard - - - - -	488-510
Sand, fine - - - - -	510-520

69 (BQ605868) 6th Marine Division well 1. Drilled, Apr. 1945. Altitude, 124 ft. Depth, 150 ft. Diameter, 13 in. Water level, Apr. 1945, +2 ft. Reported yield, 10 gpm.

Driller's log

	<u>Depth</u> <u>(ft)</u>
Shale, red - - - - -	0-25
Clay, yellow, and broken coral - - - - -	25-90
Coral, coarse - - - - -	90-102
Mud, yellow, and broken coral - - - - -	102-122
Water strata - - - - -	122-150

70 (BQ612865) B.P.M. well 3 (6th Marine Division well 2). Aquifer, limestone. Drilled, 1945 by 103rd N.C.B. Altitude, 203 ft. Depth, 234 ft. Diameter, 12 in. Pumping rate, July, Aug. 1945, 60 gpm. Pumpage (gal.), July 13, 1945, 81,000; Aug. 1, 1945 and Aug. 15, 1945, 86,400; Sept. 1 and 15, 1945, 56,000. Chloride (ppm), Aug. 8, 1945, 247; Sept. 8, 1945, 240; March 1954, 410; Dec. 14, 1954, 416; Apr. 26, 1955, 400.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1954	7.48	6.91	7.45	7.30	7.02	6.86	7.03	6.82	2.28	6.67	6.73	6.67
1955	6.38	6.01	6.66	6.45	3.86	3.29	3.38	3.02	3.88	3.89	3.42	2.82

71 (BQ616869) B.P.M. well 2 (6th Marine Division well 3). Aquifer, limestone. Drilled, July 1945 by 103rd N.C.B. Altitude, 222 ft. Depth, 253 ft. Diameter, 12 in. Water level, Jan. 1954, +1 ft. Pumping rate, July 1, 1955, 310 gpm.

Pumpage

Date	Rate (gpm)	Gallons
July 30, 1945	60	86,000
Aug. 1	60	83,000
15	60	86,000
Sept. 1	60	57,000
15	60	57,000
Dec. 15	60	54,000
Jan. 5, 1946	60	54,000
Feb. 7	50	72,000
19	50	15,000
Mar. 1	50	15,000
15	50	72,000
Apr. 1	50	72,000
July 15	125	48,000
Aug. 4	125	49,000
26	125	38,000
Sept. 1	125	53,000
15	125	53,000

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1954	10.84	8.36	14.33	13.88	13.03	12.51	14.05	14.93	11.96	15.50	14.30	14.54
1955	13.83	11.37	10.70	10.83	9.17	13.17	5.80	7.54	7.91	7.52	6.13	6.20

Chloride
(ppm)

July 17, 1945	629	Jan. 22, 1946	194
22	707	28	212
28	619	Feb. 14	212
Sept. 1	707	Mar. 13	191
Dec. 14	416	Mar. 1954	872
21	520	Dec. 14, 1954	864
28	520	Apr. 26, 1955	728
Jan. 7, 1946	530	Sept. 5, 1956	1,164
14	213		

72 (BQ620875) B.P.M. well 1 (6th Marine Division well 4). Aquifer, limestone. Drilled, Aug. 1945. Altitude, 209 ft. Depth, Aug. 1945, 302 ft.; July 1, 1955, 210 ft. Diameter, 12 in. Pumping rate, July 1955, 290 gpm. Chloride (ppm), Aug. 17, 1945, 177; Aug. 22, 1945, 135; Aug. 25, 1945, 141; March 1954, 211; Dec. 14, 1954, 197; Apr. 26, 1955, 176; Sept. 5, 1956, 282.

Pumpage

Date	Rate (gpm)	Gallons
Aug. 8, 1945	60	43,000
15	60	86,000
Sept. 1	60	57,000
15	60	57,000
Dec. 2	60	54,000
15	60	54,000
Feb. 1, 1946	50	45,000
15	50	45,000
Mar. 1	50	15,000
15	50	72,000
Apr. 3	50	72,000
May 1	175	68,000
June 3	175	44,000
15	175	45,000
July 1	175	37,000
14	175	29,000
Aug. 26	200	72,000
Sept. 1	200	18,000
15	200	33,000
July 1955	290	

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1954	10.98	10.90	11.91	13.22	13.47	12.67	11.87	11.57	12.57	12.91	11.72	13.07
1955	12.66	11.61	13.18	12.62	12.80	12.47	12.45	12.83	12.79	13.57	12.04	12.22

73 (BQ645954) Harmon Field, old well 3 (Army Depot Field well 3).
 Aquifer, limestone. Drilled, Apr. 1945. Altitude, 276 ft. Depth,
 300 ft. Diameter, 10 in. Casing, 300 ft.; lower 30 ft. perforated.
 Water level, Apr. 1945, +2 ft. Reported never used because of sand
 clogging.

Driller's log

	Depth (ft)
Fill - - - - -	0-5
Coral, soft - - - - -	5-30
Coral, hard - - - - -	30-43
Cavity - - - - -	43-45
Coral, medium hard - - - - -	45-75
Lime - - - - -	75-100
Coral - - - - -	100-188
Coral, hard - - - - -	188-229
Coral, medium hard - - - - -	229-276
Coral, water strata - - - - -	276-300

- 74 (BQ612930) Ilipog well. Aquifer, limestone. Drilled, June 1937 by U. S. Navy. Altitude, 82 ft. Depth, 89 ft. Diameter, probably 6 in. Casing, 89 ft. Water level, June 16, 1937, +2 ft. Chloride, June 16, 1937, 185 ppm.
- 75 (BR751029) Army North Field well 4 (Andersen well 4). Aquifer, limestone. Drilled, May 1945. Altitude, 527 ft. Depth, 563 ft. Diameter, 10 in. Casing, 300 ft.; lower 40 ft. perforated. Water level, Apr. 1945, +2 ft. Chloride (ppm), July 8, 1945, 140; July 15, 1945, 150; July 22, 1945, 159; Sept. 16, 1945, 170; Dec. 17, 1945, 165; June 22, 1951, 148; Apr. 30, 1953, 130.

Driller's log

	Depth (ft)
Coral - - - - -	0-100
Lime - - - - -	100-120
Coral, soft - - - - -	120-155
Coral, hard - - - - -	155-205
Lime, hard - - - - -	205-221
Lime, broken, and coral - - - - -	221-273
Dolomite lime (?) - - - - -	273-305
Lime, hard - - - - -	305-312
Coral, hard - - - - -	312-370
Lime, hard - - - - -	370-394
Coral, broken - - - - -	394-425
Lime - - - - -	425-450
Coral - - - - -	450-467
Coral and lime - - - - -	467-480
Lime - - - - -	480-518
Lime, hard - - - - -	518-525
Sand, tight - - - - -	525-535
Sand, fine, hard - - - - -	535-545
Sand and coral - - - - -	545-563

Pumpage

Date	Rate (gpm)	Gallons
July 4, 1945	200	24,000
15	200	165,000
Aug. 1	175	141,000
15	125	157,000
Sept. 2	125	160,000
16	125	163,000
Dec. 17	110	198,000
Jan. 1, 1946	110	63,000
Feb. 15	110	46,000
Apr. 1	175	74,000
15	175	85,000
May 6	175	37,000
15	175	74,000
June 1	175	60,000
July 15	175	58,000
Aug. 4	175	55,000
19	200	54,000
Sept. 2	200	24,000

76 (BQ742969) Santa Rosa Spring (Memie Aguila Spring). Water issues from tuffaceous sandstone on the southeast side of Mt. Santa Rosa. Altitude, 720 ft. Reported flow, 1,000 to 25,000 gpd. Measured flow, Aug. 9, 1956, 86,000 gpd (after a rain on the previous day). Water was pumped for military supply during parts of 1945 and 1946.

Pumpage
(gallons)

July 7, 1945	1,800	Oct. 14, 1945	2,700
14	4,500	21	2,700
21	2,700	28	2,700
28	1,800	Nov. 7	1,800
Aug. 7	2,700	14	1,800
14	2,700	21	1,800
21	2,700	28	2,700
25	4,500	Jan. 21, 1946	2,700
Sept. 8	4,500	28	2,700
14	2,900	Feb. 7	1,800
21	3,600	13	2,700
28	3,600	22	2,700
Oct. 7	2,700		

77 (BQ609865) B.P.M. well 4 (6th Marines well 1-A). Aquifer, limestone. Drilled, Apr. 1945. Altitude, 196 ft. Depth, 225 ft. Diameter, 12 in. Casing, 225 ft.; lower 30 ft. perforated. Water level, Jan. 1954, +3 ft. Pumpage, July-Sept. 1945, 70,000 gpd at a rate of 60 gpm. Chloride (ppm), Aug.-Sept. 1945, 159; Mar.-Apr. 1954, 570; Dec. 1954, 564; Apr. 1955, 500. Driller's log; soil, red, 0-4 ft.; coral, medium hard, 4-195 ft.; coral, water strata, 195-225 ft.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1954	5.25	4.45	4.53	4.29	4.25	3.86	4.00	3.85	4.05	4.05	4.20	4.45
1955	4.54	3.66	4.03	3.29	3.30	3.68	3.85	3.68	3.50	3.49	3.22	3.01

78 (BQ596916) N.A.S. Agana well 4 (N.A.B. Agana well 4). Aquifer, limestone. Dug, 1945. Altitude, 24 ft. Depth, probably less than 30 ft. Water level, Jan. 1946, +2 ft. Drawdown, 1 ft. while pumping at 150 gpm. Chloride, Jan. 1946, reported 195-350 ppm.

Pumpage
(gallons)

July 9, 1945	203,000	Oct. 14, 1945	90,000
14	212,000	21	207,000
30	72,000	28	212,000
Aug. 2	72,000	Nov. 7	171,000
7	144,000	14	176,000
14	154,000	21	212,000
21	212,000	28	176,000
28	212,000	Dec. 7	189,000
Sept. 7	212,000	14	194,000
14	207,000	21	212,000
21	216,000	28	212,000
28	158,000	Jan. 7, 1946	212,000
Oct. 8	216,000		

79 (BQ595915) ACEORP Tunnel (Tamuning Maui). Basal tunnel in limestone. Excavated, 1947, by 136th N.C.B. Altitude of land surface at entrance, 38 ft. Construction, three tunnels: tunnel 1, 150 ft.; tunnel 2, 150 ft.; tunnel 3, 700 ft. in length. Water level, 1954, +3.86 ft.

Pumpage
(million gallons)

150
150
700
1000

Feb. 1952	0.27	Mar. 1953	2.11
Mar.	7.97	Apr.	5.72
Apr.	9.01	May	6.59
May	20.62	June	6.02
Aug.	11.88	July	8.17
Sept.	7.38	Aug.	0.28
Oct.	2.64	Oct.	4.36
Nov.	0.29	Dec.	0.32
Dec.	0.43	Jan. 1954	1.91
Jan. 1953	10.60	Feb.	0.00
Feb.	1.39		

Pumpage and chloride

Date	Pumpage (million gallons)	Chloride (ppm)		
		Tunnel 1	Tunnel 2	Tunnel 3
Sept. 8, 1947	0.952	460	440	600
19	0.964	420	460	580
Oct. 1	1.008	440	440	680
Jan. 23, 1948	0.934	380	440	680
Feb. 1	0.798	360	540	680
15	0.777	360	540	700
Mar. 1	0.798	360	480	666
15	0.786	400	500	700
Apr. 1	0.882	360	560	660
15	0.838	340	440	660

Pumpage and chloride (continued)

Date	Pumpage (million gallons)	Chloride (ppm)		
		Tunnel 1	Tunnel 2	Tunnel 3
May 1, 1948	0.743	360	500	660
15	1.008	360	480	660
June 1	0.988	340	480	680
15	1.008	320	420	660
July 1	1.128	360	430	620
15	0.682	330	450	530
Aug. 1	0.594	320	480	680
15	0.756	330	450	530
Sept. 1	0.893	390	460	620
15	0.336	300	400	600
Oct. 1	0.649	320	400	600
15	0.630	500	600	800
Nov. 1	0.473	370	350	620

80 (BQ625945) Tumon Tunnel (Tumon Maui). Basal tunnel in limestone. Excavation completed, May 1947, Corps of Engineers, U. S. Army. Tunnel extends 1,000 ft. eastward from the pump sump. Water level, +1-2 ft. Drawdown, May 1947, 0.7 ft. while pumping at 1,100 gpm.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	30.03	32.13	30.80	32.84	33.78	27.01	-
1954	31.00	25.24	28.43	25.74	28.77	30.58	30.35	32.67	34.06	35.97	36.27	-
1955	28.50	15.23	-	21.41	16.98	31.36	33.59	33.76	34.69	32.44	34.06	30.72

Chloride
(ppm)

Apr. 23, 1947	89	May 1955	128
May 12	114	Aug.	120
Apr. 16, 1951	112	Sept.	120
Mar. 1, 1953	80	Oct.	118
15	130	Nov.	128
Apr. 1	120	Dec.	120
May 19	140	Jan. 1956	118
July 16	140	Feb.	128
Jan. 8, 1954	120	Mar.	129
Feb. 3	130	Apr.	130
Mar. 10	125	May	128
Dec. 10	80	June	126
Mar. 1955	115	July 9	116
Apr.	144	Aug. 1	114

81 (BQ654983) NCS well 2 (JCA well 2). Aquifer, limestone. Drilled, 1945. Altitude, 360 ft. Depth, about 390 ft. Diameter, 6 in. Pumping rate, 1955-1956, 200 gpm. Pumpage, 1956, about 75,000 gpd. Chloride (ppm), Nov. 28, 1945, 88; Mar. 7, 1946, 106; Jan. 16, 1947, 141.

Pumpage

Date	Rate (gpm)	Gallons
Oct. 19, 1945	50	26,000
Nov. 28	200	288,000
Dec. 1	200	288,000
Jan. 1, 1946	200	288,000
Feb. 2	200	288,000
Mar. 1	100	100,000
May 28	115	41,000
June 1	115	41,000
July 1	-	38,000
Aug. 1	110	40,000
Sept. 1	110	33,000
Oct. 1	110	26,000
Nov. 7	80	29,000
Dec. 1	80	19,000
Jan. 7, 1947	90	27,000
Feb. 1	90	16,000
Mar. 1	90	86,000
Apr. 28	80	34,000
May 7	80	34,000

82 (BQ605927) ABCD well. Aquifer, limestone. Drilled, 1945. Altitude, 116 ft. Depth, Nov. 22, 1955, 125.3 ft. Diameter, 8 in. Water level, Sept. 12, 1957, +2 ft. Pumping rate, 1945-1946, 100-200 gpm. Chloride (ppm), Aug. 24, 1945, 246; Sept. 24, 1946, 272; Nov. 8, 1946, 283; Dec. 10, 1946, 212; Jan. 16, 1947, 283; Mar. 30, 1953, 244; Apr. 6, 1953, 238.

Pumpage (gallons)

July 1, 1945	288,000	Mar. 15, 1946	319,000
15	216,000	Apr. 21	108,000
Aug. 1	234,000	May 5	108,000
15	290,000	19	108,000
Sept. 1	305,000	June 2	108,000
15	319,000	15	108,000
Oct. 1	312,000	July 1	108,000
15	327,000	16	108,000
Nov. 1	312,000	Aug. 1	8,000
15	312,000	15	4,000
Dec. 1	312,000	Sept. 14	3,000
15	319,000	Oct. 1	4,000
Jan. 1, 1946	319,000	15	4,000
15	319,000	Nov. 2	5,000
Feb. 1	319,000	16	3,000
15	319,000	Dec. 2	6,000
Mar. 1	319,000	16	8,000

83 (BR699029) MarBo well 5, Agafo Guamas (373rd Hospital well 2). Aquifer, limestone. Drilled, July 1945. Altitude, 468 ft. Depth, 495 ft. Diameter, 12 in. Pump setting, 490 ft. Water level, 1945, +2 ft. Pumping rate, 1945-1946, 100-150 gpm. Driller's log; coral, soft to medium, 0-420 ft.; coral, yellow, 420-435 ft.; coral, soft to medium, 435-495 ft.

Pumpage
(gallons)

July 29, 1945	123,000	Apr. 1, 1946	65,000
Aug. 1	104,000	15	59,000
15	94,000	May 29	72,000
Sept. 2	215,000	June 1	50,000
15	65,000	July 1	81,000
Feb. 18, 1946	41,000	15	68,000
Mar. 1	29,000		

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	1.34	1.70	0.53	0.12	1.35	1.78	-
1954	1.30	1.63	1.92	2.23	2.19	2.16	1.73	1.52	1.53	1.74	1.55	-
1955	1.52	1.75	-	1.77	1.64	1.42	1.50	1.34	1.32	1.55	1.59	1.54

Chloride
(ppm)

July 1945	53	Jan. 1954	34
Aug.	35	Mar. 1955	34
Sept.	44	May	38
Jan. 1946	45	June	38
May 1953	30	Nov.	45
June	35	Jan. 1956	25
July	30	Aug.	24

84 (BQ669949) MarBo well 1 (204th Hospital well 2). Aquifer, limestone. Drilled, July 1945 by 72nd N.C.B. Altitude, 344 ft. Depth, 385 ft. Diameter, 12 in. Casing, 385 ft.; lower 40 ft. perforated. Pumping rate, 1945-1946, 80-330 gpm; 1953-1956, 300 gpm. Driller's log; clay, red, 0-1 ft.; coral, medium, 1-250 ft.; coral, medium, with hard streaks, 250-342 ft.; coral, porous, 342-385 ft.

Pumpage
(gallons)

Aug. 15, 1945	102,000	Mar. 4, 1946	180,000
Sept. 2	24,000	18	240,000
15	90,000	Apr. 1	234,000
Dec. 24	210,000	15	216,000
Jan. 1, 1946	200,000	May 1	234,000
21	380,000	15	198,000
Feb. 1	240,000	June 1	252,000
15	180,000	27	180,000

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	15.15	13.74	14.01	13.18	13.62	14.66	-
1954	14.00	13.57	14.68	15.64	12.32	14.96	15.96	14.39	13.64	9.71	9.24	-
1955	8.56	9.84	-	14.52	14.54	9.48	10.33	10.17	9.04	8.93	9.60	11.45

Chloride
(ppm)

July 13, 1945	35	July 1955	66
Jan. 1, 1946	70	Aug.	95
Mar. 1, 1953	65	Sept.	70
Apr. 1	75	Oct.	68
May 19	60	Nov.	74
Dec. 10	65	Dec.	70
Jan. 3, 1954	70	Jan. 31, 1956	43
18	80	Feb.	68
Feb. 5	82	Mar.	68
Mar. 18	84	Apr.	68
Feb. 1955	66	May	68
Apr.	66	June	68
May	60	July	60
June	70	Aug. 1	78

85 (BQ703943) Marine Transit Center well 3. Aquifer, limestone. No other records available.

86 (BQ658953) Dededo Village well. Aquifer, limestone. Drilled, July 1945. Altitude, 337 ft. Depth, 371 ft. Diameter, 6 in. Casing, 365 ft.; lower 35 ft. perforated. Water level, 1945, +8 ft. Drawdown, 7 ft. while pumping at 30 gpm. Chloride, reported to have averaged about 35 ppm during period of operation. Driller's log; coral, medium hard, 0-329 ft.; coral, soft, porous, 329-371 ft.

Pumpage
(gallons)

Feb. 17, 1946	27,000	Apr. 21, 1946	20,000
21	35,000	28	27,000
28	29,000	May 7	25,000
Mar. 7	29,000	14	25,000
14	29,000	21	30,000
21	29,000	25	22,000
28	29,000	June 7	29,000
Apr. 7	21,000	July 7	25,000
14	27,000	14	25,000

87 (BQ615925) Harmon Field Oxygen Plant well 1. Aquifer, limestone. Drilled, June 1945 by 72nd N.C.B. Altitude, 140 ft. Depth, 154 ft. Diameter, 8 in. Casing, 154 ft.; lower 40 ft. perforated. Pumping rate, 1945-1946, 30 gpm. Chloride, July 10, 1945, 110 ppm. Driller's log; coral, medium, 0-138 ft.; coral, porous, 138-154 ft.

Pumpage
(gallons)

Sept. 14, 1945	18,000	Dec. 7, 1945	36,000
21	27,000	21	14,000
29	14,000	28	27,000
Oct. 9	18,000	Jan. 7, 1946	36,000
16	18,000	15	18,000
21	72,000	22	41,000
29	41,000	28	18,000
Nov. 6	41,000	Feb. 1	18,000
14	14,000	21	23,000
21	36,000	27	9,000
28	50,000	Mar. 9	9,000

88 (BQ579873) Ordot well. Aquifer, limestone. Drilled, Aug. 1937 by U. S. Navy. Altitude, 100 ft. Depth, 99 ft. Diameter, probably 6 in. Water level, Aug. 23, 1937, +8 ft. Chloride, Aug. 23, 1937, 18 ppm (before pumping).

Driller's log

	Depth (ft)
Soil - - - - -	0-10
Cascajo (limestone), dirty - - - - -	10-30
Clay - - - - -	30-40
Cascajo (limestone), dirty - - - - -	40-81
Limestone ledge, white - - - - -	81-100

- 89 (BQ496892) Piti Navy Yard well. Aquifer, sand. Drilled, about 1945 by U. S. Navy. Altitude, 6 ft. Depth, 36 ft. Diameter, 10 in. Casing, 36 ft.; lower 20 ft. perforated. Pumping rate, 1946, 80-130 gpm. Pumpage, Jan.-May 1946, 55,000-136,000 gpd. Chloride, Apr.-May 1946, 1,130 ppm.
- 90 (BR665016) NCS well 1. Aquifer, limestone. Drilled, Nov. 1948 by U. S. Navy. Altitude, 413 ft. Depth, 443 ft. Diameter, 10 in. Casing, 443 ft.; lower 35 ft. perforated. Water level, July 7, 1952, +3 ft. Pumping rate, 1952-1956, 400 gpm. Chloride (ppm), Sept. 14, 1950, 112; July 15, 1952, 150.
- 91 (BR667011) NCS well 1-A. Aquifer, limestone. Drilled, 1954 by U. S. Navy. Altitude, 429 ft. Depth, 463 ft. Diameter, 10 in. Casing, 463 ft.; lower 30 ft. perforated. Water level, Sept. 20, 1955, +4 ft. Pumping rate, 1955-1956, 200 gpm. Pumpage, 1955, 158,000 gpd. Chloride (ppm), July 23, 1954, 292; Dec. 15, 1955, 214; Apr. 12, 1957, 300.
- 92 (BQ567717) Malojlo well. Aquifer, tuffaceous sand. Dug, 1937 (?) by U. S. Navy. Altitude, about 550 ft. Depth, 6 ft. Diameter, 5 ft. Yield, Mar. 1956, 0.3 gpm (430 gpd).
- 93 (BQ599775) Talofofu dug well. Aquifer, tuffaceous sand. Altitude, about 600 ft. Depth, 8 ft. Diameter, 5 ft. Yield, Mar. 1956, 3-5 gpm (4,300-7,200 gpd).
- 94 (BQ486713) Piga Spring (Umatac Spring). Water flows from limestone bed in pyroclastic rock. Altitude, about 330 ft. Water collects in a small concrete reservoir and flows by gravity to Umatac. Discharge, Feb. 23, 1955, 62 gpm. Estimated daily use, 16,100 gals.
- 95 (BQ617909) V.D. 5 well 1. Aquifer, limestone. Drilled, about 1943 by Japanese Army. Altitude, about 270 ft. Depth, 288 ft. Diameter, 8 in. Pumping rate, 1945-1946, 30 gpm. Chloride (ppm), Jan. 17, 1946, 70; Jan. 28, 1946, 78; Feb. 24, 1946, 70.

Pumpage
(gallons)

Sept. 15, 1945	43,000	Mar. 1, 1946	29,000
Oct. 1	43,000	15	27,000
15	32,000	Apr. 1	27,000
Nov. 1	29,000	15	27,000
15	22,000	May 1	22,000
Dec. 1	18,000	15	18,000
15	31,000	June 1	20,000
Jan. 1, 1946	29,000	15	16,000
15	29,000	July 1	18,000
Feb. 1	13,000	14	18,000
15	29,000		

96 (BQ741951) Janum Spring. Water flows from a cave in limestone, near sea level.

Discharge
(million gallons)

Mar. 27, 1952	1.23	July 2, 1953	1.55
Apr. 11	1.16	Sept. 21	2.24
June 10	1.34	June 1, 1954	2.20
July 9	1.30	18	2.31
Aug. 6	1.51	30	1.50
Sept. 4	1.34	Oct. 11	2.74
Apr. 14, 1953	1.25	June 4, 1955	1.50
May 14	1.37	Nov. 22	1.66
June 12	1.43	May 25, 1956	1.32

97 (BR728048) Tarague Spring (Tarague cave 1). Sinkhole in limestone, extending to basal water table. Altitude, about 20 ft.

Pumpage and chloride

Date	Rate (gpm)	Gallons	Chloride (ppm)
July 1, 1945	80	77,000	318
22	100	34,000	250
Aug. 1	85	58,000	250
15	100	83,000	318
Sept. 2	100	68,000	318
16	100	89,000	314
Jan. 1, 1946	110	190,000	354
15	110	177,000	354
Feb. 1	110	129,000	354
15	110	99,000	354

98 (BQ619911) V.D. 5 well 2. Aquifer, limestone. Drilled, 1945. Depth, 278 ft. Diameter, 8 in. Pumping rate, 1945-1946, 45 gpm. Chloride, Jan. 1, 1946, 70 ppm. Reported pumped dry, June 26, 1946.

Pumpage
(gallons)

Aug. 20, 1945	30,000	Feb. 1, 1946	19,000
Sept. 1	30,000	15	43,000
15	58,000	Mar. 1	43,000
Oct. 8	58,000	15	41,000
15	43,000	Apr. 1	41,000
Nov. 1	43,000	15	41,000
15	32,000	May 1	32,000
Dec. 1	27,000	15	27,000
15	46,000	June 1	30,000
Jan. 1, 1946	43,000	15	24,000
15	43,000		

99 (BR680082) Northwest well 3 (NWAAB well 3). Aquifer, limestone. Drilled, Aug. 1945. Altitude, 558 ft. Depth, 590 ft.; measured depth, July 1956, 575 ft. Diameter, 10 in. Water level, May 2, 1956, +2 ft. Drawdown, 5.5 ft. while pumping at 250 gpm; 3.4 ft. while pumping at 150 gpm. Pumping rate, 1945-1946, 150 gpm. Pumpage (gpd), Aug. 1945, 132,000; Sept. 1945, 99,000. Chloride, Jan. 1, 1946, 70 ppm. The well was cleaned and put on a standby basis in Jan. 1957. Tested at 175 gpm, July 6, 1956.

100 (BQ497894) FRUU well. Drilled, 1945. Altitude, less than 20 ft. Depth, probably less than 25 ft. Pumping rate, 1945-1946, 15-20 gpm. Chloride, Jan. 1946, 60 ppm.

Pumpage
(gallons)

July 22, 1945	32,000	Dec. 21, 1945	12,000
28	32,000	28	12,000
Aug. 7	20,000	Jan. 7, 1946	10,000
14	22,000	14	17,000
21	22,000	21	17,000
Sept. 7	21,000	27	17,000

101 (BQ608927) 56th N.C.B. Asphalt Plant well. Aquifer, limestone. Shallow drilled well. Reported capacity, 36,000 gpd. Water reported brackish.

102 (BQ592931) LVT Repair Camp well. Aquifer, limestone. Drilled, July 1945. Altitude, 46 ft. Depth, 60 ft. Diameter, 8 in. Casing, 60 ft.; lower 15 ft. perforated. Water level, 1945, +2 ft. Pumping rate, 60 gpm. Chloride (ppm), 1945, 73; Jan. 1, 1946, 280. Driller's log; coral, hard, 0-15 ft.; coral, medium, 15-44 ft.; coral, porous, 44-60 ft.

103 (BQ598901) 5th Field Depot well 5. Aquifer, limestone. Altitude, 110 ft. Drilled, 1945. Depth, 134 ft. Diameter, 12 in. Pumping rate, 1945-1947, 30-50 gpm. Chloride (ppm), Jan. 1, 1946, 175; Mar. 14, 1946, 353; Jan. 2, 1947, 500.

Pumpage
(gallons)

Oct. 2, 1945	18,000	Mar. 15, 1946	39,000
15	24,000	Jan. 2, 1947	43,000
Jan. 1, 1946	48,000	21	43,000
17	25,000	Feb. 1	43,000
Feb. 1	29,000	15	43,000
15	29,000	Mar. 1	43,000
Mar. 1	39,000		

- 104 (BQ581785) Pilot Rehabilitation Camp well 1. Dug, 1945. Altitude, less than 30 ft. Depth, probably less than 30 ft. Pumping rate, Jan.-Feb. 1946, 40-50 gpm. Pumpage, Jan. 1946, 15,000 gpd. Chloride, Jan. 1946, 320-780 ppm.
- 105 (BQ581786) Pilot Rehabilitation Camp well 2. Dug, 1945. Altitude, less than 30 ft. Depth, probably less than 30 ft. Pumping rate, Jan.-Feb. 1946, 30 gpm. Pumpage, Jan. 1946, 12,000 gpd. Chloride, Jan. 1946, 320-560 ppm.
- 106 (BQ499894) FRUU well 2. Depth, 115 ft. Reported capacity, 24,000 gpd. Chloride, Jan. 1, 1946, 90 ppm. Reported pumped dry, Jan. 1946.
- 107 (BQ633958) Harmon new well 1 (20th AAF well 1). No records available.
- 108 (BQ602863) 6th Marines well 5. Aquifer, limestone. Drilled, 1945. Depth, reported 180 190 ft. Diameter, 12 in. Pumping rate, 60 gpm. Drawdown, 5.6 ft. Pumpage, Aug.-Sept. 1945, 64,000 gpd. Chloride (ppm), Aug. 1945, 53; Jan. 1946, 35.
- 109 (BR730047) Tarague Spring 4 (Tarague cave 4). Sinkhole in the limestone extending to basal water table. Developed, about 1947, by U.S.A.F. for military use. Altitude, 20 ft. Depth, 20 ft. Diameter, 30 ft. Pumping rate, 1953-1956, 1,100 gpm.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	41.14	41.44	39.90	42.47	36.87	41.68	-
1954	-	42.57	46.19	46.13	48.55	47.39	48.10	48.71	46.60	49.10	47.52	-
1955	49.10	44.35	-	47.53	48.69	43.75	48.84	48.64	47.19	48.38	47.19	48.84

Chloride
(ppm)

Apr. 24, 1947	363	Jan. 1955	640
July 11, 1951	715	Apr.	400
Apr. 16, 1952	654	May	320
May 2	680	June	380
Nov. 21	525	July	370
28	720	Aug.	480
Dec. 1	715	Sept.	372
14	750	Oct.	368
Jan. 1, 1953	720	Nov.	372
13	800	Dec.	372
Mar. 1	725	Jan. 31, 1956	378
14	730	Feb.	368
May 19	630	Mar.	360
June 30	700	Apr.	357
July 16	830	May	363
Jan. 8, 1954	600	June	362
Feb. 17	700	Aug. 1	482
Mar. 10	654		

110 (BR687055) Northwest well 4 (NWAAB well 4). Aquifer, limestone. Drilled, 1945. Altitude, 491 ft. Depth, 552 ft. Diameter, 12 in. Water level, 1946, +2 ft.

Pumpage
(million gallons)

June 1953	0.89	May 1954	1.46
July	0.11	May 1955	0.91
Aug.	0.27	June	3.45
Sept.	0.29	July	6.80
Oct.	2.31	Sept.	6.81
Nov.	2.45	Oct.	5.15
Feb. 1954	2.53	Nov.	0.48
Mar.	3.18	Dec.	1.64
Apr.	1.81		

Chloride
(ppm)

Jan. 1946	35	Nov. 1955	155
Apr. 30, 1953	130	Dec.	69
May 19	150	Jan. 31, 1956	90
July 7	120	Feb.	75
16	115	Mar.	78
Dec. 23	310	Apr.	65
Mar. 10, 1954	240	May	160
Jan. 1955	180	June	80
June 20	140	Aug. 1	186

111 (BQ586900) 5th Field Depot well 6. Aquifer, limestone. Drilled, 1945. Altitude, 90 ft. Pumping rate, 1945-1947, 40 gpm. Chloride, 1946, 35-70 ppm.

Pumpage
(gallons)

Nov. 22, 1945	19,000	Mar. 15	39,000
Dec. 1	19,000	Apr. 1	59,000
15	19,000	10	39,000
Jan. 1, 1946	19,000	Jan. 2, 1947	19,000
15	19,000	15	19,000
Feb. 1	19,000	Feb. 1	19,000
15	38,000	15	19,000
Mar. 1	39,000	Mar. 1	19,000

112 (BQ634935) Harmon Field well 4. Aquifer, limestone. Drilled, 1944 by U. S. Army. Altitude, 205 ft. Depth, Aug. 1956, 216 ft. Diameter, 10 in. Water level, Aug. 6, 1956, +4 ft. Drawdown, Jan. 1946, 0.1 ft. while pumping at 140 gpm. Pumping rate (gpm), 1946, 100-140; 1950, 250. Pumpage, Jan., Mar. 1946, 60,000 gpd. Chloride, Jan. 1946, 212 ppm.

113 (BQ629974) Harmon new well 3 (USASTAF well). Aquifer, limestone. Drilled, 1945 by 927th Army Engineers. Altitude, 290 ft. Depth, 312 ft. Diameter, 12 in. from surface to 284 ft.; 10 in. from 284 to 312 ft. Casing, 312 ft.; lower 28 ft. perforated. Pumping rate, 300 gpm. Pumpage, Feb.-Mar. 1946, 300,000 gpd.

Driller's log

	Depth (ft)
Clay, red - - - - -	0-2
Coral, soft - - - - -	2-80
Coral, medium - - - - -	80-140
Coral, hard - - - - -	140-245
Rock coral - - - - -	245-275
Coral, medium - - - - -	275-284
Sand - - - - -	284-297
Coral, hard - - - - -	297-304
Sand - - - - -	304-312

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	9.48	8.73	8.31	8.26	6.19	0.76	-
1954	-	12.94	13.84	13.59	14.02	10.00	11.01	10.91	10.99	10.30	10.21	-
1955	9.94	9.95	-	13.44	14.29	11.59	11.14	11.32	12.70	13.39	13.47	13.88

Chloride
(ppm)

Jan. 1946	105	Feb. 1955	245
May 19, 1953	210	Mar.	230
June 30	200	Apr.	200
July 16	220	May	140
Jan. 18, 1954	267	June	196
21	240	July	158
29	240	Aug.	140
Feb. 8	245	Sept.	160
15	240	Oct.	158
23	237	Nov.	160
Mar. 16	242	Dec.	160
Sept.	130	Jan. 31, 1956	192
Oct.	142		

114 (BQ487802) Bona Spring. Water issues from the limestone near contact with underlying volcanic rock. Altitude, about 295 ft. Flow, Aug. 14, 1956, 238 gpm (342,000 gpd).

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	15.49	27.56	20.43	-	31.72	43.60	45.24
1954	37.24	32.13	21.93	18.08	15.35	12.38	13.08	11.72	6.57	1.26	29.30	27.59

- 115 (BR737047) Tarague Spring 2 (Tarague Cave 2). Sinkhole in limestone extending to basal water table. Formerly used for military water supply. Altitude, 20 ft.
- 116 (BQ619923) NAS Agana well 5 (NAB Agana well 5). Aquifer, limestone. Drilled by 25th N.C.B. Water level, Jan. 1, 1953, 263 ft. below ground surface. Drawdown, 16 ft. while pumping at 200 gpm.
- 117 (BQ455865) NSC Reefer well (NSD Reefer well). Dug well. Altitude, 10 ft. Depth, probably less than 20 ft. Capacity, reported about 140,000 gpd. Chloride, Jan. 1946, 190 ppm.
- 118 (BQ477848) AdComPhibsPac well 1. No records available.
- 119 (BQ477848) AdComPhibsPac well 2. No records available.
- 120 (BQ572884) Chaot well (Test hole 133-2). Test hole ending in volcanic rock. Drilled by U. S. Navy. Altitude, 45 ft. Original depth, 297 ft.; measured depth, Sept. 1956, 258 ft. Used as observation well.
- 121 (BQ547906) Naval Hospital well. Aquifer, limestone. Drilled, 1953 by U. S. Navy. Altitude, 170 ft. Depth, 180 ft. Diameter, 4 in. Water level, May 20, 1953, +7 ft.
- 122 (BQ483833) Camp Knox well. No records available.
- 123 (BQ617900) Barrigada Village well. Aquifer, limestone. No other records available.
- 124 (BQ651950) Harmon Field well 5. Aquifer, limestone. Altitude, 290 ft. Depth, 298 ft. Diameter, 10 in. Water level, Sept. 8, 1955, +4 ft. Chloride (ppm), Apr. 23, 1954, 74; Sept. 8, 1955, 56. Reported never used.
- 125 (BQ712972) Yigo well. Aquifer, limestone. Altitude, 418 ft. Depth, 435 ft. Diameter, 6 in. Water level, Sept. 16, 1952, +6 ft. Yield, reported 200,000 gpd. Chloride (ppm), 1953, 60; July 18, 1957, 12 (before pumping).

126 (BR754011) Army North Field well 5 (Andersen well 5). Aquifer, limestone.

Pumpage
(million gallons)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1953	-	-	-	-	-	2.92	3.73	4.88	7.64	6.07	10.93	-
1954	7.00	7.04	9.45	6.32	2.17	4.05	8.32	8.37	6.65	7.59	8.55	-
1955	8.39	10.78	-	9.08	10.97	9.65	10.47	10.00	10.26	10.35	9.73	10.06

Chloride
(ppm)

May 28, 1951	348	Mar. 11, 1954	500
June 22	378	Sept.	306
Apr. 29, 1953	320	Mar. 1955	390
June 30	430	May	300
July 7	175	June	432
16	170	July	432
Jan. 7, 1954	470	Sept.	430
21	500	Oct.	405
Feb. 5	493	Nov.	400
17	426	Jan. 31, 1956	360

127 (BQ743974) Chunge Spring. Aquifer, sandy tuff. Altitude, 830 ft. Water collects in one 8 ft. x 10 ft., and one 4 ft. x 8 ft. concrete reservoir. Discharge, Aug. 27, 1955, 0.65 gpm (930 gpd); Aug. 9, 1956, 8.5 gpm (12,200 gpd), measured after a rain. Water formerly piped to Yigo.

128 (BR757001) B.P.M. Andersen well. Aquifer, limestone. Drilled, 1954 by B.P.M. Construction Co. Altitude, 496 ft. Depth, 528 ft. Diameter, 12 in. Casing, 523 ft.; lower 35 ft. perforated with 3/4-in. holes. Pumping rate, 1955, 200 gpm. Drawdown, 26 ft. Estimated pumpage, 1955, 96,000 gals. per month. Chloride (ppm), June 13, 1956, 36; Aug. 1, 1956, 30.

129 (BQ682985) Navy test well 1. Drilled, 1954 by U. S. Navy with rotary drilling equipment. Altitude, 450 ft. Depth, 452 ft. Diameter, 8 in. Dry hole (impermeable rock encountered above sea level).

Log

	Depth (ft)
Limestone, white, crystalline, porous - - - - -	0-300
Limestone, light tan, fine grain, porous - - - - -	300-365
Limestone, white to tan, crystalline - - - - -	365-395

Log (continued)

	Depth <u>(ft)</u>
Limestone, white to tan, crystalline, weathered, secondary calcite - - - - -	395-400
Limestone, white to light tan, crystalline - - - -	400-405
Limestone, light gray, crystalline - - - - -	405-415
Limestone, gray-green, earthy, soft - - - - -	415-430
Clay, gray-green, some limestone - - - - -	430-435
Tuff and clay, gray and green - - - - -	435-445
Tuff, gray-green - - - - -	445-450
Tuff, gray, some limestone - - - - -	450-452

130 (BR694001) Navy test well 2. Drilled, 1955 by U. S. Navy with rotary drilling equipment. Altitude, 511 ft. Depth, 305 ft. Diameter, 8 in. Dry hole (impermeable rock encountered above sea level).

Log

	Depth <u>(ft)</u>
Limestone, dull white, poorly crystalline, porous -	0-200
Limestone, light pink to white, medium crystalline, hard, contains gray clay-shale - - -	200-235
Limestone, light tan to white, crystalline, porous, hard - - - - -	235-245
Limestone, dark tan to white - - - - -	245-250
Limestone, tan, light gray, white - - - - -	250-255
Limestone, dirty white to amber-brown, fine grained, porous - - - - -	255-265
Limestone, similar to above but appears weathered contains green clay at 270 ft. - - - - -	265-275
Tuff or shale, similar to above but harder - - - -	275-280
Tuff, light gray green, fine grain, conchoidal fracture - - - - -	280-305

131 (BQ575777) Ypan well. Aquifer, limestone. Altitude, 130 ft. Reported abandoned because of high salinity.

132 (BQ625867) B.P.M. well 6. Aquifer, limestone. Drilled, 1954 by U. S. Navy. Altitude, about 330 ft. Chloride, Apr. 26, 1955, 880 ppm. Reported abandoned because of high salinity, contamination by gasoline and a crooked hole.

133 (BQ647993) NCS well 3. Aquifer, limestone. Drilled, 1948, by U. S. Navy. Altitude, 340 ft. Depth, 350 ft. Diameter, 10 in. Casing, 350 ft.; lower 30 ft. perforated. Water level March 12, 1958, +5 ft. Estimated pumping rate, 1955, 200 gpm. Driller's log; soil, and coral, 0-120 ft.; coral, hard, 120-310 ft.; coral sand, 310-350 ft.

- 134 (BQ566777) Talofofu well. Drilled, about 1946 by U. S. Navy. Altitude, 295 ft. Bottom of well may be in volcanic rock.
- 135 (BQ598918) Island Public Works Yard well 1. Aquifer, limestone. Drilled, 1948 by U. S. Navy. Altitude, 54 ft. Depth, 65 ft. Diameter, 10 in. Casing, 65 ft.; lower 20 ft. perforated. Water level, 1948, +2 ft. Reported never used because the water had a bad odor.
- 136 (BQ589927) Camp Watkins well 1. Aquifer, limestone and sand. Drilled, 1948 by U. S. Navy. Altitude, 50 ft. Depth, 62 ft. Diameter, 8 in. Casing, 62 ft.; lower 15 ft. perforated. Water level, 1948, +2 ft. Pumping rate, 1948, 60 gpm. Reported low salinity.
- 137 (BQ593931) Camp Watkins well 2. Aquifer, limestone and sand. Drilled, 1948 by U. S. Navy. Altitude, 36 ft. Depth, 42 ft. Diameter, 10 in. Casing, 42 ft.; lower 15 ft. perforated. Water level, 1948, +4 ft. Pumping rate, 1948, 60 gpm.
- 138 (BQ645913) NCS Golf Course well. Aquifer, limestone. Drilled, 1948 by U. S. Navy. Depth, 485 ft. Diameter, 8 in. Casing, 485 ft.; lower 30 ft. perforated. Reported low salinity. Well never used. Driller's log; coral, soft, 0-150 ft.; coral, medium, 150-465 ft.; coral, porous, 465-485 ft.
- 139 (BQ454848) Boston Exchange well 1. Aquifer, limestone. Drilled, 1948 by U. S. Navy. Depth, 36 ft. Diameter, 6 in. Casing, 36 ft.; lower 15 ft. perforated. Reported never used because of high salinity.
- 140 (BQ478726) Alatgue Spring. Water issues from limestone interbedded with tuff. Altitude, 330 ft. Discharge, Feb. 23, 1955, 30 gpm.
- 141 (BQ487690) Siligin Spring. Water issues from limestone. Altitude, 300 ft. Water collects in a small concrete reservoir and flows by gravity to Merizo to supplement river supply.

Discharge
(gpm)

Apr. 26, 1954	48	June 2, 1954	52
27	54	21	49
May 6	48	Apr. 17, 1957	32
13	45	June 10	25

- 142 (BQ636904) NCS well 4 (Barrigada well 4). Aquifer, limestone. Drilled, 1949 by U. S. Navy. Depth, 443 ft. Diameter, 10 in. Casing, 443 ft.; lower 35 ft. perforated. Chemical analysis, Oct. 10, 1950, chloride, 142 ppm; dissolved solids, 530 ppm; total hardness, 280 ppm. Driller's log; coral, 0-395 ft.; crevice, 395-400 ft.; coral lime, very hard, 400-407 ft.; coral sand, 407-443 ft.

- 143 (BQ465833) NSC Oxygen Plant well 1. Aquifer, limestone and sand. Drilled, 1949 by U. S. Navy. Altitude, 7 ft. Depth, 53 ft. Diameter, 10 in. Casing, 53 ft.; lower 20 ft. perforated. Brackish water, used for cooling. Driller's log; mud, black and yellow clay, 0-30 ft.; coral sand, 30-53 ft.
- 144 (BQ605920) Agana Power Plant well 1. Aquifer, limestone. Drilled, 1949 by U. S. Navy. Altitude, 95 ft. Depth, 104 ft. Diameter, 12 in. Casing, 104 ft.; lower 20 ft. perforated. Water level, 1949, +4 ft. Reported never used. Driller's log; clay, red, and boulders, 0-90 ft.; coral, soft, 90-104 ft.
- 145 (BQ573893) Base Development test hole 133-1. Drilled, 1954 by U. S. Navy. Altitude, 10 ft. Depth, 468 ft. No other records available.
- 146 (BQ583764) Camp Dealey well 1. Aquifer, sand. Drilled, 1948 by U. S. Navy. Altitude, 11 ft. Depth, 35 ft. Water level, 1948, +4 ft. Driller's log; boulders, 0-15 ft.; coral, very hard, 15-30 ft.; coral sand, 30-35 ft.
- 147 (BQ566898) Base Development test hole 133-3. Drilled by U. S. Navy. Altitude, 33 ft. Depth, 186 ft.

Driller's log
(condensed)

	<u>Depth</u> <u>(ft)</u>
Clay, reddish brown - - - - -	0-37
Limestone, yellow and white, coarse-grained - - -	37-81
Limestone, yellow and white, medium-grained - - -	81-86
No samples - - - - -	86-96
Limestone, yellow and white, very fine-grained -	96-121
Limestone, yellow and white, coarse-grained - - -	121-139
Clay, bluish-green, fine-grained - - - - -	139-181
No description - - - - -	181-186

- 148 (BQ563887) U.S.G.S. Soil Hole A. Test hole in argillaceous limestone. Drilled 1953 by U. S. Geological Survey with a power auger. Altitude, 63 ft. Depth, June 1957, 48 ft. Diameter, 2 in. Water level, Jan. 3, 1956, +26 ft.
- 149 (BQ632881) U.S.A.F. radio well. Aquifer, limestone. Drilled, 1955 by U. S. Navy. Altitude, 244 ft. Depth, 284 ft. Diameter, 8 in. Water level, 1955, +2 ft.
- 150 (BR772017) Andersen quarry well. Aquifer, limestone. Drilled, Jan. 1955 by U. S. Navy. Altitude, 458 ft. Depth, 490 ft. Diameter, 12 in. Water level, Jan. 21, 1957, +4 ft.

- 151 (BQ467791) Auau Spring. Water issues from limestone at contact with underlying volcanic rock. Altitude, 270 ft. Discharge (gpd), May 20, 1937, 35,000 (est.); Feb. 26, 1957, 31,680.
- 152 (BQ468788) Mao Spring. Water issues from limestone at contact with underlying volcanic rock. Altitude, 550 ft. Discharge, Feb. 26, 1957, 126,700 gpd.
- 153 (BQ583759) Asanite Spring (Asanite Cave). Sinkhole in limestone extending to basal water table. Altitude, 20 ft. Depth, about 25 ft. Chloride, Jan. 18, 1956, 646 ppm.
- 154 (BQ690919) Campanaya Spring (Campanaya Cave). Sinkhole in limestone extending to basal water table. Used by the Japanese Military forces from about 1942 to 1944, and by the U. S. Army from 1947 to 1950 to supply nonpotable water. Altitude, 20 ft. Chloride, reported more than 1,000 ppm while pumping at 400 gpm. Chloride, Jan. 1957, 600 ppm.
- 201 (BQ554793) P.I.E. WD-503. Test hole in volcanic agglomerate. Drilled, 1947 by Pacific Island Engineers. Altitude, 325 ft. Depth, 265 ft. Diameter, 3 in. Casing, 265 ft. Water level, 1947, +321 ft.

Driller's log
(condensed)

	<u>Depth</u> <u>(ft)</u>
Clay, reddish brown, and buff, mottled - - - - -	0-17
Tuff, buff to light gray, soft, weathered, fractured - - - - -	17-82
Tuff, similar to above, with limestone - - - - -	82-150
Talc, greenish gray, and fault gouge - - - - -	150-187
Agglomerate, white and gray, medium-grained, tuffaceous - - - - -	187-213
Agglomerate, gray, very coarse-grained, tuffaceous - - - - -	213-265

- 202 (BQ555791) P.I.E. WD-504. Test hole in volcanic rock. Drilled, Sept. 1947 by Pacific Island Engineers. Altitude, 312 ft. Depth, 245 ft. Diameter, 3 in. Casing, 245 ft. Water level, 1947, +304 ft.

Driller's log
(condensed)

	<u>Depth</u> <u>(ft)</u>
Clay, red and tan - - - - -	0-8
Agglomerate, reddish to buff, soft, weathered, fractured - - - - -	8-65

Driller's log (continued)
(condensed)

	Depth <u>(ft)</u>
Limestone, coralline, white, coarse-grained, fractured - - - - -	65-108
Talc (fault zone in limestone) - - - - -	108-138
Agglomerate, greenish-gray, coarse, weathered, fractured, some talc - - - - -	138-163
Talc (fault zone in green tuff) - - - - -	163-245

203 (BQ543775) P.I.E. WR-509. Test hole in tuffaceous agglomerate. Drilled, July 1948 by Pacific Island Engineers. Altitude, 106 ft. Depth, 116 ft. Diameter, 10 in. Water level, July 14, 1948, +18 ft.

204 (BQ542772) P.I.E. WR-505. Test well in limestone. Drilled, April 1948 by Pacific Island Engineers. Altitude, 26 ft. Depth, 100 ft. Diameter, 16 in. from 0-68 ft.; 12 in. from 68-100 ft. Casing, 12 in.; slotted from 0-68 ft.; 8 in. liner from 68-100 ft. Water level, April 24, 1948, +19 ft. Yield, 35 gpm with 32-ft. drawdown (chloride, 505 ppm); 54 gpm with 36-ft. drawdown (chloride, 769 ppm); 70 gpm with 39-ft. drawdown (chloride, 779 ppm).

205 (BQ541769) P.I.E. WR-507. Test hole in volcanic agglomerate. Drilled, May 1948 by Pacific Island Engineers. Altitude, 22 ft. Depth, 45 ft. Diameter, 15 in. Casing, none. Water level, May 1948, +20 ft. Driller's log; clay loam, black, silty, 0-21 ft.; agglomerate, buff, medium and coarse, tuffaceous, fractured, 21-45 ft.

206 (BQ489790) P.I.E. WD-855. Test hole in volcanic rock. Drilled, April 1948 by Pacific Island Engineers. Altitude, 314 ft. Depth, 280 ft. Diameter, 3 in. Water level, Apr. 1948, +308 ft.

Driller's log
(condensed)

	Depth <u>(ft)</u>
Clay loam, yellowish brown - - - - -	0-20
Siltstone, tuffaceous, buff, fine-grained, brown, weathered - - - - -	20-50
Tuff, calcareous, white, fine-grained and interbedded basaltic conglomerate - - - - -	50-70
Agglomerate, basaltic, coarse, fractured - - - - -	70-110
Tuff, calcareous, white, fine-grained, with coral limestone and basaltic agglomerate - - -	110-202
Tuff, calcareous, interbedded gray and dark gray, fine-grained - - - - -	202-210
Tuff, calcareous, interbedded gray and light, fine-grained, fractured - - - - -	210-220
Basalt, dark greenish gray to black, fine- grained, fractured - - - - -	220-280

207 (BQ491795) P.I.E. WD-857. Test hole in volcanic rock. Drilled, Mar. 1948 by Pacific Island Engineers. Altitude, 284 ft. Depth, 150 ft. Diameter, 3 in. Water level, Mar. 1948, +282 ft.

Driller's log
(condensed)

	<u>Depth (ft)</u>
Tuff, white, bedded, fine- and medium-grained, weathered, broken - - - - -	0-60
Conglomerate, basaltic, dark gray, medium- to coarse-grained, with some limestone - - - - -	60-81
Conglomerate, basaltic, dark gray, very coarse-grained, fractured, and coral limestone - - - -	81-89
Tuff, calcareous, white, fine- and medium-grained - - - - -	89-114
Tuff, calcareous, white, and basaltic agglomerate	114-150

208 (BQ507862) P.I.E. WR-526. Test well in volcanic rock. Drilled, 1948 by Pacific Island Engineers. Altitude, 514 ft. Depth, 300 ft. Diameter, 15 in. Casing, 300 ft. Water level, October 8, 1948, +214 ft. Yield, 133 gpm with 131 ft. drawdown.

Driller's log
(condensed)

	<u>Depth (ft)</u>
Clay, green-brown, semiplastic to sandy, heavy -	0-39
Clay, green-brown, sandy, with tuff fragments - -	39-59
Tuff, light-gray to blue-gray, medium-grained, weathered - - - - -	59-98
Agglomerate, tuffaceous, gray, medium-grained, hard, massive - - - - -	98-140
Tuff, gray to blue-gray, medium-grained - - - - -	140-263
Tuff, gray, fine- to medium-grained - - - - -	263-300

209 (BQ506866) P.I.E. WR-520. Aquifer, volcanic rock. Drilled, Dec. 1947 by Pacific Island Engineers. Altitude, 364 ft. Depth, 247 ft. Diameter, 15 in. Water level, Dec. 1947, +322 ft. Drawdown, Jan. 16, 1948, 66 ft. while pumping at 44 gpm. Well was pumped at 90 gpm during dry seasons of 1948, 1949, and 1950.

210 (BQ510868) P.I.E. WD-525. Test well in volcanic rock. Drilled, 1948 by Brown-Pacific-Maxon Const. Co. Altitude, 283 ft. Depth, 300 ft. Diameter, 15 in. Water level, 1948, +246 ft. Yield, May 20, 1948, 90 gpm, with about 260 ft. drawdown.

Driller's log
(condensed)

	Depth <u>(ft)</u>
Clay loam, reddish-brown, sandy - - - - -	0-40
Tuff, reddish-green, fine-grained, weathered - -	40-70
Basalt, gray, fine- and medium-grained, solid, slightly weathered - - - - -	70-100
Basalt, gray, fine-grained - - - - -	100-130
Tuff, greenish-gray, medium-grained, hard, and interbedded layers of soft fine-grained gray tuff	130-200
No sample - - - - -	200-300

211 (BQ507866) P.I.E. WR-524. Test well in volcanic rock. Drilled, 1948 by Brown-Pacific-Maxon Const. Co. Altitude, 347 ft. Depth, 280 ft. Diameter, 15 in. Casing, 106 ft. of 10-in. pipe. Yield, Oct. 1948, 60 gpm, with 196 ft. drawdown.

212 (BQ506877) P.I.E. WR-527. Test well in basalt. Drilled, 1948 by Pacific Island Engineers. Altitude, 287 ft. Depth, 300 ft. Diameter, 15 in. Yield, Aug. 1948, 145 gpm, with 180 ft. drawdown.

Driller's log

	Depth <u>(ft)</u>
Clay, reddish-brown, plastic - - - - -	0-40
Clay, gray to blue, semiplastic to sandy - - - -	40-60
Basalt, dark-gray to black, solid, massive - - -	60-300

213 (BQ542770) P.I.E. WR-506. Test well in basalt. Drilled, May 1948 by Pacific Island Engineers. Altitude, 21 ft. Depth, 145 ft. Diameter, 15 in. and 8 in. Water level, May 1948, +1 ft. Yield, May 29, 1948, 86 gpm with 91 ft. drawdown. Chloride, May 29, 1948, 76 ppm.

Driller's log

	Depth <u>(ft)</u>
Clay, yellow-brown - - - - -	0-15
Clay, black, sandy - - - - -	15-68
Clay, green-gray, sandy - - - - -	68-83
Sand, green-black, and silt - - - - -	83-88
Tuff, white to gray, coarse- to fine-grained - -	88-95
Basalt, green to gray, medium-grained, fresh - -	95-145

214 (BQ542773) P.I.E. WR-508. Test well in limestone and volcanic rock. Drilled, June 1948 by Pacific Island Engineers. Altitude, 108 ft. Depth, 168 ft. Diameter, 15 in. and 10 in. Water level, July 1949, +18 ft. Yield, July 1949, 150 gpm. Water-bearing zone between 97 and 112 ft. Chloride, June 1948, 31 ppm.

Driller's log
(condensed)

	Depth (ft)
Clay, tan to dark gray - - - - -	0-33
Limestone, faintly pink to white, fine- to coarse-grained, tuffaceous - - - - -	33-76
Limestone, gray, buff, white, medium-grained, tuffaceous - - - - -	76-103
Limestone, buff to white, medium-grained, tuffaceous, fresh - - - - -	103-144
Agglomerate, gray to buff, tuffaceous, weathered - - - - -	144-150
Agglomerate, gray to buff, coarse-grained, some limestone and tuff - - - - -	150-168

215 (BQ546768) P.I.E. D-494. Test hole in volcanic rock. Drilled, July 1947, by Pacific Island Engineers. Altitude, 20 ft. Depth, 135 ft. Diameter, 3 in. Water level, July 11, 1947, +10 ft.

Driller's log

	Depth (ft)
Clay, dark-gray to black, interbedded with clay loam, silt loam, sandy loam, and silty gravel -	0-118
Agglomerate, buff to gray, coarse, weathered, with blocks and fragments of limestone - - -	118-130
Tuff, gray, fine- to medium-grained, fractured, weathered - - - - -	130-135

Observations

Depth tested (ft)	Discharge (gpm)	Drawdown (ft)	Chloride (ppm)
120-135	6	15.8	1,085
	6	16.0	1,228
	6	16.1	1,310
	6	16.1	1,369
110-135	14	8.2	1,375
	14	8.2	1,472
	14	8.2	1,554

216 (BQ545768) P.I.E. D-495. Test hole in volcanic rock. Drilled, July 1947, by Pacific Island Engineers. Altitude, 175 ft. Depth, 151 ft. Diameter, 3 in. Water level, July 12, 1947, +176 ft. above land surface. Drawdown, 11.5 ft. while pumping at 15 gpm.

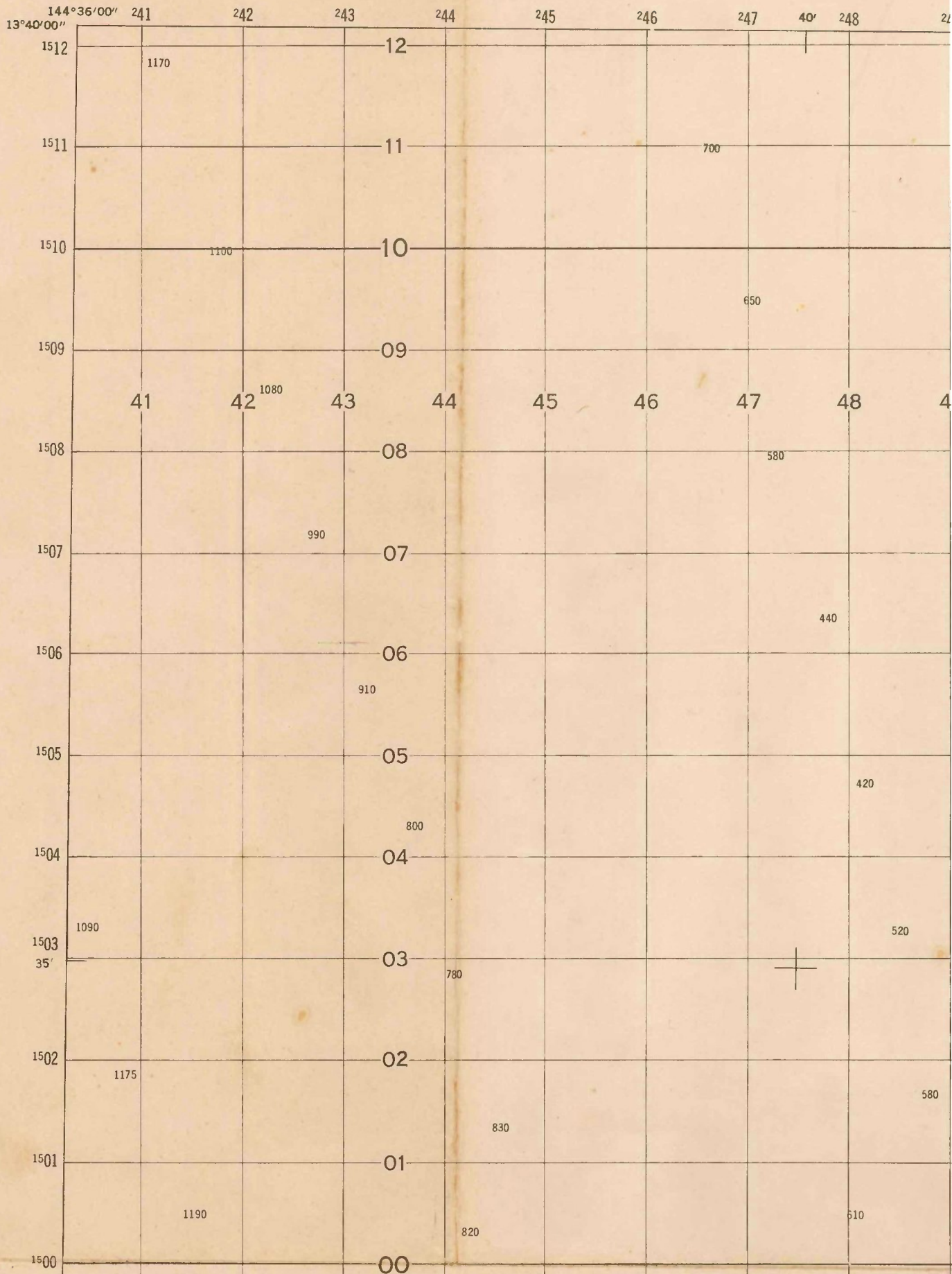
Driller's log

	<u>Depth</u> <u>(ft)</u>
Clay loam, brown and gray mottled - - - - -	0-19
Clay, dark-gray to black, with alternating layers of clay loam, silt loam, sandy loam, and silty gravel - - - - -	19-101
Agglomerate, buff, coarse, with blocks and fragments of limestone, and white, fine- grained fractured tuff - - - - -	101-151

Observations

<u>Discharge</u> <u>(gpm)</u>	<u>Chloride</u> <u>(ppm)</u>
7	217
6	245
13	262
15	269
15	296
15	290

MARIANA ISLANDS 1:50,000

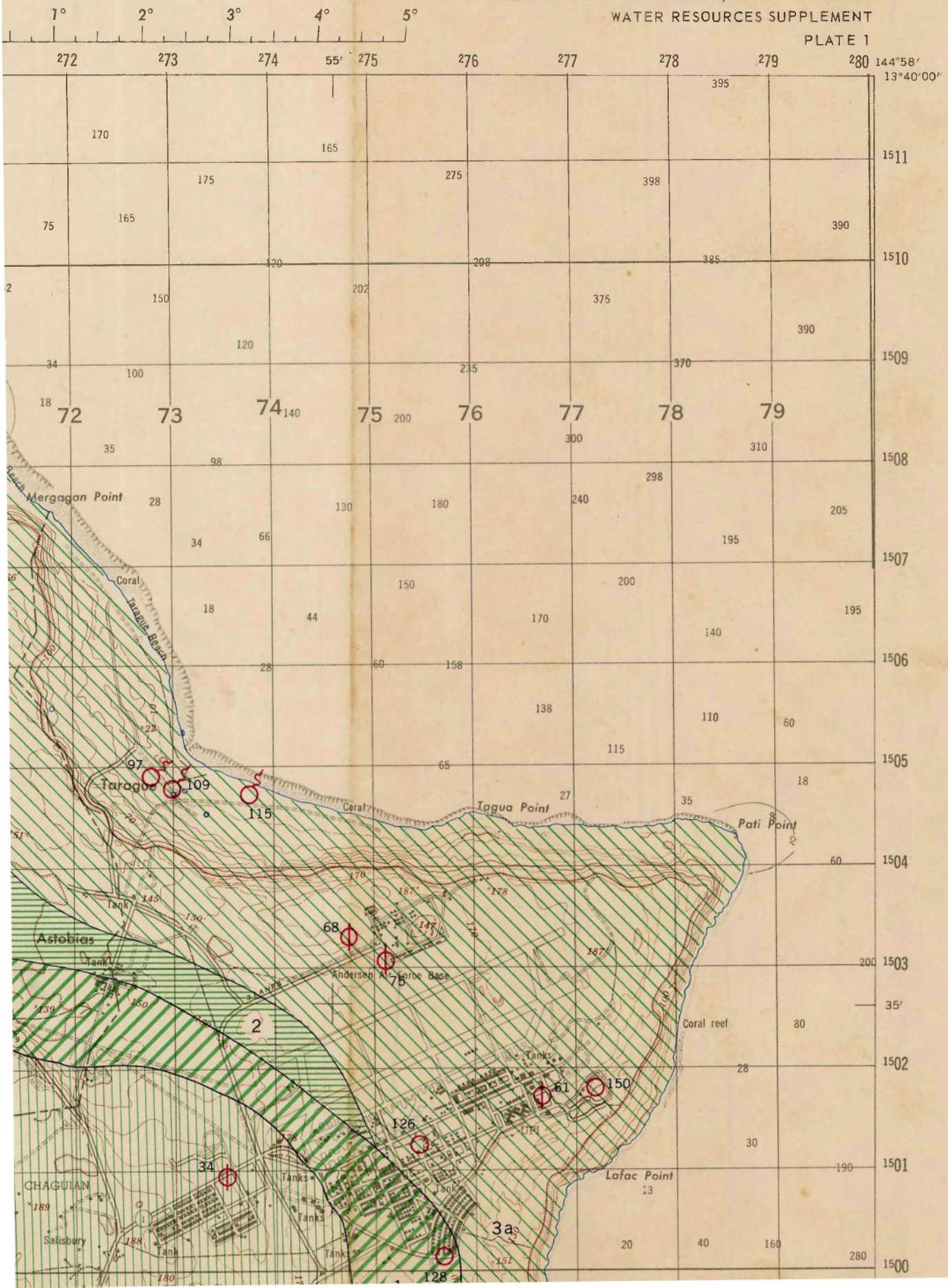


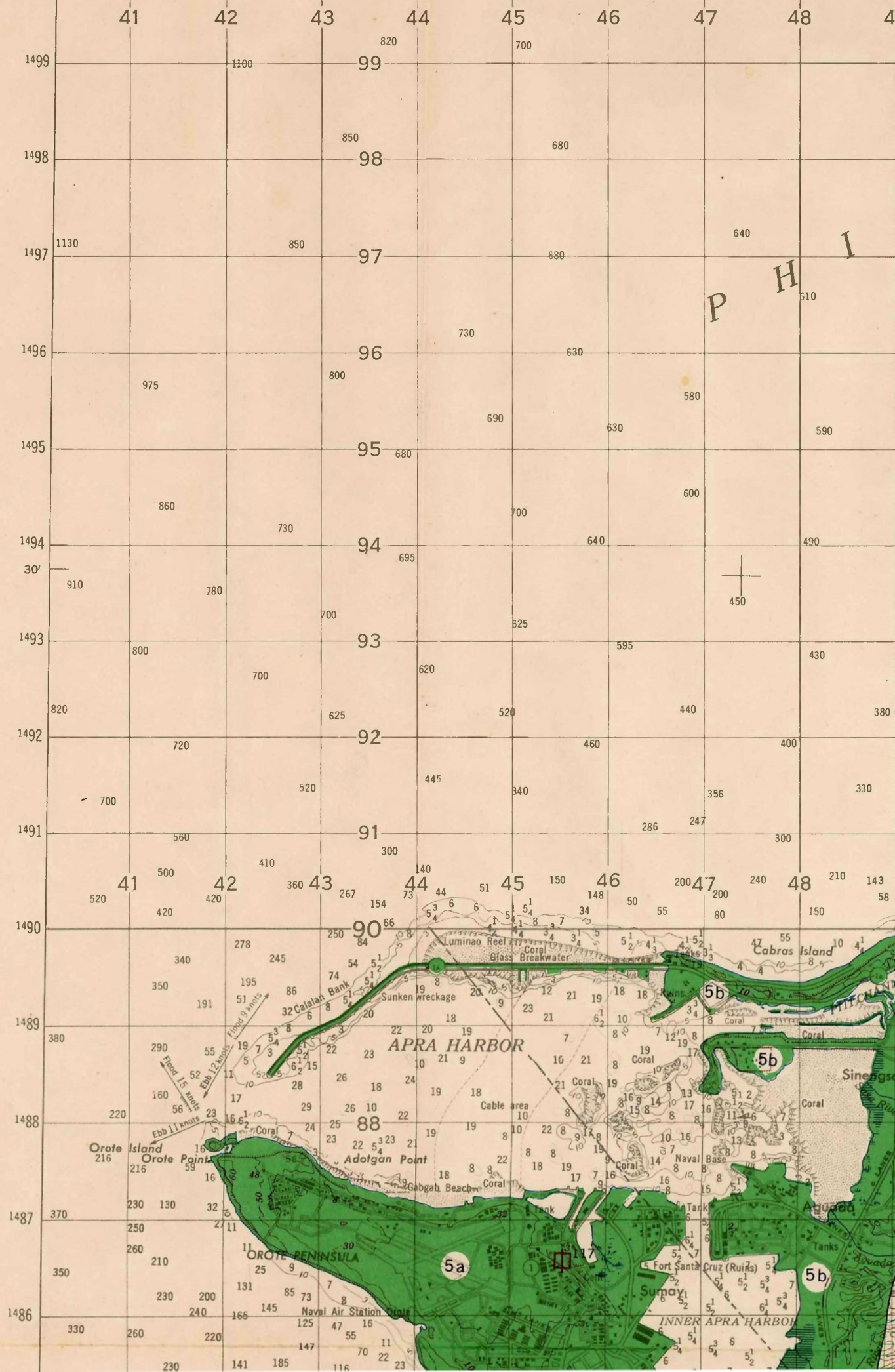


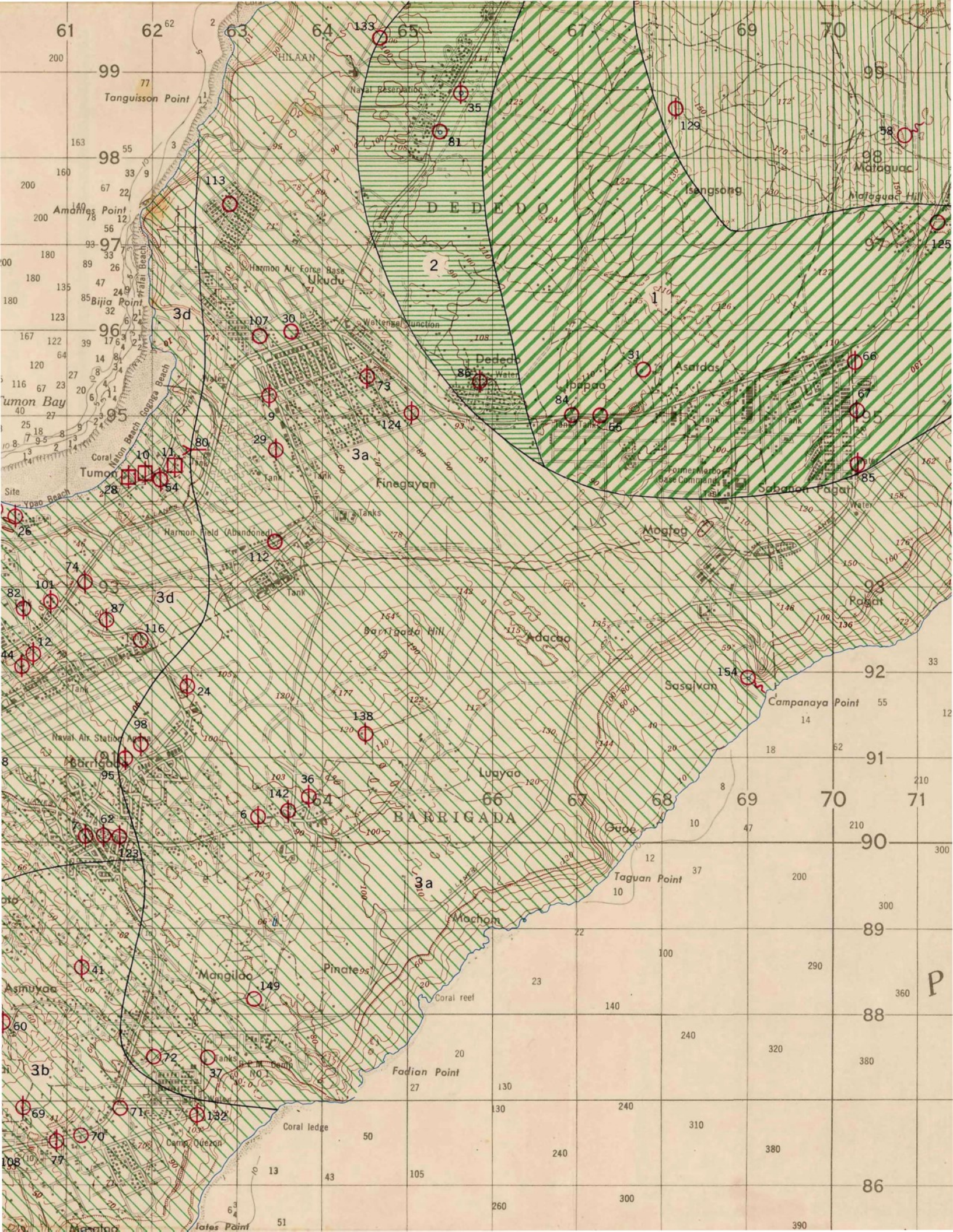
MILITARY GEOLOGY OF GUAM, MARIANA ISLANDS
WATER RESOURCES SUPPLEMENT

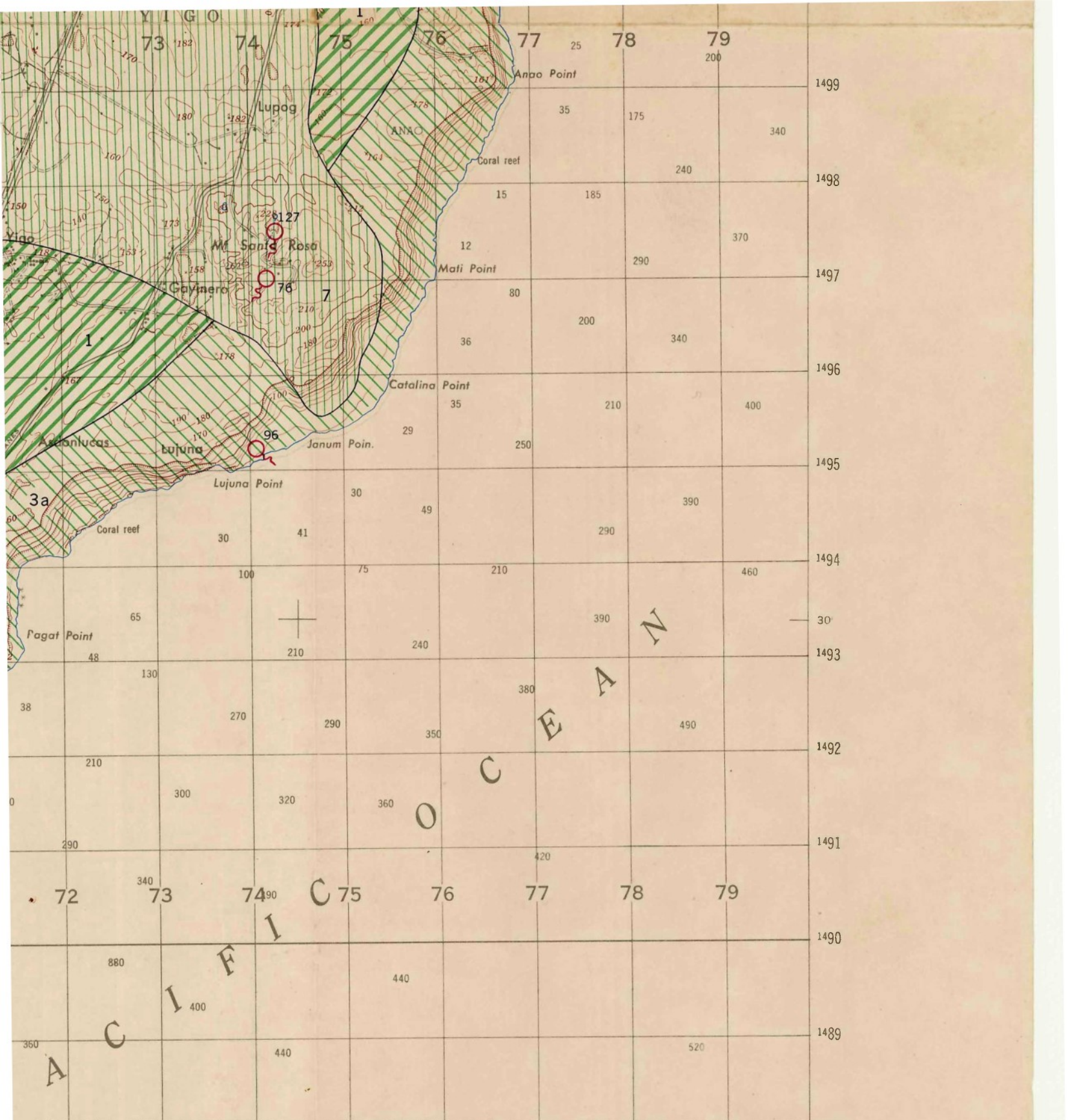
PLATE 1

SERIES W743
GUAM
EDITION 1-AWS (AFFE)







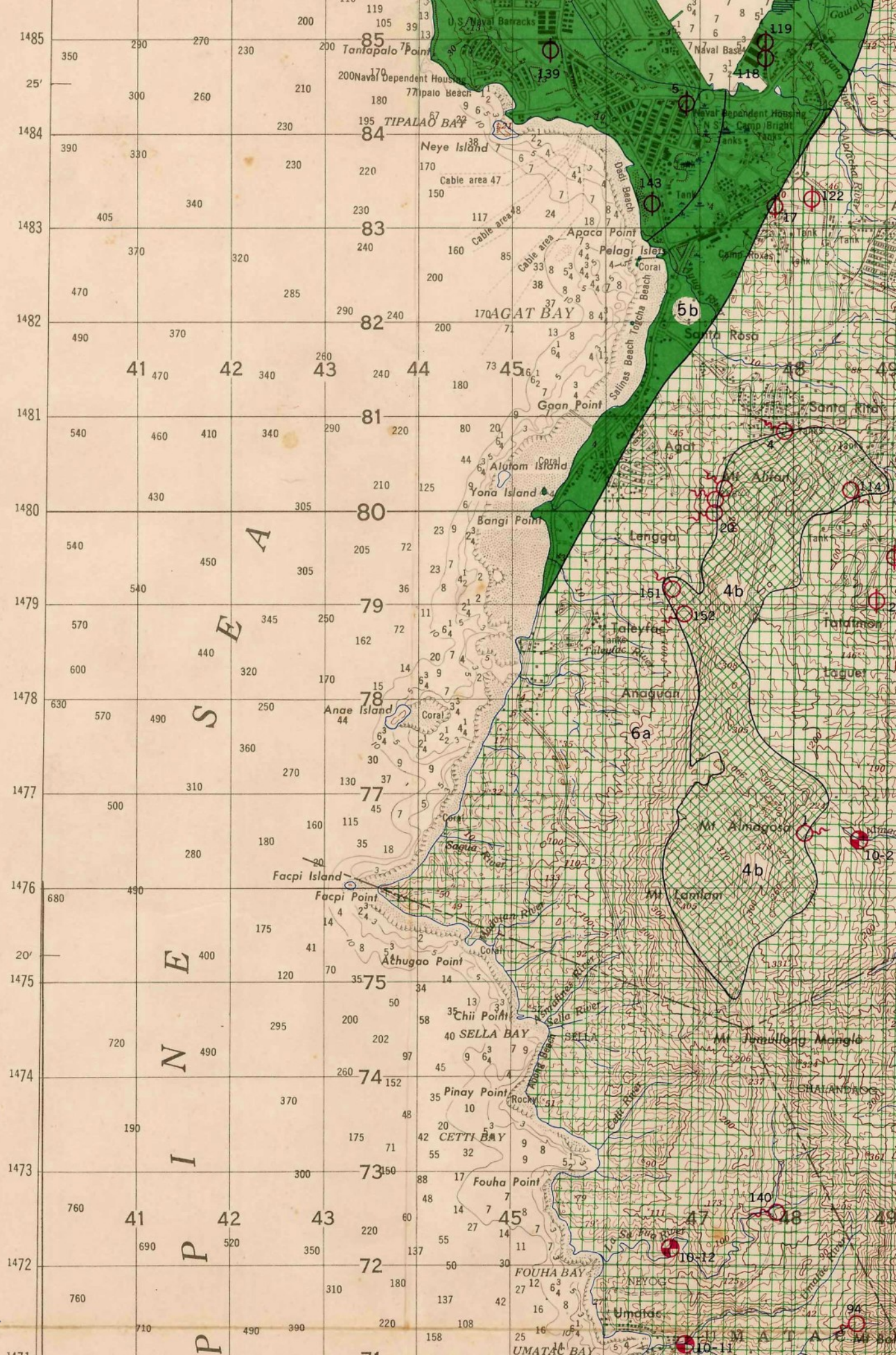


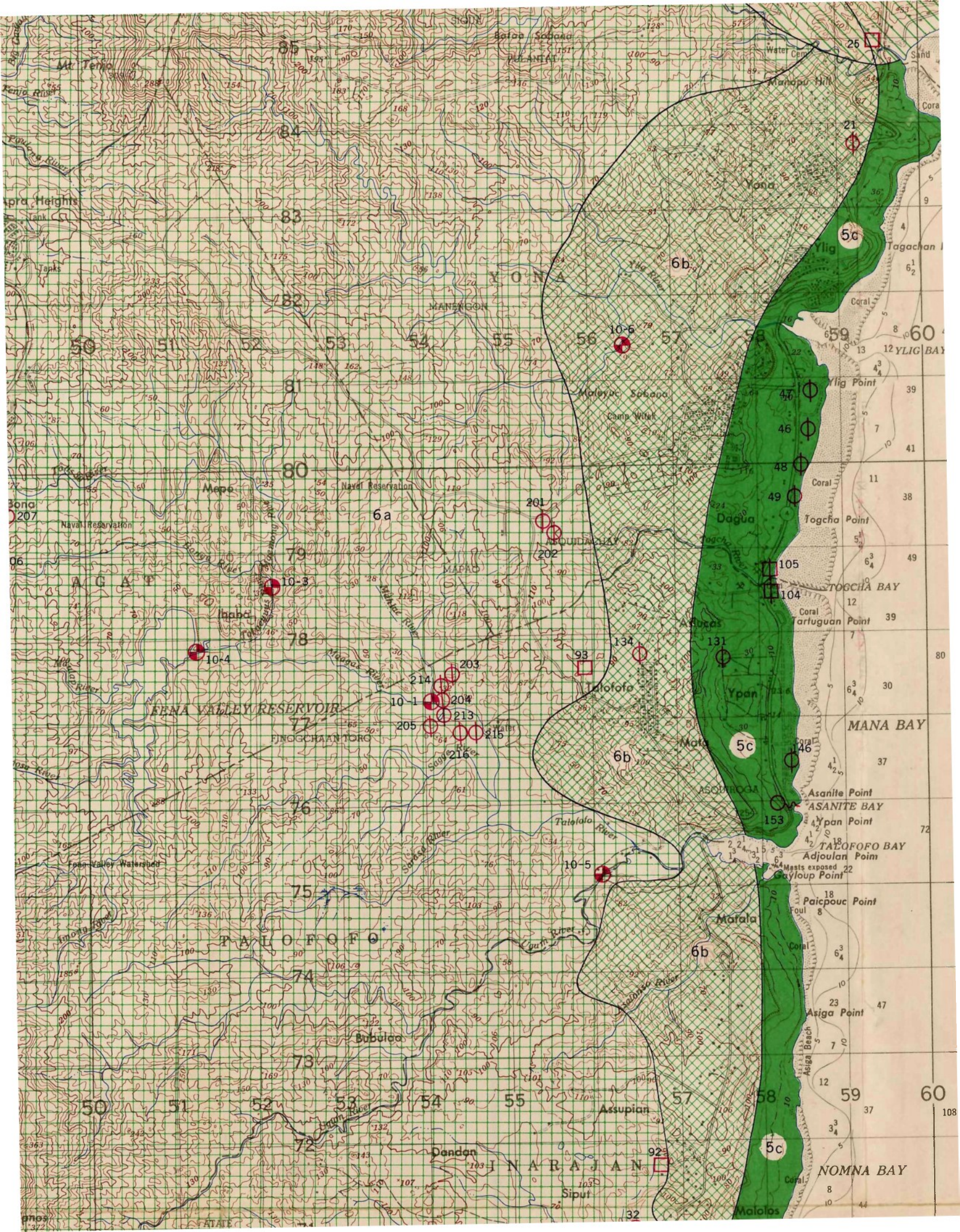
WATER RESOURCES, GUAM

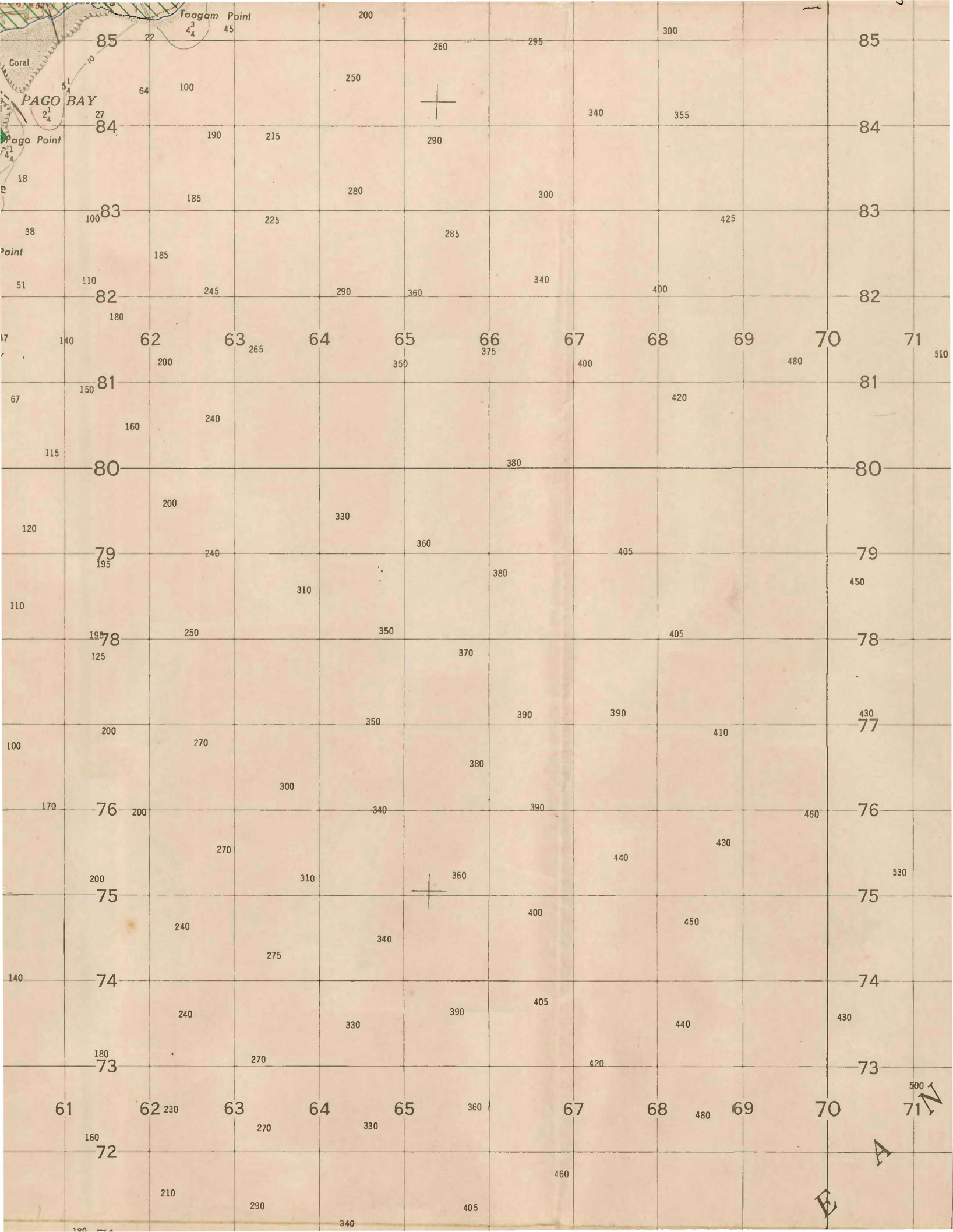
EXPLANATION



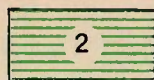
Area underlain by limestone containing basal ground water that stands 5 to 7 feet above sea level. Limestone has high permeability and yields water readily to drilled wells and tunnels. Locally, especially near boundary with area 7, relatively impermeable volcanic rock and nancalcareous sediments underlying the



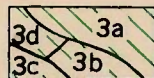




limestone may be present above sea level. Most of the water has a chloride content less than 100 ppm, but heavy pumping of wells may cause intrusion of sea water and an increase in salinity.



Area underlain by limestone containing basal ground water that stands 3 to 7 feet above sea level. Limestone has high permeability and will yield water readily to drilled wells and tunnels. Most of the water has a chloride content less than 250 ppm, but heavy pumping of wells probably will cause sea-water intrusion and an increase in salinity.



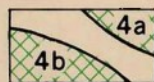
Area underlain by limestone containing basal ground water.

In subarea 3a the limestone has high permeability, and the water table stands 1 to 5 feet above sea level. Chloride content of the water ranges from 30 ppm in interior parts of the subarea to more than 1,000 ppm in coastal parts. Heavy pumping of most wells will cause sea-water intrusion and an increase in the salinity of the water. Janum Spring (96), which is at sea level on the eastern shore, has a discharge ranging from 1 to 3 mgd and a chloride content of about 30 ppm.

In subarea 3b the water table stands 1 to 5 feet above sea level, and, when undisturbed by pumping, the water contains 30 to 400 ppm of chloride. Sea-water intrusion and large increases in salinity occur when wells are pumped at rates greater than 50 to 100 gpm.

In subarea 3c the limestone has lower permeability than the rock in other parts of area 3, and the height of the water table ranges from about 1 foot above sea level in coastal parts to about 20 feet in interior parts. The water generally contains less than about 40 ppm of chloride, but the salinity may rise in heavily pumped wells. Agana Spring (2) yields water having a chloride content of 30 to 40 ppm and has an average flow greater than 1 mgd.

In subarea 3d the water table stands 1 to 4 feet above sea level, and, when undisturbed by pumping, the water has a chloride content ranging from 30 to more than 1,000 ppm. The limestone yields water readily to wells and tunnels, but pumping causes intrusion of sea water, and most wells yield water having more than 500 ppm of chloride.



Area consisting of limestone caps on hills of volcanic rock. The limestone contains thin bodies of high-level ground water that are perched on the relatively impermeable volcanic rocks. The water discharges at springs at the edges of the limestone caps. Flow of the springs varies greatly with seasonal rainfall.



Area in coastal parts of southern Guam underlain by limestone, alluvium, and beach deposits containing basal ground water. Most of the water is brackish. Locally, deposits of alluvium may contain water having less than 500 ppm of chloride, but the yields are low. The limestone and beach deposits have generally high permeability.

1485

25'
1484

1483

1482

1481

1480

1479

1478

1477

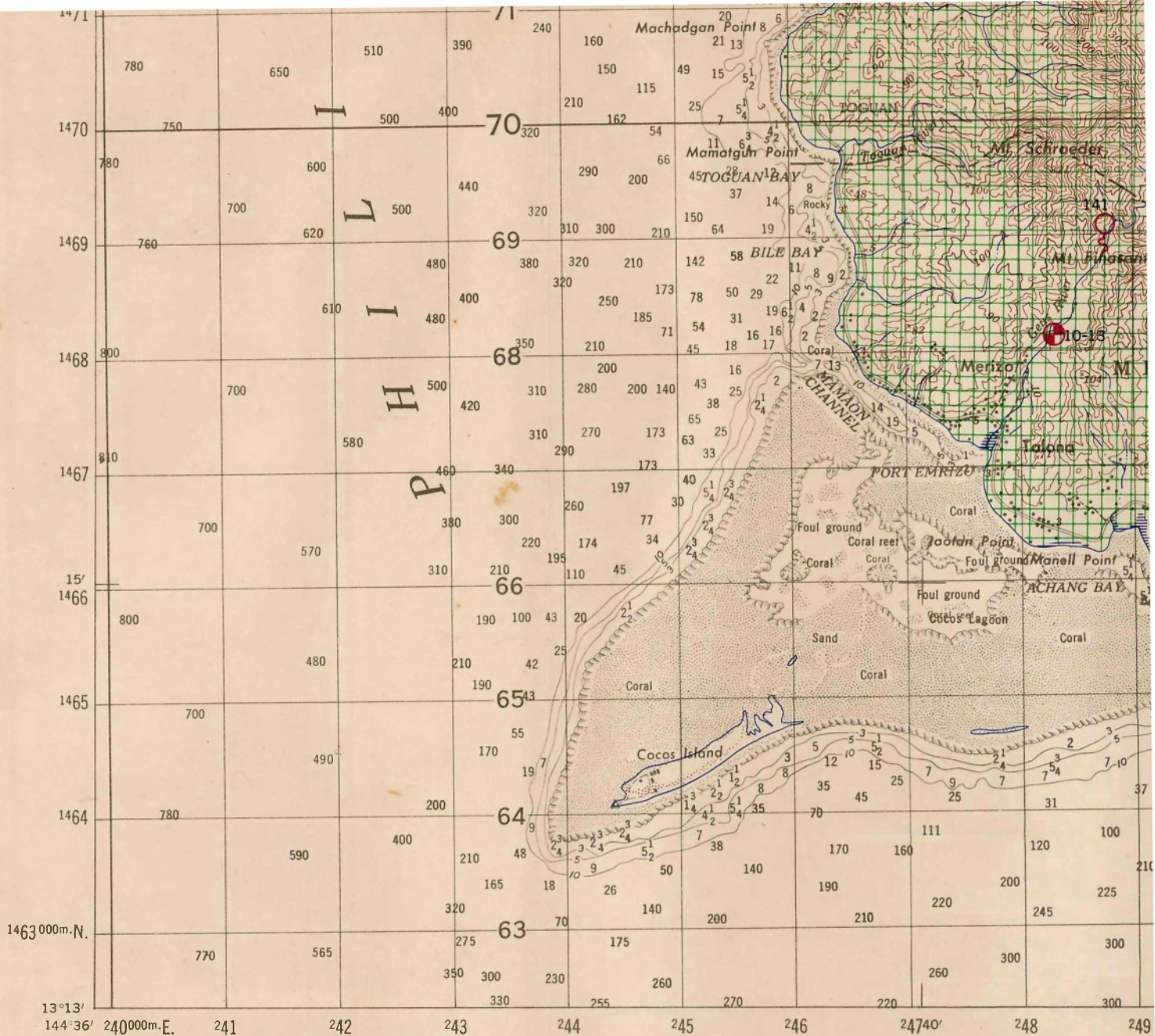
1476

1475
20'

1474

1473

1472



Ground-water resources by Porter E. Ward.

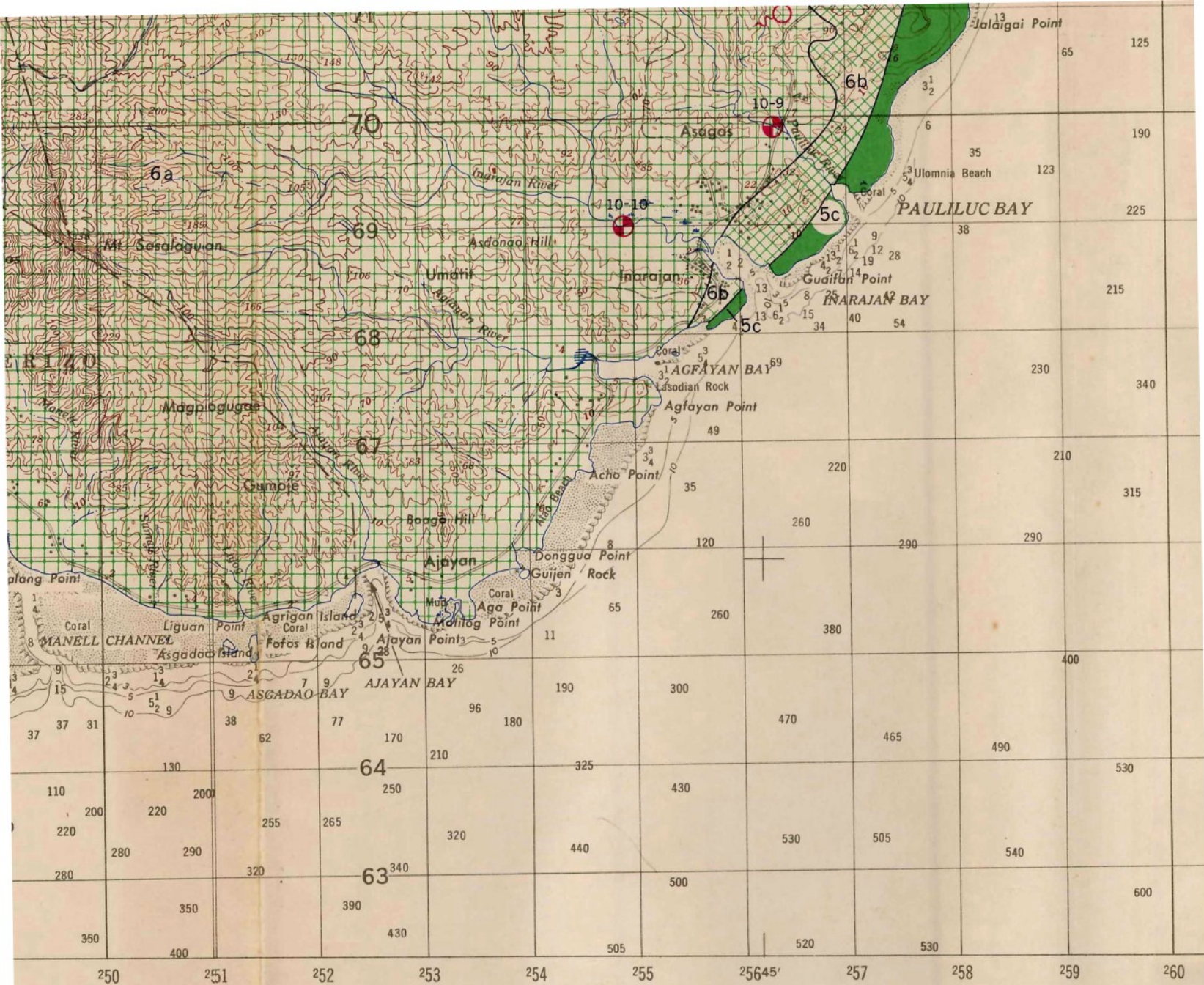
W743

Edition 1-AMS (AFFE)

Prepared under the direction of the Engineer, HQ, AFFE, by the 64th Engineer Battalion (Base Topographic). Compiled in 1954 by photogrammetric (multiplex) methods. Coastal hydrography compiled from USC&GS Chart 4196, 1948; USHO Chart 1850, 1950; USHO Field Charts 2024-2030, 1945. Horizontal and vertical control established by Butler Survey, 1911-1913; recovered and extended by US Navy, Bowditch, 1945; Pacific Island Engineers, 1946-1948; 71st Engineer Survey Liaison Detachment, 1948-1949. Planimetry and names revised from annotations by US Geological Survey, OE, Intelligence Division, 1953. Map field checked, 1953.

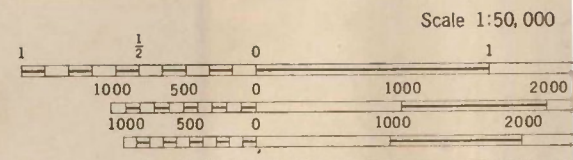
- Hard surface, all weat three or more lenes v
- Hard surface, all weat over 16' but less tha
- Hard surface, all weath
- Loose surface, graded, at
- Loose surface, dry weath
- Track; Trail
- Standard gauge railroad,
- Standard gauge railroad,
- Narrow gauge railroad, si
- Narrow gauge railroad, dc
- Spot elevation in meters:
- Wall; Levee; Cliff
- Church; School; Cemetery
- Waterwheel or mill; Locat
- Principal navigation light

SERIES W743
GUAM
EDITION 1-AMS (AFFE)



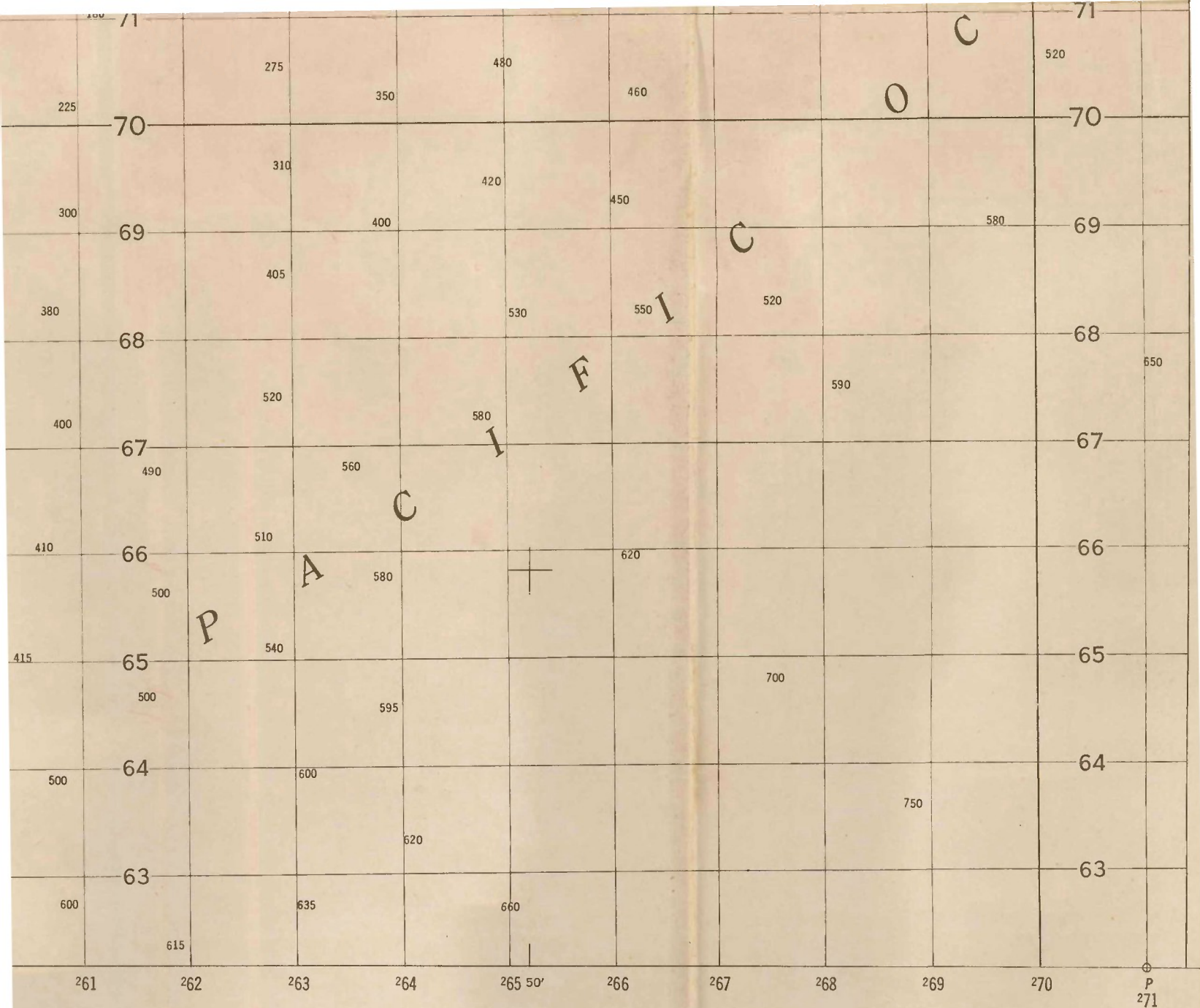
LEGEND

Other road, wide		Built-up area	
Other road, 24' wide		Limit of danger line; Submerged reef	
Road, two lanes wide		Wreck: Sunken; Exposed	
Weather road		Sunken rocks; Foreshore flats	
Gravel, or dirt road		Rocks bare or awash; Reef	
		Depth Curves and Soundings in Fathoms	
Single track		Reservoir; Dam; Ditch	
Double track		Salt evaporators	
Single track		Rice Paddy; Marsh	
Double or multiple track		Nipa; Mangrove	
Checked, Unchecked		Woods; Scrub	
		Tropical grass; Coconut grove	
Obelisk or lighthouse; Anchorage			

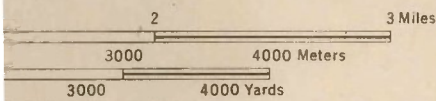


CONTOUR INTERVAL 20 METERS WITH
 CONTOURS AT 10 METERS
 VERTICAL DATUM IS BASED ON THE MEAN
 TRANSVERSE MERCATOR PROJECTION
 HORIZONTAL DATUM IS BASED ON STATION LEE
 144°45'S/1.56" EAST OF GREENWICH, 1911
 CAUTION SHOULD BE USED WHEN NOTING
 UNDETECTED CORAL HEADS OR REEFS
 HYDROGRAPHIC DATUM: APPROXIMATE LEVEL OF 1911
 BLACK NUMBERED LINES INDICATE THE ODD MERIDIAN
 MERCATOR GRID, ZONE 55, INTERNATIONAL
 THE LAST THREE DIGITS OF THE GRID NUMBER ARE

USERS NOTING ERRORS OR OMISSIONS ON THIS MAP ARE URGED TO MARK HEREON WITH A RED STAR AND REPORT TO THE MAP OFFICER, ARMY MAP SERVICE, WASHINGTON, D. C. MAPS SO FORWARDED WILL BE CORRECTED.



Water resources map by Porter E. Ward, U.S. Geological Survey, 1962



WITH SUPPLEMENTARY
 INTERVALS
 LOWEST LOW WATER
 PROJECTION
 NO. 7 (BUTLER 1911-1913):
 8°22'38.49" NORTH
 NAVIGATING AS
 MAY EXIST
 OF LOWEST LOW WATER

AFTER UNIVERSAL TRANSVERSE
 MERIDIONAL SPHEROID
 NUMBERS ARE OMITTED

SEND AND FORWARD DIRECTLY TO COMMANDING
 OFFICER. WILL BE RETURNED OR REPLACED IF DESIRED.

GRID ZONE DESIGNATION 55P		TO GIVE A STANDARD REFERENCE ON THIS SHEET TO NEAREST 100 METERS	
100,000 M. SQUARE IDENTIFICATION		SAMPLE POINT \times BRIDGE	
	1500	1. Locate first VERTICAL grid line to LEFT of point and read LARGE figures labeling the line either in the top or bottom margin, or on the line itself. Estimate tenths from grid line to point:	57 3
		2. Locate first HORIZONTAL grid line BELOW point and read LARGE figures labeling the line either in the left or right margin, or on the line itself. Estimate tenths from grid line to point:	75 5
IGNORE The SMALLER figures of any grid number; these are for finding the full coordinates. Use ONLY the LARGER figures of the grid number, example: 1463000		SAMPLE REFERENCE If reporting beyond 100,000 Meters or if sheet bears an overlapping grid, prefix 100,000 Meter Square Identification as: BQ573755 If reporting beyond 18" in any direction, prefix Grid Zone Designation as: 55PBQ573755	

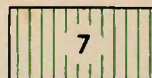
APPROXIMATE
 FOR C
 ANNUAL MAGN
 Use diagram only
 To determine mag
 pivot point "P"
 with the value c
 NORTH and MAC
 the degree scale c



Area underlain by volcanic rock and noncalcareous sediments, which contain large amounts of ground water but have very low permeability, and by limestone, which contains only meager amounts of ground water.

The water-bearing materials of subarea 6a are largely volcanic rock and associated sediments. Height of the water table ranges from a few feet above sea level in coastal lowlands to several hundred feet in interior highlands. Wells have low yield and high drawdown. Average specific capacity of wells is about 1 gpm per foot of drawdown. Numerous small springs and seeps occur in valleys.

Subarea 6b is underlain by limestone that rests on a steeply dipping surface eroded in volcanic rock and noncalcareous sediments. Meager amounts of ground water may occur locally perched on the volcanic rock, but most of the limestone is dry.



Area underlain by permeable limestone that lies above sea level on relatively impermeable volcanic rock and noncalcareous sediments. The limestone contains little or no ground water. Wells drilled into volcanic rock would have very low yields.

- 31 ○ Drilled well
- 61 ⊕ Drilled well, plugged or abandoned
- 23 < Basal tunnel
- 92 □ Dug well
- 28 ⊞ Dug well, filled or abandoned
- 96 Ⓞ Spring
- 10-13 ⊕ Stream-gaging station

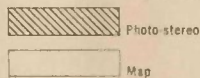
1471
1470
1469
1468
1467
1466
15'
1465
1464
1463
13'13"

272 273 274 55' 275 276 277 278 279 144°52'

COVERAGE DIAGRAM



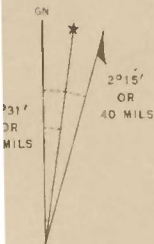
COMPILATION METHODS



- A. USC&GS Chart 4196, 1948 (reliability fair)
- B. USHO Chart 1850, 1950 (reliability fair)
- C. USHO Field Chart 2025, 1945 (reliability fair)
- D. USHO Field Chart 2028, 1945 (reliability fair)

U.S. ARMY MAP SERVICE, FAR EAST - 62-028 - 6/62 - 3.5C

- E. USHO Field Chart 2029, 1945 (reliability fair)
- F. USHO Field Chart 2027, 1945 (reliability fair)
- G. USHO Field Chart 2026, 1945 (reliability fair)
- H. USHO Field Chart 2030, 1945 (reliability fair)
- J. USHO Chart 2024, 1945 (reliability fair)
- Aerial photography: 1-May 1945; 2-Jan. 1948; 3-Mar., May 1949.



MEAN DECLINATION 1954
CENTER OF SHEET
MAGNETIC CHANGE 1' WESTERLY

To obtain numerical values. magnetic north line, connect the on the south edge of the map if the angle between GRID MAGNETIC NORTH, as plotted on at the north edge of the map.

GUAM
MARIANA ISLANDS