WATER RESOURCES OF PONAPE, CAROLINE ISLANDS

By Otto van der Brug

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 83-4139

Prepared in cooperation with the

TRUST TERRITORY OF THE PACIFIC ISLANDS and the

STATE OF PONAPE, FEDERATED STATES OF MICRONESIA

Honolulu, Hawaii

March 1984

UNITED STATES DEPARTMENT OF THE INTERIOR

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CONVERSION TABLE

The following table may be used to convert measurements in the inch-pound system to the International System of Units (SI).

Multiply	By		To obtain
	Length		
inch (in)	25.4	----	millimeter (mm)
foot (ft)	0.3048	----	meter (m)
mile, statute (mi)	1.609	----	kilometer (km)
	Area		
acre	4,047	----	square meter (m^2)
square foot (ft^2)	0.0929	----	square meter (m^2)
square mile (mi^2)	2.590	----	square kilometer (km^2)
	Volume		
acre-foot (acre-ft)	1,233	----	cubic meter (m^3)
cubic foot (ft^3)	0.02832	----	cubic meter (m^3)
gallon (gal)	3.785	----	liter (L)
million gallons (Mgal)	3,785	----	cubic meter (m^3)
	Volume Per Unit Time (includes Flow)		
cubic foot per second (ft^3/s)	0.02832	----	cubic meter per second (m^3/s)
gallon per minute (gal/min)	0.06309	----	cubic decimeter per second (dm^3/s)
gallon per day (gal/d)	90.85	----	cubic decimeter per second (dm^3/s)
million gallons per day (Mgal/d)	0.04381	----	cubic meter per second (m^3/s)
	Miscellaneous		
cubic foot per second per square mile [$(ft^3/s)/mi^2$].	0.01093	----	cubic meter per second per square kilometer [$(m^3/s)/km^2$].
micromho per centimeter at 25° Celsius (µmho/cm at 25°C).	1.000	----	microsiemens per centimeter at 25° Celsius (µS/cm at 25°C).

DEFINITION OF TERMS

Water Resources

Acre-foot (acre-ft) is the quantity of water required to cover one acre to a depth of one foot and is equivalent to 43,560 cubic feet or 325,851 gallons.

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, an artificial structure, or a uniform cross section over a long reach of the channel.

Cubic foot per second (ft^3/s) is the rate of discharge representing a volume of one cubic foot passing a given point during one second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute.

Cubic foot per second-day (ft^3/s-d) is the volume of water represented by a flow of one cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, 1.9835 acre-feet, or 646,317 gallons.

Discharge is the volume of water that passes a given point within a given period of time.

Mean discharge (mean) is the arithmetic average of individual daily mean discharges during a specified period.

Instantaneous discharge is the discharge at a particular instant of time. If this discharge is reported instead of the daily mean, the heading of the discharge column in the table is "Discharge".

Dissolved is that material in a representative water sample which passes through a 0.45-µm membrane filter.

Drainage area of a stream at a specific location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the river above the specified point.

Gage height is the water-surface elevation referred to some arbitrary gage datum.

Gaging station is a particular site on a stream where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather, due to the presence of alkaline earths (principally calcium and magnesium) and is expressed as equivalent calcium carbonate ($CaCO_3$).

Micrograms per liter (µg/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter (mg/L) is a unit expressing the concentration of chemical constituents in solution as mass (milligrams) of solute per unit volume (liter) of water.

Partial-record station is a particular site where limited streamflow and (or) water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Recurrence interval is the average interval of time within which an event will be equaled or exceeded once.

Runoff in inches shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Specific conductance is a measure of the ability of water to conduct an electrical current. It is expressed in micromhos per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in micromhos). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage is the water-surface altitude referred to some arbitrary gage datum (gage height).

Stage-discharge relation is the relation between gage height (stage) and volume of water per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

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ABSTRACT

Ponape is the third largest island in the western Pacific, with a land area of 129 square miles. The island is volcanic, nearly circular in shape, and covered with lush tropical vegetation. The mountainous interior has the highest peaks in the western Pacific.

Mean annual rainfall at Kolonia and other coastal areas is 191 inches. Inland at higher elevations, annual rainfall is considerably higher. The upper Nanpil River basin averages about 340 inches annually.

Runoff-to-rainfall ratios for Ponapean streams show that about two thirds of the rain falling on the island runs off. Flow-duration curves show the similarity of the geology, vegetation, and rainfall of the drainage basins and indicate little sustained ground-water contribution to surface runoff.

Surface-water quality is excellent as shown by 53 chemical analyses of water from 19 streams. Water of the Nanpil River, the source of water for the central water system, is especially low in dissolved solids.

This report summarizes in one volume all the hydrologic data collected and provides analyses that may be used by planning and public works officials as a basis for making decisions on the development and management of the water resources.

INTRODUCTION

Cooperation

In 1968, the U.S. Geological Survey and the Trust Territory of the Pacific Islands signed a joint-funding agreement to systematically collect water-resources data throughout most of the Trust Territory. Under this program, the Trust Territory provided labor, equipment, services, and funds to be matched on an equal-value basis by the Geological Survey. The Survey assumed responsibility for supervision, data compilation and analyses, and publication.

In March 1970, the program on Ponape was initiated with the construction of four gaging stations and was expanded subsequently to include the collection of rainfall information and chemical analyses of surface water.

After formation of the Federated States of Micronesia, the responsibility for the matching funds and services was transferred from the Trust Territory Government to the separate states.

Purpose and Scope

Since 1968, the Geological Survey has systematically collected water-resources data on the major islands in the Trust Territory of the Pacific Islands. Initially, these data consisted of records of stage and discharge of the major streams, but were gradually expanded to include rainfall records and chemical analyses of surface and ground water.

The Geological Survey has published surface-water and water-quality data in its annual release "Water Resources Data for Hawaii and other Pacific Areas," and for 1968-70, these data are also found in Water-Supply Paper 2137 (U.S. Geological Survey, 1977). No ground-water information has been collected on Ponape.

The purpose of this report is twofold. It summarizes all available water-resources information about Ponape in one volume and second, it provides interpretations which may be used for planning, development, and management of the water resources. To explore the potential of surface-water development, continuous records of gaging stations are used to develop flow-duration tables and curves, and to provide high and low-flow frequency analyses.

Low-flow measurements are used to estimate the minimum yield of ungaged basins, runoff-rainfall relationships are determined, and chemical analyses of surface water are interpreted.

Geographic Setting

Ponape, the third largest island in the western Pacific, is located between lat 6°47' and 7°01' N. and long 158°06' and 158°22' E., and is about 3,100 statute miles west of Honolulu, 2,900 miles north of Sydney, 2,600 miles east of Manila, and 2,300 miles southeast of Tokyo (fig. 1). The island is 129 mi^2 (square miles) in area, nearly circular in shape, and covered with lush tropical vegetation. The mountainous interior has the highest peaks in the Western Pacific; the Nanalaud Mountain and the Ngihneni Peak rise to 2,565 feet.

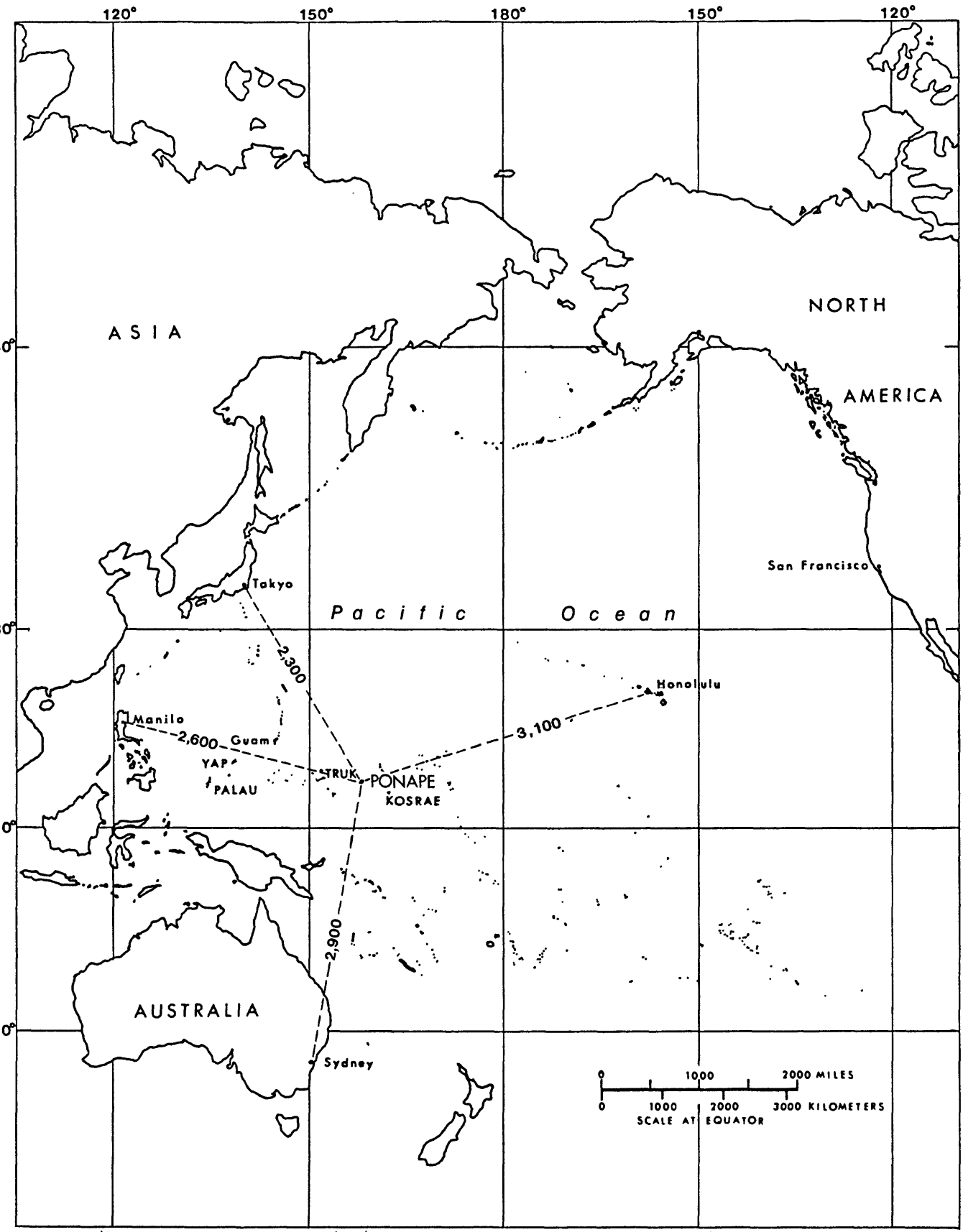
The center of the island is dome shaped, with deep valleys and steep ridges which gradually decline toward the coast. The inhabitants live in the flat coastal areas, which are separated from the ocean by mangrove swamps up to three quarters of a mile in width. The island is fringed by a barrier reef with a number of small islands on the reef or in the lagoon.

Population

Because the Island of Ponape is large and the population relatively small, residents of small, overcrowded atolls like Mokil, Pingelap, Ngatik, Kapingamarangi, and the Mortlock Islands have migrated to Ponape for many years. This migration and the natural population growth account for an annual increase of about 5 percent.

The historical trend in native population is shown by the following data:

1820	Estimated at 15,000 (Hawaii Architects and Engineers, 1968)
1891	1,705 (Hawaii Architects and Engineers, 1968)
1914	4,401 (Hawaii Architects and Engineers, 1968)
1935	5,601 on Ponape Island exluding 2,478 Japanese (Bryan, 1946)
1939	5,905 in Ponape District (Coulter, 1957)
1945-46	5,662 on Ponape Island (Bryan, 1946), also 14,066 Japanese (Denfeld, 1979)
1958	9,339 on Ponape Island (Hawaii Architects and Engineers, 1968)
1967	12,824 on Ponape Island (U.S. Department of State, 1967)
1973	19,263 in Ponape District (Tenorio, 1980)
1980	22,367 in Ponape District, U.S. Census (The New Pacific Magazine, July, August 1981).



Note: All distances are in statute miles (one statute mile is 0.868 nautical mile).

Figure 1. Location of Ponape.

Ponape District includes Mokil, Pingelap, Ant, Ngatik, Oroluk, Nukuoro and Kapingamarangi atolls with a total population of 1,892 in 1935, 2,977 in 1945-46 (Bryan, 1946), and 2,046 in 1980.

The population of Kolonia, the only town on Ponape, rose from 1,674 in 1965 to 4,795 in 1973, while the population of the area now served by the central water-supply system (mainly Kolonia and Sokehs) grew in the same period from 2,934 to 8,011 (Tenorio, 1980). The projected population for this area is 21,000 by 1990 (Tenorio, 1980).

Presently, about half the population resides in and around Kolonia with the remainder living in villages along or near the coast. The interior of the island is uninhabited.

Historical Development

The Spanish Admiral, Alvaro de Mendana, is credited with the discovery of Ponape in 1595 (Coulter, 1957) but contact with the Western World remained sporadic until whalers began to frequent the island in 1826. In the 1850's, 30 to 40 ships visited Ponape yearly (Hezel, 1973). In 1852, Protestant missionaries and their wives from the American Board of Commissioners for Foreign Missions settled on Ponape and Kosrae (Pompey, 1969). Although generally considered to be within the Spanish sphere of influence, Spain showed little interest in these islands and control remained in the hands of local chiefs. In 1885, Germany attempted to claim Ponape when the crew of a German warship hoisted the German flag on the island. The following year the dispute between Spain and Germany was settled by Pope Leo XIII in favor of Spain. It was not until March 13, 1887, that the first Spanish governor arrived with six priests and 75 soldiers. The Spanish founded Kolonia (named Colonia de Santiago) and began to build roads. On July 4, 1887, the people of Net and Sokehs rebelled, captured Kolonia, and killed the defenders and the governor. In November of that year, a new governor arrived and made peace with the Ponapeans. However, during another revolt, three years later, the Spanish garrison in Madolenihmw was annihilated (Pompey, 1969). After this, whaling ships were banned and the missionaries were forced to withdraw to Kosrae.

After the Spanish-American war of 1898, Spain sold the Caroline Islands to Germany in 1899, and in October of that year, the German governor for the Eastern Caroline Islands arrived with 50 soldiers from New Guinea. The first German Administration consisted of only five officials but secured the cooperation of the chiefs. They introduced new crops, ordered every household to plant 10 coconut trees each month, and began an extensive road-building project with roads to Sokehs, Kiti and Madolenihmw (Bernard and others, 1977). Forced labor caused a rebellion in which the German governor was killed. A clan war ensued which ended with the evacuation of all Ponapeans from Sokehs which was then settled by people from Mokil, Pingelap, and Ngatik.

After the outbreak of World War I, all previously German-held islands were occupied by Japan which was given domain over the islands after the war by the League of Nations. The Japanese developed the island further, and many Japanese settled on Ponape. By 1939, the native Ponapean population of 5,905 was outnumbered by Japanese. At the end of World War II, there were 14,066 Japanese on the island; 8,000 of whom were military (Coulter, 1957). In 1945, the United States became the trustee under terms of the United Nations charter. The island will remain under American Administration until its impending independence as one of the Federated States of Micronesia.

Acknowledgments

Throughout the years of joint funding of the program, cooperation from the headquarters staff on Saipan and officials on Ponape has been invaluable.

Special acknowledgment is made to Koichi L. Wong, who has been involved in all phases of the work since the inception of the program; to Louis F. Irving, who has acted as liaison with Trust Territory Headquarters until his retirement; and to the District Directors of Public Works, Ponape District, since 1970.

Practically all field work on Ponape, throughout the life of this program, has been done by Waltick Panuel of Kiti.

GEOLOGY

The Island of Ponape is a deeply dissected volcanic dome, roughly circular in shape. Neither geologic mapping nor any other systematic geologic studies have been made so details of stratigraphy and structure of the volcanic rock are not known.

Piper, 1946-47, describes the dome as consisting of

> ***a series of radial and branching ridges whose crest profiles are relatively smooth and decline centrifugally, and generally more than 2,000 feet above sea level for as much as 4-1/2 miles outward from their focus. With some notches and downsteps in crest profiles, five main ridges extend virtually to the coast and there terminate at from 600 to 1,100 feet above the sea. In about their upper half, ridge flanks are precipitous to steep; below, these flank slopes pass into valleys whose cross-profiles are commonly rather symmetrical and concave upward.

Fairly large terraces exist in many areas near the coast and most of the coast is fringed with mangrove swamps, in places as much as three-quarters of a mile wide.

CLIMATE

General

Because Ponape lies less than 500 miles north of the Equator in an immense ocean, the climate is invariably warm and moist. Temperatures are uniform with only 1/2°C variation in monthly means (26.8-27.3). Average annual rainfall at Kolonia is 191 inches with no month averaging less than 10 inches. Relative humidity is high, averaging 84.5 percent. From November to June, northeasterly trade winds prevail, whereas for the other half of the year, the climate is influenced by the Intertropical Convergence Zone.

Although many typhoons originate near Ponape, the island normally lies outside the typhoon path. One of the most destructive typhoons to hit Ponape occurred on April 20, 1905. Apparently, the rain gage installed by the Germans was damaged or destroyed as rainfall records for April 1905 are missing. Fifteen persons were killed and 300 injured (Philippine Weather Bureau, April, 1905). Bernard (1977) reported all houses destroyed and the island stripped of vegetation. The date he mentioned was April 20, 1904, but as the maximum 24-hour rainfall for April 1904 was only 2.48 inches, the year surely must have been 1905. Other typhoons were reported in May 1902 and December 1925 by Bryan (1946) and in November 1957 and January 1958 by the U.S. National Oceanic and Atmospheric Administration (1981). The last typhoon to cause damage on Ponape was typhoon Lola on May 31, 1972, when winds up to 69 miles per hour were recorded and damages to homes and crops were estimated at one million dollars (U.S. National Oceanic and Atmospheric Administration, 1972, v. 17, no. 5).

Rainfall Data

Records of rainfall at various locations on Ponape are available for most years since 1901 (table 1) and are given in the Hydrologic Data Section, tables 10-23. The Germans collected records at a site believed to be East Kolonia in the northern part of the island from 1900 to 1911 and at Kiti in the southern part 1910-12. Data are available at Kolonia during the Japanese Administration from 1928 to 1943. Rainfall data were collected for short periods at other locations by the Japanese (Bryan, 1946) but none of these data could be located. After World War II, the U.S. Navy collected data at Kolonia from 1949 to 1951, when the U.S. National Weather Service took over the operation, and records are available at this site to the present time. In 1972, the U.S. Geological Survey began collecting cumulative rainfall records which were read semimonthly at four sites in the western part of the island (fig. 2). Three of these storage-type rain gages were replaced by continuous-recording rain gages in 1978 and the fourth station was discontinued. At the end of 1981, the Geological Survey established a recording rain gage at Mount Pwoaipwoai in Kiti at an altitude of 1,400 feet.

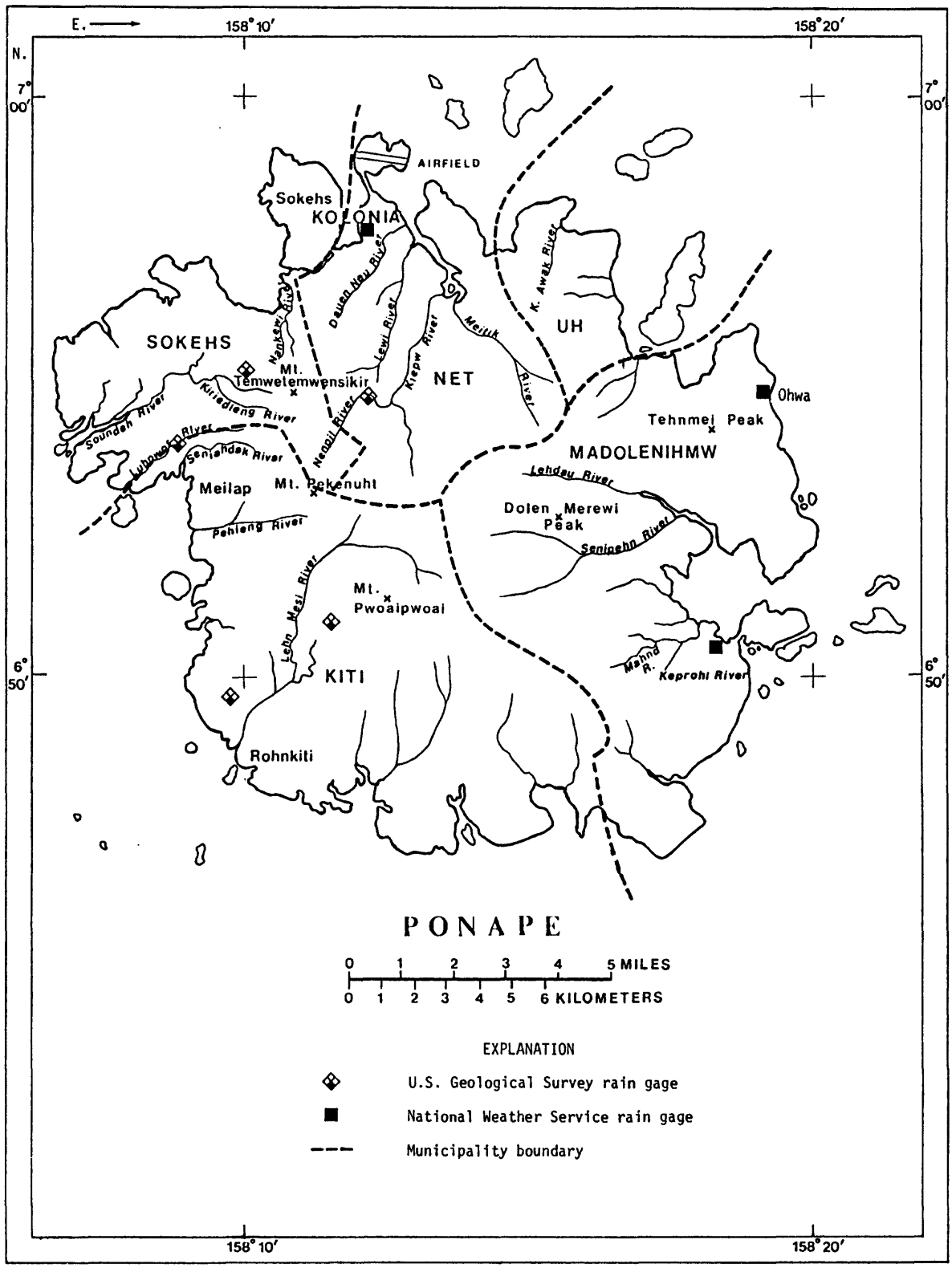
Table 1. Rainfall records of Ponape

Location	Latitude north	Longitude east	Altitude (ft)	Period of record	Source	Frequency of reading	Size can (in.)	Remarks
Northeast Ponape.[1]	6°58'	158°16.5'	--	1900-11	German	--	--	
Kiti[2]	6°55.5'	158°20.5'	--	1910-12	do.	--	--	
Kolonia[2]	6°58'	158°13'	100	1928-43	Japanese	8x daily-1935		
						6x daily-1939	--	
						3x daily-1943		
Palikir[2]	6°47'	158°17'	--	1934	do.	--	--	Not available.
Kiti[2]	6°49'	158°13'	--	1932-34	do.	--	--	Do.
Uh[2]	6°57'	158°17'	--	do.	do.	--	--	Do.
Madolenihmw[2] (Metalanim).	6°52'	158°20'	--	1929-34	do.	--	--	Do.
Kolonia	6°58'	158°13'	95	Dec. 1949-May 1950	U.S. Navy	--	8	
			115	June 1950-June 1951	do.		8	Agriculture Building.
			115	July 1951-Mar. 1956	U.S. National Weather Service.	--	8	Do.
			120	Mar. 1956-Jan. 1958	do.	--	8	Air Force site.
			125	Jan. 1958-June 1983	do.	--	8	Weather Bureau Building.
Ohwa (Oa)	6°56'	158°19'	81	Jan. 1956-May 1966	do.	Daily	8	Protestant Mission.
Madolenihmw (Metalanim).	6°51'	158°19'	30	Mar. 1967-June 1983	do.	do.	8	Ponape Agriculture Trade School.
Paies, Kiti[3]	6°54'05"	158°09'04"	150	Sept. 1981-June 1983	do.	Daily (at 1630)	8	Civic Action Team camp (U.S. Army).
Nanpil River	6°55'06"	158°12'13"	350	1972-79	U.S. Geological Survey.	2x monthly	6	Cumulative.
				June 1978-June 1983	do.	Continuous	8	
Kiriedleng River.	6°55'31"	158°10'22"	350	1972-79	do.	2x monthly	6	Cumulative.
Luhpwor River	6°54'08"	158°09'08"	150	1972-79	do.	do.	6	Do.
				June 1978-June 1983	do.	Continuous	8	
Kiti	6°49'58"	158°10'04"	420	1972-79	do.	2x monthly	6	Cumulative.
				June 1978-Nov. 1982	do.	Continuous	8	
Mount Pwoaipwoai, Kiti.	6°51'12"	158°11'48"	1,400	Jan. 1982-June 1983	do.	do.	8	

[1] In "Mitthellungen von Forschungreisenden und Gelehrten aus den deutschen Schutzgebieten" (1902) called "Messenien(g)"; Bryan, 1946, lists as "Medschenien", from "Mesenieng", a local name for East Kolonia. Location from Bryan, 1946. Location listed by Reed, 1927, as longitude 158°16' E., by Taylor, 1973, as longitude 158°17' E. Location of Mesenieng is longitude 158°12'30" E.

[2] Bryan, 1946.

[3] In National Oceanic and Atmospheric Administration, monthly reports since September 1981, given as lat 6°56' N., long 158°12' E., altitude, 48 ft.



Base from U.S. Geological Survey, 1981, scale: 1:10,000

Figure 2. Location of U.S. Geological Survey and National Weather Service rainfall stations.

The annual and monthly maximum, minimum, and mean rainfall data collected by the Germans (1900-10), the Japanese (1928-43) and the Americans (1950-82) are listed in table 2. These records were collected in or near Kolonia and have been combined to represent a long-term period. The table shows that the maximum monthly rainfall of 39.12 inches occurred in April 1942 and the minimum of 1.05 inches in February 1977. The wettest months during the year are April, with the long-term monthly rainfall averaging 19.08 inches, and May with 20.45 inches. February is the driest month, averaging a little more than 10 inches. The long-term annual rainfall average is 191 inches.

The maximum rainfall since 1950 for a 24-hour period (22.48 inches) was recorded on November 11 and 12, 1957, the result of a typhoon passing the island (National Oceanic and Atmospheric Administration, 1981).

The National Weather Service has collected rainfall records at Madolenihmw in the southeastern part of the island since 1967. Comparison of the available records collected at the site with those collected at Kolonia indicate that the rainfall at Madolenihmw was 93 percent of that at Kolonia.

The rainfall records collected by the Geological Survey were from sites some distance from the coast and at higher altitudes than those at Kolonia. For 86 percent of the period 1973 to mid 1979, cumulative rainfall totals were available from all U.S. Geological Survey rainfall stations. Comparison of these totals with concurrent records collected at Kolonia indicates that rainfall at these sites was 12 to 26 percent greater (table 3). This shows that rainfall is much greater in the interior and at higher altitudes than it is in the coastal areas. Records of the three stations which were converted to continuous recording stations in 1978, show the same condition. At Nanpil River, 26 percent (which is 50 inches) more rain falls per year than at Kolonia. The cumulative rainfall readings were checked for reliability by comparing the cumulative and continuous rainfall records available at the same location for concurrent periods. The record from June 24, 1978 to March 29, 1979, at the Nanpil gage showed that the rainfall at the continuous-record gage was 0.6 percent less than the rainfall at the cumulative gage; at Luhpwor River during the period June 27, 1978 to April 23, 1979, the continuous gage registered 2 percent more than the cumulative gage. Figure 3 shows the correlation between 55-58 years of rainfall record at Kolonia and 10 years of streamflow record at Nanpil River.

Table 2. Annual and monthly maximum, minimum, and mean rainfall, in inches, at Kolonia

	Summary	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period November 1900 to August 1910 (April, May, and July 1901 incomplete; April 1905, January, February 1909 missing) Converted from millimeters to inches Sources: Mittheilungen von Forschungreisenden und Gelehrten aus den deutschen Schutzgebieten, 1902, and Institute of Human Relations, 1943													
Maximum monthly	36.54	17.36	20.08	22.56	36.54	25.35	19.57	24.17	21.85	22.48	23.50	29.13	33.03
(Year)	1908	1908	1904	1904	1908	1908	1904	1902	1907	1904	1903	1908	1903
Minimum monthly	1.06	4.96	1.06	3.80	6.14	15.31	9.33	13.19	9.84	9.29	7.95	6.61	8.90
(Year)	1903	1903	1903	1901	1907	1907	1905	1905	1909	1903	1906	1901	1905
Mean	*181.48	11.31	7.85	12.08	21.60	19.59	15.29	16.14	16.21	15.61	14.42	14.86	16.52
(Number of years)	--	9	9	11	8	9	10	9	10	9	9	10	10
Period 1928-43 Source: Taylor, 1973													
Maximum monthly	39.12	17.91	19.88	23.98	39.12	33.96	26.76	31.31	30.37	23.64	28.00	25.99	27.38
(Year)	1942	1932	1943	1942	1942	1936	1938	1941	1941	1932	1941	1943	1928
Minimum monthly	2.73	5.53	2.73	3.30	6.11	11.97	9.00	12.39	8.20	9.80	7.37	3.67	14.43
(Year)	1942	1941	1942	1931	1931	1934	1939	1938	1934	1931	1930	1941	1940
Mean	*194.66	11.88	9.19	13.75	18.49	20.99	17.14	17.66	16.13	16.56	17.24	15.77	19.86
(Number of years)	--	16	16	16	16	16	16	16	16	16	16	16	16
Period 1950, 1952-82 Source: U.S. National Oceanic and Atmospheric Administration, 1982													
Maximum monthly	38.65	26.67	19.76	25.30	38.65	38.43	24.88	37.20	32.74	29.53	22.25	31.79	33.35
(Year)	1959	1962	1964	1976	1959	1980	1969	1965	1976	1972	1975	1957	1975
Minimum monthly	1.05	1/3.31	1.05	1/6.17	1/6.07	1/11.72	9.60	9.40	10.06	6.57	7.98	4.55	2.40
(Year)	1977	1973	1977	1978	1966	1953	1963	1973	1965	1979	1972	1963	1957
Mean	*192.42	11.41	11.21	14.30	18.74	20.42	17.24	17.73	16.72	16.39	15.94	16.62	15.70
(Number of years)	--	32	32	32	32	32	32	32	32	32	32	32	32
All periods													
Mean	*191.16	11.52	10.11	13.75	19.08	20.45	16.88	17.46	16.47	16.31	16.06	16.08	16.99
(Number of years)	--	57	57	59	56	57	58	57	58	57	57	58	58
Percent of annual mean.	100	6.0	5.3	7.2	10.0	10.7	8.8	9.2	8.6	8.5	8.4	8.4	8.9

* Total of 12 monthly means.

1/ Minimum in 1983 was less: January, 1.89 inches; March, 1.52 inches; April 2.03 inches; May, 2.21 inches.

Table 3. Comparison of rainfall, in inches, at Kolonia and at other locations

Year	Period	Kolonia (altitude 125 ft)	Kiriedleng River (altitude 350 ft)	Luhpwor River (altitude 150 ft)	Kiti (altitude 420 ft)	Nanpil River (altitude 350 ft)
	Days		Cumulative rainfall readings			
1973	1/ 365	174.04	196.9	190.6	190.1	232.1
1974	365	205.87	237.5	233.8	267.7	242.0
1975	135	66.30	41.0	65.9	60.8	62.1
1976	1/ 268	170.60	200.6	184.0	186.1	212.1
1977	1/ 365	162.61	185.1	189.0	211.4	195.5
1978	1/ 365	159.23	178.2	194.9	182.6	215.9
1979	163	72.60	88.5	90.9	60.5	117.1
Total	2,026	1,011.25	1,127.8	1,149.1	1,159.2	1,276.8
Percent 2/	--	100	112	114	115	126
	Months			Continuous rainfall readings		
1978	6	84.72	--	106.65	88.27	107.77
1979	12	196.01	--	231.23	190.7	244.02
1980	12	194.20	--	228.32	211.18	244.09
1981	8	117.89	--	129.35	107.12	159.62
Total	38	592.82	--	695.55	597.27	755.50
Percent 2/	--	100	--	117	101	127

1/ Not exactly a calendar year.

2/ Rainfall at Kolonia is used as the base for comparison.

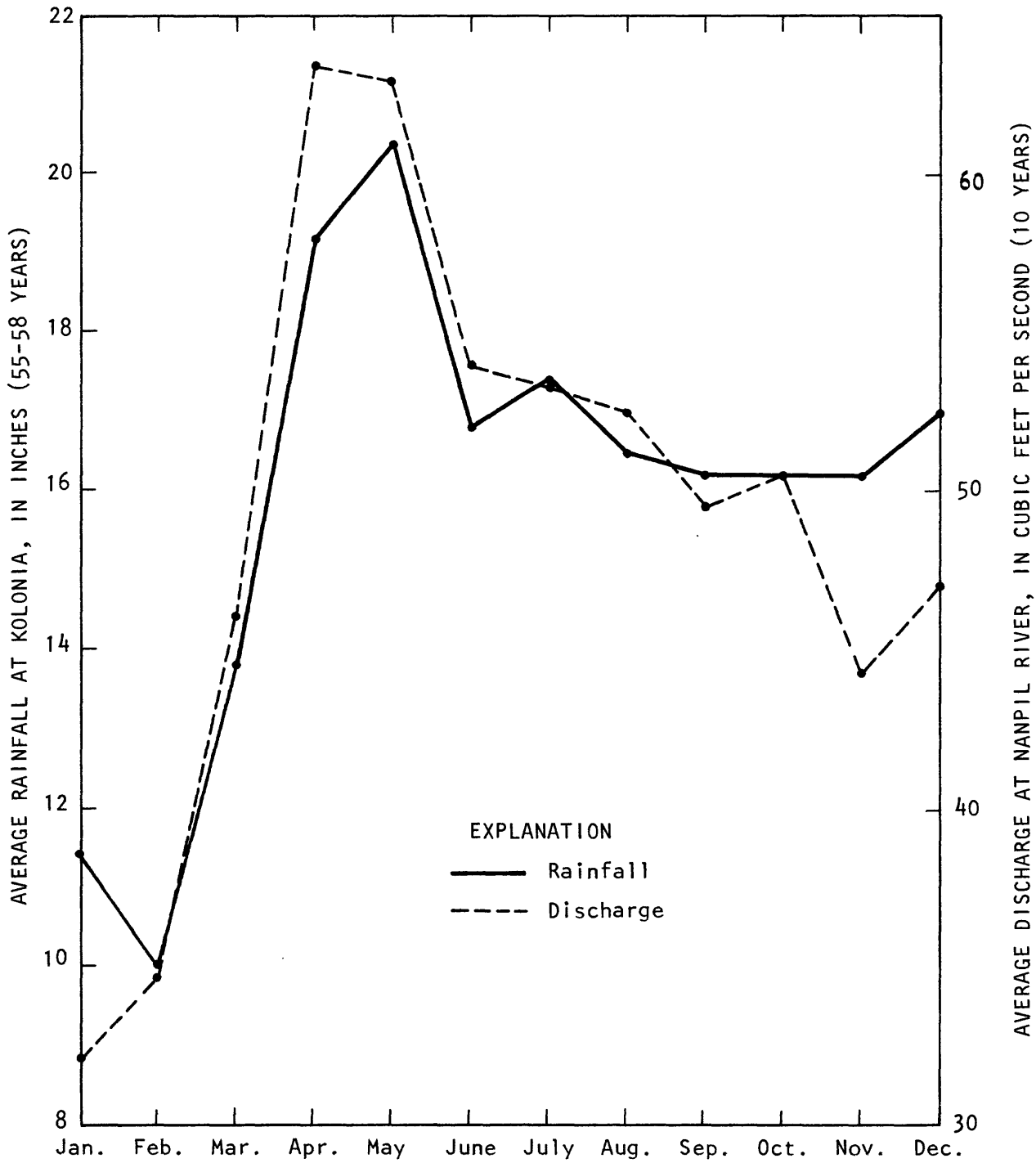


Figure 3. Comparison between rainfall at Kolonia and streamflow at Nanpil River.

Air Temperatures

Table 53 in the Hydrologic Data section lists air-temperature readings at Kolonia for the period 1949-1981. It shows that long-term monthly mean temperatures vary not more than 0.5°C between coolest and warmest months whereas annual mean temperatures vary only 1.1°C. The highest temperature recorded during the last 28 years was 35.6°C in September 1950 and the lowest was 18.9°C in December 1977.

Other readings of air temperature have been made in conjunction with surface-water temperature readings during streamflow measurements and can be found in the Hydrologic Data section, tables 40-52.

Evaporation

No evaporation data have been collected on Ponape. The nearest volcanic island for which pan evaporation data are available is Guam, where the mean of 21 annual totals during 1956-81 is 76.76 inches (U.S. National Oceanic and Atmospheric Administration 1956-72, 1973-82). As rainfall on Ponape is about twice that of Guam, the pan evaporation rate for Kolonia probably would more closely resemble that of a comparable wet coastal area--Hilo, Hawaii. There, the mean of 11 annual totals (1956-60, 1962-67) is 66.22 inches (U.S. National Oceanic and Atmospheric Administration, 1956-67, v. 1-12).

WATER RESOURCES

General

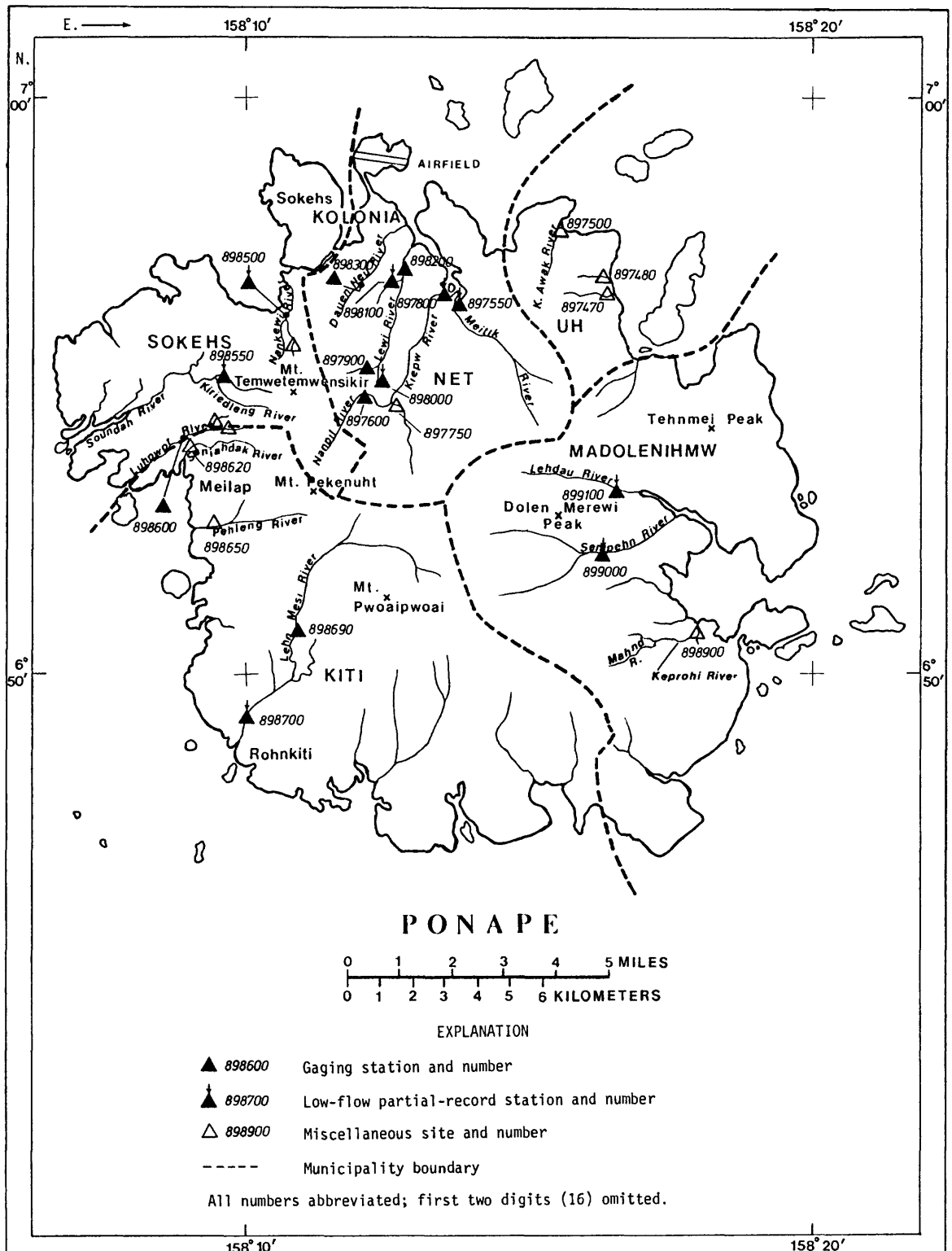
Water-resources data have been collected by the U.S. Geological Survey on Ponape since 1970 and consist of surface-water and surface-water-quality data. Surface-water data consist of daily discharges from continuous-record stream-gaging stations, systematic measurements of discharge at partial-record stations, and measurements of discharge at miscellaneous sites. Water-quality data include water temperature readings and results of chemical analyses from samples collected at all stream-gaging stations, partial-record sites, and many miscellaneous sites.

Surface Water

General

The location of sites at which continuous-record gaging stations and low-flow partial-record stations have been operated on Ponape since the introduction of the program in 1970 are shown in figure 4 and listed in table 4. In March 1970, gaging stations were constructed on Dauen Neu River, Nanpil River, and two sites on Lewi River (fig. 5). The stations were located at sites where streamflow data were needed at existing or anticipated sources of water supply for the Kolonia area. A gaging station was constructed on Luhpwor River in 1972 to collect streamflow information for the Palikir area, west of Kolonia (fig. 6). Collection of streamflow data was started in November 1981 on the Lehn Mesi River to determine the feasibility of the stream for hydroelectric development.

At the end of 1974, the gaging station on Dauen Neu River, which was the source of water supply for Kolonia, was discontinued because of the relocation of the water-supply source to the Nanpil River and as accurate data could no longer be collected owing to a leaking control.



Base from U.S. Geological Survey, 1981, scale: 1:10,000.

Figure 4. Location of surface-water stations and miscellaneous measurement sites.

Table 4. Summary of surface-water stations

Names and locations are based on the 1981 U.S. Geological Survey topographic maps, scale 1:10,000. Names in parentheses are those used in Geological Survey publications prior to 1981. For location descriptions of miscellaneous measurement sites, see table 39.

Station No.	Station name	Drain. area (mi^2)	Location			Period of record (water years)	Remarks
			Latitude north	Longitude east	Altitude (ft)		
16897550	Meitik River	5.04	6°56'12"	158°13'26"	5	1971, 1973, 1977, 1980-81, 1983.	Low-flow partial record.
16897600	Nanpil (Nanepil) River	3.00	6°55'09"	158°11'59"	370	Mar. 1970-Sept. 1982	Continuous record.
16897800	Kiepw (Tawenjokola) River at mouth.	11.2	6°56'36"	158°13'14"	5	1970-71, 1973-74, 1977, 1981, 1983.	Low-flow partial record.
16897900	Lewi (Lui) River	.46	6°55'32"	158°12'18"	290	Mar. 1970-Sept. 1982	Continuous record.
16898000	Lewi (Lui) River tributary No. 2.	.07	6°55'24"	158°12'20"	325	1970-76	Low-flow partial record.
16898100	Lewi (Lui) River tributary	.45	6°57'01"	158°12'40"	35	1970-74	Do.
16898200	Lewi (Lui) River at mouth	2.08	6°57'04"	158°12'39"	30	Mar. 1970-June 1981	Continuous record.
16898300	Dauen Neu (Tawannu) River	.75	6°56'47"	158°11'55"	150	Mar. 1970-Dec. 1974	Do.
16898500	Nankewi (Pilenkiel) River	1.48	6°56'03"	158°10'46"	120	1971-73, 1975-77, 1981-83	Low-flow partial record.
16898550	Kiriedleng (Kirictilang) River.	.73	6°55'17"	158°09'48"	260	1972-73, 1975-77, 1981-83	Do.
16898600	Luhpwor (Lupwor) River	.72	6°54'09"	158°09'07"	145	Sept. 1972-Sept. 1982	Continuous record.
16898690	Lehn Mesi River	2.31	6°50'41"	158°11'02"	260	Nov. 1981-Sept. 1982	Do.
16898700	Lehn Mesi (Lehnmasi) River at hanging bridge.	8.32	6°49'24"	158°10'11"	25	1971, 1973, 1976-77, 1981-83.	Low-flow partial record.
16899000	Senipehn (Senpen) River	6.04	6°52'28"	158°16'17"	110	1971, 1973, 1976-77, 1980-81, 1983.	Do.
16899100	Lehdau (Lataw) River	2.44	6°52'59"	158°16'15"	110	1971, 1973, 1976-77, 1980-81, 1983.	Do.

Figure 5. Lewi River at gaging station 16897900 (1971).

Figure 6. Luhpwor River gaging station under construction (1972).

The data collected at continuous-record stations consist of records of stage and measurements of discharge. Records of stage are obtained from a water-stage recorder that provides a continuous graph of water-level fluctuations at the station site. Measurements of discharge are made with a current meter. From records of stage and discharge measurements, stage-discharge curves are drawn. These curves are used in preparing rating tables which give the discharge for any stage. Application of the daily mean stage to the rating table provides the daily mean discharge from which the monthly and yearly mean discharges are computed.

Partial-record stations are sites where discharge measurements are made on a systematic basis over a period of years usually during a period of base flow where streamflow is primarily from ground-water storage. When these measurements are correlated with the simultaneous discharge of a nearby station for which continuous-record is available, the low-flow potential of the stream can be estimated. Discharge measurements made at sites not included in the partial-record program are called measurements at miscellaneous sites.

Tables with monthly and annual discharge totals, annual maximums and minimums, and annual means are presented in the Hydrologic Data section, tables 24-29. Also, annual peak discharges, their times of occurrence and corresponding stage are listed, and all peaks above a selected base discharge are given. Time is expressed in 24-hour local standard time. Results of discharge measurements made at partial-record stations and at miscellaneous sites are listed in tables 30-39.

All records were collected in the inch-pound system of units of length, area, and volume, and are published as such. All data are published by water year, beginning October 1 and ending September 30. The year is designated by the calendar year in which most of the water year falls.

Locations (latitude, longitude), altitudes, and drainage areas were obtained from the 1981 preliminary U.S. Geological Survey maps, scale 1:10,000 (Clarke Spheroid of 1866) and differ from those used in the Geological Survey annual publications "Water Resources Data for Hawaii and other Pacific Areas," 1971-74, 1975-76, 1977-80, which were based on the 1954 U.S. Army Map Service series W 856, scale 1:25,000 (International Spheroid).

The mean annual discharge and yield per square mile at the four continuous-record stations for years of complete records are listed in table 5. The yield is high, ranging from 11.4 to 14.9 ft^3/s (cubic feet per second) per square mile. The annual discharges for Nanpil River vary more than 100 percent, from a daily average of 32.4 ft^3/s in 1981 to 70.8 ft^3/s in 1972.

The distribution of the streamflow during the year is listed in table 6. Minimum streamflow occurs in January and February and the maximum occurs usually in April, May, and June. However, for Luhpwor River the maximum is shown to be in August. This is caused by the westerly exposure of the Luhpwor drainage area compared to the northerly exposure of the Nanpil and Lewi Rivers drainage basins. In about July, northeasterly trade winds frequently give way to moist southerly winds. For the few years that continuous rainfall record is available at Luhpwor River, August has clearly been the wettest month of the year.

Streamflow characteristics

Runoff-rainfall comparison.--The annual runoff converted to inches at the four gaging stations was compared to the rainfall records at Kolonia to determine the percentage of rainfall which runs off from the drainage basins. The runoff in inches from the Nanpil River basin was found to be greater than the rainfall at Kolonia (114 percent) indicating that rainfall in the interior regions of the island is much greater than in the coastal areas. This is in contrast to the more uniform island-wide rainfall of low-lying islands such as Babelthuap, Yap, and the Truk Islands.

When the continuous-record rainfall data collected since 1978 near the gaging station site on the Nanpil River were compared with the Nanpil River runoff records, the runoff/rainfall ratio was found to be about 80 percent. This ratio is believed to be high because much of the Nanpil River basin is at a higher altitude (up to 2,000 ft) than the rain gage and the average rainfall in the basin should be greater than at the rain gage site.

The Nanpil River rain gage records, however, were collected in close vicinity of the upper Lewi River drainage basin and were considered to be equivalent to the rainfall in that basin. Comparing the runoff from the upper Lewi River gaging station with both the cumulative and continuous rainfall records of the Nanpil River rain gage, the runoff/rainfall ratio was found to be 66 percent.

Table 5. Annual mean discharge, in cubic feet per second, of gaged basins

Drainage area --	16897600 Nanpil River 3.00 mi^2		16897900 Lewi River 0.46 mi^2		16898200 Lewi River at mouth 2.08 mi^2		16898600 Luhpwor River 0.72 mi^2	
Water year	Mean	Per square mile	Mean	Per square mile	Mean	Per square mile	Mean	Per square mile
1971	50.4	16.8	5.92	12.9	32.7	15.7	--	--
1972	70.8	23.6	5.52	12.0	31.2	15.0	--	--
1973	41.5	13.8	3.83	8.3	16.3	7.8	5.70	7.9
1974	53.8	17.9	5.99	13.0	27.6	13.3	8.34	11.6
1975	46.9	15.6	4.55	9.9	21.6	10.4	7.43	10.3
1976	64.1	21.4	7.37	16.0	34.9	16.8	13.5	18.7
1977	36.0	12.0	4.77	10.4	21.3	10.2	9.64	13.4
1978	35.8	11.9	4.66	10.1	19.6	9.4	7.81	10.8
1979	43.5	14.5	5.66	12.3	23.4	11.2	9.86	13.7
1980	47.8	15.9	6.40	13.9	29.5	14.2	11.12	15.5
1981	32.4	10.8	4.02	8.7	22.2	10.7	7.38	10.3
1982	42.6	14.2	7.81	17.0	--	--	11.0	15.3
Mean:								
1971-82	47.1	15.7	5.54	12.0	--	--	--	--
1973-81	44.6	14.9	5.25	11.4	24.0	11.6	8.98	12.5

Table 6. Monthly mean discharge in cubic feet per second and in percentage of annual total

	16897600 Nanpil River		16897900 Lewi River		16898200 Lewi River at mouth		16898600 Luhpwor River	
Drainage area --	3.00 mi^2		0.46 mi^2		2.08 mi^2		0.72 mi^2	
Number of years of record ----	12		12		10		10	
	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent
October	48.0	8.5	6.0	8.9	28.8	9.3	9.8	8.9
November	38.7	6.8	5.1	7.6	25.2	8.2	8.4	7.6
December	44.2	7.8	5.0	7.4	23.6	7.6	8.6	7.8
January	32.4	5.7	3.6	5.3	15.5	5.0	5.8	5.3
February	34.0	6.0	3.6	5.3	14.6	4.7	5.9	5.4
March	42.8	7.5	4.2	6.2	20.9	6.8	6.5	5.9
April	60.1	10.6	6.7	10.0	31.2	10.1	10.3	9.4
May	59.0	10.4	7.9	11.7	37.6	12.2	10.8	9.8
June	53.4	9.4	7.0	10.4	31.5	10.2	11.3	10.3
July	56.9	10.0	6.7	10.0	29.2	9.4	9.8	8.9
August	50.6	8.9	6.2	9.2	28.5	9.3	13.5	12.3
September	47.9	8.4	5.4	8.0	22.2	7.2	9.2	8.4
Total	568.0	100	67.4	100	308.8	100	109.9	100
Highest monthly mean.	173 (Sept. 1972).		14.4 (May 1972, 1980).		66.3 (May 1980).		32.1 (Aug. 1976).	
Lowest monthly mean.	4.39 (Feb. 1977).		0.40 (Feb. 1977).		1.81 (Feb. 1977).		1.09 (Feb. 1977).	

This ratio can be applied to all major streams on Ponape because the geology and vegetation of the interior parts of the island are considered to be similar. Applying the 66 percent ratio to the runoff of the Nanpil River gage, the average annual rainfall in the basin is computed to be about 340 inches.

The recording rain gage that was established on Mount Pwoaipwoai at 1,400 feet in 1981 should provide definitive data on the rainfall in the interior part of the island. These rainfall data, together with the runoff data on the Lehn Mesi River are expected to provide a reliable check of the runoff-rainfall ratio.

Flow-duration curves.--A flow-duration curve is a cumulative frequency curve showing the percentage of time within the total period of record that a specified daily discharge was equaled or exceeded. This curve combines in one curve the flow characteristics of a stream throughout the range of discharge without regard to the sequence of occurrence. The general shape of such a curve is influenced by many factors, such as basin slope and cover, ground-water contributions, precipitation, and diversion.

The curve is plotted from a flow-duration table which tabulates the distribution of daily discharges by different class limits in increasing orders of magnitude. Discharge, in cubic feet per second, is plotted on the ordinate and percent-of-time, equaled or exceeded, is plotted on the abscissa. The flow-duration tables in this report are based on the distribution of daily discharges.

When comparing flow-duration curves for different streams, data covering the same period should be used in order to avoid including an extremely dry or wet year in one set and not in the other.

The flow-duration curves for the following stations are shown in figure 7.

		Area (mi^2)	Period of record
16897600	Nanpil River	3.00	1971-80.
16897900	Lewi River	.46	Do.
16898200	Lewi River at mouth	2.08	Do.
16898600	Luhpwor River	.72	1973-80.

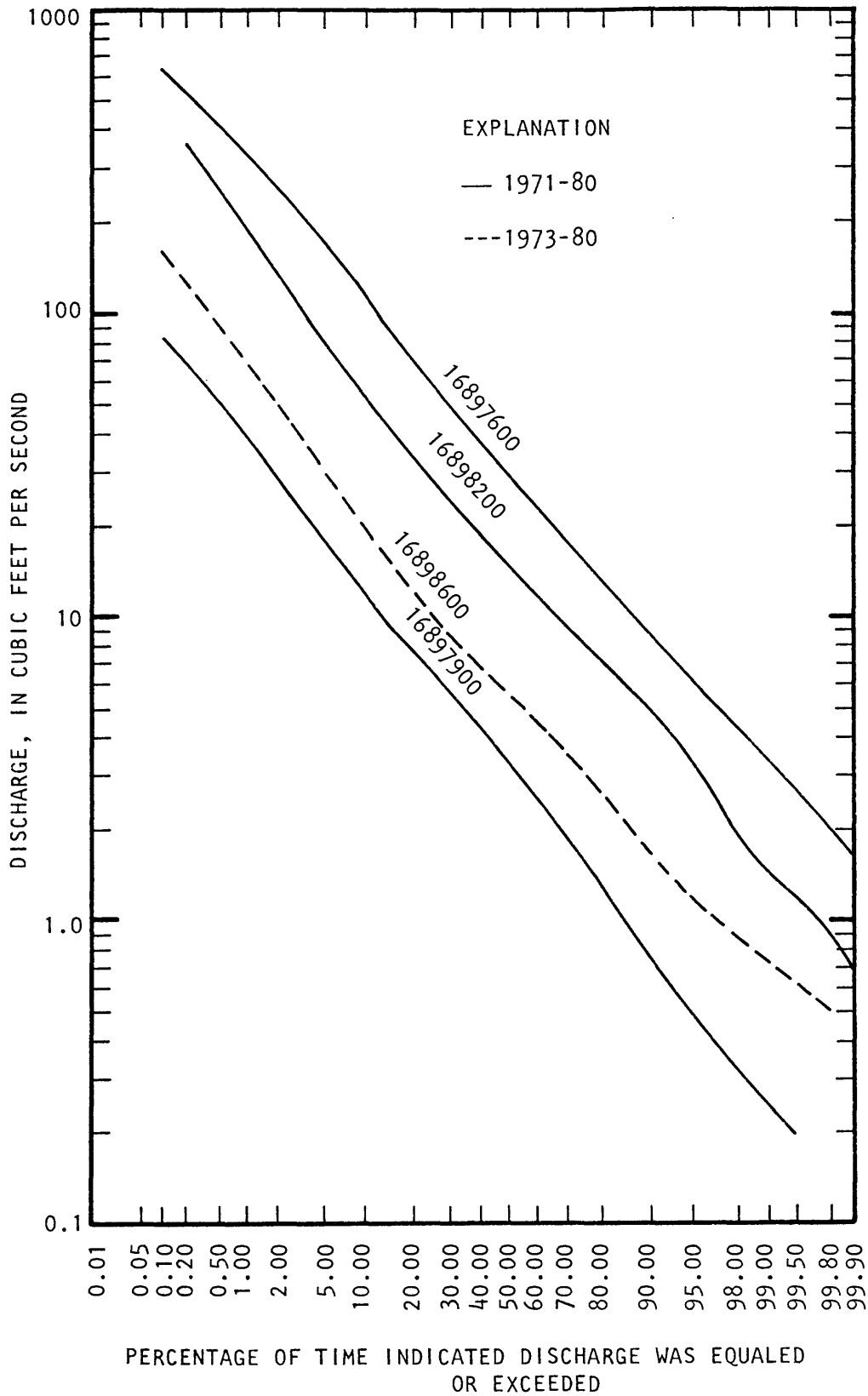


Figure 7. Flow-duration curves of continuous-record stations.

The 8-year (1973-80) and 10-year (1971-80) periods were considered to be representative of the long-term period (1950-80) because the average annual rainfall at Kolonia for these periods was 192.06, 192.66, and 192.46 inches, respectively.

The four flow-duration curves are parallel, which shows the similarity of the geology, vegetation, and rainfall of the drainage basins. These curves are virtually straight lines which indicates little sustained ground-water contribution. Ground water does discharge to the stream from short-term storage in small aquifers.

High-flow frequency curves.--High-flow frequency curves show the maximum mean discharge for certain periods of consecutive days and its likelihood of occurrence. They can also be used to show the frequency of instantaneous annual peak discharge. The high-flow frequency curves for 1, 3, 7, 15, 30, 60, and 120 consecutive days at the four gaging stations where records for 8-10 years are available, are shown in figures 8-11.

The frequency curves of annual, instantaneous peak flows for the three gaging stations with 10 years of record are shown in figure 12.

High-flow frequency curves provide information needed to determine the size of reservoirs and diversion structures. Frequency curves for annual peak flows are needed to size and design storm-drainage systems, culverts and bridge openings.

Because of abundant rainfall, the rivers are large in comparison to the size of the island and are perennial. An indirect measurement made on the Kiepw River near Kolonia for the peak flow of August 4, 1976, gave a discharge of 26,800 ft^3/s. Peak flows for that day at other stations were also the highest ever recorded on Ponape and indirect measurements made at gaging stations showed peak runoff rates of 2,500-3,000 ft^3/s per square mile.

None of the rivers on the island is known to have gone dry.

Low-flow frequency curves.--Low-flow frequency curves show the lowest mean discharge for certain periods of consecutive days. Figures 13-16 show these curves for a number of consecutive days varying from 1 to 120 days for the four gaging stations on Nanpil, Lewi and Luhpwor Rivers. Low-flow frequency curves were not computed for the station on the Dauen Neu River because the period of record was of insufficient length and the station was located downstream of a significant diversion.

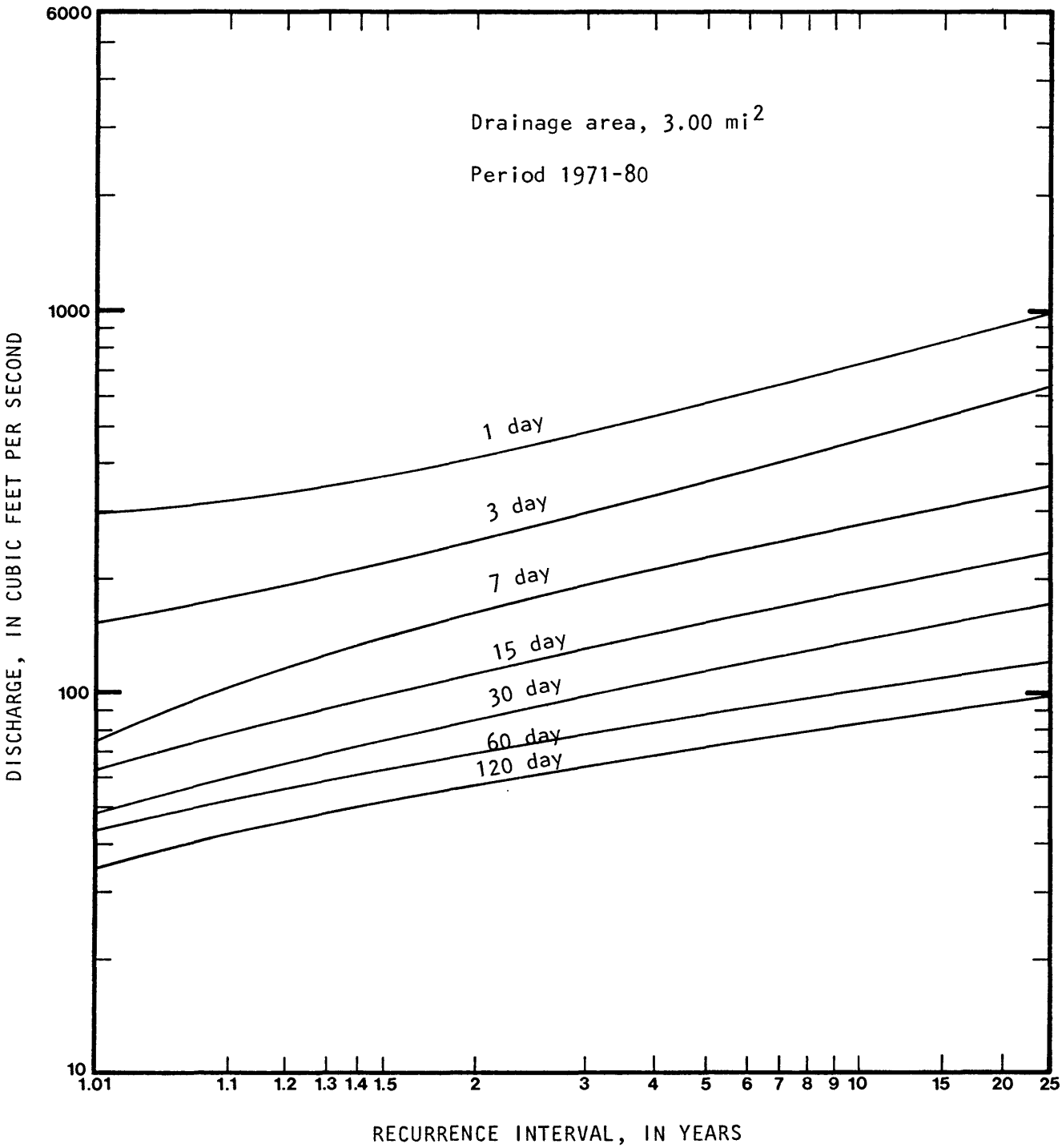


Figure 8. Magnitude and frequency of highest mean discharges for duration indicated, Nanpil River.

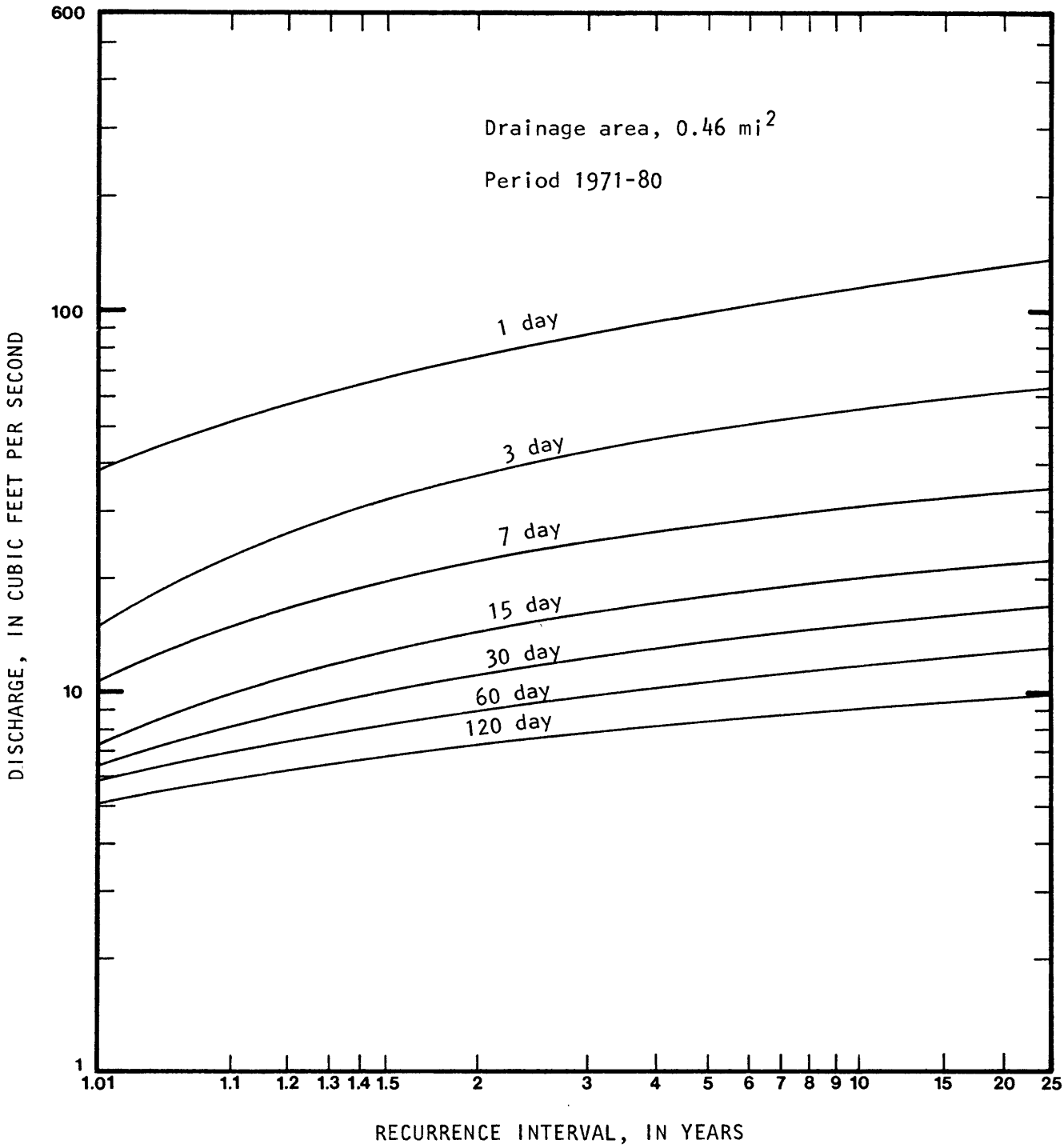


Figure 9. Magnitude and frequency of highest mean discharges for duration indicated, Lewi River.

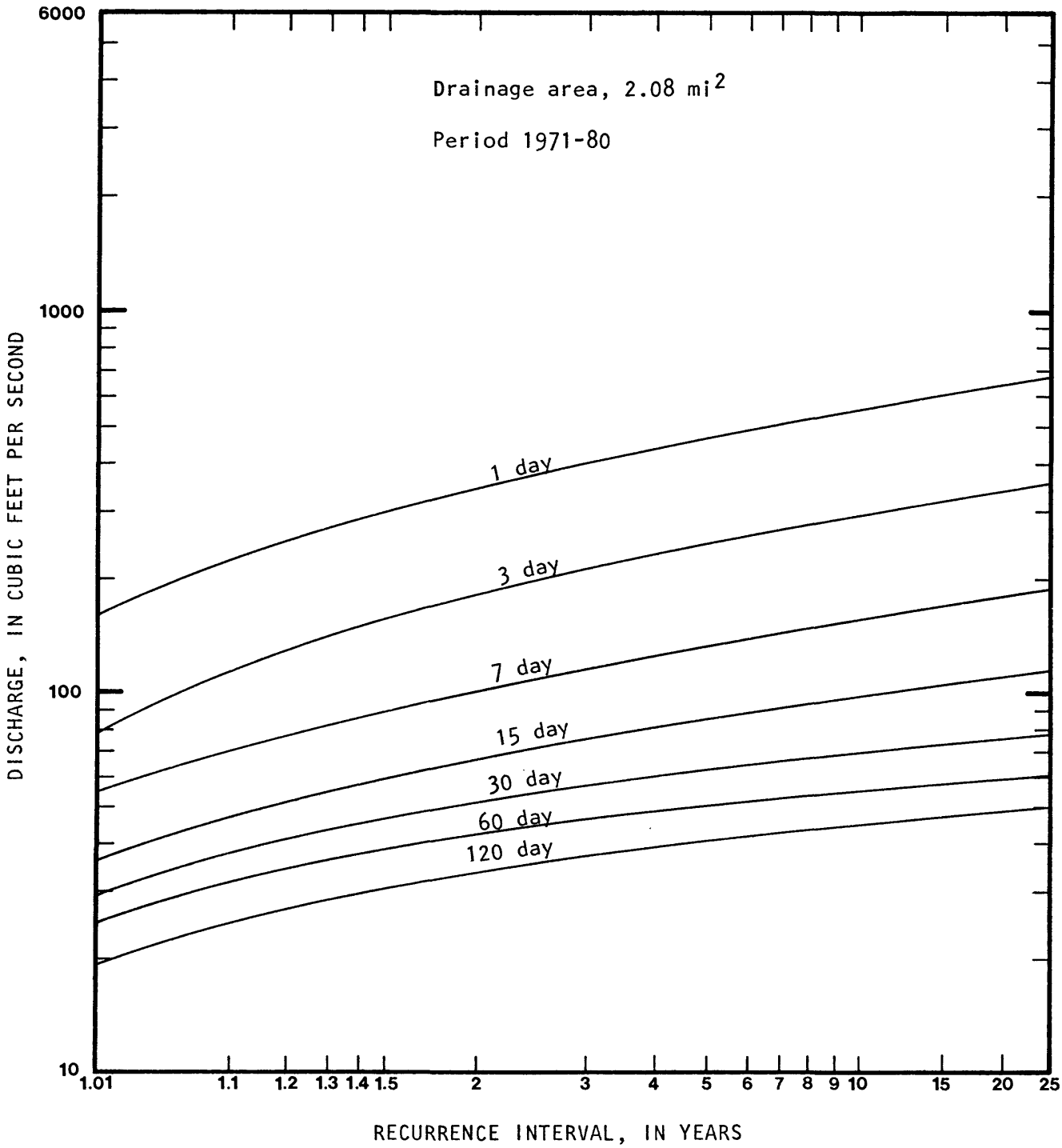


Figure 10. Magnitude and frequency of highest mean discharges for duration indicated, Lewi River at mouth.

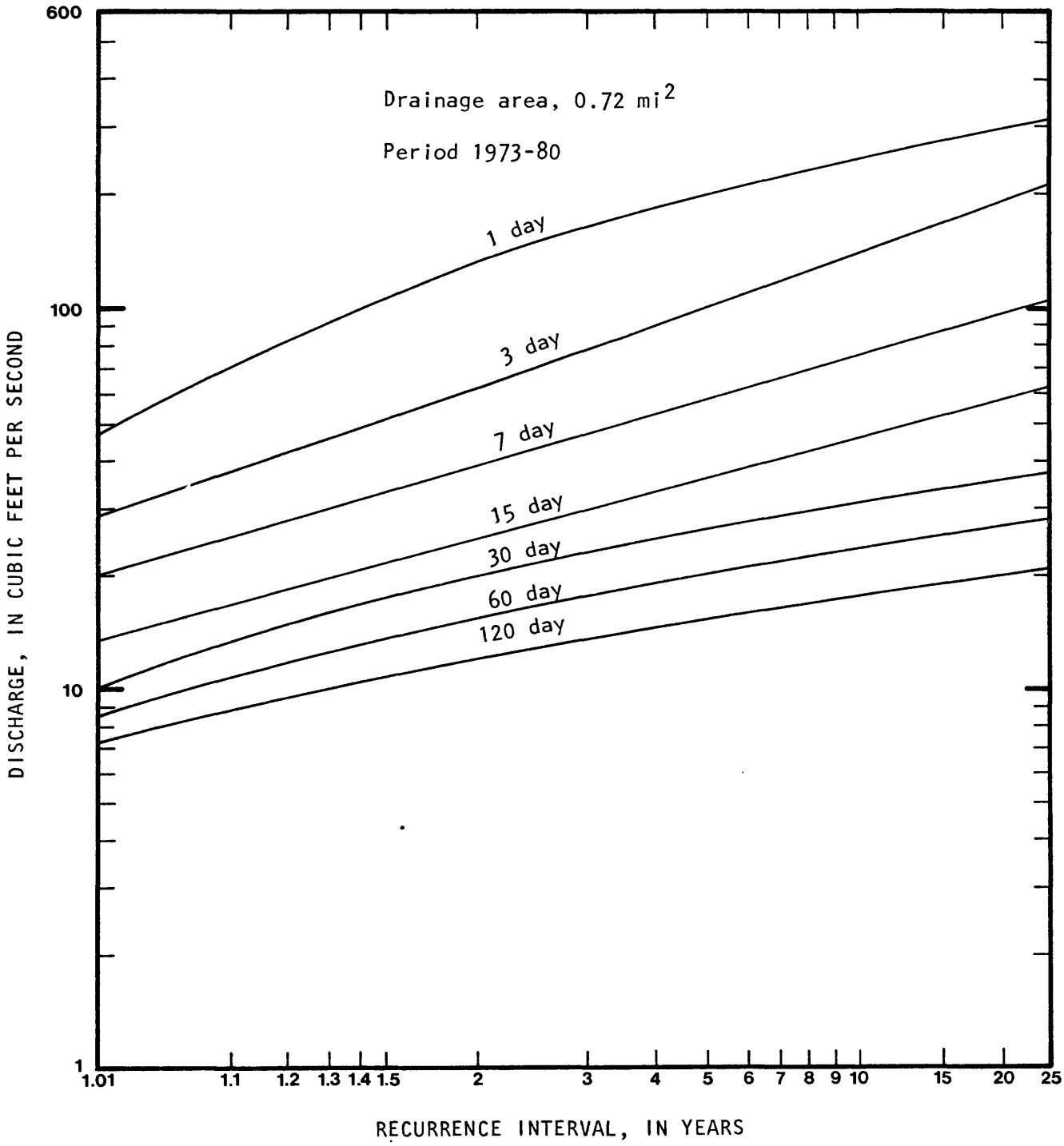


Figure 11. Magnitude and frequency of highest mean discharges for duration indicated, Luhpwor River.

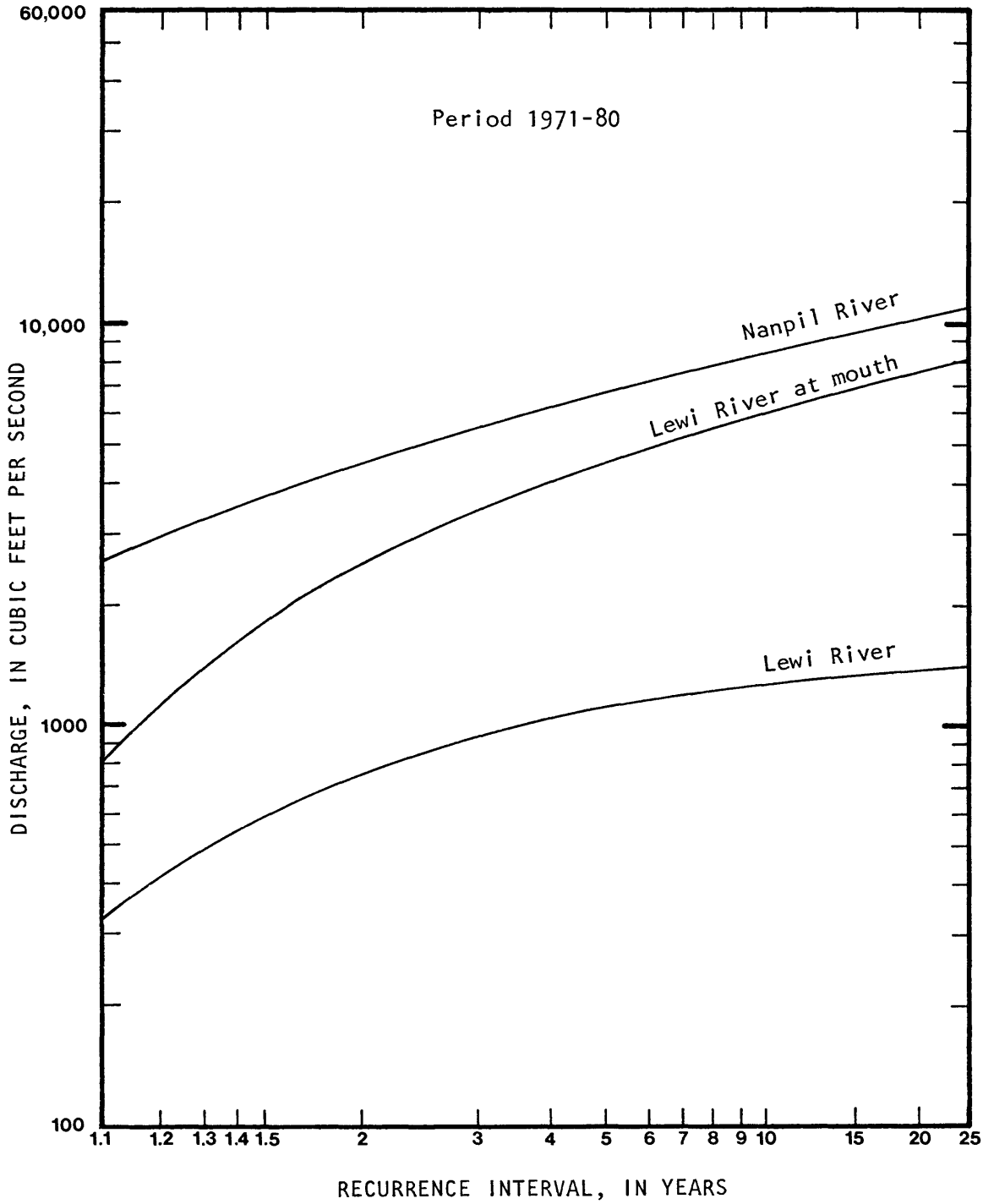
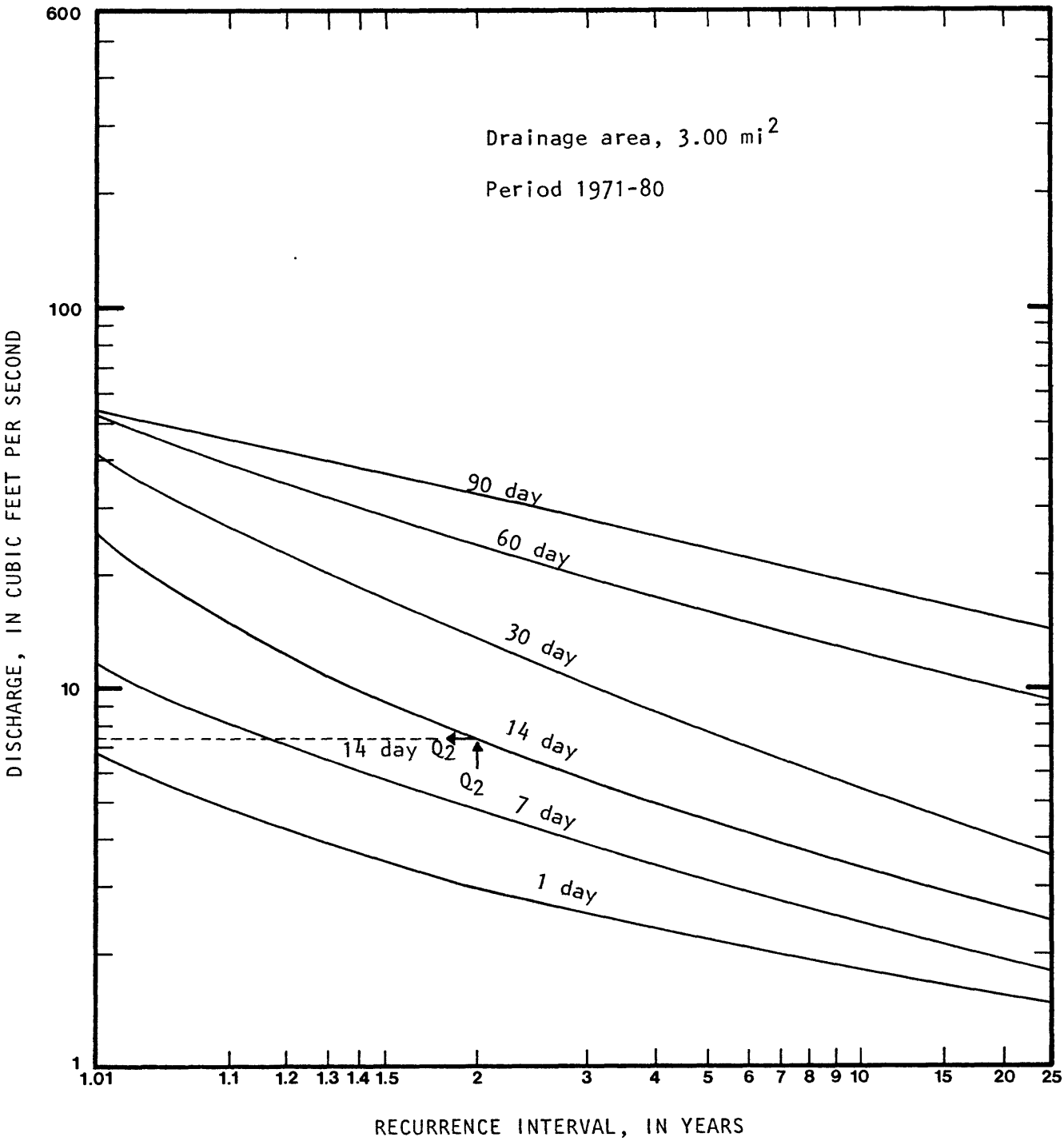


Figure 12. Magnitude and frequency of annual instantaneous peak flows for three continuous-record stations.



Note: Arrows show how lowest mean flow of 14 consecutive days with a 2-year recurrence interval is obtained.

Figure 13. Magnitude and frequency of lowest mean discharges for duration indicated, Nanpil River.

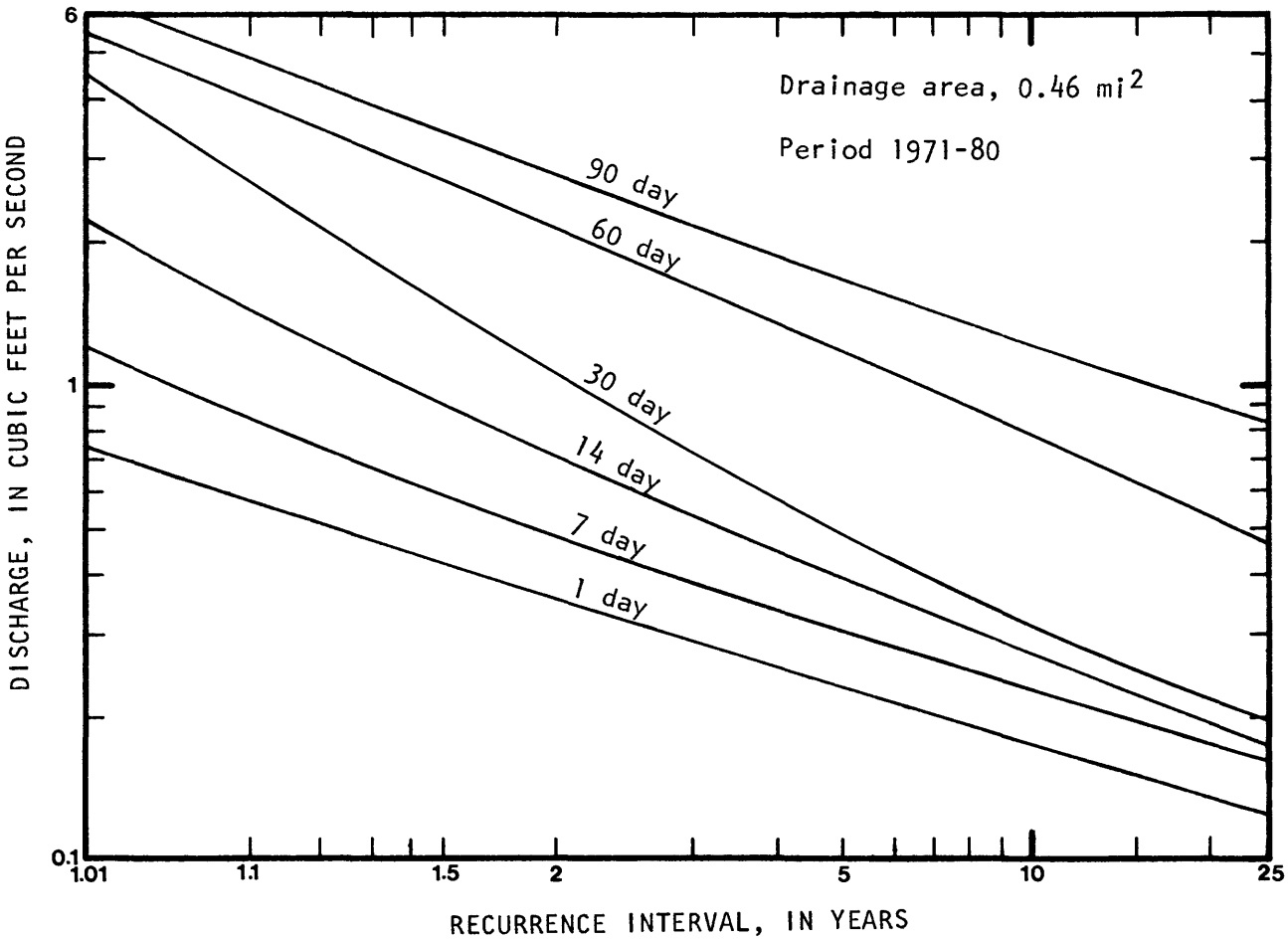


Figure 14. Magnitude and frequency of lowest mean discharges for duration indicated, Lewi River.

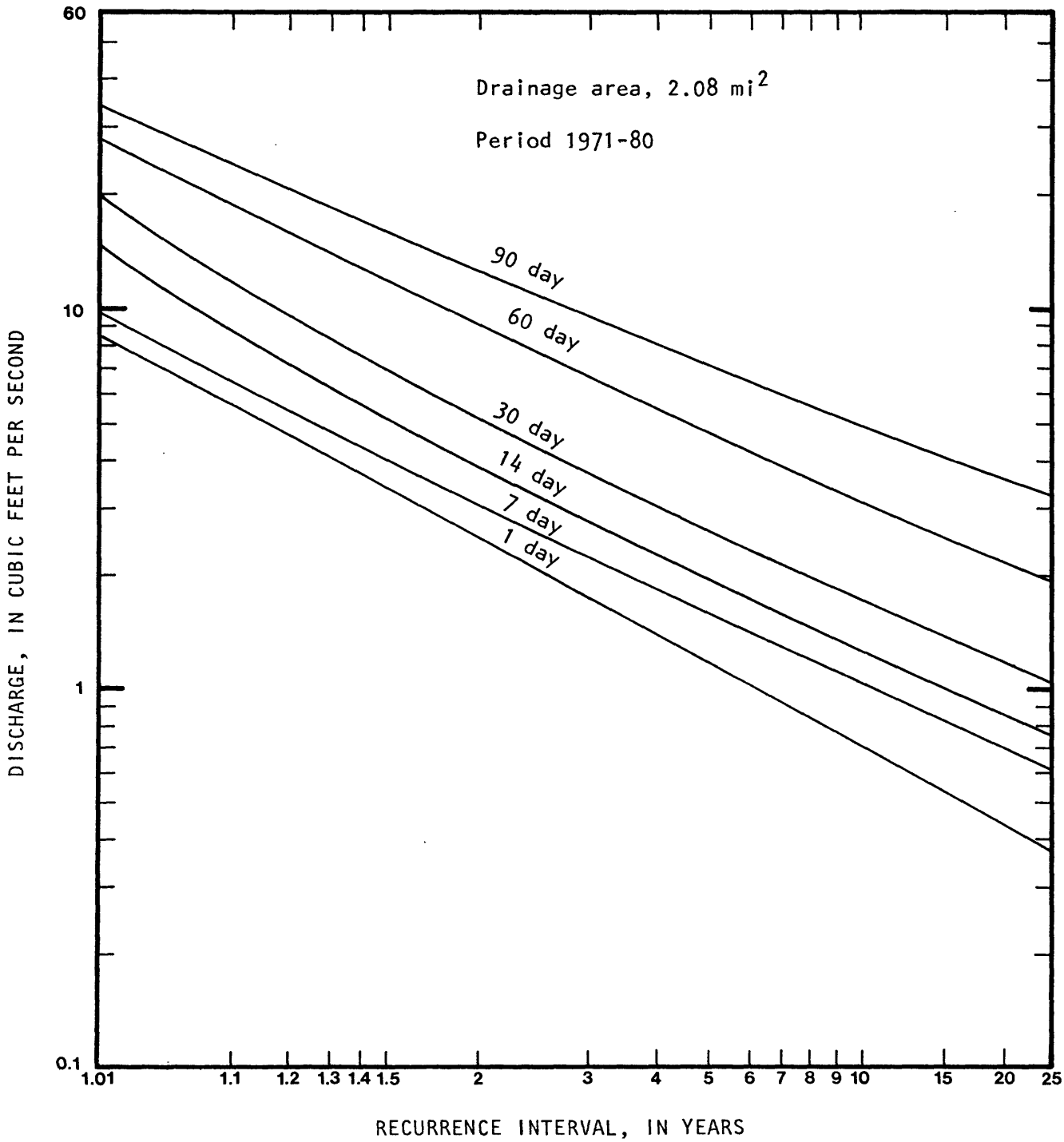


Figure 15. Magnitude and frequency of lowest mean discharges for duration indicated, Lewi River at mouth.

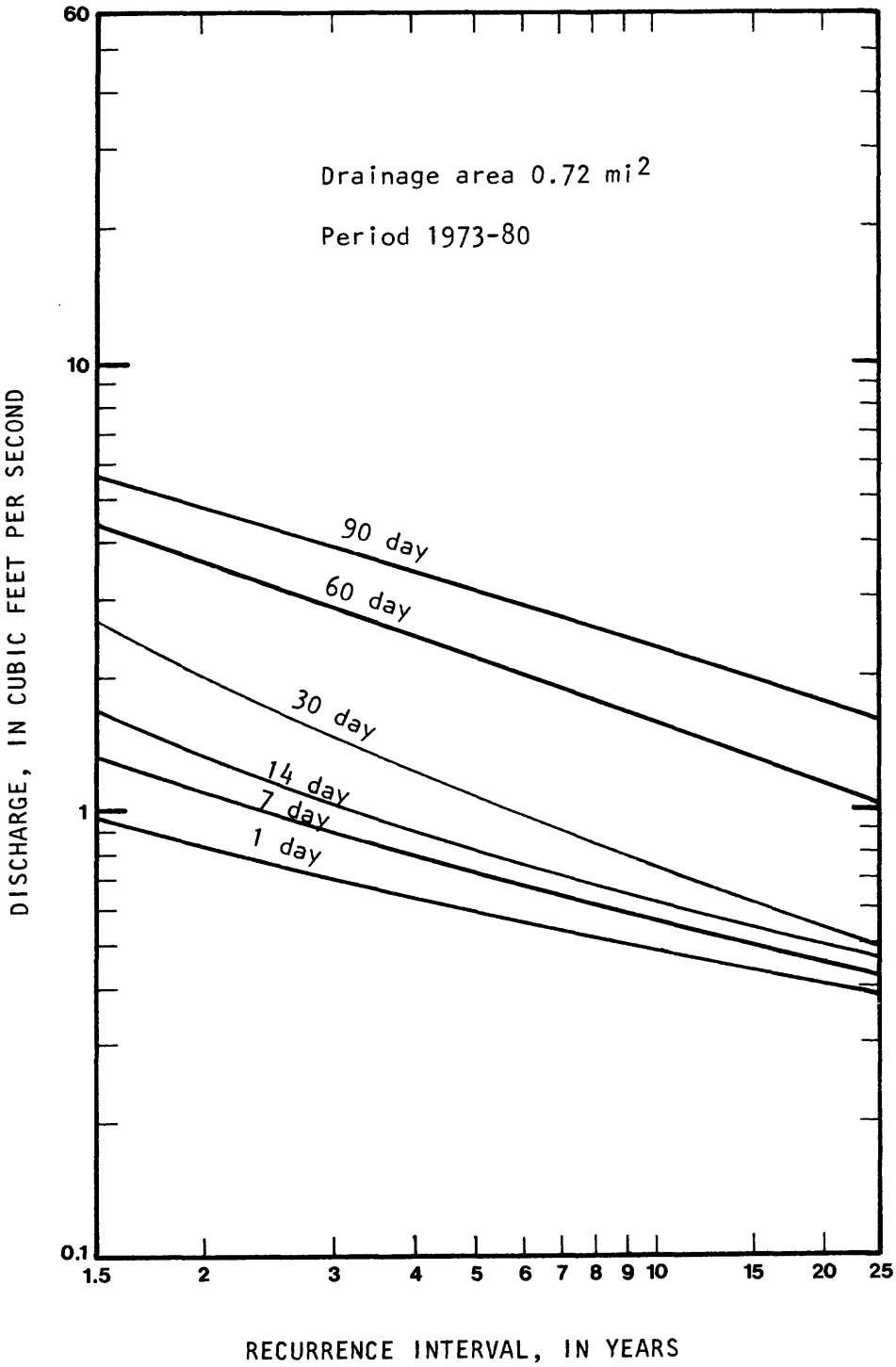


Figure 16. Magnitude and frequency of lowest mean discharges for duration indicated, Luhpwor River.

Correlation between partial-record and continuous-record stations

A low-flow partial-record station is operated to determine the low-flow characteristics of a stream through correlation with concurrent discharges at continuous-record gaging stations.

Discharge measurements made at all partial-record stations on Ponape were correlated with discharges at nearby continuous-record stations. Where two gaging stations were located nearly equidistant, correlations were made with each one, and the choice of the regression line used was based on the highest correlation coefficient (table 7).

Figures 17-25 show the regression lines which can be used to obtain reliable estimates of low flows at partial-record stations for any number of consecutive days during a certain period of time. Figure 17 shows how the low-flow 14-day Q_2 (lowest mean flow of 14 consecutive days with a 2-year recurrence interval) for a partial-record station is derived from the 14-day Q_2 flow of the corresponding continuous-record station, which is obtained from the low-flow frequency curve for that station (fig. 13).

Water Quality

General

Water-quality data were collected by the U.S. Geological Survey at 20 sites during 1971 and 1978-82 to determine the baseline chemical and physical characteristics of surface water. Toxic chemicals and bacteriological determinations were not part of this basic inventory. Locations where water samples were collected for chemical analyses are listed in table 8 and shown on figure 26.

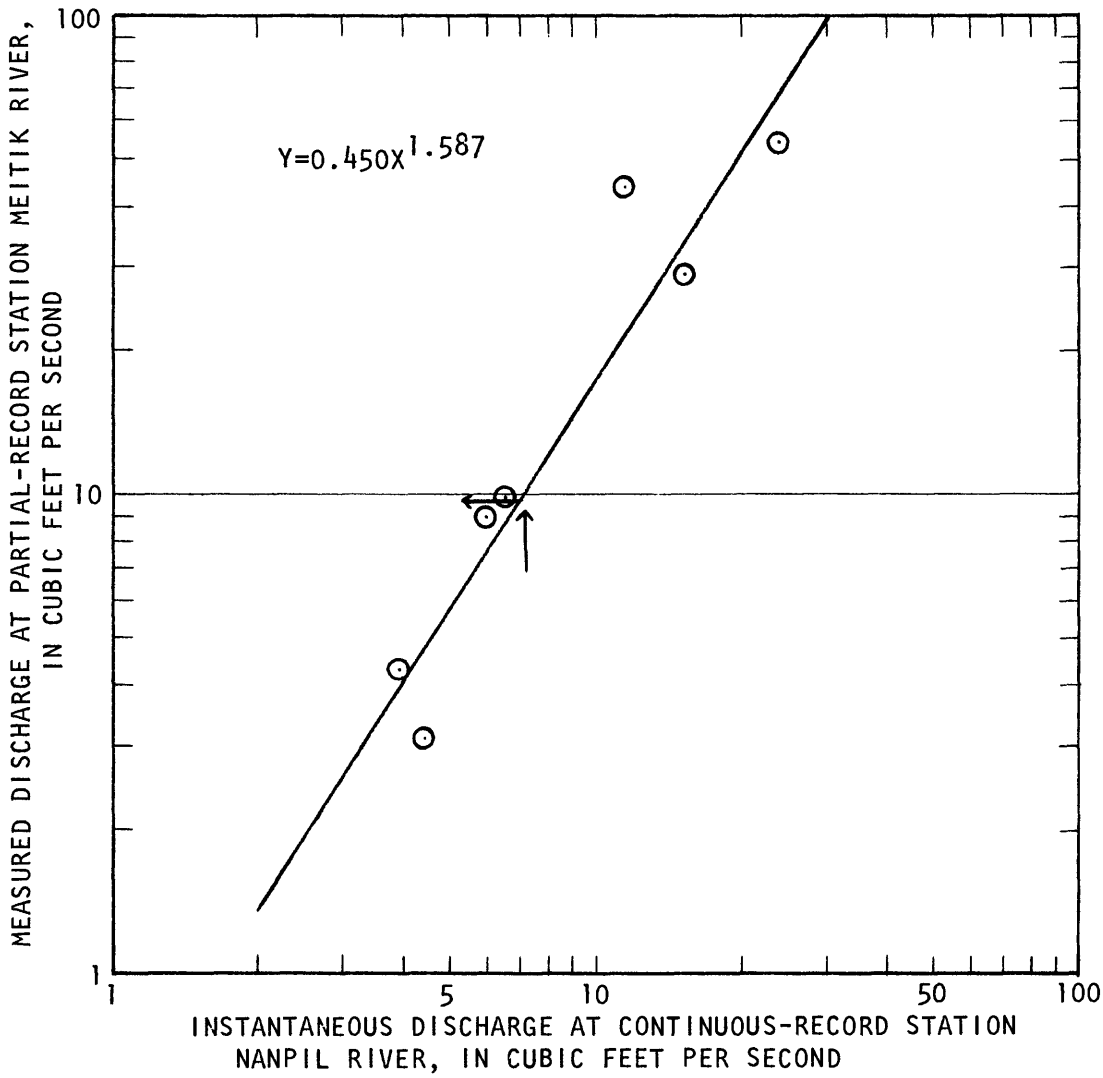
All water samples were analyzed by the U.S. Geological Survey Central Laboratory in Denver, Colorado. Discharge, water temperature, specific conductance, pH, and dissolved oxygen were determined at the site.

Results of the analyses are given in the Hydrologic Data section, tables 54-62. They show the water of all rivers, especially that of Nanpil River, to be of excellent quality, uniformly soft and low in dissolved solids. Concentrations of all chemicals analyzed are well within the maximum permissible level recommended for domestic use by the World Health Organization (1971) (table 9).

Table 7. Correlation between discharge at low-flow partial-record and continuous-record stations

[Y, discharge for partial record station; X, discharge for continuous-record station]

Partial-record station	Drainage area (mi^2)	Continuous-record station	Drainage area (mi^2)	Number of observations	Correlation coefficient	Regression equation
Meitik River	5.04	Nanpil River	3.00	7	0.94	$Y = 0.45X^{1.59}$
Kiepw (Tawenjokola) River at mouth.	11.2	do.	3.00	6	.90	$Y = 4.01X^{0.99}$
Lewi (Lui) River tributary No. 2.	.07	Lewi River	.46	40	.85	$Y = 0.31X^{0.80}$
Lewi (Lui) River tributary.	.45	Lewi River at mouth	2.08	28	.89	$Y = 0.054X^{1.37}$
Nankewi (Pilenkiel) River.	1.48	Luhpwor River	.72	16	.86	$Y = 2.81X^{0.98}$
Kiriedleng (Kirictilang) River.	.73	Luhpwor River	.72	15	.94	$Y = 1.44X^{1.10}$
Lehn Mesi (Lehnmasi) River.	8.32	Lewi River at mouth	2.08	6	.85	$Y = 18.0X^{0.56}$
Senipehn (Senpen) River.	6.04	Nanpil River	3.00	6	.86	$Y = 3.35X^{0.85}$
Lehdau (Lataw) River	2.44	do.	3.00	7	.88	$Y = 1.99X^{0.77}$



Note: Arrows show how discharge at partial-record station is obtained from discharge at continuous-record station.

Figure 17. Correlation between discharges at Meitik and Nanpil Rivers.

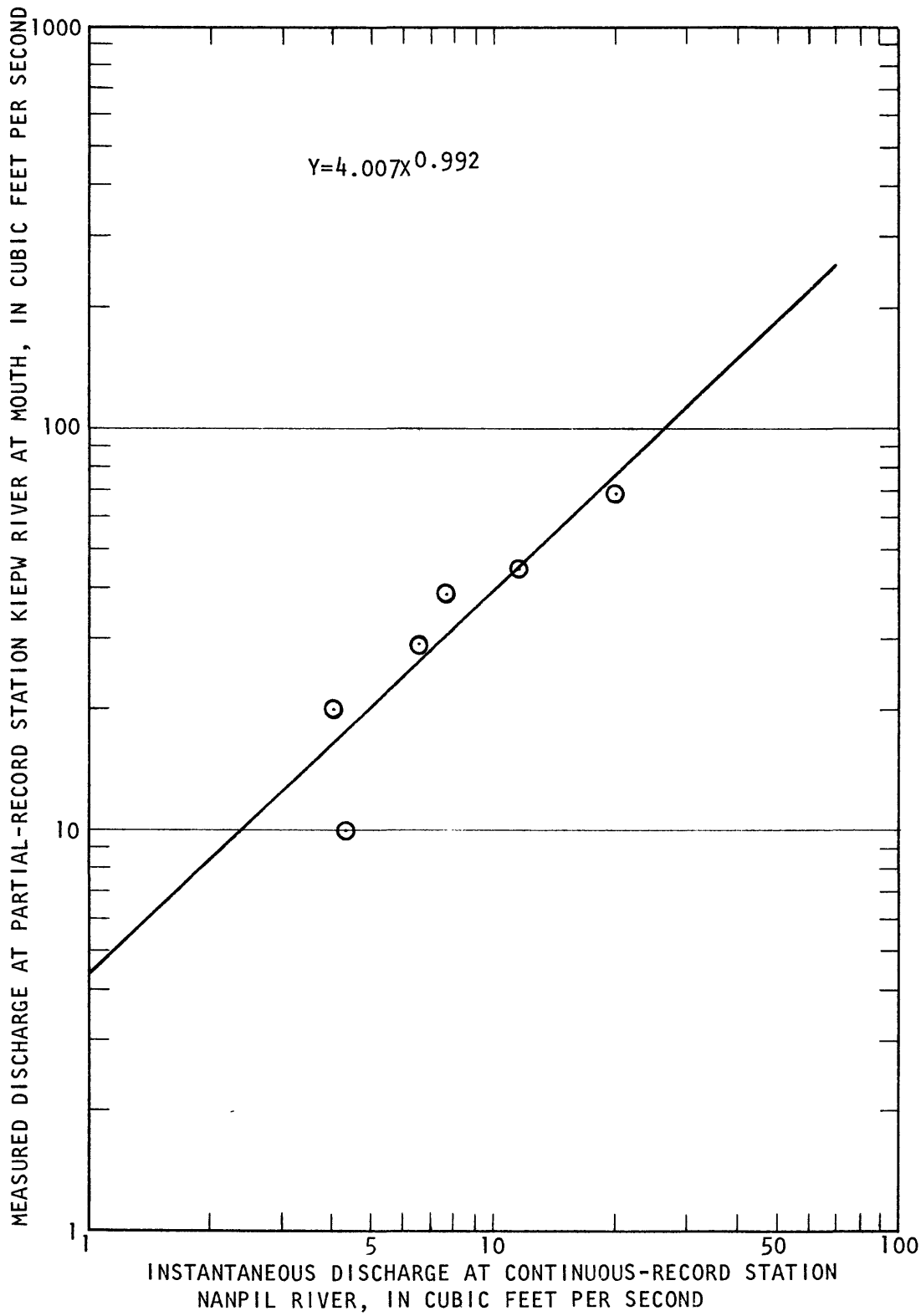


Figure 18. Correlation between discharges at Kiepw River at mouth and Nanpil River.

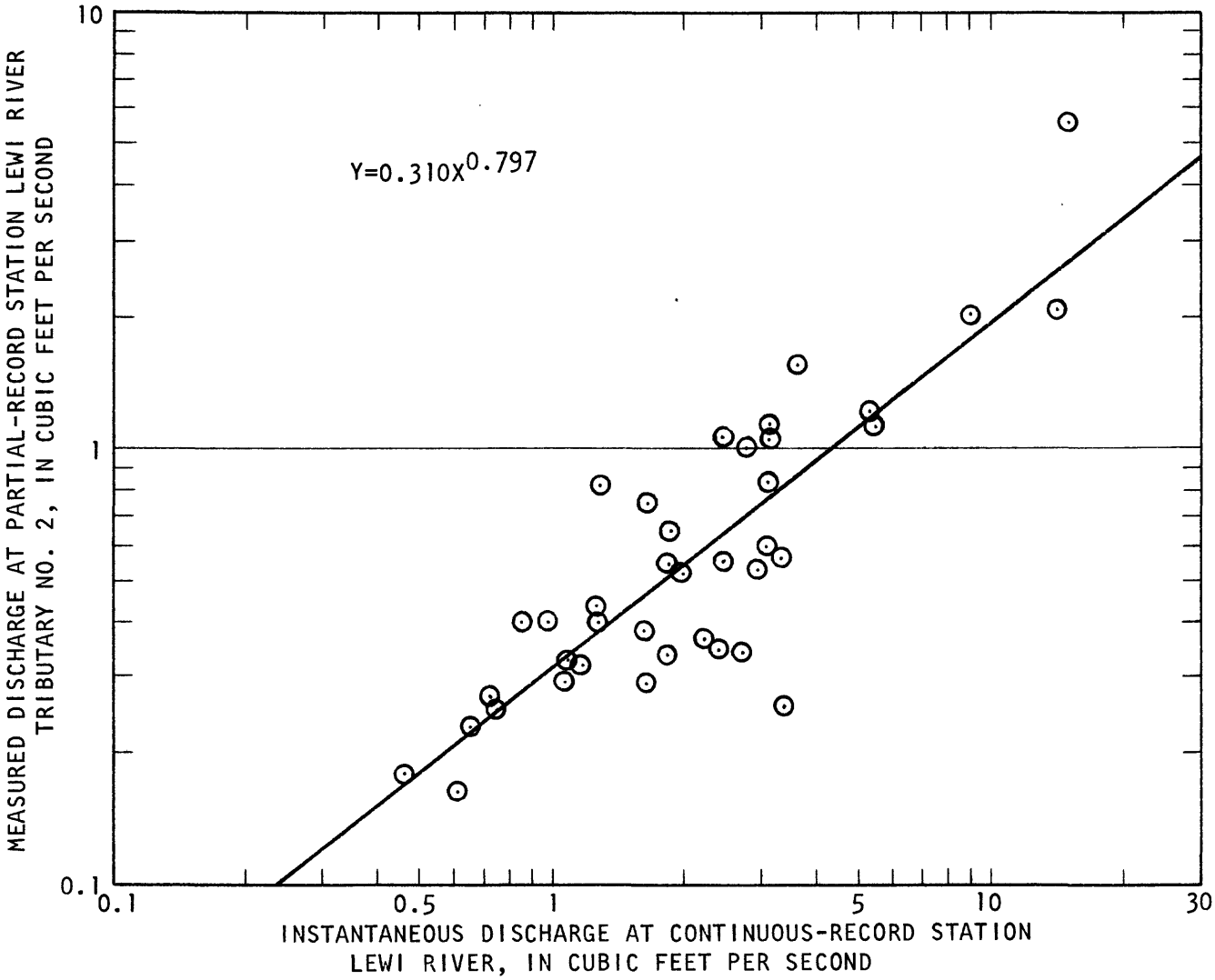


Figure 19. Correlation between discharges at Lewi River tributary No. 2 and Lewi River.

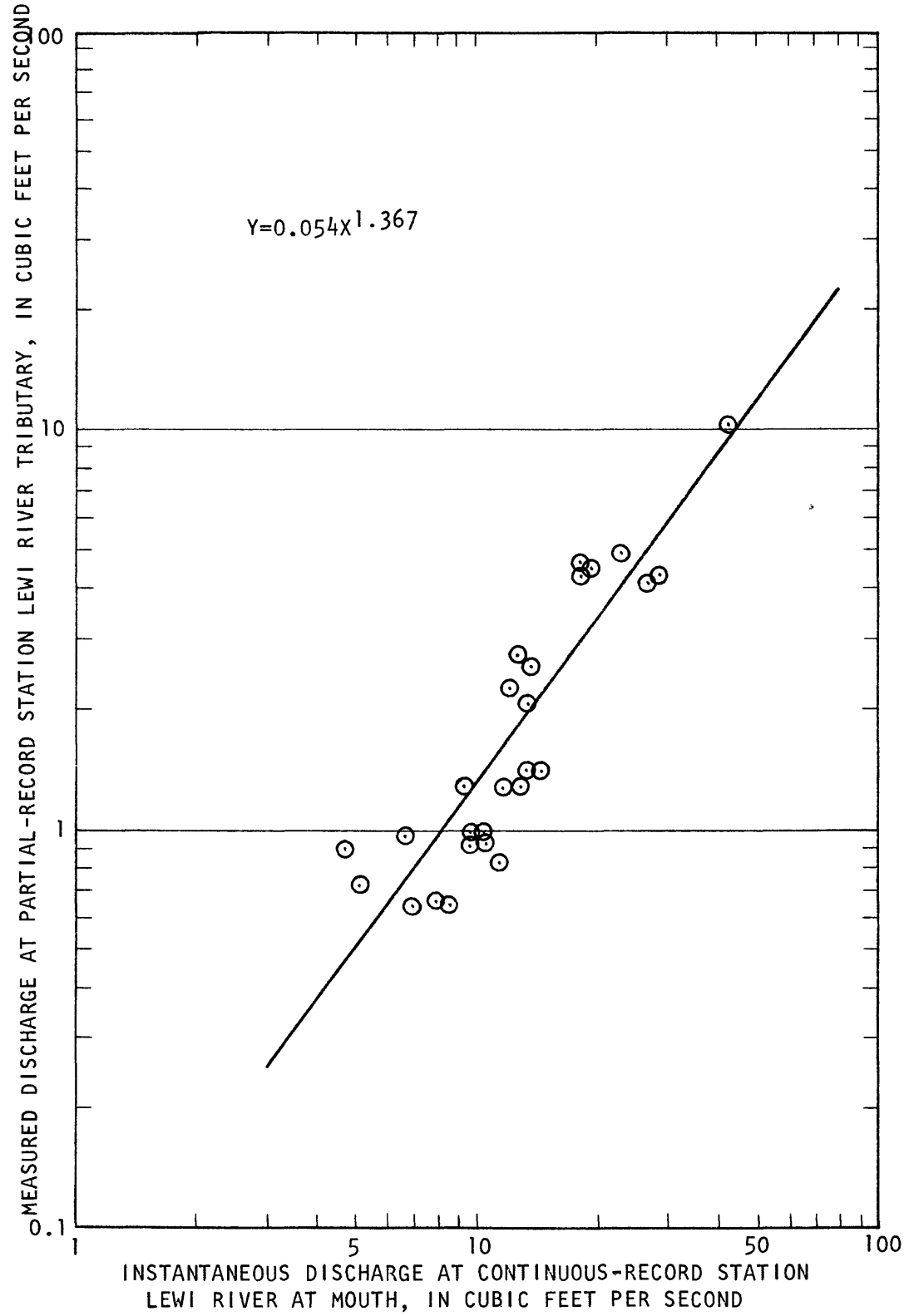


Figure 20. Correlation between discharges at Lewi River tributary and Lewi River at mouth.

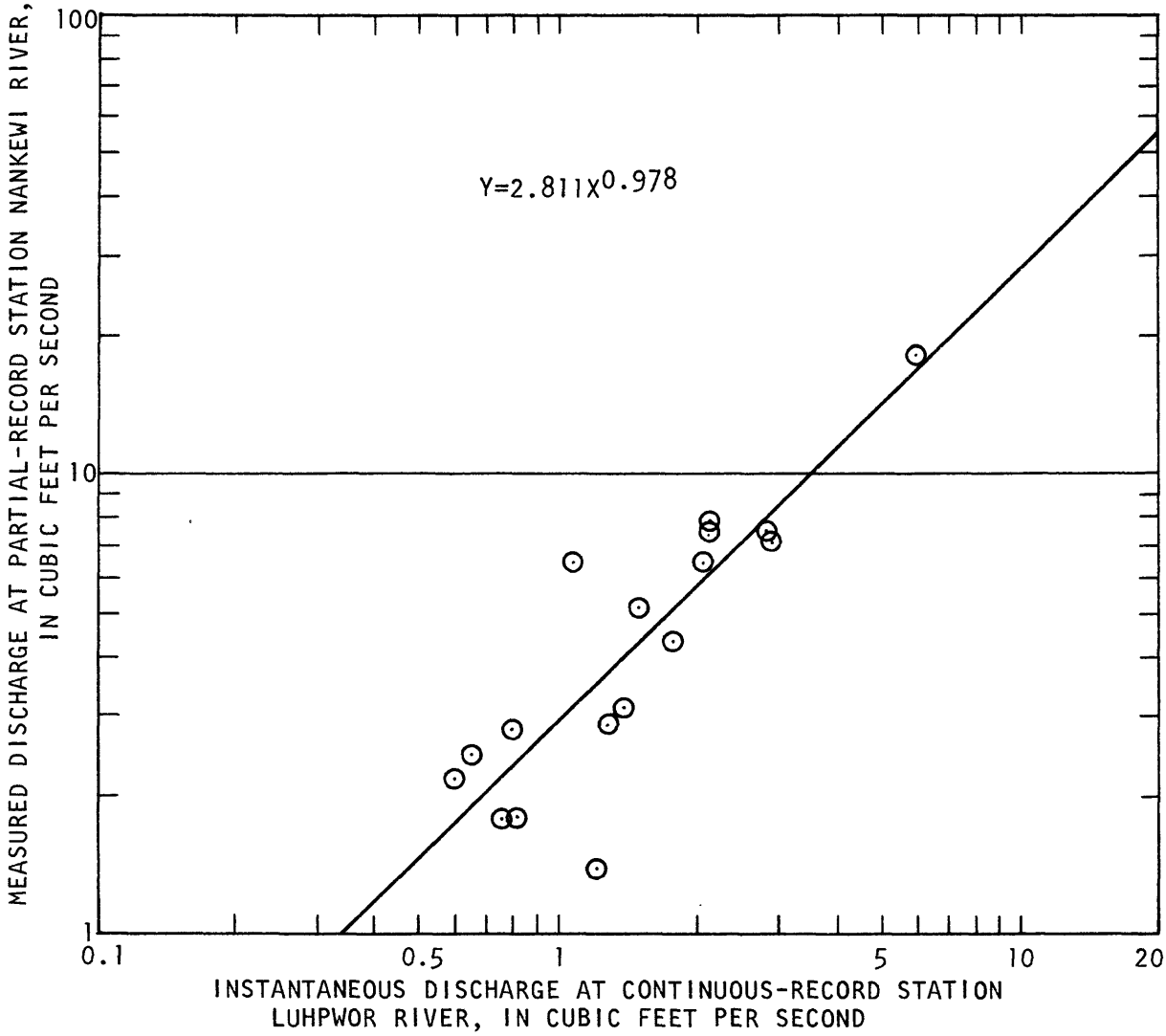


Figure 21. Correlation between discharges at Nankewi and Luhpwor Rivers.

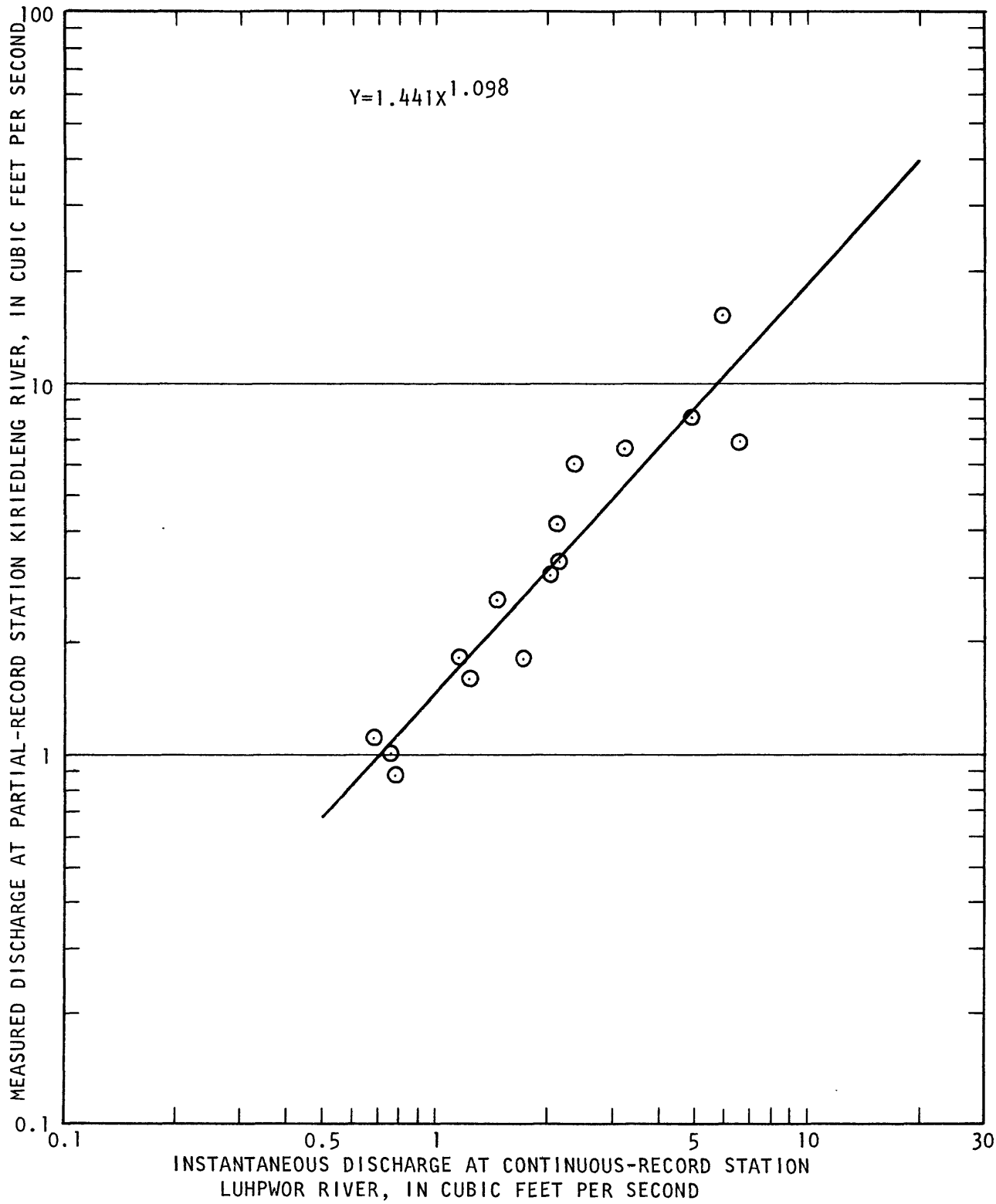


Figure 22. Correlation between discharges at Kiriedleng and Luhpwor Rivers.

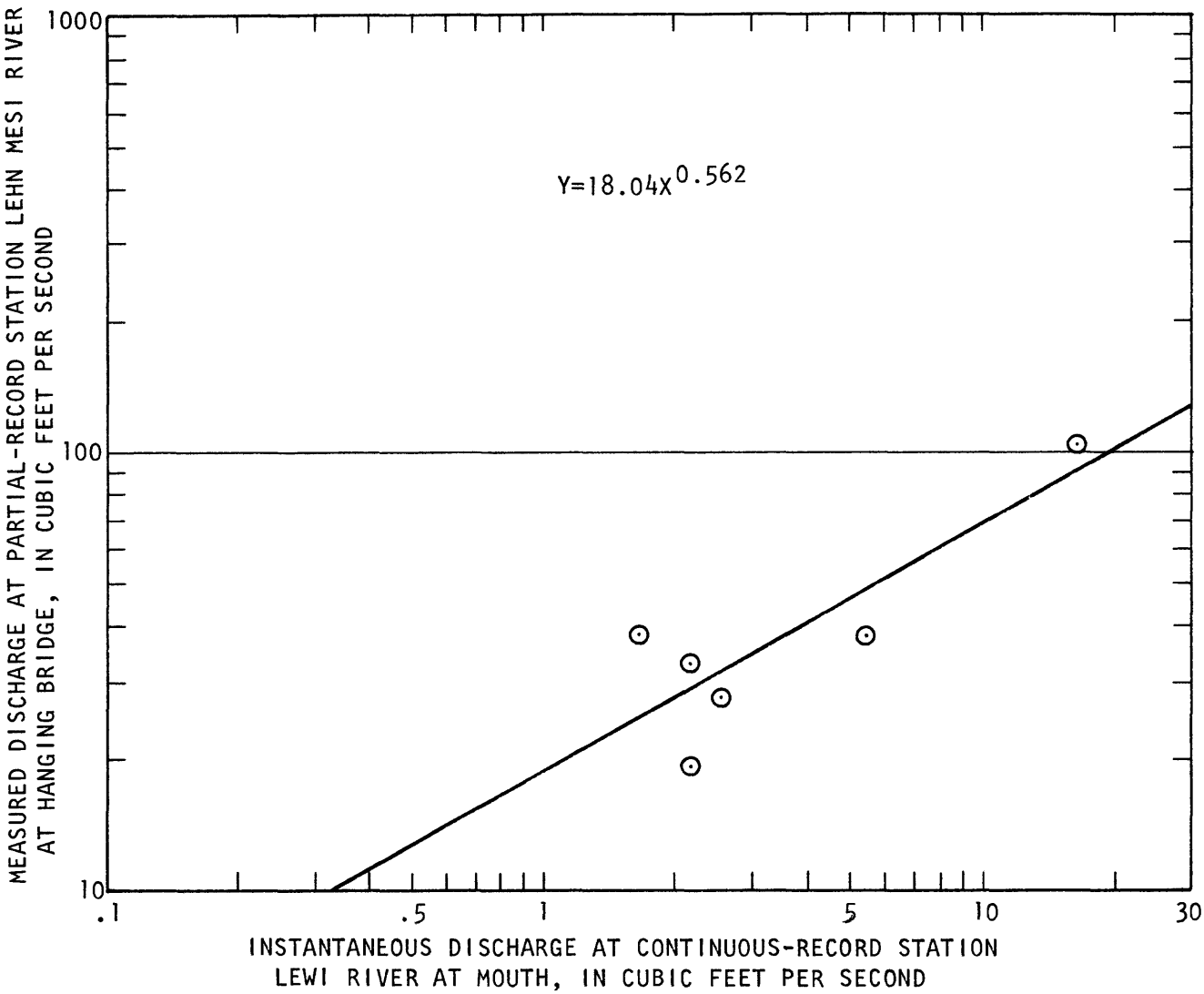


Figure 23. Correlation between discharges at Lehn Mesi River at hanging bridge and Lewi River at mouth.

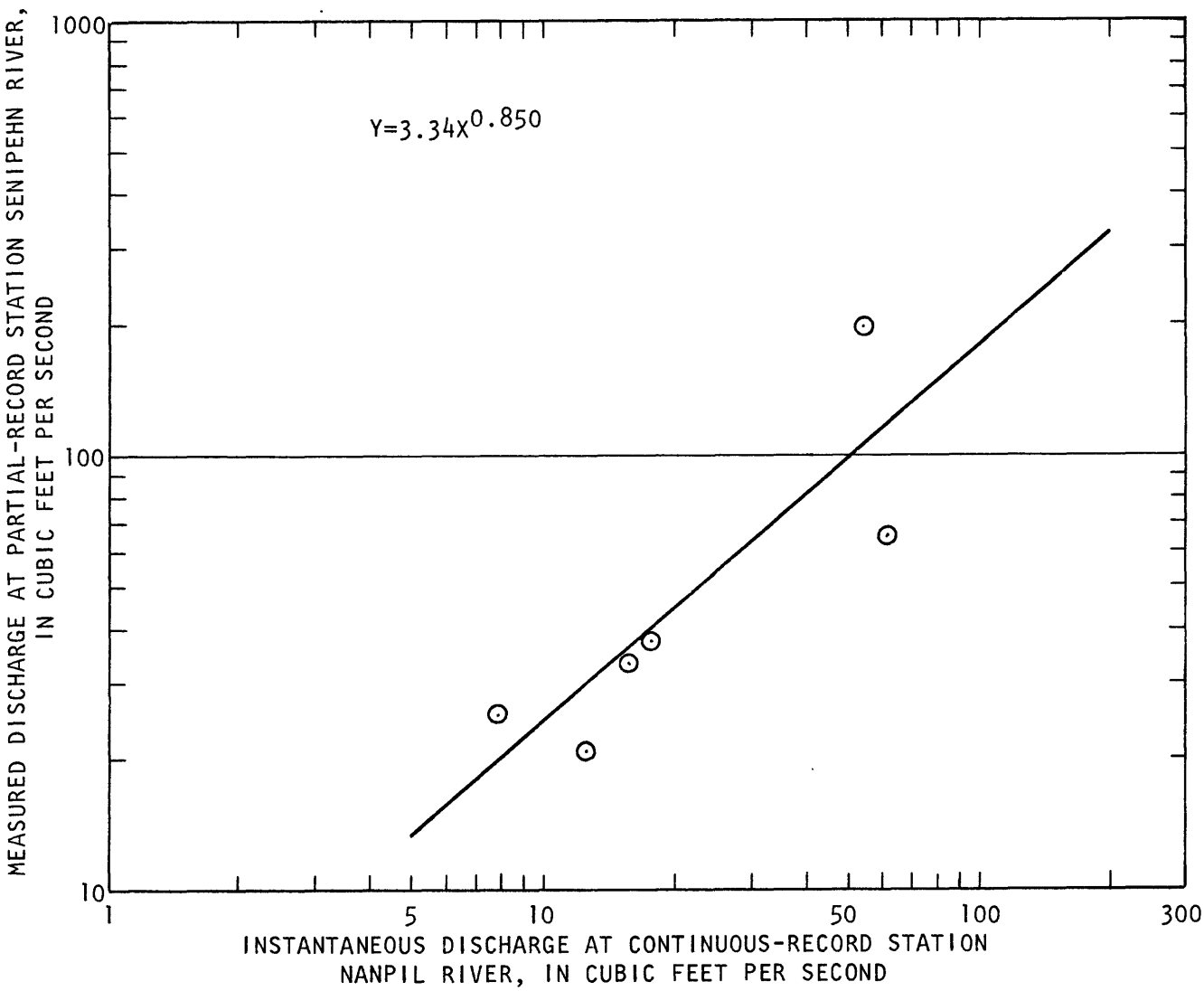


Figure 24. Correlation between discharges at Senipehn and Nanpil Rivers.

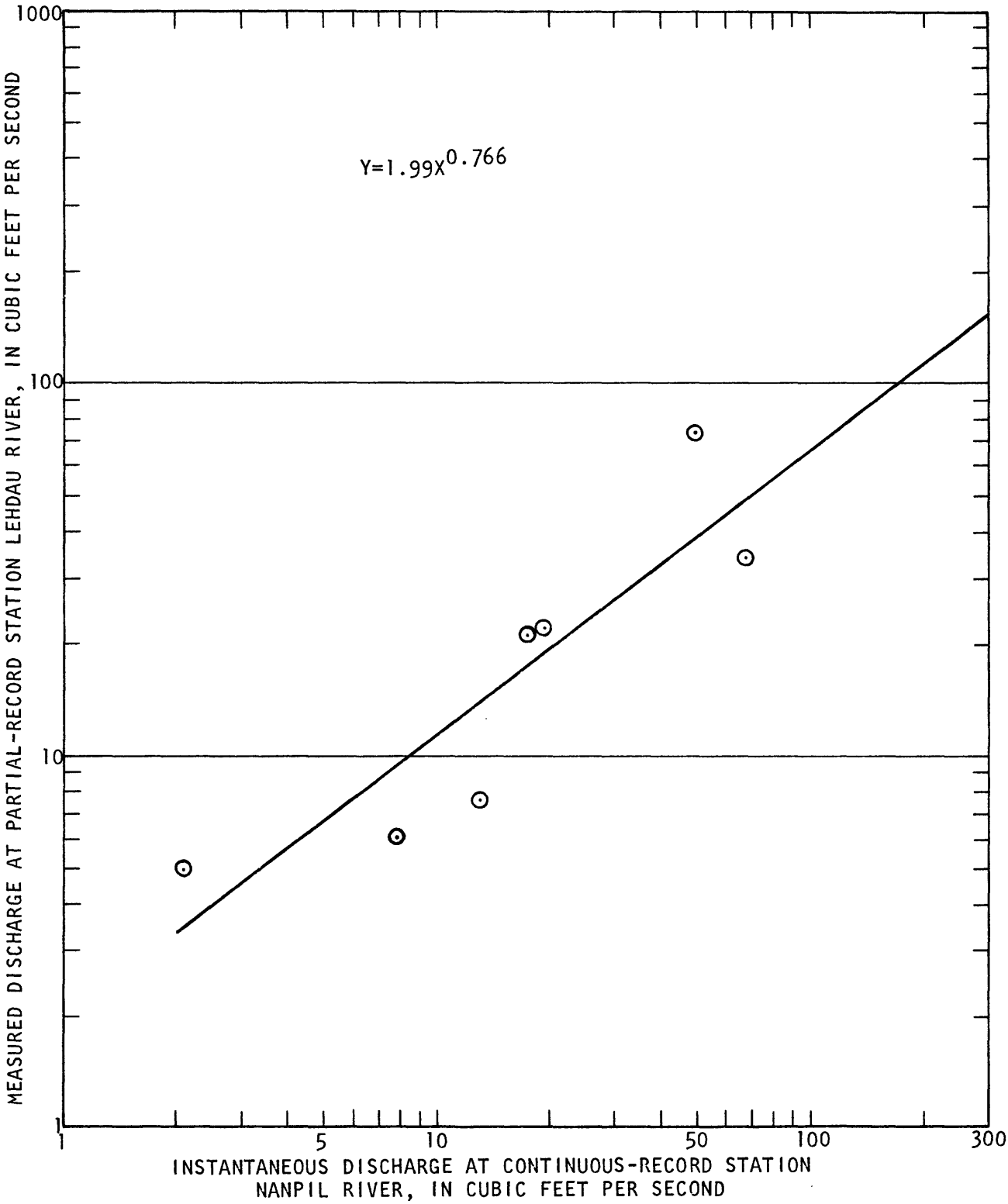


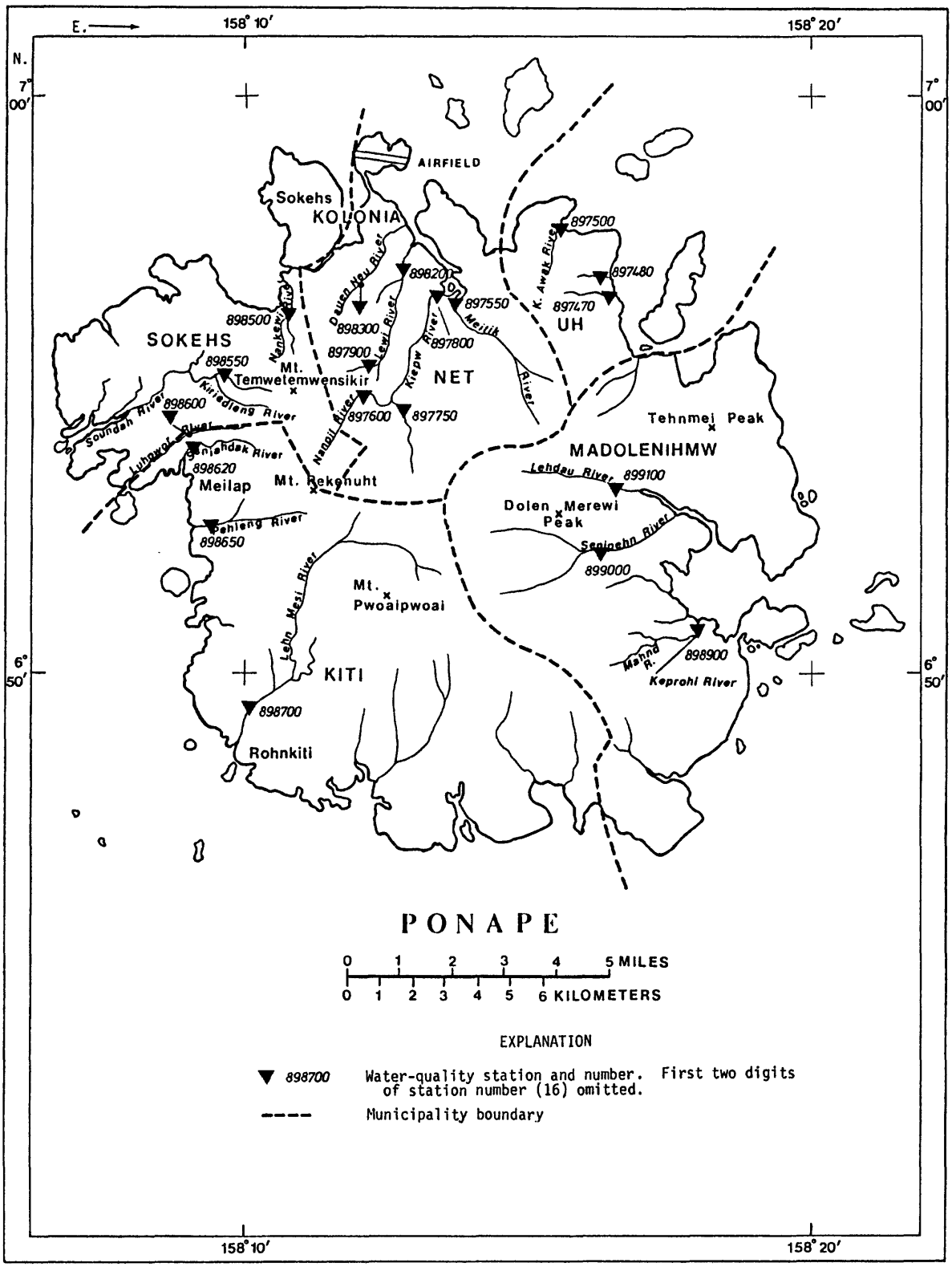
Figure 25. Correlation between discharges at Lehdau and Nanpil Rivers.

Table 8. Locations where chemical analyses of surface water were made

Station No.	Station name	Date sample collected								
		1971	1978	1979	1979	1980	1980	1981	1981	1982
16897470	Pahntakai River	--	--	--	--	--	--	4-10	--	--
16897480	Unnamed river near Cape Uh.	--	--	--	--	--	11-21	--	--	--
16897500	Kepin Awak River	--	--	--	--	--	11-21	4-10	--	--
16897550	Meitik River	--	--	--	--	5-20	11-21	--	--	--
16897600	Nanpil River	8-3	5-24	5-16	10-27	5-20	11-21	--	--	10-30
16897750	Kiepw River	--	--	--	--	--	--	4-9	--	--
16897800	Kiepw River at mouth.	--	--	--	--	--	11-21	--	--	--
16897900	Lewi River	8-3	5-24	5-16	10-27	5-20	11-21	--	--	--
16898200	Lewi River at mouth.	8-3	5-25	5-15	[1] 10-26	5-10	11-20	--	--	--
16898300	Dauen Neu River	--	--	--	--	--	--	4-9	10-23	--
16898500	Nankewi River	--	--	--	--	--	11-20	3-30	--	--
16898550	Kiriedleng River	--	--	--	--	--	11-20	3-30	--	--
16898600	Luhpwor River	--	5-28	5-17	10-29	5-21	11-20	--	--	[2] 10-13
16898620	Seniahdak River	--	--	--	--	--	--	--	10-23	11-2
16898650	Pehleng River	--	--	--	--	--	--	3-30	10-23	--
16898690	Lehn Mesi River	--	--	--	--	--	--	--	--	10-25
16898700	Lehn Mesi River at hanging bridge.	--	--	--	--	--	--	3-28	--	--
16898900	Keprohi River	--	--	--	--	--	--	3-27	--	11-2
16899000	Senipehn River	--	--	--	--	5-22	--	3-27	--	--
16899100	Lehdau River	--	--	--	--	5-22	--	3-27	--	--

[1] Two samples collected.

[2] Also sample collected at Japanese dam, 1.2 miles upstream.



Base from U.S. Geological Survey, 1981, scale 1:10,000.

Figure 26. Location of water-quality stations.

Surface-water quality

Rainfall is the source of all surface water on Ponape. The dissolved-solids concentration of stream water ranged from 15 mg/L (milligrams per liter) to 58 mg/L (with one exception of 82 mg/L at an unnamed river near Cape Uh) and averaged 32 mg/L from 45 analyses. Silica concentrations, ranging from 3.8 to 16 mg/L, constituted 16-42 percent of the dissolved solids. This is characteristic of rainwater flowing over tropical volcanic terrain. Other constituents showed the following averages: alkalinity, 13 mg/L; chloride, 3.9 mg/L; calcium, 3.2 mg/L; sodium, 2.7 mg/L; magnesium, 2.0 mg/L; potassium, 0.2 mg/L; and nitrite plus nitrate nitrogen and fluoride, less than 0.1 mg/L.

The iron concentration of surface water ranged from 22-230 µg/L (micrograms per liter) with a mean of 98 µg/L. Iron is a minor element in water but can cause undesirable effects when the concentration exceeds 300 µg/L. It can cause problems with taste, discoloration, turbidity, and growth of iron bacteria. The World Health Organization (1971) recommends a desirable level of 100 µg/L and a maximum permissible level of 1,000 µg/L.

Runoff from tropical storms is usually flashy and can cause turbidity problems in streams and coastal waters. However, the storm duration generally is short and streams revert to base-flow conditions within a short time. Physical quality data, in terms of specific conductance, pH, temperature, and turbidity, are included in the chemical analyses as an integral part of the baseline information.

A measure of acidity or basicity is pH. In natural water, pH is a function of chemical and biological processes. For streams on Ponape, pH values ranged from 6.5 to 7.9 and are within the permissible range for public water supply.

The turbidity of the stream samples analyzed in May 1980 and March 1981 reflect only base-flow conditions. It ranged from 0.6 to 4.3 NTU (nephelometric turbidity units), well within the desirable level for drinking water (table 9).

Specific conductance is expressed in micromhos per centimeter at 25°C. It is a measure of the ability of water to transmit electrical current and is used as an indicator of the amount of dissolved solids in water--the more dissolved solids, the greater the conductance. The specific conductance of stream water on Ponape did not exceed 75 µmho, with the exception of an unnamed river near Cape Uh (127 µmho) and at Dauen Neu River (90 and 104 µmho).

Table 9. World Health Organization drinking-water standards

[Trust Territory standards are based on World Health Organization, 1971, standards. NTU, nephelometric turbidity units; mg/L, milligrams per liter; µg/L, micrograms per liter].

Constituents	Units	Highest desirable	Maximum permissible
pH	--	7.0-8.5	6.5-9.2
Turbidity	NTU	5	25
Hardness as $CaCO_3$	mg/L	100	500
Calcium, dissolved (Ca)	mg/L	75	200
Magnesium, dissolved (Mg)	mg/L	30	150
Sulfate, dissolved (SO_4)	mg/L	200	400
Chloride, dissolved (Cl)	mg/L	200	600
Fluoride, dissolved (F)	mg/L	1/	1/
Solids, total dissolved	mg/L	500	1,500
Iron, dissolved (Fe)	µg/L	100	1,000
Manganese, dissolved (Mn)	µg/L	50	500

1/ 1.4-2.4 mg/L, depending on ambient temperature.

Stream temperatures

Stream temperatures do not vary much on Ponape. They fluctuate somewhat with ambient conditions and are normally highest in midafternoon. Temperature is an important consideration because of its effect on chemical reactions and biological activities. Stream temperatures are obtained during measurements of streamflow and are listed in the Hydrologic Data section, tables 40-52.

Ground Water

Because rainfall varies from nearly 200 inches per year at the coast to 340 inches or more in the interior of the island, Ponape has an abundant supply of freshwater. Rivers and streams, the numerous perennial springs issuing from the slopes, and rain catchments normally provide water in abundance; therefore, there has been little need thus far to develop ground water on the island.

WATER PRODUCTION AND DISTRIBUTION

During the Japanese Administration, two sources were developed to supply water for military use. Water from Lewi River was piped from a 5-foot-high concrete diversion dam on the Lewi River for a third of a mile along the left bank of the river to a three-compartment concrete reservoir with a capacity of 350,000 gallons. The water was then filtered through a three-compartment sand filter and transported through nearly half a mile of 8-inch transite pipe to a barge dock in southeast Kolonia (Piper, 1946-47).

Photos taken by Piper in 1947 (figs. 27 and 28) show the dam and the reservoir. The dam, which is located 500 feet upstream from the Geological Survey gaging station at the mouth of the Lewi River, was unchanged in 1983, but pipelines and the reservoir have long been abandoned.

The other development was a system which collected seepage from an airstrip fill. The water from the ditch was filtered and treated at the nearby Nanpohnmall filtration plant southwest of Kolonia and used at the nearby Japanese barracks. After World War II, the seepage collecting system was used without filtration until 1953 when the plant and storage tanks were repaired. The filtration plant is still in use today (1983) but water now comes from the Nanpil River.

Figure 27. Diversion dam on Lewi River (1946 photograph by Piper). Dam was unchanged in 1983.

Figure 28. Raw-water reservoir of Lewi River water works (1946 photograph by Piper).

In about 1965, a pump station on the Dauen Neu River was established about 60 feet upstream from the 1970-74 location of the Geological Survey gaging station. As much as 360,000 gal/d (gallons per day) were pumped from the river through a 6-inch pipe to the filtration plant to augment the water from the airstrip. After the Dauen Neu River almost ran dry in 1973, a pump was installed at the Lewi River dam to bring water from the Lewi River to the Dauen Neu River during periods of very low flow. When the Nanpil dam and pipeline were completed in 1977, the pump station on the Dauen Neu River was dismantled and the airstrip ditch was abandoned.

The dam on the Nanpil River is located at an altitude of 370 feet, about 650 feet downstream from the Geological Survey gaging station. The concrete diversion dam has an overall length of 217 feet and a maximum height of 12-1/2 feet. The spillway, 5 feet lower than the crest, is 65 feet wide. Water is diverted through a 16-inch pipe from the left side of the dam and a 30-inch-square sluice gate is located at the right end of the spillway.

From the diversion dam and settling tank, water is carried by 16,800 feet of pipeline (16-inch iron and 12-inch asbestos-cement pipe) to a 300,000-gallon settling tank at the Nanpohnmall treatment plant. The treated water is stored in a 30,000-gallon clear-water reservoir, or pumped to the 500,000-gallon Nanpohnmall storage tank. The water is then piped to three 1-Mgal (million gallon) steel tanks at Ipat, Net, and Sokehs. The distribution system serves Kolonia, Sokehs, the airport and the dock at Dekehtik (fig. 29).

The production of the Nanpohnmall treatment plant was estimated to average 1.7 Mgal/d of which more than a third apparently is lost through leakage (Tenorio, 1980). Hourly meter readings of flow in the pipe from the plant to the clear-water reservoir that were made during July 1982 show an average production of 1.2 Mgal/d. In early 1980, the number of persons served by the system was estimated to be 8,000 (Tenorio, 1980).

Figure 30 presents the mass curve of mean monthly discharges at Nanpil River gaging station for the period of record, March 1970 to December 1981. During this period, the lowest discharge occurred from October 1972 to March 1973. Long-term (57 years) rainfall records for Kolonia show this 6-month period to be the lowest on record until 1983 (37.7 inches). Rainfall for each month of this period was less than half the long-term average for that month. Figure 30 shows that the average yield of the Nanpil River during this period amounted to 7.3 ft^3/s per day or 4.7 Mgal/d.

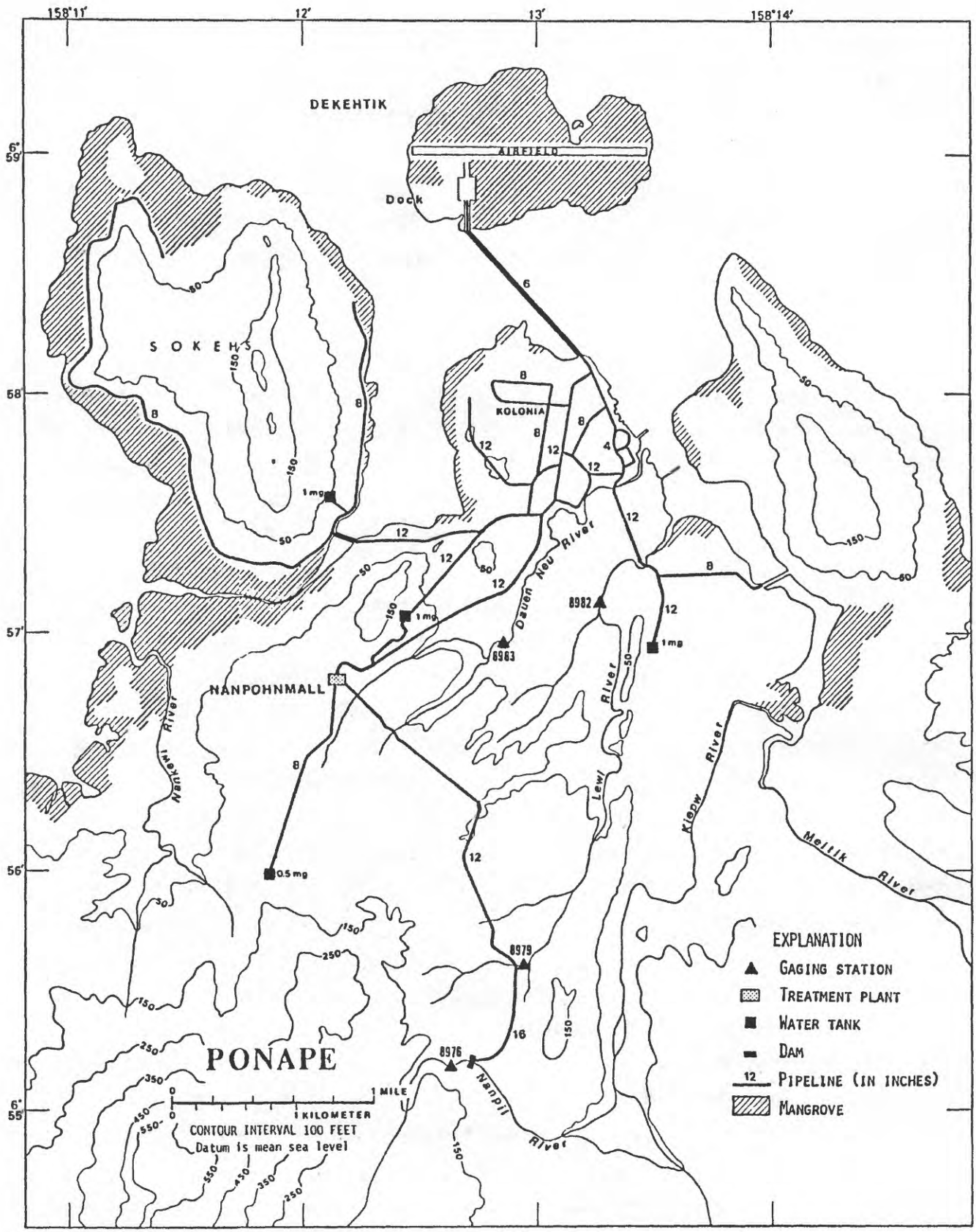


Figure 29. Water-supply system of Kolonia.

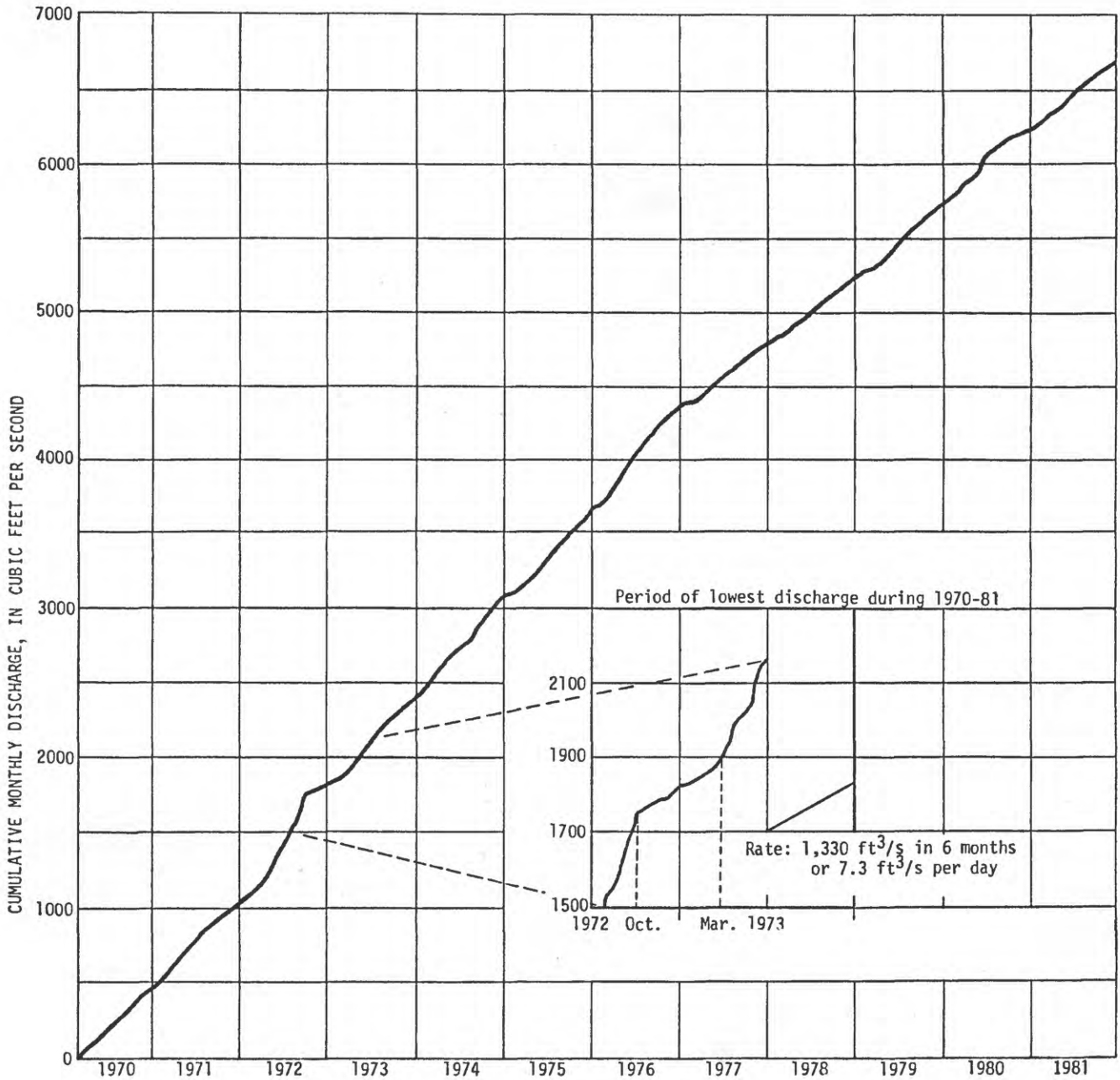


Figure 30. Mass curve of mean monthly discharges at Nanpil River.

The period Nov. 9-25, 1972, had the lowest flow during the 6-month period October 1972 to March 1973. The total discharge for the 17 days was 61.3 ft^3/s. In order to maintain the average flow rate of 7.3 ft^3/s during the period, a storage of 40 Mgal (125 acre-feet) would be required.

A survey of the water quality of the central water system was made in 1977. An analysis of eight grab samples of the finished water showed the mean chloride concentration to be 12 mg/L, conductivity 55 µmho, dissolved solids 36 mg/L, nitrate (as N) 3 mg/L, and total coliform zero per 100 ml (Young and others, 1977). At present (1983), the local Environment Protection Agency makes a monthly check of the water from the central water system for total and fecal coliform.

HYDROELECTRICAL POTENTIAL

As the gradient of most streams on Ponape is moderately steep to within a few miles of the coast and waterfalls are common, the potential for developing hydroelectric power has occurred to many.

During the Japanese Administration, a dam was built where the Nanpil River joins the Kiepw River. A rough, concrete-lined ditch with a cross-sectional area of about 15 square feet diverted the water from an 8-1/2-foot-high concrete dam across the Nanpil River (about 150 feet wide at this point) to a small hydroelectric plant (fig. 31). At the plant two 312-kilowatt generators, driven by horizontal-shaft turbines, operated under a 50-foot head. At the end of World War II, only one generator and its turbine was in place; the other reportedly was lost enroute to Japan for repairs (Piper, 1946-47). The one generator was used intermittently by the U.S. Navy until August 1946 when the flume washed out and the plant was abandoned. The dam washed out not long afterward. According to Piper, the plant was deficient in design because of insufficient storage, poor flume construction, and insufficient head at the plant.

Figure 31. Dam on Nanpil River diverting water to hydroelectric plant (1946 photograph by Piper). Dam washed out not long after the photograph was taken.

In general, the problem in developing hydroelectric energy on Ponape is the lack of storage potential because of narrow valleys and steep slopes of the drainage basins. The power development would thus have to depend principally on run-of-the-river flow. The flow-duration curves of figure 7 indicate that discharge is very low at times. Precipitation is disposed of principally by evapotranspiration or by immediate overland runoff. Consequently, during periods of minimal rainfall, discharge of the river will diminish rapidly.

The stream most often considered for the development of hydroelectric power is the Nanpil River because of its proximity to Kolonia, the high altitude of the drainage area, and two large waterfalls. The larger waterfall is about 100 feet high and fills a gorge approximately 1,000 feet upstream from the Geological Survey gaging station. The mean daily discharge at the Nanpil River gaging-station site during 1971-82 was 47 ft^3/s, but twice during the 1972-73 water year, the mean daily discharge dropped to 1.6 ft^3/s.

Other streams considered for hydroelectric power development are the Lehn Mesi River in Kiti and Mahnd River in Madolenihmw. Low-flow discharge measurements made on the Lehn Mesi River at hanging bridge (fig. 32, station 16898700 on fig. 4) were correlated with the discharge of Lewi River at mouth (fig. 23) so low-flow estimates for the Lehn Mesi River can be made. More reliable low-flow data can be expected when streamflow data of the Lehn Mesi gaging station, constructed in November 1981 at altitude 260 feet, become available. For Mahnd River no data are available and the flow regimen of the stream cannot be assessed.

J. F. Mink (1977) made an evaluation of hydroelectric-power potential for the Nanpil River and Mahnd River and considered the potential for a Nanpil River development excellent. The U.S. Army Corps of Engineers (1981) studied the possibility of developing hydropower at the Lehn Mesi and Senipehn Rivers and recommended an additional study of a Lehn Mesi River facility.

Figure 32. Lehn Mesi River at hanging bridge (1946 photograph by Piper). Unchanged in 1982.

SUMMARY

Rainfall on Ponape is abundant. On the north coast where more than 55 years of rainfall record is available, the annual mean is 191 inches. With altitude, this amount increases to 340 inches or more. About two thirds of the rainfall runs off and surface water normally is plentiful. Peak flow on the Kiepw River on August 4, 1976 was determined to be 26,800 ft^3/s and none of the rivers are known to go dry.

The quality of the surface water is excellent as shown by 53 chemical analyses of 19 streams. Water of the Nanpil River, the source of water for the central water system, is especially low in dissolved solids. With the amount of surface water available in the mountainous interior, the prospect for developing some hydroelectric power is promising.

HYDROLOGIC DATA

Water and Air Temperatures and Instantaneous Discharge

Water-Quality Records

Rainfall Records

Table 10. Monthly and annual rainfall, in inches, during the German Administration

[Sources: "Mitt(h)eilungen von Forschungreisenden und Gelehrten aus den deutschen Schutzgebieten," 1902, 1913, and Institute of Human Relations, 1943. Converted from millimeters to inches]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
						At Kolonia							
1900	--	--	--	--	--	--	--	--	--	--	13.63	19.27	--
1901	14.24	5.45	3.80	(3.58)	(13.52)	22.17	(16.36)	13.22	13.77	17.36	6.61	16.61	--
1902	14.65	7.09	13.42	26.06	22.56	16.81	24.17	17.24	22.32	13.31	12.99	10.63	201.25
1903	4.96	1.06	6.73	26.30	20.87	17.64	18.62	11.85	9.29	23.50	20.43	33.03	194.28
1904	12.80	20.08	22.56	22.28	25.04	19.57	13.50	17.48	22.48	18.23	8.94	10.24	213.20
1905	5.20	12.20	13.03	--	16.26	9.33	13.19	20.94	13.03	9.84	16.26	8.90	--
1906	14.17	3.15	7.13	15.32	17.09	11.30	14.65	14.17	17.24	7.95	16.38	18.62	157.17
1907	9.09	5.04	11.06	6.14	15.32	10.79	13.46	21.85	13.54	12.64	7.64	11.93	138.50
1908	17.36	4.72	14.68	36.54	25.35	10.90	14.21	16.97	17.44	10.16	29.13	21.34	218.80
1909	--	--	14.61	20.83	16.14	17.24	16.46	9.84	11.34	16.81	16.54	14.49	--
1910	9.29	11.85	17.16	19.37	17.72	17.16	17.01	18.50	--	--	--	--	--
1911	--	--	8.74	--	--	--	--	--	--	--	--	--	--
						At Kiti							
1910	--	--	--	--	17.48	15.51	16.22	17.13	15.63	13.07	21.69	15.16	--
1911	4.53	11.14	11.06	23.70	--	--	--	--	14.41	9.21	7.09	6.18	--
1912	4.35	--	--	--	--	--	--	--	--	--	--	--	--

Note: Rain can leaking April 23-30, May 1-5, July 14-20, 1901.

Table 11. Monthly and annual rainfall, in inches, during the Japanese Administration at Kolonia

[Source: Taylor, 1973]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1928	15.69	13.62	10.93	27.53	21.79	23.10	18.48	12.18	16.28	23.56	21.09	27.38	231.63
1929	17.30	10.04	15.21	21.56	26.61	16.70	19.18	17.54	15.60	24.79	14.16	15.09	213.78
1930	12.96	5.05	14.00	19.65	18.26	17.11	19.37	20.42	18.53	7.37	13.14	21.52	187.38
1931	9.92	4.52	3.30	6.11	14.26	17.47	14.20	10.53	9.80	14.68	11.84	22.09	138.72
1932	17.91	16.26	10.51	12.72	20.80	20.14	13.61	10.24	23.14	12.98	12.21	18.50	189.02
1933	6.92	11.38	9.44	20.60	28.66	16.37	13.12	11.64	14.65	21.93	17.18	26.93	198.82
1934	15.74	15.49	10.91	19.13	11.97	14.76	14.93	8.20	16.29	11.96	15.26	18.44	173.08
1935	14.58	9.39	17.31	16.85	19.04	16.50	22.40	13.61	16.75	14.56	15.60	26.08	202.67
1936	5.99	3.58	10.74	12.93	33.96	19.00	14.04	17.46	15.39	14.98	22.44	18.54	189.05
1937	7.09	6.88	11.48	15.55	16.83	15.15	22.62	23.09	11.62	14.92	20.03	16.01	181.27
1938	10.16	7.37	22.71	29.69	25.10	26.76	12.39	21.55	15.12	11.10	19.09	22.85	223.89
1939	14.92	4.92	20.41	10.10	12.14	9.00	14.66	14.10	16.78	15.22	13.48	18.57	164.30
1940	10.18	9.38	11.91	13.23	17.97	20.19	19.68	22.20	19.71	21.39	11.03	14.43	191.30
1941	5.53	6.61	11.25	16.23	18.61	18.47	31.31	30.37	21.23	28.00	3.67	16.26	207.54
1942	11.88	2.73	23.98	39.12	24.93	11.35	19.60	12.78	14.35	19.19	16.22	15.18	211.31
1943	13.30	19.88	15.89	14.87	24.94	12.24	13.03	12.16	19.73	19.23	25.99	19.83	211.09
Mean	11.88	9.19	13.75	18.49	20.99	17.14	17.66	16.13	16.56	17.24	15.77	19.86	194.66

Table 12. Monthly and annual rainfall, in inches, from U.S. National Weather Service at Kolonia

[Source: U.S. National Oceanic and Atmospheric Administration, 1982, 1983]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1949	--	--	--	--	--	--	--	--	--	--	--	20.34	--
1950	8.50	7.83	15.24	22.36	17.13	12.39	11.89	11.71	15.80	18.91	10.29	12.93	164.98
1951	14.59	15.66	23.25	31.86	--	--	14.39	22.14	10.60	12.56	12.00	13.36	--
1952	9.91	3.32	10.22	14.88	23.56	18.99	17.31	13.61	14.81	18.28	17.56	18.75	181.20
1953	10.07	10.44	10.95	15.75	11.72	20.68	15.12	26.41	13.88	12.40	20.73	20.78	188.93
1954	11.95	8.44	13.45	18.20	21.76	18.43	11.37	17.89	17.73	14.65	22.52	20.21	196.60
1955	13.03	7.40	16.72	33.04	26.15	15.60	12.44	20.73	19.35	16.21	20.48	24.79	225.94
1956	17.61	6.51	18.33	28.08	23.40	13.41	16.90	17.43	13.29	15.40	15.68	19.98	206.02
1957	11.23	14.58	9.93	6.53	15.23	20.58	15.72	17.57	16.79	8.62	31.79	2.40	170.97
1958	9.72	15.71	17.00	23.59	20.40	16.62	21.28	11.23	14.89	20.56	23.16	9.35	203.51
1959	3.91	15.37	22.03	38.65	21.26	15.61	19.12	12.73	18.42	13.28	11.31	26.11	217.80
1960	13.82	12.45	15.81	25.72	22.08	18.36	12.01	16.02	13.11	16.18	18.88	20.85	205.29
1961	16.60	17.86	17.47	11.59	22.21	18.11	15.51	17.52	20.69	14.07	18.29	16.47	206.39
1962	26.67	16.04	11.04	11.94	22.41	11.89	13.60	18.54	22.91	18.57	28.39	13.60	215.60
1963	20.99	16.37	17.06	12.44	19.12	9.60	13.73	18.23	13.12	20.68	4.55	9.08	174.97
1964	3.59	19.76	14.03	16.02	12.69	13.16	14.33	16.47	15.44	11.02	12.66	18.22	167.39
1965	11.74	11.12	6.36	14.28	14.18	18.73	37.20	10.06	24.67	15.27	15.50	14.20	193.31
1966	15.84	1.71	14.77	6.07	21.27	11.87	24.22	10.18	10.65	16.61	18.74	18.12	170.05
1967	10.21	18.83	21.82	20.90	13.46	11.48	14.02	20.32	19.51	16.37	22.44	12.60	201.96
1968	9.88	13.60	24.47	21.09	16.99	10.54	22.32	17.36	17.58	14.65	9.32	13.33	191.13
1969	6.39	9.47	10.71	22.35	17.75	24.88	28.90	13.28	18.01	12.86	16.20	15.00	195.80
1970	7.98	7.14	7.35	14.58	15.73	16.80	12.40	16.10	15.74	20.40	15.62	19.93	169.77
1971	16.64	13.12	19.98	17.37	24.59	23.62	22.69	16.67	9.89	19.11	12.02	8.67	204.37
1972	10.52	11.79	14.66	20.39	33.46	9.73	36.31	12.38	29.53	7.98	7.30	7.71	201.76
1973	3.31	3.70	7.71	24.38	16.28	23.40	9.40	17.85	18.15	21.32	10.38	18.16	174.04
1974	10.66	16.56	18.81	22.24	16.74	21.27	21.57	18.77	8.84	17.30	20.79	12.32	205.87
1975	6.61	4.26	15.99	16.79	17.50	18.83	15.60	11.26	12.61	22.25	17.22	33.35	192.27
1976	6.02	12.76	25.30	20.18	24.39	20.99	13.04	32.74	24.11	16.94	26.34	13.48	236.29
1977	4.45	1.05	12.65	15.93	26.17	14.70	16.97	18.72	10.88	20.00	16.14	4.95	162.61
1978	16.38	6.18	6.17	18.91	12.82	19.27	10.28	13.62	11.44	16.97	13.19	14.00	159.23
1979	8.16	6.65	11.98	23.38	18.76	23.85	17.07	22.35	6.57	17.57	20.09	19.58	196.01
1980	14.01	18.63	8.11	15.10	38.43	23.21	15.87	15.79	15.32	11.70	7.96	10.07	194.20
1981	14.59	13.75	8.55	10.47	23.00	17.92	16.20	13.41	15.04	15.43	16.46	17.47	182.29
1982	14.06	16.35	12.94	16.59	22.67	17.28	23.00	17.99	25.58	8.42	9.94	16.05	200.87
1983	1.89	1.72	1.52	2.03	2.21	15.91							
Mean 1950, 1952-82	11.41	11.21	14.30	18.74	20.42	17.24	17.73	16.72	16.39	15.94	16.62	15.70	192.42

Table 13. Monthly and annual rainfall, in inches, from U.S. National Weather Service at Ohwa (Oa)

[Source: U.S. National Oceanic and Atmospheric Administration, 1956-66]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1956	14.91	3.92	14.45	18.03	15.71	11.98	6.25	--	11.93	14.88	18.38	--	--
1957	6.88	9.04	8.32	5.38	11.72	1/ 12.74	1/ 10.53	13.98	9.38	8.91	23.39	0.58	120.85
1958	12.09	9.67	12.09	--	--	--	--	--	9.76	12.80	21.17	--	--
1959	10.68	10.24	15.73	25.33	14.29	14.79	17.03	6.41	12.71	7.69	8.14	14.01	157.05
1960	13.43	9.04	13.24	17.76	13.97	--	--	8.55	15.84	11.91	17.98	21.02	--
1961	18.06	20.44	14.65	8.87	20.52	18.46	12.97	11.28	10.44	10.21	10.63	16.30	172.83
1962	17.08	13.89	8.37	13.58	--	--	12.17	15.98	--	--	17.61	6.04	--
1963	10.01	13.16	13.39	13.72	17.61	8.84	10.35	12.31	8.08	14.35	7.19	2/ 7.14	2/ 136.15
1964	4.27	--	11.55	16.50	--	--	--	--	--	14.75	7.87	15.58	--
1965	7.08	5.47	7.72	--	--	9.56	--	8.97	--	6.90	11.54	2/ 10.36	--
1966	22.57	.95	14.75	6.16	15.78	--	--	--	--	--	--	--	--
Mean	12.46	9.58	12.21	13.93	15.66	12.73	11.55	11.07	11.16	11.38	14.39	11.38	*147.50

1/ Rainfall for last 3 days in June (about 0.5 inches) included in July total.

2/ A few days estimated.

* Total of 12 monthly means.

Table 14. Monthly and annual rainfall, in inches, from U.S. National Weather Service at Madolenihmw (Metalanim)

[Source: U.S. National Oceanic and Atmospheric Administration, 1967-72, 1973-83]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1967	--	--	17.90	21.89	7.61	12.23	13.17	15.53	12.25	15.26	20.85	11.60	--
1968	9.01	9.82	21.41	17.60	21.49	15.30	17.52	13.92	17.37	18.75	10.02	10.62	182.83
1969	4.55	6.89	10.99	21.32	19.42	22.12	21.61	9.26	12.37	6.38	11.40	--	--
1970	6.56	7.37	6.76	11.90	22.36	17.37	6.85	20.82	17.65	35.58	20.07	1/ 17.59	1/ 190.88
1971	1/ 14.17	9.56	18.28	19.56	18.00	21.38	17.89	23.17	8.96	21.19	--	12.55	--
1972	1/ 10.01	9.27	9.96	12.20	22.06	--	32.11	17.56	21.71	12.95	6.21	8.01	--
1973	3.13	7.68	9.58	22.03	--	--	--	15.94	19.45	15.69	15.70	17.15	--
1974	11.87	18.96	11.66	--	--	--	--	15.45	12.45	17.58	13.04	15.99	--
1975	4.48	5.73	--	11.47	21.69	11.39	--	17.90	18.21	29.25	21.93	33.28	--
1976	7.53	11.02	29.28	25.04	22.00	--	--	--	18.68	22.06	26.50	25.57	--
1977	11.19	1.99	7.05	11.31	16.42	13.68	15.23	8.61	10.27	23.54	17.76	3.37	140.42
1978	13.54	7.62	6.19	19.52	8.31	18.03	8.59	6.92	--	15.87	15.88	8.39	--
1979	6.64	8.07	7.90	28.20	12.87	17.29	13.04	17.64	7.88	15.11	16.50	17.80	168.94
1980	10.22	13.44	7.30	20.71	37.84	23.21	14.28	10.17	10.32	11.70	5.48	12.72	177.39
1981	13.75	11.28	7.89	12.58	16.84	17.33	16.37	9.31	15.20	15.44	14.58	15.97	166.54
1982	14.58	15.20	12.42	21.35	19.25	14.52	16.16	21.82	14.56	6.61	11.97	10.81	179.25
1983	1.29	.80	1.24	.70	2.21	12.15							
1967-82:													
Mean	9.42	9.59	12.30	18.45	19.01	16.99	16.07	14.93	14.49	17.68	15.19	14.76	* 178.88
Percent	5.3	5.4	6.9	10.3	10.6	9.5	9.0	8.3	8.1	9.9	8.5	8.2	100

1/ A few days estimated.
* Total of 12 monthly means.

Table 15. Monthly rainfall, in inches, from U.S. National Weather Service at Paies, Kiti

[Source: U.S. National Oceanic and Atmospheric Administration, 1981-83]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1981	--	--	--	--	--	--	--	--	19.25	18.40	21.42	19.15
1982	18.06	--	--	--	20.32	24.50	25.70	22.25	25.65	8.36	15.23	17.86
1983	2.80	2.33	1.92	2.10	2.35	17.82						

Nanpil River Rain Gage
(U.S. Geological Survey)

Location: Lat 6°55'06" N., long 158°12'13" E., at gate of Nanpil Dam area, 0.4 mi east of Nanpil River gaging station (16897600).

Period of record: May 1972 to June 1983.

Gage: May 1972 to July 1979: Six-inch diameter steel cylinder, read bimonthly (cumulative readings) (table 16).

June 1978 to June 1983: Eight-inch diameter rain can, continuous record of rainfall (table 17).

Altitude of gage is 350 ft (from topographic map).

Monthly and annual rainfall totals, in inches (See table 17.)

Year	Jan.	Feb.	Mar.	Apr.	May	June
1978	*	*	*	*	(88.6)	23.01
1979	14.72	11.67	12.62	23.79	23.90	28.15
1980	19.73	23.32	12.11	20.59	45.17	31.97
1981	19.56	19.11	11.15	21.55	23.88	23.06
1982	--	--	19.66	--	--	23.84
1983	3.15	2.39	2.78	2.91	4.39	16.47

Year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1978	15.40	19.76	8.95	21.23	19.42	18.56	(214.9)
1979	30.80	26.34	12.02	24.72	21.82	13.47	244.02
1980	17.16	16.74	19.20	*	(23.70)	14.40	244.09
1981	20.74	20.57	--	--	21.19	--	--
1982	35.42	27.26	32.98	11.47	10.90	19.28	--

* Included in following total.

Table 16. Cumulative rainfall readings, in inches, at Nanpil River

Period	Rainfall	Period	Rainfall
	1972		
Apr. 19 to May 10	18.7	Aug. 30 to Sept. 19	28.9
May 10-23	8.3	Sept. 19-28	7.2
May 23 to June 6	22.7	Oct. 12 to Nov. 9	6.2
June 6-21	10.6	Nov. 9-22	.1
June 21 to July 6	6.0	Nov. 22 to Dec. 6	8.6
July 6 to Aug. 16	27.9	Dec. 21 to Jan. 4	4.7
Aug. 16-30	5.4		
	1973		
Jan. 4-18	2.2	July 11-25	5.8
Jan. 18 to Feb. 1	7.0	July 25 to Aug. 7	3.8
Feb. 1-14	3.0	Aug. 7-23	16.9
Feb. 14-28	6.2	Aug. 23 to Sept. 6	10.6
Feb. 28 to Mar. 22	10.9	Sept. 6-20	8.6
Mar. 22 to Apr. 4	.7	Sept. 20 to Oct. 4	6.9
Apr. 4-26	24.7	Oct. 4-18	8.2
Apr. 26 to May 17	21.5	Oct. 18-31	16.2
May 17-31	7.8	Oct. 31 to Nov. 14	8.8
May 31 to June 19	16.7	Nov. 4-28	7.2
June 19-28	5.6	Nov. 28 to Dec. 12	7.5
June 28 to July 11	5.0	Dec. 12 to Jan. 10	20.3
Total Jan. 4, 1973 to Jan. 10, 1974: 232.1 inches			
	1974		
Jan. 1-10	1/ 2.0	July 9-24	18.6
Jan. 10-23	4.2	July 24 to Aug. 7	8.7
Jan. 23 to Feb. 13	15.1	Aug. 7-21	10.8
Feb. 13-28	7.3	Aug. 21 to Sept. 11	14.7
Feb. 28 to Mar. 21	17.8	Sept. 11-24	7.4
Mar. 21 to Apr. 3	8.3	Sept. 24 to Oct. 9	6.3
Apr. 3-18	15.2	Oct. 9-22	7.9
Apr. 18 to May 1	11.1	Oct. 22 to Nov. 5	9.1
May 1-15	8.7	Nov. 5-27	15.2
May 15 to June 25	26.6	Nov. 27 to Dec. 17	14.1
June 25 to July 9	8.9	Dec. 17-31	1/ 4.0
Total for 1974: 242.0 inches			

Table 16. Cumulative rainfall readings, in inches, at Nanpil River--Continued

Period	Rainfall	Period	Rainfall
		1975	
Jan. 20 to Feb. 5	1.5	June 4-19	12.3
Feb. 5-19	1.1	June 19 to July 2	7.3
Feb. 19 to Mar. 6	11.2	July 2-15	4.7
Mar. 6-19	10.2	July 15-31	7.1
Mar. 19 to Apr. 4	2.8	July 31 to Aug. 19	10.9
Apr. 4-16	8.3	Aug. 19 to Sept. 8	8.2
Apr. 16 to May 1	8.8	Sept. 8-29	10.1
May 1-15	8.3	Nov. 20 to Dec. 22	18.5
May 15 to June 4	9.9		
		1976	
Dec. 22 to Jan. 14	11.1	July 14-28	8.8
Jan. 14-29	6.7	July 28 to Aug. 17	5.0
Feb. 9-24	11.4	Aug. 17-25	8.3
Feb. 24 to Mar. 17	16.9	Sept. 28 to Oct. 7	4.8
Mar. 17 to Apr. 7	26.6	Oct. 7-28	21.0
Apr. 7-27	19.2	Oct. 28 to Nov. 10	10.1
Apr. 27 to May 5	17.9	Nov. 10-30	7.9
May 5-26	21.5	Nov. 30 to Dec. 9	13.8
May 26 to June 16	15.0	Dec. 9-22	10.2
June 16 to July 1	10.0	Dec. 22 to Jan. 6	9.9
July 1-14	8.4		
		1977	
Jan. 6-20	6.4	July 21 to Aug. 3	7.9
Jan. 20 to Feb. 2	1.8	Aug. 3-24	9.9
Feb. 2-16	1.8	Aug. 24 to Sept. 14	11.0
Feb. 16 to Mar. 2	.4	Sept. 14-28	5.1
Mar. 2 to Apr. 1	16.8	Sept. 28 to Oct. 12	8.6
Apr. 1-15	1.8	Oct. 12-27	12.0
Apr. 15-28	20.8	Oct. 27 to Nov. 10	12.0
Apr. 28 to May 11	14.8	Nov. 10-23	10.3
May 11 to June 8	16.0	Nov. 23 to Dec. 7	9.5
June 8-27	9.8	Dec. 7-21	1.1
June 27 to July 5	5.3	Dec. 21 to Jan. 4	2.8
July 5-21	9.6		

Total Jan. 6, 1977 to Jan. 4, 1978: 195.5 inches

Table 16. Cumulative rainfall readings, in inches, at Nanpil River--Continued

Period	Rainfall	Period	Rainfall
		1978	
Jan. 4-19	9.6	July 13-26	8.2
Jan. 19 to Feb. 2	12.8	July 26 to Aug. 10	5.4
Feb. 2-17	10.5	Aug. 10-24	7.2
Feb. 17 to Mar. 2	2.6	Aug. 24 to Sept. 7	9.5
Mar. 2-15	4.5	Sept. 7-21	4.3
Mar. 15-29	2.1	Sept. 21 to Oct. 3	12.2
Mar. 29 to Apr. 12	12.3	Oct. 3-26	12.0
Apr. 12 to May 11	22.4	Oct. 26 to Nov. 14	9.6
May 11-24	6.1	Nov. 14-22	9.6
May 24 to June 15	13.1	Nov. 22 to Dec. 7	6.8
June 15-28	11.5 [1/]	Dec. 7-21	11.6
June 28 to July 13	6.7	Dec. 21 to Jan. 4	5.3
Total Jan. 4, 1978 to Jan. 4, 1979: 215.9 inches			
		1979	
Jan. 4-18	6.2	Mar. 14-29	6.3
Jan. 18 to Feb. 1	7.3	Mar. 29 to Apr. 24	28.6
Feb. 1-14	1.2	May 16-30	10.8
Feb. 14 to Mar. 2	8.5	June 11-28	19.1
Mar. 2-14	5.7	June 28 to July 16	14.8

[1/] Estimated on basis of Kolonia rainfall.

Table 17. Daily rainfall, in inches, at continuous-record rain gage at Nanpil River

1978

Day	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.24	0.36	0.25	0.73	3.49	0	0.17
2	2.15	.58	.08	.17	.77	0	.55
3	.86	.02	.16	.74	.22	0	.11
4	1.39	0	1.21	.11	.44	.04	.74
5	.26	.89	1.48	.24	0	.47	.22
6	.76	0	.04	.67	3.61	1.26	.62
7	.11	0	.05	0	.41	.19	.17
8	.18	2.04	.04	0	.02	.67	2.84
9	.31	1.26	.94	.01	.10	.43	.34
10	.77	.02	2.22	.26	.07	.73	3.65
11	.01	.84	1.80	.36	.37	.60	.05
12	.05	0	.02	.58	1.32	.07	.30
13	.27	.13	1.16	.01	1.39	.38	1.03
14	1.21	.71	.36	1.03	.16	1.02	1.67
15	.01	.01	.19	.11	.23	.76	.65
16	.20	.36	.16	0	0	.42	.71
17	.53	.31	.07	.01	0	3.00	.17
18	.70	2.45	.01	0	1.16	1.34	.11
19	3.12	.13	.23	.36	.08	2.26	0
20	.12	.13	2.20	.12	0	.76	0
21	.79	2.62	.04	1.00	.31	.26	0
22	.60	.02	.02	.44	.90	.32	.23
23	4.75	.70	.59	0	.44	.17	.59
24	1.26	.10	.04	.84	1.10	.91	.01
25	1.27	.08	3.14	0	.08	.36	.29
26	.02	.54	.12	.55	.48	0	1.16
27	.01	.19	.71	.17	1.44	2.38	1.08
28	.34	.29	.02	.26	.08	.08	.08
29	.38	.04	.05	.01	.23	.46	.28
30	.34	.24	.48	.17	1.72	.08	.55
31		.34	1.88		.61		.19
Total	23.01	15.40	19.76	8.95	21.23	19.42	18.56

Total June to December 1978: 126.33 inches.
Total January to May 1978 from cumulative rainfall readings and estimate for January 1-4 and May 25-31, 1978, based on Kolonia rainfall (5.7 inches): 88.6 inches.
Total for 1978: 214.9 inches.

Table 17. Daily rainfall, in inches, at continuous-record rain gage at Nanpil River--Continued

1979

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	*	0	0.10	1.26	0.58	*	*	0.40	1.04	0.86	0.88
2	.54	*	0	3.96	.94	.24	*	17.74	.07	.89	.31	5.38
3	.28	*	.18	.06	.43	.31	*	.82	.04	.60	1.62	.60
4	0	*	.28	.19	.76	.30	*	.18	.12	1.78	.79	2.45
5	0	*	0	1.28	1.61	.47	*	.23	.02	2.57	.26	.41
6	.01	*	.24	1.06	.14	1.72	*	.56	.11	.24	.35	.29
7	0	*	.12	1.04	.72	.36	*	.83	.73	.65	.40	0
8	0	*	.23	.76	.37	1.74	*	.14	0	1.34	.98	0
9	2.14	*	.25	3.86	.19	1.26	*	.26	.22	1.87	1.19	0
10	1.02	*	2.42	.24	.92	.49	*	2.28	.19	.64	1.20	0
11	.77	*	.32	.58	1.49	.42	*	.08	.16	0	.54	0
12	1.46	*	.13	1.12	1.03	*	*	5.06	.30	.05	.61	0
13	.01	*	1.16	2.36	1.14	*	*	6.48	0	.02	.28	0
14	0	*	.72	2.52	.30	*	*	2.34	.10	.13	1.50	0
15	0	1.74	.43	.62	.34	*	*	.05	0	.41	1.38	0
16	.17	.95	1.94	0	1.20	*	13.06	0	1.19	.06	.46	0
17	.59	.74	1.62	0	.43	*	*	.16	.04	2.18	0	0
18	.01	.37	.92	0	.40	*	*	.01	.20	.16	2.20	0
19	.01	0	.22	0	3.06	*	*	.74	.25	0	.08	0
20	0	.10	.05	0	.08	*	*	.71	.11	.22	.26	0
21	1.28	.42	.04	.01	.02	*	*	.08	.12	0	.52	0
22	.22	3.26	.01	0	.19	*	*	.79	.12	0	2.32	.11
23	1.08	.13	.30	0	.07	*	*	2.98	.82	0	.76	.29
24	2.00	1.60	.08	.08	.49	*	*	.10	1.31	.01	.49	0
25	1.33	.74	0	.16	.32	*	*	0	.71	1.33	.05	.04
26	.04	.13	.08	.37	1.12	*	*	0	1.86	.46	.26	0
27	.41	.77	.18	1.16	1.21	*	*	1.40	.02	2.29	1.32	.17
28	.30	.72	.03	.72	2.05	20.26	*	.06	1.00	2.71	.47	.18
29	.02		0	.44	.43	*	*	0	.12	.98	.36	.10
30	.17		.12	1.10	.10	*	*	0	1.69	1.97	0	.57
31	.85		.55		1.09		*	0		.12		2.00
Total	14.72	11.67	12.62	23.79	23.90	1/(28.15)	1/(30.80)	1/(26.34)	12.02	24.72	21.82	13.47

* Included in following total.

1/ June 29, 30 and August 1, 2 included in July total.

Total for 1979: 244.02 inches.

Table 17. Daily rainfall, in inches, at continuous-record rain gage at Nanpil River--Continued

1980

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.77	0.04	0.19	2.77	2.23	2.01	*	0.41	1.67	0.10	*	0.50
2	1.25	.01	.82	.43	.16	2.48	*	.34	1.21	2.80	*	.01
3	.23	0	.20	0	.12	3.70	9.14	.01	.35	.04	*	.29
4	.13	5.46	.23	.05	2.12	.20	*	.23	.46	.25	*	.01
5	1.03	.06	.10	.25	.10	.55	*	2.32	.20	2.42	(10.42)	0
6	.84	.02	0	.01	5.22	1.28	*	.40	1.08	0	.04	.05
7	.52	.79	.02	.18	2.88	1.08	*	.12	1.02	.12	.77	0
8	.73	5.80	0	.23	5.66	5.90	*	.36	.26	*	.02	0
9	4.33	.01	0	.07	.58	.05	*	.70	.38	*	.16	.96
10	.36	1.68	.71	.12	.20	.05	*	.76	.25	*	.26	.47
11	.13	.74	.87	.59	3.31	.30	*	.13	.22	*	.30	.35
12	.26	.18	.50	.50	*	.02	*	0	.23	*	0	.49
13	.44	0	.90	.70	*	.05	*	.10	.20	*	.76	.02
14	1.13	.05	1.78	.13	*	3.10	*	.29	.40	*	.02	.50
15	1.63	.86	.74	.76	*	.35	9.86	1.08	.01	*	.86	.01
16	1.51	.01	.55	2.94	*	1.34	.31	.62	.67	*	.08	.31
17	.07	.04	.78	.17	*	.37	0	.67	2.40	*	1.27	1.78
18	.84	.49	.32	.31	*	*	1.98	1.87	.06	*	.38	2.90
19	.90	.11	.01	.68	*	*	0	.14	.24	*	.04	.37
20	.11	3.34	.14	3.18	[1]/11.9	*	.47	.24	1.43	*	.38	.32
21	.84	.02	.38	1.54	.82	*	.84	2.76	.85	*	.82	.44
22	.32	1.09	.55	1.86	.80	*	.29	.12	1.15	*	.11	.08
23	0	1.16	.14	.47	1.14	*	.08	.02	.35	*	.34	.16
24	.05	0	.02	.25	.24	*	.26	.04	0	*	0	.18
25	.01	.41	.02	.18	.60	*	1.46	.31	0	*	.03	.11
26	.32	.04	.01	.20	3.95	*	.17	.16	1.91	*	.41	.35
27	0	.33	.46	.31	.36	*	.18	2.04	1.78	*	0	.70
28	.01	.05	.08	1.57	1.68	*	.26	.08	.32	*	0	.19
29	.22	.53	0	.10	.07	*	.14	.04	.02	*	.34	.05
30	.20		.13	.04	.11	*	.76	.26	.08	*	.16	1.96
31	.55		1.46		.92		.10	.12		*		.84
Total	19.73	23.32	12.11	20.59	[1]/45.17	[2]/(31.97)	[2]/(17.16)	16.74	19.20	*	(23.70)	14.40

* Included in following total.

[1]/ Rainfall for May 12-20 estimated at 126 percent of Kolonia rainfall.

[2]/ July 1-3, when 4.17 inches were recorded in Kolonia, included in June total.

Total for 1980: 244.09 inches.

Table 17. Daily rainfall, in inches, at continuous-record rain gage at Nanpil River--Continued

1981

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.16	*	0.05	0.04	4.21	0.02	0.22	0.01	--	--	0.44	0.20
2	1.62	*	.11	.08	2.40	.07	.73	.62	--	--	.88	1.62
3	1.00	*	.38	.16	1.46	.29	2.65	.25	--	--	1.37	--
4	0	*	.06	.04	.36	0	1.56	0	--	--	.05	--
5	.07	*	0	.20	.70	.38	.01	.02	--	--	1.37	--
6	0	*	.01	.58	.37	1.36	.02	1.04	--	--	.27	--
7	.01	*	0	.01	.01	.38	0	3.78	--	--	3.90	--
8	.28	*	.14	1.10	.01	2.32	.56	.74	--	--	.23	--
9	.14	*	.12	1.24	.36	2.10	.82	.95	--	--	.92	--
10	.65	1/ 7.50	.37	.43	.24	1.60	0	.44	--	--	2.14	--
11	.60	.43	.25	1.38	0	2.82	.96	.70	--	--	2.83	--
12	.66	.01	.08	1.78	.31	.43	.31	.10	--	--	.72	--
13	.29	.04	.01	.50	.01	.38	1.25	0	--	--	0	--
14	0	0	.01	1.69	.10	.67	1.54	.85	--	--	.14	--
15	.04	0	.13	1.69	.22	1.48	.17	.30	--	--	.23	--
16	2.81	5.45	0	1.10	.01	.36	1.06	.55	--	--	.02	--
17	.05	3.06	0	1.82	1.60	1.00	.01	2.39	--	--	.02	--
18	.10	.02	.04	.05	.74	1.08	.05	.28	--	--	.61	--
19	1.15	.68	.02	.47	1.16	.24	.18	.59	--	--	.24	--
20	3.32	.10	.48	.70	.16	.70	0	.02	--	--	2.50	--
21	.22	.16	.53	.05	.43	.02	.23	.06	--	--	.13	--
22	.24	.30	1.68	.32	2.62	1.63	.86	0	--	--	.85	--
23	1.00	.02	.67	.01	.32	.17	.02	.36	--	0.04	0	--
24	1.08	.20	1.96	.01	.04	.77	.10	.42	--	.08	.01	--
25	.01	0	.08	.56	.05	.04	.23	.67	--	.60	.01	--
26	.01	.08	2.39	.77	2.66	.02	1.68	2.14	--	.17	.19	--
27	2.35	.46	.88	3.55	.55	.53	1.84	.24	--	1.03	.17	--
28	.80	.60	.08	.50	1.01	2.06	.02	.19	--	2.06	.13	--
29	1/ 0		.47	.05	1.32	.02	1.68	.30	--	.52	.20	--
30	1/ 0		.14	.67	.25	.12	.04	1.56	--	.04	.62	--
31	1/ .90		.01		.20		1.94	1/ 1.00		.14		--
Total	19.56	19.11	11.15	21.55	23.88	23.06	20.74	20.57	--	--	21.19	--

* Included in following total.

1/ Estimated on basis of Kolonia, Luhpwor, and Kiti rainfall records.

Total January to August 1981: 159.62 inches.

Table 17. Daily rainfall, in inches, at continuous-record rain gage at Nanpil River--Continued

1982

Day	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	--	--	0.30	5.54	0.37	*	0.10	0.35	0.41
2	0	--	--	.16	1.49	.47	*	1.22	1.07	.26
3	0	--	--	6.04	.32	*	*	.12	0	.90
4	0	--	--	.10	*	*	*	.25	.01	3.36
5	0	--	--	.13	*	*	*	1.07	0	2.14
6	.01	--	--	1.03	*	*	*	.02	0	.92
7	.74	--	--	.78	*	*	*	.02	.22	0
8	.25	--	--	.19	*	*	*	.06	.01	1.25
9	1.16	--	--	.01	*	*	*	.62	.89	3.65
10	.24	--	--	.41	*	*	*	0	.20	1.26
11	.19	--	--	.34	*	*	*	.40	.02	.14
12	.84	--	--	.30	*	*	*	.01	1.30	.32
13	2.52	--	--	.94	*	*	*	1.62	5.04	.07
14	.46	--	--	.40	*	*	*	1.01	.01	.17
15	1.56	--	--	.96	17.13	*	*	.55	0	.08
16	.01	--	--	1.04	0	*	22.0	.01	0	0
17	.12	--	--	0	.48	*	1.84	.35	0	1.27
18	.88	--	--	.92	.38	*	.13	.04	0	.07
19	.52	--	--	.12	.54	13.46	.30	1.60	0	.12
20	.31	--	--	.23	.07	.35	1.21	.83	.96	.06
21	3.08	--	0.06	2.39	2.57	0	0	.58	0	.19
22	1.01	--	0	1.80	2.44	.46	0	0	0	.56
23	.36	--	0	1.32	1.49	1.27	.38	.28	.12	0
24	0	--	.10	.85	.01	.72	.46	.06	.04	.19
25	.10	--	.14	1.21	.01	2.52	0	.34	.55	.18
26	.41	--	2.45	.03	.84	4.19	0	.05	0	1.30
27	1.00	--	.37	.12	.02	.08	1.28	0	0	.40
28	1.28	--	.18	.16	0	0	.72	0	.11	0
29	1.85	--	.16	.97	.12	.23	3.33	0	0	.01
30	.76	--	.10	.59	.90	.28	1.33	.10	0	0
31	0		0		1.07	2.86		.16		0
Total	19.66	--	--	23.84	35.42	27.26	32.98	11.47	10.90	19.28

* Included in following total.

Rainfall for September 1 (0000-1520): 6.08 inches.

Table 17. Daily rainfall, in inches, at continuous-record rain gage at Nanpil River--Continued

1983

Day	Jan.	Feb.	Mar.	Apr.	May	June
1	0.04	0.01	0.79	0.08	0	0.01
2	.02	.01	.13	.44	0	0
3	.05	0	.04	.04	0	.60
4	.43	.07	0	0	.01	.30
5	0	.06	.01	0	.22	.04
6	0	0	.30	0	.01	.38
7	0	0	0	0	0	.04
8	0	.10	.12	0	.07	.01
9	.04	0	.28	0	.40	.43
10	0	.01	.26	0	.52	.10
11	0	0	.20	0	.02	.59
12	.07	0	0	0	0	1.48
13	.38	.71	.01	.01	.41	.72
14	.05	.26	.02	0	.25	.52
15	.20	.48	0	0	.05	2.11
16	.22	0	.25	0	.06	.91
17	.23	0	0	0	.04	.55
18	0	.62	.07	0	.10	.07
19	*	.06	0	0	.08	.49
20	.17	0	0	0	0	.41
21	0	0	0	.30	.42	.57
22	0	0	0	1.21	.59	1.25
23	.02	0	0	.53	.08	.74
24	.61	0	0	.26	0	.50
25	.14	0	0	.04	0	.72
26	0	0	0	0	0	.01
27	0	0	0	0	0	.72
28	.06	0	.04	0	.26	.40
29	.06		.08	0	.17	.31
30	0		.18	0	.02	1.49
31	.36		0		.61	
Total	3.15	2.39	2.78	2.91	4.39	16.47

Table 18. Cumulative rainfall readings, in inches, at Kiriedleng River

[Lat 6°55'31" N., long 158°10'22" E., near top of hill on road from Kolonia to Palikir, 0.8 mi southwest of Sekere school, and 1.6 mi southeast of Mount Palikir; altitude, 350 ft (from topographic map)]

Period	Rainfall	Period	Rainfall
	1972		
June 4-7	0	Aug. 29 to Sept. 18	9.2
June 7-20	4.5	Nov. 7-21	.9
June 20 to July 5	1.1	Nov. 21 to Dec. 5	7.8
July 5 to Aug. 15	28.0	Dec. 5 to Jan. 3	4.2
Aug. 15-29	4.7		
	1973		
Jan. 3-18	0	July 10-24	4.8
Jan. 18-31	.5	July 24 to Aug. 8	2.3
Jan. 31 to Feb. 15	3.2	Aug. 8-22	7.8
Feb. 15-27	2.7	Aug. 22 to Sept. 5	6.1
Feb. 27 to Mar. 21	10.0	Sept. 5-19	9.1
Mar. 21 to Apr. 3	1.5	Sept. 19 to Oct. 3	5.8
Apr. 3-25	15.8	Oct. 3-17	15.8
Apr. 25 to May 16	19.0	Oct. 17 to Nov. 2	19.7
May 16-30	7.7	Nov. 2-15	7.1
May 30 to June 13	9.9	Nov. 15-29	4.2
June 13-27	13.1	Nov. 29 to Dec. 13	7.8
June 27 to July 10	5.1	Dec. 13 to Jan. 9	17.9
Total Jan. 3, 1973 to Jan. 9, 1974: 196.9 inches			
	1974		
Jan. 1-9	2.0	July 10-25	15.0
Jan. 9-24	5.3	July 25 to Aug. 15	13.9
Jan. 24 to Feb. 14	14.3	Aug. 15-22	1.3
Feb. 14-26	5.9	Aug. 22 to Sept. 16	13.8
Feb. 26 to Mar. 20	16.7	Sept. 16-25	4.2
Mar. 20 to Apr. 4	7.9	Sept. 25 to Oct. 10	7.8
Apr. 4-19	14.3	Oct. 10-30	7.3
Apr. 19 to May 3	12.9	Oct. 30 to Nov. 5	7.8
May 3-21	7.3	Nov. 5-29	18.1
May 21 to June 27	27.4	Nov. 29 to Dec. 18	20.9
June 27 to July 10	9.4	Dec. 18-31	4.0 [1/]
Total for 1974: 237.5 inches			

Table 18. Cumulative rainfall readings, in inches, at Kiriedleng River--Continued

Period	Rainfall	Period	Rainfall
		1975	
Jan. 21 to Feb. 6	0.9	June 6-20	12.7
Feb. 6-20	.9	June 20 to July 1	5.9
Feb. 20 to Mar. 5	9.8	July 1-17	3.8
Mar. 5-20	10.9	July 17-30	6.9
Mar. 20 to Apr. 2	2.1	July 30 to Aug. 20	9.2
Apr. 2-17	6.8	Aug. 20 to Sept. 8	9.8
Apr. 17 to May 2	9.1	Sept. 8-24	9.6
May 2-20	10.2	Nov. 19 to Dec. 23	20.0
May 20 to June 6	9.6	Dec. 23 to Jan. 13	10.3
		1976	
Jan. 13-28	6.0	June 29 to July 13	9.3
Jan. 28 to Feb. 25	10.3	July 13-27	6.6
Feb. 25 to Mar. 23	22.4	Sept. 14 to Oct. 6	9.3
Mar. 23 to Apr. 8	15.9	Oct. 6-27	20.2
Apr. 8-21	7.3	Oct. 27 to Nov. 9	16.9
Apr. 21 to May 4	19.3	Nov. 9-22	9.9
May 4-27	20.7	Nov. 22 to Dec. 7	10.5
May 27 to June 15	15.6	Dec. 7-21	9.4
June 15-29	9.8	Dec. 21 to Jan. 4	6.4
		1977	
Jan. 4-18	4.7	July 6-20	9.9
Jan. 18-Feb. 1	2.0	July 20 to Aug. 2	7.4
Feb. 1-15	1.0	Aug. 2-23	11.7
Feb. 15 to Mar. 1	.2	Aug. 23 to Sept. 13	14.1
Mar. 1-31	14.0	Sept. 13-27	9.6
Mar. 31 to Apr. 13	1.3	Sept. 27 to Oct. 11	7.5
Apr. 13-27	13.4	Oct. 11-25	11.9
Apr. 27 to May 12	13.6	Oct. 25 to Nov. 9	8.2
May 12-24	9.0 [1/]	Nov. 9-22	12.0
May 24 to June 7	10.7	Nov. 22 to Dec. 7	6.3
June 7-24	8.8	Dec. 7-20	1.8
June 7 to July 6	3.8	Dec. 20 to Jan. 3	2.2

Total Jan. 4, 1977 to Jan. 3, 1978: 185.1 inches

Table 18. Cumulative rainfall readings, in inches, at Kiriedleng River--Continued

Period	Rainfall	Period	Rainfall
		1978	
Jan. 3-18	6.8	July 25 to Aug. 8	4.8
Jan. 18 to Feb. 1	12.0	Aug. 8-22	7.9
Feb. 1-15	8.2	Aug. 22 to Sept. 6	7.3
Feb. 15 to Mar. 1	3.6	Sept. 6-20	5.7
Mar. 1-14	3.8	Sept. 20 to Oct. 4	11.7
Mar. 14-28	1.1	Oct. 4-25	7.3
Mar. 28 to Apr. 11	12.2	Oct. 25 to Nov. 7	5.9
Apr. 11 to May 2	11.8	Nov. 7-21	9.9
May 3 to June 26	31.0 [1/]	Nov. 21 to Dec. 6	4.7
June 26 to July 11	5.3	Dec. 6-19	8.0
July 11-25	6.3	Dec. 19 to Jan. 3	2.9
Total Jan. 3, 1978 to Jan. 3, 1979: 178.2 inches			
		1979	
Jan. 3-16	7.3	Mar. 13-27	5.9
Jan. 16-29	5.9	Mar. 27 to Apr. 23	19.9
Jan. 29 to Feb. 13	1.1	May 17-31	6.7
Feb. 13-27	8.3	May 31 to June 27	12.8
Feb. 27 to Mar. 13	4.9	June 27 to July 11	12.8

1/ Estimated on basis of Kolonia rainfall.

Luhpwor River Rain Gage
(U.S. Geological Survey)

Location: Lat 6°54'08" N., long 158°09'08" E., on left bank about 100 ft inland from Luhpwor River gaging station (16898600), about 400 ft upstream from waterfall, and 2.1 mi west of Mount Temwetemwensikir.

Period of record: November 1972 to June 1983.

Gage: November 1972 to July 1979: Six-inch diameter steel can, read bimonthly (cumulative totals) (table 19).

June 1978 to June 1983: Eight-inch diameter rain can, continuous record of rainfall (table 20).

Altitude of gage is 150 ft (from topographic map).

Monthly and annual rainfall totals, in inches (See table 20.)

Year	Jan.	Feb.	Mar.	Apr.	May	June
1978	*	*	*	*	(77.5)	21.87
1979	12.41	11.68	12.60	22.68	17.39	22.64
1980	15.95	15.06	10.76	13.93	39.07	29.85
1981	17.81	15.57	8.43	16.06	15.50	17.75
1982	--	--	15.36	--	--	--
1983	1.18	1.82	1.57	.65	1.97	14.65

Year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1978	16.61	21.36	14.79	13.94	18.08	14.04	198.2
1979	20.07	30.70	18.99	19.13	*	(42.94)	231.23
1980	16.70	29.90	1/ 20.26	*	1/ (23.97)	1/ 12.87	228.32
1981	18.42	19.81	1/ 19.25	17.25	1/ 21.42	1/ 19.15	206.42
1982	26.15	22.46	23.46	8.82	15.01	--	--

* Included in following total.

1/ From nearby U.S. National Weather Service rain gage Paies, Kiti.

Table 19. Cumulative rainfall readings, in inches, at Luhpwor River

Period	Rainfall	Period	Rainfall
	1973		
Jan. 3-16	1/ 1.5	July 10-24	3.0
Jan. 16-31	1.5	July 24 to Aug. 8	4.7
Jan. 31 to Feb. 15	2.7	Aug. 8-22	10.1
Feb. 15-27	2.6	Aug. 22 to Sept. 5	10.4
Feb. 27 to Mar. 21	11.5	Sept. 5-19	12.1
Mar. 21 to Apr. 3	.2	Sept. 19 to Oct. 3	6.2
Apr. 3-25	17.5	Oct. 3-17	13.2
Apr. 25 to May 15	16.1	Oct. 17 to Nov. 2	11.0
May 15-30	4.6	Nov. 2-15	6.7
May 30 to June 13	9.0	Nov. 15-29	5.3
June 13-27	10.3	Nov. 29 to Dec. 13	5.2
June 27 to July 10	6.0	Dec. 13 to Jan. 9	19.2
Total Jan. 3, 1973 to Jan. 9, 1974: 190.6 inches			
	1974		
Jan. 1-9	1/ 2.0	July 10-25	13.3
Jan. 9-24	5.2	July 25 to Aug. 15	15.7
Jan. 24 to Feb. 14	15.5	Aug. 15-22	3.8
Feb. 14-26	6.3	Aug. 22 to Sept. 16	16.8
Feb. 26 to Mar. 20	16.5	Sept. 16-25	3.1
Mar. 20 to Apr. 4	7.6	Sept. 25 to Oct. 10	10.0
Apr. 4-19	13.6	Oct. 10-30	16.1
Apr. 19 to May 3	9.5	Oct. 30 to Nov. 6	4.4
May 3-21	5.1	Nov. 6-29	14.7
May 21 to June 27	24.6	Nov. 29 to Dec. 18	19.2
June 27 to July 10	6.8	Dec. 18-31	1/ 4.0
Total for 1974: 233.8 inches			
	1975		
Jan. 21 to Feb. 6	1.3	Apr. 2-17	5.8
Feb. 6-20	1.3	Apr. 17 to May 2	9.3
Feb. 20 to Mar. 5	8.3	May 2-20	12.3
Mar. 5-20	16.0	May 20 to June 5	10.1
Mar. 20 to Apr. 2	1.5		

Table 19. Cumulative rainfall readings, in inches, at Luhpwor River--Continued

Period	Rainfall	Period	Rainfall
1976			
Jan. 1 to Feb. 11 ---	1/ 18.6	July 13-27 ----------	8.3
Feb. 11-25 ----------	7.8	July 27 to Aug. 26 -----	24.0
Feb. 25 to Mar. 23 ----	22.9	Aug. 26 to Sept. 14 ----	17.8
Mar. 23 to Apr. 8 -----	16.5	Sept. 14 to Oct. 6 -----	8.8
Apr. 8-21 ----------	10.4	Oct. 6-27 ----------	17.6
Apr. 21 to May 4 ------	18.6	Oct. 27 to Nov. 9 ------	12.8
May 4-27 ----------	22.5	Nov. 9-22 ----------	6.8
May 27 to June 15 -----	15.8	Nov. 22 to Dec. 7 ------	11.2
June 15-29 ----------	11.2	Dec. 7-21 ----------	8.9
June 29 to July 13 ----	8.3	Dec. 21 to Jan. 4 ------	8.3
Total Jan. 1, 1976 to Jan. 4, 1977: 277.1 inches			
1977			
Jan. 4-18 ----------	6.0	July 6-20 ----------	8.3
Jan. 18 to Feb. 1 -----	2.4	July 20 to Aug. 2 ------	9.6
Feb. 1-15 ----------	1.3	Aug. 2-23 ----------	15.1
Feb. 15 to Mar. 1 -----	.3	Aug. 23 to Sept. 13 ----	16.4
Mar. 1-31 ----------	3.1	Sept. 13-27 ----------	12.9
Mar. 31 to Apr. 13 ----	.8	Sept. 27 to Oct. 11 ----	9.1
Apr. 13-27 ----------	13.7	Oct. 11-25 ----------	14.2
Apr. 27 to May 12 -----	12.8	Oct. 25 to Nov. 9 ------	7.5
May 12-25 ----------	1/ 9.0	Nov. 9-22 ----------	11.9
May 25 to June 7 ------	8.7	Nov. 22 to Dec. 7 ------	8.0
June 7-24 ----------	9.3	Dec. 7-20 ----------	2.5
June 24 to July 6 -----	4.3	Dec. 20 to Jan. 3 ------	1.8
Total Jan. 4, 1977 to Jan. 3, 1978: 189.0 inches			
1978			
Jan. 3-18 ----------	7.8	July 11-25 ----------	10.0
Jan. 18 to Feb. 1 -----	11.0	July 25 to Aug. 8 ------	4.7
Feb. 1-15 ----------	7.3	Aug. 8-22 ----------	9.7
Feb. 15 to Mar. 1 -----	3.9	Aug. 22 to Sept. 6 -----	8.4
Mar. 1-14 ----------	3.8	Sept. 6-20 ----------	6.4
Mar. 14-28 ----------	.8	Sept. 20 to Oct. 4 -----	10.7
Mar. 28 to Apr. 11 ----	11.3	Oct. 4-25 ----------	5.8
Apr. 11 to May 2 ------	13.1	Oct. 25 to Nov. 7 ------	4.3
May 2-25 ----------	11.2	Nov. 7-21 ----------	11.0
May 25 to June 14 -----	16.2	Nov. 21 to Dec. 6 ------	7.9
June 14-26 ----------	1/ 12.0	Dec. 6-19 ----------	9.6
June 26 to July 11 ----	4.1	Dec. 19 to Jan. 3 ------	3.9
Total Jan. 3, 1978 to Jan. 3, 1979: 194.9 inches			

Table 19. Cumulative rainfall readings, in inches, at Luhpwor River--Continued

Period	Rainfall	Period	Rainfall
		1979	
Jan. 3-16	5.7	Mar. 13-27	6.9
Jan. 16-29	6.0	Mar. 27 to Apr. 23	20.3
Jan. 29 to Feb. 13	1.2	May 17-31	7.9
Feb. 13-27	10.0	June 7-27	11.4
Feb. 27 to Mar. 13	5.4	June 27 to July 11	12.2

1/ Estimated on basis of Kolonia rainfall.

Table 20. Daily rainfall, in inches, at continuous-record rain gage at Luhpwor River

1978

Day	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.12	0.19	0.46	0.41	2.98	0	0.18
2	2.22	.41	.02	.08	.64	0	.42
3	1.72	0	.01	.01	0	0	.02
4	.64	0	1.22	.38	.86	.02	.74
5	.16	.23	.71	.24	.04	.06	.11
6	1.94	.23	.01	1.04	.92	.44	.31
7	.20	0	0	1.02	.40	.16	.08
8	.06	.25	.01	0	.24	.60	2.15
9	.36	1.82	1.12	.01	.29	.19	.36
10	1.36	0	.95	0	.02	.28	3.17
11	.04	1.54	3.49	1.91	.02	.35	.06
12	.02	.01	.01	.72	.24	0	.19
13	*	1.49	1.25	0	1.33	.14	1.04
14	.50	.01	2.52	1.61	.20	1.03	1.10
15	.02	.01	.18	.08	.20	.47	.44
16	.22	.13	.16	.01	0	.23	.59
17	.31	.17	0	0	0	4.80	.18
18	.37	2.32	.01	.12	.84	.86	0
19	3.08	.07	.23	.11	.22	1.78	0
20	.53	0	1.57	.02	0	.48	0
21	.30	2.89	0	1.30	.11	0	0
22	.60	1.08	.06	.28	.08	.12	.17
23	4.57	.83	.31	.01	.06	0	.17
24	1.66	.04	.01	2.33	.48	.79	0
25	.02	1.44	2.88	0	0	.32	.44
26	.10	.38	.23	1.21	.77	0	.62
27	.05	.06	1.63	.37	.47	4.14	.67
28	.32	.24	.01	.36	.56	.01	.02
29	.26	0	.22	0	.19	.74	.26
30	.12	.59	.36	1.16	1.24	.07	.43
31		.18	1.72		.54		.12
Total	21.87	16.61	21.36	14.79	13.94	18.08	14.04

* Included in following total.
Total June to December 1978: 120.69 inches.
Total January to May 1978 from cumulative rainfall readings at about the same location and estimate for Jan. 1, 2 based on Kolonia rainfall (0.3 inches): 77.5 inches.
Total for 1978: 198.2 inches.

Table 20. Daily rainfall, in inches, at continuous-record rain gage at Luhpwor River--Continued

1979

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0.04	0	0	0.77	0.24	0.96	5.64	0.14	1.06	0.84	--
2	.13	0	0	4.06	.67	.04	1.73	.12	.06	.95	.08	--
3	.07	0	.35	.07	.41	.09	.70	1.44	.02	2.15	1.15	--
4	0	0	.31	.29	.78	.13	.50	.77	.02	1.31	.54	--
5	0	0	.01	1.08	.91	.49	1.55	.71	.04	.29	.24	--
6	0	.11	.19	1.96	.06	1.34	.53	.65	1.04	.42	.25	--
7	0	.04	.13	.86	.42	.32	0	3.53	2.46	1.57	.52	--
8	.29	0	.19	1.26	.41	1.36	.14	.17	.01	1.44	1.02	--
9	3.36	0	.26	3.68	.06	1.03	.40	.07	.13	.41	1.08	--
10	.58	0	1.69	.10	.65	.06	0	3.92	.26	0	1.10	--
11	.65	.01	.14	.48	1.15	.25	0	[1/].08	.43	0	.64	--
12	.67	0	.11	.90	.58	.23	0	[1/]2.32	.31	0	.12	0.72
13	.01	.84	1.54	3.02	.79	.94	.96	[1/]--	.04	0	.12	.13
14	0	.13	.53	1.90	.14	.43	0	[1/]1.96	0	.05	--	.24
15	0	.02	.70	.02	.11	3.10	.16	.06	0	.29	--	.01
16	.13	.35	2.02	0	1.39	.19	2.50	0	1.75	.34	--	.30
17	.13	1.15	1.08	0	.43	.13	.12	.25	.65	0	--	0
18	0	.78	.94	0	.26	.77	1.76	.02	.34	0	--	2.80
19	0	0	.29	0	1.80	.14	.11	.26	.04	.23	--	.17
20	0	0	.17	0	.01	.20	.17	1.02	2.52	.01	--	.07
21	1.28	.54	0	0	.07	3.29	.18	.05	.05	0	--	.73
22	.14	4.64	0	0	.59	.35	.56	.22	0	1.27	--	1.12
23	.80	.16	1.09	0	.05	.31	.12	.92	.46	.06	--	1.76
24	1.52	.79	.10	0	.04	.02	.35	.35	.80	1.69	--	2.15
25	1.43	1.12	0	.07	.30	1.62	3.43	0	.68	.38	--	.25
26	0	.13	0	.06	1.19	.08	.26	.22	1.22	1.63	--	0
27	.18	.41	.06	1.03	1.02	2.21	.78	.30	.78	.01	--	.16
28	.43	.42	0	.47	1.94	.60	.17	0	.60	1.55	--	.08
29	0		0	.25	.19	1.34	.11	.24	.25	.54	--	.19
30	.07		.12	1.12	.04	1.34	0	.41	3.89	1.44	--	.29
31	.54		.58		.16		1.82	0		.04		1.08
Total	12.41	11.68	12.60	22.68	17.39	22.64	20.07	[2/]30.70	18.99	19.13	*	[3/]42.94

* Included in following total.

[1/] Partial record for the day.

[2/] Includes estimate of 5.0 inches, based on Kolonia and Nanpil River rainfall, for August 12-14.

[3/] Includes 22.99 inches for November 14 to December 11, 1979, recorded at Kiti rain gage.

Total for 1979: 231.23 inches.

Table 20. Daily rainfall, in inches, at continuous-record rain gage at Luhpwor River--Continued

1980

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.42	0.01	0.04	1.50	2.57	2.12	1.19	0.68	0.53	1.58	*	0.77
2	.71	0	.60	.14	.01	2.71	.73	3.20	2.72	2.41	*	.01
3	.11	.01	.29	.01	.17	3.19	.02	0	1.02	.52	*	0
4	.25	6.36	.06	.04	0	.13	1.66	.54	.85	.54	4.61	0
5	1.12	*	0	.12	.22	.56	.38	2.04	.18	1.14	0	0
6	.68	*	0	.01	3.29	1.07	.20	2.81	.55	0	0	0
7	.25	*	0	0	.91	1.21	.11	.04	1.32	.15	.54	0
8	.49	*	0	0	4.99	*	.42	.38	.22	.56	0	0
9	1.97	*	0	0	1.37	1/4.7	.02	1.02	.14	.31	.10	.74
10	.08	*	.68	0	.34	.10	2.21	1.06	1.34	.68	.46	.38
11	.05	*	.74	.34	1.99	.24	.07	.11	.30	.17	.61	.36
12	.17	*	.48	.34	2.99	.62	.50	.07	.22	.02	0	.50
13	.16	*	.72	.65	.02	.01	1.10	*	.67	1.96	.67	0
14	1.46	2.24	2.33	.14	*	4.12	1.15	*	.20	.12	*	.38
15	2.10	.82	.71	.96	*	.55	.05	1.46	.11	1.72	*	.22
16	.89	0	.34	3.35	*	.56	.60	1.18	.54	.02	*	.06
17	.08	0	.53	.05	*	.03	.24	.80	3.56	.01	*	1.90
18	.37	.24	.29	.44	*	.23	1.81	2.50	.22	.26	*	2.28
19	.94	.05	.01	.66	1/8.8	.64	.37	.05	.62	.86	*	.05
20	.16	4.01	.08	1.86	.01	.13	.01	.56	.70	.07	2.51	.28
21	.90	.02	.20	.47	2.09	.49	.59	4.84	.64	.12	.38	.36
22	.14	0	.50	1.24	1.61	2.30	.77	.03	.76	*	.02	.04
23	0	0	.14	.16	1.87	1.68	.01	2.40	.38	*	.06	.02
24	0	0	.04	.06	.16	.18	.28	.01	.02	*	0	.07
25	0	.13	.02	0	.67	.34	1.06	.18	.01	*	.01	.04
26	1.22	.02	.05	.06	3.80	.02	.38	.41	.13	*	.16	.61
27	.05	.19	.32	.78	.05	.10	.56	2.20	1.86	*	.01	.59
28	0	0	.08	.52	.47	1.03	.07	.68	.37	*	0	.07
29	.23	.96	.07	.01	.19	.79	.13	0	.01	*	.37	.11
30	.28		.04	.02	.12	0	.01	.60	.07	*	.24	2.56
31	.67		1.40		.36		0	.05		*		.47
Total	15.95	15.06	10.76	13.93	1/39.07	1/29.85	16.70	29.90	20.26	*	23.97	12.87

* Included in following total.

1/ Rainfall for May 14-19 and June 8 and 9 estimated on basis of Kolonia rainfall.
Total for 1980: 228.32 inches.

Table 20. Daily rainfall, in inches, at continuous-record rain gage at Luhpwor River--Continued

1981

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	0.77	0.67	*	0.06	1.67	0.02	0	1.60	--	0.89	0.22
2	.84	1.96	*	.01	1.07	.04	.40	.46	--	0	.37
3	.89	.41	0.24	0	1.00	.12	2.03	.04	--	1.75	.71
4	.06	.26	0	0	1.22	.05	.76	0	--	0	.01
5	.02	0	0	0	.49	.31	.01	.06	--	0	1.76
6	.01	.02	.10	.11	.08	.72	.08	.76	--	.20	.19
7	.05	.28	.01	0	0	.54	0	4.28	--	.50	2.10
8	.18	1.87	.28	.66	0	2.00	.42	.83	--	.08	.36
9	.07	.62	.05	.74	.65	.96	.86	1.08	--	1.04	2.32
10	.42	.19	.04	.43	.88	.32	.10	.04	--	.34	1.60
11	.67	.36	.10	3.40	.14	2.70	1.44	.84	--	2.17	1.98
12	.80	.04	.05	1.20	.11	.34	.22	.08	--	.48	.72
13	0	0	.02	.34	0	.53	1.10	.01	--	.17	0
14	0	.01	.01	1.06	0	.37	1.26	.31	--	0	.04
15	.02	0	.07	1.85	.17	1.07	.30	.01	--	.46	.35
16	2.03	4.50	0	.23	0	.58	.50	1.66	--	.78	.13
17	.05	2.47	0	.95	1.04	1.15	.04	1.19	--	.26	--
18	.04	.04	0	.02	.48	.53	0	.23	--	.05	--
19	1.82	.76	0	.23	.60	.16	1.49	.16	--	1.98	--
20	2.58	0	.26	.36	.25	.55	.01	0	--	1.70	--
21	.49	.08	.43	0	.26	.05	.54	.17	--	.48	--
22	.41	.11	1.34	.19	1.44	1.21	.19	0	--	.01	--
23	1.43	.06	.64	0	.60	.11	.06	*	--	.07	--
24	.74	.06	1.75	0	.01	1.33	.01	*	0.89	.06	--
25	.02	.01	.01	.16	0	0	.47	*	1.92	1.36	--
26	.01	.15	1.78	.94	1.71	0	1.16	*	.08	.24	--
27	1.68	.40	.80	2.26	.37	.54	1.56	*	0	1.49	--
28	.79	.24	.07	.35	.82	1.40	0	*	.24	.65	--
29	.04		.30	.01	.12	.05	.46	*	0	0	--
30	.04		.08	.60	.30	0	.71	*	0	0	--
31	.84		0		.02		1/ 2.24	1/ 6.00		.04	
Total	17.81	15.57	8.43	16.06	15.50	17.75	18.42	19.81	--	17.25	--

* Included in following total.

1/ Estimated on basis of Kolonia, Nanpil River, and Kiti rainfall.

Total January to August 1981: 129.35 inches.
Rainfall at nearby U.S. National Weather Service rain gage Paies, Kiti: September, 19.25; November, 21.42; and December, 19.15 inches (National Oceanic and Atmospheric Administration, 1981, v. 77, nos. 9, 11, 12).
Total 1981 (combined): 206.42 inches.

Table 20. Daily rainfall, in inches, at continuous-record rain gage at Luhpwor River--Continued

1982

Day	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	--	--	3.65	0.92	4.80	0.16	0.42	0.84
2	0	.05	--	--	1.34	.11	.89	.79	.29	.18
3	0	.04	--	--	*	.80	1.20	.13	.01	1.70
4	0	.06	--	--	*	.54	1.09	.64	.11	2.52
5	.08	0	--	--	*	0	1.75	.97	0	1.45
6	0	.01	--	--	*	.04	.52	.01	0	1.19
7	.58	.67	--	--	*	4.13	0	.01	.17	0
8	.23	1.63	--	0.53	*	1.27	.07	.10	.65	1.33
9	1.03	0	--	0	*	.31	.18	.32	*	4.99
10	.31	0	--	.17	*	0	.01	0	*	1.98
11	.16	0	--	.12	*	1.45	.13	.05	*	.10
12	.61	0	--	0	*	.12	.07	0	*	.50
13	2.26	.20	--	2.17	*	.05	0	1.16	*	.52
14	.20	.02	--	.41	11.81	.53	0	1.80	*	--
15	.46	0	--	.88	.16	.20	0	.56	*	--
16	.05	0	--	1.10	.17	.83	.16	.01	11.06	--
17	.14	1.76	--	.01	.73	.06	3.31	.01	0	--
18	.74	.65	--	2.59	.64	*	.07	.04	0	--
19	.29	.59	--	.06	.10	*	.41	1.20	0	--
20	.11	5.14	--	.07	.02	*	.84	.43	2.02	--
21	3.28	2.28	--	1.96	1.19	*	0	.30	.01	--
22	.55	1.33	--	3.06	1.54	*	0	0	0	--
23	.17	.05	--	1.82	.88	*	.17	0	0	--
24	.02	1.16	--	.85	.02	*	2.58	0	.02	--
25	.05	--	--	.86	.10	*	0	.05	.25	--
26	.80	--	--	.01	.10	*	.07	.08	0	--
27	1.09	--	--	.44	.02	*	.65	0	0	--
28	.67	--	--	.05	0	*	.65	0	0	--
29	1.32	--	--	1.18	.22	*	3.48	0	0	--
30	.16	--	--	1.07	1.19	*	.36	0	0	--
31	0		--		2.27	11.1		0		--
Total	15.36	--	--	--	26.15	22.46	23.46	8.82	15.01	--

* Included in following total.

Table 20. Daily rainfall, in inches, at continuous-record rain gage at Luhpwor River--Continued

1983

Day	Jan.	Feb.	Mar.	Apr.	May	June
1	0	0	0.44	0	0	0
2	0	0	.11	.05	.04	1.86
3	0	0	.07	0	0	.16
4	.05	.14	0	0	0	.04
5	0	.16	0	0	.02	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	.07	.02	0	0	0
9	.04	0	.20	0	.18	.35
10	0	0	.18	0	.49	.26
11	0	0	.19	0	0	.12
12	0	0	0	0	0	1.44
13	.13	.41	0	0	.23	.24
14	.01	.14	.02	.01	.12	.16
15	.11	.52	0	0	.10	1.46
16	.35	0	.02	0	.01	.84
17	.11	0	0	0	0	.68
18	0	.28	0	0	.01	.07
19	.11	0	0	0	.13	.98
20	.01	0	0	0	0	.38
21	0	0	0	0	.23	1.02
22	0	.10	0	.05	.34	1.16
23	0	0	0	.34	.06	.30
24	.18	0	0	.20	0	.44
25	0	0	0	0	0	.41
26	0	0	0	0	0	.01
27	0	0	0	0	0	.31
28	0	0	.01	0	0	.02
29	0		.06	0	0	.16
30	0		.25	0	0	1.78
31	.08		0		.01	
Total	1.18	1.82	1.57	0.65	1.97	14.65

Kiti Rain Gage
(U.S. Geological Survey)

Location: Lat 6°49'58" N., long 158°10'04" E., 0.1 mi northeast of school in Nan Paremwed area.

Period of record: June 1972 to November 1982.

Gage: June 1972 to July 1979: Six-inch diameter steel cylinder read bimonthly (cumulative readings) (table 21).

June 1978 to November 1982: Eight-inch diameter rain can, continuous record of rainfall (table 22).

Altitude of gage is 420 ft (from topographic map).

Monthly and annual rainfall totals, in inches (See table 22.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1978	*	*	*	*	(85.2)	18.49	13.31	14.97	10.25	16.97	14.28	6.51	179.98
1979	7.00	4.82	6.27	21.19	12.51	18.75	16.53	38.0	10.17	15.90	17.30	22.28	190.7
1980	8.53	16.71	*	(38.83)	33.94	20.53	19.78	21.25	14.62	20.44	7.22	9.33	211.18
1981	10.98	10.15	6.63	14.31	14.90	16.63	17.77	15.75	14.98	13.21	16.72	18.94	170.97
1982	--	9.95	--	--	22.78	18.59	23.16	20.78	27.12	8.71	9.44	--	--

* Included in following total.

Table 21. Cumulative rainfall readings, in inches, at Kiti

Period	Rainfall	Period	Rainfall
		1972	
May 25 to June 9	17.8	Sept. 16-30	6.3
June 9-22	4.1	Sept. 30 to Nov. 10	7.9
June 22 to July 3	9.2	Nov. 10-24	1.6
July 3 to Aug. 18	27.7	Nov. 24 to Dec. 8	6.3
Aug. 18 to Sept. 1	6.3	Dec. 8 to Jan. 5	6.1
Sept. 1-16	17.6		
		1973	
Jan. 5 to Feb. 16	4.5	July 27 to Aug. 10	3.4
Feb. 16-26	5.2	Aug. 10-24	12.7
Feb. 26 to Mar. 23	8.7	Aug. 24 to Sept. 7	4.8
Mar. 23 to Apr. 6	1.1	Sept. 7-21	7.3
Apr. 6-27	19.8	Sept. 21 to Oct. 5	9.8
Apr. 27 to May 18	9.4	Oct. 5-19	3.8
May 18 to June 1	6.9	Oct. 19 to Nov. 3	18.7
June 1-15	12.4	Nov. 3-16	5.8
June 15-29	3.4	Nov. 16-30	5.8
June 29 to July 13	4.2	Nov. 30 to Dec. 14	9.2
July 13-27	7.9	Dec. 14 to Jan. 11	25.3

Total Jan. 5, 1973 to Jan. 11, 1974: 190.1 inches

		1974	
Jan. 1-11	[1/]2.0	July 11-27	17.8
Jan. 11-26	6.9	July 27 to Aug. 9	10.9
Jan. 26 to Feb. 15	19.9	Aug. 9-23	9.7
Feb. 15 to Mar. 1	6.9	Aug. 23 to Sept. 13	15.3
Mar. 1-22	15.3	Sept. 13-27	5.1
Mar. 22 to Apr. 5	6.3	Sept. 27 to Oct. 11	5.7
Apr. 5-20	19.8	Oct. 11-25	13.7
Apr. 20 to May 3	15.9	Oct. 25 to Nov. 8	6.6
May 3-17	12.3	Nov. 8-30	20.7
May 17 to June 28	25.7	Nov. 30 to Dec. 20	19.9
June 28 to July 11	7.3	Dec. 20-31	[1/]4.0

Total 1974: 267.7 inches

Table 21. Cumulative rainfall readings, in inches, at Kiti--Continued

Period	Rainfall	Period	Rainfall
		1975	
Jan. 23 to Feb. 7	1.1	June 7-21	15.8
Feb. 7-21	1.5	June 21 to July 3	6.0
Feb. 21 to Mar. 7	9.3	July 3-19	3.6
Mar. 7-21	9.9	July 19 to Aug. 2	7.8
Mar. 21 to Apr. 5	1.9	Aug. 2-22	8.8
Apr. 5-18	7.9	Aug. 22 to Sept. 12	11.3
Apr. 18 to May 3	8.9	Sept. 12-26	9.2
May 3-23	11.1	Nov. 21 to Dec. 26	18.9
May 23 to June 7	9.2		
		1976	
Dec. 26 to Jan. 16	17.6	June 18 to July 2	7.8
Jan. 16-30	4.8	July 2-16	7.9
Jan. 30 to Feb. 27	9.9	July 16-30	9.3
Feb. 27 to Mar. 19	20.1	Sept. 16 to Oct. 9	6.2
Mar. 19 to Apr. 9	10.3	Oct. 9-29	19.9
Apr. 9-23	12.1	Oct. 29 to Nov. 27	11.0
Apr. 23 to May 7	18.0	Nov. 27 to Dec. 10	11.6
May 7-23	23.7	Dec. 10-23	9.9
May 28 to June 18	18.3	Dec. 23 to Jan. 8	8.8
		1977	
Jan. 8-21	7.3	July 22 to Aug. 5	8.8
Jan. 21 to Feb. 4	2.1	Aug. 5-26	10.3
Feb. 4-17	1.1	Aug. 26 to Sept. 16	15.8
Feb. 17 to Mar. 4	.5	Sept. 16-30	8.3
Mar. 4 to Apr. 2	11.9	Sept. 30 to Oct. 14	10.2
Apr. 2-16	1.1	Oct. 14-28	13.8
Apr. 16-29	23.5	Oct. 28 to Nov. 11	11.1
Apr. 29 to May 13	14.5	Nov. 11-25	11.0
May 13 to June 10	20.3	Nov. 25 to Dec. 9	11.2
June 10-25	10.0	Dec. 9-23	1.3
June 25 to July 7	5.9	Dec. 23 to Jan. 6	2.5
July 7-22	8.9		

Total Jan. 8, 1977 to Jan. 6, 1978: 211.4 inches

Table 21. Cumulative rainfall readings, in inches, at Kiti--Continued

Period	Rainfall	Period	Rainfall
	1978		
Jan. 6-20	7.3	July 28 to Aug. 11	4.2
Jan. 20 to Feb. 3	11.7	Aug. 11-26	7.1
Feb. 3-18	9.8	Aug. 26 to Sept. 9	9.1
Feb. 18 to Mar. 3	2.9	Sept. 9-22	5.1
Mar. 3-17	4.9	Sept. 22 to Oct. 9	10.1
Mar. 17-31	1.8	Oct. 9 to Nov. 19	13.2
Mar. 31 to Apr. 14	15.7	Nov. 19 to Dec. 3	8.0
Apr. 14 to May 5	19.3	Dec. 3-17	5.3
May 5 to June 30	30.3 [2/]	Dec. 17-22	2.0
June 30 to July 14	5.8	Dec. 22 to Jan. 7	1.1
July 14-28	7.9		
	Total Jan. 6, 1978 to Jan. 7, 1979: 182.6 inches		
	1979		
Jan. 7-23	5.3	Mar. 18 to Apr. 1	7.0
Jan. 23 to Feb. 3	2.3	Apr. 1-22	18.8
Feb. 3-19	1.2	May 19 to June 3	4.5
Feb. 19 to Mar. 4	4.0	June 3 to July 1	9.6
Mar. 4-18	5.8	July 1-15	7.2

[1/] Estimated on basis of Kolonia rainfall.

[2/] Rainfall for May 6-30 estimated on basis of Kolonia rainfall and for June from continuous rainfall record at about the same location.

Table 22. Daily rainfall, in inches, at continuous-record rain gage at Kiti

1978

Day	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*	0.24	0.10	0.01	1.82	*	0
2	*	.48	.24	.59	.35	*	.16
3	1/ 4.00	0	0	.36	0	*	*
4	1.27	.05	1.27	1.64	.01	*	*
5	.54	0	.11	.42	.32	0.20	*
6	.52	0	.02	2.12	.23	.12	*
7	1.08	.66	0	.12	1.30	.56	*
8	.53	.34	0	0	.24	.02	*
9	.18	.30	0	0	.24	.12	*
10	.61	.28	.48	0	0	.37	*
11	.04	2.20	1.52	2.21	0	.78	*
12	0	0	.01	.49	.72	.08	*
13	0	0	1.01	0	1.84	.48	*
14	.38	.35	.61	1.36	.30	.32	*
15	.19	2.57	.56	.18	.06	.77	*
16	.48	.26	.04	0	0	.56	*
17	.16	.03	0	0	0	4.57	2/ 5.3
18	.30	.80	.02	0	.71	.65	0
19	1.66	.24	.35	.01	.89	.41	0
20	.32	1.40	2.45	.01	.01	.38	0
21	.49	.84	0	.46	0	.02	0
22	.30	.17	.10	.02	1.36	.14	.19
23	2.99	.95	.67	.01	.13	.01	0
24	1.38	.11	.01	.02	.23	.84	0
25	.72	.17	2.82	.01	.12	.50	.06
26	.04	.44	.47	.02	1.12	0	.24
27	.01	.01	.66	.16	1.75	2.03	.30
28	.01	.24	.38	.01	1.10	.06	0
29	.29	0	.44	.01	.32	.29	0
30	0	.05	.20	.01	*	0	.04
31		.13	.43		1.80		.22
Total	18.49	13.31	14.97	10.25	16.97	14.28	6.51

* Included in following total.

1/ Rainfall recorded at Luhpwor rain gage.

2/ From cumulative rainfall readings at about the same location.

Total June to December 1978: 94.78 inches.

Total January to May from cumulative rainfall readings at about the same location and estimate for May 6-30 based on Kolonia rainfall (11.8 inches): 85.2 inches.

Total for 1978: 179.98 inches.

Table 22. Daily rainfall, in inches, at continuous-record rain gage at Kiti--Continued

1979

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0.29	0.35	0.86	4.55	0	0.35	0.71	0.96
2	0	0	0	3.76	.29	.04	.88	.12	.25	.17	.04	11.87
3	0	0	.02	.01	.76	.02	1.79	.65	0	3.79	1.09	.46
4	0	0	.11	0	.18	.18	1.61	.01	0	1.66	.74	2.18
5	0	0	.01	.79	.61	.86	.28	1.04	.29	.54	.05	.29
6	0	0	0	1.82	.05	1.38	.62	.17	.04	.67	.20	.11
7	0	.01	0	.23	.60	.02	.49	2.12	.89	.30	.49	0
8	.05	0	0	.36	.49	1.19	0	.19	.25	1.19	.59	0
9	2.89	0	0	2.40	0	.72	.04	.38	.19	.32	1.40	0
10	.52	0	1.24	0	.72	.17	.07	4.72	.55	0	1.81	0
11	.30	0	0	.47	.46	.14	0	.47	.37	0	.34	0
12	.23	0	0	.86	.07	.22	0	11.51	.06	.06	1.02	.32
13	0	.28	.77	.79	.47	.40	1.15	*	0	0	1.70	.14
14	0	.19	.36	.41	.13	.32	.06	*	.32	.44	.30	.56
15	0	0	.37	.34	.14	.12	.02	*	.02	.13	1.92	0
16	0	.31	.46	.20	.79	3.71	1.84	*	.09	.02	.28	0
17	.42	.28	1.58	.08	.29	.29	1.45	*	.06	.04	0	.01
18	0	.13	.99	4.56	.14	.17	.05	*	0	0	0	.56
19	0	0	.13	.85	2.26	.35	.10	1/6.2	0	.18	.10	0
20	0	0	.06	.18	0	.17	.46	.79	1.27	0	.17	.26
21	.56	.07	0	0	.01	.13	.06	.60	0	2.40	.24	.23
22	.04	1.62	0	.17	.60	2.59	0	.49	0	0	1.12	.53
23	.64	.24	.07	.24	.02	.35	.60	1.24	0	0	.22	.71
24	.77	.79	.04	0	0	.58	.07	.11	.28	.25	1.21	.40
25	.19	.34	0	.12	.11	.31	2.44	0	.19	.13	.10	1.55
26	0	.10	.01	.16	.62	1.36	.40	2.36	.80	.66	.06	.01
27	.02	.32	.05	.14	.38	.01	.12	.24	.01	0	1.34	.13
28	.07	.14	0	.76	1.26	1.43	.16	0	2.11	1.19	.06	.10
29	0		0	.36	.17	.10	0	0	1.00	1.00	0	.05
30	.02		0	1.13	0	1.07	.02	.04	1.13	.34	0	0
31	.28		0		.60		.89	0		.07		.85
Total	7.00	4.82	6.27	21.19	12.51	18.75	16.53	1/38.0	10.17	15.90	17.30	22.28

* Included in following total.

1/ Rainfall for August 13-19 estimated on basis of Kolonia rainfall.

Total for 1979: 190.7 inches.

Table 22. Daily rainfall, in inches, at continuous-record rain gage at Kiti--Continued

1980

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.16	0	0.14	--	1.70	1.64	0.92	1.92	0	1.18	0	*
2	1.04	0	.41	--	.07	1.48	.49	.10	.96	2.60	0	*
3	.13	0	.05	--	.08	3.61	.35	.22	.56	.18	0	*
4	.01	5.41	0	--	0	.06	1.78	.30	.13	.25	0	*
5	.30	.02	0	--	1.12	.40	.14	.73	.32	1.36	.31	*
6	.55	.01	0	--	3.92	.76	.08	.14	.52	.01	.24	*
7	.32	.14	0	--	1.32	.78	0	.12	1.02	.42	.49	1.50
8	.02	2.95	0	--	4.78	.26	.13	.04	.25	1.15	.10	0
9	.18	0	0	--	1.09	.10	.04	.66	.29	.71	.25	.25
10	0	1.13	.26	--	.37	.01	4.97	1.36	.48	.42	.29	.52
11	0	.40	.82	--	1.15	.31	.14	0	.26	1.72	.36	.24
12	0	0	.59	--	1.90	1.12	.85	.12	.06	.01	.70	.23
13	0	0	.13	--	0	.16	.47	.08	.28	.01	.98	0
14	.52	0	--	0.08	3.16	4.12	2.95	.38	.40	.04	.01	.06
15	.73	*	--	.56	1.62	.07	.05	.67	.62	1.36	.66	.07
16	.40	.46	--	1.91	0	.10	.48	1.55	1.81	.02	.40	.08
17	.04	0	--	.01	.04	.07	.96	.80	1.30	.02	.83	1.03
18	.02	0	--	.14	.07	.42	2.22	.67	.05	.40	0	2.39
19	.70	0	--	.40	1.54	.10	.06	.17	.67	.34	.02	.07
20	.04	5.53	--	1.13	.05	1.67	0	.50	.94	.04	.35	.20
21	.14	.01	--	.58	1.34	.13	.55	.72	.44	0	.73	.02
22	.07	0	--	1.97	.60	.64	.25	.58	.78	.01	.08	0
23	.06	0	--	.07	.35	1.13	.14	.83	.01	2.56	.06	0
24	0	0	--	.23	.34	.35	.06	0	0	1.52	0	0
25	0	0	--	0	1.01	.04	.64	*	0	.12	0	0
26	1.98	.01	--	.06	4.08	.04	.11	*	.43	.13	.22	.29
27	0	.08	--	1.38	.13	.02	.64	*	1.74	*	0	.14
28	0	0	--	.61	1.62	.36	0	*	.30	*	0	.01
29	.06	.56	--	1.08	.06	.54	.25	*	0	*	.14	.01
30	.05		--	.20	.12	.04	.06	*	0	*	*	1.96
31	.01		--		.31		0	8.59		3.86		.26
Total	8.53	16.71	*	[1]38.83	33.94	20.53	19.78	21.25	14.62	20.44	[2]7.22	[2]9.33

* Included in following total.

[1] Includes 26.02 inches for March 14 to April 13, 1980, recorded at Luhpwor River rain gage.

[2] Rainfall for November 30 (about 0.2 inches) included in December total.

Total for 1980: 211.18 inches.

Table 22. Daily rainfall, in inches, at continuous-record rain gage at Kiti--Continued

1981

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.06	0.02	0	0.17	2.42	*	0.20	0	0.01	0.16	0.05	0.01
2	.18	.41	0	0	2.28	*	.07	.35	.02	0	.04	.62
3	.60	.18	0	0	.02	*	1.45	.01	.04	0	2.09	3.22
4	0	.14	0	.70	.24	*	1.51	0	.76	.16	.05	.01
5	0	0	0	0	.04	*	.06	0	.19	0	.49	.08
6	0	.01	0	0	0	*	0	1.06	.46	.23	.52	--
7	0	.13	0	0	0	*	0	2.53	.10	.49	2.16	--
8	0	1.58	.19	.11	.37	*	.14	.82	.01	.16	.01	--
9	0	.23	.02	.35	1.06	*	.94	1.13	3.17	.32	1.42	--
10	.26	..19	0	.23	.01	*	.10	.06	.38	.53	1.21	--
11	1.03	.04	.12	1.66	.96	*	1.30	.58	.30	1.04	.84	--
12	1.22	0	.13	.98	.07	*	.20	.05	.01	.83	.37	--
13	0	0	0	.48	0	*	.85	.01	1.54	.24	0	--
14	0	0	0	1.58	.01	*	1.07	.53	.04	0	.42	--
15	0	0	0	2.90	.13	*	1.13	1.36	.08	.26	.06	--
16	.71	4.32	.04	.02	.02	*	.60	.55	.65	.31	.30	--
17	.01	2.02	0	1.44	1.04	*	0	1.45	.18	.24	0	--
18	.06	0	.07	0	.41	*	0	.36	.60	.11	.55	--
19	1.21	.38	0	.22	.66	1/ 9.50	.02	.35	.29	.95	.10	
20	2.21	0	.10	.07	.22	.36	.05	.06	2.06	3.53	2.41	--
21	.14	0	.31	.04	.42	1.01	.01	0	.20	.54	.48	--
22	.36	.01	.86	.06	.46	1.19	.05	0	.12	0	1.20	--
23	1.18	.05	1.02	0	.31	.06	0	1.90	1.08	.02	0	--
24	.66	.16	1.55	0	.01	.91	0	.11	1.78	.01	.01	--
25	0	0	.01	.32	.08	.10	.16	.04	.59	1.08	0	--
26	0	0	1.20	0	1.80	0	1.66	.83	0	.56	.08	--
27	.49	.16	.78	2.20	.23	.10	2.64	.25	.01	.17	.10	--
28	.25	.12	.06	.29	1.36	3.36	0	.11	0	.29	0	--
29	0		.13	.06	.08	.02	1.33	.06	0	0	.04	--
30	0		.04	.43	.18	.02	1.08	.79	.31	.60	1.72	--
31	.35		0		.01		1.15	.40		.38		--
Total	10.98	10.15	6.63	14.31	14.90	16.63	17.77	15.75	14.98	13.21	16.72	2/ 18.94

* Included in following total.

1/ Based on total for June 1 to about June 17 (8.47 inches) and rainfall records at Luhpwor River.

2/ Rainfall for Dec. 6-31 estimated at 15.0 inches on basis of rainfall at Paies, Kolonia, and Madelenihmw.

Total for 1981: 170.97 inches.

Table 22. Daily rainfall, in inches, at continuous-record rain gage at Kiti--Continued

1982

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		1.16	0	*	1.18	0.30	2.75	0.69	7.14	0.16	0.20	1.30
2		.35	0	*	.52	.01	.80	.17	1.62	1.16	0	.10
3		0	0	*	1.06	1.44	.40	.29	1.14	.01	0	1.01
4		.74	0	*	1.74	.05	.56	.10	1.02	.06	.07	1.13
5		0	0	*	.13	.08	2.70	.10	2.84	1.04	0	.92
6		0	0	*	.29	.89	.01	.05	.70	.60	.41	1.10
7		.30	.49	*	3.29	.17	.83	4.03	.02	.13	.48	0
8		.01	.02	*	*	.48	3.91	.70	.02	0	.11	--
9		.30	.58	*	*	.06	.25	.40	.42	.12	1.07	--
10		0	0	*	*	*	.43	.11	.23	0	.80	--
11		0	0	*	*	*	.70	2.18	.20	0	.84	--
12		0	.02	*	7.98	*	1.02	.02	.13	0	.90	--
13		.16	1.73	*	.01	3.22	.01	.17	0	.90	1.46	--
14		1.07	.19	*	.58	.23	.32	.72	0	1.84	.10	--
15		1.16	.08	*	2.02	2.64	.38	.90	0	.38	.06	--
16		.97	0	*	.01	1.04	.53	.78	.14	0	0	--
17		.10	0	*	0	.10	.24	.06	1.86	0	0	--
18		1.44	.67	*	.03	2.77	.14	.05	.30	.11	0	--
19		0	.34	*	1.24	.07	.05	.13	.46	.42	0	--
20		0	0	*	.96	.04	.28	.01	.06	.31	2.06	--
21		.41	3.22	*	0	1.22	.26	0	.06	.24	.77	--
22		.90	.49	10.79	0	.02	1.24	.11	.19	0	0	--
23		.24	.37	0	.02	.01	.49	.44	1.54	0	0	--
24		.64	.01	.14	.05	1.51	0	2.65	.95	0	0	--
25		0	0	2.50	.07	.58	0	.83	0	.29	0	--
26		0	.31	1.50	.71	0	.97	2.64	.02	.06	0	--
27		0	1.12	.18	.06	.68	.01	.01	.35	0	0	--
28		0	*	1.73	.07	.06	0	.02	3.13	.01	.11	--
29			*	1.55	.36	.46	.05	.26	2.21	0	0	--
30			*	.11	.10	.46	.41	.30	.37	.38	0	--
31			*		.30		3.42	1.86		.49		--
Total		9.95	*	(28.14)	22.78	18.59	23.16	20.78	27.12	8.71	9.44	--

* Included in following total.

Table 23. Daily rainfall, in inches, at continuous-record rain gage at Mount Pwoaipwoai

[Lat 6°51'12" N., long 158°11'48" E., 1.0 mi west of Mount Pwoaipwoai; altitude, 1,400 ft (from topographic map)]

1982

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.12	2.28	--	--	0.90	--	2.86	0.85	7.39	*	2.60	0
2	.30	.60	--	--	1.02	--	1.79	1.24	*	*	0	.46
3	.03	0	--	--	1.56	--	.20	.56	*	*	0	1.30
4	.21	1.92	--	--	2.79	--	.74	*	*	*	0	1.81
5	1.20	0	--	--	*	--	.43	*	*	*	*	1.38
6	1.98	.24	--	--	*	--	0	*	*	*	*	1.03
7	4.44	.72	--	--	*	--	1.63	*	*	*	*	0
8	1.62	.18	--	--	*	--	2.59	*	*	6.49	*	1.30
9	.18	.84	--	--	*	--	3.38	*	*	.25	*	3.14
10	1.86	.06	--	--	*	--	.38	*	13.2	.11	*	1.69
11	0	.12	--	--	*	--	*	*	.14	0	*	.06
12	0	0	0.96	--	*	--	*	10.9	.17	0	*	.29
13	.06	1.20	2.91	--	*	--	*	.22	0	1.08	*	.19
14	0	2.22	.51	--	*	--	*	.79	0	3.73	*	.07
15	.12	.78	.42	--	14.60	--	*	.32	0	.47	*	.05
16	--	.84	.06	--	--	--	*	1.90	.13	.04	*	.10
17	--	.12	.24	--	--	--	*	.19	1.00	0	*	1.04
18	--	1.80	1.14	--	--	--	*	.07	.46	0	*	.14
19	--	.06	.54	--	--	--	*	.79	.53	.98	9.13	.26
20	--	.06	.30	--	--	--	*	0	.06	1.50	1.04	.11
21	--	.78	4.14	--	--	--	*	.07	.59	.71	.30	.26
22	--	1.20	1.05	--	--	--	*	.88	.12	.01	0	.16
23	--	--	.84	--	--	--	*	.80	.48	0	0	.05
24	--	--	.09	--	--	0.86	*	1.16	1.39	0	0	.36
25	--	--	.03	3.06	--	.77	*	1.49	0	.38	.12	.07
26	--	--	.27	2.16	--	0	*	*	.06	.44	0	1.10
27	--	--	2.07	.78	--	.71	*	5.4	1.68	0	.22	.72
28	--	--	1.05	2.34	--	.16	*	0	3.72	.08	.05	0
29	.24		2.10	2.10	--	.97	*	.31	4.86	.17	0	0
30	0		.42	1.92	--	1.31	14.4	.36	.17	.23	0	.06
31	.48		--		--		1.52	2.11		.25		0
Total	--	--	--	--	--	--	29.92	30.41	36.15	16.92	13.46	17.20

* Included in following total.
Total July to December 1982: 144.06 inches.

Table 23. Daily rainfall, in inches, at continuous-record rain gage at Mount Pwoaipwoai--Continued

1983

Day	Jan.	Feb.	Mar.	Apr.	May	June
1	0	0	0.46	0	0	0.10
2	0	.25	.12	.50	.05	.72
3	.05	0	.04	.12	.04	.85
4	.28	.14	0	0	0	.12
5	0	.04	.02	0	.04	0
6	0	.01	.52	0	.08	.37
7	0	.01	.07	0	0	0
8	.05	.01	.19	0	.02	.34
9	.23	0	.52	0	1.31	.77
10	.11	0	.35	0	1.08	.56
11	0	0	.58	0	.05	.88
12	0	0	0	0	.01	2.86
13	.59	.97	.04	.27	.19	1.06
14	.12	.35	.07	.04	.46	.26
15	.14	.10	.02	0	.26	*
16	.36	0	.24	0	.01	*
17	.26	.04	0	0	0	5.81
18	0	.83	.13	.08	0	.29
19	.22	0	0	0	.23	.91
20	.14	0	.14	.08	0	.08
21	0	.18	.05	.04	1.09	.55
22	.07	.06	0	.27	.80	1.50
23	.01	0	0	.66	0	1.01
24	.49	.05	0	.23	0	.43
25	.08	0	0	.07	0	.71
26	0	0	.20	0	0	0
27	0	0	.04	.02	0	.67
28	0	.14	.07	0	.20	0
29	0		.10	.01	.12	1.66
30	0		.10	0	0	1.56
31	.19		0		.40	
Total	3.39	3.18	4.07	2.39	6.44	24.07

* Included in following total.
Tipping bucket readings, transmitted via satellite, used April 11-22.

Streamflow Records

Gaging stations

Table 24. Streamflow records for Nanpil River (16897600)

Location: Lat 6°55'09" N., long 158°11'59" E., on left bank 0.1 mi upstream from diversion dam, 1.3 mi upstream from Kiepw River, and 1.4 mi northeast of Mount Temwetemwensikir.

Drainage area: 3.00 mi^2.

Period of record: March 1970 to September 1982.

Gage: Water-stage recorder. Altitude of gage is 370 ft (from topographic map).

Remarks: Records fair. No diversion above station.

Average discharge: 12 years, 47.1 ft^3/s, 34,120 acre-ft/yr.

Extremes for period of record: Maximum discharge, 8,820 ft^3/s Aug. 4, 1976 (gage height, 9.68 ft), from rating curve extended above 168 ft^3/s on basis of slope-area measurement at gage height 9.68 ft; minimum, 1.6 ft^3/s Nov. 17-23, 1972, Feb. 6, Oct. 21, 22, 1973.

A. Discharge measurements, in cubic feet per second, made outside the period of continuous discharge record ending September 1982

Date	Discharge	Date	Discharge
Oct. 30, 1982	4.7	May 24, 1983	5.4
Dec. 1, 1982	2.9	June 7, 1983	5.1
Dec. 15, 1982	12	June 21, 1983	78
Jan. 5, 1983	6.4	July 6, 1983	131
Jan. 20, 1983	4.3	Aug. 17, 1983	17
Feb. 3, 1983	1.9	Aug. 30, 1983	13
Feb. 15, 1983	5.9	Sept. 14, 1983	14
Mar. 1, 1983	1.8	Sept. 26, 1983	47
Apr. 12, 1983	.65	Oct. 13, 1983	8.2
Apr. 26, 1983	1.6		

Table 24. Streamflow records for Nanpil River--Continued

B. Annual maximum discharge (*) and peak discharges above base (3,500 ft^3/s)

(Discharge in cubic feet per second, gage height in feet)

Date	Time	Discharge	Gage height
Sept. 4, 1970 -------	1100	*3,060	6.85
Apr. 27, 1971 -------	1100	*3,920	7.40
July 22, 1971 -------	0930	3,660	7.24
Oct. 2, 1971 --------	1930	4,320	7.65
Jan. 30, 1972 -------	0830	3,820	7.34
May 4, 1972 ---------	2230	3,890	7.38
May 18, 1972 --------	a/2100	4,580	1/7.80
May 31, 1972 --------	a/1300	*5,000	1/8.04
Sept. 14, 1972 ------	0630	4,680	7.86
Apr. 27, 1973 -------	0730	*3,920	7.40
Nov. 6, 1973 --------	0600	5,000	8.04
July 11, 1974 -------	0530	*5,220	8.16
Oct. 12, 1974 -------	1930	*4,460	7.73
Aug. 2, 1976 --------	0300	4,020	7.46
Aug. 4, 1976 --------	1330	*8,820	9.68
Sept. 8, 1976 -------	1100	3,680	7.99
Oct. 14, 1976 -------	0700	*2,500	7.36
Jan. 24, 1978 -------	1745	*3,040	7.67
Feb. 22, 1979 -------	1615	4,520	8.37
Aug. 1, 1979 --------	0630	*5,130	8.61
Aug. 13, 1979 -------	a/0500	a/3,500	--
Dec. 2, 1979 --------	1700	4,500	8.36
Jan. 9, 1980 --------	1245	3,600	7.94
Feb. 4, 1980 --------	1930	3,660	7.92
May 8, 1980 ---------	1015	3,800	8.05
May 12, 1980 --------	0545	*4,700	8.44
Aug. 7, 1981 --------	a/0600	a/*4,000	--
May 8, 1982 ---------	a/0600	*5,850	a/8.85

a/ About.

1/ From floodmark in well.

Table 24. Streamflow records for Nanpil River--Continued

C. Annual minimum discharge in cubic feet per second

Water year	Date	Discharge
1970[1/] ----	Mar. 3-6, 1970 ----------	3.8
1971 ------	Sept. 14, 15, 1971 ----------	3.2
1972 ------	Dec. 22, 1971 ----------	4.9
1973 ------	Nov. 17-23, 1972, Feb. 6, 1973 -----	1.6
1974 ------	Oct. 21, 22, 1973 ----------	1.6
1975 ------	Feb. 5, 6, 1975 ----------	2.0
1976 ------	Jan. 13, 1976 ----------	3.4
1977 ------	Mar. 2, 3, 1977 ----------	2.0
1978 ------	Mar. 22, 23, 1978 ----------	2.9
1979 ------	Feb. 11-13, 1979 ----------	3.6
1980 ------	May 12, 1980 ----------	3.8
1981 ------	Dec. 8, 9, 1980, Mar. 17-20, 1981 --	4.6
1982 ------	Apr. 13, 16, 17, 1982 ----------	2.2

[1/] March to September 1970.

Table 24. Streamflow records for Nanpil River--Continued

D. Monthly and annual discharges, in cubic feet per second

	Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Water year
1970														
Total				692.7	1,395.7	1,367.8	1,585	1,137.2	1,673.2	1,373				--
	--										1,606	1,178	1,518	
Mean	--			22.3	46.5	44.1	52.8	36.7	54.0	45.8	51.8	39.3	49.0	--
Max.	--			273	179	191	150	163	181	198	120	106	164	--
Min.	--			4.3	4.3	8.8	11	6.0	9.2	10	14	12	14	--
1971														
Total		1,374.9	1,190	1,854	1,787	1,973	1,641	1,888	1,432.4	937.1				18,379.4
	17,463.3										1,796	870.6	719.3	
Mean	47.8	44.4	42.5	59.8	59.6	63.6	54.7	60.9	46.2	31.2	57.9	29.0	23.2	50.4
Max.	348	250	214	304	190	254	239	348	163	101	294	86	94	348
Min.	3.5	5.7	12	11	11	12	11	12	8.4	3.5	13	7.2	5.2	3.5
1972														
Total		1,375.8	1,167.0	1,635.3	2,312.7	3,631.0	1,175.9	4,574	1,490	5,178.1				25,925.7
	24,993.3										898.9	426.1	1,128.5	
Mean	68.3	44.4	40.2	52.8	77.1	117	39.2	148	48.1	173	29.0	14.2	36.4	70.8
Max.	1,080	317	133	211	300	700	215	928	193	1,080	134	125	203	1,080
Min.	1.6	8.4	8.8	5.7	7.2	9.0	6.4	16	11	6.4	4.0	1.6	6.9	5.2
1973														
Total		310.9	601.3	1,114.7	3,057.8	1,727	2,170.7	962.7	1,572.6	1,194				15,165.2
	17,397.6										1,679.0	1,131.6	1,875.3	
Mean	47.7	10.0	21.5	36.0	102	55.7	72.4	31.1	50.7	39.8	54.2	37.7	60.5	41.5
Max.	554	29	171	288	477	299	554	150	212	193	251	391	202	554
Min.	1.6	2.8	1.6	5.8	2.8	14	9.7	9.7	8.3	10	2.2	7.5	5.2	1.6
1974														
Total		1,191.7	1,811.1	1,925.4	2,184	1,382	1,605	1,884	1,947.1	1,012.4				19,628.6
	20,488.8										2,215.1	1,630	1,701	
Mean	56.1	38.4	64.7	62.1	72.8	44.6	53.5	60.8	62.8	33.7	71.5	54.3	54.9	53.8
Max.	400	198	400	260	280	130	266	370	370	185	331	186	324	400
Min.	2.8	2.8	7.1	8.6	21	14	13	12	8.3	9.0	8.1	10	11	2.2
1975														
Total		768.0	546.3	1,606.4	1,389.8	1,770	1,738	1,446	1,022.5	1,280.9				17,114.0
	18,089.4										1,906	1,634.5	2,981	
Mean	49.6	24.8	19.5	51.8	46.3	57.1	57.9	46.6	33.0	42.7	61.5	54.5	96.2	46.9
Max.	503	211	283	381	395	187	194	198	140	142	299	342	503	395
Min.	2.2	3.3	2.2	5.5	4.0	11	10	11	5.2	4.9	11	8.0	15	2.2

Table 24. Streamflow records for Nanpil River--Continued

D. Monthly and annual discharges, in cubic feet per second--Continued

	Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Water year
1976														
Total		407.3	1,322.2	3,182.6	1,861.1	2,280.0	1,829.5	1,578.9	3,176	1,299.6				23,458.7
	21,344.8										1,396.8	1,541	1,469.4	
Mean	58.3	13.1	45.6	103	62.0	73.5	61.0	50.9	102	43.3	45.1	51.4	47.4	64.1
Max.	698	87	342	386	338	240	280	280	698	511	275	168	260	698
Min.	3.0	3.4	5.2	5.2	8.1	9.0	7.8	5.9	12	4.6	3.0	14	6.0	3.4
1977														
Total		564.3	122.8	988.2	1,460.7	1,441.0	967.3	1,100.4	1,339	762.6				13,153.5
	12,218.7										1,491.7	1,559	421.7	
Mean	33.5	18.2	4.39	31.9	48.7	46.5	32.2	35.5	43.2	25.4	48.1	52.0	13.6	36.0
Max.	433	116	11	189	433	211	129	77	115	85	244	240	64	433
Min.	2.2	3.4	2.3	2.2	3.9	7.2	7.9	9.4	13	7.9	8.3	11	3.6	2.2
1978														
Total		1,388.6	931.9	515.8	1,443.5	1,065	1,360	863.9	1,218.9	822.5				13,082.5
	13,587.9										1,327.8	1,417	1,233	
Mean	37.2	44.8	33.3	16.6	48.1	34.4	45.3	27.9	39.3	27.4	42.8	47.2	39.8	35.8
Max.	333	333	134	107	138	102	209	136	165	80	195	158	162	333
Min.	3.4	6.5	7.2	3.4	4.4	10	10	7.5	7.5	7.5	9.8	10	11	3.4
1979														
Total		1,061.7	790.9	743.8	2,137.7	1,444	1,571	1,082.3	1,937	1,130.0				15,876.2
	15,872.0										1,312.3	1,117	1,544.3	
Mean	43.5	34.2	28.2	24.0	71.3	46.6	52.4	34.9	62.5	37.7	42.3	37.2	49.8	43.5
Max.	413	127	247	79	251	136	153	106	400	152	130	87	413	400
Min.	3.9	7.0	3.9	4.2	8.7	12	23	8.3	15	7.6	6.1	13	4.8	3.9
1980														
Total		1,556	1,387.1	698.0	1,487.1	2,793	2,087	1,141	1,131	1,254				17,507.8
	15,859.4										1,200.8	407.2	717.2	
Mean	43.3	50.2	47.8	22.5	49.6	90.1	69.6	36.8	36.5	41.8	38.7	13.6	23.1	47.8
Max.	350	187	320	113	350	330	315	147	131	181	158	31	118	413
Min.	4.2	10	7.0	5.1	4.2	17	13	12	14	13	9.2	5.6	5.1	4.2
1981														
Total		1,285.6	1,134	623.5	1,133.7	1,062.4	1,254.4	1,049.2	1,142	832.0				11,842.0
	12,691.3										1,027	1,025.2	1,122.3	
Mean	34.8	41.5	40.5	20.1	37.8	34.3	41.8	33.8	36.8	27.7	33.1	34.2	36.2	32.4
Max.	280	197	170	97	159	117	156	107	280	75	95	129	157	280
Min.	5.1	9.6	10	5.1	8.3	8.0	9.4	7.2	10	8.0	12	8.0	8.3	5.1
1982														
Total		1,226.7	741.0	1,011.2	1,091.9	1,371.5	1,818	2,150	1,437.6	1,529.2				15,551.6
Mean		39.6	26.5	32.6	36.4	44.2	60.6	69.4	46.4	51.0				42.6
Max.		160	100	121	134	200	150	250	233	330				330
Min.		8.0	8.0	5.0	2.6	6.0	17	12	9.6	5.6				2.6

Table 25. Streamflow records for Lewi River (16897900)
(Lui River)

Location: Lat 6°55'32" N., long 158°12'18" E., on right bank at road and pipeline crossing, 300 ft upstream from right-bank tributary, and 2.4 mi upstream from mouth.

Drainage area: 0.46 mi^2.

Period of record: March 1970 to September 1982.

Gage: Water-stage recorder. Altitude of gage is 290 ft (from topographic map).

Remarks: Records good to fair. No diversion above station.

Average discharge: 12 years, 5.64 ft^3/s, 4,090 acre-ft/yr.

Extremes for period of record: Maximum discharge, 1,190 ft^3/s Aug. 4, 1976 (gage height, 5.92 ft), from rating curve extended above 37 ft^3/s on basis of slope-area measurement at gage height 5.92 ft; minimum, 0.13 ft^3/s Feb. 2-4, 1973.

A. Discharge measurements, in cubic feet per second, made outside the period of continuous discharge record ending September 1982

Date	Discharge	Date	Discharge
Feb. 19, 1970	2.8	Apr. 26, 1983	0.12
Feb. 26, 1970	.48	May 24, 1983	.13
Oct. 29, 1982	.59	June 7, 1983	.30
Dec. 1, 1982	.39	June 21, 1983	2.2
Dec. 15, 1982	.74	July 6, 1983	11
Jan. 5, 1983	.66	Aug. 17, 1983	2.6
Jan. 20, 1983	.44	Aug. 30, 1983	3.0
Feb. 3, 1983	.19	Sept. 14, 1983	1.2
Feb. 15, 1983	.23	Sept. 26, 1983	5.3
Mar. 2, 1983	.20	Oct. 13, 1983	.68
Apr. 12, 1983	.03		

Table 25. Streamflow records for Lewi River--Continued

B. Annual maximum discharge (*) and peak discharges above base (600 ft^3/s)

(Discharge in cubic feet per second, gage height in feet)

Date	Time	Discharge	Gage height
July 16, 1970 -------	0730	* 298	3.44
July 17, 1971 -------	1600	* 806	5.24
July 22, 1971 -------	0930	672	4.84
Oct. 2, 1971 --------	2100	684	4.88
Apr. 27, 1972 -------	1530	621	4.67
May 4, 1972 ---------	1700	* 970	5.64
May 31, 1972 --------	1330	790	5.20
Sept. 14, 1972 ------	0600	612	4.64
June 14, 1973 -------	0900	* 516	4.32
Oct. 29, 1973 -------	1230	642	4.74
July 11, 1974 -------	0500	* 766	5.13
Nov. 15, 1974 -------	1800	* 422	3.97
Dec. 17, 1975 -------	1200	839	5.12
Aug. 4, 1976 --------	1330	*1,190	5.92
Sept. 8, 1976 -------	1300	767	4.93
Oct. 19, 1976 -------	1200	* 668	4.65
Dec. 16, 1976 -------	1200	644	4.58
Jan. 24, 1978 -------	1715	* 654	4.61
Aug. 1, 1979 --------	0600	*1,180	5.91
Aug. 13, 1979 -------	0500	665	4.64
Dec. 2, 1979 --------	1900	644	4.58
May 8, 1980 ---------	1015	* 692	4.74
May 26, 1980 --------	1100	612	4.50
Aug. 7, 1981 --------	0530	* 570	4.35
May 4, 1982 ---------	2030	720	4.80
May 8, 1982 ---------	a/ 0600	*1,080	5.70
July 1, 1982 --------	1830	950	5.40

a/ About.

Table 25. Streamflow records for Lewi River--Continued

C. Annual minimum discharge in cubic feet per second

Water year	Date	Discharge
1970[1/]	Mar. 30 to Apr. 1, 1970	0.26
1971	Jan. 24, 25, 1971	.42
1972	Jan. 23, 1972	.47
1973	Feb. 2-4, 1973	.13
1974	Jan. 16, 1974	.35
1975	Jan. 30, Feb. 10-22, 1975	.18
1976	Jan. 23-26, Feb. 8, 9, 1976	.38
1977	Mar. 22-25, Apr. 15, 1977	.21
1978	Mar. 6, 7, 30, 31, 1978	.34
1979	Jan. 8, 9, 1979	.43
1980	Mar. 30, 31, 1980	.38
1981	Mar. 20, 1981	[a/].30
1982	Mar. 2, 1982	.67
1983	Apr. 18, 19, 1983	.02

[1/] March to September 1970.

[a/] About.

Table 25. Streamflow records for Lewi River--Continued

D. Monthly and annual discharges, in cubic feet per second

	Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Water year
1970														
Total				48.93	126.51	152.54	203.1	121.3	196.7	163.10				--
	--										204.0	119.7	181.4	
Mean	--			1.58	4.22	4.92	6.77	3.91	6.35	5.44	6.58	3.99	5.85	--
Max.	--			24	21	22	20	24	20	20	17	10	26	--
Min.	--			.30	.34	.62	1.2	1.0	1.2	.80	2.3	1.5	1.9	--
1971														
Total		149.72	109.64	248.3	185.5	237.4	210.9	254.3	161.1	97.50				2,159.46
	2,015.91										201.4	99.22	60.93	
Mean	5.52	4.83	3.92	8.01	6.18	7.66	7.03	8.20	5.20	3.25	6.50	3.31	1.97	5.92
Max.	67	30	14	34	29	37	24	67	20	12	36	10	9.2	67
Min.	.51	.51	.78	1.2	1.0	1.1	1.5	1.5	1.1	.55	1.7	.62	.70	.51
1972														
Total		141.06	135.82	145.82	195.95	446.1	121.92	386.5	138.15	385.0				2,015.91
	2,286.09										82.57	39.41	67.79	
Mean	6.25	4.55	4.68	4.70	6.53	14.4	4.06	12.5	4.46	12.8	2.66	1.31	2.19	5.52
Max.	138	34	22	24	36	138	14	73	13	77	13	12	14	67
Min.	.18	.55	.78	.70	.85	1.2	.85	1.4	.85	1.2	.41	.18	.23	.51
1973														
Total		13.10	21.62	74.95	272.47	222.9	216.5	73.24	164.51	149.9				1,398.96
	1,732.65										231.66	119.23	172.57	
Mean	4.75	.42	.77	2.42	9.08	7.19	7.22	2.36	5.31	5.00	7.47	3.97	5.57	3.83
Max.	58	1.2	3.8	21	41	31	58	13	23	21	49	33	16	58
Min.	.13	.18	.13	.29	.29	1.7	1.8	.66	.60	1.3	.66	.53	.47	.13
1974														
Total		93.17	180.8	203.61	206.3	165.56	228.2	258.6	192.98	133.41				2,186.09
	2,223.89										194.96	202.7	163.6	
Mean	6.09	3.01	6.46	6.57	6.88	5.34	7.61	8.34	6.23	4.45	6.29	6.76	5.28	5.99
Max.	58	13	34	37	29	17	23	58	28	33	24	35	32	58
Min.	.41	.41	1.0	.73	2.3	.80	2.4	2.3	.96	.73	.96	1.2	1.1	.41
1975														
Total		57.59	23.85	94.37	123.11	182.0	203.6	180.4	107.50	126.74				1,660.42
	1,930.46										285.8	197.4	348.1	
Mean	5.29	1.86	.85	3.04	4.10	5.87	6.79	5.82	3.47	4.22	9.22	6.58	11.2	4.55
Max.	51	15	9.1	27	46	23	18	27	11	11	51	43	50	46
Min.	.18	.18	.18	.47	.18	1.4	1.3	1.3	.60	.66	2.2	1.2	2.3	.18

Table 25. Streamflow records for Lewi River--Continued

D. Monthly and annual discharges, in cubic feet per second--Continued

	Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Water year
1976														
Total		42.98	111.66	308.74	232.2	254.4	191.2	144.61	358.5	223.34				2,698.93
	2,514.85										198.31	244.1	204.81	
Mean	6.87	1.39	3.85	9.96	7.74	8.21	6.37	4.66	11.6	7.44	6.40	8.14	6.61	7.37
Max.	93	6.2	26	44	37	27	23	32	69	93	45	25	49	93
Min.	.38	.43	.38	.81	2.4	1.8	1.4	.65	2.3	.73	.43	2.2	.73	.38
1977														
Total		42.78	11.15	92.88	218.56	215.99	115.87	155.6	151.5	88.13				1,739.68
	1,548.45										198.79	208.8	48.40	
Mean	4.24	1.38	.40	3.00	7.29	6.97	3.86	5.02	4.89	2.94	6.41	6.96	1.56	4.77
Max.	87	7.5	.54	20	87	44	16	13	24	14	35	29	13	87
Min.	.21	.30	.29	.21	.21	.99	.97	1.4	1.1	.81	.66	1.5	.38	.21
1978														
Total		197.79	94.98	52.43	218.67	139.3	213.9	123.17	134.95	68.64				1,699.82
	1,719.70										176.67	168.9	130.3	
Mean	4.71	6.38	3.39	1.69	7.29	4.49	7.13	3.97	4.35	2.29	5.70	5.63	4.20	4.66
Max.	75	75	14	11	23	20	46	21	22	7.3	32	22	25	75
Min.	.38	.43	.66	.38	.42	1.0	1.4	.97	.89	.58	.97	1.8	1.1	.38
1979														
Total		109.34	86.74	88.16	302.61	212.3	230.8	171.0	334.77	54.32				2,065.91
	2,199.16										194.10	189.0	226.02	
Mean	6.03	3.53	3.10	2.84	10.1	6.85	7.69	5.52	10.8	1.81	6.26	6.30	7.29	5.66
Max.	103	16	25	17	49	30	27	20	103	10	19	17	82	103
Min.	.48	.48	.54	.54	.81	1.6	2.3	1.1	.97	.48	.81	2.2	.72	.48
1980														
Total		182.6	197.27	67.31	142.73	445.5	280.0	172.4	125.4	120.8				2,343.13
	2,025.57										121.7	77.47	92.69	
Mean	5.53	5.89	6.80	2.17	4.76	14.4	9.33	5.56	4.05	4.03	3.93	2.58	2.99	6.40
Max.	68	33	64	11	21	68	59	17	14	8.8	7.0	9.8	20	82
Min.	.43	1.0	.66	.43	.60	2.1	1.6	2.0	1.3	1.2	1.2	.97	.66	.43
1981														
Total		115.18	138.25	57.95	144.38	141.18	165.32	130.1	151.9	129.6				1,465.72
	1,670.46										153.9	164.4	178.3	
Mean	4.58	3.72	4.94	1.87	4.81	4.55	5.51	4.20	4.90	4.32	4.96	5.47	5.75	4.02
Max.	43	17	33	8.8	15	18	25	15	43	12	15	23	32	43
Min.	.35	.81	.81	.35	.92	.92	.92	1.2	1.3	1.2	1.4	1.5	1.5	.35
1982														
Total		209.3	116.0	111.23	173.42	287.6	346.8	452.4	274.89	382.24				2,850.48
Mean		6.75	4.14	3.59	5.78	9.28	11.6	14.6	8.89	12.7				7.81
Max.		25	16	14	28	63	35	77	57	124				124
Min.		1.4	1.0	.67	.93	1.5	3.0	1.1	.89	.97				.67

Table 26. Streamflow records for Lewi River at mouth (16898200)
(Lui River at mouth)

Location: Lat 6°57'04" N., long 158°12'39" E., on right bank 0.3 mi upstream from bridge at mouth and 0.4 mi southwest of Ponape State Hospital.

Drainage area: 2.08 mi^2.

Period of record: March 1970 to December 1981 (discontinued).

Gage: Water-stage recorder. Altitude of gage is 30 ft (from topographic map).

Remarks: Records good. During dry periods in 1974-77, water was diverted from dam, 500 ft upstream, to Dauen Neu River pump-station pool for domestic use in Kolonia.

Average discharge: 11 years, 25.5 ft^3/s, 18,470 acre-ft/yr.

Extremes for period of record: Maximum discharge, 6,360 ft^3/s Aug. 4, 1976 (gage height, 8.91 ft), from rating curve extended above 288 ft^3/s on basis of slope-area measurement at gage height 8.91 ft; minimum, 0.26 ft^3/s Jan. 20, 1973, during short regulation of flow.

A. Discharge measurements, in cubic feet per second, made outside the period of continuous discharge record

Date	Discharge
Feb. 14, 1970	4.8
Mar. 4, 1982	4.8
Mar. 9, 1982	9.5
Oct. 29, 1982	6.0
Mar. 2, 1983	2.4

Table 26. Streamflow records for Lewi River at mouth--Continued

B. Annual maximum discharge (*) and peak discharges above base (2,000 ft^3/s)

(Discharge in cubic feet per second, gage height in feet)

Date	Time	Discharge	Gage height
June 17, 1970 -------	0200	* 804	4.14
Mar. 15, 1971 -------	2230	2,090	5.74
Apr. 27, 1971 -------	1200	2,010	5.66
July 17, 1971 -------	1530	*4,790	7.92
Oct. 2, 1971 --------	2000	2,000	5.65
Apr. 27, 1972 -------	1600	2,610	6.24
May 4, 1972 ---------	2300	*2,720	6.34
May 31, 1972 --------	1300	2,330	5.98
Sept. 14, 1972 ------	0600	2,110	5.76
June 14, 1973 -------	0930	*2,810	6.42
Oct. 29, 1973 -------	1300	2,480	6.12
May 11, 1974 --------	1300	*2,570	6.20
July 11, 1974 -------	0500	2,390	6.04
Nov. 15, 1974 -------	1845	*1,100	4.60
Dec. 17, 1975 -------	1200	2,280	5.93
Aug. 4, 1976 --------	1400	*6,360	8.91
Sept. 8, 1976 -------	1230	2,600	6.23
Nov. 21, 1976 -------	0430	*2,060	5.71
Jan. 24, 1978 -------	1830	*1,670	5.30
Aug. 1, 1979 --------	0645	*4,840	7.95
Aug. 13, 1979 -------	0600	3,150	6.70
Dec. 2, 1979 --------	1800	*2,260	5.91
May 8, 1980 ---------	1100	2,110	5.76
Aug. 7, 1981 --------	a/0600	a/*2,500	--

a/ About.

Table 26. Streamflow records for Lewi River at mouth--Continued

C. Annual minimum discharge in cubic feet per second

Water year	Date	Discharge
	Without regulation	
1970[1/]	Mar. 6, 1970	3.0
1971	Feb. 8, 1971	4.5
1972	Dec. 22, 1971	4.1
1973	Feb. 4, 5, 1973	1.1
1974	Jan. 17, 1974	3.8
1975	Feb. 24, 1975	[2/].38
1976	Jan. 25, 26, 1976	3.0
1977	Mar. 1, 6, 1977	.94
1978	Mar. 26, 27, 1978	2.6
1979	Feb. 11-13, 1979	2.7
1980	Mar. 30, 31, 1980	3.6
1981	Mar. 19, 20, 1981	2.3
	During short regulation (gate in dam closed)	
1973	Jan. 20, 1973	.26
1974	Jan. 20, 1974	.62
1977	Jan. 9, 1977	.55
1978	Mar. 10, 1978	1.6
1979	Sept. 22, 1979	2.0
1980	Apr. 4, 1980	1.1
1981	Dec. 13, 1980	.78

[1/] March to September 1970.

[2/] Part of flow diverted to Dauen Neu River.

Table 26. Streamflow records for Lewi River at mouth--Continued

D. Monthly and annual discharges, in cubic feet per second

	Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Water year
1970														
Total				279.1	567.8	685.2	936.3	583.8	878.1	762.9				--
	--										1,221	664.1	1,021	
Mean	--			9.00	18.9	22.1	31.2	18.8	28.3	25.4	39.4	22.1	32.9	--
Max.	--			114	100	94	113	138	117	105	123	62	200	--
Min.	--			3.2	3.6	5.3	9.5	5.6	8.7	6.6	12	9.3	12	--
1971														
Total		1,016.2	444.1	1,468.8	991.4	1,285.9	1,167	1,326	868.8	452.9				11,927.2
	10,838.7										1,046	505.7	265.9	
Mean	29.7	32.8	15.9	47.4	33.0	41.5	38.9	42.8	28.0	15.1	33.7	16.9	8.58	32.7
Max.	374	287	51	280	227	245	170	374	112	54	204	46	24	374
Min.	4.2	5.0	5.0	9.3	7.4	7.4	12	12	8.2	898	11	6.3	4.2	5.0
1972														
Total		635.5	647.7	629.1	900.9	1,963.3	560.5	1,834	677.9	1,760.8				11,427.3
	10,469.0										395.8	188.7	274.8	
Mean	28.6	20.5	22.3	20.3	30.3	63.3	18.7	59.2	21.9	58.7	12.8	6.29	8.86	31.2
Max.	427	122	111	76	209	330	73	368	73	427	56	43	55	427
Min.	2.6	4.9	5.7	5.5	6.5	8.7	6.7	10	6.3	7.3	4.0	2.6	3.2	4.2
1973														
Total		82.3	62.9	238.3	1,076.04	963.0	995.6	373.7	644.8	669.3				5,965.24
	7,534.24										1,033.2	640.8	754.3	
Mean	20.6	2.65	2.25	7.69	35.9	31.1	33.2	12.1	20.8	22.3	33.3	21.4	24.3	16.3
Max.	289	4.2	8.0	58	176	148	289	54	98	90	193	188	67	289
Min.	.70	1.3	1.0	1.1	.70	9.4	9.6	6.3	3.5	7.5	4.3	6.2	4.9	.70
1974														
Total		430.2	854.8	973.8	1,045	788.0	1,039	1,140	894.0	466.1				10,059.2
	10,375.7										869.4	1,078.8	796.6	
Mean	28.4	13.9	30.5	31.4	34.8	25.4	34.6	36.8	28.8	15.5	28.0	36.0	25.7	27.6
Max.	230	52	240	201	209	80	116	230	153	80	94	156	189	230
Min.	4.0	4.0	7.6	7.8	12	7.6	11	12	6.2	4.7	6.0	9.8	6.1	4.0
1975														
Total		316.4	87.78	627.9	590.4	845.6	904.1	869.8	420.2	478.1				7,885.08
	8,750.58										1,223	851.3	1,536	
Mean	24.0	10.2	3.14	20.3	19.7	27.3	30.1	28.1	13.6	15.9	39.5	28.4	49.5	21.6
Max.	177	73	25	143	177	145	77	135	40	50	187	153	229	177
Min.	.46	1.8	.46	3.5	1.5	9.6	8.2	6.3	4.9	4.3	13	9.3	12	.46

Table 26. Streamflow records for Lewi River at mouth--Continued

D. Monthly and annual discharges, in cubic feet per second--Continued

	Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Water year
1976														
Total		237.0	476.4	1,281.0	1,034	1,268	1,041	673.2	2,002	1,147.2				12,770.1
	12,095.5										878.8	1,235	821.9	
Mean	33.0	7.65	16.4	41.3	34.5	40.9	34.7	21.7	64.6	38.2	28.3	41.2	26.5	34.9
Max.	710	26	106	226	196	160	136	119	710	446	201	210	161	710
Min.	3.2	3.2	4.0	5.3	12	10	10	6.2	14	5.3	3.8	13	5.0	3.2
1977														
Total		171.2	50.6	301.4	898.1	1,062.0	545.2	672.5	685.0	440.7				7,762.4
	6,780.6										830.2	846	277.7	
Mean	18.6	5.52	1.81	9.72	29.9	34.3	18.2	21.7	22.1	14.7	26.8	28.2	8.96	21.3
Max.	349	19	33	67	349	201	51	54	102	51	159	117	58	349
Min.	1.1	2.5	1.3	1.1	2.1	8.0	7.6	8.0	8.1	5.5	5.1	10	3.2	1.1
1978														
Total		816.5	343.9	210.7	950.1	528.4	863.9	560.9	567.2	374.0				7,169.5
	7,104.0										667.9	645.1	575.4	
Mean	19.5	26.3	12.3	6.80	31.7	17.0	28.8	18.1	18.3	12.5	21.5	21.5	18.6	19.6
Max.	360	360	38	50	100	56	149	57	86	28	79	78	106	360
Min.	2.7	3.1	4.8	2.7	3.4	6.7	8.1	7.3	6.8	5.6	7.9	7.3	6.2	2.7
1979														
Total		344.8	255.0	447.5	1,273.4	904	1,033	732.3	1,426.5	218.2				8,523.1
	9,301.2										760.4	899	1,007.1	
Mean	25.5	11.1	9.11	14.4	42.4	29.2	34.4	23.6	46.0	7.27	24.5	30.0	32.5	23.4
Max.	394	40	45	64	232	99	127	91	394	25	81	82	338	394
Min.	2.8	3.6	2.8	4.1	5.4	10	12	8.2	7.3	3.2	6.2	14	5.8	2.8
1980														
Total		759.2	923.3	289.5	618.6	2,054	1,308	870	646	644.8				10,779.9
	9,429.4										658.9	310.1	347.0	
Mean	25.8	24.5	31.8	9.34	20.6	66.3	43.6	28.1	20.8	21.5	21.3	10.3	11.2	29.5
Max.	351	105	323	31	94	351	291	91	61	48	67	26	48	351
Min.	3.8	6.9	5.6	3.8	4.2	20	12	12	11	8.8	7.0	5.6	3.8	3.8
1981														
Total		606.0	646.1	276.6	563.8	1,071.4	1,015.0	817.8	953.6	835.0				8,101.3
	9,058.9										767	703.5	803.1	
Mean	24.8	19.5	23.1	8.92	18.8	34.6	33.8	26.4	30.8	27.8	24.7	23.4	25.9	22.2
Max.	250	112	127	40	57	119	168	90	250	74	90	111	112	250
Min.	2.5	5.4	6.2	2.5	4.4	5.9	9.0	8.0	8.6	8.0	10	6.3	6.2	2.5

Table 27. Streamflow records for Dauen Neu River (16898300)
(Tawannu River)

Location: Lat 6°56'47" N., long 158°11'55" E., on left bank 0.4 mi southwest of P.I.C.S. (Ponape Island Central School) and 1.7 mi upstream from bridge at mouth.

Drainage area: 0.75 mi^2.

Period of record: March 1970 to December 1974 (discontinued).

Gage: Water-stage recorder and concrete control. Altitude of gage is 150 ft (from topographic map).

Remarks: Records fair. Up to 360,000 gallons per day is diverted 100 ft above station for domestic use in Kolonia. During dry periods in 1974-75, water was pumped from Lewi River to the gage pool to augment the water supply.

Extremes for period of record: Maximum discharge, 1,550 ft^3/s July 17, 1971 (gage height, 5.58 ft), from rating curve extended above 76 ft^3/s; no flow for many days in January and February 1973.

A. Discharge measurements, in cubic feet per second, made outside the period of continuous discharge record

Date	Discharge	Date	Discharge
Feb. 14, 1970	0.78	June 3, 1975	4.9
Feb. 22, 1970	1.9	June 17, 1975	5.8
Jan. 22, 1975	.67	June 30, 1975	10
Feb. 4, 1975	.10	July 18, 1975	14
Feb. 18, 1975	.77	Nov. 17, 1975	7.7
Mar. 4, 1975	3.7	Jan. 15, 1976	3.9
Mar. 18, 1975	5.8	Feb. 3, 1976	6.2
Apr. 3, 1975	.28	Mar. 2, 1976	6.6
Apr. 15, 1975	2.5	Mar. 9, 1976	4.2
Apr. 29, 1975	5.8	Apr. 9, 1981	4.7
May 13, 1975	3.5	Oct. 21, 1981	14

Table 27. Streamflow records for Dauen Neu River--Continued

B. Annual maximum discharge (*) and peak discharges above base (600 ft^3/s)

(Discharge in cubic feet per second, gage height in feet)

Date	Time	Discharge	Gage height
Aug. 21, 1970 -------	1400	* 357	2.99
Mar. 15, 1971 -------	2300	724	4.01
Apr. 27, 1971 -------	0900	720	4.00
July 17, 1971 -------	1530	*1,550	5.58
Apr. 27, 1972 -------	1600	*1,090	4.78
May 4, 1972 ---------	2300	1,080	4.75
May 18, 1972 --------	2100	a/ 620	--
May 31, 1972 --------	1300	a/ 600	--
July 28, 1972 -------	1030	a/ 700	--
June 14, 1973 -------	0900	a/ *1,000	a/ 4.5
Oct. 29, 1973 -------	1300	a/ 640	a/ 3.8
Mar. 11, 1974 -------	1200	*1,060	4.72
July 11, 1974 -------	0630	a/ 950	a/ 4.5

a/ About.

C. Annual minimum discharge in cubic feet per second

Water year	Date	Discharge
1970 1/ ----	Apr. 1, 1970 ----------	0.10
1971 ------	Jan. 30, 1971 ----------	.81
1972 ------	Dec. 22-25, 1971 ----------	.12
1973 ------	Many days in January and February 1973 ----------	0
1974 ------	Oct. 21, 1973 ----------	.18

1/ March to September 1970.

Table 27. Streamflow records for Dauen Neu River--Continued

D. Monthly and annual discharges, in cubic feet per second

	Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Water year
1970														
Total				86.16	200.70	277.7	354.3	208.6	348.6	262.1				--
	--										459.5	252.0	364.5	
Mean	--			2.78	6.69	8.96	11.8	6.73	11.2	8.74	14.8	8.40	11.8	--
Max.	--			39	40	34	36	47	38	26	47	28	65	--
Min.	--			.30	.15	1.8	3.8	1.5	2.6	2.3	5.1	3.1	3.8	--
1971														
Total		344.26	148.7	496.9	368.9	452.2	432.3	564.9	277.3	162.9				4,324.36
	3,928.35										401.5	206.0	72.49	
Mean	10.8	11.1	5.31	16.0	12.3	14.6	14.4	18.2	8.95	5.43	13.0	6.87	2.34	11.8
Max.	233	82	13	70	71	65	39	233	35	19	67	15	6.4	233
Min.	.24	.92	1.2	3.3	3.6	2.9	5.6	4.9	2.7	1.2	5.6	2.5	.24	.92
1972														
Total		137.76	185.5	213.8	321.2	783.9	169.2	788.3	263.6	642.5				4,221.75
	3,816.58										134.11	64.41	76.30	
Mean	10.4	5.61	6.40	6.90	10.7	25.3	5.64	25.4	8.50	21.4	4.33	2.15	2.46	11.5
Max.	162	29	36	28	102	121	30	161	32	162	19	15	20	162
Min.	.30	.60	1.2	1.4	2.0	2.5	1.9	3.5	1.2	1.7	.70	.75	.30	.24
1973														
Total		3.80	6.94	54.75	407.55	327.5	430.5	121.55	239.19	233.1				2,099.70
	2,591.62										348.95	188.1	229.69	
Mean	7.10	.12	.25	1.77	13.6	10.6	14.4	3.92	7.72	7.77	11.3	6.27	7.41	5.75
Max.	134	.60	1.0	14	72	52	134	38	47	39	66	46	23	134
Min.	0	0	0	.10	.02	3.1	4.5	.88	.60	2.2	.30	1.3	.62	0
1974														
Total		126.57	321.1	393.1	450.3	281.6	465.6	439.4	301.82	127.41				3,673.64
	3,901.22										257.52	416.6	320.2	
Mean	10.7	4.08	11.5	12.7	15.0	9.08	15.5	14.2	9.74	4.25	8.31	13.9	10.3	10.1
Max.	115	21	90	91	115	33	50	85	64	18	39	74	66	115
Min.	.53	.62	2.2	3.0	3.3	2.1	3.8	4.2	.92	.53	.92	2.8	2.7	.30

Table 28. Streamflow records for Luhpwor River (16898600)

Location: Lat 6°54'09" N., long 158°09'07" E., on left bank about 300 ft upstream from 50-ft waterfall, 0.2 mi downstream from highway bridge, and 0.2 mi west of Pwakorokot Hill.

Drainage area: 0.72 mi^2.

Period of record: September 1972 to September 1982.

Gage: Water-stage recorder. Altitude of gage is 145 ft (from topographic map).

Remarks: Records good except those above 100 ft^3/s, which are fair.

Average discharge: 10 years, 9.19 ft^3/s, 6,660 acre-ft/yr.

Extremes for period of record: Maximum discharge, 3,090 ft^3/s Aug. 4, 1976 (gage height, 8.26 ft), from rating curve extended above 47 ft^3/s on basis of estimate of peak flow; minimum, 0.40 ft^3/s Feb. 18 and 19, 1973.

A. Discharge measurements, in cubic feet per second, made outside the period of continuous discharge record ending September 1982

Date	Discharge	Date	Discharge
June 8, 1972	2.8	Feb. 28, 1983	0.34
June 20, 1972	2.8	Mar. 22, 1983	.37
July 5, 1972	5.0	Apr. 13, 1983	.32
July 13, 1972	13	May 25, 1983	.24
Aug. 11, 1972	4.3	June 8, 1983	.18
Aug. 29, 1972	3.8	June 23, 1983	5.6
Oct. 13, 1982	2.0	July 11, 1983	4.7
Dec. 2, 1982	2.6	Aug. 16, 1983	6.8
Dec. 14, 1982	4.1	Aug. 31, 1983	4.4
Jan. 4, 1983	1.5	Sept. 15, 1983	12
Feb. 2, 1983	.54	Sept. 27, 1983	7.2
Feb. 16, 1983	.70	Oct. 12, 1983	2.4

Table 28. Streamflow records for Luhpwor River--Continued

B. Annual maximum discharge (*) and peak discharges above base (750 ft^3/s)

(Discharge in cubic feet per second, gage height in feet)

Date	Time	Discharge	Gage height
Sept. 14, 1972 ------	0630	* 1,370	6.13
Sept. 25, 1972 ------	1300	993	5.69
Apr. 27, 1973 -------	0730	* 1,180	5.92
Oct. 29, 1973 -------	1230	1,050	5.76
Nov. 6, 1973 --------	[a/] 0630	1,060	5.78
Mar. 17, 1974 -------	0200	1,550	6.31
July 11, 1974 -------	0515	* 1,770	6.53
Oct. 12, 1974 -------	1930	* 853	5.49
Mar. 26, 1976 -------	1700	1,030	5.74
Apr. 22, 1976 -------	0700	1,710	6.47
June 9, 1976 --------	1400	1,300	6.05
Aug. 2, 1976 --------	0400	1,880	7.29
Aug. 4, 1976 --------	1345	* 3,090	8.26
Sept. 8, 1976 -------	1145	1,210	6.40
Dec. 16, 1976 -------	1230	765	5.65
Apr. 24, 1977 -------	0030	918	5.93
Apr. 25, 1977 -------	1400	* 1,070	6.19
Oct. 19, 1977 -------	2000	755	5.63
Nov. 28, 1977 -------	2200	1,200	6.38
Jan. 24, 1978 -------	1745	815	5.75
June 23, 1978 -------	1515	978	6.03
Aug. 11, 1978 -------	0630	* 1,200	6.39
Oct. 1, 1978 --------	1600	755	5.63
Nov. 17, 1978 -------	1800	1,220	6.42
Nov. 27, 1978 -------	0700	870	5.85
Feb. 22, 1979 -------	1630	1,430	6.71
Aug. 1, 1979 --------	0615	* 1,450	6.74
Aug. 12, 1979 -------	1545	1,070	6.18
Dec. 2, 1979 --------	1900	1,140	6.30
Jan. 9, 1980 --------	[a/] 1300	[a/] 1,000	> 6.0
Feb. 4, 1980 --------	[a/] 1930	[a/] 1,000	> 6.0
May 8, 1980 ---------	1000	846	5.81
May 12, 1980 --------	0530	* 1,760	7.15
May 26, 1980 --------	1115	775	5.67
June 2, 1980 --------	0445	1,090	6.22
June 3, 1980 --------	1115	800	5.72
June 14, 1980 -------	1415	1,090	6.22
Aug. 21, 1980 -------	1130	800	5.72

Table 28. Streamflow records for Luhpwor River--Continued

B. Annual maximum discharge (*) and peak discharges above base (750 ft^3/s)--Continued

(Discharge in cubic feet per second, gage height in feet)

Date	Time	Discharge	Gage height
Oct. 2, 1980 --------	1330	765	5.65
Aug. 7, 1981 --------	0700	*1,020	6.10
May 8, 1982 ---------	0600	*2,140	7.56
Aug. 7, 1982 --------	0730	870	5.85

a/ About.

C. Annual minimum discharge in cubic feet per second

Water year	Date	Discharge
1973 ------	Feb. 18, 19, 1973 ----------	0.40
1974 ------	Dec. 2, 1973 ----------	1.0
1975 ------	Feb. 10, 22-24, 1975 ----------	.45
1976 ------	Jan. 26, 1976 ----------	1.0
1977 ------	Mar. 2, 3, 6, 7, 1977 ----------	.62
1978 ------	Mar. 26-28, 30, 1978 ----------	.92
1979 ------	Mar. 30, 1979 ----------	.80
1980 ------	Mar. 9, 1980 ----------	1.4
1981 ------	Mar. 19, 20, 1981 ----------	.62
1982 ------	Apr. 16, 17, 1982 ----------	1.2

Table 28. Streamflow records for Luhpwor River--Continued

D. Seepage investigation of March 8, 1983

[No rainfall during the day; flow represent base flow conditions]

Time	Latitude north 6°	Longitude east 158°	1/ Altitude (ft)	Discharge (ft^3/s)	Location (distance upstream from gaging station)
0855	54'06"	09'11"	160	0.38	500 ft
0930	54'03"	09'16"	170	.35	0.2 mi, at highway bridge
1020	54'04"	09'19"	180	.34	0.28 mi
1050	54'06"	09'22"	190	.29	0.35 mi
1230	54'11"	09'28"	220	.24	0.5 mi, 100 ft upstream from right-bank tributary.
1255	54'09"	09'33"	250	.18	0.6 mi
1340	54'12"	09'42"	280	.14	0.8 mi
1420	54'11"	09'48"	300	.06	0.9 mi
1445	54'13"	09'54"	330	.07	1.0 mi
1455	54'15"	09'57"	370	.08	1.1 mi, at Japanese dam
1520	54'15"	10'04"	420	.06	1.2 mi

1/ From topographic map.

Table 28. Streamflow records for Luhpwor River--Continued

E. Monthly and annual discharges, in cubic feet per second

	Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Water year
1972														
Total										683.7				--
	--										127.25	46.88	93.19	
Mean	--									22.8	4.10	1.56	3.01	--
Max.	--									158	19	8.3	21	--
Min.	--									1.5	.90	.57	.73	--
1973														
Total		35.82	39.66	102.40	395.12	251.6	326.8	112.5	288.8	258.8				2,078.82
	2,487.00										271.5	176.9	227.1	
Mean	6.81	1.16	1.42	3.30	13.2	8.12	10.9	3.63	9.32	8.63	8.76	5.90	7.33	5.70
Max.	89	2.1	7.5	31	72	49	89	15	40	30	64	50	20	89
Min.	.45	.73	.45	.85	.77	3.0	2.8	1.2	1.1	2.3	1.1	1.4	1.2	.45
1974														
Total		168.4	252.1	280.2	320.8	170.0	220.0	432.0	336.7	188.7				3,044.4
	3,219.0										354.5	222.8	272.8	
Mean	8.82	5.43	9.00	9.04	10.7	5.48	7.33	13.9	10.9	6.29	11.4	7.43	8.80	8.34
Max.	198	20	55	33	39	12	34	198	58	21	46	25	60	198
Min.	1.4	1.4	2.4	2.3	4.5	1.9	2.8	3.4	2.4	2.6	3.0	2.4	2.3	1.1
1975														
Total		123.19	74.78	212.5	199.31	302.0	289.7	313.3	171.8	177.0				2,713.68
	3,024.98										311.3	335.6	514.5	
Mean	8.29	3.97	2.67	6.85	6.64	9.74	9.66	10.1	5.54	5.90	10.0	11.2	16.6	7.43
Max.	98	23	43	39	55	26	24	50	22	13	30	54	98	60
Min.	.49	.73	.49	1.4	.82	4.1	3.9	3.2	1.6	1.4	4.4	2.6	4.4	.49
1976														
Total		80.8	196.4	553.8	377.7	389.1	406.1	362.3	995.8	403.9				4,927.3
	5,010.3										384.4	442.8	417.2	
Mean	13.7	2.61	6.77	17.9	12.6	12.6	13.5	11.7	32.1	13.5	12.4	14.8	13.5	13.5
Max.	282	8.7	39	91	129	41	52	56	282	162	82	50	106	282
Min.	1.0	1.0	1.3	1.9	3.3	3.4	3.9	1.9	4.7	1.9	1.5	5.5	2.0	1.0
1977														
Total		105.8	30.54	199.14	336.6	412.0	250.7	260.6	382.5	296.8				3,5190.08
	3,140.98										401.7	370.7	93.9	
Mean	8.61	3.41	1.09	6.42	11.2	13.3	8.36	8.41	12.3	9.89	13.0	12.4	3.03	9.64
Max.	89	17	1.9	43	85	81	44	22	52	34	89	52	10	106
Min.	.66	1.3	.74	.66	1.1	3.6	2.8	2.6	4.0	3.9	1.6	3.6	1.2	.66

Table 28. Streamflow records for Luhpwor River--Continued

E. Monthly and annual discharges, in cubic feet per second--Continued

	Calendar year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Water year
1978														
Total		292.5	155.1	77.68	260.5	176.6	334.2	247.9	279.3	161.0				2,851.08
	2,727.68										253.3	291.7	197.9	
Mean	7.47	9.44	5.54	2.51	8.68	5.70	11.1	8.00	9.01	5.37	8.17	9.72	6.38	7.81
Max.	119	119	19	19	36	24	75	28	62	10	58	64	43	119
Min.	.92	1.2	1.7	.92	1.3	1.7	1.7	2.3	2.4	2.4	2.3	2.3	2.1	.92
1979														
Total		173.9	185.9	165.90	433.0	307.9	358.8	338.6	626.7	265.3				3,598.80
	3,887.40										342.6	268.8	420.1	
Mean	10.7	5.61	6.64	5.35	14.4	9.93	12.0	10.9	20.2	8.84	11.1	8.96	13.6	9.86
Max.	142	28	92	20	54	33	41	42	135	58	34	18	142	135
Min.	.80	1.4	1.2	.80	1.8	2.5	5.0	3.5	2.7	1.8	2.9	4.7	2.3	.80
1980														
Total		267.1	273.8	132.9	201.8	644.3	530.5	273.3	393.7	348.0				4,096.9
	3,609.2										315.7	86.9	143.9	
Mean	9.86	8.62	9.44	4.29	6.73	20.8	17.7	8.82	12.7	11.6	10.2	2.90	4.64	11.2
Max.	97	40	60	24	35	96	97	24	53	53	45	7.6	27	142
Min.	1.2	2.0	2.0	1.4	1.6	3.8	4.6	3.9	4.6	4.1	3.0	1.4	1.2	1.4
1981														
Total		273.8	242.6	78.11	222.3	233.4	277.7	245.0	335.1	239.7				2,694.21
	2,986.21										285.0	273.0	280.5	
Mean	8.18	8.83	8.66	2.52	7.41	7.53	9.26	7.90	10.8	7.99	9.19	9.10	9.05	7.38
Max.	79	47	49	9.8	27	22	44	23	79	24	35	28	28	79
Min.	.68	2.6	1.6	.68	1.3	2.0	2.6	2.7	2.9	2.8	3.7	2.6	2.3	.68
1982														
Total		293.4	232.0	197.5	341.5	469.2	385.2	469.5	377.1	412.2				4,016.1
Mean		9.46	8.29	6.37	11.4	15.1	12.8	15.1	12.2	13.7				11.0
Max.		35	30	28	46	88	44	59	60	100				100
Min.		1.8	3.5	1.4	1.3	2.6	3.0	3.2	2.6	2.0				1.3

Table 29. Streamflow records for Lehn Mesi River (16898690)

Location: Lat 6°50'41" N., long 158°11'02" E., on left bank 3.2 mi upstream from mouth, 1.7 mi southwest of Mount Tolenpwoaipwoai, and 4.5 mi south of Mount Temwetemsekir.

Drainage area: 2.31 mi^2.

Period of record: November 1981 to September 1982.

Gage: Water-stage recorder. Altitude of gage is 260 ft (from topographic map).

Remarks: Records fair.

Extremes for period of record: Maximum discharge, 7,740 ft^3/s, May 8, 1983 (gage height, 10.14 ft), from rating curve extended above 126 ft^3/s; minimum, 16 ft^3/s Apr. 13, 1983.

A. Discharge measurements, in cubic feet per second, made outside the period of continuous discharge record ending September 1982

Date	Discharge	Date	Discharge
Oct. 25, 1982	29	Apr. 7, 1983	5.7
Nov. 22, 1982	25	Apr. 21, 1983	5.1
Dec. 6, 1982	126	May 31, 1983	10
Dec. 23, 1982	24	June 17, 1983	78
Jan. 11, 1983	10	July 1, 1983	120
Jan. 25, 1983	24	July 14, 1983	43
Feb. 10, 1983	7.4	Aug. 26, 1983	24
Feb. 27, 1983	6.9	Sept. 10, 1983	31
Mar. 17, 1983	11	Oct. 7, 1983	87

Table 29. Streamflow records for Lehn Mesi River--Continued

B. Monthly discharges, in cubic feet per second

	1981	
	Nov.	Dec.
Total	3,070	3,123
Mean	102	101
Max.	378	400
Min.	32	33

	1982								
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Total	2,714	2,425	2,859	2,928	3,333	2,813	4,015	3,435	4,006
Mean	87.5	86.6	92.2	97.6	108	93.8	130	111	134
Max.	393	258	297	330	556	250	460	492	793
Min.	19	23	18	16	21	21	32	33	26

Low-flow partial-record stations

Table 30. Discharge measurements, in cubic feet per second, at Meitik River (16897550)

Location: Lat 6°56'12" N., long 158°13'26" E., at bridge near mouth. Altitude is 5 ft (from topographic map).

Drainage area: 5.04 mi^2.

Period of record: Water years 1971, 1973, 1977, 1980-81, 1983.

Date	Discharge	Date	Discharge
Jan. 25, 1971	9.2	Apr. 2, 1973	4.4
Feb. 22, 1971	35	Feb. 28, 1977	3.2
May 19, 1971	46	May 20, 1980	56
June 28, 1971	30	Nov. 21, 1980	22
Jan. 15, 1973	10	Jan. 7, 1983	8.1

Table 31. Discharge measurements, in cubic feet per second, at Kiepw River at mouth (16897800)

(Tawenjokola River at mouth)

Location: Lat 6°56'36" N., long 158°13'14" E., at road crossing 0.1 mi upstream from mouth. Altitude is 5 ft (from topographic map).

Drainage area: 11.2 mi^2.

Period of record: Water years 1970-71, 1973-74, 1977, 1981, 1983.

Date	Discharge	Date	Discharge
Feb. 22, 1970	42	Aug. 4, 1974	26,820
Jan. 25, 1971	29	Sept. 24, 1974	2,730
Feb. 22, 1971	70	Feb. 28, 1977	10
June 29, 1971	45	Nov. 21, 1980	55
Jan. 15, 1973	39	Jan. 7, 1983	16
Apr. 2, 1973	20		

Table 32. Discharge measurements, in cubic feet per second, at Lewi River tributary No. 2 (16898000)

(Lui River tributary No. 2)

Location: Lat 6°55'24" N., long 158°12'20" E., 0.2 mi upstream from mouth and 0.5 mi north of Nanpil dam. Altitude is 325 ft (from topographic map).

Drainage area: 0.07 mi^2.

Period of record: Water years 1970-76.

Date	Discharge	Date	Discharge
Feb. 19, 1970	1.1	Apr. 23, 1971	5.6
Mar. 26, 1970	.40	May 18, 1971	.29
May 11, 1970	.35	June 30, 1971	.39
May 19, 1970	1.1	Aug. 10, 1971	.32
June 4, 1970	.29	Sept. 8, 1971	.55
June 18, 1970	1.2	Nov. 3, 1971	.85
July 21, 1970	1.2	Dec. 1, 1971	.55
Aug. 7, 1970	.37	Jan. 25, 1972	1.6
Sept. 1, 1970	2.1	Feb. 23, 1972	.82
Sept. 24, 1970	2.1	Mar. 21, 1972	.76
Oct. 8, 1970	.54	June 7, 1972	.34
Oct. 22, 1970	.56	Aug. 30, 1972	.25
Nov. 5, 1970	.52	Nov. 9, 1972	.18
Dec. 2, 1970	1.2	Dec. 6, 1972	.23
Dec. 16, 1970	.57	Mar. 21, 1974	.41
Dec. 30, 1970	.29	Sept. 24, 1974	.65
Jan. 26, 1971	.17	Oct. 9, 1974	1.0
Feb. 9, 1971	.35	Oct. 22, 1974	.40
Feb. 23, 1971	.33	Nov. 5, 1974	.44
Mar. 23, 1971	.26	Feb. 24, 1976	.27
Apr. 14, 1971	.60		

Table 33. Discharge measurements, in cubic feet per second, at Lewi River tributary (16898100)

(Lui River tributary)

Location: Lat 6°57'01" N., long 158°12'40" E., at mouth and 0.45 mi southwest of Ponape State Hospital. Altitude is 35 ft (from topographic map).

Drainage area: 0.45 mi^2.

Period of record: Water years 1970-74.

Date	Discharge	Date	Discharge
Feb. 14, 1970	1.6	Mar. 22, 1971	2.8
May 11, 1970	1.3	Apr. 26, 1971	4.5
May 20, 1970	10	May 17, 1971	1.1
June 19, 1970	4.8	June 29, 1971	.95
July 20, 1970	1.4	Aug. 9, 1971	1.3
Sept. 2, 1970	4.6	Sept. 7, 1971	2.1
Sept. 22, 1970	.99	Nov. 2, 1971	.84
Oct. 12, 1970	4.4	Nov. 30, 1971	1.3
Oct. 21, 1970	4.3	Jan. 26, 1972	.65
Nov. 6, 1970	5.0	Feb. 22, 1972	1.0
Dec. 3, 1970	1.3	Mar. 20, 1972	2.3
Dec. 17, 1970	1.4	June 6, 1972	1.0
Jan. 27, 1971	.74	Aug. 28, 1972	.65
Feb. 8, 1971	.91	Dec. 4, 1972	.68
Feb. 24, 1971	2.6	Mar. 22, 1974	.97

Table 34. Discharge measurements, in cubic feet per second, at Nankewi River (16898500)

(Pilenkiel River)

Location: Lat 6°56'03" N., long 158°10'46" E., at highway bridge, 350 ft west of Sekere School. Altitude is 120 ft (from topographic map).

Drainage area: 1.48 mi^2.

Period of record: Water years 1971-73, 1975-77, 1981-83.

Date	Discharge	Date	Discharge
Apr. 12, 1971	19	Jan. 31, 1973	1.8
May 19, 1971	8.3	Feb. 15, 1973	2.2
June 28, 1971	12	Feb. 28, 1973	4.4
May 24, 1972	34	Apr. 3, 1973	1.8
June 8, 1972	9.0	July 10, 1973	7.9
June 20, 1972	15	Sept. 5, 1973	7.6
July 5, 1972	11	Nov. 6, 1974	7.1
July 13, 1972	22	Nov. 29, 1974	7.2
Aug. 29, 1972	7.3	Feb. 25, 1976	6.4
Sept. 18, 1972	12	Mar. 1, 1977	1.4
Sept. 29, 1972	36	Nov. 20, 1980	7.5
Oct. 11, 1972	7.5	Mar. 30, 1981	8.7
Nov. 7, 1972	3.1	Mar. 9, 1982	7.0
Nov. 21, 1972	2.5	Jan. 14, 1983	3.9
Dec. 5, 1972	6.5	Feb. 16, 1983	1.9
Dec. 20, 1972	18	Apr. 27, 1983	.53
Jan. 3, 1973	5.1	May 25, 1983	.51
Jan. 16, 1973	2.9	June 23, 1983	16

Table 35. Discharge measurements, in cubic feet per second, at Kiriedleng River (16898550)

(Kirictilang River)

Location: Lat 6°55'17" N., long 158°09'48" E., at small right-bank tributary, 300 ft downstream from road bridge and 1.4 mi northwest of Mount Temwetemwensekir. Altitude is 260 ft (from topographic map).

Drainage area: 0.73 mi^2.

Period of record: Water years 1972-73, 1975-77, 1981-83.

Date	Discharge	Date	Discharge
May 24, 1972	12	Apr. 3, 1973	1.0
June 8, 1972	5.3	July 10, 1973	3.3
June 20, 1972	6.3	Sept. 5, 1973	4.2
July 5, 1972	6.4	Oct. 10, 1974	8.0
July 13, 1972	13	Oct. 30, 1974	6.6
Aug. 29, 1972	3.6	Nov. 6, 1974	6.0
Sept. 18, 1972	7.5	Nov. 29, 1974	6.9
Sept. 27, 1972	41	Apr. 2, 1975	1.8
Oct. 11, 1972	4.4	Feb. 25, 1976	3.0
Nov. 7, 1972	1.9	Mar. 1, 1977	.59
Nov. 21, 1972	1.1	Nov. 20, 1980	2.8
Dec. 5, 1972	3.0	Mar. 30, 1981	3.6
Dec. 20, 1972	15	Mar. 10, 1982	3.0
Jan. 3, 1973	2.6	Jan. 4, 1983	1.6
Jan. 16, 1973	1.6	Feb. 16, 1983	.98
Jan. 31, 1973	.88	Apr. 27, 1983	.42
Feb. 15, 1973	1.1	May 25, 1983	.42
Feb. 28, 1973	1.8	June 23, 1983	4.9

Table 36. Discharge measurements, in cubic feet per second, at Lehn Mesi River at hanging bridge (16898700)

(Lehnmasi River at hanging bridge)

Location: Lat 6°49'24" N., long 158°10'11" E., at footbridge, 0.6 mi upstream from mouth. Altitude is 25 ft (from topographic map).

Drainage area: 8.32 mi^2.

Period of record: Water years 1971, 1973, 1976-77, 1981-82.

Date	Discharge	Date	Discharge
Jan. 29, 1971	38	Mar. 4, 1977	37
Mar. 24, 1971	103	Mar. 28, 1981	75
Jan. 25, 1973	19	Jan. 29, 1982	146
Feb. 26, 1973	28	Feb. 11, 1983	12
Apr. 6, 1973	32	June 13, 1983	17
Feb. 12, 1976	39		

Table 37. Discharge measurements, in cubic feet per second, at Senipehn River (16899000)

(Senpen River)

Location: Lat 6°52'28" N., long 158°16'17" E., 0.1 mi downstream from confluence of two branches, 0.5 mi southeast of Merewi Hill, and 1.5 mi upstream from mouth. Altitude is 110 ft (from topographic map).

Drainage area: 6.04 mi^2.

Period of record: Water years 1971, 1973, 1976-77, 1980-81, 1983.

Date	Discharge	Date	Discharge
Apr. 13, 1971	32	Mar. 27, 1981	71
July 1, 1971	38	Jan. 6, 1983	14
Jan. 19, 1973	21	Feb. 17, 1983	7.8
Feb. 27, 1973	65	Mar. 24, 1983	3.4
Feb. 10, 1976	25	Apr. 28, 1983	4.6
Mar. 3, 1977	41	May 26, 1983	8.0
May 22, 1980	194		

Table 38. Discharge measurements, in cubic feet per second, at Lehdau River (16899100)

(Lataw River)

Location: Lat 6°52'59" N., long 158°16'15" E., 0.1 mi upstream from left-bank tributary, 0.4 mi northeast of Merewi Hill and 1.4 mi upstream from mouth. Altitude is 110 ft (from topographic map).

Drainage area: 2.44 mi^2.

Period of record: Water years 1971, 1973, 1976-77, 1980-81, 1983.

Date	Discharge	Date	Discharge
Apr. 13, 1971	21	Mar. 27, 1981	32
July 1, 1971	22	Jan. 6, 1983	4.3
Jan. 19, 1973	7.9	Feb. 17, 1983	3.5
Feb. 27, 1973	35	Mar. 24, 1983	1.5
Feb. 10, 1976	6.1	Apr. 28, 1983	1.6
Mar. 3, 1977	5.0	May 26, 1983	1.6
May 22, 1980	76		

Miscellaneous sites

Table 39. Discharge measurements, in cubic feet per second, at miscellaneous sites

Location	Altitude (ft) (from topo-graphic map)	Drainage area (mi^2)	Date and time	Discharge
Pahntakai River (Station 16897470)				
Lat 6°56'22" N., long 158°16'20" E., at road crossing near mouth, 1.6 mi southeast of Awak School.	10	0.52	4-10-81	5.0
Unnamed river near Cape Uh (Station 16897480)				
Lat 6°56'40" N., long 158°16'18" E., at road crossing near mouth, 1.4 mi southeast of Awak School.	5	.19	11-21-80	1.5
Kepin Awak River (Station 16897500)				
Lat 6°37'37" N., long 158°15'35" E., at road crossing near mouth at Awak.	5	.88	11-21-80 4-10-81	10 12
Kiepw River (Station 16897750)				
Lat 6°54'58" N., long 158°12'47" E., 100 ft upstream from confluence with Nanpil River.	150	5.71	4-9-81	53
Nankewi River tributary				
Lat 6°55'35" N., long 158°11'05" E., 0.7 mi upstream from mouth and 1.1 mi north of Mount Temwetemwensekir.	300	.56	10-16-67	.42
Luhpwor River at Japanese dam				
Lat 6°54'15" N., long 158°09'59" E., 1.1 mi southwest of Mount Temwetemwensekir and 1.1 mi upstream from gaging station.	370	.17	1-31-73 (1145) 2-28-73 (1145) 4-3-73 (0930) 10-23-81 (1145) 10-13-82 (1450) 3-8-83 (1455)	.41 (0.69 at gaging station). .65 (1.8 at gaging station). .38 (.77 at gaging station). .86 (4.5 at gaging station). .51 (1.9 at gaging station). .08 (.38 at gaging station).
Right Branch Luhpwor River				
Lat 6°54'16" N., long 158°09'48" E., at foot path crossing near confluence with Luhpwor River.	330	.08	10-23-81	.48

Table 39. Discharge measurements, in cubic feet per second, at miscellaneous sites--Continued

Location	Altitude (ft) (from topo-graphic map)	Drainage area (mi^2)	Date and time	Discharge
Seniahdak River (Station 16898620)				
Lat 6°53'46" N., long 158°09'15" E., at road bridge, 0.45 mi south of Pwakorokot Hill.	65	0.56	10-23-81	3.8
			3-9-82	5.5
			11-2-82	9.7
			1-4-83	2.5
			2-16-83	1.0
			3-22-83	.93
			4-27-83	.31
			5-25-83	.91
			6-23-83	7.9
Pehleng River (Station 16898650)				
Lat 6°52'27" N., long 158°09'26" E., at road crossing near mouth, and 0.25 mi north of Doletikitik Hill.	15	2.01	3-30-81	15
			10-23-81	8.4
			1-4-83	2.9
			2-16-83	2.5
			3-22-83	1.2
			4-27-83	.56
			5-25-83	1.4
			6-23-83	24
Keprohi River (Station 16898900)				
Lat 6°50'40" N., long 158°17'57" E., 150 ft upstream from bridge and 0.5 mi northeast of P.A.T.S. (Ponape Agriculture Trade School).	20	2.05	3-27-81	24
			7-14-82	25
			11-2-82	4.0
			1-6-83	4.0
			2-17-83	2.3
			3-24-83	1.9
			4-28-83	1.2
			5-26-83	1.0

Table 40. Water and air temperatures and instantaneous discharges at Nanpil River

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Nov. 19, 1970	1000	16	26	--
Apr. 14, 1971	1030	14	24	--
Apr. 22, 1971	1000	30	23	--
May 4, 1971	1000	57	23	--
May 18, 1971	1020	12	24	--
June 2, 1971	1000	16	24	--
June 15, 1971	1035	39	24	--
June 30, 1971	1015	17	24	--
July 27, 1971	1005	21	23	--
Feb. 13, 1974	1040	15	23	28
Feb. 28, 1974	1120	12	24	29
Mar. 21, 1974	1020	11	25	31
Apr. 3, 1974	1130	69	24	30
Apr. 18, 1974	1000	20	23	29
May 1, 1974	1100	33	24	29
May 15, 1974	1030	29	24	30
June 25, 1974	1210	17	24	30
July 9, 1974	1110	13	23	28
July 24, 1974	1100	34	24	32
Aug. 7, 1974	1110	28	26	31
Aug. 21, 1974	1035	11	23	26
Nov. 5, 1974	1005	14	23	27
Nov. 27, 1974	1010	46	24	28
Dec. 17, 1974	1030	39	23	26
Jan. 20, 1975	1245	6.5	23.5	25
Feb. 5, 1975	1035	2.2	24	27
Feb. 19, 1975	1015	8.5	24	28
Mar. 6, 1975	1200	10	24	26
Mar. 19, 1975	1035	21	24	27
Apr. 4, 1975	0955	8.0	24	27
Apr. 16, 1975	1035	32	24	28
May 1, 1975	1045	22	24	29
May 15, 1975	1050	21	24	29
June 4, 1975	1030	17	24	28
June 19, 1975	1030	39	25	29
July 2, 1975	1125	11	24	27
July 15, 1975	1035	62	24	28
July 31, 1975	1140	13	24	28

Table 40. Water and air temperatures and instantaneous discharges at Nanpil River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Oct. 8, 1975	1010	18	24	29
Oct. 21, 1975	1155	19	24	29
Nov. 5, 1975	1210	66	24	29
Dec. 22, 1975	1035	21	24	28
Jan. 14, 1976	1130	2.3	24	26
Jan. 29, 1976	1200	32	24	27
Feb. 9, 1976	1610	5.2	24.5	27
Feb. 24, 1976	1155	7.7	24	27
Mar. 17, 1976	1340	38	25	28
Apr. 7, 1976	1210	8.5	24.5	29.5
Apr. 27, 1976	1145	27	24.5	29
May 5, 1976	1105	53	24.5	27
May 26, 1976	1130	13	24	27
June 16, 1976	1205	11	25	28
July 1, 1976	1220	6.5	25	28
July 14, 1976	1140	9.4	25	30
July 28, 1976	1310	6.3	26	29
Aug. 16, 1976	1625	13	25	27.5
Aug. 18, 1976	1045	17	24.5	26
Aug. 20, 1976	1035	28	24	28
Sept. 15, 1976	1420	9.0	25.5	29
Oct. 7, 1976	1300	2.8	24	29
Oct. 28, 1976	1100	48	25	27
Nov. 10, 1976	1320	12	25	29
Nov. 30, 1976	1040	38	24.5	28.5
Dec. 9, 1976	1220	6.7	24	27
Jan. 6, 1977	1105	4.0	24.5	28
Jan. 20, 1977	1310	37	24	28
Feb. 2, 1977	1020	6.7	24	28
Feb. 16, 1977	1210	3.8	24.5	28
Mar. 2, 1977	1200	2.3	25	29
Apr. 1, 1977	1110	16	24	28
Apr. 15, 1977	1230	4.1	24	28
Apr. 28, 1977	1240	16	25	28
June 8, 1977	1240	9.2	26	28
June 27, 1977	1200	32	25	28
July 5, 1977	1245	22	25	28
July 21, 1977	1215	7.1	26	29
Aug. 3, 1977	1310	14	26	28
Aug. 24, 1977	1250	36	25	28
Sept. 14, 1977	1200	7.8	25	28
Sept. 28, 1977	1130	16	26	29

Table 40. Water and air temperatures and instantaneous discharges at Nanpil River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Oct. 12, 1977	1125	16	24	28
Oct. 27, 1977	1120	8.8	25	28
Nov. 10, 1977	1230	16	25	27
Nov. 23, 1977	1150	18	25	27.5
Dec. 8, 1977	1220	11	24	27
Dec. 21, 1977	1230	6.0	24.5	27.5
Jan. 4, 1978	1230	8.4	26	28
Jan. 19, 1978	1205	17	24.5	27
Feb. 2, 1978	1300	9.8	24	26
Mar. 2, 1978	1310	12	24.5	28
Mar. 15, 1978	1130	7.8	25	27
Mar. 29, 1978	1330	10	26	28.5
Apr. 12, 1978	1155	23	24	29.5
May 11, 1978	1255	25	26	28.5
May 24, 1978	1415	9.3	26	--
June 15, 1978	1245	14	25.5	29
June 28, 1978	1340	14	25	27.5
July 13, 1978	1220	12	24.5	28
July 26, 1978	1240	15	24.5	27
Aug. 10, 1978	1220	13	26.5	28
Aug. 24, 1978	1400	10	25	28.5
Sept. 7, 1978	1300	18	24.5	27.5
Oct. 3, 1978	1140	25	24.5	27
Oct. 26, 1978	1205	16	25	27
Nov. 14, 1978	1335	59	25.5	27
Nov. 22, 1978	1225	31	24.5	26
Dec. 7, 1978	1250	17	25	30
Dec. 21, 1978	1250	11	25	28
Jan. 4, 1979	1320	15	24.5	27
Jan. 18, 1979	1250	12	25	28
Feb. 1, 1979	1320	17	26	28
Feb. 14, 1979	1350	16	24	28
Mar. 2, 1979	1310	9.4	26	28
Mar. 14, 1979	1230	46	26	28
Mar. 29, 1979	1330	4.4	25	28
Apr. 24, 1979	1230	22	24.5	28
May 16, 1979	1045	62	24	26
May 30, 1979	1300	21	25	29
June 11, 1979	1320	27	26	29

Table 40. Water and air temperatures and instantaneous discharges at Nanpil River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Aug. 2, 1979	1130	29	26	28
Aug. 20, 1979	1145	29	25.5	29
Sept. 13, 1979	1120	11	24.5	28.5
Oct. 2, 1979	1220	70	25	27
Oct. 27, 1979	1045	21	24.5	--
Dec. 17, 1979	1410	5.3	25	27
Dec. 27, 1979	1035	18	24	28
Jan. 30, 1980	1255	10	24	28
Feb. 27, 1980	1420	6.5	25	30
Mar. 11, 1980	1150	14	24.5	29
Apr. 10, 1980	1220	4.4	25	29
May 2, 1980	1430	26	25	29
May 20, 1980	1045	26	25	30
June 4, 1980	1305	33	24	28
June 18, 1980	1345	51	24	29
July 3, 1980	1235	23	24	31
July 15, 1980	1105	36	24	28
Aug. 14, 1980	1150	13	24.5	30
Aug. 27, 1980	1120	16	24	29
Sept. 10, 1980	1320	16	24	29
Sept. 25, 1980	1200	15	24	29
Nov. 5, 1980	1240	7.2	24	29
Dec. 2, 1980	1255	15	24.5	29

Table 41. Water and air temperatures and instantaneous discharges at Kiepw River at mouth

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
June 29, 1971	0935	45	24	--
Feb. 28, 1977	1435	10	26	31
Nov. 21, 1980	1440	55	28	--

Table 42. Water and air temperatures and instantaneous discharges at Lewi River

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Feb. 19, 1970	1125	2.8	24	--
Feb. 26, 1970	1220	.48	25	--
May 19, 1970	1325	2.5	25	--
Apr. 14, 1971	1140	2.6	24	--
Apr. 22, 1971	1125	3.0	24	--
May 4, 1971	1250	12	23	--
May 18, 1971	1250	1.5	25	--
June 15, 1971	1415	4.8	25	--
June 30, 1971	1130	1.6	25	--
July 28, 1971	1125	2.1	24	--
Jan. 25, 1974	1445	1.4	24.5	26
Feb. 13, 1974	1250	2.6	25	28
Feb. 28, 1974	1320	2.3	24.5	28
Mar. 21, 1974	1210	1.6	25	30
Apr. 3, 1974	1320	5.1	25	29
Apr. 18, 1974	1145	2.5	25	30
May 1, 1974	1255	2.6	25	29
May 15, 1974	1230	4.0	25	29
June 25, 1974	1500	12	24	29
July 9, 1974	1320	3.7	23	27
July 24, 1974	1255	5.6	24	30
Aug. 7, 1974	1310	3.4	25	31
Aug. 21, 1974	1310	1.3	26	30
Nov. 5, 1974	1300	1.4	25	28
Nov. 27, 1974	1205	2.8	24	27
Dec. 17, 1974	1300	4.3	24	28
Jan. 20, 1975	1600	.61	24	25
Feb. 5, 1975	1400	.24	24	26
Feb. 19, 1975	1350	.19	24	28
Mar. 6, 1975	1400	.56	25	27
Mar. 19, 1975	1315	1.6	24	28
Apr. 4, 1975	1150	.44	25	28
Apr. 16, 1975	1335	3.2	24	27
May 1, 1975	1230	2.8	24	28
May 22, 1975	1010	4.2	24	28
June 4, 1975	1310	2.7	24	28
June 19, 1975	1135	5.8	24	28
July 2, 1975	1245	2.2	23	27
July 15, 1975	1350	6.0	24	28
July 31, 1975	1005	1.2	25	29
Oct. 8, 1975	1305	2.8	24	29

Table 42. Water and air temperatures and instantaneous discharges at Lewi River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Oct. 21, 1975	1035	3.2	24	29
Nov. 5, 1975	1100	5.4	25	29
Nov. 20, 1975	0945	2.2	25	30
Dec. 22, 1975	0925	3.7	24	26
Jan. 14, 1976	1015	.47	24	27
Jan. 29, 1976	0955	4.0	24	27
Feb. 9, 1976	1505	.39	25.5	27
Feb. 24, 1976	0945	.75	24	27.5
Mar. 17, 1976	1035	6.3	25.5	28
Apr. 27, 1976	1020	4.1	24	27
May 26, 1976	1000	2.5	24	28
June 16, 1976	1015	1.8	25	28
July 1, 1976	1000	1.8	25.5	28
July 14, 1976	1315	1.7	26	28.5
July 28, 1976	1120	.61	26	30.5
Aug. 25, 1976	1045	4.3	25	29
Sept. 15, 1976	1020	1.6	25	29
Oct. 7, 1976	1040	.46	24.5	29
Oct. 28, 1976	1330	5.8	26	28
Nov. 10, 1976	1015	2.6	25	30
Nov. 30, 1976	1225	5.5	24	28
Dec. 9, 1976	1015	1.2	24	28
Dec. 22, 1976	1015	4.1	24	28
Jan. 6, 1977	1000	.69	25	28
Jan. 20, 1977	1115	1.4	25	29
Feb. 16, 1977	0930	.42	25	28
Mar. 2, 1977	0955	.34	24	29
Apr. 1, 1977	0930	2.0	24.5	27.5
Apr. 15, 1977	1045	.26	26	28.5
Apr. 28, 1977	1040	1.9	25.5	28.5
May 11, 1977	1100	3.8	26	30
June 8, 1977	1040	1.4	26	28
June 27, 1977	1020	4.1	25.5	28
July 5, 1977	1040	2.6	25	29
July 21, 1977	1020	1.3	25.5	29.5
Aug. 3, 1977	1040	2.2	25.5	28
Aug. 24, 1977	1115	4.4	25.5	28
Sept. 14, 1977	1030	1.1	25	27
Sept. 28, 1977	0950	1.1	25	28
Oct. 12, 1977	0945	1.5	25	28
Oct. 27, 1977	0955	1.5	25	27
Nov. 10, 1977	1015	2.0	25	27

Table 42. Water and air temperatures and instantaneous discharges at Lewi River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Nov. 23, 1977	1020	3.2	25	27
Dec. 8, 1977	1045	1.2	24	27
Dec. 21, 1977	1045	.65	24	27
Jan. 4, 1978	1050	.39	25	26
Jan. 19, 1978	1015	1.8	25	28
Feb. 2, 1978	1100	1.1	24	26.5
Mar. 2, 1978	1125	.96	25	28
Mar. 15, 1978	0940	.78	25	27.5
Mar. 29, 1978	1030	.66	25	28
Apr. 12, 1978	1005	2.9	26	28
May 11, 1978	1015	2.7	26	29
May 24, 1978	1220	1.2	26	--
June 15, 1978	1015	2.3	25.5	28
June 28, 1978	1115	1.9	25	26
July 13, 1978	1010	2.2	24.5	28
July 26, 1978	1045	3.4	25	27.5
Aug. 10, 1978	0955	1.5	26	28
Aug. 24, 1978	1045	1.2	25	28
Sept. 21, 1978	1100	2.3	25	27
Oct. 3, 1978	1000	3.1	24	27
Oct. 26, 1978	1025	1.7	25	27
Nov. 14, 1978	1100	2.4	25	27
Nov. 22, 1978	1020	4.8	25	27
Dec. 7, 1978	1030	1.7	25	28
Dec. 21, 1978	1100	1.3	25.5	29
Jan. 4, 1979	1030	1.2	25	28
Jan. 18, 1979	1045	.87	25	28
Feb. 1, 1979	1050	1.6	24.5	26
Feb. 14, 1979	1100	.91	24.5	26
Mar. 2, 1979	1030	1.5	24	26
Mar. 14, 1979	1055	5.7	25	27
Mar. 29, 1979	1030	.62	25	29
Apr. 24, 1979	1015	2.4	26	28
May 16, 1979	1225	5.9	24.5	26
May 30, 1979	1015	3.5	25	27
June 11, 1979	1005	4.1	25	28
June 28, 1979	1105	7.8	26	28
July 16, 1979	0950	1.6	27	29
Aug. 2, 1979	1045	4.6	25	28
Aug. 17, 1979	1015	2.4	26	28
Sept. 13, 1979	0950	.72	24.5	28

Table 42. Water and air temperatures and instantaneous discharges at Lewi River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Oct. 2, 1979	1000	16	24	27
Oct. 27, 1979	1335	3.3	26.5	--
Nov. 15, 1979	1215	9.5	26	27
Dec. 17, 1979	1100	.86	25	29
Dec. 27, 1979	1205	2.7	25	28
Jan. 30, 1980	1430	.87	24	28
Feb. 27, 1980	1230	1.2	25	30
Apr. 10, 1980	1015	.68	24	29
May 20, 1980	1320	4.2	26.5	29
June 4, 1980	1030	5.7	24	29
June 18, 1980	1045	3.0	25	29
July 3, 1980	1030	4.2	25	29
July 15, 1980	1400	2.9	25	29
Aug. 14, 1980	0945	1.1	24	31.5
Aug. 28, 1980	1130	3.8	25	30
Sept. 10, 1980	1155	2.8	24	29
Sept. 25, 1980	1030	1.7	24	29
Nov. 5, 1980	1050	1.1	24	29
Dec. 2, 1980	1100	1.0	24	29.5

Table 43. Water and air temperatures and instantaneous discharges at Lewi River tributary No. 2

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
May 19, 1970	1400	1.1	25	--
Apr. 14, 1971	1200	.60	25	--
Apr. 23, 1971	1223	5.6	25	--
May 18, 1971	1445	.29	25	--
June 30, 1971	1410	.39	25	--
Mar. 21, 1974	1320	.41	25	30
Nov. 5, 1974	1340	.44	24	30
Feb. 24, 1976	1030	.27	25	27

Table 44. Water and air temperatures and instantaneous discharges at Lewi River tributary

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
May 20, 1970	1550	10	26	--
Apr. 26, 1971	1035	4.5	24	--
May 17, 1971	1500	1.1	24	--
June 29, 1971	1505	.95	26	--
Mar. 21, 1974	1100	.97	24	28

Table 45. Water and air temperatures and instantaneous discharges at Lewi River at mouth

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Feb. 14, 1970	1100	4.8	25	--
Jan. 8, 1971	1605	30	26	--
Apr. 26, 1971	0940	28	24	--
May 3, 1971	1345	70	23	--
May 17, 1971	1420	7.5	25	--
June 1, 1971	1035	21	25	--
June 14, 1971	1335	34	24	--
June 29, 1971	1415	9.6	27	--
July 19, 1971	0855	24	23	--
Feb. 12, 1974	1100	35	25	32
Mar. 1, 1974	0930	14	25	27
Mar. 22, 1974	1030	19	24.5	28
Apr. 2, 1974	1430	30	25	33
Apr. 22, 1974	1400	24	26	31
Apr. 30, 1974	1430	48	26	30
May 16, 1974	1020	28	25	29
June 26, 1974	1110	19	24	29
July 15, 1974	1020	38	24	29
July 29, 1974	0950	12	25	32
Aug. 12, 1974	1120	34	25	27
Aug. 20, 1974	1350	12	26	32
Aug. 29, 1974	0900	9.3	24.5	--
Sept. 9, 1974	1410	8.4	25	31
Nov. 26, 1974	1355	13	26	29
Dec. 19, 1974	1030	20	24	27
Jan. 17, 1975	1240	3.8	25	27
Jan. 18, 1975	1035	3.7	24.5	25
Jan. 19, 1975	1205	3.4	24.5	25.5
Jan. 20, 1975	0920	3.2	24	25
Jan. 21, 1975	0920	3.5	24	25
Jan. 22, 1975	1030	3.5	24.5	25
Feb. 4, 1975	1020	1.9	24	28
Feb. 18, 1975	1430	2.4	24	29
Mar. 4, 1975	1405	9.1	25	28
Apr. 3, 1975	1400	2.1	26	30
Apr. 18, 1975	1000	12	24	28
Apr. 30, 1975	1430	28	25	28
May 22, 1975	1500	16	24	28
June 3, 1975	1350	18	25	29
June 30, 1975	1050	19	24	28
July 16, 1975	1050	16	24	28

Table 45. Water and air temperatures and instantaneous discharges at Lewi River at mouth--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Aug. 1, 1975	1355	7.0	24	28
Oct. 20, 1975	1420	24	24	29
Dec. 2, 1975	1420	18	25	29
Dec. 22, 1975	1445	15	24	27
Jan. 15, 1976	1410	4.3	24	27
Feb. 3, 1976	1350	21	27	32
Feb. 10, 1976	1725	4.2	28	27
Mar. 2, 1976	1405	11	24	28
Mar. 16, 1976	1405	11	27	29.5
Apr. 5, 1976	1430	13	26	28
Apr. 20, 1976	1435	45	25	28
May 6, 1976	1500	32	24	27
May 25, 1976	1140	21	24	27
June 17, 1976	1400	9.6	25	28
June 30, 1976	1115	23	25	28
July 19, 1976	1435	10	27	31
July 29, 1976	1045	10	25	28
Aug. 16, 1976	1000	20	25.5	28
Aug. 17, 1976	1015	22	26	28.5
Aug. 30, 1976	1350	20	25	29
Sept. 20, 1976	1415	5.9	25	29
Oct. 8, 1976	0945	4.8	25	29
Oct. 29, 1976	1025	18	25	29
Nov. 22, 1976	1440	21	25	28
Dec. 8, 1976	1415	8.2	25	29
Dec. 20, 1976	1145	38	24	28
Jan. 5, 1977	1355	4.7	24	28
Jan. 19, 1977	1345	5.4	24	28
Feb. 3, 1977	1410	2.6	25	30
Feb. 17, 1977	0950	1.7	25	28
Feb. 28, 1977	1530	1.5	25	28
Mar. 31, 1977	1410	18	24	28
Apr. 18, 1977	1500	2.9	26	28
Apr. 26, 1977	1345	26	28	30.5
May 17, 1977	1415	9.8	29	32.5
June 9, 1977	1400	7.7	28	30
June 22, 1977	1350	12	26	28
July 20, 1977	1405	8.6	29	31
Aug. 4, 1977	1040	11	26	28.5
Aug. 26, 1977	0935	9.3	26	29
Sept. 15, 1977	1345	7.1	26	28

Table 45. Water and air temperatures and instantaneous discharges at Lewi River at mouth--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Sept. 29, 1977	1330	6.5	29	32
Oct. 14, 1977	1340	10	25	28
Nov. 11, 1977	1020	12	25	27.5
Nov. 30, 1977	1435	21	26	27.5
Dec. 9, 1977	1035	7.5	26	28
Dec. 22, 1977	1345	3.9	25	27
Jan. 6, 1978	1040	4.5	26	28
Jan. 20, 1978	1005	7.0	26	28.5
Feb. 3, 1978	0950	7.0	25	28
Feb. 14, 1978	1355	8.6	28	30
Mar. 3, 1978	1100	4.5	25	27.5
Mar. 16, 1978	1105	5.8	26	27
Mar. 30, 1978	1005	2.8	26.5	28.5
Apr. 14, 1978	1035	18	26	28
May 3, 1978	1410	12	26.5	28
May 25, 1978	1355	14	27	--
June 13, 1978	1430	11	28	29.5
June 29, 1978	1355	11	27	28.5
July 14, 1978	0910	12	25	27.5
July 27, 1978	1345	16	25	27.5
Aug. 9, 1978	1355	14	26	27
Aug. 23, 1978	1410	11	26	28.5
Sept. 11, 1978	1430	6.7	27	30
Oct. 5, 1978	1050	13	26.5	29
Oct. 27, 1978	0945	9.8	25	27.5
Nov. 8, 1978	1115	8.2	25.5	27
Nov. 30, 1978	1410	11	28	31
Dec. 12, 1978	1345	16	26	29
Dec. 22, 1978	0950	8.5	26	28.5
Jan. 5, 1979	1035	4.9	26	28
Jan. 19, 1979	0950	4.6	24	27
Jan. 30, 1979	1425	7.2	26	28.5
Feb. 16, 1979	1015	3.3	26	29
Mar. 5, 1979	1355	4.8	28	30
Mar. 15, 1979	1400	22	26	28
Mar. 30, 1979	1015	4.7	26	29
Apr. 23, 1979	0940	2.4	26	28
May 15, 1979	0930	17	26	29
June 1, 1979	0940	18	26	28
June 12, 1979	1050	23	26	28
June 29, 1979	1350	34	26	28

Table 45. Water and air temperatures and instantaneous discharges at Lewi River at mouth--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
July 17, 1979	1405	19	26	27
Aug. 3, 1979	1105	21	26	30
Aug. 16, 1979	1520	20	25	27
Sept. 14, 1979	1020	4.6	26	28
Oct. 5, 1979	1420	24	26	27
Oct. 17, 1979	1335	16	27	30
Oct. 26, 1979	1435	8.6	26.5	--
Nov. 20, 1979	1335	20	27	29
Dec. 13, 1979	1340	18	26	29
Dec. 26, 1979	1450	10	26	28
Jan. 29, 1980	1300	7.8	26	29
Feb. 28, 1980	1350	7.6	26	31
Mar. 12, 1980	1400	6.4	26	29
Apr. 8, 1980	1050	4.8	26	32
Apr. 24, 1980	1420	22	26	31
May 10, 1980	1330	51	26.5	27.5
June 5, 1980	1440	42	26	28
June 16, 1980	1350	22	25	29
July 1, 1980	1120	14	26	31
July 17, 1980	0920	11	24	28
Aug. 15, 1980	1050	28	28	30
Aug. 29, 1980	0930	16	24	29
Sept. 23, 1980	1005	23	25	28
Sept. 29, 1980	0950	20	25	29
Nov. 6, 1980	0830	9.3	24	27
Dec. 4, 1980	1010	4.8	25.5	29

Table 46. Water and air temperatures and instantaneous discharges at Dauen Neu River

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Feb. 14, 1970	1320	0.78	26	--
Feb. 22, 1970	1245	1.9	27	--
May 20, 1970	1345	22	26	--
May 21, 1970	1010	19	25	25
Nov. 18, 1970	1705	4.9	26	--
Jan. 9, 1971	1510	13	26	--
Apr. 21, 1971	1445	5.8	24	--
May 3, 1971	1715	18	24	--
May 17, 1971	1020	4.2	25	--
June 1, 1971	1325	7.4	26	--
June 14, 1971	1005	19	24	--
June 29, 1971	1040	5.5	25	--
July 19, 1971	0955	8.4	24	--
Feb. 27, 1974	1505	18	25	30
Mar. 19, 1974	1100	5.8	26	31
Apr. 2, 1974	1545	8.3	25	30
Apr. 22, 1974	1540	7.8	25	30
Apr. 30, 1974	1550	12	26	32
May 16, 1974	0930	6.9	25	30
June 28, 1974	1000	7.0	25	30
July 8, 1974	1420	7.8	24	28
July 23, 1974	1420	12	26	30
Aug. 6, 1974	1040	7.2	26.5	31
Aug. 20, 1974	0950	3.7	25	31
Sept. 9, 1974	1050	1.1	25	31
Oct. 29, 1974	1440	3.8	24	29
Nov. 4, 1974	1020	4.0	23	26
Nov. 26, 1974	1055	3.9	25	30
Dec. 16, 1974	1030	11	24	29
Jan. 22, 1975	1145	0.67	--	26
Feb. 4, 1975	1255	.10	24	26
Feb. 18, 1975	1040	.77	24	28
Mar. 4, 1975	1050	3.7	25	28
Mar. 18, 1975	1055	5.8	24	27
Apr. 3, 1975	0915	.28	24	28
Apr. 15, 1975	1400	2.5	24	29
Apr. 29, 1975	1453	5.8	25	29
May 13, 1975	1405	3.5	25	29
June 3, 1975	1050	4.9	24	28
June 17, 1975	0950	5.8	26	29
June 30, 1975	1355	10	24	28

Table 46. Water and air temperatures and instantaneous discharges at Dauen Neu River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
July 18, 1975	0935	14	25	28
Nov. 17, 1975	1100	7.7	25	30
Dec. 1, 1975	1045	--	25	31
Jan. 15, 1976	1105	3.9	24	26
Feb. 3, 1976	1355	6.2	26	30
Mar. 2, 1976	1035	6.6	25	29
Mar. 9, 1976	1345	4.2	26	28
Apr. 9, 1981	1200	4.7	26	--
Oct. 21, 1981	1455	14	26	--

Table 47. Water and air temperatures and instantaneous discharges at Nankewi River

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
May 19, 1971	1055	8.3	25	--
June 28, 1971	0945	12	24	--
Nov. 6, 1974	0930	7.1	24	32
Feb. 25, 1976	1430	6.4	24	27
Nov. 20, 1980	1520	7.5	28.5	--
Mar. 30, 1981	1700	8.7	26	--

Table 48. Water and air temperatures and instantaneous discharges at Kiriedleng River

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Oct. 30, 1974 ----------	1320	6.6	25	32
Nov. 6, 1974 ----------	1420	6.0	24	30
Nov. 29, 1974 ----------	1445	6.9	25	28
Apr. 2, 1974 ----------	1330	1.8	25	30
Feb. 25, 1974 ----------	1320	3.0	24	27
Mar. 1, 1977 ----------	1145	.59	26	31
Mar. 30, 1981 ----------	1600	8.7	25	--

Table 49. Water and air temperatures and instantaneous discharges at Luhpwor River

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Jan. 26, 1974	1200	2.0	24.5	27
Feb. 14, 1974	1005	3.5	26	31
Feb. 26, 1974	1055	3.6	25	28
Mar. 20, 1974	1015	4.1	26	30.5
Apr. 4, 1974	1150	5.2	26	32
Apr. 19, 1974	1050	4.8	26	29
May 3, 1974	1045	4.6	26	30
May 5, 1974	1100	2.6	25	30
May 21, 1974	0950	3.0	26	31
June 27, 1974	1135	5.3	24	29
July 10, 1974	1000	4.8	24	27
July 25, 1974	1330	5.0	27	30.5
Aug. 15, 1974	1200	5.8	26	30
Aug. 22, 1974	1050	3.6	25	32
Nov. 6, 1974	1235	3.0	25	29
Nov. 29, 1974	1210	7.9	25	28
Dec. 18, 1974	1120	6.6	24	27
Jan. 21, 1975	1430	1.8	25	26
Feb. 6, 1975	1140	.77	24	29
Feb. 20, 1975	1150	.68	25	29
Mar. 5, 1975	1055	3.1	25	29
Mar. 20, 1975	1115	3.9	24	28
Apr. 2, 1975	1015	1.2	25	30
May 2, 1975	1105	7.4	24	28
May 20, 1975	1005	7.6	24	27
June 5, 1975	1105	8.0	25	28
June 24, 1975	1100	9.7	25	29
July 1, 1975	1020	4.6	24	28
July 17, 1975	0930	7.5	24	28
July 30, 1975	1105	7.9	24	28
Oct. 9, 1975	1010	5.0	24	28
Oct. 23, 1975	1025	14	23	28
Nov. 6, 1975	1050	9.8	24	29
Nov. 19, 1975	1045	4.2	24	29
Dec. 23, 1975	1045	6.0	25	29
Jan. 13, 1976	1300	1.3	26	31
Jan. 28, 1976	1010	1.6	25.5	27
Feb. 1, 1976	1005	1.2	25.5	27
Feb. 25, 1976	1130	2.1	24	27
Mar. 23, 1976	1040	11	25	28
Apr. 8, 1976	1310	4.1	26	29
May 4, 1976	1145	4.7	24	27

Table 49. Water and air temperatures and instantaneous discharges at Luhpwor River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
May 27, 1976	1020	4.9	24	28
June 15, 1976	1150	6.4	26	28
June 29, 1976	1100	4.4	26	28
July 13, 1976	0945	5.6	25	27
July 27, 1976	1430	2.8	26.5	29
Sept. 14, 1976	1035	5.1	26	29
Oct. 6, 1976	1115	1.7	24.5	29
Oct. 27, 1976	1100	6.4	24	28
Nov. 22, 1976	1020	6.4	24	28
Dec. 7, 1976	1050	4.2	25	28
Dec. 21, 1976	1100	3.3	24	28
Jan. 4, 1977	1020	1.8	25.5	28.5
Jan. 18, 1977	1030	5.5	25	28
Feb. 1, 1977	1050	1.8	25	28
Feb. 15, 1977	1100	1.3	25	28
Mar. 1, 1977	1015	1.2	26	30
Mar. 31, 1977	1020	9.5	25	28
Apr. 13, 1977	1045	1.4	26.5	28
Apr. 27, 1977	1115	8.0	26	28
May 12, 1977	1200	6.1	26	29
May 25, 1977	1020	3.4	26.5	30
June 7, 1977	1030	3.5	27	30
June 24, 1977	1015	16	26	28
July 20, 1977	1120	2.9	27	30
Aug. 2, 1977	1120	4.9	26	28
Aug. 23, 1977	1100	4.6	27	31.5
Sept. 13, 1977	1150	5.2	26	28
Oct. 11, 1977	1200	6.3	27	29.5
Oct. 25, 1977	1320	3.0	26	29
Nov. 9, 1977	1100	4.5	26	29
Nov. 22, 1977	1200	5.2	26	29.5
Dec. 20, 1977	1155	1.6	26	29
Jan. 3, 1978	1150	1.3	26	28
Jan. 18, 1978	1150	5.9	26	29
Feb. 1, 1978	1230	2.7	25.5	27
Feb. 15, 1978	1135	2.8	26	28.5
Mar. 1, 1978	1125	2.7	25.5	28
Mar. 14, 1978	1120	1.7	26	30
Mar. 28, 1978	1230	1.1	26	28
Apr. 11, 1978	1140	9.7	26	29
May 2, 1978	1035	4.3	26	28

Table 49. Water and air temperatures and instantaneous discharges at Luhpwor River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
May 25, 1978	1025	2.3	26	--
June 14, 1978	1145	3.6	26.5	28
June 27, 1978	1440	5.2	27	28
July 11, 1978	1145	3.4	26	29
July 25, 1978	1045	5.2	26	28
Aug. 8, 1978	1255	2.6	27	31
Aug. 22, 1978	1215	3.4	26	30
Sept. 6, 1978	1300	3.6	24	27
Sept. 20, 1978	1145	2.2	26.5	29
Oct. 4, 1978	1140	4.9	26	28
Oct. 25, 1978	1245	2.9	27	29
Nov. 7, 1978	1150	2.6	25	27
Nov. 21, 1978	1155	7.0	27	30.5
Dec. 6, 1978	1245	4.4	27	30.5
Dec. 19, 1978	1145	3.8	26	29
Jan. 3, 1979	1415	2.5	27	30
Jan. 16, 1979	1230	2.3	26	28
Jan. 29, 1979	1415	3.4	27	29
Feb. 13, 1979	1440	3.7	25.5	27
Feb. 27, 1979	1140	5.1	26	30
Mar. 13, 1979	1220	9.4	26	28
Mar. 27, 1979	1315	2.4	27	29
Apr. 23, 1979	1415	7.2	26	29
May 17, 1979	1000	12	26	28
May 31, 1979	1335	5.5	26	28
June 7, 1979	1250	5.6	27	30
June 12, 1979	1555	7.3	26	29
June 27, 1979	1530	6.1	26	28
July 11, 1979	1330	3.8	27	29
July 31, 1979	1430	12	26	28
Aug. 14, 1979	1150	15	26	28.5
Sept. 11, 1979	1150	3.7	26	28
Oct. 5, 1979	1235	10	25	27
Oct. 17, 1979	1110	3.6	26	30
Oct. 29, 1979	1030	12	26	--
Nov. 14, 1979	1420	4.5	27	29
Dec. 11, 1979	1300	2.8	27	29
Dec. 28, 1979	1050	4.2	25	28

Table 49. Water and air temperatures and instantaneous discharges at Luhpwor River--Continued

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Feb. 26, 1980	1415	2.5	26	29
Mar. 13, 1980	1430	4.8	25	29
Apr. 9, 1980	1340	1.8	26	30
Apr. 23, 1980	1510	7.1	27	31
May 21, 1980	1130	5.3	27	28
June 9, 1980	1150	14	25	31
June 17, 1980	1225	6.8	26	28
July 2, 1980	1330	6.2	26	30
July 16, 1980	1400	5.4	26	30
Aug. 15, 1980	1500	6.8	24	29
Aug. 29, 1980	1200	7.6	25	30
Sept. 12, 1980	1220	5.1	24	29
Sept. 24, 1980	1200	6.0	26	31
Nov. 4, 1980	1230	3.5	24	29
Dec. 3, 1980	1140	1.7	25	30

Table 50. Water and air temperatures and instantaneous discharges at Lehn Mesi River at hanging bridge

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Feb. 12, 1976	1245	39	27	31
Mar. 4, 1977	1150	37	26	30
Mar. 28, 1981	1230	75	25	--

Table 51. Water and air temperatures and instantaneous discharges at Senipehn River

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
June 1, 1977	1230	38	25	--
Feb. 10, 1976	1315	25	27	29
May 22, 1980	1230	194	27	28
Mar. 27, 1981	1500	75	26	--

Table 52. Water and air temperatures and instantaneous discharges at Lehdau River

Date	Time	Instantaneous discharge (ft^3/s)	Water temperature (^oC)	Air temperature (^oC)
Apr. 13, 1971	1200	21	25	--
July 1, 1971	1120	22	24	--
Feb. 10, 1976	1155	6.1	26	26.5
May 22, 1980	1130	76	25	26
Mar. 27, 1981	1230	32	26	--

Table 53. Monthly and annual mean air temperatures at Kolonia (1949-81)

[Source: U.S. National Oceanic and Atmospheric Administration, 1981. Converted from degrees Fahrenheit to degrees Celsius]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1949	--	--	--	--	--	--	--	--	--	--	--	27.0	--
1950	27.6	27.4	28.1	27.7	27.7	27.3	26.6	26.9	27.2	26.9	26.6	26.6	27.2
1951	27.1	26.5	26.4	26.3	--	--	27.4	26.7	26.7	26.9	27.6	27.2	--
1952	27.2	27.9	27.6	27.4	27.4	27.3	26.9	26.5	26.8	27.2	26.9	26.9	27.2
1953	27.1	27.3	27.5	27.5	27.5	27.4	26.9	26.5	26.8	27.3	27.1	27.1	27.2
1954	27.2	27.1	27.4	27.3	27.2	26.7	26.5	26.4	26.6	26.1	26.7	26.9	26.8
1955	27.0	27.3	26.8	26.3	26.0	26.4	26.4	26.7	26.4	26.4	26.8	26.3	26.6
1956	26.8	27.0	26.9	26.5	26.7	26.6	26.2	26.4	26.4	26.7	27.1	27.1	26.7
1957	27.1	26.9	27.7	27.5	27.7	27.3	27.2	26.9	27.2	27.4	26.7	28.0	27.3
1958	27.3	26.7	26.8	27.2	27.1	26.9	26.7	27.0	27.3	27.3	26.8	27.1	27.1
1959	27.1	26.6	27.0	26.8	26.9	26.9	26.7	26.9	26.8	27.0	27.2	27.0	26.9
1960	27.1	27.0	27.0	26.9	26.8	27.1	26.9	26.6	26.9	26.8	27.2	27.1	26.9
1961	26.9	27.2	27.2	27.6	26.8	26.7	26.5	26.7	26.5	26.7	26.6	27.0	26.9
1962	26.7	27.2	27.2	27.2	27.1	27.1	26.8	26.5	26.7	26.7	26.7	27.2	26.9
1963	26.4	26.8	27.0	26.9	27.2	26.9	26.8	26.9	26.8	26.7	27.2	27.3	26.9
1964	27.7	27.6	27.2	27.1	26.8	26.5	26.4	26.5	26.6	26.4	26.7	26.4	26.8
1965	26.9	27.0	27.2	26.8	27.1	26.9	26.1	26.7	26.6	26.9	26.7	27.0	26.8
1966	26.7	27.4	27.1	27.6	27.0	27.2	26.9	27.3	26.9	26.9	26.8	26.9	27.1
1967	27.5	27.0	26.9	26.7	27.3	26.9	26.7	26.7	26.6	26.6	26.8	27.3	26.9
1968	27.3	27.0	26.8	26.6	26.7	26.7	26.4	26.9	26.6	26.6	26.7	27.0	26.8
1969	26.8	26.2	26.8	27.1	27.3	27.1	26.5	26.4	26.6	27.6	26.4	27.1	26.7
1970	27.1	27.8	27.7	27.6	27.6	27.1	26.7	26.7	26.3	27.3	26.7	27.4	27.1
1971	26.9	26.3	26.4	26.5	26.6	26.4	26.4	26.3	26.8	26.6	27.0	27.3	26.7
1972	27.0	27.1	27.1	26.7	26.7	27.2	26.4	26.6	26.6	26.7	27.3	27.5	26.9
1973	27.2	27.1	27.9	27.2	27.5	27.4	27.5	27.2	27.0	26.9	27.6	27.3	27.3
1974	26.6	27.5	27.2	27.1	27.3	26.4	26.6	26.9	26.8	26.7	27.1	27.1	26.9
1975	27.7	27.9	27.2	27.5	27.2	26.8	26.6	26.8	26.9	26.4	26.8	26.4	27.0
1976	27.6	26.8	27.3	26.7	26.8	26.9	26.8	26.6	26.4	27.2	27.1	27.1	26.9
1977	27.2	28.1	27.7	27.8	27.4	27.5	27.3	27.6	27.5	27.2	27.2	27.6	27.5
1978	27.3	27.4	28.1	27.4	27.8	27.0	27.1	27.4	27.2	27.2	27.1	27.6	27.3
1979	27.6	27.5	27.6	27.0	27.6	27.6	27.4	27.1	27.7	27.6	27.6	27.3	27.4
1980	27.7	27.6	28.2	28.0	27.2	27.6	27.4	27.4	27.0	27.4	27.7	27.9	27.6
1981	27.6	27.6	27.9	27.8	27.9	27.5	27.3	27.6	27.7	27.7	27.7	27.7	27.7
Mean	27.2	27.2	27.3	27.2	27.2	27.0	26.8	26.8	26.8	26.9	27.0	27.2	27.1
Max.	30.2	30.1	30.3	30.4	30.6	30.7	30.8	31.0	31.1	31.1	30.9	30.5	31.1
Min.	24.1	24.2	24.1	23.8	23.7	23.3	22.7	22.6	22.6	22.7	23.0	23.8	22.6

Table 54. Chemical analyses of water from rivers in northeast Ponape (Uh municipality)

[Ft^3/s, cubic feet per second; µmho, micromho per centimeter at 25°C; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituents		16897470 Pahntakai River	16897480 Unnamed river near Cape Uh	16897500 Kepin Awak River	
Time ----------		4-10-81 1430	11-21-80 1715	11-21-80 1630	4-10-81 1200
Discharge, instantaneous ----	ft^3/s	5.0	1.5	10	12
Specific conductance --------	µmho	75	127	47	59
pH -------------------------	--	7.9	7.4	7.7	7.7
Temperature, water ----------	°C	26.0	27.0	26.5	26.0
Oxygen, dissolved -----------	mg/L	8.3	--	--	7.1
Hardness as $CaCO_3$ --------	mg/L	28	46	15	20
Noncarbonate hardness -------	mg/L	0	0	5	8
Calcium, dissolved (Ca) -----	mg/L	6.0	8.5	3.2	4.4
Magnesium, dissolved (Mg) ---	mg/L	3.2	6.1	1.6	2.2
Sodium, dissolved (Na) ------	mg/L	4.5	4.7	2.8	4.9
Percent sodium --------------	percent	25	18	29	34
Sodium adsorption ratio -----	--	.4	.3	.3	.5
Potassium, dissolved (K) ----	mg/L	.3	.7	.4	.3
Alkalinity, total as $CaCO_3$ --	mg/L	30	41	7	23
Sulfate, dissolved (SO_4) ----	mg/L	.9	.9	.8	1.6
Chloride, dissolved (Cl) ----	mg/L	6.1	4.7	4.1	5.9
Fluoride, dissolved (F) -----	mg/L	.1	.2	.1	.1
Silica, dissolved (SiO_2) ----	mg/L	15	29	8.4	10
Solids, dissolved, sum of constituents -------	mg/L	55	82	27	43
Solids, dissolved, ton per acre foot ---------	ton/ac-ft	--	.11	.04	--
Nitrite plus nitrate, dissolved as N ----------	mg/L	.04	.56	.32	.11
Iron, dissolved (Fe) --------	µg/L	150	150	150	180
Manganese, dissolved (Mn) ---	µg/L	10	3	4	4

Table 55. Chemical analyses of water from rivers near Kolonia (Net municipality)
[Ft^3/s, cubic feet per second; µmho, micromho per centimeter at 25°C; NTU, nephelometric turbidity units; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituents		16897550 Meitik River		16897750 Kiepw River	16897800 Kiepw River at mouth	16898300 Dauen Neu River	
Time		5-20-80 1630	11-21-80 1340	4-9-81 1530	11-21-80 1440	4-9-81 1200	10-21-81 1455
Discharge, instantaneous	ft^3/s	55	22	53	55	4.7	14
Specific conductance	µmho	45	59	35	42	90	104
pH	--	6.9	7.1	7.7	6.8	7.5	7.6
Temperature, water	°C	27.5	27.5	25.0	28.0	26.0	26.0
Turbidity	NTU	1.0	--	--	--	--	--
Oxygen, dissolved	mg/L	7.8	7.5	8.5	7.8	7.5	--
Hardness as $CaCO_3$	mg/L	16	29	15	13	38	44
Noncarbonate hardness	mg/L	0	8	1	0	6	10
Calcium, dissolved (Ca)	mg/L	1.9	5.4	3.6	2.7	10	12
Magnesium, dissolved (Mg)	mg/L	2.8	3.8	1.4	1.5	3.2	3.3
Sodium, dissolved (Na)	mg/L	2.3	3.3	6.5	2.5	3.6	3.9
Percent sodium	percent	23	19	48	29	16	16
Sodium adsorption ratio	--	.2	.3	.7	.3	.2	.3
Potassium, dissolved (K)	mg/L	.2	.6	.4	.3	.2	.2
Alkalinity, total as $CaCO_3$	mg/L	17	21	14	15	32	34
Sulfate, dissolved (SO_4)	mg/L	.1	2.2	.4	.1	1.7	5.0
Chloride, dissolved (Cl)	mg/L	3.6	3.1	4.1	3.2	4.8	5.1
Fluoride, dissolved (F)	mg/L	.1	.1	.1	0	.1	.1
Silica, dissolved (SiO_2)	mg/L	12	14	8.7	9.7	8.2	7.0
Solids, dissolved, sum of constituents	mg/L	33	45	34	29	51	58
Solids, dissolved, ton per acre foot	ton/ac-ft	.04	.06	--	.04	--	--
Nitrite plus nitrate, dissolved as N	mg/L	.02	0	.03	0	--	.17
Iron, dissolved (Fe)	µg/L	110	230	100	160	170	92
Manganese, dissolved (Mn)	µg/L	5	7	4	10	6	10

Table 56. Chemical analyses of water from Nanpil River (16897600)

[Ft^3/s, cubic feet per second; µmho, micromho per centimeter at 25°C; NTU, nephelometric turbidity units; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituents		8-3-71	5-24-78	5-16-79	10-27-79	5-20-80	11-21-80	10-30-82
Time		1005	1400	1030	1030	1100	1240	1650
Discharge, instantaneous	ft^3/s	26	9.3	62	21	26	13	4.7
Specific conductance	µmho	21	26	28	21	22	32	26
pH	--	--	7.0	6.9	7.5	6.6	6.8	6.5
Temperature, water	°C	24	26	24	25	25	26.5	25.5
Turbidity	NTU	--	--	--	--	.6	--	--
Oxygen, dissolved	mg/L	--	8.0	8.2	7.6	8.9	--	--
Hardness as $CaCO_3$	mg/L	7	11	6	6	8	9	7
Noncarbonate hardness	mg/L	2	5	4	2	4	--	0
Calcium, dissolved (Ca)	mg/L	1.4	1.5	1.4	1.0	2.0	2.3	1.1
Magnesium, dissolved (Mg)	mg/L	.8	1.7	.7	.8	.8	.9	.9
Sodium, dissolved (Na)	mg/L	1.7	2.5	2.2	2.1	1.9	1.9	2.3
Percent sodium	percent	--	34	41	44	33	30	43
Sodium adsorption ratio	--	--	.3	.4	.4	.3	.3	.4
Potassium, dissolved (K)	mg/L	.1	0	.5	.1	.2	.2	.1
Bicarbonate (HCO_3)	mg/L	6	7	--	--	--	--	--
Carbonate (CO_3)	mg/L	0	0	--	--	--	--	--
Alkalinity, total as $CaCO_3$	mg/L	5	6	2	4	4	--	11
Sulfate, dissolved (SO_4)	mg/L	--	2.6	3.1	3.9	--	2.0	< 5
Chloride, dissolved (Cl)	mg/L	3.0	4.2	5.3	2.9	4.9	3.1	3.0
Fluoride, dissolved (F)	mg/L	0	0	0	0	.1	.1	< .1
Silica, dissolved (SiO_2)	mg/L	4.8	6.5	4.8	5.3	4.9	5.9	6.8
Solids, dissolved, sum of constituents	mg/L	15	23	19	19	17	--	--
Solids, dissolved, ton per acre foot	ton/ac-ft	--	.03	.03	.03	.02	--	--
Nitrite plus nitrate, dissolved as N	mg/L	0	--	.04	.01	.02	.04	< .1
Iron, dissolved (Fe)	µg/L	--	50	60	60	40	100	56
Manganese, dissolved (Mn)	µg/L	--	0	.7	2	< 3	2	1

Table 57. Chemical analyses of water from Lewi River (16897900)

[Ft^3/s, cubic feet per second; µmho, micromho per centimeter at 25°C; NTU, nephelometric turbidity units; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituents		8-3-71	5-24-78	5-16-79	10-27-79	5-20-80	11-21-80
Time		1105	1100	1300	1330	1300	1110
Discharge, instantaneous	ft^3/s	3.4	1.2	5.9	3.3	4.2	3.6
Specific conductance	µmho	31	40	38	30	31	38
pH	--	--	6.8	6.9	6.6	6.7	6.7
Temperature, water	°C	25	26	25	26.5	26.5	26.0
Turbidity	NTU	--	--	--	--	2.4	--
Oxygen, dissolved	mg/L	--	7.6	7.9	7.6	7.8	7.2
Hardness as $CaCO_3$	mg/L	12	16	14	10	10	14
Noncarbonate hardness	mg/L	2	4	4	3	0	0
Calcium, dissolved (Ca)	mg/L	2.2	2.4	2.7	1.5	1.4	2.6
Magnesium, dissolved (Mg)	mg/L	1.6	2.5	1.7	1.5	1.5	1.9
Sodium, dissolved (Na),	mg/L	1.9	2.5	2.5	2.1	2.1	2.2
Percent sodium	percent	--	25	28	31	32	25
Sodium adsorption ratio	--	--	.3	.3	.3	.3	.3
Potassium, dissolved (K)	mg/L	.1	0	.4	.1	.1	.2
Bicarbonate (HCO_3)	mg/L	12	15	--	--	--	--
Carbonate (CO_3)	mg/L	0	0	--	--	--	--
Alkalinity, total as $CaCO_3$	mg/L	10	12	10	7	10	16
Sulfate, dissolved (SO_4)	mg/L	.2	2.2	3.9	4.9	1.0	.4
Chloride, dissolved (Cl)	mg/L	3.0	3.8	5.5	3.1	3.3	3.3
Fluoride, dissolved (F)	mg/L	0	0	0	0	.1	.1
Silica, dissolved (SiO_2)	mg/L	8.3	11	7.6	8.1	7.9	9.7
Solids, dissolved, sum of constituents	mg/L	23	32	31	26	23	30
Solids, dissolved, ton per acre foot	ton/ac-ft	--	.04	.04	.04	.03	.04
Nitrite plus nitrate, dissolved as N	mg/L	0	--	.07	.01	.02	0
Iron, dissolved (Fe)	µg/L	--	80	70	90	60	130
Manganese, dissolved (Mn)	µg/L	--	0	10	3	3	3

Table 58. Chemical analyses of water from Lewi River at mouth (16898200)

[Ft^3/s, cubic feet per second; µmho, micromho per centimeter at 25°C; NTU, nephelometric turbidity units; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituents		8-3-71	5-25-78	5-15-79	10-26-79		5-10-80	11-20-80
Time		1410	1530	0930	1500	1600	1330	1640
Discharge, instantaneous	ft^3/s	5.3	14	17	10	223	51	9.4
Specific conductance	µmho	41	46	48	53	24	32	57
pH	--	--	7.5	7.0	7.6	6.8	6.5	7.1
Temperature, water	°C	27.0	27.0	26.0	26.5	25.0	26.5	27.5
Turbidity	NTU	--	--	--	--	--	4.3	--
Oxygen, dissolved	mg/L	--	7.6	8.3	7.9	--	8.2	8.0
Hardness as $CaCO_3$	mg/L	17	21	20	20	9	10	20
Noncarbonate hardness	mg/L	4	5	5	4	5	5	5
Calcium, dissolved (Ca)	mg/L	2.9	3.6	3.9	3.0	1.4	1.5	3.1
Magnesium, dissolved (Mg)	mg/L	2.3	3.0	2.4	3.1	1.3	1.5	3.0
Sodium, dissolved (Na)	mg/L	2.0	2.5	2.3	3.3	1.9	2.0	2.7
Percent sodium	percent	--	20	20	26	30	30	22
Sodium adsorption ratio	--	--	.2	.2	.3	.3	.3	.3
Potassium, dissolved (K)	mg/L	.1	.1	.2	.2	.6	.2	.2
Bicarbonate (HCO_3)	mg/L	16	20	--	--	--	--	--
Carbonate (CO_3)	mg/L	0	0	--	--	--	--	--
Alkalinity, total as $CaCO_3$	mg/L	13	16	15	16	4	5	15
Sulfate, dissolved (SO_4)	mg/L	.4	2.4	3.1	5.7	6.1	4.2	.6
Chloride, dissolved (Cl)	mg/L	3.5	6.9	4.4	4.4	2.8	3.0	3.2
Fluoride, dissolved (F)	mg/L	0	0	.1	.1	0	.1	.2
Silica, dissolved (SiO_2)	mg/L	7.5	11	9.3	13	4.3	6.2	13
Solids, dissolved, sum of constituents	mg/L	27	39	35	43	21	22	35
Solids, dissolved, ton per acre foot	ton/ac-ft	--	.05	.05	.06	.03	.03	.05
Nitrite plus nitrate, dissolved as N	mg/L	0	--	.09	.02	.02	.05	0
Iron, dissolved (Fe)	µg/L	--	110	120	110	170	90	120
Manganese, dissolved (Mn)	µg/L	--	0	60	5	7	4	2

Table 59. Chemical analyses of water from rivers in northwest Ponape (Sokehs municipality)

[Ft^3/s, cubic feet per second; µmho, micromho per centimeter at 25°C; NTU, nephelometric turbidity units; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituents		16898500 Nankewi River		16898550 Kiriedleng River	
Time		11-20-80 1520	3-30-81 1700	11-20-80 1330	3-30-81 1600
Discharge, instantaneous	ft^3/s	7.5	8.7	2.8	3.6
Specific conductance	µmho	56	53	46	47
pH	--	7.2	7.3	6.8	6.5
Temperature, water	°C	28.5	26.0	--	25.0
Turbidity	NTU	--	2.2	--	1.6
Oxygen, dissolved	mg/L	7.6	7.7	7.8	7.6
Hardness as $CaCO_3$	mg/L	19	17	16	--
Noncarbonate hardness	mg/L	3	3	0	--
Calcium, dissolved (Ca)	mg/L	4.7	4.1	3.4	--
Magnesium, dissolved (Mg)	mg/L	1.8	1.7	1.7	--
Sodium, dissolved (Na)	mg/L	2.8	3.2	2.6	--
Percent sodium	percent	24	28	26	--
Sodium adsorption ratio	--	.3	.3	.3	--
Potassium, dissolved (K)	mg/L	.2	.2	.4	--
Alkalinity, total as $CaCO_3$	mg/L	16	14	18	10
Sulfate, dissolved (SO_4)	mg/L	1.1	.6	.3	1.7
Chloride, dissolved (Cl)	mg/L	3.3	4.0	3.0	4.0
Fluoride, dissolved (F)	mg/L	.1	.1	.1	.1
Silica, dissolved (SiO_2)	mg/L	14	13	16	--
Solids, dissolved, sum of constituents	mg/L	38	32	38	--
Solids, dissolved, ton per acre foot	ton/ac-ft	.05	--	.05	--
Nitrite plus nitrate, dissolved as N	mg/L	0	.18	0	.12
Iron, dissolved (Fe)	µg/L	80	130	40	--
Manganese, dissolved (Mn)	µg/L	4	6	1	--

Table 60. Chemical analyses of water from Luhpwor River (16898600)

[Ft^3/s, cubic feet per second; µmho, micromho per centimeter at 25°C; NTU, nephelometric turbidity units; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituents		5-25-78	5-17-79	10-29-79	5-21-80	11-20-80	10-13-82	
Time ----------		0930	1000	1030	1100	1315	1040	1/ 1450
Discharge, instantaneous ----	ft^3/s	2.3	13	11	5.6	2.6	1.9	0.51
Specific conductance --------	µmho	52	43	36	44	48	54	52
pH --------------------------	--	7.2	7.2	7.6	7.1	7.1	7.2	7.5
Temperature, water ----------	°C	26	26	26	27	27	26.0	25.5
Turbidity -------------------	NTU	--	--	--	1.0	--	--	--
Oxygen, dissolved -----------	mg/L	8.2	7.6	6.1	8.4	7.5	--	--
Hardness as $CaCO_3$ ----------	mg/L	24	14	14	14	17	20	22
Noncarbonate hardness -------	mg/L	6	7	3	0	1	0	0
Calcium, dissolved (Ca) -----	mg/L	4.9	2.9	2.9	2.8	3.5	3.9	4.7
Magnesium, dissolved (Mg) ---	mg/L	2.9	1.6	1.7	1.8	2.0	2.4	2.4
Sodium, dissolved (Na) ------	mg/L	2.9	2.4	2.0	2.5	2.5	2.8	2.9
Percent sodium --------------	percent	21	27	23	27	24	24	22
Sodium adsorption ratio -----	--	.3	.3	.2	.3	.3	.3	.3
Potassium, dissolved (K) ----	mg/L	.1	.5	.1	.2	.2	.1	.2
Bicarbonate (HCO_3) ----------	mg/L	22	--	--	--	--	--	--
Carbonate (CO_3) ------------	mg/L	0	--	--	--	--	--	--
Alkalinity, total as $CaCO_3$ --	mg/L	18	7	11	14	16	23	23
Sulfate, dissolved (SO_4) ----	mg/L	3.1	3.1	4.7	1.3	1.0	< 5	< 5
Chloride, dissolved (Cl) ----	mg/L	4.6	3.8	2.7	3.0	2.9	3.2	3.2
Fluoride, dissolved (F) -----	mg/L	0	.1	0	.1	0	< .1	< .1
Silica, dissolved (SiO_2) ----	mg/L	13	8.6	8.8	12	13	15	15
Solids, dissolved, sum of constituents -------	mg/L	42	28	30	32	35	--	--
Solids, dissolved, ton per acre foot ---------	ton/ac-ft	.06	.04	.04	.04	.05	--	--
Nitrite plus nitrate, dissolved as N ----------	mg/L	--	.04	.01	.02	0	.17	.12
Iron, dissolved (Fe) --------	µg/L	80	120	100	100	190	210	22
Manganese, dissolved (Mn) ---	µg/L	0	10	4	8	4	6	3

1/ At Japanese dam, 1.1 mi upstream from gaging station.

Table 61. Chemical analyses of water from rivers in southwest Ponape

(Kiti municipality)

[Ft^3/s, cubic feet per second; µmho, micromho per centimeter at 25°C; NTU, nephelometric turbidity units; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituents		16898620 Seniahdak River		16898650 Pehleng River		16898690 Lehn Mesi River	16898700 Lehn Mesi River at hanging bridge
Time		10-23-81 1305	11-8-82 1425	3-30-81 1430	10-23-81 1340	10-25-82 1220	3-28-81 1230
Discharge, instantaneous	ft^3/s	3.8	9.7	15	8.4	27	75
Specific conductance	µmho	41	38	37	35	42	36
pH	--	7.2	6.8	7.6	7.6	7.1	7.5
Temperature, water	°C	28.0	26.0	26.0	--	26.0	25.0
Turbidity	NTU	--	--	2.1	--	--	1.3
Oxygen, dissolved	mg/L	--	--	8.2	--	--	8.7
Hardness as $CaCO_3$	mg/L	16	13	11	24	15	11
Noncarbonate hardness	mg/L	7	0	4	15	0	4
Calcium, dissolved (Ca)	mg/L	3.1	2.2	2.1	7.0	2.2	1.8
Magnesium, dissolved (Mg)	mg/L	2.0	1.8	1.4	1.5	2.4	1.6
Sodium, dissolved (Na)	mg/L	2.5	2.3	2.9	2.5	2.4	2.5
Percent sodium	percent	25	28	36	19	25	32
Sodium adsorption ratio	--	.3	.3	.4	.2	.3	.3
Potassium, dissolved (K)	mg/L	.2	.2	.2	.2	.2	.2
Alkalinity, total as $CaCO_3$	mg/L	9	16	7	9	20	7
Sulfate, dissolved (SO_4)	mg/L	5.0	< 5	.6	5.0	< 5	.5
Chloride, dissolved (Cl)	mg/L	3.0	3.3	3.5	11	2.8	3.3
Fluoride, dissolved (F)	mg/L	< .1	< .1	.1	< .1	< .1	.1
Silica, dissolved (SiO_2)	mg/L	11	9.6	9.5	10	11	7.6
Solids, dissolved, sum of constituents	mg/L	33	--	24	43	--	22
Nitrite plus nitrate, dissolved as N	mg/L	.18	.11	.04	.18	< .1	.09
Iron, dissolved (Fe)	µg/L	34	62	80	58	26	70
Manganese, dissolved (Mn)	µg/L	4	1	3	9	1	3

Table 62. Chemical analyses of water from rivers in Madolenihmw

[Ft^3/s, cubic feet per second; µmho, micromho per centimeter at 25°C; NTU, nephelometric turbidity units; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituents		16898900 Keprohi River		16899000 Senipehn River		16899100 Lehdau River	
Time		3-27-81 1700	11-2-82 1200	5-22-80 1230	3-27-81 1500	5-22-80 1130	3-27-81 1230
Discharge, instantaneous	ft^3/s	24	4.0	195	71	77	32
Specific conductance	µmho	39	62	28	33	23	30
pH	--	7.5	7.0	6.7	7.3	6.7	7.6
Temperature, water	°C	27.0	27.5	27.0	26.0	25.0	26.0
Turbidity	NTU	1.9	--	2.6	.90	2.6	1.6
Oxygen, dissolved	mg/L	8.0	--	--	8.1	--	7.8
Hardness as $CaCO_3$	mg/L	14	23	7	9	6	7
Noncarbonate hardness	mg/L	4	0	1	1	0	0
Calcium, dissolved (Ca)	mg/L	2.5	3.1	1.2	1.5	1.1	1.4
Magnesium, dissolved (Mg)	mg/L	1.8	3.6	1.0	1.2	.9	.9
Sodium, dissolved (Na)	mg/L	2.8	3.2	2.0	2.6	1.9	2.6
Percent sodium	percent	30	23	37	39	38	43
Sodium adsorption ratio	--	.3	.3	.3	.4	.3	.4
Potassium, dissolved (K)	mg/L	.2	.2	.2	.2	.3	.2
Alkalinity, total as $CaCO_3$	mg/L	10	28	6	8	6	7
Sulfate, dissolved (SO_4)	mg/L	.2	< 5	1.9	.2	.5	.2
Chloride, dissolved (Cl)	mg/L	3.8	3.9	2.7	3.4	2.8	3.5
Fluoride, dissolved (F)	mg/L	.1	< .1	.1	.1	.1	0
Silica, dissolved (SiO_2)	mg/L	3.8	16	6.7	8.1	5.5	7.6
Solids, dissolved, sum of constituents	mg/L	22	--	19	22	17	21
Solids, dissolved, ton per acre foot	ton/ac-ft	--	--	.03	--	.02	--
Nitrite plus nitrate, dissolved as N	mg/L	.08	.12	.02	.06	.05	.06
Iron, dissolved (Fe)	µg/L	80	61	80	60	80	100
Manganese, dissolved (Mn)	µg/L	3	2	4	2	9	3

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