Water Wells on Isla de Culebra, Puerto Rico

By GREGORY S. CHERRY and JUAN RAMOS

U.S. Geological Survey
Open-File Report 95-369

Prepared in cooperation with the
U.S. OFFICE OF MANAGEMENT AND BUDGET

San Juan, Puerto Rico
1995

U.S. DEPARTMENT OF THE INTERIOR
BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY
Gordon P. Eaton, Director

For additional information write to:

Caribbean District Chief
U.S. Geological Survey
Water Resources Division
GSA Center
651 Federal Drive, Suite 400-15
Guaynabo, Puerto Rico 00965

Copies of this report can be purchased from:

U.S. Geological Survey
Earth Science Information Center
Open-File Reports Section
Box 25286, MS 517
Denver Federal Center
Denver, CO 80225

CONTENTS

FIGURES

TABLES

CONVERSION FACTORS, ABBREVIATED WATER-QUALITY UNITS, AND ACRONYMS

Multiply	By	To obtain
foot	0.3048	meter
gallon	3.785	liter
gallon per day	0.003785	cubic meter per day
gallon per minute	0.06308	liter per second
inch	25.4	millimeter
mile	1.609	kilometer
square mile	259.0	hectare

Temperature is given in degree Celsius (°C), which can be converted to degree Fahrenheit (°F) by the following equation: °F = 1.8 (°C) + 32.

Abbreviated water-quality units used in this report:

microsiemen per centimeter at 25 degrees Celsius (µS/cm)

milligram per liter (mg/L)

Acronyms used in this report:

PRASA	Puerto Rico Aqueduct and Sewer Authority
PRDNER	Puerto Rico Department of Natural and Environmental Resources
USGS	U.S. Geological Survey
USOMB	U.S. Office of Management and Budget

Water Wells on Isla de Culebra, Puerto Rico

By Gregory S. Cherry *and* Juan Ramos

Abstract

This report presents a compilation of well-inventory data collected during May and June 1991 on Isla de Culebra, Puerto Rico. The report includes maps depicting well locations and tables of well-inventory data for 77 wells. Currently (1995), the demand for freshwater on Isla de Culebra is met by desalinated seawater and rooftop-rainfall collected in cisterns. The water resources of Isla de Culebra are limited due to the island's small land mass, meager rainfall, and high evapotranspiration rates. Ground-water use is limited to agriculture and livestock due to the water's high mineral content. The well-inventory data in this report provides a data base to assist hydrologists, water managers, and planners in the utilization of the limited ground-water resources of Isla de Culebra.

INTRODUCTION

The principal aquifer on Isla de Culebra is the fractured volcanic rock with a probable storage capacity of less than 1 percent by volume (Jordan and Gilbert, 1976, p. 8). To meet the demand for freshwater on Isla de Culebra, desalinated seawater and rooftop-rainfall catchments are the primary sources for supply. The Puerto Rico Aqueduct and Sewer Authority (PRASA) is responsible for freshwater supply and distribution to the public for the island. Public-water supply production steadily increased from an average of 29,000 gallons per day in 1970 (Jordan and Gilbert, 1976, p. 8) to an average of 120,000 gallons per day in 1991 (A. Romero, Puerto Rico Aqueduct and Sewer Authority, oral commun., 1991). The PRASA has met the increased demand by constructing a desalination plant in 1971 and increasing the capacity of the plant in 1980. In rural areas, away from water distribution lines, residents rely on rooftop-rainfall catchments for public-water supply. Before the construction of the desalination plant in 1971, the municipal well field of five wells was a major source of water for public supply. However, the water from these wells has a high mineral content and is unsuitable for drinking. Although the water resources on Isla de Culebra are limited, proper development of ground-water resources as an alternative source to desalinized water could maintain a cost-effective public-water supply and provide an additional source of water in the event of an emergency.

Purpose and Scope

In 1990, the U.S. Geological Survey (USGS) began a cooperative investigation with the U.S. Office of Management and Budget (USOMB) to study and develop the ground-water resources on Isla de Culebra, Puerto Rico. This report presents data for 77 wells, including water-quality data (specific conductance and chloride concentration) from an inventory conducted during May and June of 1991.

Description of Study Area

Isla de Culebra is located between Puerto Rico and the U.S. Virgin Islands and is part of the Commonwealth of Puerto Rico. The island is about 17 miles east of Puerto Rico and 9 miles north of Isla de Vieques and has an area of about 10 square miles (fig. 1). The dominant features of the island are two ridges, one trending northwest-southeast and the other trending east-west. The highest elevation on the island is 650 feet above mean sea level (Mount Resaca).

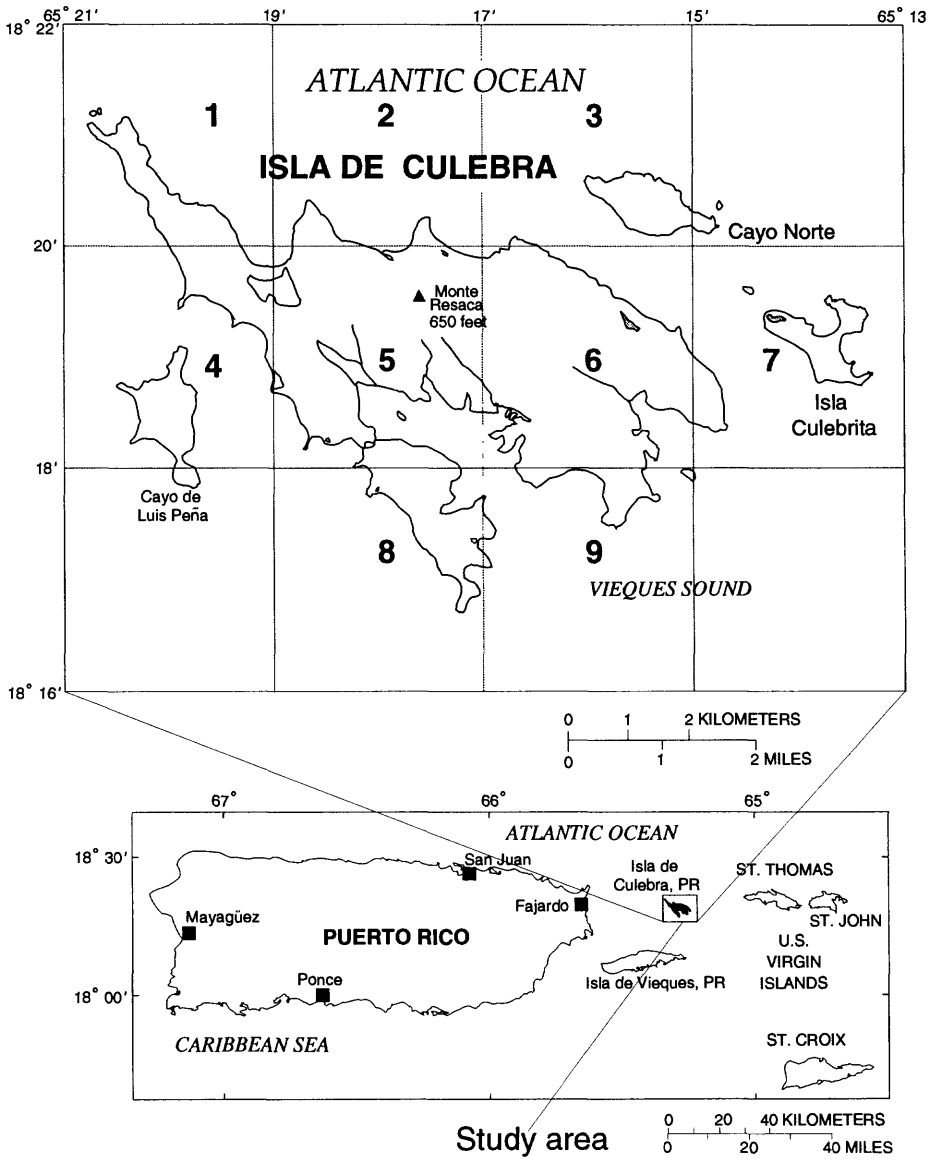

Figure 1. Location of Isla de Culebra, Puerto Rico, and area grids.

Acknowledgments

The authors express their gratitude to the many well and landowners on Isla de Culebra for their assistance in locating wells and allowing access to their property. A special thanks is extended to the following people who provided information and well locations: Anastacio Romero of the PRASA, Juan Mata-Feliciano of the Puerto Rico Department of Natural and Environmental Resources (PRDNER), and Miguel Acosta of the Puerto Rico Department of Public Works.

DATA PRESENTATION

The locations, descriptions, and water-quality data (specific conductance and chloride concentration) for 77 wells constructed on Isla de Culebra are presented in this report. For ease in locating wells, Isla de Culebra was divided into nine grids (fig. 1). Each grid is presented as a separate figure in this report (figs. 2-10) and represents a 2-minute square section of the topographic map of Isla de Culebra published at the original topographic map scale of 1:30,000. Some grids cover areas in which no wells exist.

Tables 1 to 7 contain well information for grids that have wells located in them. Information presented in these

tables includes the well number as referenced on the preceding figure, well name, use of water, measured depth of well, well casing diameter, land-surface altitude, depth to water below land-surface datum, date the water level was measured, and specific conductance and chloride concentration determined from the water sample. The well numbers used in tables 1 to 7 consist of two numbers, the first referring to the grid number in figure 1 and the second to the number designation within the grid. Wells in this report can be cross-referenced in other USGS publications by the site-identification number, which appears in the appendix. The site-identification number conforms with the USGS Ground-Water Site Inventory (GWSI) classification system; once this number is established for a given well, the site-identification number does not change. The site-identification number is designed to correspond to the latitude-longitude coordinates of the well. Additional information included in this report are remarks for each well which are presented in the appendix.

Records of wells on Isla de Culebra were compiled from the PRDNER files and the data were verified in the field by the USGS personnel. Additional information on the water resources of the island was provided by Isla de Culebra government officials and property owners. The USGS personnel performed soundings with a weighted steel tape on wells that were open at the surface to determine depth of well and water level.

Water samples were collected from selected wells with a bailer. The date the water sample was collected coincides with the date of the water-level measurement.

The land-surface altitude at each well location was estimated from the USGS topographic map. The contour interval of the topographic map of Culebra is 16.4 feet (5 meters). Dashed contour lines represent an interval of 3.3 feet (1 meter). The estimated land-surface altitudes from the topographic map were converted to feet for consistency of units within the tables. The accuracy of reporting land-surface altitudes in this report is considered to be one-half of the contour interval used or 8.2 feet (2.5 meters).

REFERENCE

Jordan D.G., and Gilbert, B.K., 1976, Water supply and waste disposal, Culebra, Puerto Rico: U.S. Geological Survey Water-Resources Investigations Report 3-76, 31 p.

THIS PAGE WAS LEFT BLANK
INTENTIONALLY

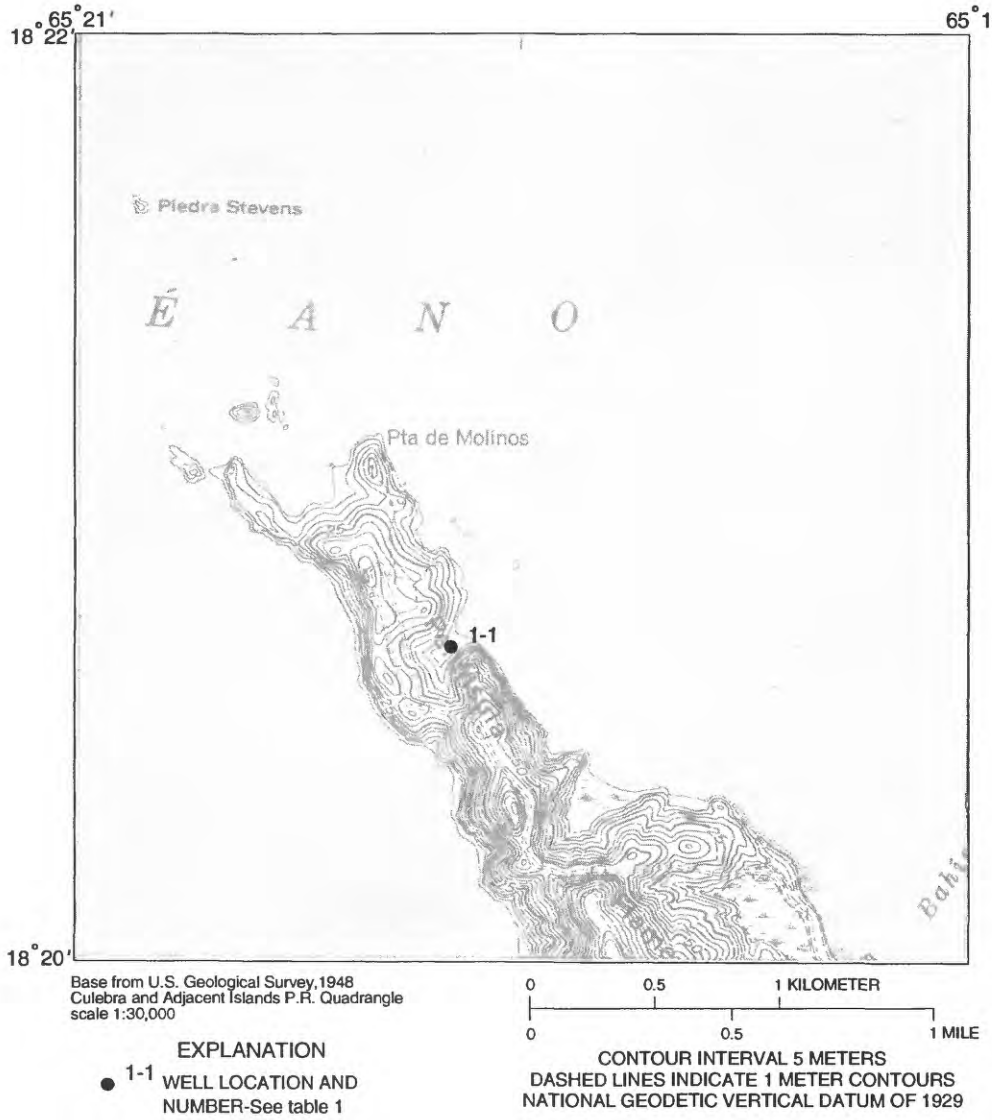

Figure 2. Location of well in grid 1, Isla de Culebra, Puerto Rico.

Table 1. Description of well in grid 1, Isla de Culebra, Puerto Rico

[Well location shown in figure 2. Use of water: NU, well not in use. µS/cm, microsiemen per centimeter at 25 degrees Celsius; mg/L, milligram per liter. --, no data]

Well No.	Well name	Use of water	Measured depth of well (feet below land surface)	Casing diameter (inches)	Land surface altitude of well (feet)	Date water level measured	Depth to water below land surface datum (feet)	Specific conduc-tance (µS/cm)	Chloride, dissolved (mg/L)
1-1	Fish and Wildlife dug well	NU	8	72	10	5-24-91	dry	--	--

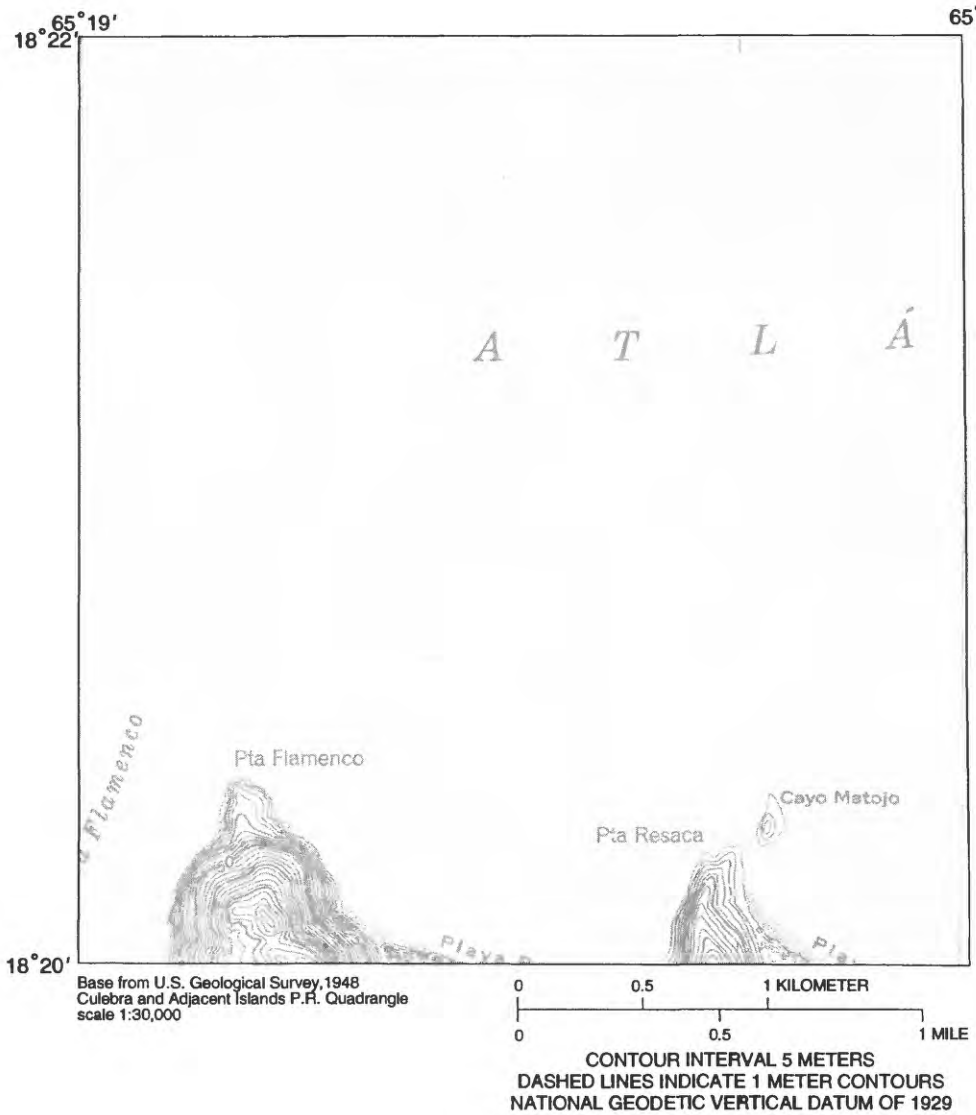

Figure 3. Location of grid 2, Isla de Culebra, Puerto Rico.

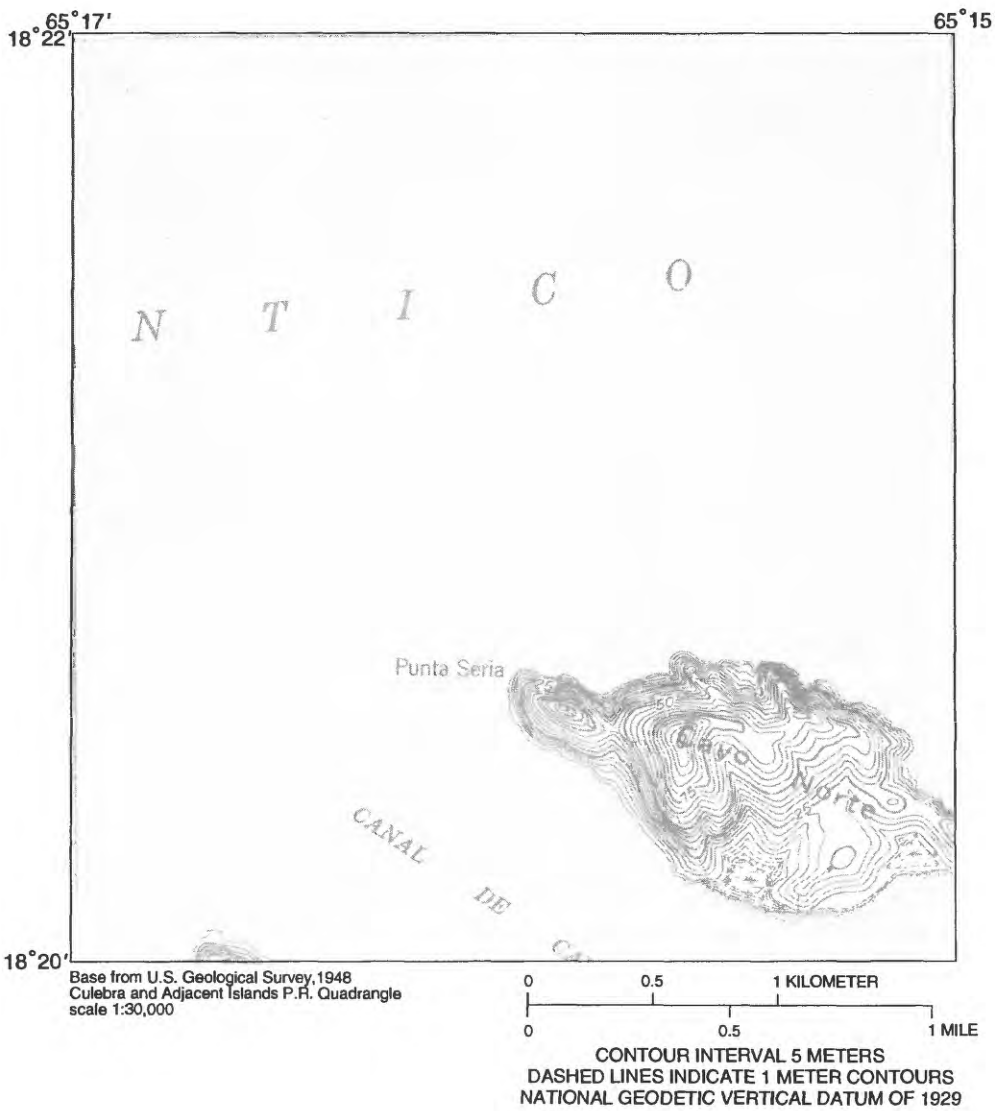

Figure 4. Location of grid 3, Isla de Culebra, Puerto Rico.

THIS PAGE WAS LEFT BLANK
INTENTIONALLY

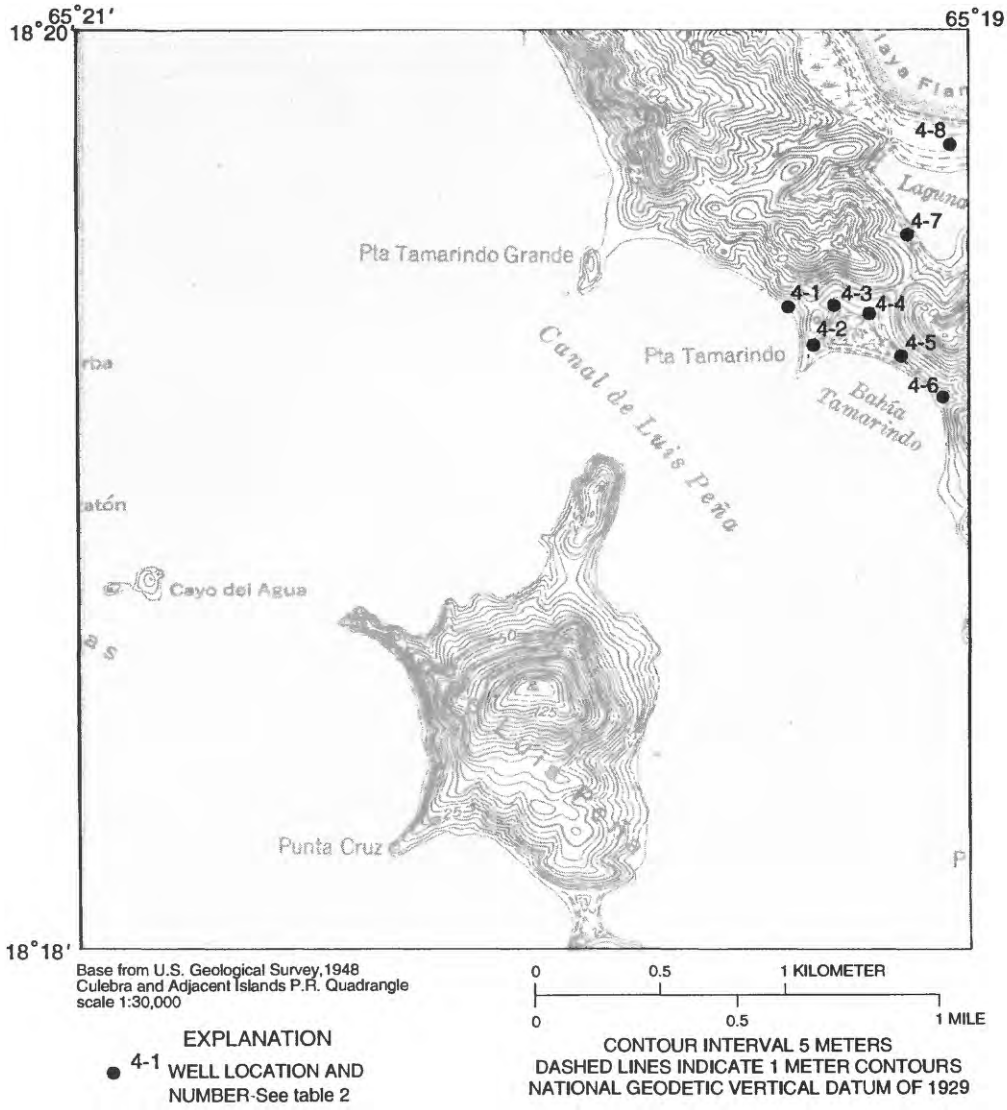

Figure 5. Location of wells in grid 4, Isla de Culebra, Puerto Rico.

Table 2. Description of wells in grid 4, Isla de Culebra, Puerto Rico

[Well locations shown in figure 5. Use of water: NU, well not in use. µS/cm, microsiemen per centimeter at 25 degrees Celsius; mg/L, milligram per liter. --, no data]

Well No.	Well name	Use of water	Measured depth of well (feet)	Casing diameter (inches)	Land surface altitude of well (feet)	Date water level measured	Depth to water below land surface datum (feet)	Specific conduc-tance (µS/cm)	Chloride, dissolved (mg/L)
4-1	Tamarindo 1	NU	21	4	16	5-08-91	15	11,600	3,750
4-2	Tamarindo 2	NU	17	4	33	5-08-91	11	7,000	2,060
4-3	Tamarindo 3	NU	18	4	25	5-08-91	dry	--	--
4-4	Tamarindo 4	NU	19	4	25	5-08-91	dry	--	--
4-5	Márquez Succesión 1 dug well	NU	9	108	10	5-08-91	2	3,900	1,160
4-6	Márquez Succesión 2 dug well	NU	14	126	25	5-08-91	7	3,300	820
4-7	Márquez Succesión 3 dug well	NU	15	108	13	5-08-91	5	510	110
4-8	Flamenco 1 dug well	NU	4	7	13	5-24-91	dry	--	--

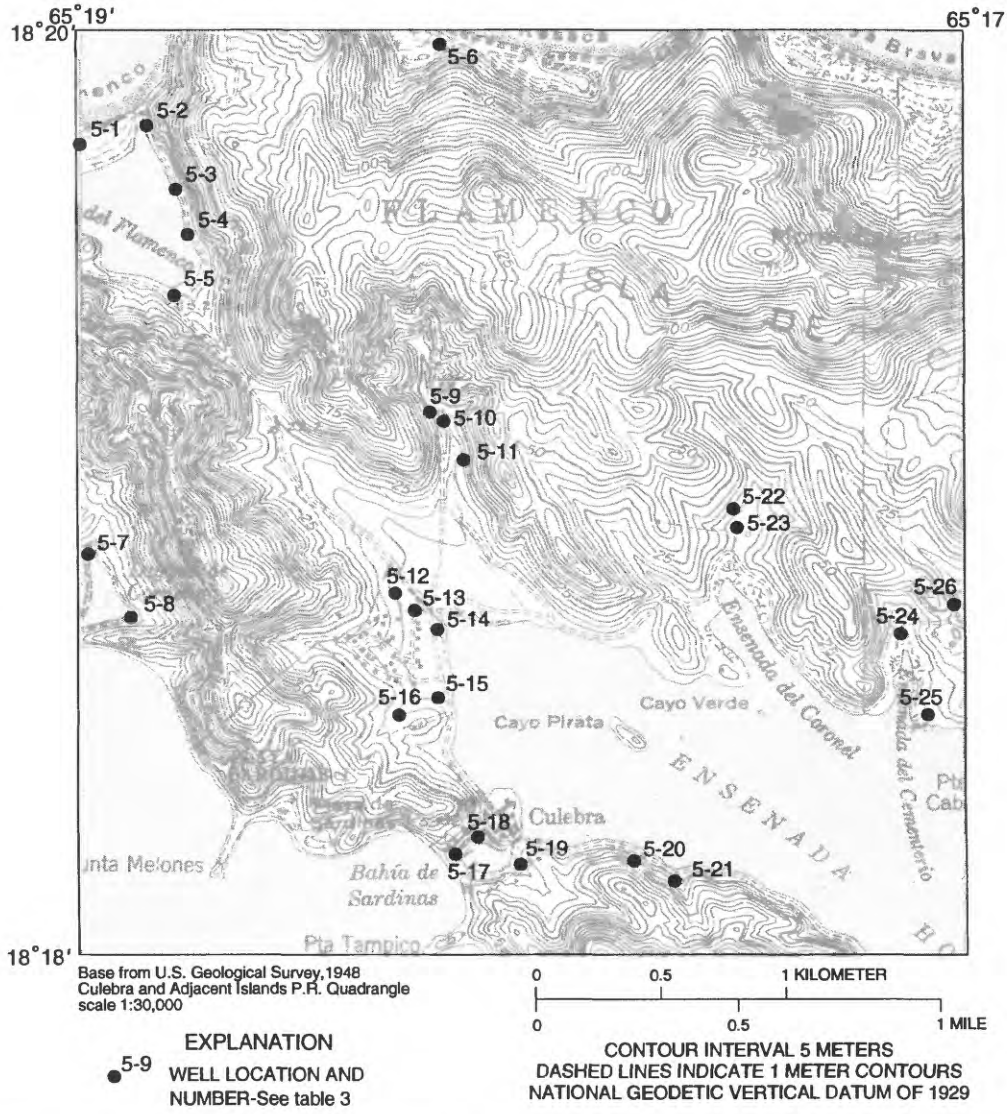

Figure 6. Location of wells in grid 5, Isla de Culebra, Puerto Rico.

Table 3. Description of wells in grid 5, Isla de Culebra, Puerto Rico

[Well locations shown in figure 6. Use of water: A, agriculture or stock well; D, domestic well; NU, well not in use. µS/cm, microsiemen per centimeter at 25 degrees Celsius; mg/L, milligram per liter. --, no data]

Well No.	Well name	Use of water	Measured depth of well (feet)	Casing diameter (inches)	Land surface altitude of well (feet)	Date water level measured	Depth to water below land surface datum (feet)	Specific conductance (µS/cm)	Chloride, dissolved (mg/L)
5-1	Flamenco 2 dug well	NU	([1])	84	13	5-24-91	dry	--	--
5-2	Ayala Succesión	NU	([1])	--	33	--	--	--	--
5-3	Cosme-Peña dug well	NU	[1]4	120	8	5-10-91	3	13,200	4,800
5-4	Cruz Rodríguez dug well	NU	7	120	8	5-09-91	6	12,300	4,250
5-5	Márquez Succesión 4 dug well	NU	11	136	16	5-09-91	7	5,900	1,460
5-6	Resaca 1 dug well	NU	11	140	10	5-30-91	6	25,900	8,920
5-7	Villamil, Pérez Jr. dug well	A	9	120	7	5-08-91	7	9,000	2,550
5-8	Ramona González dug well	NU	10	108	13	5-09-91	7	9,500	3,125
5-9	Neil Romero	NU	58	6	66	5-13-91	5	1,100	230
5-10	Judith Romero 1	D	62	6	66	5-13-91	43	3,920	1,030
5-11	Judith Romero 2 dug well	NU	47	144	57	5-13-91	14	810	155
5-12	Culebra 1	NU	37	6	13	5-09-91	3	6,100	1,900
5-13	Culebra 2 dug well	NU	12	122	8	5-09-91	3	7,900	2,250
5-14	Culebra 3	NU	37	6	3	5-09-91	--	6,200	1,680
5-15	Eddie González 1 dug well	A	9	99	13	5-10-91	2	12,000	3,900
5-16	Eddie González 2	NU	77	8	31	5-10-91	28	13,200	4,450
5-17	Alberto Pérez dug well	NU	5	24	8	5-10-91	2	2,890	340
5-18	José Carlos Colón dug well	D	11	54	11	5-23-91	3	2,200	430
5-19	Lucas Carrillo dug well	A	6	163	20	5-08-91	1	790	145
5-20	Luis Manuel Collazo dug well	NU	10	88	16	5-07-91	7	2,000	325
5-21	Richard Fischbach dug well	NU	8	144	16	5-07-91	5	1,390	290
5-22	Jack Strictland	NU	([1])	6	16	--	--	--	--
5-23	Juan Mata-Feliciano dug well	NU	11	99	8	5-16-91	3	9,000	2,850
5-24	PRASA 8	NU	[2]300	6	10	5-15-91	1	36,800	15,050
5-25	PRASA 7	NU	[2]300	6	10	5-15-91	4	20,200	7,020
5-26	PRASA 1	NU	[1]15	6	33	5-17-91	12	2,440	--

[1]See remarks in appendix 1.
[2]Reported depth.

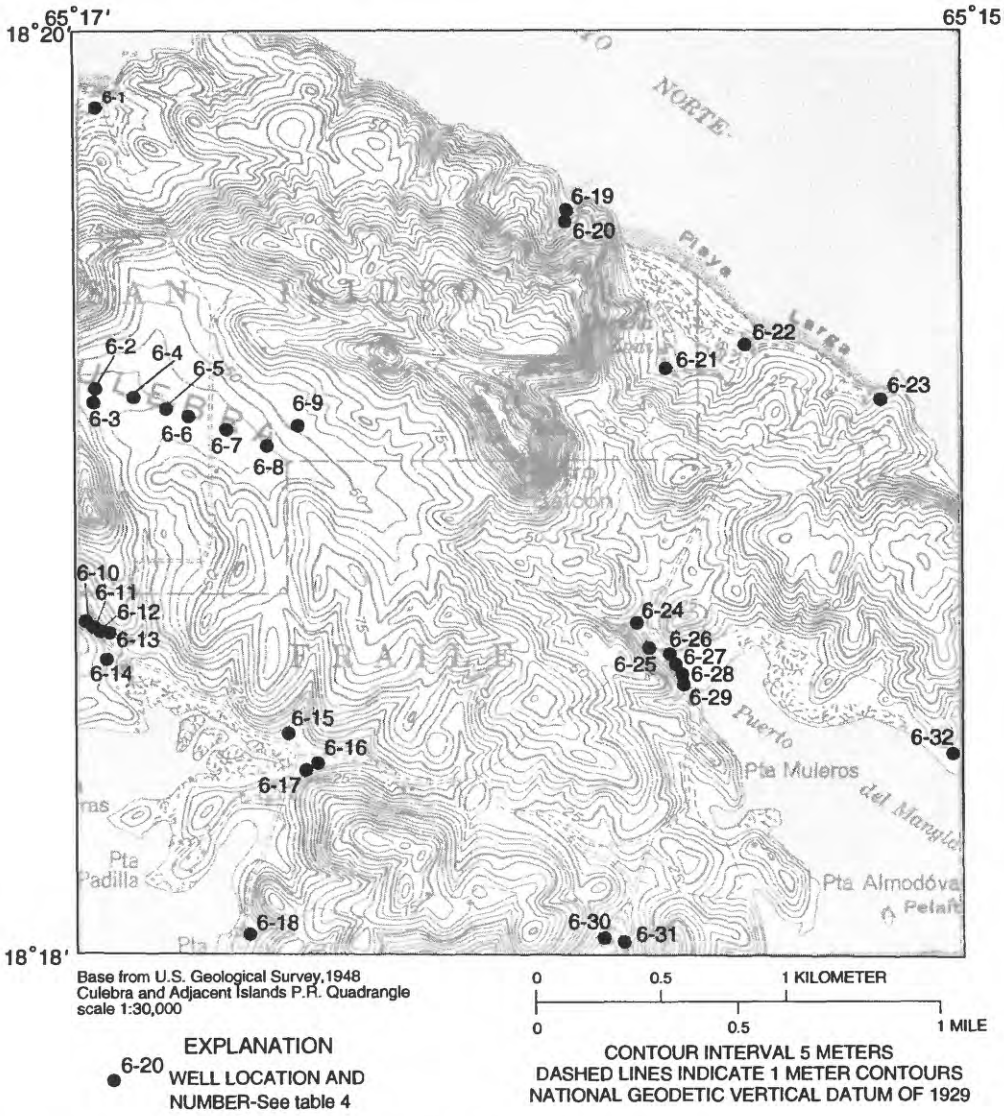

Figure 7. Location of wells in grid 6, Isla de Culebra, Puerto Rico.

Table 4. Description of wells, in grid 6, Isla de Culebra, Puerto Rico

[Well locations shown in figure 7. Use of water: D, domestic well; NU, well not in use. µS/cm, microsiemen per centimeter at 25 degrees Celsius; mg/L, milligram per liter; --, no data]

Well No.	Well name	Use of water	Measured depth of well (feet)	Casing diameter (inches)	Land surface altitude of well (feet)	Date water level measured	Depth to water below land surface datum (feet)	Specific conductance (µS/cm)	Chloride, dissolved (mg/L)
6-1	Márquez Succesión 5 dug well	NU	13	150	3	5-23-91	12	24,200	3,380
6-2	La Plena 1 dug well	NU	--	176	115	5-22-91	dry	--	--
6-3	Rafael González dug well	NU	--	140	115	5-22-91	dry	--	--
6-4	PRASA 9	NU	38	7	115	5-22-91	14	800	70
6-5	PRASA 10	NU	22	7	115	5-22-91	dry	--	--
6-6	PRASA 11	D	76	7	120	5-22-91	27	8,160	2,640
6-7	Carlota Serrano 1	NU	75	126	126	5-21-91	36	--	--
6-8	Carlota Serrano 2	NU	87	--	131	5-22-91	48	--	--
6-9	Carlota Serrano 3	NU	49	--	170	5-21-91	2	390	--
6-10	PRASA 2	NU	[1]16	6	33	5-15-91	9	--	--
6-11	PRASA 3	NU	[2]300	6	25	5-15-91	13	16,000	5,650
6-12	PRASA 4	NU	[2]300	6	33	5-17-91	8	14,200	5,200
6-13	PRASA 5	NU	([1])	6	33	--	--	--	--
6-14	PRASA 6	NU	[2]300	6	33	5-16-91	3	16,000	2,280
6-15	Benito González 1 dug well	NU	12	209	10	5-14-91	9	10,000	3,700
6-16	Benito González 2 dug well	NU	12	222	13	5-14-91	4	16,200	5,950
6-17	Benito González 3 dug well	NU	10	115	13	5-14-91	4	17,000	6,310
6-18	Carenero 1 dug well	NU	([1])	--	13	5-14-91	dry	--	--
6-19	Claro Feliciano 1 dug well	NU	--	72	10	5-17-91	dry	--	--
6-20	Claro Feliciano 2 dug well	NU	9	216	10	5-17-91	7	790	140
6-21	Zoni 1 dug well	NU	12	156	7	5-17-91	8	6,000	1,740
6-22	Playa Larga 1 dug well	NU	([1])	60	3	5-14-91	2	740	--
6-23	Ernesto Garai dug well	NU	7	118	3	5-14-91	4	22,100	7,800
6-24	Triburcio González 1	NU	([1])	6	33	5-23-91	dry	--	--
6-25	Triburcio González 2 dug well	NU	20	120	16	5-14-91	7	3,800	940
6-26	Triburcio González 3 dug well	NU	12	180	16	5-14-91	7	5,900	1,520
6-27	Triburcio González 4 dug well	NU	14	169	12	5-14-91	6	9,000	2,600
6-28	Triburcio González 5 dug well	NU	12	108	10	5-14-91	3	6,000	1,720
6-29	Triburcio González 6 dug well	NU	10	91	10	5-14-91	3	6,000	1,800
6-30	Hugh Callum dug well	NU	13	146	16	5-16-91	8	11,500	3,850
6-31	Catsen dug well	NU	9	144	10	5-16-91	6	7,500	2,460
6-32	Fletcher 1 dug well	NU	4	132	13	5-23-91	2	17,600	6,150

[1]See remarks in appendix 1.
[2]Reported depth.

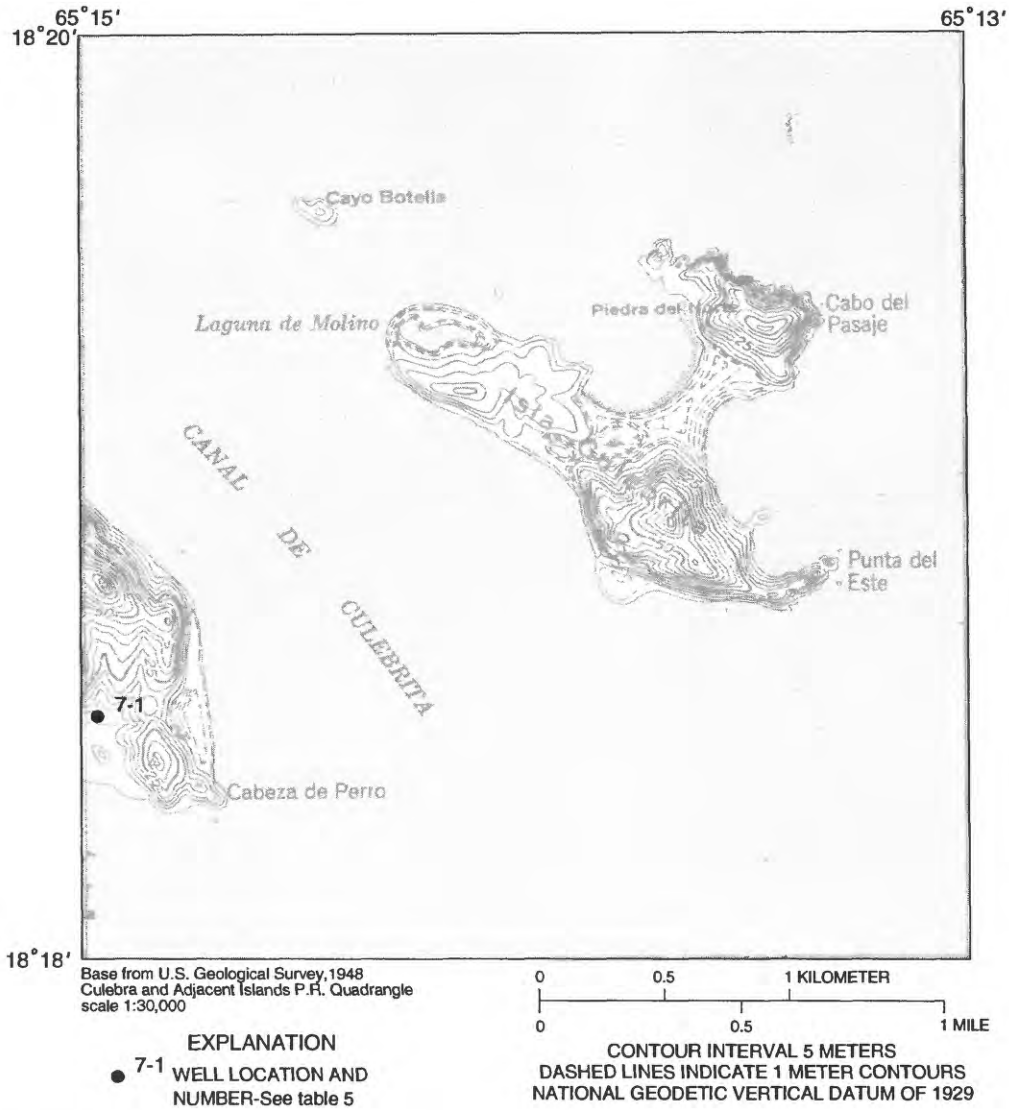

Figure 8. Location of well in grid 7, Isla de Culebra, Puerto Rico.

Table 5. Description of well in grid 7, Isla de Culebra, Puerto Rico

[Well location shown in figure 8. Use of water: NU, well not in use. µS/cm, microsiemen per centimeter at 25 degrees Celsius; mg/L, milligram per liter. --, no data]

Well No.	Well name	Use of water	Measured depth of well (feet)	Casing diameter (inches)	Land surface altitude of well (feet)	Date water level measured	Depth to water below land surface datum (feet)	Specific conduc-tance (µS/cm)	Chloride, dissolved (mg/L)
7-1	Fletcher 2 dug well	NU	12	189	13	5-22-91	10	3,290	--

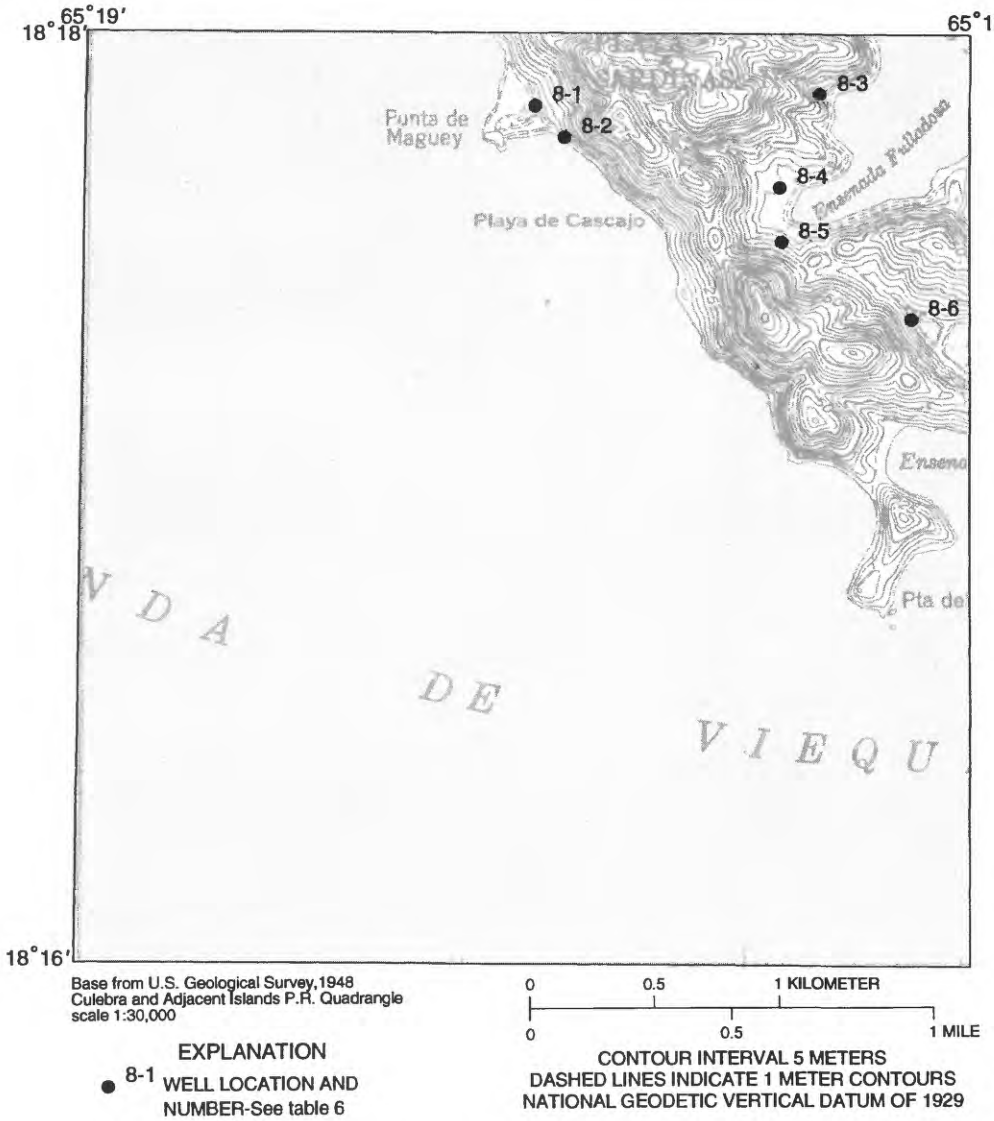

Figure 9. Location of wells for grid 8, Isla de Culebra, Puerto Rico.

Table 6. Description of wells in grid 8, Isla de Culebra, Puerto Rico

[Well locations shown in figure 9. Use of water: A, agriculture or stock well; NU, well not in use. µS/cm, microsiemen per centimeter at 25 degrees Celsius; mg/L, milligram per liter. --, no data]

Well No.	Well name	Use of water	Measured depth of well (feet)	Casing diameter (inches)	Land surface altitude of well (feet)	Date water level measured	Depth to water below land surface datum (feet)	Specific conduc-tance (µS/cm)	Chloride, dissolved (mg/L)
8-1	Carrillo Succesión dug well	NU	5	108	16	5-07-91	3	8,500	2,300
8-2	Fischbach Succesión dug well	NU	10	115	20	5-07-91	dry	--	--
8-3	Claro Feliciano 3 dug well	A	12	96	16	5-07-91	6	7,000	1,900
8-4	Anastacio Romero dug well	NU	6	96	16	5-07-91	5	4,050	1,260
8-5	Sea Bourne Resort dug well	NU	15	110	16	5-07-91	4	--	--
8-6	Dakity 1 dug well	NU	9	108	10	5-07-91	6	12,900	4,400

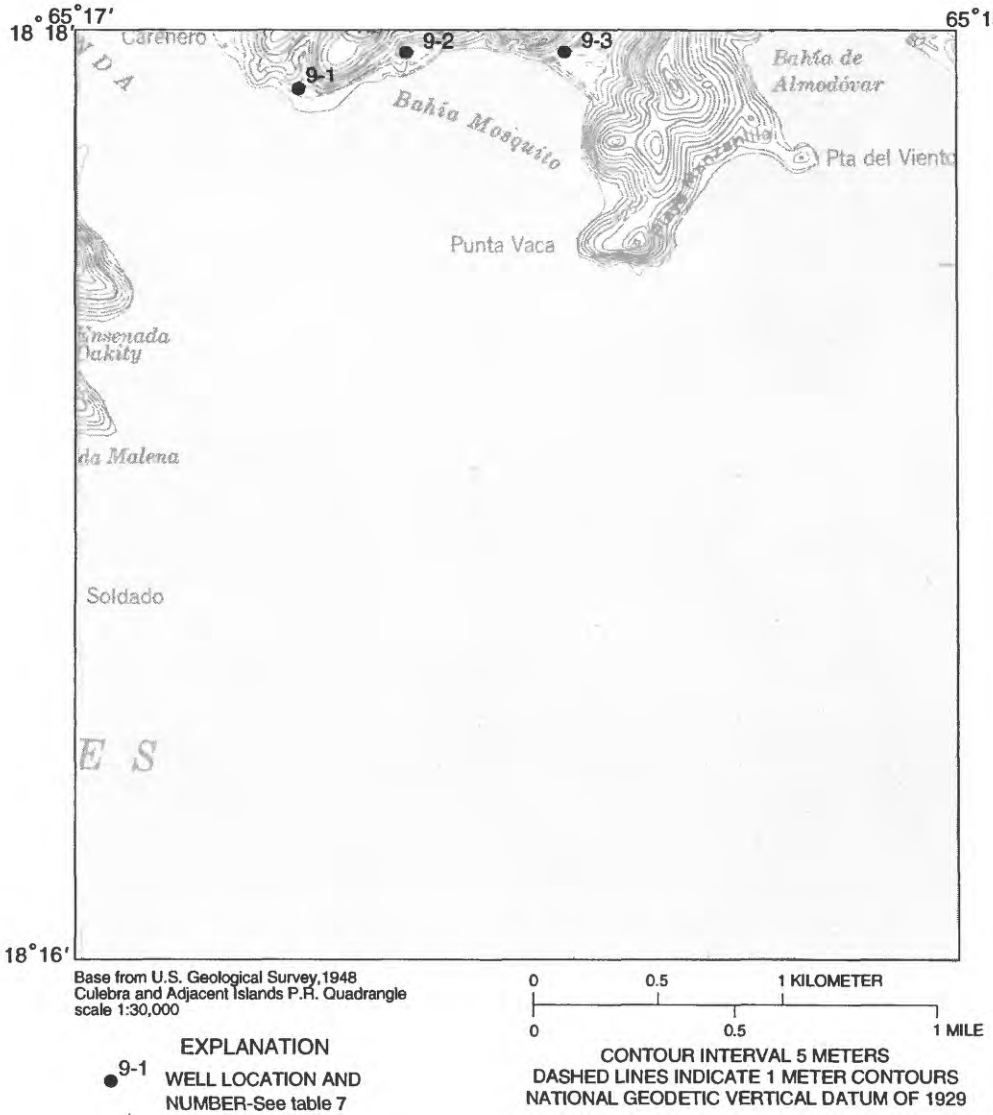

Figure 10. Location of wells in grid 9, Isla de Culebra, Puerto Rico.

Table 7. Description of wells in grid 9, Isla de Culebra, Puerto Rico

[Well locations shown in figure 10. Use of water: D, domestic well; NU, well not in use. µS/cm, microsiemen per centimeter at 25 degrees Celsius; mg/L, milligram per liter. --, no data]

Well No.	Well name	Use of water	Measured depth of well (feet)	Casing diameter (inches)	Land surface altitude of well (feet)	Date water level measured	Depth to water below land surface datum (feet)	Specific conductance (µS/cm)	Chloride, dissolved (mg/L)
9-1	William González dug well	D	15	94	13	5-17-91	8	1,400	290
9-2	Cotto dug well	NU	([1])	96	3	5-17-91	dry	--	--
9-3	Punta Vaca dug well	NU	10	183	16	5-16-91	4	26,000	9,200

[1]See remarks in appendix 1.

APPENDIX 1

THIS PAGE WAS LEFT BLANK
INTENTIONALLY

Appendix 1. Well names, site-identification number, and remarks for wells on Isla de Culebra, Puerto Rico

[Site identification No.: Unique number for each site based on the latitude and longitude of the site. First six digits are latitude, next seven digits are longitude, and final two digits are a sequence number to uniquely identify each site. --, no data]

Well No.	Figure No.	Well name	Site identification No.	Remarks
1-1	2	Fish and Wildlife dug well	182042065201000	--
4-1	5	Tamarindo 1	181925065192400	Observation well owned by the municipality of Culebra. Water sample for specific conductance and chloride concentration bailed from a depth of 4 feet below the water table.
4-2	5	Tamarindo 2	181919065192100	Observation well owned by the municipality of Culebra. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
4-3	5	Tamarindo 3	181924065191800	Observation well owned by the municipality of Culebra.
4-4	5	Tamarindo 4	181923065191300	Observation well owned by the municipality of Culebra.
4-5	5	Márquez Succesión 1 dug well	181918065190900	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 6 feet below the water table.
4-6	5	Márquez Succesión 2 dug well	181913065190300	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 5 feet below the water table.
4-7	5	Márquez Succesión 3 dug well	181934065190800	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
4-8	5	Flamenco 1 dug well	181945065190200	Well used for livestock in the past.
5-1	6	Flamenco 2 dug well	81946065185900	Well used for livestock in the past. Well filled with sand and soil.
5-2	6	Ayala Succesión	181948065185000	Well used for livestock in the past. Drilled by the Department of Agriculture. Unable to access well.
5-3	6	Cosme-Peña dug well	181940065184700	Well used for livestock in the past but is now collapsed.
5-4	6	Cruz Rodríguez dug well	181934065184400	Well used for livestock in the past.
5-5	6	Márquez Succesión 4 dug well	181926065184700	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 3 feet below the water table.
5-6	6	Resaca 1 dug well	181959065181000	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 3 feet below the water table.

Appendix 1. Well names, site-identification number, and remarks for wells on Isla de Culebra, Puerto Rico—*Continued*

Well No.	Figure No.	Well name	Site identification No.	Remarks
5-7	6	Villamil, Pérez Jr. dug well	181853065185800	Owner estimated daily pumpage is 500 gallons for flushing toilets. In the past, well was used for livestock. Surface pump installed (3/4 horsepower). Water sample for specific conductance and chloride concentration bailed from a depth of 2 feet below the water table.
5-8	6	Ramona González dug well	181845065185300	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 2.5 feet below the water table.
5-9	6	Neil Romero	181911065181200	Well has no pump installed.
5-10	6	Judith Romero 1	181910065181000	Well used for flushing toilets and watering horses. Yield measured at 38 gallons per minute. Water sample for specific conductance and chloride concentration bailed from a depth of 18 feet below the water table. Submersible pump installed.
5-11	6	Judith Romero 2 dug well	181905065180800	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 30 feet below the water table.
5-12	6	Culebra 1	181848065181700	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 32 feet below the water table. Drilled by the Department of Agriculture.
5-13	6	Culebra 2 dug well	181845065181500	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 8 feet below the water table. Owned by the municipality of Culebra.
5-14	6	Culebra 3	181843065181100	Water sample for specific conductance and chloride concentration bailed from a depth of 30 feet below the water table. Drilled by the Department of Agriculture. Owned by the municipality of Culebra.
5-15	6	Eddie González 1 dug well	181834065181100	Well used to water horses. Water sample for specific conductance and chloride concentration bailed from a depth of 6 feet below the water table.
5-16	6	Eddie González 2	181832065181700	Well used for flushing toilets and cleaning horses when operable. Unable to get specific conductance probe below a depth of 46 feet. Water sample for specific conductance and chloride concentration bailed from a depth of 10 feet below the water table.
5-17	6	Alberto Pérez dug well	181814065180900	Well used to water plants when operable. Water sample for specific conductance and chloride concentration bailed from a depth of 2 feet below the water table.

Appendix 1. Well names, site-identification number, and remarks for wells on Isla de Culebra, Puerto Rico—*Continued*

Well No.	Figure No.	Well name	Site identification No.	Remarks
5-18	6	Jose Carlos Colón dug well	181816065180600	Well used to water plants and clean the house. Water sample for specific conductance and chloride concentration bailed from a depth of 7 feet below the water table.
5-19	6	Lucas Carrillo dug well	181813065180000	Well used for livestock. Water sample for specific conductance and chloride concentration bailed from a depth of 3 feet below the water table.
5-20	6	Luis Manuel Collazo dug well	181813065174400	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
5-21	6	Richard Fischbach dug well	181811065173900	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
5-22	6	Jack Strictland	181859065173100	Well clogged with rocks and soil at a depth of 14.5 feet below land surface.
5-23	6	Juan Mata-Feliciano dug well	181856065173100	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 7 feet below the water table.
5-24	6	PRASA 8	181842065170800	Water sample for specific conductance and chloride concentration bailed from a depth of 50 feet below the water table.
5-25	6	PRASA 7	181832065170500	Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table. Drilled to supply water to the desalination plant but well was abandoned due to low yields.
5-26	6	PRASA 1	181847065170100	Rock wedged inside the casing at a depth of 15.4 feet below land surface.
6-1	7	Márquez Succesión 5 dug well	181951065165700	Well used for livestock in the past. Water sample for specific conductance and chloride concentration values at a depth of 0.5 foot below the water table.
6-2	7	La Plena 1 dug well	181914065165700	Used for livestock in the past.
6-3	7	Rafael González dug well	181912065165700	Used for livestock in the past.
6-4	7	PRASA 9	181912065165200	Water sample for specific conductance and chloride concentration bailed from a depth of 20 feet below the water table.
6-5	7	PRASA 10	181911065164800	Submersible pump installed.

Appendix 1. Well names, site-identification number, and remarks for wells on Isla de Culebra, Puerto Rico—*Continued*

Well No.	Figure No.	Well name	Site identification No.	Remarks
6-6	7	PRASA 11	181910065164500	Well has a reported yield of 20 gallons per minute. Submersible pump installed. Water sample for specific conductance taken at surface discharge line.
6-7	7	Carlota Serrano 1	181908065163900	At one time, this well provided water to PRASA until it became a low producer and subsequently was abandoned.
6-8	7	Carlota Serrano 2	181906065163400	--
6-9	7	Carlota Serrano 3	181909065163000	Water sample for specific conductance bailed from a depth of 20 feet below the water table. Well constructed by PRASA as a recharge well but was not effective in this capacity.
6-10	7	PRASA 2	181845065170000	Rock wedged inside casing. Measured depth is not total depth of well.
6-11	7	PRASA 3	181844065165900	Water sample for specific conductance and chloride concentration bailed from a depth of 100 feet below the water table. Drilled as a test well.
6-12	7	PRASA 4	181844065165700	Water sample for specific conductance and chloride concentration bailed from a depth of 100 feet below the water table.
6-13	7	PRASA 5	181843065165600	Several rocks wedged inside casing.
6-14	7	PRASA 6	181839065165600	Water sample for specific conductance and chloride concentration bailed from a depth of 100 feet below the water table.
6-15	7	Benito González 1 dug well	181830065163100	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
6-16	7	Benito González 2 dug well	181825065162700	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
6-17	7	Benito González 3 dug well	181825065162900	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
6-18	7	Carenero 1 dug well	181804065163600	Well has collapsed.
6-19	7	Claro Feliciano 1 dug well	181937065155400	Well used for livestock in the past.
6-20	7	Claro Feliciano 2 dug well	181935065155400	Well used for livestock in the past. Water sample could be rainwater because there was a puddle at the bottom of the well.

Appendix 1. Well names, site-identification number, and remarks for wells on Isla de Culebra, Puerto Rico—*Continued*

Well No.	Figure No.	Well name	Site identification No.	Remarks
6-21	7	Zoni 1 dug well	181917065154000	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 3.5 feet below the water table.
6-22	7	Playa Larga 1 dug well	181920065153000	Well is full of coconuts. Reading for specific conductance taken by lowering probe just below the water table. Well was dry when surveyed 3 weeks prior to May 14, 1991.
6-23	7	Ernesto Garai dug well	181912065151200	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
6-24	7	Triburcio González 1	181844065154400	Well clogged with debris. Several long-time Culebra residents claimed that this was a free-flowing well in the past.
6-25	7	Triburcio González 2 dug well	181841065154300	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 10 feet below the water table.
6-26	7	Triburcio González 3 dug well	181840065154000	Well used for livestock in the past. Water sample for specific conductance and chloride chloride concentration bailed from a depth of 4 feet below the water table.
6-27	7	Triburcio González 4 dug well	181838065153900	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 6 feet below the water table.
6-28	7	Triburcio González 5 dug well	181837065153800	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 6 feet below the water table.
6-29	7	Triburcio González 6 dug well	181836065153800	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 5 feet below the water table.
6-30	7	Hugh Callum dug well	181804065154900	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 5 feet below the water table.
6-31	7	Catsen dug well	181803065154600	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1.5 feet below the water table.
6-32	7	Fletcher 1 dug well	181826065150200	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1.5 feet below the water table.

Appendix 1. Well names, site-identification number, and remarks for wells on Isla de Culebra, Puerto Rico—*Continued*

Well No.	Figure No.	Well name	Site identification No.	Remarks
7-1	8	Fletcher 2 dug well	181832065145800	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
8-1	9	Carrillo Succesión dug well	181751065175900	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
8-2	9	Fischbach Succesión dug well	181747065175500	Well used for livestock when operable.
8-3	9	Claro Feliciano 3 dug well	181753065172000	Well used to water horses. Water sample for specific conductance and chloride concentration bailed from a depth of 4 feet below the water table.
8-4	9	Anastacio Romero dug well	181741065172600	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.
8-5	9	Sea Bourne dug well	181734065172500	--
8-6	9	Dakity 1 dug well	181725065170800	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed a depth of 1.5 feet below the water table. Owned by the Commonwealth of Puerto Rico.
9-1	10	William González dug well	181753065162900	Well used to water plants. Water sample for specific conductance and chloride concentration bailed from a depth of 5 feet below the water table.
9-2	10	Cotto dug well	181758065161500	Well used for livestock in the past. Well has collapsed.
9-3	10	Punta Vaca dug well	181758065155300	Well used for livestock in the past. Water sample for specific conductance and chloride concentration bailed from a depth of 1 foot below the water table.