WATER RESOURCES RESEARCH CENTER
University of Hawaii at Manoa

Technical Memorandum Report No. 75

## AUTHOR'S NOTE (p. 11)

A number of readers have expressed concern that the sustainable yiel
listed in Technical Memorandum Report No. 75 were not sufficiently di
cussed to clarify their meaning. Discussion is limited to page 11
the text where it is stated that sustainable yields are computed as
fraction of infiltration. To most readers the conditions implicit
this statement are clear, but to those less familiar with the liter
ture of Hawaiian hydrology, further explanation may be helpful.
amplify the meaning of the text, add the following statement to p. 11

> The sustainable yield values refer to the safely developable fraction of the recharge derived from rainfall directly on the aquifer unit. They do not take into account inflows from adjacent aquifer units or irrigation return components. The sustainable yields as given are not applicable to situations complicated by large subsurface inflows, reduced opportunities for recharge, and return irrigation.

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## WATER RESOURCES RESEARCH CENTER
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[12]Abstract (Purpose, method, results, conclusions)

A consistent classification and nomenclature of the aquifer systems in the state of Hawaii do not exist in spite of the fact that groundwater is an essential water supply source in each island. The classification of water resources currently in use ignores aquifer features and boundaries and is based, instead, on topographic and judicial boundaries. One of the consequences is confusion in terminology because each investigator or describer of the resources often arbitrarily assigns aquifer names. A classification scheme is proposed which starts with the island as the largest component and the aquifer unit as the smallest. Each island is divided into Sectors in which similar generalities of hydrogeology prevail. Sectors are divided into systems in which hydrogeological and groundwater hydraulic connections are stronger, and the systems are further divided into units categorized by hydrological and geological features. A single code, consisting of a number for an island and letters for all other characteristics, identifies each aquifer unit. The code is open ended and may be expanded to include other aquifer features. For the six major islands, the classification scheme includes 21 sectors, 64 systems, and 192 aquifer units. The intent of this study is not to fix the classification at this time, but to provide an incentive for standardization.

2540 Dole Street • Honolulu, Hawaii 96822 • U.S.A. • (808) 948-7847

AUTHOR INFORMATION:

Mr. John F. Mink
Consultant
Water Resources-Earth Sciences
P.O. Box 4452
Honolulu, Hawaii 96813
Tel. (808) 671-0793

and

Research Affiliate
Water Resources Research Center
University of Hawaii at Manoa
Honolulu, Hawaii 96822

Mr. Stanley T. Sumida
Formerly, Hydrologist/Geologist IV
Planning & Engineering Division
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii

# AQUIFER CLASSIFICATION,
# STATE OF HAWAI'I

John F. Mink
Stanley T. Sumida

Technical Memorandum Report No. 75

December 1984

This research was commissioned by the Office of the Director, Water Resources Research Center, University of Hawaii at Manoa.

WATER RESOURCES RESEARCH CENTER
University of Hawaii at Manoa
Honolulu, Hawaii 96822

## ABSTRACT

A consistent classification and nomenclature of the aquifer systems in the state of Hawai'i do not exist in spite of the fact that groundwater is an essential water supply source in each island. The classification of water resources currently in use ignores aquifer features and boundaries and is based, instead, on topographic and judicial boundaries. One of the consequences is confusion in terminology because each investigator or describer of the resources often arbitrarily assigns aquifer names.

A classification scheme is proposed which starts with the island as the largest component and the aquifer unit as the smallest. Each island is divided into sectors in which similar generalities of hydrogeology prevail. Sectors are divided into systems in which hydrogeological and groundwater hydraulic connections are stronger, and the systems are further divided into units categorized by hydrological and geological features. A single code, consisting of a number for an island and letters for all other characteristics, identifies each aquifer unit. The code is open ended and may be expanded to include other aquifer features.

For the six major islands, the classification scheme includes 21 sectors, 64 systems, and 192 aquifer units. The intent of this study is not to fix the classification at this time, but to provide an incentive for standardization.

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## INTRODUCTION

In an economy and a society which are vitally dependent on groundwater as the principal source of water supply, it is curious that in the state of Hawai'i the classification of water resources based on mode of occurrence and location within an aquifer framework has been so feeble. Aquifers are identified and referred to, but normally in a non-definitive way. It is not uncommon to apply different names to the same aquifer, even the best known ones, such as the "Pearl Harbor" or "Southern Oahu" aquifer, and the "Schofield" or "Wahiawa" high-level aquifer in the island of O'ahu. Many important aquifers in the state have not been named at all. If investigating scientists and engineers have been so carefree in their nomenclature, it is hardly surprising that the lay public, including journalists and public relations staff who are the source of the public's information, engenders its own terminology.

A need exists for standardizing nomenclature and boundaries of aquifers in the state. The generalities of groundwater location and occurrence are reasonably well known for all of the islands and, in some, particularly O'ahu, the important resources are understood in appreciable detail. Yet, ironically, even in O'ahu the nearly century-long probing of the major aquifers has not resulted in a consistent typology. The classification that has been used throughout the state, and which has become embedded in virtually all state documents referring to water resources, was set 25 years ago and is based on geographic boundaries somewhat constrained by drainage basin topography. This classification, in which each island is divided into Hydrographic Areas, was created in 1959 by the Hawaii Water Authority, the predecessor of the Division of Water and Land Development of the Hawaii State Department of Land and Natural Resources. Boundaries of the Hydrographic Areas ignore groundwater conditions and, in consequence, nimble narrative descriptions are required by those investigators wanting to establish aquifer congruence within the areas.

Hawai'i's water resources have become a focus of regulatory attention because they are obviously finite, yet demand appears to be open-ended. The drought of 1983-1984 impressed on the government and the public the fragility of the resources. At the center of the drama have been the southern O'ahu groundwater resources, which are perceived as in danger of overexploitation. Reaction to concern about the adequacy of O'ahu's resources has given rise to the State Water Code which will be submitted to the Thirteenth (1985-1986) Legislature for action. In addition, groundwater protection measures advocated by the federal Environmental Protection Agency and promulgated by the Hawaii State Department of Health are expected to be enforced. This emphasis on conserving and protecting groundwater resources requires that a consistent classification and nomenclature of the aquifer systems of the state be established.

# BRIEF HISTORY OF AQUIFER CLASSIFICATION IN HAWAI'I

In the earliest days of well drilling following the discovery of artesian water at Honouliuli, O'ahu, in 1879, groundwater sources were named according to the immediate location where a successful well was drilled. The names were neither exclusive nor systematized, and most are now forgotten. Only in Honolulu did a consistent classification evolve following the successful development of the artesian aquifers in the district. The city had grown to contain the bulk of O'ahu's population and, from the moment the first well was drilled, a persistent fear was born that the resources were too limited to sustain expected demands. As a result of the nervous attention paid to water-level data, four presumptively separate artesian "basins" were identified, the boundaries and nomenclature of which have been retained to this day. Nowhere else on the island was a classification attempted until H.T. Stearns made a comprehensive study of the geology of O'ahu.

Stearns chiefly described O'ahu's groundwater resources in terms of appearance within lithologic series and, to a lesser extent, by mode of occurrence (Stearns and Vaksvik 1935). He discriminated among the waters in the Koolau and Waianae Volcanic Series, and in the sedimentary successions. His foray into systematic classification extended the artesian basin concept of the Honolulu District to other artesian aquifers in the Koolau formation. To the four Honolulu aquifers, he added six more, numbered clockwise starting in southern

O'ahu. His reference was specifically to basal artesian groundwater.

Thereafter, deliberate efforts to refine the systematization were hardly perceptible until a few years ago. Water resources investigations were made by sectors with surprisingly little attention paid to establishing aquifer boundaries and degree of continuity among aquifer units. The first deliberate effort to utilize hydrogeological measures to categorize groundwater regions throughout the state was made by K.J. Takasaki of the U.S. Geological Survey in 1977 in a report dealing with designing a monitoring network for the Hawaiian Islands. In that report the basic premise of classification was "geohydrologic units which represent areas where there are similarities in the occurrence of groundwater or in the geology pertinent to the occurrence of groundwater" (Takasaki 1977). The descriptive format included (1) geohydrology units by name and number; (2) topographic and lithologic elements, in particular a combination of formation and lithologic terms for each unit; and (3) mode of occurrence of the water as basal, perched, and dike-impounded. Takasaki's classification is the nucleus from which the classification presented in this report evolved.

A year later Takasaki (1978) reverted to the Hydrographic Areas classification of the state agencies in a report appraising Hawai'i's groundwater resources. As noted earlier, this classification ignores groundwater conditions. Hydrographic Areas were also used as the descriptive basis for the

Hawaii Water Resources Plan (1979), purportedly the most comprehensive assessment of the state's water resources to have been made. The six major islands of the state were divided into 27 Hydrographic Areas whose boundaries "...based on surface topography, represent Hawaiian major drainage basins...."

In 1978 the direct antecedent of the groundwater classification given in this report was included in the "Underground Injection Control Study" done for the Hawaii State Department of Health (J.F. Mink, in First West Engineers 1978). The groundwater resources were coded using letters and numbers by location, sequence, mode of occurrence, lithology, and potential development.

The annual U.S. Geological Survey "Water Resources Data" reports include chemical and hydrological information on groundwater. The descriptive framework is by island, each of which is referred to as a numbered Hydrologic Unit. The elements of definition are lithology by formation name, and mode of occurrence of the water (e.g., artesian and basal).

In this report, the elements of classification start with each island, which is divided into sectors, in turn divided into aquifer systems composed of aquifer units. The sectors are somewhat analogous to the hydrographic areas of the state documents but reflect subsurface rather than topographic boundaries. the systems embrace similar lithology while the units incorporate the elements of hydrology and geology.

# DESCRIPTION OF AQUIFER CODES

Hydrogeologic Sectors primarily reflect broad hydrogeologic features and, secondarily, geographic and topographic boundaries. Aquifer systems are more specifically defined by hydrogeologic continuity, in particular, hydraulic connections among units. The descriptive units categorize groundwater occurrence within an aquifer system.

Islands are coded by number in conformance with the U.S. Geological Survey protocol. Each sector is coded by an abbreviation for either a Hawaiian geographic name within the sector or by a general locator, such as north, south, east, and west, and in the case of O'ahu, the general term windward. This letter code normally consists of a single capital letter taken from the first letter of the geographic locator, but in some cases it consists of two letters, the first of which is the start of the name. The sector code is unique within each island but may repeat codes in another island.

The aquifer system code is derived exclusively from Hawaiian place names. Usually a single letter is employed, but in some cases two letters are necessary. The system notation does not repeat within a sector, but often the same letter code is used among sectors in the same island. The aquifer Unit code consists of several letters, the first two of which refer to hydrology and the following ones to geology of occurrence of the water. Where boundaries of the applicable aquifer descriptions are not defined, the hydrologic-geologic code may consist of two letters separated by a slash.

A specific aquifer is defined by the combination of a System with a descriptive unit. The full code for an aquifer consists of the island number and sector letter separated by a dash from the system letter, which is separated by a dash from the unit description. For example, the Kalihi basal unconfined aquifer in flank lavas in the Honolulu Sector of O'ahu is coded 3H-K-BUF. Obviously, the code letters could be replaced by numbers to give a unique number for each aquifer, but the combination of numbers and letters is a powerful mnemonic for quick orientation.

The unit code letters apply identically to all islands, but sectors and systems are unique to each island. The descriptive unit codes are as follows.

HYDROLOGY. Aquifers are classified as either basal or high level, and as either confined or unconfined. Thus,

B = basal, in which fresh water is in contact with seawater

H = high level, in which fresh water is not in contact with seawater

C = confined, where the top of the saturated aquifer lies below the head of the water

U = unconfined, where the water table elevation and head are essentially the same.

GEOLOGY. Aquifers are categorized as occurring in the flank lavas of the volcanic domes, in rift zones characterized by dikes, on poorly permeable perching members, or within the sedimentary sequence. Flank aquifers normally are horizontally extensive and have the lowest heads; rift aquifers are segmented into compartments by dikes; perched aquifers lie on horizontal impermeable formations but are not ordinarily very extensive; and sedimentary aquifers are comprised of alluvial and marine sediments deposited by erosion and biogenic processes during waxing and waning sea levels. The geologic codes are

F = flank

D = dike

P = perched

S = sedimentary.

Flank and dike basal water are sometimes indistinguishable and are coded as F/D. Other double codes are D/P and F/P.

The island sector and system codes are as follows.

| Island | No. | Sector | Letter | Aquifer System | Letter |
|---|---|---|---|---|---|
| Kauai | 2 | Lihue | L | Anahola | A |
| | | | | Wailua | W |
| | | | | Hanamaulu | H |
| | | | | Koloa | K |
| | | Waimea | W | Makaweli | M |
| | | | | Waimea | W |
| | | | | Kekaha | K |
| | | Hanalei | H | Napali | N |
| | | | | Wainiha | W |
| | | | | Hanalei | H |
| | | | | Kalihiwai | K |

| Island | No. | Sector | Letter | Aquifer System | Letter |
|---|---|---|---|---|---|
| Oahu | 3 | Honolulu | H | Palolo | P |
| | | | | Nuuanu | N |
| | | | | Kalihi | K |
| | | | | Moanalua | M |
| | | | | Waialae | W |
| | | Pearl Harbor | P | Waiawa | W |
| | | | | Ewa | E |
| | | Waianae | W | Nanakuli | N |
| | | | | Lualualei | L |
| | | | | Waianae | W |
| | | | | Makaha | M |
| | | | | Keeau | K |
| | | North | N | Mokuleia | M |
| | | | | Waialua | W |
| | | | | Kawailoa | K |
| | | Central | C | Wahiawa | W |
| | | | | Koolau | K |
| | | Windward | WW | Koolauloa | KL |
| | | | | Kahana | KH |
| | | | | Koolaupoko | KP |
| | | | | Waimanalo | W |
| Molokai | 4 | West | W | Maunaloa | M |
| | | Central | C | Hoolehua | H |
| | | South | S | Kawela | K |
| | | North | N | Wailau | W |
| Lanai | 5 | Lanai | L | Lanaihale | L |
| | | | | Manele | M |
| | | | | Paoma | P |
| | | | | Kaa | K |
| Maui | 6 | East | E | Paia | P |

| Island | No. | Sector | Letter | Aquifer System | Letter |
|---|---|---|---|---|---|
| Maui | 6 | East | E | Waikamoi | W |
| | | | | Nahiku | N |
| | | | | Hana | H |
| | | | | Kipahulu | KP |
| | | | | Kahikinui | KN |
| | | | | Makena | M |
| | | West | W | Honolua | H |
| | | | | Lahaina | L |
| | | | | Olowalu | O |
| | | | | Maalaea | M |
| | | | | Waiehu | W |
| | | | | Kahakuloa | K |
| Hawaii | 8 | Kohala | KH | Hawi | H |
| | | | | Mahukona | M |
| | | Mauna Kea | MK | Hamakua | H |
| | | | | Waimea | W |
| | | Mauna Loa | ML | Hilo | H |
| | | | | Ninole | N |
| | | | | Kona | K |
| | | | | Anaehoomalu | A |
| | | Kilauea | KL | Puna | P |
| | | | | Kalapana | K |
| | | Hualalai | HL | Hualalai | H |

For the coded aquifers a variety of supplementary information can be appended. Certain hydrologic parameters and quantities, such as rainfall, infiltration (recharge), sustainable yield, and storage can expand the utility of the classification. Some of these quantities are given in accompanying tables and have been computed as follows.

**RAINFALL.** From average annual rainfall, but the basal confined aquifer units are excluded because they are covered by restraining sediments. Units of measurement are mgd.

**INFILTRATION (I)** (excluded in the tables but necessary in calculating sustainable yield). For average annual rainfall equal to or greater than 50 in., infiltration is taken as one-half the rainfall; for the average less than 50 in., it is taken as one-fourth the rainfall. Units of measurement are mgd.

**SUSTAINABLE YIELD (SY).** Computed as a fraction of infiltration (I) as,

$$SY = I\,[1 - (H_e/H_o)^2]$$

in which $H_e$ is equilibrium head and $H_o$ is initial head. The values are as follows:

| $H_o$ | $H_e/H_o$ | SY |
|---|---|---|
| >15 | 0.5 | 0.75 I |
| 9-14.9 | 0.7 | 0.51 I |
| 3-8.9 | 0.8 | 0.36 I |
| <3 | 0.9 | 0.19 I |

For details of the derivation, see Mink (1980, p. 76, eq. [16]). Units of measurement are mgd.

The tables that follow list aquifer units for each island along with their areas in square miles, average rainfall in mgd, and estimated sustainable yield in mgd. The total number of sectors, systems, and units in the classification are shown on the following page.

| Island | Sectors | Systems | Units |
|---|---|---|---|
| Kauai | 3 | 11 | 36 |
| Oahu | 6 | 21 | 76 |
| Molokai | 4 | 4 | 13 |
| Lanai | 1 | 4 | 4 |
| Maui | 2 | 13 | 40 |
| Hawaii | 5 | 11 | 23 |
| TOTAL | 21 | 64 | 192 |

## DESCRIPTION OF TABLES

### Aquifers

All aquifer systems and aquifer units with their appropriate codes are listed by island (App. Table A.1). The first column (Sort) assigns a sorting number to each unit by using the island number as the first digit in a four-digit code. The sequencing of numbers by intervals of 10 allows room for inserting additional aquifer units when they become identified. The second column gives island of occurrence, and the third column the sector. The next column lists aquifer system names, to each of which belongs at least one aquifer unit.

Under the column heading, Aquifer, the hydrology and geology of each unit is described. The combination of system and Aquifer identifies the aquifer unit. The last column lists the code for each unit. From the data incorporated in the code, aquifer unit maps can be drawn. In this report, the maps show only system outlines (App. Figs. A.1-A.6).

## Island Aquifers

The next set of tables summarizes pertinent data for aquifer units by island (App. Tables B.1-B.6). The Sort column, which incidentally can also be employed to identify each aquifer unit because it is a unique number, is given along with the aquifer code. Data in the tables include area, average rainfall, and estimated sustainable yield. Neither rainfall nor sustainable yield is computed for confined aquifers because they are not tributary to direct rainfall. The sustainable yield of the confined aquifer is included with their unconfined extensions. Also, rainfall and sustainable yield are not computed for the perched water of the Hamakua Coast of Hawai'i Island (SMK-H-HUP) because the calculations are made for the dike and basal units beneath it. Sustainable yield calculations are not included for the sedimentary aquifer units. The form of the table is open ended so that additional data and descriptive information can be incorporated in new columns. The volume of storage, for instance, is a logical add on. Lithologic nomenclature, as well as quality and contamination data, can as easily be appended.

Minor discrepancies exist between the official total area for each island and the sum of the unit areas planimetered for this report. A comparison of the summed unit areas with the island areas given in the Hawaii State Department of Planning and Economic Development "Data Book" are as follows:

| Island | Summed Units (mgd) | DATA BOOK* (mgd) | % Diff. |
|---|---|---|---|
| Kauai | 548 | 549 | <1 |
| Oahu | 595 | 594 | <1 |
| Molokai | 260 | 261 | <1 |
| Lanai | 140 | 140 | 0 |
| Maui | 705 | 729 | 3 |
| Hawaii | 3995 | 4034 | <1 |

*DPED (1977).

The rainfall and sustainable yield values were derived from original calculations. Because sustainable yield depends on infiltration, the infiltration is first calculated, although it is not included in the tables. A comparison of total island values with those given by Takasaki (1978) for non-caprock portions of each island follows (values in mgd):

| Island | Rain (Tak.) | Rain (Units) | Infil. (Tak.) | Infil. (Units) |
|---|---|---|---|---|
| Kauai | 2,430 | 2,230 | 120* | 1,049 |
| Oahu | 1,800 | 1,754 | 655 | 685 |
| Molokai | 565 | 547 | 90* | 205 |
| Lanai | 187 | 139 | 23 | 26 |
| Maui | 2,820 | 2,083 | 835* | 919 |
| Hawaii | 14,100 | 14,087 | 4,300* | 6,711 |

*Takasaki's infiltration does not include groundwater seepage into streams.

A comparison of the computed sustainable yields with those given in the Hawaii State "Water Resources Development Plan" (1980) is presented below. Like the Takasaki (1978) estimates of infiltration, the State Plan estimates of groundwater sustainable yields (noted as GW SY below) neglects the groundwater component of stream flow (note that the surface water sustainable yield of the state is written as SW SY and that all values are in mgd).

| Island | State SW SY | State GW SY | State Total SY | Units GW SY |
|---|---|---|---|---|
| Kauai | 930 | 113 | 1043 | 722 |
| Oahu | 178 | 450-615 | 793 | 508 |
| Molokai | 52 | 63 | 115 | 122 |
| Lanai | 0 | 5 | 5 | 12 |
| Maui | 439 | 705 | 1144 | 496 |
| Hawaii | 690 | 2250 | 2940 | 2688 |

## AQUIFER MAPS

The maps presented in this report give the boundaries of the sectors and aquifer systems for the islands of Kaua'i, O'ahu, Moloka'i, Lana'i, Maui, and Hawai'i (App. Figs. A.1-A.6). Much more detailed maps of the aquifer units should eventually be drafted.

## CONCLUSIONS

An attempt has been made to build a framework for dividing the state into hydrologic units based on groundwater features. Given the importance of groundwater in the life of Hawai'i, such a framework is reasonable and needed. Much additional effort is necessary to perfect the systematization; thus, this effort should be regarded as an incentive to continue work rather than as its completion.

## REFERENCES

Department of Land and Natural Resources. 1980. State water resources development plan. State of Hawaii.

Department of Planning and Economic Development. 1977. Data book. State of Hawaii.

First West Engineers. 1978. Underground injection control study. Department of Health, State of Hawaii. 71 pp.

Hawaii Water Authority. 1959. Water resources in Hawaii. Territory of Hawaii. 148 pp.

Hawaii Water Resources Regional Study. 1979. Hawaii water resources plan. An intergovernmental team report submitted to the U.S. Water Council for transmittal to the U.S. Congress. 207 pp.

Mink, J.F. 1980. State of the groundwater resources of southern Oahu. Board of Water Supply, City and County of Honolulu. 83 pp.

Stearns, H.T., and Vaksvik, K.N. 1935. Geology and groundwater resources of the island of Oahu, Hawaii. Bull. 1, Division of Hydrography, Territory of Hawaii. 479 pp.

Takasaki, K.J. 1977. Elements needed in design of a groundwater quality monitoring network in the Hawaiian Islands. U.S. Geological Survey Water Supply Paper 2041.

______. 1978. Summary appraisals of the nation's groundwater resources – Hawaii region. U.S. Geological Survey Prof. Paper 813-M.

U.S. Geological Survey. (annual). Water resources data – Hawaii and other Pacific areas. U.S. Geological Survey Water-Data Reports prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development and with other agencies.

## APPENDIX CONTENTS

### Tables



### Figures

APPENDIX TABLE A.1. AQUIFER CLASSIFICATION, STATE OF HAWAI'I

| Sort | Island | Sector | System | Aquifer | Code |
|---|---|---|---|---|---|
| 2010 | Kauai | Lihue | Anahola | HUD | 2L-A-HUD |
| 2020 | Kauai | Lihue | Anahola | BUF/D | 2L-A-BUF/D |
| 2030 | Kauai | Lihue | Anahola | BUS | 2L-A-BUS |
| 2040 | Kauai | Lihue | Anahola | BCF | 2L-A-BCF |
| 2050 | Kauai | Lihue | Waialua | HUD | 2L-W-HUD |
| 2060 | Kauai | Lihue | Waialua | BUF/D | 2L-W-BUF/D |
| 2070 | Kauai | Lihue | Waialua | BUS | 2L-W-BUS |
| 2080 | Kauai | Lihue | Waialua | BCF | 2L-W-BCF |
| 2090 | Kauai | Lihue | Hanamaulu | HUD | 2L-H-HUD |
| 2100 | Kauai | Lihue | Hanamaulu | BUF/D | 2L-H-BUF/D |
| 2110 | Kauai | Lihue | Hanamaulu | BUS | 2L-H-BUS |
| 2120 | Kauai | Lihue | Hanamaulu | BCF | 2L-H-BCF |
| 2130 | Kauai | Lihue | Koloa | HUD | 2L-K-HUD |
| 2140 | Kauai | Lihue | Koloa | BUF/D | 2L-K-BUF/D |
| 2150 | Kauai | Waimea | Makaweli | BUF | 2W-M-BUF |
| 2160 | Kauai | Waimea | Makaweli | HUD | 2W-M-HUD |
| 2170 | Kauai | Waimea | Waimea | BUF | 2W-W-BUF |
| 2180 | Kauai | Waimea | Waimea | HUD | 2W-W-HUD |
| 2190 | Kauai | Waimea | Waimea | BUS | 2W-W-BUS |
| 2200 | Kauai | Waimea | Waimea | BCF | 2W-W-BCF |
| 2210 | Kauai | Waimea | Kekaha | BUF | 2W-K-BUF |
| 2220 | Kauai | Waimea | Kekaha | HUD | 2W-K-HUD |
| 2230 | Kauai | Waimea | Kekaha | BUS | 2W-K-BUS |
| 2240 | Kauai | Waimea | Kekaha | BCF | 2W-K-BCF |
| 2250 | Kauai | Hanalei | Napali | HUD | 2H-N-HUD |
| 2260 | Kauai | Hanalei | Napali | BUD | 2H-N-BUD |
| 2270 | Kauai | Hanalei | Wainiha | BUF | 2H-W-BUF |
| 2280 | Kauai | Hanalei | Wainiha | HUD | 2H-W-HUD |
| 2290 | Kauai | Hanalei | Wainiha | BUS | 2H-W-BUS |
| 2300 | Kauai | Hanalei | Wainiha | BCF | 2H-W-BCF |
| 2310 | Kauai | Hanalei | Hanalei | BCF | 2H-H-BCF |
| 2320 | Kauai | Hanalei | Hanalei | BUF | 2H-H-BUF |
| 2330 | Kauai | Hanalei | Hanalei | HUD | 2H-H-HUD |
| 2340 | Kauai | Hanalei | Hanalei | BUS | 2H-H-BUS |
| 2350 | Kauai | Hanalei | Kalihiwai | BUF | 2H-K-BUF |
| 2360 | Kauai | Hanalei | Kalihiwai | HUD | 2H-K-HUD |
| 3010 | Oahu | Honolulu | Palolo | BCF | 3H-P-BCF |
| 3020 | Oahu | Honolulu | Palolo | BUF | 3H-P-BUF |
| 3030 | Oahu | Honolulu | Palolo | HUD | 3H-P-HUD |
| 3040 | Oahu | Honolulu | Palolo | BUS | 3H-P-BUS |
| 3050 | Oahu | Honolulu | Nuuanu | BCF | 3H-N-BCF |
| 3060 | Oahu | Honolulu | Nuuanu | BUF | 3H-N-BUF |
| 3070 | Oahu | Honolulu | Nuuanu | HUD | 3H-N-HUD |
| 3080 | Oahu | Honolulu | Nuuanu | BUS | 3H-N-BUS |
| 3090 | Oahu | Honolulu | Kalihi | BCF | 3H-K-BCF |
| 3100 | Oahu | Honolulu | Kalihi | BUF | 3H-K-BUF |
| 3110 | Oahu | Honolulu | Kalihi | HUD/P | 3H-K-HUD/P |
| 3120 | Oahu | Honolulu | Kalihi | BUS | 3H-K-BUS |
| 3130 | Oahu | Honolulu | Moanalua | BCF | 3H-M-BCF |
| 3140 | Oahu | Honolulu | Moanalua | BUF | 3H-M-BUF |

APPENDIX TABLE A.1.--Continued

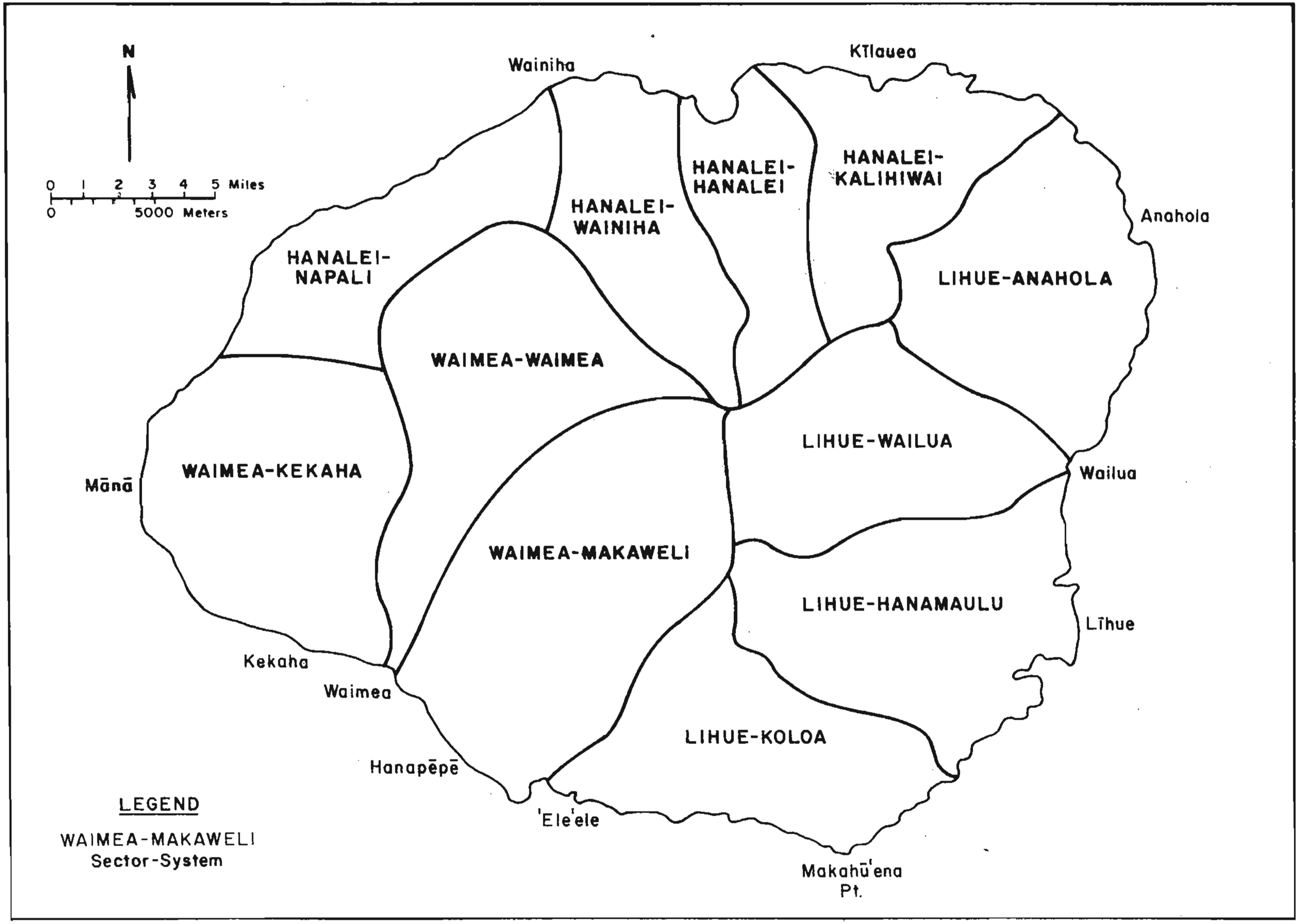
| Sort | Island | Sector | System | Aquifer | Code |
|---|---|---|---|---|---|
| 3150 | Oahu | Honolulu | Moanalua | HUD | 3H-M-HUD |
| 3160 | Oahu | Honolulu | Moanalua | BUS | 3H-M-BUS |
| 3170 | Oahu | Honolulu | Waialae | BCF | 3H-W-BCF |
| 3180 | Oahu | Honolulu | Waialae | BUF | 3H-W-BUF |
| 3190 | Oahu | Honolulu | Waialae | HUD | 3H-W-HUD |
| 3200 | Oahu | Honolulu | Waialae | BUS | 3H-W-BUS |
| 3210 | Oahu | Pearl Harbor | Waiawa | BCF | 3P-W-BCF |
| 3220 | Oahu | Pearl Harbor | Waiawa | BUF | 3P-W-BUF |
| 3230 | Oahu | Pearl Harbor | Waiawa | HUD | 3P-W-HUD |
| 3240 | Oahu | Pearl Harbor | Waiawa | BUS | 3P-W-BUS |
| 3250 | Oahu | Pearl Harbor | Ewa | BCF | 3P-E-BCF |
| 3260 | Oahu | Pearl Harbor | Ewa | BUF | 3P-E-BUF |
| 3270 | Oahu | Pearl Harbor | Ewa | HUD | 3P-E-HUD |
| 3280 | Oahu | Pearl Harbor | Ewa | BUS | 3P-E-BUS |
| 3290 | Oahu | Waianae | Nanakuli | BCD | 3W-N-BCD |
| 3300 | Oahu | Waianae | Nanakuli | BUD | 3W-N-BUD |
| 3310 | Oahu | Waianae | Nanakuli | HUD | 3W-N-HUD |
| 3320 | Oahu | Waianae | Nanakuli | BUS | 3W-N-BUS |
| 3330 | Oahu | Waianae | Lualualei | BCD | 3W-L-BCD |
| 3340 | Oahu | Waianae | Lualualei | BUD | 3W-L-BUD |
| 3350 | Oahu | Waianae | Lualualei | HUD | 3W-L-HUD |
| 3360 | Oahu | Waianae | Lualualei | BUS | 3W-L-BUS |
| 3370 | Oahu | Waianae | Waianae | BCD | 3W-W-BCD |
| 3380 | Oahu | Waianae | Waianae | BUD | 3W-W-BUD |
| 3390 | Oahu | Waianae | Waianae | HU/CD | 3W-W-HU/CD |
| 3400 | Oahu | Waianae | Waianae | BUS | 3W-W-BUS |
| 3410 | Oahu | Waianae | Makaha | BCD | 3W-M-BCD |
| 3420 | Oahu | Waianae | Makaha | BUD | 3W-M-BUD |
| 3430 | Oahu | Waianae | Makaha | HU/CD | 3W-M-HU/CD |
| 3440 | Oahu | Waianae | Makaha | BUS | 3W-M-BUS |
| 3450 | Oahu | Waianae | Keaau | BCD | 3W-K-BCD |
| 3460 | Oahu | Waianae | Keaau | BUD | 3W-K-BUD |
| 3470 | Oahu | Waianae | Keaau | HUD | 3W-K-HUD |
| 3480 | Oahu | Waianae | Keaau | BUS | 3W-K-BUS |
| 3490 | Oahu | North | Mokuleia | BCF | 3N-M-BCF |
| 3500 | Oahu | North | Mokuleia | BUF | 3N-M-BUF |
| 3510 | Oahu | North | Mokuleia | BUD | 3N-M-BUD |
| 3520 | Oahu | North | Mokuleia | HUD | 3N-M-HUD |
| 3530 | Oahu | North | Mokuleia | BUS | 3N-M-BUS |
| 3540 | Oahu | North | Waialua | BCF | 3N-W-BCF |
| 3550 | Oahu | North | Waialua | BUF | 3N-W-BUF |
| 3560 | Oahu | North | Waialua | BUS | 3N-W-BUS |
| 3570 | Oahu | North | Kawailoa | BCF | 3N-K-BCF |
| 3580 | Oahu | North | Kawailoa | BUF | 3N-K-BUF |
| 3590 | Oahu | North | Kawailoa | BUD | 3N-K-BUD |
| 3600 | Oahu | North | Kawailoa | HUD | 3N-K-HUD |
| 3610 | Oahu | North | Kawailoa | BUS | 3N-K-BUS |
| 3620 | Oahu | Central | Wahiawa | HUD | 3C-W-HUD |
| 3630 | Oahu | Central | Koolau | HUD | 3C-K-HUD |
| 3640 | Oahu | Windward | Koolauloa | BCF | 3WW-KL-BCF |

APPENDIX TABLE A.1.—Continued

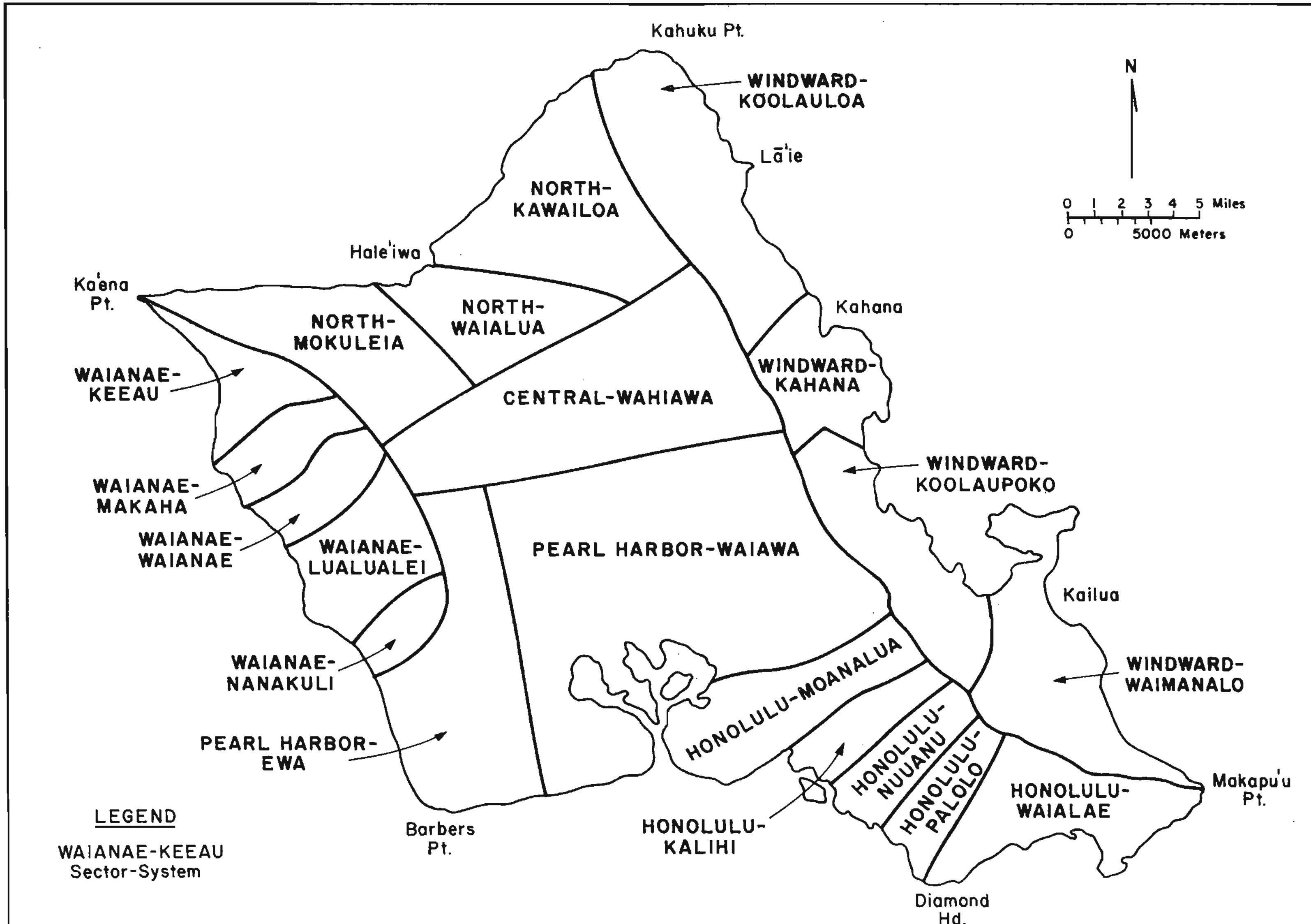
| Sort | Island | Sector | System | Aquifer | Code |
|---|---|---|---|---|---|
| 6210 | Maui | West | Honolua | HUD | 6W-H-HUD |
| 6220 | Maui | West | Honolua | BUS | 6W-H-BUS |
| 6230 | Maui | West | Lahaina | BCF | 6W-L-BCF |
| 6240 | Maui | West | Lahaina | BUF | 6W-L-BUF |
| 6250 | Maui | West | Lahaina | HUD | 6W-L-HUD |
| 6260 | Maui | West | Lahaina | BUS | 6W-L-BUS |
| 6270 | Maui | West | Olowalu | BCF | 6W-O-BCF |
| 6280 | Maui | West | Olowalu | BUF | 6W-O-BUF |
| 6290 | Maui | West | Olowalu | HUD | 6W-O-HUD |
| 6300 | Maui | West | Olowalu | BUS | 6W-O-BUS |
| 6310 | Maui | West | Maalaea | BCF | 6W-M-BCF |
| 6320 | Maui | West | Maalaea | BUF | 6W-M-BUF |
| 6330 | Maui | West | Maalaea | HUD | 6W-M-HUD |
| 6340 | Maui | West | Maalaea | BUS | 6W-M-BUS |
| 6350 | Maui | West | Waiehu | BCF | 6W-W-BCF |
| 6360 | Maui | West | Waiehu | BUF | 6W-W-BUF |
| 6370 | Maui | West | Waiehu | HUD | 6W-W-HUD |
| 6380 | Maui | West | Waiehu | BUS | 6W-W-BUS |
| 6390 | Maui | West | Kahakuloa | BUF/D | 6W-K-BUF/D |
| 6400 | Maui | West | Kahakuloa | HUD/P | 6W-K-HUD/P |
| 8010 | Hawaii | Kohala | Hawi | BUF | 8KH-H-BUF |
| 8020 | Hawaii | Kohala | Hawi | HUD | 8KH-H-HUD |
| 8030 | Hawaii | Kohala | Mahukona | BUF | 8KH-M-BUF |
| 8040 | Hawaii | Kohala | Mahukona | HUD | 8KH-M-HUD |
| 8050 | Hawaii | Mauna Kea | Hamakua | BUF | 8MK-H-BUF |
| 8060 | Hawaii | Mauna Kea | Hamakua | HUD | 8MK-H-HUD |
| 8070 | Hawaii | Mauna Kea | Hamakua | HUP | 8MK-H-HUP |
| 8080 | Hawaii | Mauna Kea | Waimea | BUF | 8MK-W-BUF |
| 8090 | Hawaii | Mauna Kea | Waimea | HUD/P | 8MK-W/HUD/P |
| 8100 | Hawaii | Mauna Loa | Hilo | BUF | 8ML-H-BUF |
| 8110 | Hawaii | Mauna Loa | Hilo | HUD | 8ML-H-HUD |
| 8120 | Hawaii | Mauna Loa | Ninole | BUF | 8ML-N-BUF |
| 8130 | Hawaii | Mauna Loa | Ninole | HUD | 8ML-N-HUD |
| 8140 | Hawaii | Mauna Loa | Ninole | HUD/P | 8ML-N-HUD/P |
| 8150 | Hawaii | Mauna Loa | Anaehoomalu | BUF | 8ML-A-BUF |
| 8160 | Hawaii | Mauna Loa | Anaehoomalu | HUD | 8ML-A-HUD |
| 8170 | Hawaii | Mauna Loa | Kona | BUF | 8ML-K-BUF |
| 8180 | Hawaii | Mauna Loa | Kona | HUD | 8ML-K-HUD |
| 8190 | Hawaii | Kilauea | Puna | HUD | 8KL-P-HUD |
| 8200 | Hawaii | Kilauea | Kalapana | BUF | 8KL-K-BUF |
| 8210 | Hawaii | Kilauea | Kalapana | HUD | 8KL-K-HUD |
| 8220 | Hawaii | Hualalai | Hualalai | BUF | 8HL-H-BUF |
| 8230 | Hawaii | Hualalai | Hualalai | HUD | 8HL-H-HUD |

APPENDIX TABLE A.1.—Continued

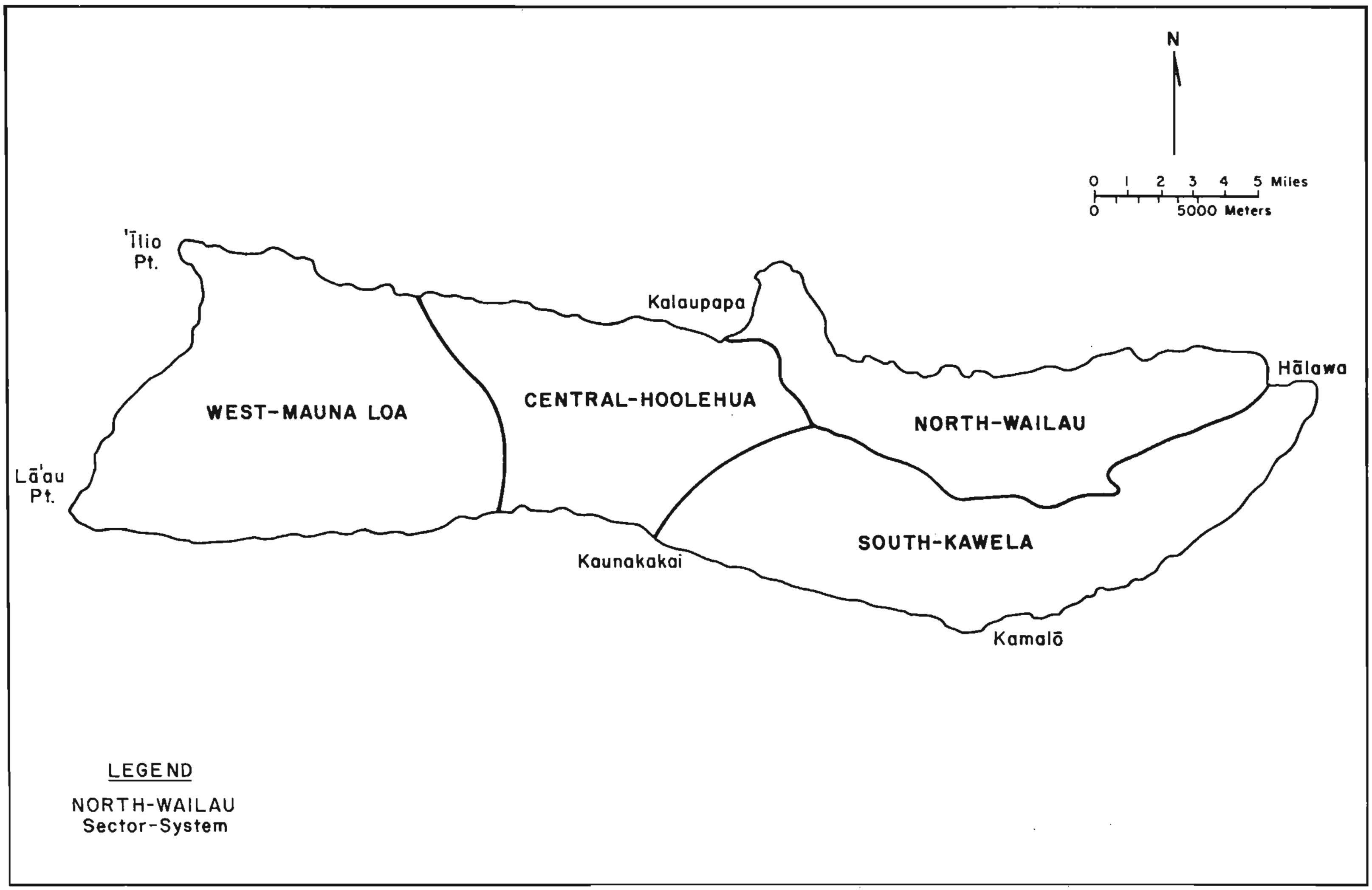
| Sort | Island | Sector | System | Aquifer | Code |
|---|---|---|---|---|---|
| 3650 | Oahu | Windward | Koolauloa | BUF | 3WW-KL-BUF |
| 3660 | Oahu | Windward | Koolauloa | HUD | 3WW-KL-HUD |
| 3670 | Oahu | Windward | Koolauloa | BUS | 3WW-KL-BUS |
| 3680 | Oahu | Windward | Kahana | BCD | 3WW-KH-BCD |
| 3690 | Oahu | Windward | Kahana | BUD | 3WW-KH-BUD |
| 3700 | Oahu | Windward | Kahana | HUD | 3WW-KH-HUD |
| 3710 | Oahu | Windward | Kahana | BUS | 3WW-KH-BUS |
| 3720 | Oahu | Windward | Koolaupoko | BCD | 3WW-KP-BCD |
| 3730 | Oahu | Windward | Koolaupoko | HUD | 3WW-KP-HUD |
| 3740 | Oahu | Windward | Waimanalo | BCD | 3WW-W-BCD |
| 3750 | Oahu | Windward | Waimanalo | HUD | 3WW-W-HUD |
| 3760 | Oahu | Windward | Waimanalo | BUS | 3WW-W-BUS |
| 4010 | Molokai | West | Maunaloa | BUF/D | 4W-M-BUF/D |
| 4020 | Molokai | West | Maunaloa | BCF | 4W-M-BCF |
| 4030 | Molokai | West | Maunaloa | BUS | 4W-M-BUS |
| 4040 | Molokai | Central | Hoolehua | BUF/D | 4C-H-BUF/D |
| 4050 | Molokai | Central | Hoolehua | HUD | 4C-H-HUD |
| 4060 | Molokai | Central | Hoolehua | BCF | 4C-H-BCF |
| 4070 | Molokai | Central | Hoolehua | BUS | 4C-H-BUS |
| 4080 | Molokai | South | Kawela | BUF | 4S-K-BUF |
| 4090 | Molokai | South | Kawela | HUD | 4S-K-HUD |
| 4100 | Molokai | South | Kawela | BCF | 4S-K-BCF |
| 4110 | Molokai | South | Kawela | BUS | 4S-K-BUS |
| 4120 | Molokai | North | Wailau | BUD | 4N-W-BUD |
| 4130 | Molokai | North | Wailau | HUD | 4N-W-HUD |
| 5010 | Lanai | Lanai | Lanaihale | HUD | 5L-L-HUD |
| 5020 | Lanai | Lanai | Manele | BUD | 5L-M-BUD |
| 5030 | Lanai | Lanai | Paoma | BUF | 5L-P-BUF |
| 5040 | Lanai | Lanai | Kaa | BUF | 5L-K-BUF |
| 6010 | Maui | East | Paia | BCF | 6E-P-BCF |
| 6020 | Maui | East | Paia | BUF | 6E-P-BCF |
| 6030 | Maui | East | Paia | HUD | 6E-P-HUD |
| 6040 | Maui | East | Paia | BUS | 6E-P-BUS |
| 6050 | Maui | East | Waikamoi | BUF/D | 6E-W-BUF/D |
| 6060 | Maui | East | Waikamoi | HUD/P | 6E-W-HUD/P |
| 6070 | Maui | East | Nahiku | BUF/D | 6E-N-BUF/D |
| 6080 | Maui | East | Nahiku | HUD/P | 6E-N-HUD/P |
| 6090 | Maui | East | Hana | BUF | 6E-H-BUF |
| 6100 | Maui | East | Hana | HUD | 6E-H-HUD |
| 6110 | Maui | East | Kipahulu | BUF | 6E-KP-BUF |
| 6120 | Maui | East | Kipahulu | HUD/P | 6E-KP-HUD/P |
| 6130 | Maui | East | Kahikinui | BUF | 6E-KN-BUF |
| 6140 | Maui | East | Kahikinui | HUD | 6E-KN-HUD |
| 6150 | Maui | East | Makena | BCF | 6E-M-BCF |
| 6160 | Maui | East | Makena | BUF | 6E-M-BUF |
| 6170 | Maui | East | Makena | HUD | 6E-M-HUD |
| 6180 | Maui | East | Makena | BUS | 6E-M-BUS |
| 6190 | Maui | West | Honolua | BCF | 6W-H-BCF |
| 6200 | Maui | West | Honolua | BUF | 6W-H-BUF |



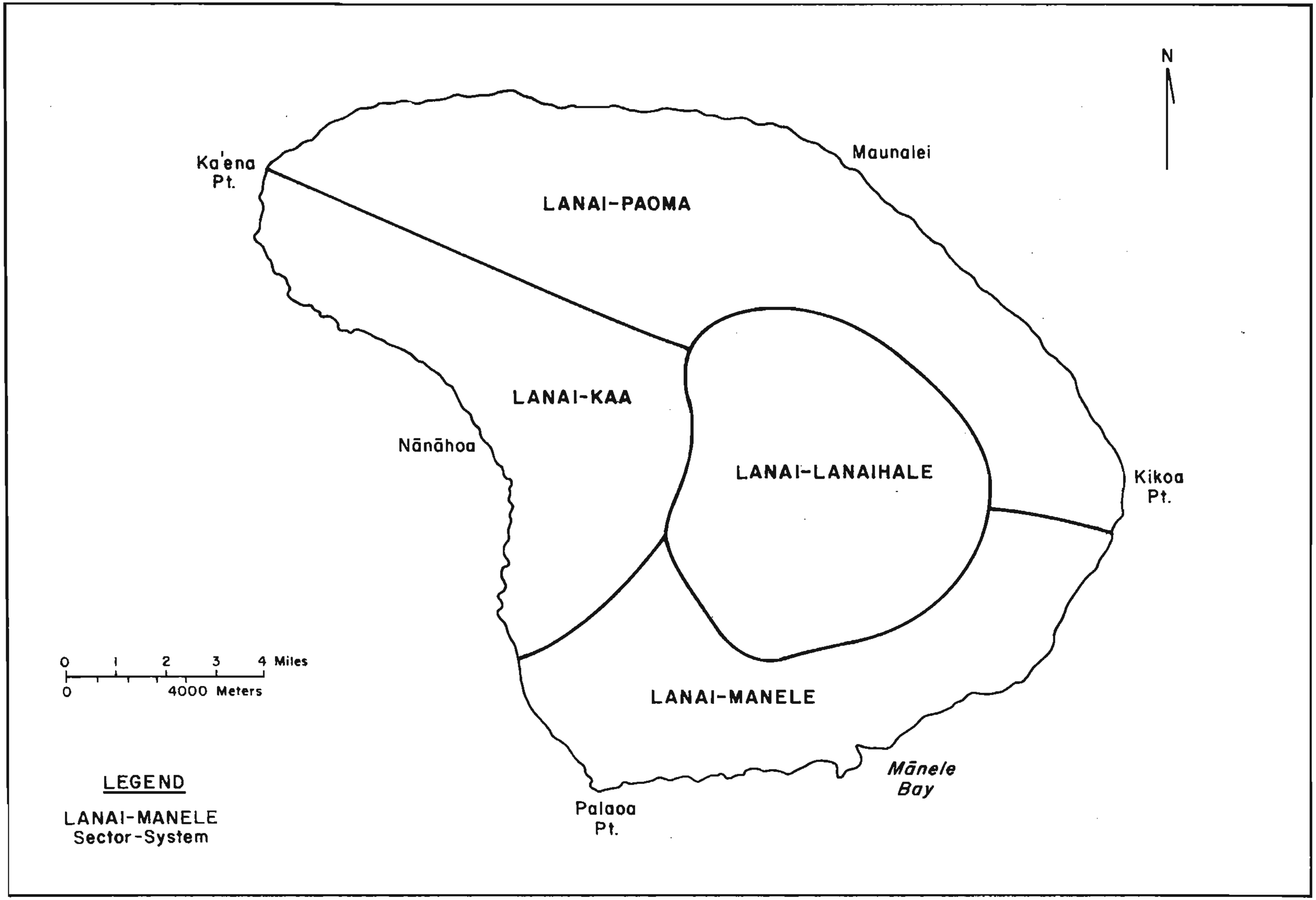

Appendix Figure A.1. Map of aquifer systems, island of Kaua'i



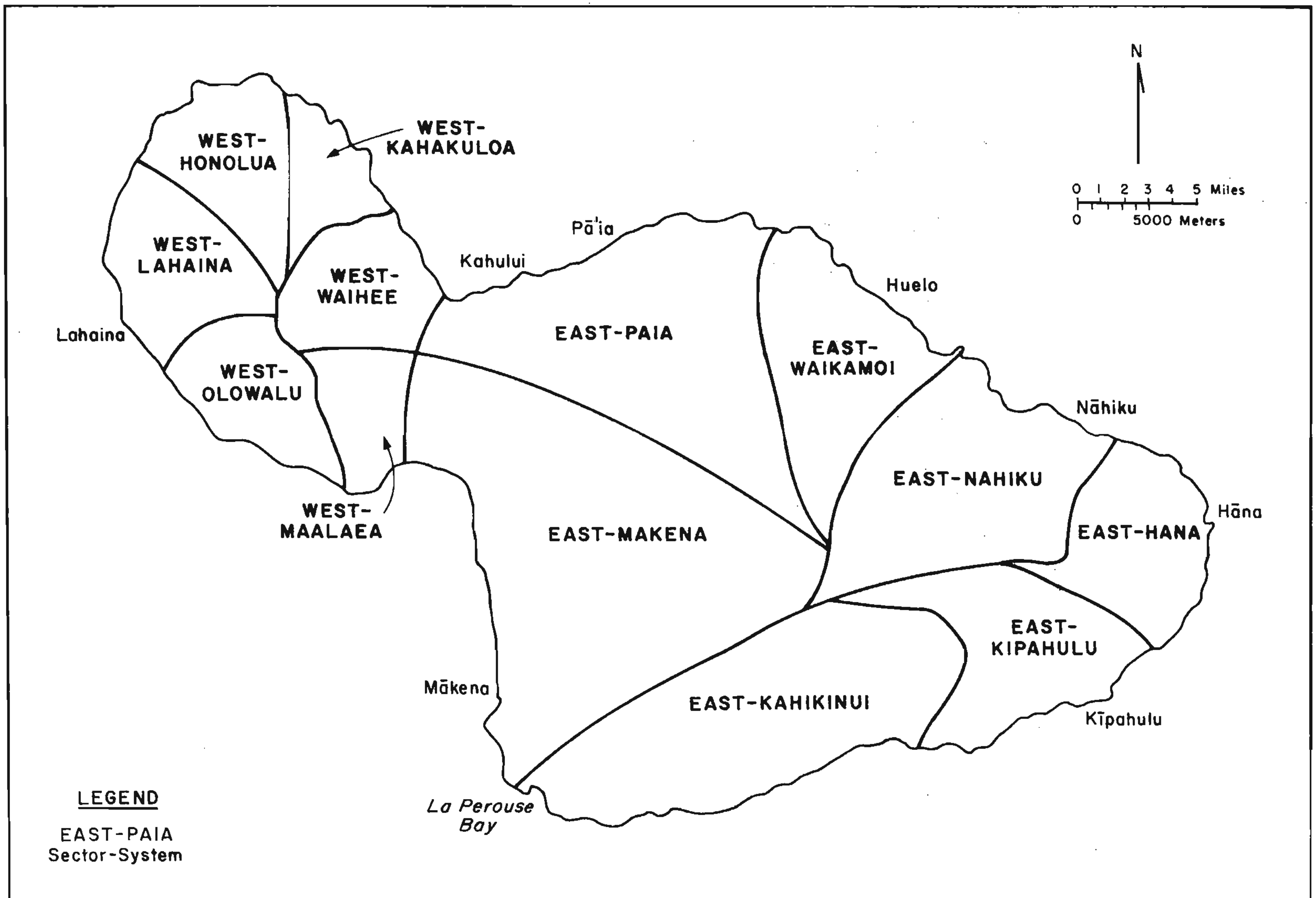

Appendix Figure A.2. Map of aquifer systems, island of O'ahu



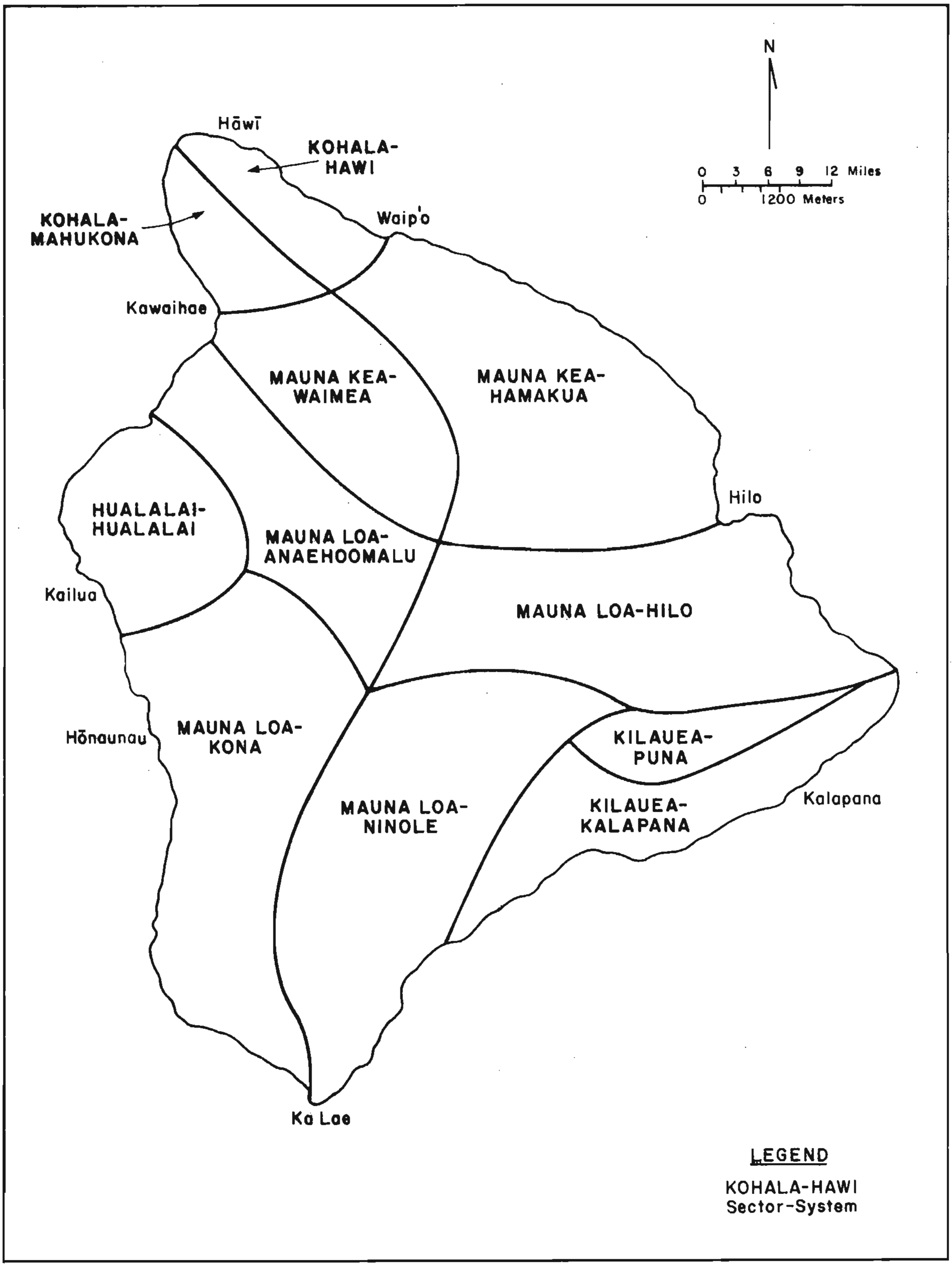

Appendix Figure A.3. Map of aquifer systems, island of Moloka'i




Appendix Figure A.4. Map of aquifer systems, island of Lana'i




Appendix Figure A.5. Map of aquifer systems, island of Maui




Appendix Figure A.6. Map of aquifer systems, island of Hawai'i

APPENDIX TABLE B.1. CODE AND KEY HYDROLOGIC STATISTICS FOR KAUAI AQUIFERS

| Sort | Code | Area (mile²) | Avg. Rain (mgd) | Sustainable Yield (mgd) |
|---|---|---|---|---|
| 2010 | 2L-A-HUD | 23.82 | 91 | 35 |
| 2020 | 2L-A-BUF/D | 23.82 | 68 | 12 |
| 2030 | 2L-A-BUS | 2.29 | 5 | |
| 2040 | 2L-A-BCF | | | |
| 2050 | 2L-W-HUD | 41.12 | 294 | 110 |
| 2060 | 2L-W-BUF/D | 10.00 | 36 | 7 |
| 2070 | 2L-W-BUS | 0.65 | 2 | |
| 2080 | 2L-W-BCF | | | |
| 2090 | 2L-H-HUD | 27.05 | 129 | 49 |
| 2100 | 2L-H-BUF/D | 27.05 | 77 | 14 |
| 2110 | 2L-H-BUS | 1.43 | 3 | |
| 2120 | 2L-H-BCF | | | |
| 2130 | 2L-K-HUD | 24.37 | 87 | 33 |
| 2140 | 2L-K-BUF/D | 24.37 | 58 | 8 |
| 2150 | 2W-M-BUF | 29.75 | 50 | 7 |
| 2160 | 2W-M-HUD | 50.52 | 241 | 91 |
| 2170 | 2W-W-BUF | 2.53 | 3 | |
| 2180 | 2W-W-HUD | 55.56 | 238 | 89 |
| 2190 | 2W-W-BUS | 0.86 | 1 | |
| 2200 | 2W-W-BCF | | | |
| 2210 | 2W-K-BUF | 16.82 | 20 | 3 |
| 2220 | 2W-K-HUD | 25.75 | 49 | 9 |
| 2230 | 2W-K-BUS | 17.58 | 17 | |
| 2240 | 2W-K-BCF | | | |
| 2250 | 2H-N-HUD | 22.35 | 53 | 10 |
| 2260 | 2H-N-BUD | 11.17 | 21 | 3 |
| 2270 | 2H-W-BUF | 3.85 | 13 | 4 |
| 2280 | 2H-W-HUD | 34.45 | 246 | 92 |
| 2290 | 2H-W-BUS | 1.47 | 4 | |
| 2300 | 2H-W-BCF | | | |
| 2310 | 2H-H-BCF | | | |
| 2320 | 2H-H-BUF | 2.86 | 14 | 4 |
| 2330 | 2H-H-HUD | 26.94 | 224 | 84 |
| 2340 | 2H-H-BUS | 3.30 | 12 | |
| 2350 | 2H-K-BUF | 18.28 | 65 | 17 |
| 2360 | 2H-K-HUD | 18.28 | 109 | 41 |
| 36 aquifers | Total | 548.29 | 2,230 | 722 |

APPENDIX TABLE B.2. CODE AND KEY HYDROLOGIC STATISTICS FOR OAHU AQUIFERS

| Sort | Code | Area (mile²) | Avg. Rain (mgd) | Sustainable Yield (mgd) |
|---|---|---|---|---|
| 3010 | 3H-P-BCF | | | |
| 3020 | 3H-P-BUF | 2.50 | 8 | 3 |
| 3030 | 3H-P-HUD | 1.40 | 9 | 4 |
| 3040 | 3H-P-BUS | 5.32 | 9 | |
| 3050 | 3H-N-BCF | | | |
| 3060 | 3H-N-BUF | 4.79 | 14 | 5 |
| 3070 | 3H-N-HUD | 3.50 | 21 | 8 |
| 3080 | 3H-N-BUS | 5.88 | 10 | |
| 3090 | 3H-K-BCF | | | |
| 3100 | 3H-K-BUF | 3.60 | 9 | 4 |
| 3110 | 3H-K-HUD/P | 2.10 | 12 | 5 |
| 3120 | 3H-K-BUS | 4.35 | 7 | |
| 3130 | 3H-M-BCF | | | |
| 3140 | 3H-M-BUF | 7.39 | 18 | 7 |
| 3150 | 3H-M-HUD | 3.50 | 22 | 8 |
| 3160 | 3H-M-BUS | 15.40 | 22 | |
| 3170 | 3H-W-BCF | | | |
| 3180 | 3H-W-BUF | 13.57 | 23 | 2 |
| 3190 | 3H-W-HUD | 5.05 | 17 | 7 |
| 3200 | 3H-W-BUS | 11.39 | 16 | |
| 3210 | 3P-W-BCF | | | |
| 3220 | 3P-W-BUF | 83.49 | 260 | 98 |
| 3230 | 3P-W-HUD | 11.55 | 94 | 35 |
| 3240 | 3P-W-BUS | 21.52 | 26 | |
| 3250 | 3P-E-BCF | | | |
| 3260 | 3P-E-BUF | 23.73 | 34 | 7 |
| 3270 | 3P-E-HUD | 5.00 | 11 | 2 |
| 3280 | 3P-E-BUS | 13.98 | 13 | |
| 3290 | 3W-N-BCD | | | |
| 3300 | 3W-N-BUD | 4.00 | 4 | |
| 3310 | 3W-N-HUD | 0.86 | 1 | 1 |
| 3320 | 3W-N-BUS | 0.70 | 1 | |
| 3330 | 3W-L-BCD | | | |
| 3340 | 3W-L-BUD | 1.00 | 1 | |
| 3350 | 3W-L-HUD | 9.01 | 15 | 2 |
| 3360 | 3W-L-BUS | 14.13 | 14 | |
| 3370 | 3W-W-BCD | | | |
| 3380 | 3W-W-BUD | 2.30 | 3 | 1 |
| 3390 | 3W-W-HU/CD | 4.40 | 11 | 5 |
| 3400 | 3W-W-BUS | 1.90 | 2 | |
| 3410 | 3W-M-BCD | | | |
| 3420 | 3W-M-BUD | 1.10 | 1 | 1 |
| 3430 | 3W-M-HU/CD | 6.00 | 17 | 7 |
| 3440 | 3W-M-BUS | 2.14 | 2 | |
| 3450 | 3W-K-BCD | | | |
| 3460 | 3W-K-BUD | 4.00 | 4 | |
| 3470 | 3W-K-HUD | 7.37 | 11 | 2 |
| 3480 | 3W-K-BUS | 1.70 | 2 | |
| 3490 | 3N-M-BCF | | | |

APPENDIX TABLE B.2.—Continued

| Sort | Code | Area (mile²) | Avg. Rain (mgd) | Sustainable Yield (mgd) |
|---|---|---|---|---|
| 3500 | 3N-M-BUF | 1.70 | 3 | 1 |
| 3510 | 3N-M-BUD | 19.09 | 36 | 7 |
| 3520 | 3N-M-HUD | 10.00 | 22 | 5 |
| 3530 | 3N-M-BUS | 5.24 | 8 | |
| 3540 | 3N-W-BCF | | | |
| 3550 | 3N-W-BUF | 18.00 | 34 | 5 |
| 3560 | 3N-W-BUS | 2.98 | 4 | |
| 3570 | 3N-K-BCF | | | |
| 3580 | 3N-K-BUF | 23.03 | 49 | 4 |
| 3590 | 3N-K-BUD | 1.49 | 3 | |
| 3600 | 3N-K-HUD | 10.00 | 36 | 9 |
| 3610 | 3N-K-BUS | 3.42 | 7 | |
| 3620 | 3C-W-HUD | 53.17 | 190 | 71 |
| 3630 | 3C-K-HUD | 13.41 | 128 | 48 |
| 3640 | 3WW-KL-BCF | | | |
| 3650 | 3WW-KL-BUF | 13.30 | 41 | 11 |
| 3660 | 3WW-KL-HUD | 17.11 | 102 | 38 |
| 3670 | 3WW-KL-BUS | 10.00 | 24 | |
| 3680 | 3WW-KH-BCD | | | |
| 3690 | 3WW-KH-BUD | 3.55 | 10 | 3 |
| 3700 | 3WW-KH-HUD | 14.11 | 84 | 32 |
| 3710 | 3WW-KH-BUS | 0.50 | 2 | |
| 3720 | 3WW-KP-BCD | 5.00 | 14 | |
| 3730 | 3WW-KP-HUD | 24.85 | 130 | 49 |
| 3740 | 3WW-W-BCD | | | |
| 3750 | 3WW-W-HUD | 20.74 | 59 | 11 |
| 3760 | 3WW-W-BUS | 14.62 | 24 | |
| 76 aquifers | Total | 594.93 | 1,754 | 508 |

APPENDIX TABLE B.3. CODE AND KEY HYDROLOGIC STATISTICS FOR MOLOKAI AQUIFERS

| Sort | Code | Area ($mile^2$) | Avg. Rain (mgd) | Sustainable Yield (mgd) |
|---|---|---|---|---|
| 4010 | 4W-M-BUF/D | 79.78 | 84 | 4 |
| 4020 | 4W-M-BCF | | | |
| 4030 | 4W-M-BUS | 1.44 | 1 | |
| 4040 | 4C-H-BUF/D | 48.36 | 58 | 5 |
| 4050 | 4C-H-HUD | 2.27 | 6 | 2 |
| 4060 | 4C-H-BCF | | | |
| 4070 | 4C-H-BUS | 3.12 | 2 | |
| 4080 | 4S-K-BUF | 59.13 | 113 | 10 |
| 4090 | 4S-K-HUD | 8.31 | 40 | 15 |
| 4100 | 4S-K-BCF | | | |
| 4110 | 4S-K-BUS | 6.21 | 9 | |
| 4120 | 4N-W-BUD | 4.77 | 10 | 2 |
| 4130 | 4N-W-HUD | 46.95 | 224 | 84 |
| 13 aquifers | Total | 260.34 | 547 | 122 |

APPENDIX TABLE B.4. CODE AND KEY HYDROLOGIC STATISTICS FOR LANAI AQUIFERS

| Sort | Code | Area ($mile^2$) | Avg. Rain (mgd) | Sustainable Yield (mgd) |
|---|---|---|---|---|
| 5010 | 5L-L-HUD | 24 | 40 | 7 |
| 5020 | 5L-M-BUD | 27 | 22 | 1 |
| 5030 | 5L-P-BUF | 32 | 23 | 1 |
| 5040 | 5L-K-BUF | 57 | 54 | 3 |
| 4 aquifers | Total | 140 | 139 | 12 |

APPENDIX TABLE B.5. CODE AND KEY HYDROLOGIC STATISTICS FOR MAUI AQUIFERS

| Sort | Code | Area (mile²) | Avg. Rain (mgd) | Sustainable Yield (mgd) |
|---|---|---|---|---|
| 6010 | 6E-P-BCF | | | |
| 6020 | 6E-P-BUF | 91.26 | 87 | 8 |
| 6030 | 6E-P-HUD | 8.89 | 13 | 2 |
| 6040 | 6E-P-BUS | 11.04 | 11 | |
| 6050 | 6E-W-BUF/D | 40.16 | 287 | 51 |
| 6060 | 6E-W-HUD/P | 12.27 | 88 | 33 |
| 6070 | 6E-N-BUF/D | 37.40 | 356 | 91 |
| 6080 | 6E-N-HUD/P | 33.95 | 243 | 91 |
| 6090 | 6E-H-BUF | 32.63 | 155 | 28 |
| 6100 | 6E-H-HUD | 5.52 | 39 | 15 |
| 6110 | 6E-KP-BUF | 16.35 | 47 | 8 |
| 6120 | 6E-KP-HUD/P | 16.35 | 31 | 6 |
| 6130 | 6E-KN-BUF | 78.71 | 112 | 5 |
| 6140 | 6E-KN-HUD | 13.94 | 20 | 4 |
| 6150 | 6E-M-BCF | | | |
| 6160 | 6E-M-BUF | 116.69 | 83 | 4 |
| 6170 | 6E-M-HUD | 17.26 | 33 | 6 |
| 6180 | 6E-M-BUS | 11.24 | 11 | |
| 6190 | 6W-H-BCF | | | |
| 6200 | 6W-H-BUF | 15.85 | 30 | 3 |
| 6210 | 6W-H-HUD | 13.07 | 62 | 23 |
| 6220 | 6W-H-BUS | 0.47 | 1 | |
| 6230 | 6W-L-BCF | | | |
| 6240 | 6W-L-BUF | 25.27 | 24 | 2 |
| 6250 | 6W-L-HUD | 13.49 | 48 | 18 |
| 6260 | 6W-L-BUS | 2.40 | 2 | |
| 6270 | 6W-O-BCF | | | |
| 6280 | 6W-O-BUF | 13.50 | 10 | |
| 6290 | 6W-O-HUD | 9.78 | 35 | 14 |
| 6300 | 6W-O-BUS | 3.07 | 2 | |
| 6310 | 6W-M-BCF | | | |
| 6320 | 6W-M-BUF | 7.99 | 8 | |
| 6330 | 6W-M-HUD | 3.40 | 8 | 3 |
| 6340 | 6W-M-BUS | 4.78 | 3 | |
| 6350 | 6W-W-BCF | | | |
| 6360 | 6W-W-BUF | 4.23 | 10 | 4 |
| 6370 | 6W-W-HUD | 16.99 | 121 | 46 |
| 6380 | 6W-W-BUS | 10.28 | 15 | |
| 6390 | 6W-K-BUF/D | 6.46 | 15 | 4 |
| 6400 | 6W-K-HUD/P | 10.18 | 73 | 27 |
| 40 aquifers | Total | 704.87 | 2,083 | 496 |

APPENDIX TABLE B.6. CODE AND KEY HYDROLOGIC STATISTICS FOR HAWAII AQUIFERS

| Sort | Code | Area ($mile^2$) | Avg. Rain (mgd) | Sustainable Yield (mgd) |
|---|---|---|---|---|
| 8010 | 8KH-H-BUF | 51.07 | 146 | 26 |
| 8020 | 8KH-H-HUD | 69.75 | 415 | 156 |
| 8030 | 8KH-M-BUF | 81.43 | 78 | 7 |
| 8040 | 8KH-M-HUD | 25.07 | 60 | 23 |
| 8050 | 8MK-H-HUF | 565.04 | 3,363 | 605 |
| 8060 | 8MK-H-HUD | 77.38 | 92 | 17 |
| 8070 | 8MK-H-HUP | | | |
| 8080 | 8MK-W-BUF | 227.60 | 163 | 15 |
| 8090 | 8MK-W-HUD/P | 71.50 | 68 | 13 |
| 8100 | 8ML-H-BUF | 577.96 | 4,127 | 743 |
| 8110 | 8ML-H-HUD | 37.21 | 44 | 8 |
| 8120 | 8ML-N-BUP | 486.87 | 1,159 | 209 |
| 8130 | 8ML-N-HUD | 90.46 | 108 | 20 |
| 8140 | 8ML-N-HUD/P | 46.55 | 222 | 83 |
| 8150 | 8ML-A-BUF | 295.83 | 282 | 13 |
| 8160 | 8ML-A-HUD | 36.28 | 35 | 7 |
| 8170 | 8ML-K-BUF | 565.51 | 1,615 | 154 |
| 8180 | 8ML-K-HUD | 80.65 | 77 | 14 |
| 8190 | 8KL-P-HUD | 101.36 | 603 | 227 |
| 8200 | 8KL-K-BUF | 98.25 | 281 | 27 |
| 8210 | 8KL-K-HUD | 160.53 | 764 | 287 |
| 8220 | 8HL-H-BUF | 189.95 | 271 | 13 |
| 8230 | 8HL-H-HUD | 59.01 | 112 | 21 |
| 23 aquifers | Total | 3,995.26 | 14,085 | 2,688 |