GEOTHERMAL POTENTIAL ON MAUI

1). limited data available

--geochemical

a. ground radon emanations
b. soil mercury measurements
c. chloride/magnesium ion anomalies

--apparent resistivity surveys

2). appears from the data that the Ukumehame region, located on the south rift of the West Maui Mountains shows the 'best' geothermal potential. other areas which also look good are the Lahaina/Kaana-pali and the Haiku/Paia regions.

3). Don Thomas and his group are taking more data on Maui this summer, most probably concentrating in these three areas. they will come out with a final report on the island's potential sometime early next year.

Geochemical Surveys

radon/mercury anomalies

1). studies were done only in 2 areas--Lahaina/Kaana-pali and Haiku/Paia regions.

2). radon

a). formed from the radioactive decay of ^{238}U to ^{222}Rn and can be found within lavas located above the water table and in ground water.
b). the radon measured is believed to be transported to the surface by thermally induced outgassing of ground gas.

3). mercury

a). highly volatile at high temperatures and is readily absorbed by the soil and clay particles and therefore tends to concentrate above areas of high subsurface temperatures such as geothermal reservoirs.

4). figs. 1 & 2 show the radon and mercury concentrations in the areas previously mentioned.

5). Lahaina/Kaana-pali region

--high radon concentrations northeast of Kaana-pali, higher than 20 units are considered significant

--high mercury in both Lahaina and Kaana-pali

--appears that Kaana-pali has the stronger thermal anomaly

6). Haiku-Paia region

--this area shows some of the highest radon emanations measured in the island

--mercury measurements are also fairly high

--both these anomalies correspond to the location of a rift of Haleakala Crater and is believed to indicate a region of above normal subsurface temperatures

chloride/magnesium ion anomalies

1). several areas in Maui exhibit high chloride/magnesium ion ratios
   a. Olowalu/Ukumehame area
   b. Lahaina/Kaana-pali area
   c. Haiku/Paia area

2). ratios
   a. greater than 15 -- considered to be strong indicators of thermally altered ground water

   b. between 12-15 -- low order geothermal anomalies

   c. 3-8 --unaltered ground water

3). Well number 4835-01, located in Ukumehame is the only warm water well in Maui (33°C, 91°F at 143 feet). The other wells range from 19 - 25°C (66.2 - 77°F) and average about 22°C (72°F).

3). See fig. 3 for locations and Cl/Mg concentrations

Apparent Resistivity Surveys

1). 21 Schlumberger resistivity soundings were made on the island

of Maui.

2). 13 of the 21 soundings displayed low-resistivity values which were interpreted as seawater saturated basalts

3). Fig. 4 shows the locations of the sounding points

4). Table 1 shows the resistivity values obtained at 13 points

5). Most of the resistivity values averaged about 20 ohm-meters except for Ukumehame which displayed a resistivity of about 4 ohm-m.

6). Since Ukumehame is the only warm water well on Maui, this low resistivity value is not surprising.

7). using the salinity-resistivity-temperature monogram by Meidav (1970) and assuming a typical hawaiian basalt porosity of 15 - 20%, the average temperature of the sea water at Ukumehame was calculated to be 203 ± 73 ^{o}F at a depth of 273 - 608 feet. (Mattice and Lienert, 1980)

Conclusions

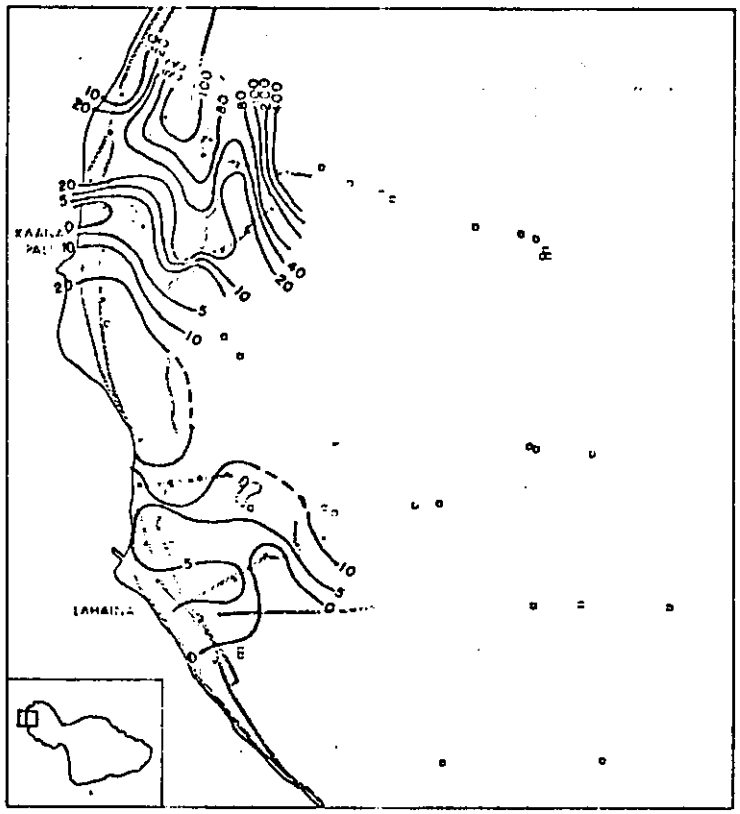
1). Ukumehame shows the best potential

2). Haiku/Paia region is probably warmer than the Lahaina/Kaanapali region.

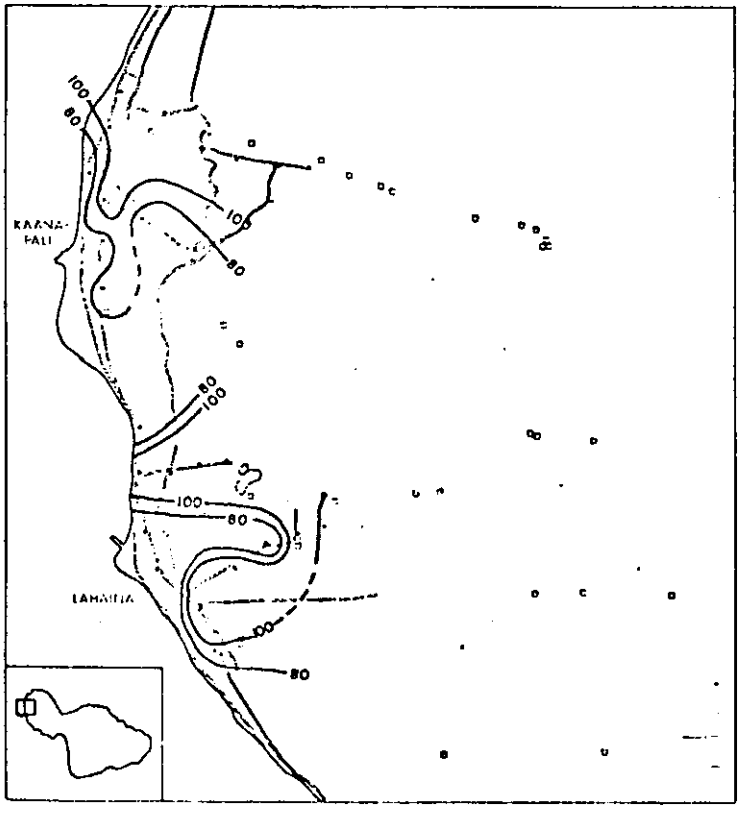
E. Kitamura
July 1, 1980

FIGURE 1

RADON and MERCURY MEASUREMENTS of the LAHAINA and KAANA-PALI AREA



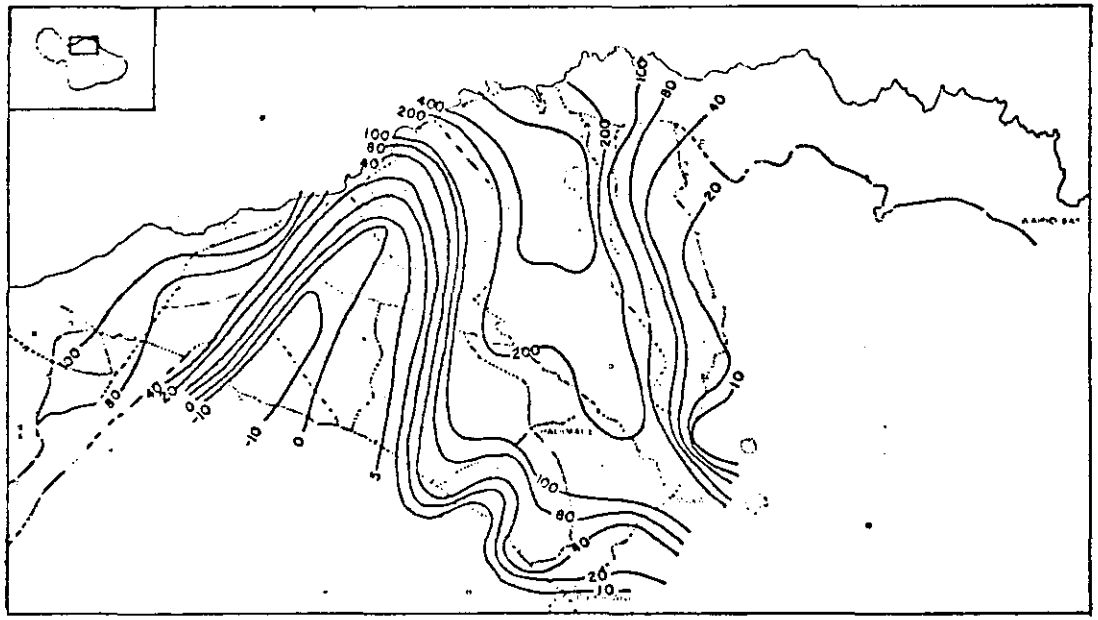
RADON EMANATION



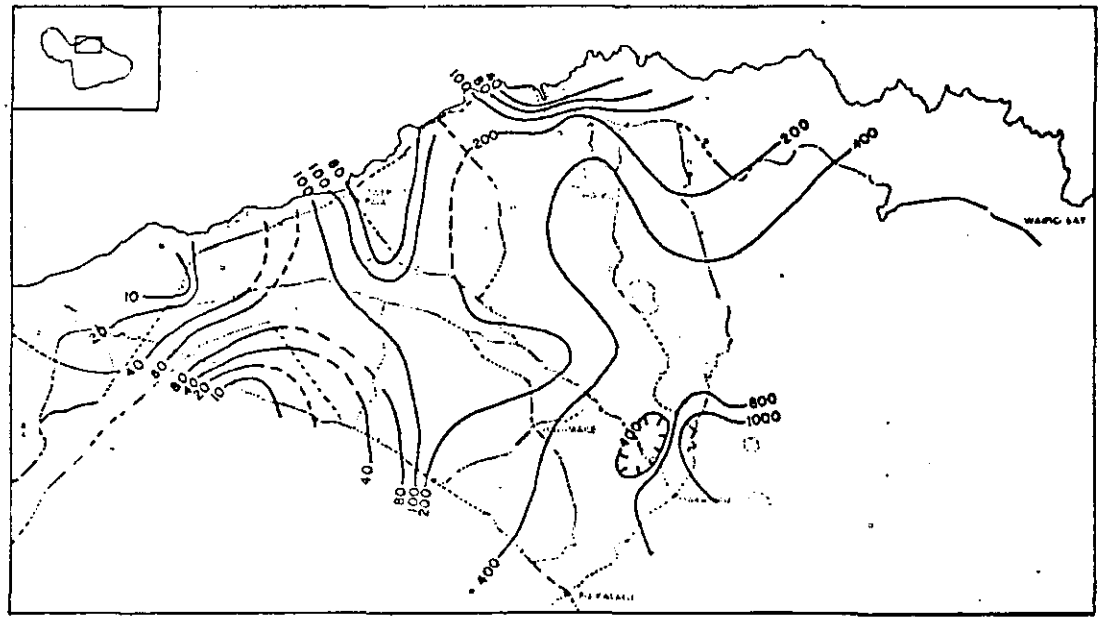
SOIL MERCURY SURVEY

FIGURE 2

RADON and MERCURY MEASUREMENTS of the HAIKU-PAIA AREA, MAUI ISLAND

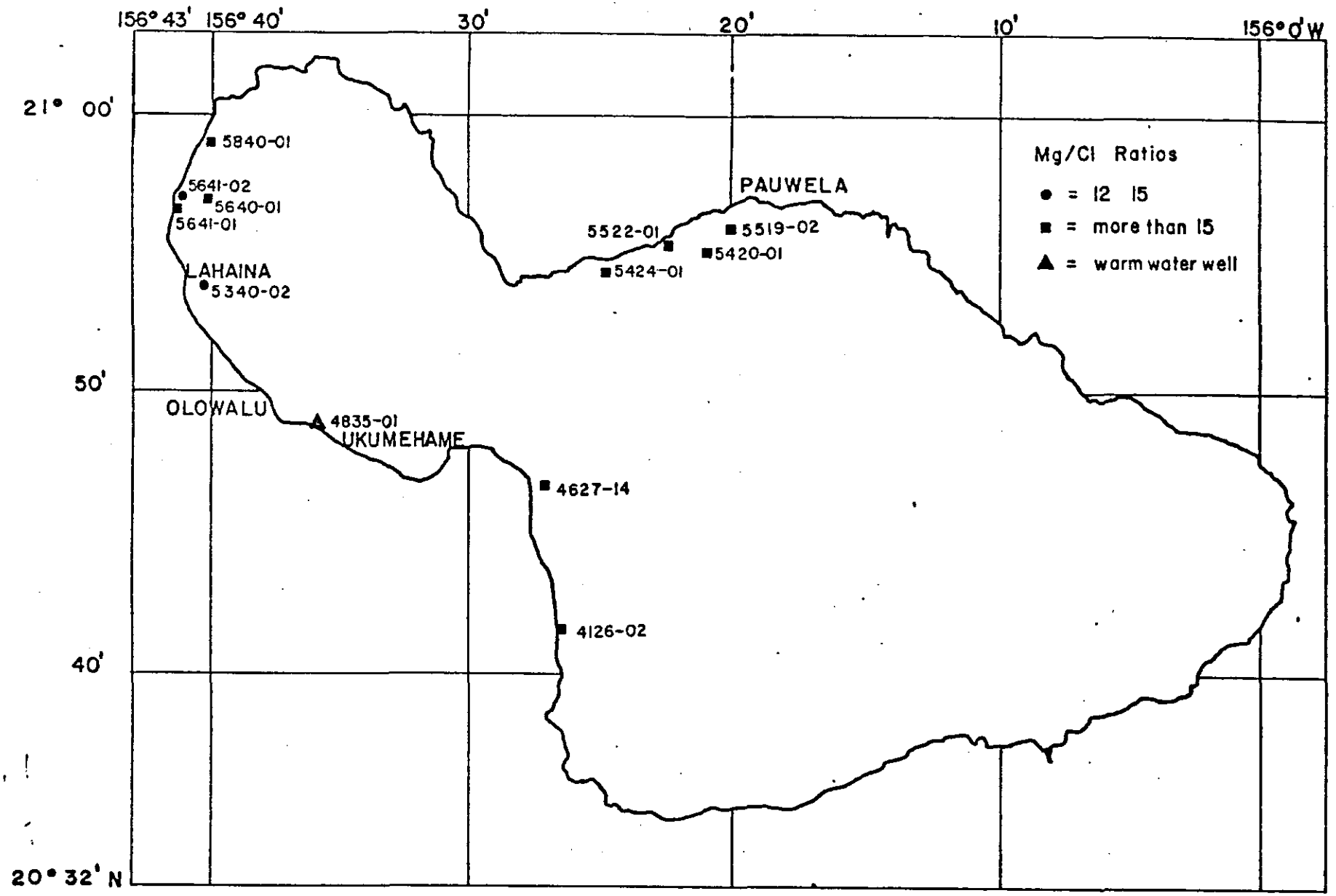


GROUND RADON EMANATION



SOIL MERCURY SURVEY

FIGURE 3



LOCATION OF MAUI WELLS HAVING CHLORIDE/MAGNESIUM ANOMALIES

FIGURE 4

LOCATIONS OF THE SCHLUMBERGER SOUNDINGS

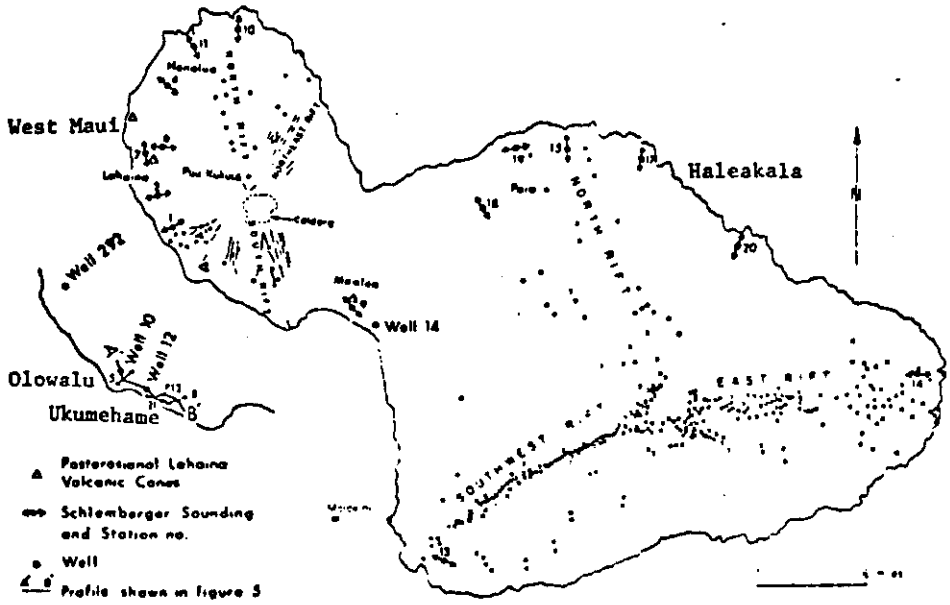


TABLE 1

APPARENT RESISTIVITIES OF 13 SOUNDINGS

Location	Station Number	Resistivity and standard errors of seawater saturated basalt in Ω-m
Honolua	S10	39.0 ± 29.0
Honolua	S11	36.0 ± 34.0
Lahaina	S7	38.0 ± 27.0
Lahaina	S2	24.0 ± 3.0
Lahaina	S1	40.0 ± 185.0
Olowalu	S5	7.7 ± 2.7
Ukumehame	S21	4.1 ± 3.5
Ukumehame	S12	4.3 ± 7.7
Ukumehame	S8	3.9 ± 2.2
Maalaea	S9	13.4 ± 2.0
Paia	S18	13.1 ± 5.0
Paia	S19	9.8 ± 1.1
Paia	S15	10.5 ± 8.0

FIGURE 5

LOCATION OF THE VOLCANIC RIFT ZONES ON MAUI AND ELEVATION CONTOURS

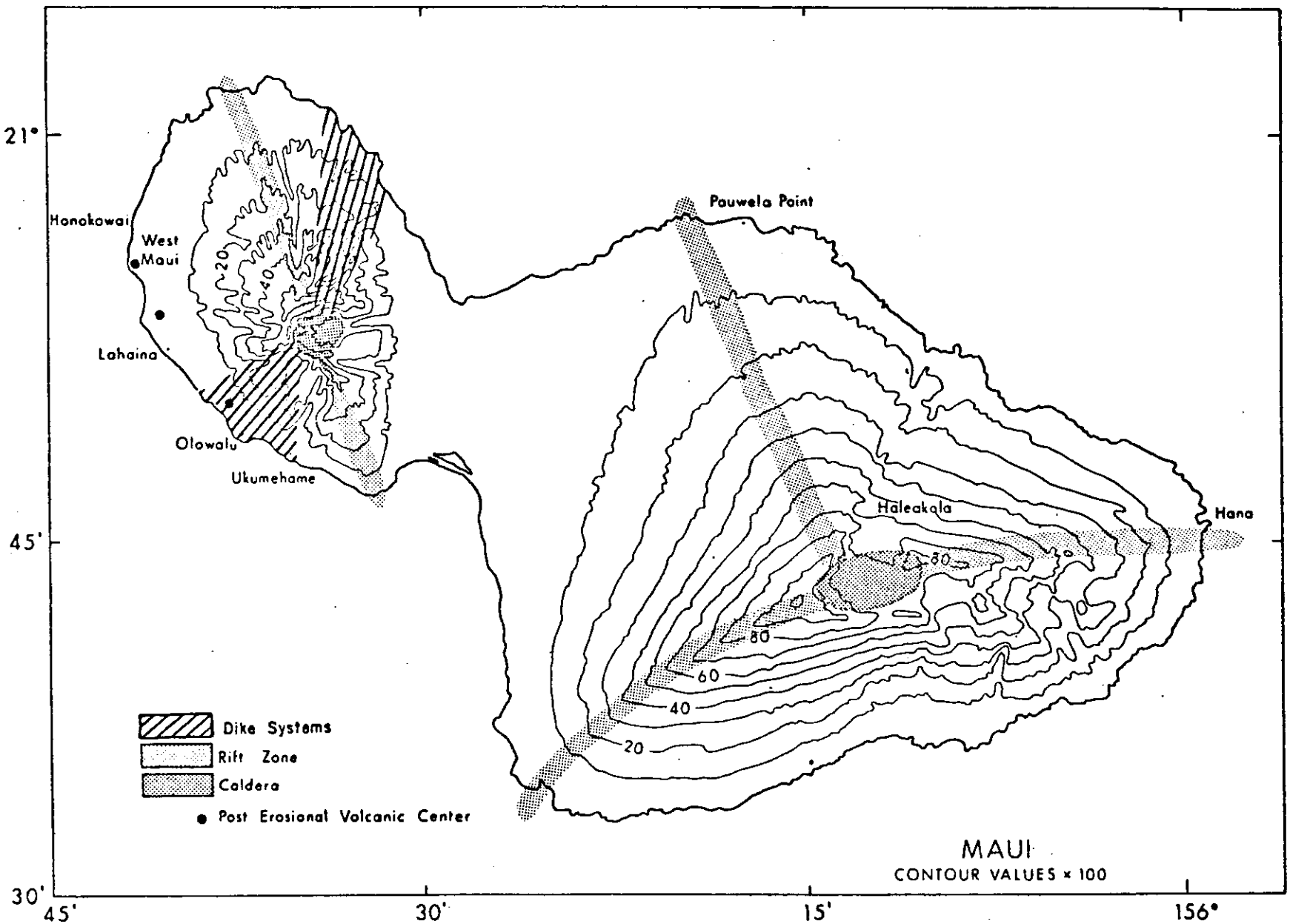
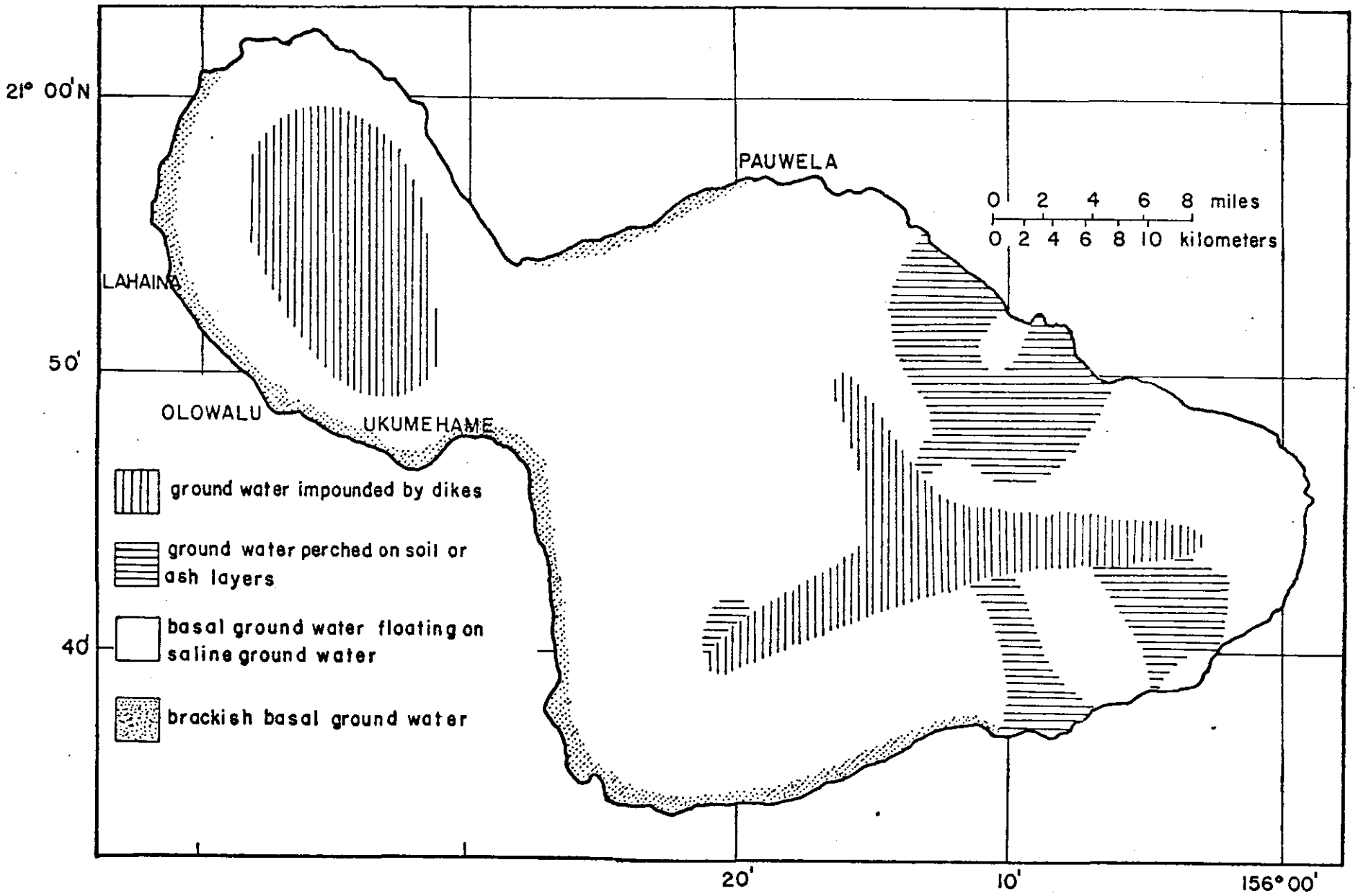


FIGURE 6



HYDROLOGY OF MAUI

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