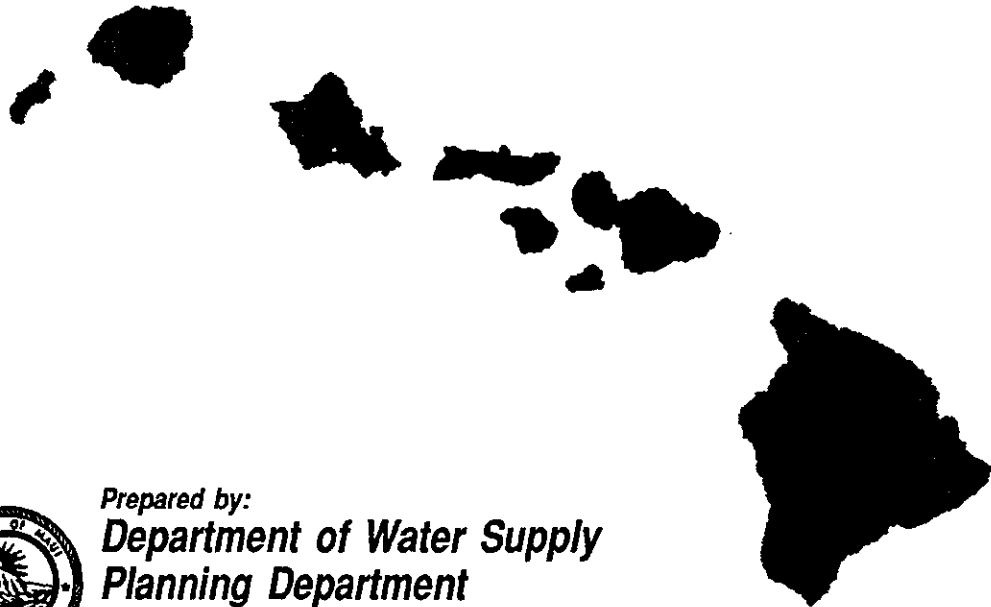


**HAWAII WATER PLAN**

# **MAUI COUNTY WATER USE AND DEVELOPMENT PLAN**



*Prepared by:*  
**Department of Water Supply  
Planning Department  
County of Maui**

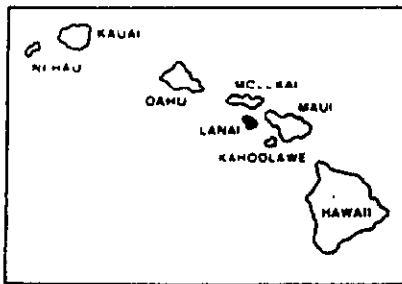
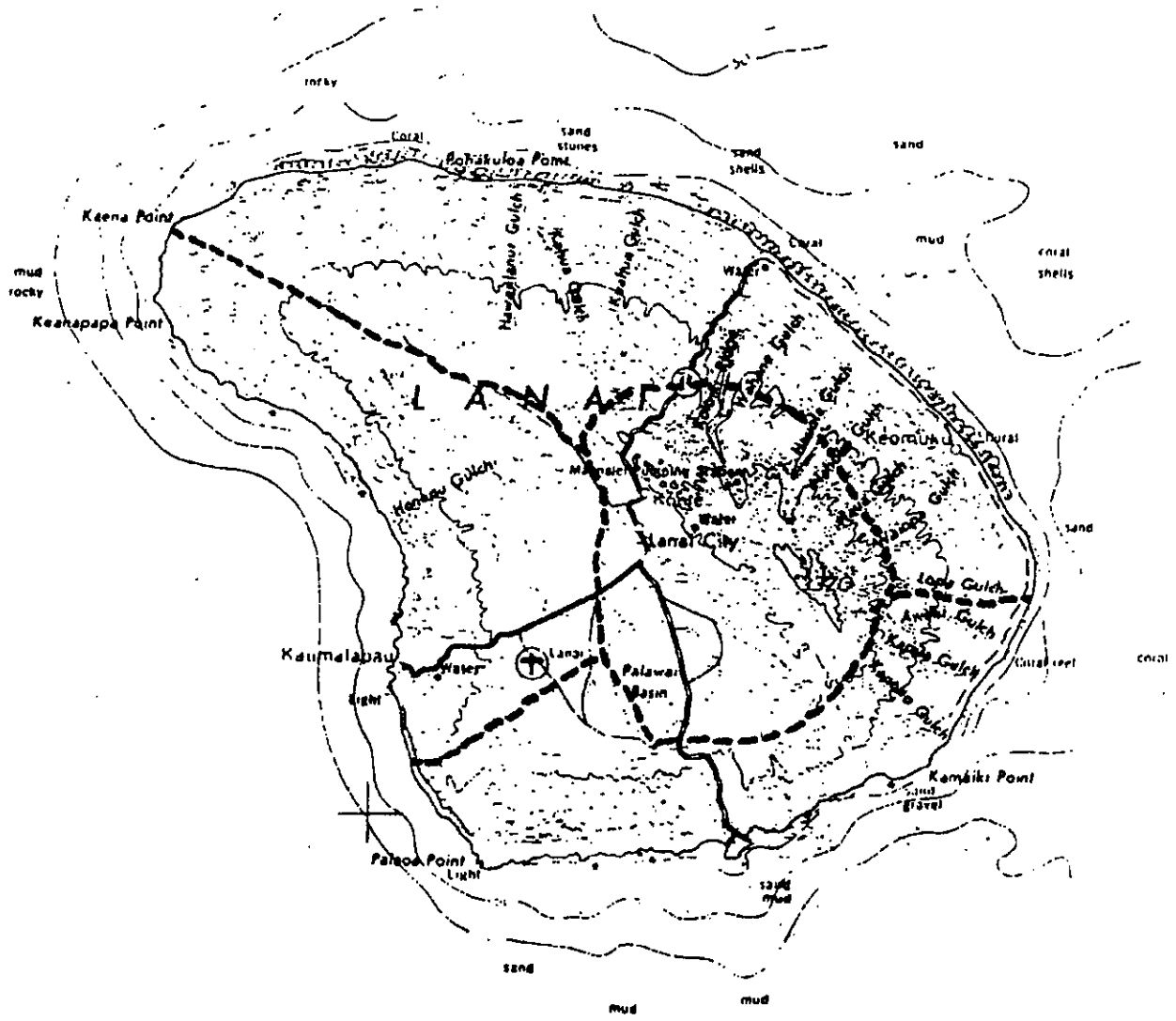


**Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii**

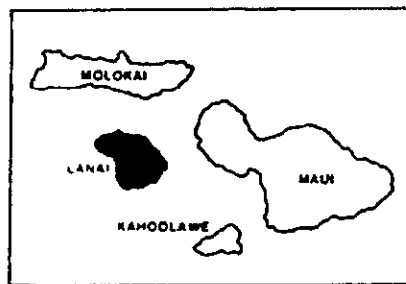
March 1990

Exhibit 13

# LANAI



STATE OF HAWAII



MAUI COUNTY

# ISLAND OF LANAI

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## 1.0 INTRODUCTION

The Island of Lanai has a land area of 90,000 acres (141 square miles), spread somewhat irregularly around the peak of a single volcano. Most of its 2,200 people live in Lanai City on the central plateau just below Lanaihale, the volcanic peak. Centrally located, the community services the pineapple fields that extend over the central plateau.

The remainder of the population is in small communities along the shore. The largest of these surrounds the Kaumalapau barge harbor which handles outgoing pineapple and incoming goods. Along Manele and Hulopoe bays are a small boat harbor and park. Along the eastern windward shore are a few kuleanas and land holdings which make up the two percent of the island not owned by Castle and Cooke, Inc.

Castle and Cooke, Inc. owns and operates the pineapple plantation, one of the world's largest, and is the only major employer on the island. Labor requirements have decreased as the industry has become more mechanized and the population has declined as younger people leave for employment opportunities elsewhere.

## 1.1 SURFACE WATER SYSTEMS

There are no surface water systems in use on Lanai.

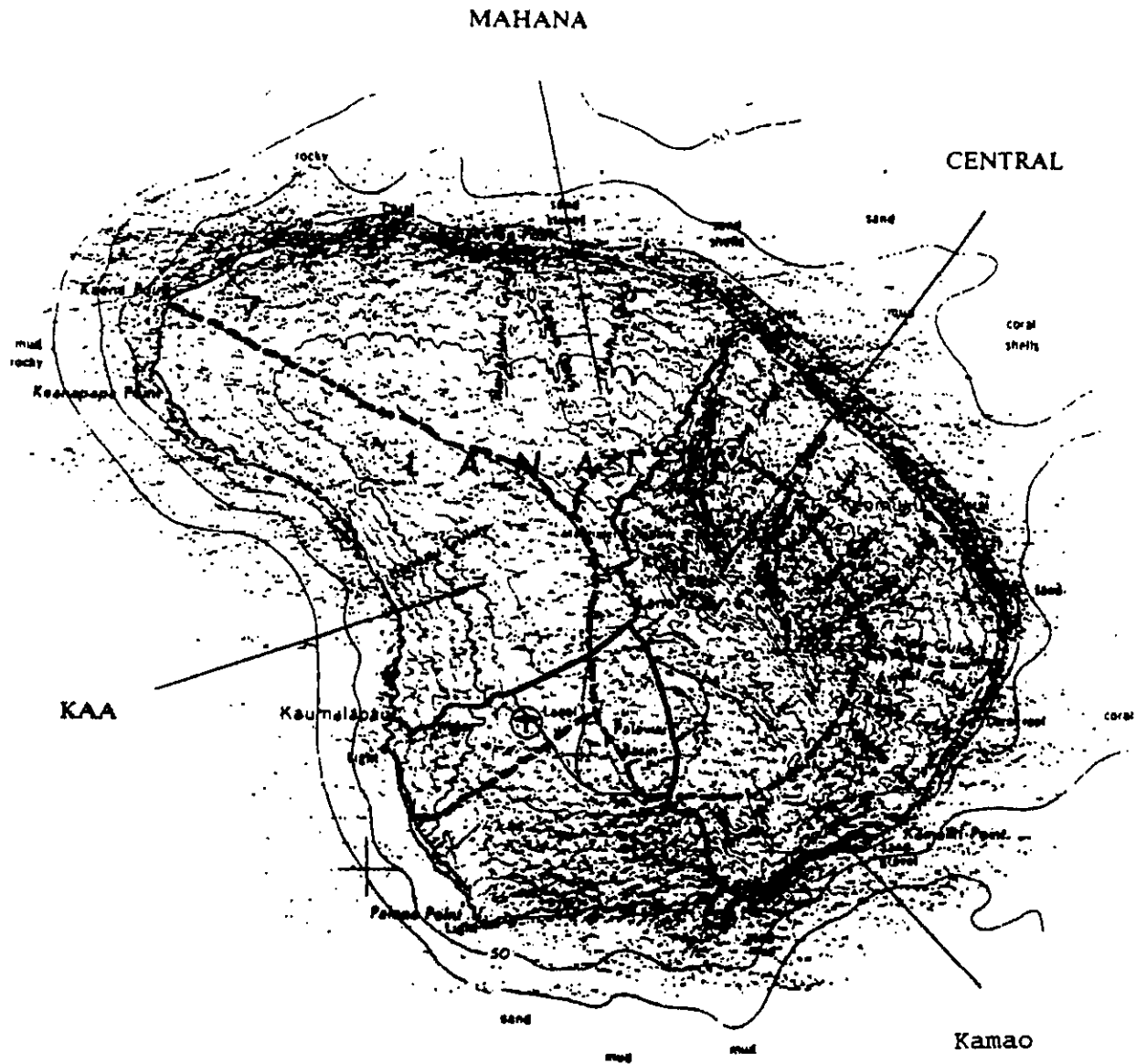
## 1.2 GROUNDWATER SYSTEMS

Castle and Cooke, Inc. is the only water supplier on the island. It supplies domestic water through the Maunalei system as well as agricultural water for the plantation. As the water purveyor and a registered public utility, Castle and Cooke, Inc. must meet the requirements of the Safe Drinking Water Act. The Maui County Department of Water Supply, though nominally responsible for public water systems, does not have any operations or responsibilities on the Island of Lanai.

## 2.0 WATER RESOURCES SUMMARY

The island is divided into four aquifer sectors. The Central Sector covers the circular region around Lanaihale. Mahana Sector includes the semi-circular region on the north half of the island. Kaa Sector is the southwest part of the island and Kamao Sector, the southeast (Plate 17). Each sector is divided into several systems. The sectors and their associated systems are:

# ISLAND OF LANAI AQUIFER SECTORS



AQUIFER SECTOR	AQUIFER SYSTEM	CLASSIFICATION #
Central	Windward	50101
	Leeward	50102
Mahana	Hauola	50201
	Maunalei	50202
	Paoma	50203
Kaa	Honopu	50301
	Kaumalapau	50302
Kamao	Kealia	50401
	Manele	50402

Central Sector. This aquifer has an estimated sustainable yield of between 6 and 6.2 MGD, according to data provided by two independent studies. Aquifers in the other sectors are brackish (non-potable). The estimated sustainable yields for all the sector are identified below and on Plate 18.

Central	6.0 Million Gallons/Day
Mahana	N/A Million Gallons/Day
Kaa	N/A Million Gallons/Day
Kamao	N/A Million Gallons/Day

## 2.1 SURFACE WATER RESOURCES INVENTORY

The State Water Commission is responsible for providing an inventory of the surface waters and recommendations for exceedent levels (the amount of water which can be taken from the stream). The State has yet to provide the County of Maui with the numbers required for long-term planning in this area. The data will be incorporated in the next issue of this plan.

The Maui County use of surface water for domestic purposes is quantified and included in the interim in-stream standards. For the purpose of this report, it is assumed that the current use is equal to exceedent levels. This is consistent with the interim in-stream flow standards used by the Water Commission. Discussion of this topic is deferred.

## 2.2 GROUNDWATER RESOURCES INVENTORY

The principal potable water on the island comes from a high level aquifer in the

**TOTAL:** 6.0+ Million Gallons/Day

These numbers represent the potential groundwater source unadjusted for recharge. The Central Sector adjustment may need to be made to determine the practical sustainable yield.

## 3.0 WATER USE INVENTORY

For the purposes of this report, there are only two kinds of water - surface and groundwater. Surface water, as mentioned earlier, is any water which shows influence of weather or other events on the surface. Groundwater is everything else. Water is considered "used" in the sector where it originates although the water may be actually applied somewhere else. All sources identified in Lanai are presently classified as groundwater.

## 3.1 SURFACE WATER USE INVENTORY

There are no surface water sources in use on the Island of Lanai.



### 3.2 GROUNDWATER USE INVENTORY

The domestic water for Lanai is supplied from the Central high level aquifer from Upper and Lower Tunnels, Shafts #2 and #3. Well #6, also in this aquifer, has been dug and is ready for production. Current domestic and commercial usage is .38 MGD.

Water for pineapple is also supplied from the same Central high level aquifer. Wells #1 through #5 and Shaft #3 are in production and used for irrigation. The current average use is 2.4 MGD.

Total current use is 2.78 MGD, all from the high-level source.

### 4.0 COMMUNITY PLANS

The two attributes valued most highly by the Lanai residents were:

- 1) the environment (pleasing climate, attractive landscaping, good drinking water and absence of air and water pollution)
- 2) and its social qualities (stable, small town atmosphere, low crime rate, lack of pressure and a healthy environment for children).

The two major problems areas were:

- 1) the island's dependence on one crop (pineapple) with the resulting decline in jobs, the leaving of their children and the high cost of living in a shrinking economy, and

- 2) the serious constraints in basic services of health, education and cultural programs.

Based on these concerns, the community plan emphasizes:

- a. development of tourism as a secondary economic activity.
- b. encouragement of more diversified agriculture,
- c. concentration of any population growth in Lanai City, and
- d. discouragement of special permits in State Agriculture and Rural Districts.

Project districts were to be established in Koale and at Manele Bay.

Based on these original plans, the projected population was expected to reach 4,500 in the year 2000. When the plan was developed in 1980, population had dropped to 2,119. Current population (1988) is 2,200.

The Lanai Company, a subsidiary of Castle and Cooke Ltd., has started construction of resort facilities in the two project districts, Koale and Manele Bay. The projected population growth is similar to that projected in the community plan, with population reaching a level of 4,500 in the year 2005 and 4,800 in year 2010. Most of this population growth will come from new workers at the resort, the return of out-migrant children to Lanai and a reduction in the out-migration rate.

## 5.0 WATER DEVELOPMENT PLANS

To meet the demands for water resulting from the development of the two resorts, the Lanai Company has projected water usage from the Center high level source as:

Domestic	1.0 MGD
Pineapple	1.8 MGD
Commercial	0.25 MGD
Landscaping:	
Koele Hotel	0.18 MGD
Koele Golf Course	0.25 MGD
Hulopoe	0.0 MGD
Manele Golf Course	0.00 MGD
Manele Bay	0.23 MGD
<b>TOTAL:</b>	<b>3.86 MGD</b>

To meet this increased demand, Wells #6 and #7 have been drilled and are ready to go into production. Wells #8 and #9 are being drilled.

Additional, non-potable sources will be used for landscape watering as below:

Manele Golf Course	0.8 MGD
Community Gardens & Other	0.4 MGD
<b>TOTAL:</b>	<b>1.20 MGD</b>

Well #10 is under construction in Manele as an exploratory well to supply landscape watering in this area.

## 6.0 SUMMARY AND CONCLUSIONS

The plans for development are consistent with the community plan. There appears to be sufficient water to meet the development needs, if the geologist estimates are correct. There are two cautions:

- Geologists numbers are estimates. The actual water available that can be economically developed may differ.
- There is only one potable water aquifer for the island. Extreme caution is suggested to prevent damage to the aquifer or contamination by agricultural chemicals.

Since the projected use totals 64 percent of the total estimated sustainable yield, incremental development of the projects and substitution of non-potable groundwater for potable groundwater is suggested whenever possible.