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**IRRIGATION WATER SUPPLIES ON THE
ISLANDS OF OAHU AND MAUI**

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Background

Hawaiian geohydrology is best understood if continental concepts are forgotten and the Islands are considered as essentially porous and permeable lava sponges set in the ocean and saturated with sea water at their bases. Plentiful rain falls with relative uniformity in time on the windward sides or the tops of these spongy islands, but only in winter storms on their leeward sides. Infiltration rates are high and stream channels short and steep, so that most streams are intermittent or at least flashy. Within the sponges are, however, some impermeable septae retaining water at high levels and in places diverting it back to the surface as stream-stabilizing spring flow. The ground water escaping high-level retention in the sponges sinks to sea level and accumulates there floating on and displacing the sea water and discharging laterally in coastal springs.

Surface storage capacities are slight due to the steepness and permeability of valleys. Development of surface water for irrigation is rarely feasible except where the streams are spring-fed. Spring flows may be augmented by tunnel development of high-level ground water. Where coastal primms of sediments restrict discharge to the ocean, the basal ground water bodies may exceed 1000 feet in thickness and have heads in excess of 25 feet above sea level. Deep drilled wells, flowing or pumped, may in such places be used for development. Where such restriction does not exist, the basal ground-water bodies tend to be so thin that specially developed systems of shafts and skimming tunnels, known as maui wells, are required to recove the fresh water floating on the salt.

Island of Oahu

Oahu Sugar

Oahu Sugar Company develops about half of its water from springs and tunnels fed by high-level ground-water trapped behind dikes intruding the lava flows on the windward side of the Koolau Range. The water is brought through the range by a 2 3/4-mile tunnel, having a capacity of about 60 mgd. The remainder is pumped from wells and coastal springs on the plantation. Most of the wells were drilled in batteries for steam pumping.

Ewa

Ewa Plantation is supplied entirely from basal ground water, some developed by drilled wells and maui wells in lavas of the Koolau volcano, some by wells in lavas of the Waianae volcano, and some by pits in coral.

Waialua

Waialua Agricultural Company derives more than half of its water from surface streams. The largest supply is derived from the 2 billion gallon Wahiawa Reservoir which owes its existence to the comparative flatness and deep weathering of the Koolau lava flows where they ponded against the Waianae volcano. The remaining water is pumped or flows from coastal springs, drilled wells, and maui wells. Pump 14 at Opaepa is a Maui well with a 300-foot shaft and 14 mgd. capacity.

Kahuku

Kahuku plantation is supplied entirely from basal groundwater pumped or flowing from wells or coastal springs.

Island of Maui

HC&S

Hawaiian Commercial and Sugar Company derives most of its water from surface springs and shallow ground water bodies perched on buried soil beds in the rainy "ditch country" on the north side of Haleakala. A system of ditches, having a total capacity of 350 mgd. leads the water 30 miles around the mountain and across the plantation. Another 50 mgd. capacity is derived from dike-fed streams on the north side of West Maui. When the ditch flows decline in the summer, pumps are started in a large number of maui wells and batteries of shallow drilled wells on the plantation. Total pumping capacity is about 200 mgd. The largest maui well, pump 7, has a 40-mgd. capacity. Pump 17 has a shaft 500 feet deep.

Wailuku

Wailuku Sugar Company derives most of its water from streams fed by dike springs and tunnels on the north and east sides of West Maui. The ditch flows are supplemented from a shaft and drilled-well combination developing basal water confined in the West Maui lavas behind the alluvial fans deposited against Haleakala.

Pioneer Mill

Pioneer Mill Company obtains part of its water from surface and dike-spring fed streams in deep canyons of West Maui, and part from maui wells on the plantation. At the Honokowai well 8 to 10 mgd is skimmed by two 600-foot tunnels from a layer of fresh water 80 feet or less in thickness.

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