



Ke Kahawai Pono

"The trustee who oversees the rightful sharing of water."

Keauhou Aquifer

Joint Government Water Conference

King Kamehameha's Kona Beach Hotel Courtyard, Kailua-Kona, Hawaii

August 11, 2015

Keauhou Aquifer

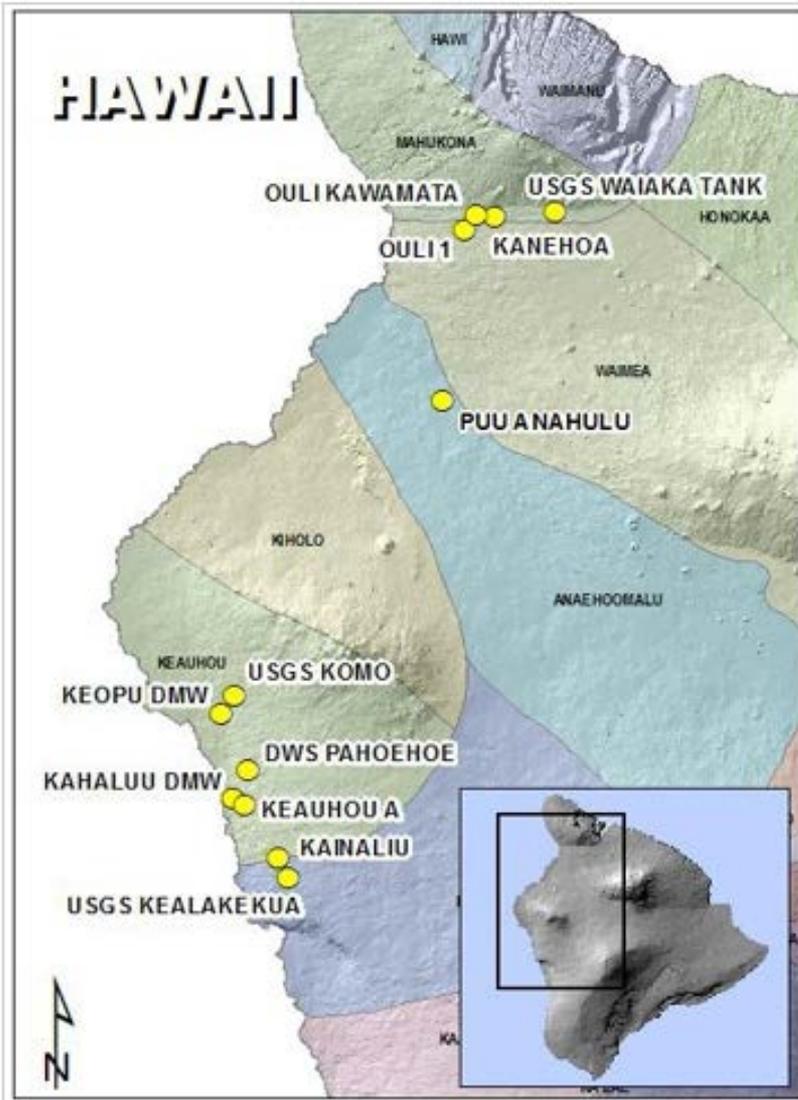
- During the 1980s and through the early 1990s, and continuing into the current millennium, Kailua-Kona has experienced tremendous growth, and resulted in an increased demand for potable water resources.
- As wells were drilled, new and interesting geological and hydrological information began to emerge that spurred additional wells at higher elevations, and at greater cost.

Keauhou Aquifer

Since 1991, the CWRM has collected ground water elevation measurements in public and private wells and test holes on the leeward side of Hawaii.

Currently, the CWRM monitors 2 Deep Monitoring Wells (DMWs) and more than a dozen water level wells in west Hawaii.

Keauhou Aquifer



HAWAII WELLS

- [Ouli 1](#)
- [Ouli Kawamata](#)
- [USGS Waiaka Tank](#)
- [Kanehoa](#)
- [DWS Pahoehoe](#)
- [Kahaluu DMW](#)
- [Kainaliu](#)
- [Keauhou A](#)
- [Keopu DMW](#)
- [USGS Kealakekua](#)
- [USGS Komo](#)

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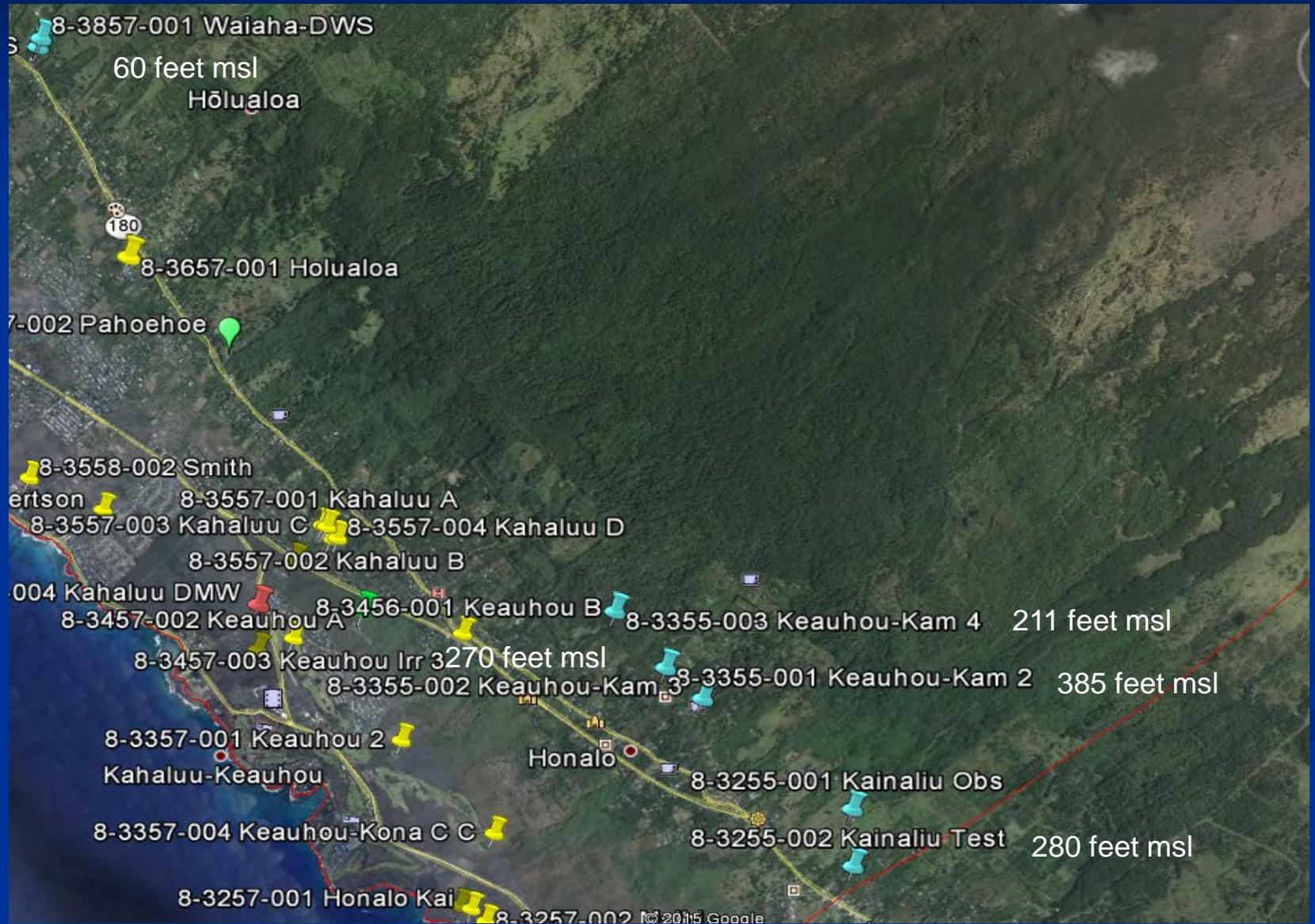
A 2014 aquifer analysis study concluded:

- The data suggests a slow decline of water levels in some of the high-level wells, and an apparent relationship to water-level decline and climatic conditions as recorded in the Lanihau and Huehue Ranch rain gages.
- The data suggests that the high-level wells tap interconnected, though bounded, aquifers whose rate of water level decline is inversely proportional to its volume.
- The data suggests that there is a water-level pattern observed in the high-level wells with Keopu being the “drain” for the ground water flow system.

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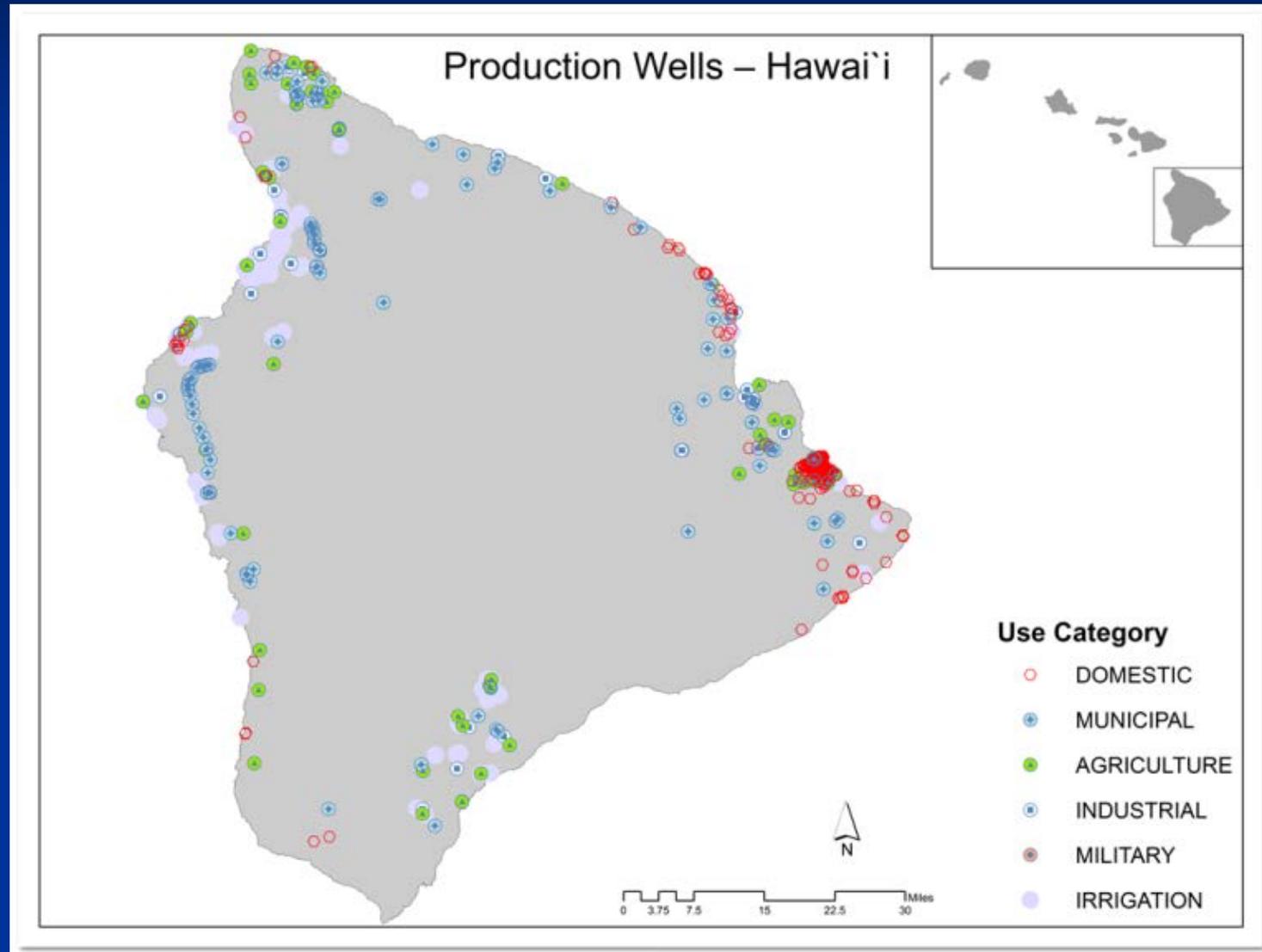
Keauhou Aquifer

- Two deep monitoring well drilling projects, Keopu DMW (8-3858-001), and Kamakana (8-3959-001), intercepted deep fresh water zones beneath the saltwater zone. Horizontal extent and capacity of this deep freshwater zone is unknown, but may be a potential additional freshwater source for the Kona area
- The low ground water gradients suggest a highly permeable basal coastal aquifer where basaltic lavas comprise the aquifer, and this finding is supported by tidal analysis. The composition of the lava flows determines its permeability, and in turn, the ground water gradient.

Keauhou Aquifer

- From 1959 to 1978, average daily pumpage increased from less than 1 mgd to about 3.5 mgd.
- With the Kahaluu Shaft coming online in mid-1979, average pumpage increased to between 5 and 6 mgd.
- Prior to the development of the high-level wells, increasing water use demands were met by increasing pumpage from the Kahaluu wells and shaft -by mid-1990's average pumpage was about 8 mgd.

Keauhou Aquifer

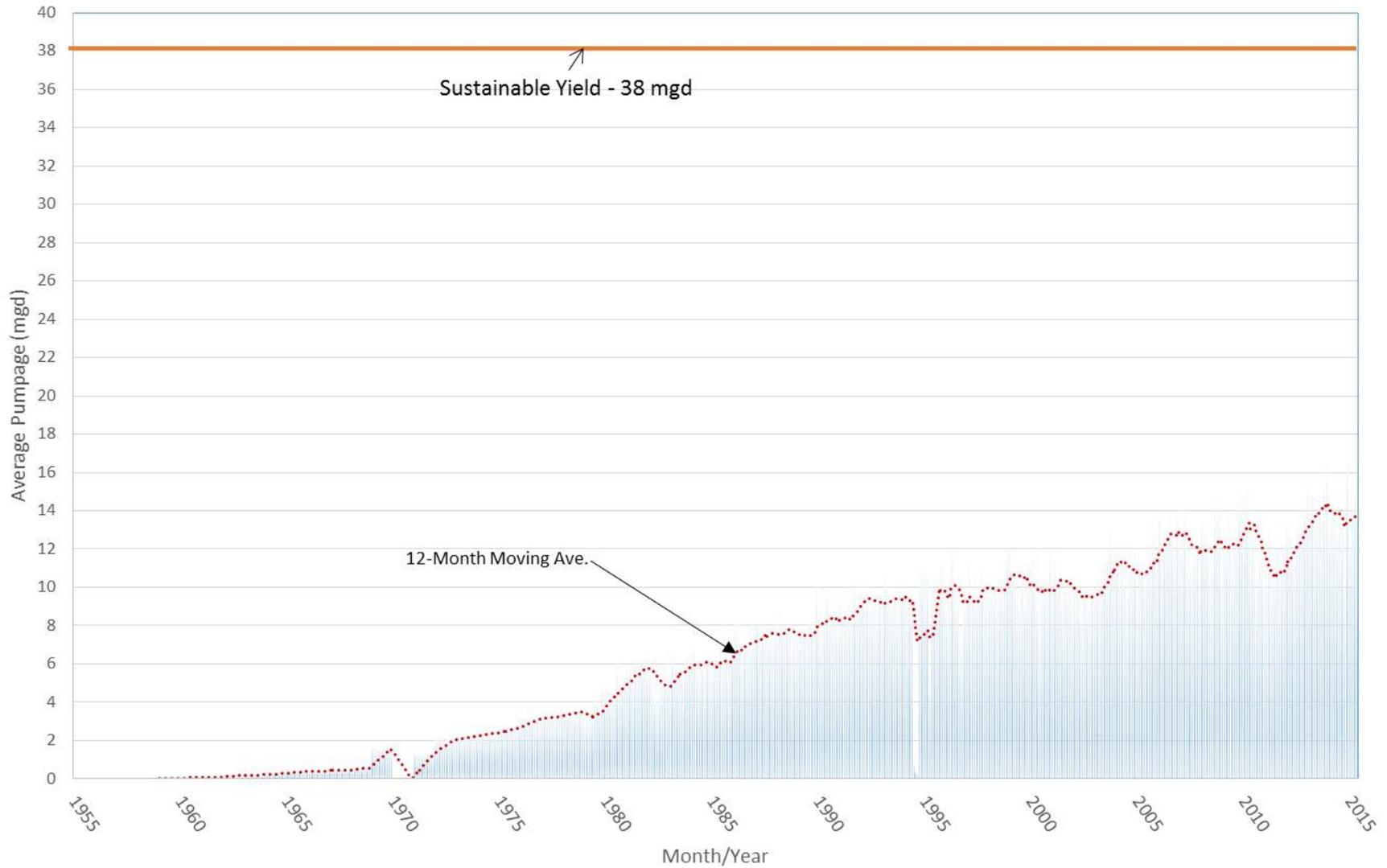


Keauhou Aquifer

- When the high-level wells came on line, withdrawal rate increased to 11.1 mgd in 1997 (9.8 mgd by HDWS).
- At the end of 2014, average withdrawal of ground water was 13.4 mgd (against a Sustainable Yield of 38 mgd)
- Total pumpage from the Keauhou aquifer is small when compared to the estimated sustainable yield and total average daily recharge into the system.

Keauhou Aquifer

Keauhou Aquifer System Ave Daily Pumpage



Keauhou Aquifer

- Basal wells are affected by pumpage because the static water levels generally are 5 ft., msl or less, thus the chloride concentration in the water is sensitive to localized pumpage.
- High-level wells are not affected in this way.



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<http://hawaii.gov/dlnr/cwrm/>

