

Optimizing Pumping Rates for the Pearl Harbor Aquifer

Shelby Fillinger `sgf @ hawaii dot edu`

Introduction

Pearl Harbor Aquifer is one of the largest suppliers of fresh water in the State of Hawai'i. The average output is at 100 Mgal/d over the last 10 years.

Optimizing the pumping rate/ finding sustainable yield allows for proper planning and use of the aquifer.

Threats like sea level rise could affect the aquifer, and risk salt water intrusion.

Reference: USGS Numerical Simulation of Flow in Deep Open Boreholes in a Coastal Freshwater Lens, Pearl Harbor Aquifer, Oahu, Hawaii

Implementation

For the model flopy was used.

The aquifer was set at 81840 x 15840 x 5906 ft in dimension (y, x, z).

4 pumping wells were distributed in the aquifer.

Head levels were set at 10 and 0 ft. Minimum head was set at -50 ft.

Optimization was done with basin hopping.

Results

Optimum pumping rate: 38.5 thousand ft³ / 288 million US gallons

