

## *Preliminary Outline*

7.2.25

# **KEAUHOU AQUIFER SYSTEM AREA GROUNDWATER ADAPTIVE MANAGEMENT PLAN**

A First Generation Plan for Keauhou's  
Groundwater Resources

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## **Executive Summary**

### **I. Introduction and Background Information**

- What is an Adaptive Management Plan (AMP) and why it is needed
- What brought this effort about?
- AMP good practices
- Keauhou Aquifer System Area focus: coastal Groundwater Dependent Ecosystems (GDEs); first and future generation AMPs
- CWRM's authorities and obligations regarding protected public trust uses of water and maximizing reasonable and beneficial use of water
- How this plan was developed
  - Alignment and Meetings with CWRM Staff
  - Advisory Panel
  - Expert Groups
  - Stakeholder Consultations
  - Outside Reviewer
  - Updates and public briefings to CWRM

### **II. The Setting**

- The Keauhou Aquifer System Area (KASA) described
- Key GDE features and indigenous aquaculture sites
  - Anchialine pools
  - Fishponds
  - Estuarian sites and near shore fisheries
  - Basal springs
  - Other
- Wells in KASA provide drinking water to the community and support other commercial and industrial activities. There are current and anticipated new well applications in KASA.
- Native Hawaiian traditional and customary practices dependent on groundwater exist in KASA.

- Other current or future protected public trust uses exist in KASA, including use by the Department of Hawaiian Home Lands.
- Foundational documents (an initial few; more to be added)

### **III. The Problem**

- Starting assumptions
  - Fresh water is the foundation for both economic and environmental sustainability in West Hawai'i
  - Decisions regarding Keauhou GDEs will affect other decisions about freshwater withdrawals (new wells), which have implications for regional development
- Short and Long Term Threats
  - ⊖ Excessive withdrawals of groundwater
  - Contamination and pollution
  - Flooding, runoff and erosion
  - Sea level rise, wildfires, saltwater intrusion, altered precipitation patterns, droughts

### **IV. AMP Goals**

- (1) Perpetuate a flow of fresh groundwater to GDEs sufficient that native biota and public trust obligations to Native Hawaiians can be sustained while allowing for protected public trust uses and reasonable and beneficial uses of water;
- (2) Help directly decide or indirectly inform management decisions regarding requests for future ground water withdrawals, including special conditions that may be imposed on well operators
- (3) Establish initial monitoring indicators, potential triggers for management actions related to biological and environmental thresholds; and an initial plan for an ongoing monitoring program.
- (4) Set in place a plan that will allow for learning about this system, to be continually updated by CWRM into successive plans as knowledge emerges.

### **V. Methodology**

- Gather existing knowledge, information, and observations through updated literature and insights and information from stakeholders and rights-holders.
- Establish a working conceptual model for the KASA.
- Identify possible GDE sentinel sites for baseline monitoring.
- Through the Expert Groups, create a short and prioritized list of indicators to be tracked (Initial Priority Baseline Indicators).

- Establish initial monitoring procedures and plan a future monitoring program.
- Set proposed thresholds and triggers.

## **VI. Caveats and Uncertainties**

- No complete inventory of all GDE features
- The precise sources and flow patterns of fresh water coming to the GDEs are unknown
- Incomplete GDE biota inventories
- Insufficient or contradictory current monitoring knowledge

## **VII. Expert Group Recommendations**

- Native Hawaiian and 'Ohana Traditional and Customary Practices / Kilo
  - Participating Experts
  - Recommended Initial Priority Baseline Indicators
  - Assumptions behind the indicators
  - Specific research for a second generation AMP
- Hydrology
  - Participating Experts
  - Determine hydrologic boundaries and possible interactions between them.
  - Determine areas of discharge into onshore and nearshore environments.
  - Recommend monitoring to study impacts of well pumpage on the various aquifer bodies.
  - Specific research for a second generation AMP
- Indicator Species
  - Participating Experts
  - Recommended Initial Priority Baseline Indicators
  - Assumptions behind the indicators
  - Specific research for a second generation AMP
- Contamination and Pollution
  - Participating Experts
  - Identify sources of contaminants or pollution to the groundwater and coastal waters.

- Develop a hypothesis of the mechanisms of contamination and pollutant transport between the aquifers and the ocean.
- Recommended Initial Priority Baseline Indicators and a monitoring program
- Assumptions behind the indicators
- Specific research for a second generation AMP

## **VIII. Final Recommendations**

- First generation sentinel sites
- First generation indicators and development of a baseline monitoring plan
- Initial management actions
- Setting the stage for the longer term

## **IX. Appreciations**

### **Appendices**

1. Participants and Persons Consulted and Meeting Notes
2. Literature Consulted