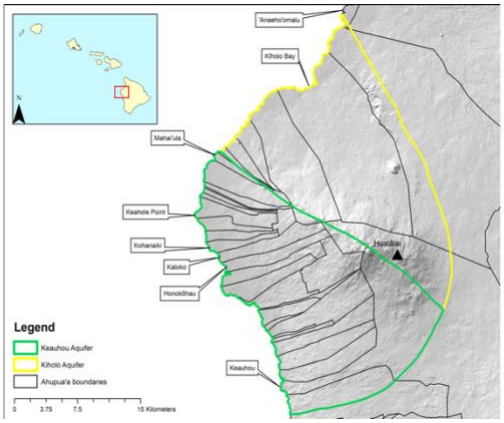
Project Description

(Draft as of: 8.6.25 [1])

KEAUHOU AQUIFER SYSTEM GROUNDWATER ADAPTIVE MANAGEMENT PLAN



The Commission on Water Resource Management ("CWRM") is reconsidering its approach to groundwater management in the Keauhou Aquifer System Area ("KASA"). Housing and economic growth require groundwater and the Keauhou region is part of the expanding Kona population center. However, CWRM has an affirmative duty to balance maximum beneficial use of water with the protection of the public trust, including maintenance of waters in their natural state, traditional and customary rights of Native Hawaiians, provision of adequate reserves of water for the Department of Hawaiian Home Lands (DHHL), and domestic use. In doing so, CWRM must also exercise the precautionary principle.

Current and planned groundwater withdrawals have wide implications across the entire KASA, especially including impacts to coastal Groundwater Dependent Ecosystems ("GDEs") and Native Hawaiian traditional and customary practices. CWRM intends to expand the study zone originally proposed by the Kaloko-Honokōhau National Historic Park to include the entire KASA and create a first-generation Adaptive Management Plan ("AMP") that will be periodically updated and amended as new information emerges.

GDEs are unique communities of endemic plants and animals that rely on flows of fresh water. In West Hawai'i, GDEs are prominently found along the Kona coast and differ significantly from surface water ecosystems. Though not perfectly understood, it is

[1] This draft will be successively updated as the AMP substance and process evolves.

hypothesized that groundwater in the KASA moves down beneath the surface from three aquifer bodies: basal, high-level dike confined, and deep confined. At the coast, these waters feed springs, anchialine pools, fishponds, offshore seeps, near shore estuaries, and reef life. GDE features are important sites for biodiversity and Native Hawaiian cultural practices which include, among others, subsistence and ceremonial use.

Keauhou's coast has benefitted from substantial scientific study, providing a strong foundation for adaptive management. While a comprehensive inventory of all GDE features is an important future milestone, existing knowledge will support the development of a robust first-generation AMP. With current funding and timeline constraints, this AMP can serve as a strategic initial "blueprint" and launch point for meaningful action—articulating current assumptions about the conceptual model of the aquifers, establishing relevant indicators and a monitoring framework, identifying sentinel sites, and prioritizing key areas for continued research.

The initial Keauhou AMP is expected to be robust enough to help inform ground water permitting and pumping decisions, create a baseline monitoring plan, and be fully adaptive to changes as new information emerges and the plan is updated. We are being assisted in this effort by Peter S. Adler, PhD and Stephanie Sang of GUILD Consulting. Adler helped organize the initial GDE symposium in 2017.

I. Objectives

Between now and November 30, 2025, CWRM will develop a robust first-generation plan for an updatable AMP for groundwater in the KASA. The overarching purpose of this AMP is to move the topic of impacts of KASA groundwater withdrawals on GDEs and Native Hawaiian traditional and customary practices from dialogue to applied, actionable science. Further, it is hoped that this plan will serve as a useful framework for AMPs in other areas of CWRM's jurisdiction. Specifically for Keauhou, the plan will be used to:

(1) Perpetuate a flow of fresh groundwater to GDEs sufficient that native biota and traditional and customary practices of Native Hawaiians can be sustained while allowing for other 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, a monitoring plan, potential triggers for management actions related to ecological and cultural thresholds, and plans for future monitoring;

(4) Set in place a plan that allows for learning and will be continually updated by CWRM into second and third-generation plans as additional knowledge emerges.

II. Starting Points and Expert Groups

This first-generation AMP will build most immediately on (1) the 2017 symposium on Groundwater Dependent Ecosystems [2]; (2) the draft proposal for an AMP submitted by the Kaloko-Honokōhau National Historical Park [3]; (3) the peer reviewed bio-cultural research conducted by Gibson, Bremmer, Burnett, Lui, and Smith[4]; and (4) other materials filed before CWRM and research conducted since 2017 to be identified by experts and others.

Four work groups of three or four well regarded experts are being established with a CWRM point person helping to staff each. Adler and Sang will facilitate and write up and incorporate each group's findings and recommendations. The specific role of Working Group experts is to:

(a) identify a short and prioritized list of specific AMP baseline monitoring indicators;

(b) articulate the assumptions behind each recommended indicator;

(c) develop a monitoring plan;

(d) identify any specific additional pertinent research conducted since the 2017 symposium; and

(e) suggest a short list of critical future research efforts that will improve second and third-generations of the AMP.

The four expert groups are:

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[2] https://files.hawaii.gov/dlnr/cwrm/activity/keauhou/20181108-GDE_Symposium_Final.pdf

[3] "Pilot Adaptive Management Plan For (1) Protecting Groundwater Dependent Ecosystems In Kaloko-Honokōhau National Historical Park and (2) Providing Water Security and Sustainability in the Keauhou Aquifer System Area, Hawai'i County, Hawai'i" December, 2022

[4] "Biocultural Values of Groundwater Dependent Ecosystems in Kona, Hawai'i" by Veronica L. Gibson, Leah L. Bremer, Kimberly M. Burnett, Nicole Keaka Lui, and Celia M. Smith. *Ecology and Society,* 2022.

- **Native Hawaiian and ʻOhana Traditional and Customary Practices / Kilo**
    - Expert To be named
    - Expert To be named
    - Expert To be named
      CWRM - Ciara Kahahane

- **Hydrology**
    - Donald Thomas, PhD, Geochemist, Director of the Center for the Study of Active Volcanoes, University of Hawaiʻi at Mānoa
    - Heidi L. Kane, Hydrologist, Pacific Islands Water Science Center, United States Geological Survey
    - Brytne Okuhata, PhD, Hydrologist, Pacific Islands Water Science Center, United States Geological Survey
      CWRM - Ryan Imata

- **Indicator Species**
    - Celia Smith - The Wilder Chair and Professor of Botany, School of Life Sciences, University of Hawaiʻi at Mānoa
    - Diamond Tachera - *Project Scientist I*, Mesoscale & Microscale Meteorology Laboratory, *Co-Principal Investigator*, NSF CoPe Rising Voices, Changing Coasts, NSF National Center for Atmospheric Research (NCAR)
    - Henrietta Dulai – Professor, Department of Earth Sciences, School of Ocean Earth Science and Technology, University of Hawaiʻi at Mānoa
    - Ryan Okano - Aquatic Biologist, DLNR, Division of Aquatic Resources
    - Troy Sakihara - Aquatic Biologist, DLNR, Division of Aquatic Resources
    - Veronica Gibson – Postdoctoral wetland researcher, Heʻeia National Estuarine Research Reserve
      CWRM – Katie C Roth

- **Contamination and Pollution**
    - Jennifer Doi, Environmental Health Specialist, Hawaii Department of Health (DOH), Clean Water Branch
    - Christopher Shuler, Hydrologist, University of Hawaiʻi at Mānoa, Water Resources Research Center
    - Robert Whittier, Geologist, DOH, Safe Drinking Water Branch
    - Chris Sparber, Hawaiʻi County Wastewater
      CWRM - Neal Fujii

Other data such as projected sea level rise and drought and rainfall estimations will also be incorporated into the AMP.

III. Advisory Committee and External Reviewer

The AMP project has an Advisory Committee to offer general counsel on both the process and the content of the AMP's development and help ensure a strong first-generation plan. Advisors will convene at least three times, either face-to-face or electronically before, during, and near the end of the project, to help ensure the AMP's clarity and robustness.

The following have agreed to serve on the committee:

- Leah Bremer - Institute for Sustainability and Resilience, UHERO, and Water Resources Research Center, University of Hawai'i at Mānoa
- Kā'eo Duarte - Kamehameha Schools; Vice President, 'Āina Pauahi
- Scot K. Izuka – United States Geological Survey (ret)
- Charles Young - Hawai'i Island 'Aha Moku

The project will also have an outside reviewer, Dr. Scott McCreary of Concur, Inc. (https://www.concurinc.com). McCreary has substantial experience with adaptive management plans and joint fact-finding on natural resource matters.

IV. Plan Phases and Key Activities

The project will take place in 4 flexible phases and be accomplished by the end of November 2025:

Phase IA - Project Planning and Preparation. Anticipated completion by June 15, 2025
Some key activities include: Development of a preliminary AMP outline for discussion with CWRM staff, advisors, and the outside reviewer. Begin preparation of a reasonable set of literature references to be attached to the draft AMP.

Phase IB – Community Engagement, Scoping, and Commission Approval. Anticipated completion by July 18, 2025.
Some key activities include: Establishment of four working groups composed of experts. Conduct outreach meetings to present the plan. Development of a schedule for public briefings with Commissioners.

Phase II - Expert Group Meetings. Anticipated completion by August 31, 2025.

Some key activities include: Hybrid or in-person meetings of the four expert Working Groups. Development of preliminary maps of the KASA to show features influencing GDEs. Meetings on Island of Hawai'i with Native Hawaiian and traditional and customary users, Hawai'i Department of Water Supply, Kaloko-Honokōhau National Historical Park, and others.

Phase III – Prepare First Draft AMP; Briefings for CWRM and the Public. Anticipated completion by September 30, 2025.
Some key activities include: Continuing consultations with project advisors, creation of a first draft AMP, and public briefings with CWRM Commissioners.

Phase IV - Prepare Revised AMP. Anticipated completion by November 30, 2025
Some key activities include: Incorporating feedback from CWRM Commissioners and the public into a further pre-publication AMP draft.

Barring unexpected delays, a first-generation AMP will be completed by November 30, 2025.

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