Loko iʻa or fishponds are a traditional form of Hawaiian aquaculture. Each loko iʻa is unique to its location but the coastal fishponds generally have strong stone walls built above the highest tide level with sluice gates open to the ocean. As young fish entered from the ocean they would feed in the loko iʻa, eventually grow larger, and be unable to exit due to the gate. Combining aspects of the natural and built environment as well as fresh and salt water, these loko iʻa are valuable culturally and ecologically. Because these ponds rely on natural nutrient inputs, they are sensitive to changes in groundwater as well as freshwater and ocean dynamics. It is important to better understand the water and nutrient movement into and through these fishponds so that currently active loko iʻa can be sustainably managed and ones that have fallen into disrepair can be restored in ways that allow adaptation for changing climate.

To determine how the hydrology of the loko iʻa changes we have collected a robust set of water quality data from both shoreline stations and long-term dataloggers deployed to the fishponds, as well as mapped the geography and bathymetry of our fishponds. This comprehensive dataset encompasses king tides, drought periods, and intense rainfall-all of which provide views into a possible future for these fishponds as sea level rises and weather patterns shift. In addition we have interviewed fishpond managers to
determine what their needs are regarding information about the hydrology and primary production of their ponds, and helped them develop a workflow to visualize their data using Kibana Dashboard. It is exciting to have these powerful trend analysis tools accessible and being combined with place-based experience to support the restoration and management of loko i’a.

This project is part of a larger effort involving the UH system, Conservation International Hawai’i, the Edith Kanaka’ole Foundation, Kamehameha Schools, and the Hawaii Department of Aquatic Resources. Because there are many groups involved in loko i’a restoration and maintainance these combined efforts are a vital way to increase our understanding of these fishponds on a larger scale, and the information gained can benefit the community. By combining robust scientific data collection, advanced data analysis and visualization, and strong community engagement and effort these loko i’a can be restored to full functionality and serve as a model for fishpond restoration and management in other regions.

Quick Summary

- Loko i’a, traditional Hawaiian fishponds or fishtraps, are culturally and ecologically important structures that rely on natural nutrient inputs from groundwater as well as surface fresh and saltwaters.

- Our work investigates the dynamics of groundwater flow as well as the larger socio-ecologic environment in several fishponds in east Hawai’i island. We are collecting long-term data on water quality to determine the hydrological flow through these loko i’a as well as how it varies during a variety of weather conditions.

- This work is part of a larger cooperative effort by a variety of agencies to better understand the dynamics driving the functioning of these loko i’a, so that managers will be able to better support adaption of these shoreline areas in a changing climate.