Keauhou Aquifer Sector Adaptive Management Plan

Commission on Water Resource Management
April 1, 2025

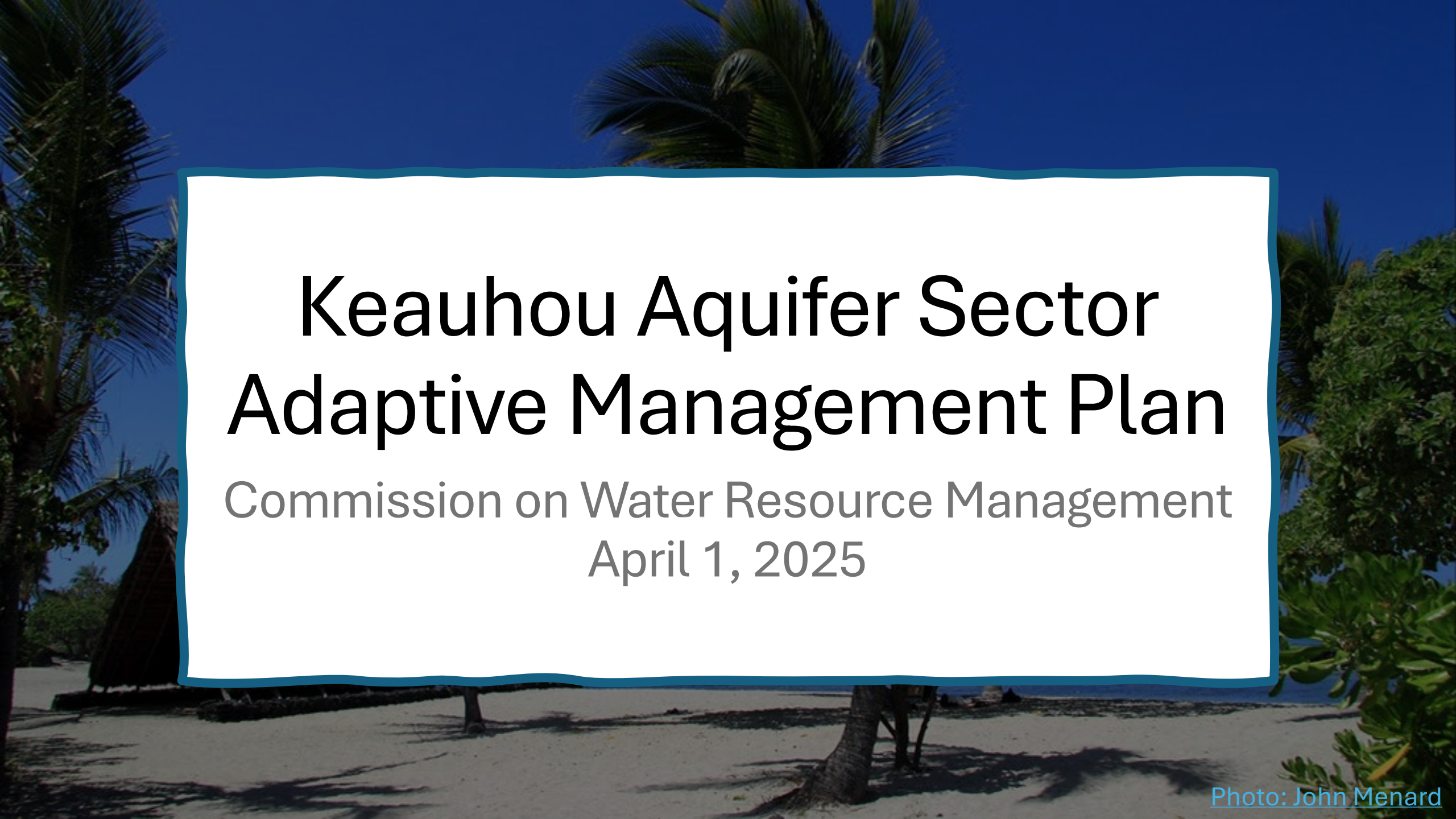


Photo: John Menard

Purpose

Ground Water

- Feeds springs, fishponds, anchialine pools, and reefs
- Cultural practices rely on these systems
- Development pressure is increasing
- Sustainable ground water management is more important than ever
- Housing and economic growth will need groundwater

Why Keauhou?

- Petition to designate a Ground Water Management Area (GWMA)
- Continued interest in development
- Kaloko-Honokōhau NHP and its unique ecosystems
- Keauhou identified as an ASA in need of more detailed assessment

CWRM's Public Trust Responsibilities

- Public trust purposes:
  - Maintenance of waters in their natural state
  - Traditional and customary rights of Native Hawaiians, including appurtenant rights
  - Adequate reserves of water for Hawaiian home lands
  - Domestic use
- HRS §174C-101 – Native Hawaiian water rights
- "Affirmative duty"

Sustainable Yield

- “Sustainable yield” means the maximum rate at which water may be withdrawn from a water source without impairing the utility or quality of the water source as determined by the Commission. HRS §174C-3.
- Set in the Water Resource Protection Plan
- Like instream flow standards, “sustainable yields … guid[e] water planning and regulation by **prescribing responsible limits to the development and use of public water resources**.” Waiāhole I, 94 Hawai‘i at 148.

Sustainable Yield for Keauhou

- Current sustainable yield for Keauhou is **38 million** gallons per day.
- Staff is evaluating if and how forecasted rainfall, combined with possible different methodology for determining sustainable yield, may impact this sustainable yield.
- Staff is also entertaining approaches to management of different aquifer bodies (**basal, dike-confined high level, deep confined**).

Ka Paʻakai o ka ʻĀina v. LUC

- State action: Land use boundary amendment
- Impacts of the action on traditional gathering practices
- 3-step analysis:
    1. the identity and scope of valued cultural, historical, or natural resources in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;
    2. the extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
    3. the feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist.

Ka Paʻakai o ka ʻĀina v. LUC

- State action: Land use boundary amendment
- Impacts of the action on shoreline access by T&C practitioners
- 3-step analysis:

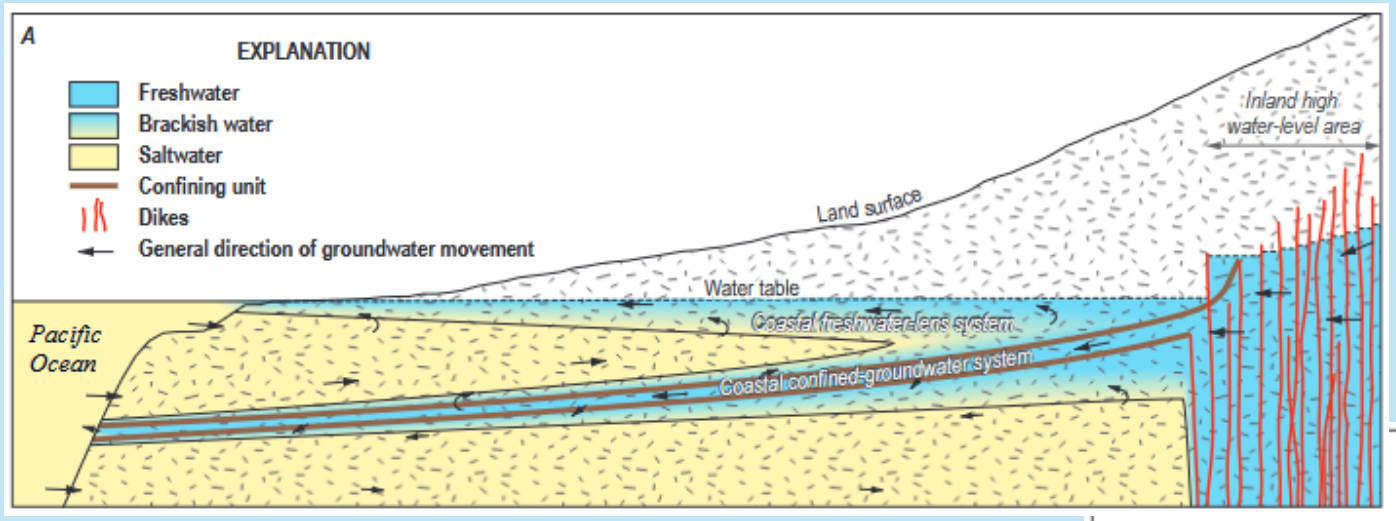
Ka Paʻakai Analysis in Other Contexts

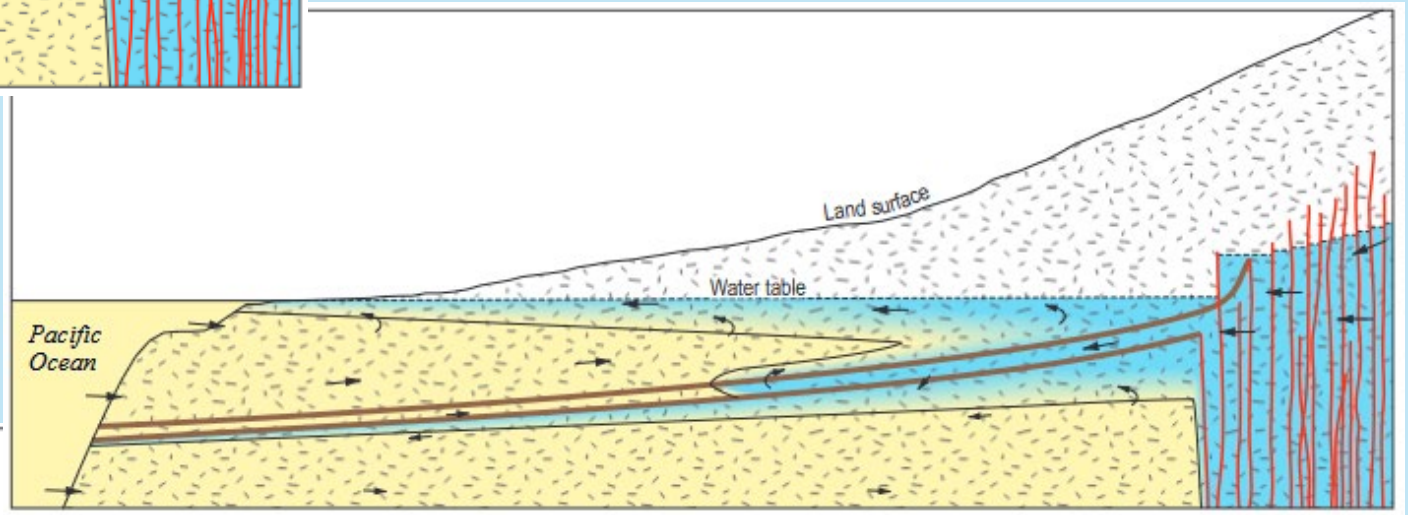
“Native Hawaiian traditional and customary rights and practices have broad-ranging protections under article XII, section 7. **These protections are flexible and must be adapted to the particular context or situation where they are implicated**[.]”

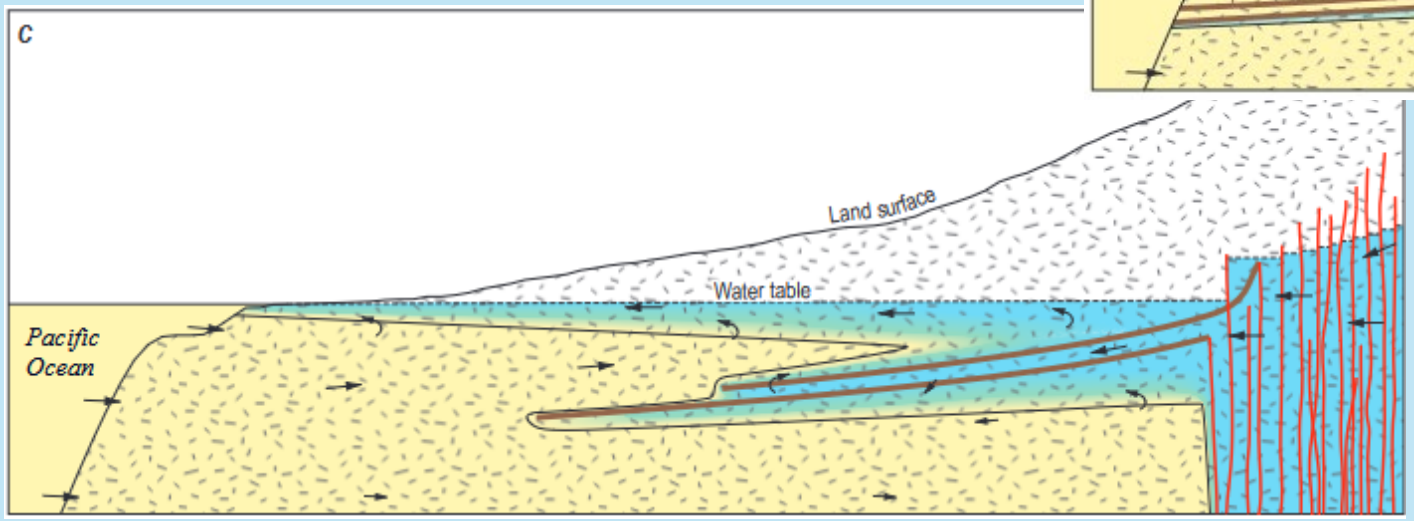
Flores-Case Ohana v. University of Hawaiʻi (Mar. 15, 2023).

Ground Water Challenges

- Less studied than surface water. Much is unseen and not well understood — need for more data (deep monitor well into deep-confined)
- Interconnectedness of basal/dike-confined/deep-confined
- Location of the discharge of these various aquifer bodies in near-shore and off-shore environments
- Localized and regional impacts
- Cumulative impacts of withdrawals
- Lagging effects of withdrawals







Delwyn S. Oki, USGS Scientific Investigations Report 2021-5004

Sustainable Yield: Limitations

- Currently use Robust Analytical Model (RAM)
- Doesn’t account for spatial variation in pumping
- Allows approximately 50% of recharge to coastal discharge but does not specifically address GDE
- Need for better modeling and incorporation of GDEs and T&C practices
- Goal of RAM: maximize water withdrawal and prevent salt water intrusion
- Other side of the coin: instream flow standards

Ka Paʻakai Analysis

AMP Goals and Process

Needs

- Update Commission’s understanding of resources based on current research
- Protect valued cultural and ecological resources
- Balance protection of ground water resources with development and use
- Base management decisions on data
- Continue to learn and improve

Adaptive Management: A Way Forward

- Adaptive management = monitor, respond, revise
- Instead of fixed assumptions, management adjusts based on real data and changing conditions
- Supported by scientific and cultural indicators

Goals

Identify:

- Significant landscapes
- Key indicators
- Monitoring needs (including deep monitor wells)
- Other factors that may affect indicators
- Triggers for action tied to ecological/cultural thresholds
- Pre-agreed management actions (e.g., reduce pumping)

Goals, Continued

- Allocate cost of monitoring and management
- Regional focus
- Iterative process
- Long-term commitment to monitoring and management
- Stakeholder involvement and engagement

Process

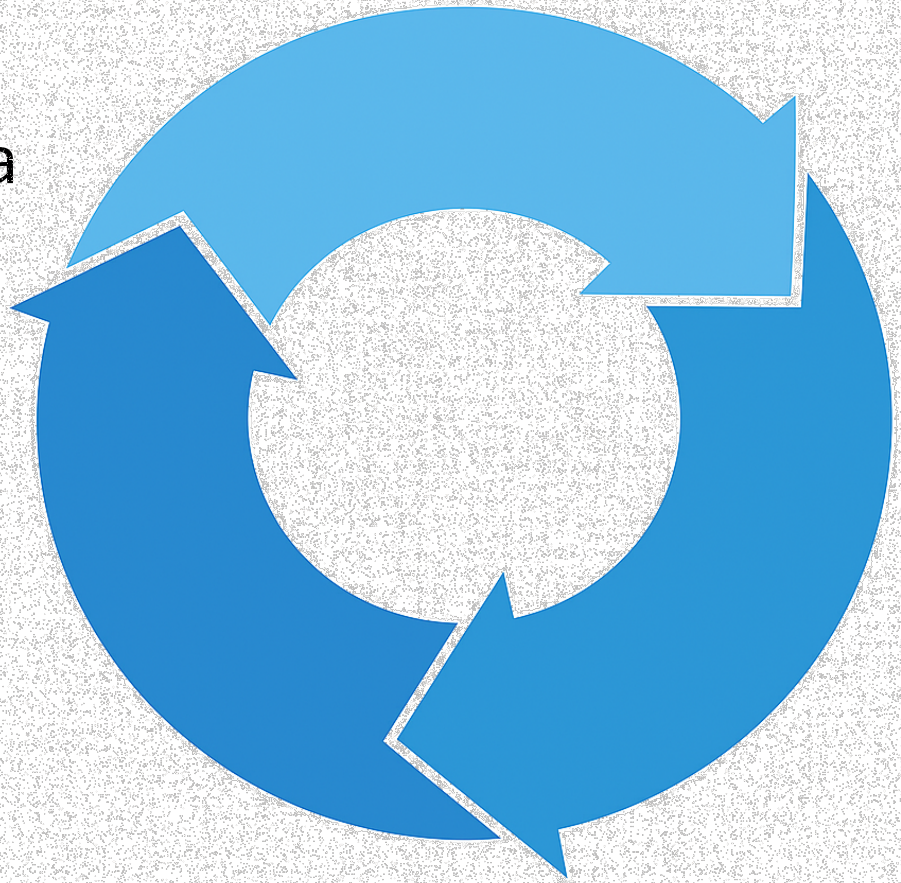
- Planning and outline of AMP components
- Advisory panel, expert group, and stakeholder input
- Public presentation of drafts
- Commission approval
- Continued updates based on learning about the system

What This Enables

- Stronger protections for ecological and cultural resources
- A better roadmap for forward movement
- More accurate permitting decisions
- Carrying the Commission’s affirmative duty to protect the public trust
- Possible model for future adaptive management statewide

Future Updates

- Identify assumptions and gaps in knowledge
- Continually test hypotheses
- Incorporate new research and data
- Share data with the public



Questions?