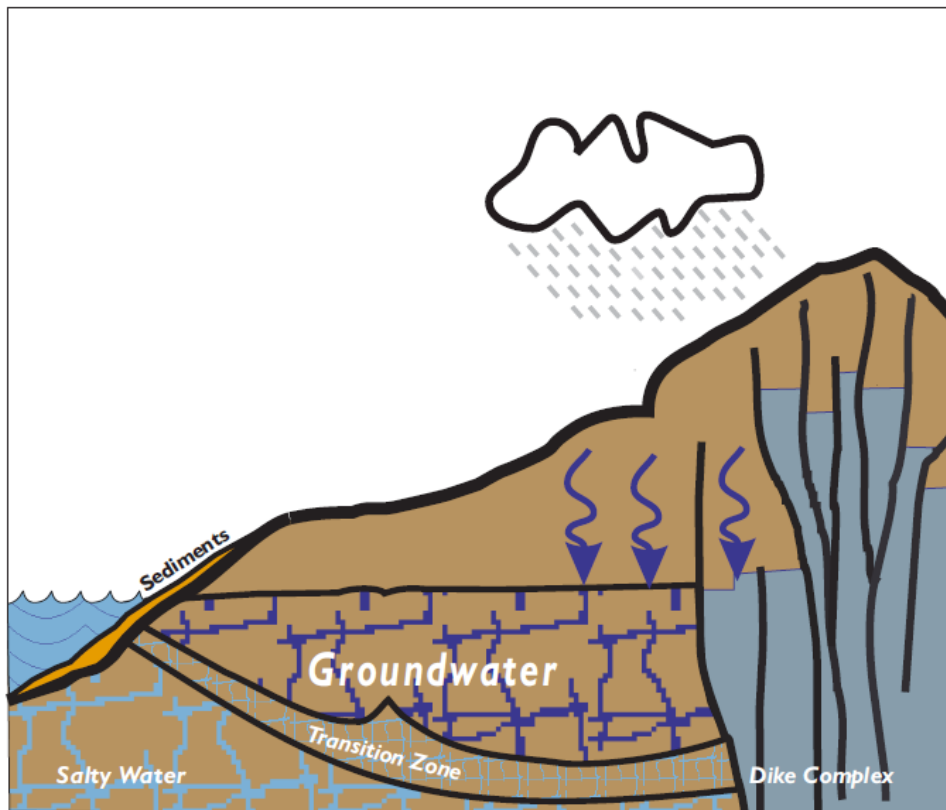


2018 Joint Government Water Conference

Hilo Hawaiian Hotel
Hilo, Hawaii
August 15, 2018

7:30am - 3:45pm

“Protecting Hawaii’s Groundwater”



Sponsored by:



2018 - 4th Joint Government Water Conference
“Protecting Hawaii’s Groundwater”
Hilo Hawaiian Hotel, Hilo, Hawaii
Wednesday, August 15, 2018 ~ 7:30 am - 3:45 pm

Drinking Water/Groundwater/Wastewater Professional(s):

The Department of Health (DOH) Environmental Health Administration (EHA) offices/branches invite you to register for the 4th Joint Government Water Conference. The Conference is intended to provide water industry personnel, government agencies, and other water-related organizations with an update of the groundwater protection strategies and activities being conducted in the State of Hawaii by the various DOH EHA offices/branches. In addition, we have invited several other water related agencies to give presentations on their activities and how it relates to or concerns our water systems and water-related activities. This conference will allow participants to keep abreast of the activities of the water-related government agencies, meet our staff and other water system personnel, ask questions and provide us with feedback, and learn what is in store for the drinking water/groundwater/wastewater industry in the coming years. We look forward to your attendance at our 4th Joint Government Water Conference.

Note: **You must pre-register for this conference by WEDNESDAY, August 1, 2018.** No registration on the date of the conference will be accepted. **Registration is limited.** Priority will be given to people working professionally in water (groundwater, drinking water & wastewater) and government environmental protection personnel. A meal will be served as an integral part of the Conference.

Register On-line at: <http://events.egov.com/eventreg/HI/event.htm?name=4thjointgovernmentwaterconferencehilo>

TENTATIVE AGENDA (as of August 3, 2018)	
7:30am	Registration
8:15am	<i>Opening Remarks and Introduction</i> Joanna Seto(DOH) & Keith Okamoto (HDWS)
8:30am	<i>SDWB: Groundwater Protection Strategy</i> Joanna Seto (DOH)
9:00am	<i>WWB: Cesspool Strategy and Water Reuse</i> Sina Pruder (DOH)
9:30am	<i>CWB: Polluted Runoff Program Strategy</i> Mike Burke (DOH)
10:00am	Break
10:30am	<i>USGS: Water Quality Activities</i> Adam Johnson (USGS)
11:00am	<i>DOA-Pesticides: Pesticides in Groundwater</i> Cal Westergard (DOA)
11:45am	<i>LUNCH–Native Oysters for Water Quality Improvement.</i> Rhiannon Chandler-‘Iao (Oahu Waterkeepers)
	CONCURRENT SESSION A (Cesspool Workshop)
	CONCURRENT SESSION B (Water Quality Workshop)
1:00pm	<i>Linking Land and Sea Through Collaborative Research to Inform Ridge-to-Reef Management.</i> Jade Delevaux (UH)
1:30pm	<i>Detecting Sewage Pollution in the Puako Watershed.</i> Tracy Wiegner (UH-Hilo)
2:00pm	Break
2:15pm	<i>On-Site Wastewater Treatment & Disposal Technologies-Function, Design, Operation, and Maintenance.</i> Roger Babcock (UH)
2:45pm	<i>Discussion: Funding and Implementing Cesspool Upgrades–“now to 2050.”</i>
3:30pm	Wrap-up

For more information, contact the Safe Drinking Water Branch at (808) 586-4258.

We provide access to our activities without regard to race, color, national origin (including language), age, sex, religion, or disability. Write or call our Affirmative Action Officer at Box 3378, Honolulu, HI 96801-3378 or at (808) 586-4616 (voice) within 180 days of a problem.

MORNING SESSION

HAWAII'S GROUNDWATER PROTECTION STRATEGY
Joanna L. Seto, P.E.
Safe Drinking Water Branch, Hawaii Department of Health

BIOGRAPHY

Joanna L. Seto, P.E., is the Engineering Program Manager of the Department of Health's Safe Drinking Water Branch. She has more than 25 years of combined private and public engineering experience working at Hawaiian Dredging & Construction Company, Sato & Associates, Inc., and the Department of Health, Clean Water Branch and Safe Drinking Water Branch. Joanna is currently the webmaster of the American Water Works Association-Hawaii Section. She was past president of the Hawaii Section of the American Society of Civil Engineers and is involved with Na Wahine Softball Club and as class representative for the `Iolani Bulletin. She graduated from `Iolani School and Washington University in St. Louis, Missouri where she earned a Bachelor of Science in Civil Engineering.

ABSTRACT

The Hawaii Department of Health (DOH) Groundwater Protection Strategy was finalized in June 2017. The Safe Drinking Water Branch will present the three goals of the strategy and the related objectives.

Goal 1: Monitor and assess groundwater quality.

Goal 2: Identify and prioritize groundwater contaminations threats.

Goal 3: Mitigate priority contamination threats and prevent contamination.

This strategy involves multiple DOH branches and offices (and potential funding sources): Safe Drinking Water Branch (GW106/DWSRF 15%), Wastewater Branch (CWSRF), Clean Water Branch (SW106), Solid & Hazardous Waste Branch (SHWB), Hazard Evaluation and Emergency Response Office (HEER).

Hawaii Groundwater Protection Strategy

Hawaii Department of Health Coordinating Branches/Offices:

Safe Drinking Water Branch (*GW106/DWSRF 15%*), Wastewater Branch (*CWSRF*), Clean Water Branch (*SW106*),
Solid & Hazardous Waste Branch (*SHWB*), Hazard Evaluation and Emergency Response Office (*HEER*)

June 2017

Mission: To safeguard groundwater quality and public health by protecting Hawaii's groundwater from contamination.
(*potential funding source listed within parentheses*)

Goal 1: **Monitor and assess groundwater quality.** (*GW106*)

Objective 1: Collect and analyze groundwater monitoring data with focus on priority threats to groundwater quality.

Objective 2: Work with other agencies that collect groundwater data to understand what data they collect and how it is collected.

Objective 3: Every four years, generate a Groundwater Status Report which provides a review, analysis, and summary of groundwater monitoring data to understand contaminant trends and sources of contamination. The Report shall include a list of proposed future monitoring of contaminants of concern with rationales and priorities based on severity of public health impacts.

Goal 2: **Identify and prioritize groundwater contamination threats.**

Objective 1: Recognize that groundwater quality monitoring since the 1990s has shown that the priority threats to groundwater quality as determined by DOH and review of data are as follows (*GW106*):

Priority Threats to Groundwater Quality - 2017
Onsite sewage disposal systems/cesspools/injection wells (WWB/CWB/SDWB)
Large scale use of recycled water (WWB/SDWB)
Large fuel storage facilities (SHWB/SDWB)
Increasing nitrate concentrations (WWB/CWB/SDWB)
Agricultural chemicals (HEER/SDWB)

Objective 2: Identify future threats to groundwater quality and prioritize for Goal 1 or Goal 3 follow-up
(*GW106/CWSRF/SW106/319/HEER/SHWB*).

Goal 3: **Mitigate priority contamination threats and prevent contamination.**

Objective 1: Coordinate protection efforts with other branches/offices/agencies:

- Safe Drinking Water Branch Underground Injection Control Program - issuing permits for discharges to wells
- Wastewater Branch - protection from onsite sewage disposal systems and cesspools
- Clean Water Branch - surface water protection that also protect groundwater
- Solid & Hazardous Waste Branch - leaking underground storage tanks, landfills, and other wastes that may contribute to groundwater contamination
- Hazard Evaluation and Emergency Response Office - toxicology and health impacts of groundwater contamination and use of hazardous chemicals and pesticides
- Environmental Planning Office - review of new development projects and their impacts to groundwater
- Department of Land and Natural Resources, Commission on Water Resource Management – water quality planning via the Hawaii Water Plan, Water Resources Protection Plan – Section 10, Water Use Permits, Well-drilling applications, salt-water intrusion data
- Department of Agriculture – pesticide use and application

Objective 2: Coordinate use of funding sources to support the HIGWPS: Safe Drinking Water Branch (*GW106/DWSRF 15%/DWSRF Fees*), Wastewater Branch (*CWSRF*), Clean Water Branch (*SW106, 319*), Solid & Hazardous Waste Branch (*SHWB*), Hazard Evaluation and Emergency Response Office (*HEER*)

Objective 3: Coordinate the regulatory framework used by each branch/office/agency to protect groundwater from the prioritized contamination threats (e.g., Code of Federal Regulations, Hawaii Revised Statutes, Hawaii Administrative Rules, EPA Guidelines and online tools).

HAWAII'S CESSPOOL STRATEGY and WATER REUSE
Sina Pruder, P.E.
Wastewater Branch, Hawaii Department of Health

BIOGRAPHY

Sina Pruder received her engineering degree from the University of Hawaii. She also has her professional engineering license in civil engineering. She has worked in the Wastewater Branch for 24 years, where she is currently the Branch Chief. Wastewater Branch is responsible for regulating onsite wastewater systems (including cesspools) and water reuse in the State of Hawaii.

ABSTRACT

This presentation will cover cesspool and water reuse activities in the state of Hawaii. Topics include: New requirements on cesspools and mandatory upgrades by 2050, available income tax credits for cesspool upgrades, cesspool upgrade prioritization legislative report and the cesspool conversion working group required by Act 132 of 2018. The work group was established to develop a long-range, comprehensive plan for cesspool conversion statewide of all cesspools by 2050.

Recycled water usage statewide, trends and challenges, and update of the Water Reuse Task Force authorized by House Concurrent Resolution 86 D1 of 2018 to identify barriers and solutions to expand water reuse in Hawaii. Recent findings have raised concerns about the long-term security of fresh water in Hawaii, and increasing the amount of water reuse in the State will help alleviate pressure on fresh water drinking supplies.

CWB: POLLUTED RUNOFF PROGRAM STRATEGY
Michael T. Burke
Clean Water Branch – Polluted Runoff Control Program
Hawaii Department of Health

BIOGRAPHY

Michael T. Burke is the Program Specialist of the Department of Health's Clean Water Branch, Polluted Runoff Control (PRC) Program. He has been with PRC for almost ten years and supervisor for the past three. Prior to joining PRC, he worked at the Department of the Attorney General, Pomaré, Inc. (Hilo Hattie's corporate office), and Hoku Scientific, Inc. where he developed extensive contracting, project management, and procurement experience. Mike grew up in Wai'anae (and still considers his parents' house "home") and graduated from Hawaii Baptist Academy. He earned a Bachelor of Arts in Political Science from Loyola Marymount University and earned a Juris Doctor from Loyola Law School, in Los Angeles, California.

ABSTRACT

The PRC Program's mission is "to protect and improve the quality Hawai'i's water resources by preventing and reducing nonpoint source pollution." The PRC achieves its mission by administering the U.S. Environmental Protection Agency's Clean Water Act Section 319(h) Nonpoint Source Management Program, which provides federal grants to support the PRC and fund implementation projects that improve water quality in watersheds throughout the State. This presentation will highlight some of the PRC's implementation projects, and outline funding opportunities and challenges for potential partners.

PESTICIDE-MONITORING PROGRAM OF SURFACE WATER IN HAWAI'I: PROGRESS AND PLANS FOR HAWAI'I ISLAND

Adam Johnson

**U.S. Geological Survey Pacific Islands Water Science Center
Honolulu, Hawai'i**

BIOGRAPHY

Adam Johnson received a Bachelors in Science (BS) degree in Geological Sciences, Univ. of Minnesota-Duluth, 2005 and a Masters of Science (MS) degree in Geology and Geophysics, Univ. of Hawaii at Manoa, 2008. He has been a Hydrologist at the USGS Pacific Islands Water Science Center in Honolulu since 2009

ABSTRACT

In 2016, the U.S. Geological Survey (USGS), in collaboration with the Hawai'i Department of Agriculture (HDOA), initiated a program to monitor pesticides in surface water in Hawai'i. The program's objective is to gather and disseminate reliable data needed to address growing concerns of potential adverse impacts to public and ecosystem health from exposure to pesticides in surface water. Initial monitoring efforts were focused on Kaua'i and O'ahu. Ongoing and planned monitoring efforts are focused on Maui and Hawai'i Island, but also include continued monitoring on Kaua'i and O'ahu. To date, targeted sites for pesticide monitoring on the windward side of Hawai'i Island include 14 streams and a river between Hilo and Honomū. The targeted sites are downstream of agricultural areas, developed areas, or both, and include sites recommended by HDOA. Monitoring efforts at the targeted sites aim to collect water samples during dry-weather conditions and shortly after a storm event. Additionally, plans are being made to deploy passive samplers at selected monitoring sites. The passive samplers will be left submerged in the streams for several weeks, during which they can absorb and accumulate pesticides and other organic contaminants, in a manner similar to absorption of chemicals in an organism's tissues. USGS used passive samplers recently on other islands to monitor pesticides and other organic contaminants in surface water and groundwater over prolonged periods. Results of chemical analyses of water samples and passive samplers collected on Hawai'i Island will be used to assess the occurrence and concentrations of over 200 current-use pesticide compounds in surface water at monitoring sites. Approved pesticide-monitoring results will be made publicly available. Approved pesticide-monitoring results currently are available only for Kaua'i and O'ahu, and these results indicate that none of the Hawaii toxicity standards and only a few of the Federal water-quality benchmarks considered were exceeded at monitoring sites during 2016–17.

HAWAII DEPARTMENT OF AGRICULTURE -PESTICIDES
Cal Westergard
Pesticides Branch, Hawaii Department of Agriculture

BIOGRAPHY

Cal Westergard is the Environmental Health Specialist for the State of Hawai'i's Department of Agriculture, Pesticides Branch, Education section for the island of Hawaii. Cal graduated from the University of Hawai'i at Hilo in 2011 with a degree in Tropical Agriculture. He worked on several different farms and resorts on the Big Island prior to accepting a position with the Division of Environmental Quality – Pesticide Enforcement Branch in Saipan, CNMI. After moving back to Hilo, he is happily employed with the Hawai'i Department of Agriculture-Pesticide Education Branch.

ABSTRACT

The Hawaii Department of Agriculture oversees major regulations affecting pesticide use In Hawaii. Activities include regulating the manufacture, sale, and use of pesticides in the State of Hawaii and regulating the distribution and use of pesticides to ensure safety and availability of important pesticides.

**LUNCH
SPEAKER**

NATIVE OYSTERS FOR WATER QUALITY IMPROVEMENT

Rhiannon Chandler-‘Iao, Esq., Executive Director and O‘ahu Waterkeeper, Waiwai Ola Waterkeepers Hawaiian Islands

BIOGRAPHY

Rhiannon “Rae” Tereari‘i Chandler-‘Iao serves as the Executive Director and O‘ahu Waterkeeper for Waiwai Ola Waterkeepers Hawaiian Islands. She earned a B.A. in Ethnic Studies from the University of Hawai‘i at Mānoa in 2004. After graduating from William S. Richardson School of Law in 2016 with certificates in both Native Hawaiian Rights Law and Environmental Law, she worked as a Post-J.D. Research & Teaching Fellow at Ka Huli Ao Center for Excellence in Native Hawaiian Law. Prior to attending law school, Rhiannon served as the Executive Director of the environmental non-profit organization Community Work Day Program, d.b.a. Mālama Maui Nui. While on Maui, she served as a member of the Maui County Cultural Resources Commission, the Maui Nui Marine Resource Council, and the Steering Committee of Ka Ipu Kukui Fellows Leadership Program.

ABSTRACT

Waiwai Ola Waterkeepers Hawaiian Islands, a member of Waterkeeper Alliance, is currently working with the Pacific Aquaculture and Coastal Resources Center at UH Hilo on the first project in Hawai‘i to restore native oysters to improve water quality and clarity. Oysters are filter feeders that remove harmful pollutants including sediment, bacteria, heavy metals, PCBs, oil, microplastics, sunscreen chemicals, and nutrients from the water column. In conjunction with the native oyster restoration project, Waterkeepers will engage youth in watershed education about stormwater, wastewater, water quality, and fishing safety. The oyster restoration project is set to begin in late 2018 at select locations around O‘ahu. The project is modeled after several successful partnerships with Waterkeeper organizations on the East Coast involving the restoration of native oysters for bioremediation, including the Billion Oyster Project in New York Harbor.

Waterkeepers’ second major initiative is the “Clean Water Under Our Homes” program to address Hawai‘i’s pressing cesspool issue. In partnership with the Hawai‘i Department of Health, Waterkeepers is working to create a low-cost loan program to help residents afford to upgrade their cesspools to septic tanks or aerobic treatment units. This will reduce bacteria levels and pathogens in our water resources.

CONCURRENT SESSION A

LINKING LAND AND SEA THROUGH COLLABORATIVE RESEARCH TO INFORM RIDGE-TO-REEF MANAGEMENT

Jade M.S. Delevaux, University of Hawai'i at Manoa

BIOGRAPHY

Jade Delevaux is an environmental scientist and researcher located in Honolulu, Hawai'i. She has been practicing environmental science since 2006 and her career has primarily focused on integrating land and sea processes to improve coastal water quality and resources in Australia, New Caledonia, Fiji, and Hawai'i. Jade obtained her bachelor degree in Geographical Sciences from the University of Queensland (Australia), her masters in Marine Biodiversity and Conservation from Scripps Institution of Oceanography at University of California San Diego, and completed her PhD in Natural Resources and Environmental Management at the University of Hawai'i. Areas of active research include developing scientific tools that can inform sustainability and conservation planning to sustain natural resources and foster coastal communities' resilience in Hawai'i and Fiji.

ABSTRACT

Across Pacific Islands, declining natural resources, which are important food production systems for local communities, have contributed to a cultural renaissance of customary ridge-to-reef management approaches. To support these efforts, resource managers need an improved understanding of land-sea linkages and tools that can evaluate how terrestrial and marine drivers shape the condition of coral reefs. We established an interdisciplinary process to inform integrated land-sea management in Hawai'i in response to increasing coastal development, fishing, and climate change related impacts. We developed a modeling framework to link land and sea through groundwater flow. We identified coral reefs vulnerable to groundwater-based nutrients, and linked them to areas on land where appropriate management of human-derived nutrients could prevent increases in benthic algae and promote changes of coral recovery from bleaching. We applied our framework at opposite ends of the Hawaiian Archipelago, in Hā'ena and Ka'ūpūlehu, where local communities have applied customary resource management approaches through U.S. state government-recognized processes, with the goal of perpetuating traditional food systems and cultural practices. Our results demonstrate the value of interdisciplinary collaborations among researchers, resource managers and community members to develop placed-based solutions to local environmental threats. Our findings also show how culturally-grounded and inclusive research can guide management actions that foster the resilience of coral reefs. We discuss the lessons learned from our process and highlight the critical aspects of collaboration necessary to develop scientific tools that can inform practical and appropriate management actions.

DETECTING SEWAGE POLLUTION IN THE PUAKO WATERSHED

Tracy N. Wiegner, Ph.D.
University of Hawai'i at Hilo, Department of Marine Science

Biography

Dr. Tracy Wiegner is a professor of Marine Science at the University of Hawai'i at Hilo (UHH). She has been at UHH for 14 years. Her research focuses on the connection between the land and ocean. Specifically, she studies how freshwater inputs from rivers and groundwater affect near-shore water quality and biological processes. She works on both the windward and leeward coasts of Hawai'i Island. Before moving to Hawai'i, she earned her B.S. from Cornell University and her Ph.D. from Rutgers University, and was a post-doctoral scientist at the Stroud Water Research Center. At UHH, she teaches courses on global change, watersheds, chemical oceanography, and the scientific method, as well as mentors undergraduate and graduate students on research projects.

Abstract

Determining the location of sewage pollution in a watershed is important for implementing management actions to reduce pollution impacts on coral reefs. The study's goal was to identify locations of sewage pollution in the Puakō watershed on Hawai'i Island. To achieve this goal, sewage indicators [fecal indicator bacteria, stable nitrogen isotopes, nutrients] were measured in groundwater at high, mid-, and low elevation wells, as well as along the shoreline. Dye tracer tests, water quality, and $\delta^{15}\text{N}$ macroalgal measurements assessed water quality impairment caused by different onsite sewage disposal systems (OSDS) types. FIB concentrations along Puakō's shoreline were substantially higher than those in upslope wells and resorts' shoreline waters, with concentrations of Enterococci exceeding state standards and *Clostridium perfringens* ones indicative of non-point source sewage pollution. Positive hits for human *Bacteroides* only occurred at Puakō. $\delta^{15}\text{NO}_3^-$ were indicative of sewage pollution at Puakō, while values upslope and at adjacent resorts were indicative of soil and fertilizers. These findings confirm that sewage is largely entering the water table at Puakō. Dye was detected in front of all OSDS types, reached the shoreline within 5 h to 10 d, and each OSDS type had an example of dye reaching the shoreline in 1 d. FIB, $\delta^{15}\text{N}$ macroalgal, nutrient concentrations were also similar in front of all OSDS types. These results suggest that the underlying geology controls how fast sewage flows from the OSDS to the shoreline, not the system type. Our findings highlight the need for improved sewage treatment and collection at Puakō.

**ON-SITE WASTEWATER TREATMENT AND DISPOSAL
TECHNOLOGIES –
FUNCTION, DESIGN, OPERATION, AND MAINTENANCE**

**Roger W. Babcock, Ph.D.
University of Hawaii at Manoa
Department of Civil and Environmental Engineering**

BIOGRAPHY

Dr. Roger Babcock is a Professor of Civil & Environmental Engineering in the College of Engineering and the Water Resources Research Center at the University of Hawaii at Manoa. He obtained his Ph.D. in Civil Engineering from UCLA. Dr. Babcock worked for Carollo Engineers in the early 1990s and has been at the University of Hawaii since 1995. He is the CE Graduate Program Chair. Dr. Babcock conducts research on biological wastewater treatment, on-site wastewater treatment, water recycling, membrane bioreactors, bioremediation, and stormwater runoff management. Dr. Babcock also has Professional Engineering licenses in California and Hawaii, does consulting work for several Hawaii firms, serves on the Board of Certification of Wastewater Treatment Plant Operators, and is director of Hawaii's Statewide Wastewater Operator Training Center.

ABSTRACT

This presentation will describe on-site wastewater treatment technologies including septic tanks, aerobic treatment units, recirculating sand filters, disinfection units, and others. On-site disposal technology descriptions will include cesspools, absorption trenches/beds, elevated mounds, ET systems, and water recycling. The presentation will include designs, expected performance of these units, effects of site conditions, and operation and maintenance requirements.

DISCUSSION SESSION

HAWAII'S CESSPOOL STRATEGY – WHERE DO WE GO FROM HERE?

Funding and Implementing Cesspool Upgrades – “up to 2050”

- The Legislature has taken important actions to address Hawaii's cesspools, supported by DOH.
- Cesspools have significant impact on the quality of drinking water, general water quality, the health of our reefs, and the health of Hawaii's residents and visitors.
- Through federal regulation, the USEPA is already working with operators in the state to address large-capacity cesspools, and we must now focus on addressing smaller-scale domestic use of cesspools statewide.
- During Legislative session 2017, Act 125 was passed, requiring the replacement of all cesspools by 2050 and directing DOH to evaluate cesspools in the state, develop a prioritization method, and work with the Department of Taxation on possible funding options to reduce the financial burden on homeowners.
- The report identifies 14 areas in the state where an evaluation of data on hand indicates greatest need for action. As we gather more data in the future, the areas prioritized may change.
- During Legislative session 2018, Act 132 was passed to establish a Cesspool Conversion Working Group to develop a comprehensive plan for the conversion of all statewide cesspools by 2050.
- Act 132 identifies 14 tasks that need to be evaluated by the working group.
- Provides a \$1M appropriation to retain the services of a consultant to assist the work group with the evaluation of these 14 specific task items.

Tasks required under Act 132 related to financing of cesspool upgrades

- Develop a long-range, comprehensive plan for cesspool conversion statewide of all cesspools by 2050, to be known as the cesspool conversion plan.
- Examine financing issues and the feasibility of various mechanisms, including grants, loans, tax credits, fees, special assessment districts, requirements for conversion at point of sale, and any other appropriate mechanisms for accomplishing and funding cesspool conversion, or any combination of these mechanism.
- Consider owners' ability to pay for cesspool conversions, and, especially how assistance can be provided for lower-income homeowners.
- Consider the most cost-effective approach to cesspool conversion.

CONCURRENT SESSION B

GROUNDWATER MONITORING STATUS REPORT
Daniel Chang
Safe Drinking Water Branch, Hawaii Department of Health

BIOGRAPHY

Daniel Chang is an Environmental Health Specialist with the Hawaii Department of Health's Safe Drinking Water Branch. He has over 30 years of experience in hazardous waste, groundwater and drinking water quality and protection programs. Mr. Chang received his Bachelors degree from the University of Hawaii at Manoa majoring in Chemistry. His duties and responsibilities at the Safe Drinking Water Branch includes: oversight/supervision of the Monitoring & Analyses Section and the Groundwater Protection Program. He also provides guidance/assistance to the Wellhead/Source Water Assessment and Protection Program.

ABSTRACT

As part of the Hawaii Groundwater Protection Strategy, the Groundwater Protection Program must prepare a Groundwater Monitoring Status Report every four (4) years.

Goal 1: Monitor and assess groundwater quality.

- ▶ Objective 3: Every four years, generate a Groundwater Status Report which provides a review, analysis, and summary of groundwater monitoring data to understand contamination trends and sources of contamination. The Report shall include a list of proposed future monitoring of contaminants of concern with rationale and priorities based on severity of public health impacts.

This presentation will provide an overview of the history of groundwater monitoring, summarize current monitoring projects, and propose future monitoring of potential contaminants of concern.

IMPORTANCE OF WATERSHED PROTECTION TO GROUNDWATER

Katie Ersbak

Division of Forestry and Wildlife, Hawaii Department of Land and Natural Resources

BIOGRAPHY

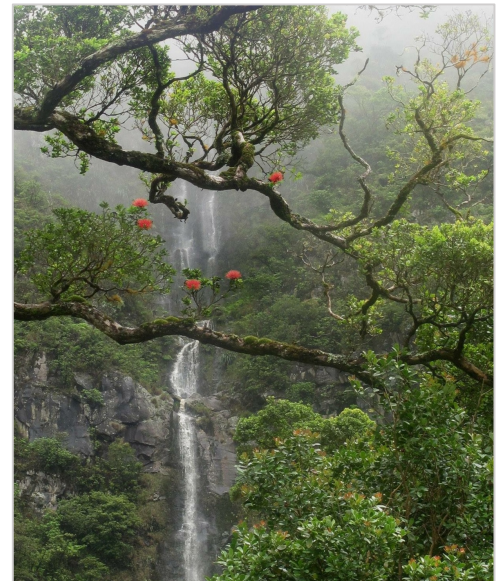
Katie Ersbak is a Watershed Planner with the State of Hawai'i, Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW). She has B.A. in Urban Studies and Planning from the University of California, San Diego and a Master's Degree in Urban and Regional Planning from the University of Hawai'i at Mānoa. Katie began her career at DLNR in 2011 with the Commission on Water Resource Management. Her experience working on fresh water issues helped set the stage for a position with DOFAW where she currently coordinates statewide protection efforts for Hawaii's native forests and mauka watersheds working closely with groups like the Watershed Partnerships. As the head of DOFAW's Watershed Partnerships Program, Katie administers funding to support the partnerships and other groups in their efforts to control ungulates, stop the spread of invasive weeds, build fences and engage with policy makers.

ABSTRACT

Hawaii's native forests absorb rain and cloud moisture across millions of acres - and are the source of Hawaii's fresh water. At the same time, they help reduce erosion that can impact water quality and damage coral reefs. For over a century, the public-private partnerships have managed mauka forests by preventing the advance of invasive plants, animals and disease. This presentation will discuss the approaches to mauka watershed management in Hawai'i and the important role of the State's Division of Forestry and Wildlife and Watershed Partnerships in helping safeguard fresh water resources.

CO-PRESENTER

Cheyenne Perry was raised under the blazing sun of Waianae on Oahu where he developed an appreciation for cool mountain waters and plants that were green. After some time in the military he moved to the Island of Hawaii to attend school at UH Hilo developing a background in marine science and conservation biology while making a home there, the forests of Mauna Kea beckoned. Today he is the Coordinator for the Mauna Kea Watershed Alliance, one of ten watershed partnerships statewide, helping to coordinate watershed management across partnership lands totaling 343,000 acres.



OVERVIEW

COMMITMENT AND GOALS

EXPECTED BENEFITS



**DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE**



DIVISION OF FORESTRY AND WILDLIFE
 1151 Punchbowl Street, Room 325 | Honolulu, HI 96813



DOFAW PROGRAM PRIORITIES

-  Water
-  Fire & Forest Health
-  Native Ecosystems
-  Forestry
-  Recreation

PARTNERS

NEED FOR WATERSHED PROTECTION



BUDGET

CONTACT PERSON

RAPID 'ŌHI'A DEATH RESPONSE



DEPARTMENT OF LAND
AND NATURAL RESOURCES

ROD infected forest.

'SUMMARY

Rapid 'Ōhi'a Death (ROD) is a fungal disease that has killed hundreds of thousands of native 'ōhi'a (*Metrosideros polymorpha*) trees and affected more than 135,000 acres of forest on Hawai'i island. While much of the affected area has only scattered dead trees, some areas have lost as much as 90% of healthy canopy trees. The expansion of ROD on Hawai'i island poses the single greatest threat to Hawai'i's main native tree species and watersheds, not just on Hawai'i Island, but throughout the state. DLNR is leading the multiagency response on Hawai'i Island, as well as carrying out early detection surveys on other islands.



Fences (green lines) appear to protect forests from ROD near Volcano, Hawai'i Island.

THREAT TO OUR WATERSHEDS

Our native 'ōhi'a forests are vital to aquifer recharge and help ensure an adequate supply of fresh water for drinking, agriculture, irrigation, and other uses. In addition to ROD monitoring and research, investments in watershed management and fencing projects are an important part of rapid response. Intact native forests have a much higher capacity to withstand impacts from ROD than unprotected areas. By investing money in watershed management and protection projects such as fencing, the State can ensure the perpetuation of healthy forests – more resilient to disease and able to continue providing clean, fresh water.


As shown on page 3 below, 'ōhi'a forests are the dominant vegetation across much of the island's important recharge areas. **In fact, more than 1/3 of recharge on Hawai'i Island is associated with 'ōhi'a forest.** Forests killed by ROD will be replaced by other vegetation, in many cases, invasive trees such as strawberry guava. Although we don't know how much recharge will be reduced by the conversion of 'ōhi'a forests to non-native vegetation, research shows that strawberry guava trees evaporate 27-53% more water than native forests, causing extensive water loss (Giambelluca et al., 2008). In East Hawai'i, non-native vegetation has already reduced estimated groundwater recharge by 85 million gallons a day (Engott, 2011). More research is needed to understand the hydrology of 'ōhi'a forests and quantify impacts of 'ōhi'a forest replacement on water recharge.

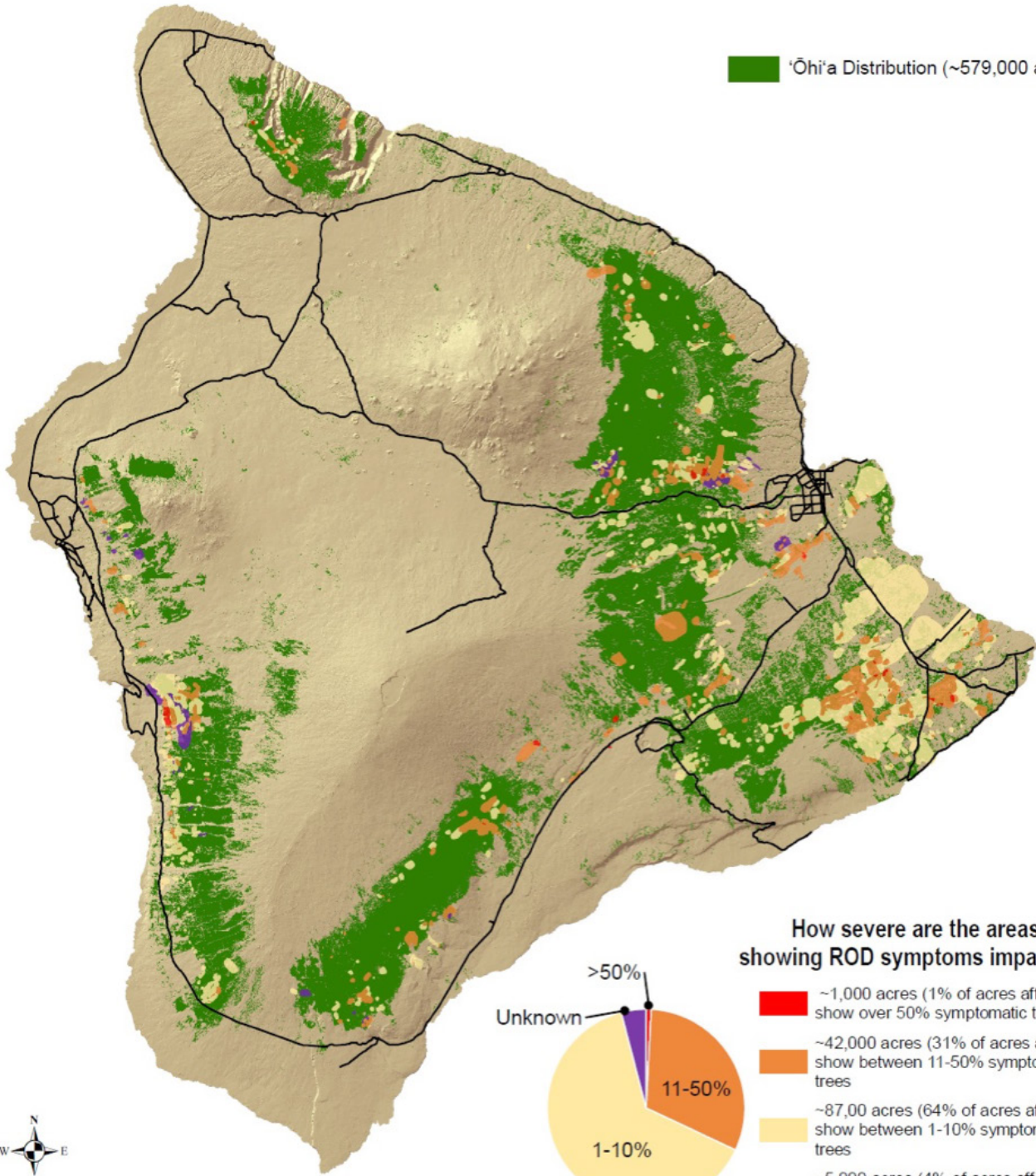


Rapid 'Ōhi'a Death Aerial Survey

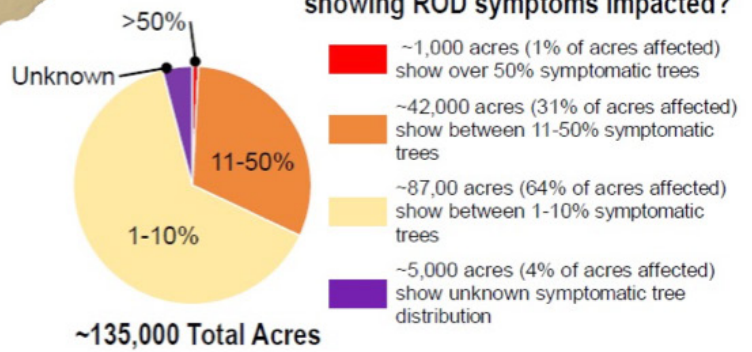
January 2016 to December 2017
Hawai'i Island



 'Ōhi'a Distribution (~579,000 acres)



How severe are the areas showing ROD symptoms impacted?



10 0 10 Miles



FOR_RODPERCENT_1_021218

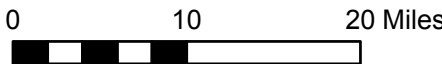
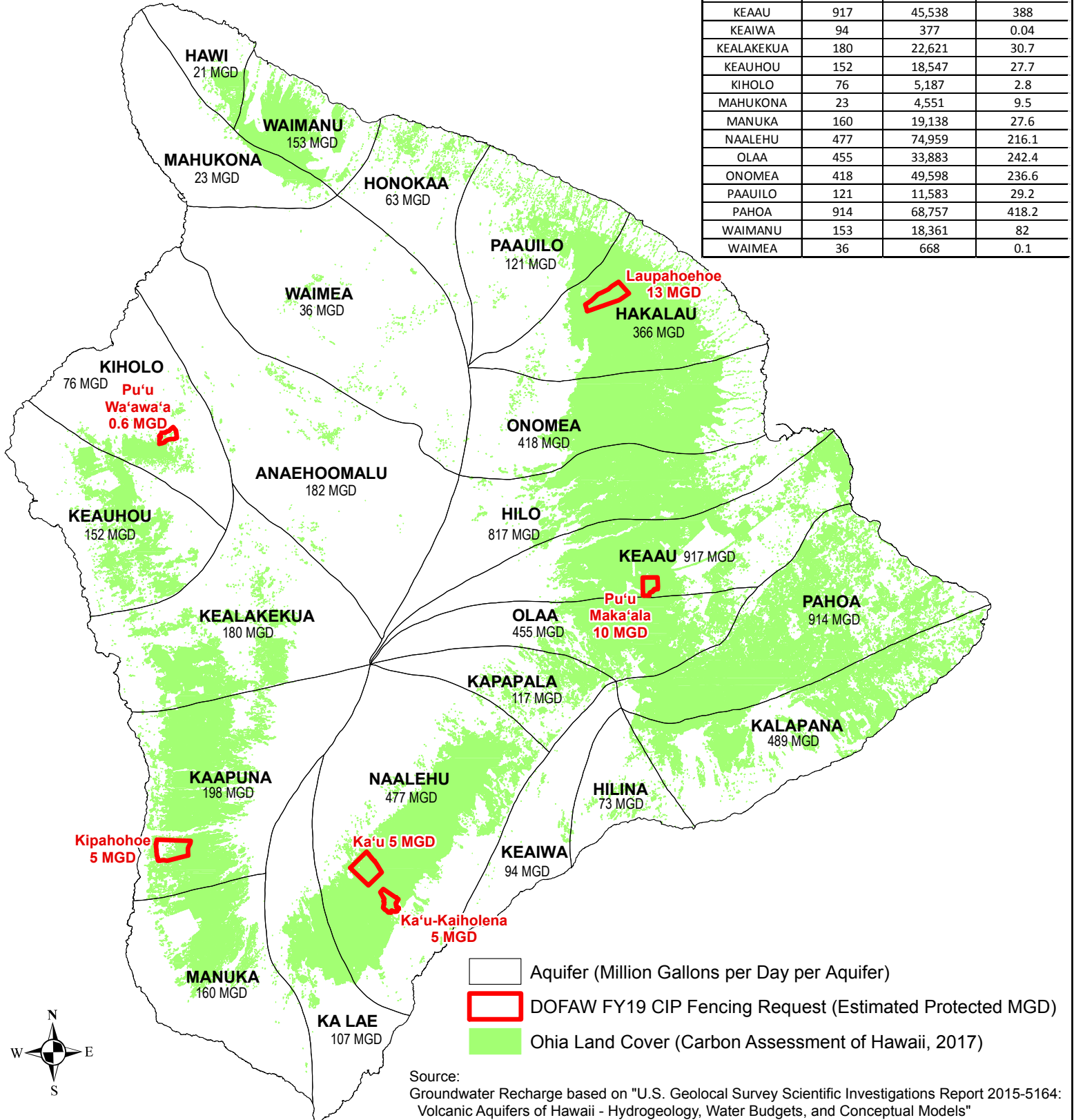


Rapid 'Ōhi'a Death and Groundwater Recharge

Hawaii Island



AQUIFER	Total MGD of Aquifer	Ohia Acres w/in Aquifer	Ohia MGD w/in Aquifer
ANAEHOOMALU	182	973	0.6
HAKALAU	366	53,986	229
HAWI	21	3,402	7
HILINA	73	1,137	2
HILO	817	42,955	424
HONOKAA	63	2,133	2
KA LAE	107	13,728	20
KAAPUNA	198	48,196	82
KALAPANA	489	34,661	124
KAPAPALA	117	5,884	14
KEAAU	917	45,538	388
KEAIWA	94	377	0.04
KEALAKEKUA	180	22,621	30.7
KEAUHOU	152	18,547	27.7
KIHOLO	76	5,187	2.8
MAHUKONA	23	4,551	9.5
MANUKA	160	19,138	27.6
NAALEHU	477	74,959	216.1
OLAA	455	33,883	242.4
ONOMEA	418	49,598	236.6
PAAUILO	121	11,583	29.2
PAHOA	914	68,757	418.2
WAIMANU	153	18,361	82
WAIMEA	36	668	0.1



- Aquifer (Million Gallons per Day per Aquifer)
- DOFAW FY19 CIP Fencing Request (Estimated Protected MGD)
- Ohia Land Cover (Carbon Assessment of Hawaii, 2017)

Source:
 Groundwater Recharge based on "U.S. Geological Survey Scientific Investigations Report 2015-5164: Volcanic Aquifers of Hawaii - Hydrogeology, Water Budgets, and Conceptual Models"
 Carbon Assessment of Hawaii Map (CAH_LandCover)
 USGS, 2017
 Aquifer, DLNR, 2014

PROTECTING HAWAII'S GROUNDWATER THROUGH COORDINATION and COLLABORATION WITH OTHER AGENCIES & OUTREACH and EDUCATION

The Hawaii Department of Health (DOH) Groundwater Protection Strategy was finalized in June 2017. The Safe Drinking Water Branch will present the three goals of the strategy and the related objectives.

Goal 1: Monitor and assess groundwater quality.

Goal 2: Identify and prioritize groundwater contaminations threats.

Goal 3: Mitigate priority contamination threats and prevent contamination.

Meeting Goal 3 of the Hawaii Groundwater Protection Strategy involves multiple DOH branches and offices: Safe Drinking Water Branch (GW106/DWSRF 15%), Wastewater Branch (CWSRF), Clean Water Branch (SW106), Solid & Hazardous Waste Branch (SHWB), Hazard Evaluation and Emergency Response Office (HEER), as well as other agencies, organizations and stakeholders.

Outreach and Education is also critical to protecting our groundwater resources. What message are we presenting and who do we need to present this to.

CONFERENCE EVALUATION

*2018 Joint Government Water Conference
"Protecting Hawaii's Groundwater"
Hilo Hawaiian Hotel, Hilo, Hawaii
August 15, 2018*

CONFERENCE EVALUATION FORM

1. How much experience do you have working in water/wastewater industry program areas?

___ 0-1 years	___ 2-5 years	___ 5-10 years	___ 10-20 years	___ 20+ years
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2. Which water industry area(s) do you work in? (Check all that are applicable)

___ Drinking Water ___ Wastewater ___ Water Quality

___ Water Resources ___ Water Protection ___ Watershed Management

___ Other (specify): _____

3. How would you rate the overall conference?

___ Excellent	___ Good	___ Adequate	___ Poor
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4. What did you like about the conference? _____

5. What did you dislike about the conference? _____

6. How do you rate the presentation of technical information (was it presented in an understandable and interesting manner)?

___ Excellent	___ Good	___ Adequate	___ Poor
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7. Did this conference meet your expectation?

___ Yes	___ No
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Comments: _____

8. Have you attended any of the previous Joint Government Water Conference(s)?

Yes No If Yes, would you rate this conference as: BETTER WORST

9. In the future, would you attend this type of conference again?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
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Comments: _____

10. In April 2015, the Hawaii Department of Health (DOH) implemented a Nutritional Wellness Policy that committed us to provide a safe, healthy, and productive environment for its employees and members of the public using its facilities or attending a DOH sponsored event. The adoption of this policy shall ensure that healthy choices are available whenever food and beverages are purchased with state or federal funds for DOH meetings, conferences, and other DOH sponsored events throughout the state. Do you think that the food and beverages served at today's conference provided you with a healthy choice or not.

YES NO If NOT (please explain) _____

11. Are there aspects of the conference that you believe should have greater (or less) emphasis?

12. Do you have any suggestions on how the conference could be improved?

13. Do you have any suggestions for topics for future conferences?

Thank you for attending the 2018 Joint Government Water Conference and for completing this evaluation form. Your comments will help us to better plan future conferences.

OPTIONAL:

Name: _____