



Water Quality Plan

FINAL 2019



HAWAII STATE
DEPARTMENT
OF HEALTH

Message from Director Bruce Anderson, Ph.D.



A vital part of Governor Ige's priorities for Hawai'i includes fostering public environmental stewardship, protecting and efficiently using our fresh water supply and providing state lands and waters for the public's use and enjoyment.

The Department of Health (DOH) takes its responsibility of working with the people of Hawai'i to protect and improve public health and the environment seriously. Through its programs and actions detailed in this Water Quality Plan, the Environmental Management Division makes progress toward attainment of the DOH Strategic Priority to improve and protect Hawai'i's water, air, and land. We continue to work with public and private partners in ensuring the health of our State's water quality.

Message from Deputy Director of Environmental Health Keith Kawaoka



The Environmental Management Division helps to ensure the quality of the water we drink and the ocean and streams we enjoy. Our work to protect Hawai'i's environmental health helps to define what it means to live in this island state renowned for its natural beauty. The Department has been delegated the authority from the U.S. Environmental Protection Agency to implement a number of federal environmental statutes, including the Safe Drinking Water Act and Clean Water Act. Together with our State, County and Federal partners, we ensure that ground and surface water in Hawai'i meets state and national standards. We also focus on issues that are unique to our islands. In this Water Quality Plan, we summarize the work we do and help point the way forward to finding even better ways to protect and improve Hawai'i's public health and the environment.

Governor Ige's:

Priorities: <https://governor.hawaii.gov/governor-david-iges-priorities-for-hawaii%CA%BBi/>

Action Plan: <http://governor.hawaii.gov/action-plan/environment/>

Acknowledgements

The 2019 State of Hawai`i, Department of Health, Water Quality Plan was prepared by the Environmental Health Administration's Safe Drinking Water Branch, with assistance from the Clean Water Branch, Wastewater Branch, State Laboratories Division, Solid & Hazardous Waste Branch, Hazard Evaluation & Emergency Response Office, Environmental Resources Office, Compliance Assistance Office, Environmental Information Manager, and the Office of Environmental Quality Control. The following are also recognized for their valuable contribution to this Plan:

Department of Land and Natural Resources (DLNR)

DLNR, Commission on Water Resource Management

Hawai`i State Department of Agriculture

County of Hawai`i

County of Kauai

County of Maui

City and County of Honolulu

Department of Business, Economic Development & Tourism, Office of Planning

Office of Hawaiian Affairs

Department of Hawaiian Home Lands

United States Environmental Protection Agency

United States Geological Survey

United States Army Corps of Engineers

United States Department of Defense

All photos courtesy of DOH staff, family and friends.

The development of the Water Quality Plan has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement I00939417 to State of Hawaii, Department of Health. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Acronyms

BMP	Best Management Practice
CAO	DOH Compliance Assistance Office
CCH	City and County of Honolulu
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
CNPCP	Coastal Nonpoint Pollution Control Program
CWA	Federal Clean Water Act
CWSRF	Clean Water State Revolving Fund (loans)
CWB	DOH Clean Water Branch
CWRM	State of Hawai'i Department of Land and Natural Resources, Commission on Water Resource Management
DLNR	State of Hawai'i Department of Land and Natural Resources
DOA	State of Hawai'i Department of Agriculture
DOH	State of Hawai'i Department of Health
DOT	State of Hawai'i Department of Transportation
DWSRF	Drinking Water State Revolving Fund
EHA	State of Hawai'i, Department of Health, Environmental Health Administration
EHASB	DOH State Laboratories Division's Environmental Health Analytical Services Branch
EMD	DOH Environmental Management Division
EPA	U.S. Environmental Protection Agency
EPO	DOH Environmental Planning Office
GWP	Groundwater Protection
ERO	DOH Environmental Resources Office
HAR	Hawai'i Administrative Rules
HEER	DOH Hazard Evaluation & Emergency Response (HEER Office)
HEPA	Hawai'i Environmental Policy Act
HRS	Hawai'i Revised Statutes
IWS	Individual Wastewater System
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
MRDL	Maximum Residual Disinfectant Level
MS4	Municipal Separate Storm Sewer System NPDES Permit
NGPC	Notice of General Permit Coverage
NOAA	National Oceanic and Atmospheric Association
NPDES	National Pollutant Discharge Elimination System
OEQC	Office of Environmental Quality Control
PCA	Potential Contaminating Activities
PRC	Polluted Runoff Control
QA/QC	Quality Assurance/Quality Control
RCRA	Federal Resource Conservation and Recovery Act
SDWA	Federal Safe Drinking Water Act
SDWB	DOH Safe Drinking Water Branch
SHWB	DOH Solid & Hazardous Waste Branch
SLD	DOH State Laboratories Division
SRF	State Revolving Fund
SWP	Source Water Protection
SWAP	Source Water Assessment & Protection (SWAP Program)
TMDL	Total Maximum Daily Load
TRI	Toxic Release Inventory
UIC	Underground Injection Control
UH	University of Hawai'i
UST	Underground Storage Tank
WBP	Watershed Based Plans
WQP	Water Quality Plan
WQS	Water Quality Standards
WWB	DOH Wastewater Branch

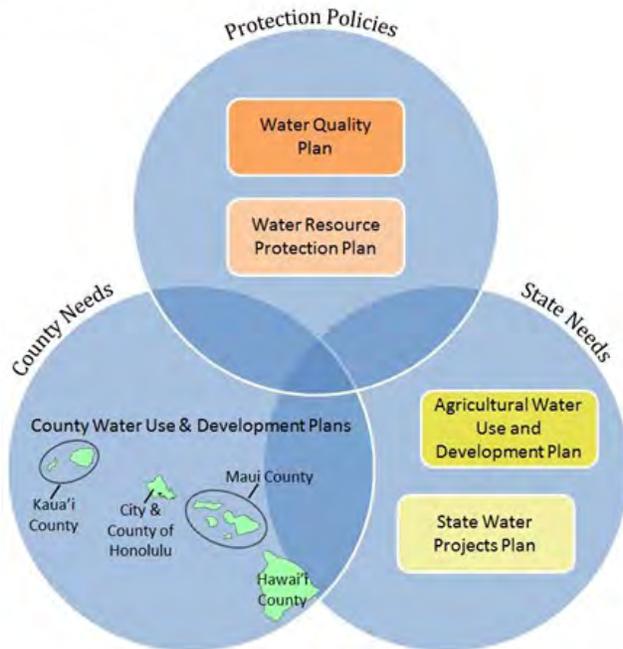
Executive Summary

The Water Quality Plan (WQP) is an integral component of the State of Hawai'i Water Plan, which establishes a framework for comprehensive water resources planning to address water quantity and quality issues in Hawai'i.

Hawai'i Water Plan consists of the:

- Water Quality Plan, prepared by the Hawai'i Department of Health (DOH);
- Water Resource Protection Plan, prepared by the Commission on Water Resource Management (CWRM);
- State Water Projects Plan, prepared by the Hawai'i Department of Land and Natural Resources (DLNR);
- Agricultural Water Use and Development Plan, prepared by the Hawai'i Department of Agriculture (HDOA); and the
- County Water Use and Development Plans, prepared by each County.

Hawai'i Water Plan Components:



Source: State of Hawaii Department of Health, Environmental Planning Office

The purpose of the Water Quality Plan is to ensure the protection of human health and sensitive ecological systems by outlining a path forward to protect, restore, and enhance the quality of waters in the State. It is intended to be a "living" plan that can be adjusted and adapted to provide information on water resources, and reflect the evolving regulations, standards, and management policies that affect water quality in Hawai'i. DOH's water programs—the Safe Drinking Water Branch, Clean Water Branch, and Wastewater Branch—are responsible for protecting the State's ground and surface water quality, and their ongoing work provides the core of the Plan.

The Water Quality Plan describes DOH's water protection goals, which include:

- Develop scientifically-based water quality standards that meet federal requirements and protect State waters;
- Develop Total Maximum Daily Loads (TMDLs) that improve water quality and serve an integral role in watershed-based planning;
- Educate the public and increase the amount of resources devoted to the control of nonpoint source water pollution;
- Regulate point source discharges through permitting and enforcement;
- Assess the susceptibility of public drinking water sources and protect them from contamination;
- Coordinate ground water protection activities across different jurisdictions and geographic areas to achieve comprehensive, resource-based ground water protection;
- Protect existing and potential sources of drinking water through the regulation of wastewater disposal through injection wells;
- Increase water reuse statewide; and
- Upgrade and replace cesspools.

The 2019 WQP describes DOH's priorities that align with the water protection goals. Three (3) current high priorities include devising a long-term strategy for the operation of the Red Hill Bulk Fuel Storage Facility, developing and implementing a long-term strategy for the upgrade and replacement of cesspools, and establishment of a Nonpoint Source Pollution Branch.

The **Safe Drinking Water Branch** (SDWB) is focusing on:

- Assessing all existing and proposed drinking water sources in the State;
- Developing and implementing the Wellhead Protection Financial Assistance Program (WHP-FAP);
- Finishing development and implementation of the Groundwater Protection Program; and
- Reducing the number of unpermitted underground injection well facilities.

The **Clean Water Branch** (CWB) is working to:

- Amend current water quality standards to clarify the overall framework of waterbody types, classes, protected uses, and evaluative criteria;
- Engage in new water quality monitoring initiatives to supply data for: 1) developing water quality monitoring methodologies and policies; 2) prioritizing watersheds; and (3) strategies to address identified pollutant sources;
- Collaborate with the Counties and State agencies to prioritize impaired watersheds for restoration efforts and support stakeholder stewardship of watershed resources; and
- Obtain federal approval of the Coastal Nonpoint Pollution Control Program Management Plan.

The **Wastewater Branch (WWB)** will:

- Support the implementation of recommendations provided in the Water Reuse Task Force Legislative Report to expand water reuse; and
- Continue to work with stakeholders to develop a long-range plan for cesspool conversions as required under Act 132 of 2018.

The WQP also describes ongoing activities under the Drinking Water State Revolving Fund (DWSRF) and the Clean Water State Revolving Fund (CWSRF). The DWSRF provides low interest loans to regulated drinking water systems for drinking water infrastructure improvement projects related to public health, including storage, treatment, source, and distribution. The CWSRF provides low interest loans to point source and nonpoint source water pollution control projects, including for the construction of publicly owned wastewater treatment works. The Funds are a vital source of support for building, maintaining, and improving public water infrastructure in Hawai'i.

In addition to the ongoing water program activities, the WQP also discusses the work of many other Branches and Offices within DOH that do not focus solely on water issues, but nonetheless make valuable contributions to protecting State water quality, including:

- The State Laboratories Division (SLD), which analyzes drinking and surface water samples for the CWB and SDWB;
- The Solid and Hazardous Waste Branch (SHWB), which regulates Underground Storage Tanks and landfills to protect ground water;
- The Hazard Evaluation and Emergency Response (HEER) Office, which responds to releases of toxic substances into water, and addresses human health concerns associated with potential contaminant exposures through drinking water supplies or local fish consumption. The HEER Office has conducted numerous studies with the help of CWB that monitor for pesticides and other chemicals in the State's waters;
- The Environmental Resources Office (ERO), which manages water-related grants and helps to administer the DWSRF and CWSRF, which support water infrastructure projects;
- The Compliance Assistance Office (CAO), which provides assistance to small businesses to ensure that their operations are consistent with environmental regulations, including those under state and federal water laws;
- The Environmental Information Manager (EIM), who develops information systems and oversees the organization and distribution of DOH's environmental data, including water permitting, monitoring, and enforcement data; and
- The Office of Environmental Quality Control (OEQC), which oversees the review and analysis of land use documents that have the potential to affect water quality.

DOH recognizes that protecting water quality requires coordination and cooperation amongst many different agencies and organizations and the plan seeks to address some of these coordination challenges, as well as challenges related to program funding and adapting to a changing climate. The WQP also details DOH's ongoing efforts and future plans to share information between programs within the Department, as well as its work to make data available to other agencies and the public.



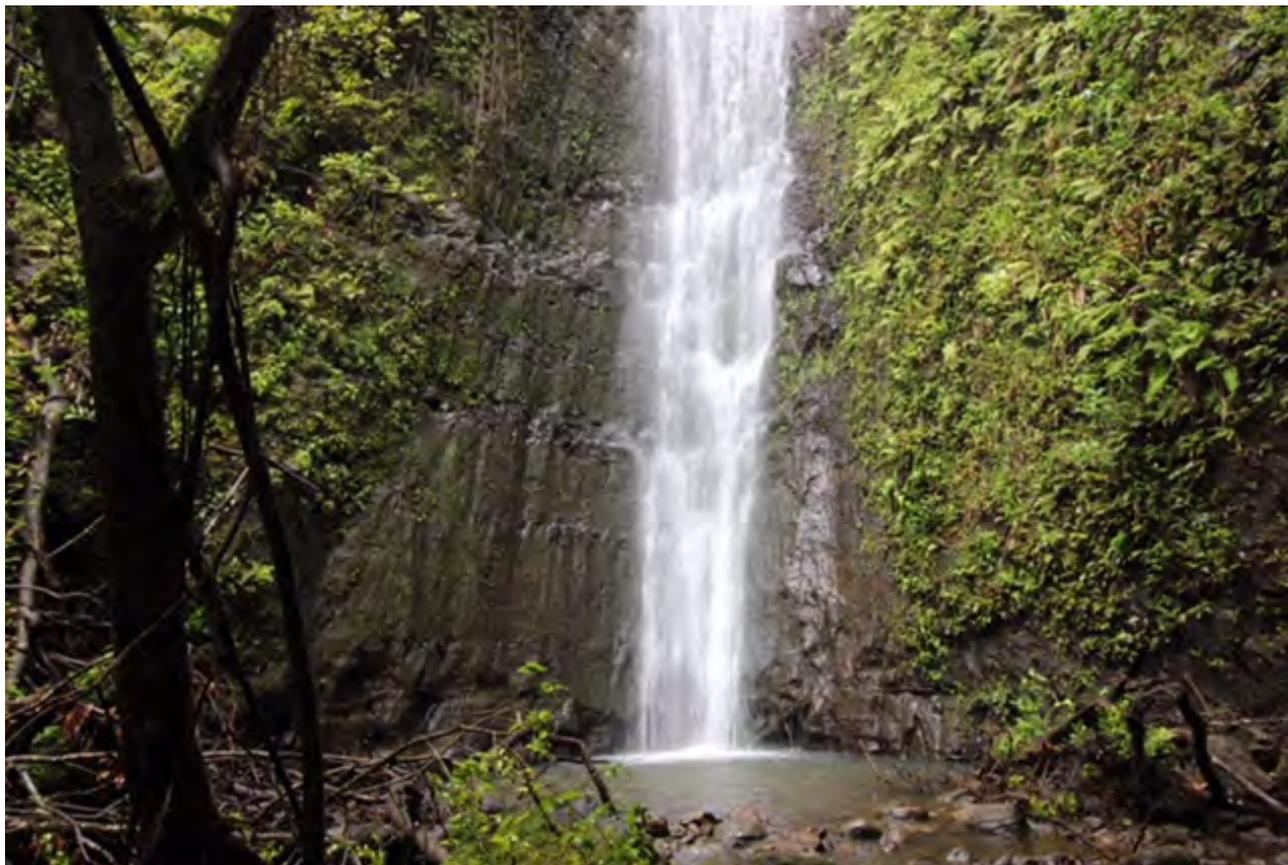
Contents

Acronyms	4
Executive Summary	5
1. State Water Code	13
2. Hawai`i Water Plan	13
2.1. Statewide Framework for the Hawai`i Water Plan.....	15
3. Purpose	16
4. Strategic Plans	17
4.1. State Strategic Plan	17
4.2. Hawai`i DOH Water Quality Plan	17
4.3. U.S. Environmental Protection Agency Strategic Plan	18
4.4. Hawai`i Water Conservation Plan	20
Section II: Water Programs.....	21
Surface Water Quality.....	22
1. Clean Water Branch (CWB)	22
1.1. Monitoring and Analysis Section	23
1.2. Polluted Runoff Control Program	34
1.3. Engineering Section	38
1.4. Environmental Indicators.....	42
2. Safe Drinking Water Branch (SDWB)	44
3. Wastewater Branch (WWB)	45
3.1. Water Reuse	46
3.2. Wastewater Treatment Plant Operation & Maintenance Compliance	48
Groundwater Quality	49
4. Safe Drinking Water Branch (SDWB)	49
4.1. Underground Injection Control Program	50
4.2. Source Water Assessment and Protection Program	52
4.3. Hawaii Groundwater Protection Strategy and Protection Program.....	57
4.4. Groundwater Contamination Viewer (Maps)	62
4.5. Drinking Water State Revolving Fund Program.....	64
4.6. Environmental Indicators.....	65
5. Wastewater Branch (WWB)	67
5.1. Upgrading and Eliminating Cesspools.....	67

5.2. Clean Water State Revolving Fund Program	72
6. Compliance and Enforcement	74
Challenges and New Initiatives	75
7. Intra-agency Coordination	75
8. Inter-agency Coordination	76
9. Funding Issues	76
10. Climate Change.....	77
Section III: Water Quality Support	78
1. Water Quality Supporting Activities.....	79
2. State Laboratories Division	80
2.1. Laboratory Testing	81
3. Solid and Hazardous Waste Branch.....	82
3.1. Underground Storage Tank Program.....	82
3.2. Hazardous Waste Section.....	87
3.3. Solid Waste Management Program.....	87
4. Hazard Evaluation and Emergency Response Office	89
4.1. Pesticides.....	89
5. Environmental Resources Office	90
5.1. Grants.....	90
5.2. State Revolving Fund Loans.....	90
6. Environmental Planning Office (EPO).....	92
7. Compliance Assistance Office	94
8. Environmental Information Manager.....	95
9. Office of Environmental Quality Control	99
Section IV: Literature Review	101
1. Introduction	102
2. Surface Water and Ground Water Systems in Hawai`i.....	102
3. Total Maximum Daily Loads.....	105
4. Cesspools	106
5. Water Reclamation.....	107
6. Climate Change and Its Effect on Water Resources	108
7. Main Causes of Water Pollution in Hawai`i	110
8. What Can You Do to Help?.....	112
Section V: Relevant Statutes and Rules	114

1. Introduction	115
2. Federal Statutes	115
3. Clean Water Act	115
4. Safe Drinking Water Act	116
5. State Statutes	117
6. Hawai`i Administrative Rules.....	118
7. Traditional and Customary Rights	118
Section VI: Information Sources.....	119
1. General	120
1.1. Statewide	120
1.2. Department of Health.....	120
1.3. Environmental Health Administration:.....	120
2. DOH Water Programs	120
2.1. Clean Water Branch (CWB)	120
2.2. Wastewater Branch (WWB)	120
2.3. Safe Drinking Water Branch (SDWB)	121
3. Supporting Division, Branches and Offices	121
3.1. State Laboratories Division (SLD)	121
3.2. Solid and Hazardous Waste Branch (SHWB)	121
3.3. Environmental Planning Office (EPO)	121
3.4. Compliance Assistance Office (CAO).....	121
3.5. Environmental Information Manager (EIM).....	121
3.6. Office of Environmental Quality Control (OEQC)	121
4. Others	121
4.1. Commission on Water Resource Management (CWRM)	121
4.2. Department of Land and Natural Resources (DLNR)	122
4.3. Department of Agriculture (DOA).....	122
4.4. Department of Business, Economic Development, and Tourism	122
4.5. U.S. EPA.....	122
4.6. Counties:	122
5. DOH Water Program Organizational Chart.....	123
6. Water Quality Standards Maps.....	126

Section I: Background



1. State Water Code

The State Water Code, Chapter 174C, Hawai`i Revised Statutes (HRS), sets forth the requirements for the Hawai`i Water Plan. The Water Code tasks CWRM, in coordination with the Counties and other state agencies, with “formulat[ing] an integrated and coordinated program for the protection, conservation, and management of waters in each county . . .” HRS § 174C-31(d)(5). The responsible agencies must look at, among other things, “the existing water resources of the State and the means and methods of conserving and augmenting such water resources,” “existing and contemplated needs and uses of water . . . and their effect on the environment, procreation of fish and wildlife, and water quality,” and the “quantity and quality of water needed for existing and contemplated uses.”

The State Water Code is available at:

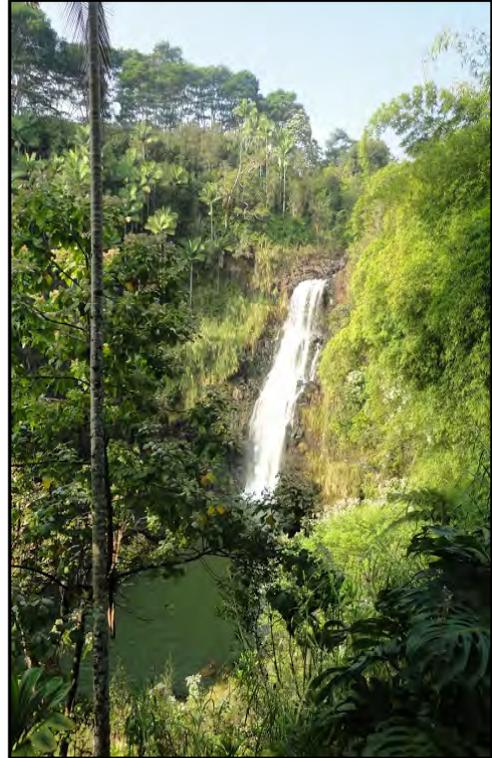
<http://files.hawaii.gov/dlnr/cwrm/regulations/Code174C.pdf>

2. Hawai`i Water Plan

The Hawai`i Water Plan serves as a guide to address the problems of supply and conservation of water in Hawai`i, consistent with the water resources policies expressed in the Water Code (HRS § 174C-2), and the requirements above.

The Hawai`i Water Plan consists of five parts:

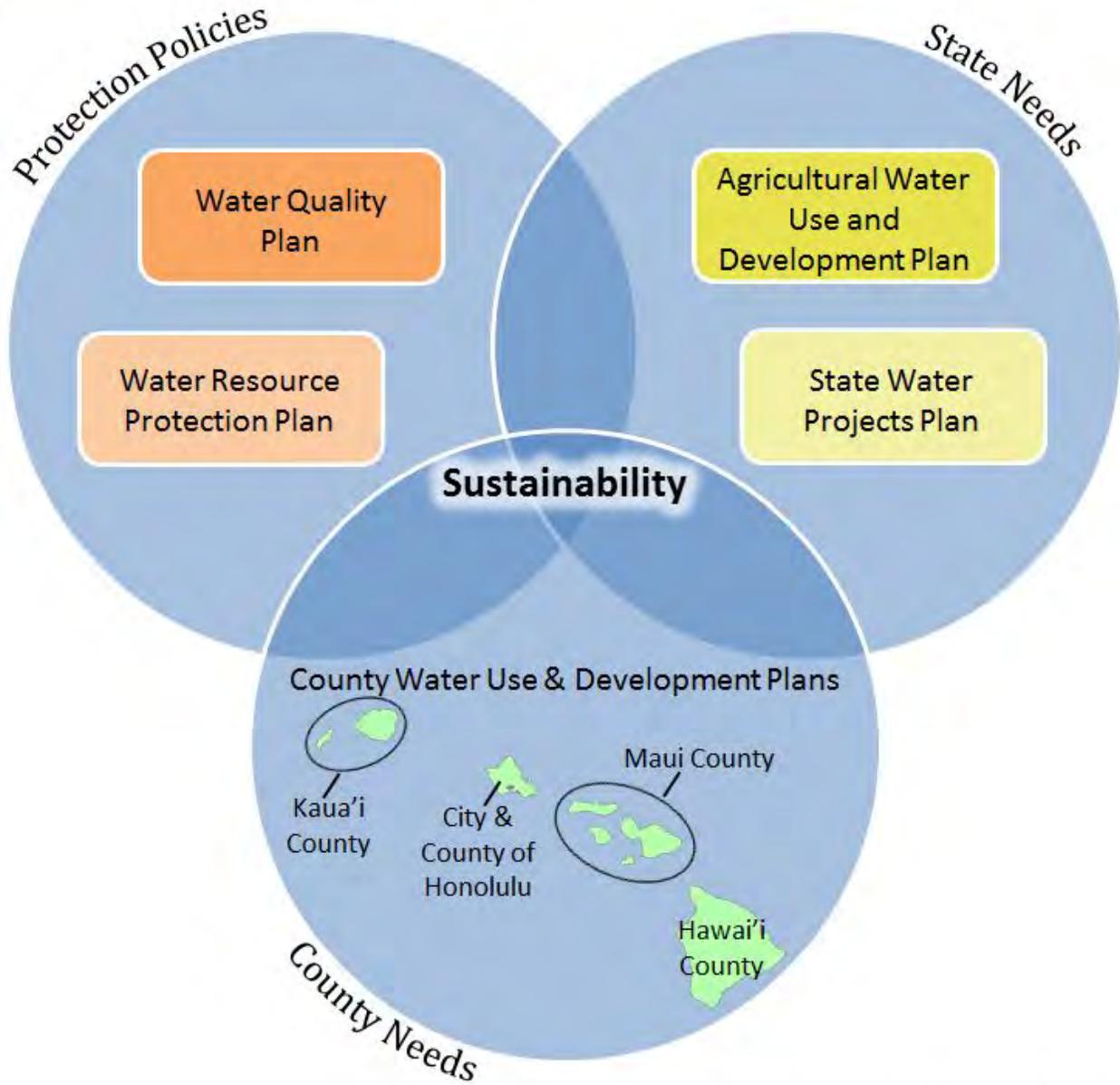
1. The Water Resource Protection Plan (WRPP) prepared by CWRM;
2. The Water Use and Development Plan (WUDP) prepared by each separate county;
3. The State Water Projects Plan prepared by DLNR’s Engineering Division;
4. The Water Quality Plan prepared by the Department of Health (DOH); and
5. The Agricultural Water Use and Development Plan prepared by the Department of Agriculture (DOA).



In 2000, to help clarify how various components of the Hawai`i Water Plan fit together, the CWRM created a statewide framework for updating the Hawai`i Water Plan (“the Framework”). The Framework was intended to provide direction to each of the agencies charged with developing a component of the larger Hawai`i Water Plan. The Figure below illustrates the relationship between various components of the Hawai`i Water Plan. In 2013, the WRPP update began to incorporate new information, since the 2008 plan, including emerging issues such as climate change. In early 2014 DOH began updating the State Water Quality Plan. As of March 2019, CWRM is holding public hearings and accepting written testimony on proposed modifications to the WRPP.

For more information, please see: <http://dlnr.hawaii.gov/cwrm/planning/hiwaterplan/wrpp/>

Hawaii Water Plan Components:



Source: State of Hawaii Department of Health, Environmental Planning Office

2.1. Statewide Framework for the Hawai`i Water Plan

The Statewide Framework for Updating the Hawai`i Water Plan (“the Framework”) was created to provide guidance to “address current complexities associated with planning, regulation, and management of our water resources.” The Framework identified the purpose of the WQP as “to protect the public health and sensitive ecological systems by preserving, protecting, and restoring an enhancing the quality of ground and surface waters throughout the State of Hawai`i.”

The Framework seeks to:

- Achieve integration of land use and water planning efforts;
- Recommend guidelines for the Hawai`i Water Plan update so that the plan and its component parts are useful;
- Better define roles and responsibilities of all state and county agencies with respect to the development and updating of Hawai`i Water Plan components;
- Facilitate permitting and identify potential critical resource areas where increased monitoring or baseline data-gathering should proceed; and
- Outline an Implementation Plan for near-term and long-term actions.

The Framework’s discussion of the WQP places particular emphasis on DOH’s Safe Drinking Water Branch (SDWB) Source Water Assessment and Protection (SWAP) Program, discussed in Section II, 3.1.2, because of its importance in developing a comprehensive, statewide drinking water protection program.

The Framework also focuses on the importance of the WQP for developing effective linkages between inter-agency programs, including:

- Establishment of more effective inter-agency coordination and communication;
- Consolidation of agency review and permitting requirements; and
- Maximizing efficient use of agency time, staff, and program resources.

The goal is ultimately for the WQP to lay the groundwork for continual program updates and status reports, coordination of data collection and monitoring efforts, development of common databases and assurance of data consistency, establishment of a protocol for more effective data sharing, and identification of relationships between regulatory and non-regulatory program efforts among agencies.

DOH’s environmental programs have made significant strides towards establishing common databases, data consistency, data sharing, and coordination of data collection and monitoring efforts within the Department (see discussion of the Environmental Information Manager in Section III, 9.).

In the future, DOH will work towards coordinating data collection, organization, and dissemination between and among agencies to improve water quality in Hawai`i. When DOH has a finished draft of the WQP, it will be presented to other government agencies, organizations, and the public to obtain their input.

For more information, please visit: <http://dlnr.hawaii.gov/cwrm/planning/hiwaterplan/framework/>

3. Purpose

The State Water Code tasks DOH with creating the WQP, a complementary plan to CWRM's Water Resource Protection Plan, that will "formulate an integrated coordinated program for the protection, conservation, and management of the waters in each county based on CWRM's preliminary studies." As a part of the Hawai'i Water Plan, the WQP shall provide:

- Federal/State/County goals, objectives, and policies related to water quality;
- Water quality criteria for designation of water management areas;
- Groundwater and Surface water quality standards, monitoring requirements and enforcement provisions; and
- Water quality management programs and recommended strategies.

DOH is required to "consult with and carefully evaluate the recommendations of concerned federal, state, and local agencies, particularly county water supply agencies," as it drafts the Water Quality Plan, and it is required to periodically review and revise the plan. HRS § 174C-68(c).

The purpose of the Water Quality Plan is to provide information on DOH's ongoing water quality work across many of its different programs, as well as lay out the direction its taking in the future by setting goals and priority action items. The plan also examines and discusses potential solutions for the water quality management challenges that DOH faces, including improving intra- and inter-agency coordination, dealing with funding issues, and adapting to climate change.

DOH hopes that providing discussion of its ongoing and future work will improve opportunities for inter-agency coordination by identifying where various programs intersect and where resources can be more efficiently allocated. This section describes the DOH water programs' ongoing work and future plans to protect and improve the State's water quality. Section III discusses how other DOH divisions, branches and offices play a role in protecting water quality and supporting the water programs.



4. Strategic Plans

The Water Quality Plan strives to be consistent with, and obtains guidance from, state and federal strategic plans.

4.1. State Strategic Plan

Governor Ige's State Plan for "Engineering Hawai'i's Future" illustrates the State's commitment to the people of Hawai'i.

The Ige Administration supports a healthy environment and responsible economic growth through comprehensive planning that engages environmental interests, development interests, and other community interests. The State Plan's section on the environment clearly describes the importance of clean water including the statement "provide funding to protect Hawai'i's watersheds to ensure a continuous supply of clean drinking water for all."

DOH recognizes the ongoing need to collaborate with other agencies and partners to achieve beneficial results for the State's water quality. This Water Quality Plan details DOH's ongoing work and future plans to provide a means to identify links that will allow for better coordination with work at other agencies.

Governor Ige's State Plan is available at: <https://governor.hawaii.gov/action-plan/>

4.2. Hawai'i DOH Water Quality Plan

From 2019-2024, DOH will implement the goals and actions detailed in this Water Quality Plan. The plan focuses on both ground and surface water quality, each of which incorporates various programs listed below:

Surface Water Quality:

1. Water Quality Standards
2. Monitoring Program
3. Polluted Runoff Control
4. TMDLs
5. National Pollutant Discharge Elimination System (NPDES) Program
6. Water Quality Certifications
7. Revising Recycled Water Guidelines
8. Clean Water State Revolving Loan Fund

Ground Water Quality:

1. Source Water Assessment and Protection (SWAP) Program
2. Comprehensive State Groundwater Protection Program
3. Underground Injection Control
4. Upgrading and Eliminating Cesspools
5. Safe Drinking Water State Revolving Loan Fund

4.3. U.S. Environmental Protection Agency Strategic Plan

The U.S. Environmental Protection Agency (EPA), has 10 regional offices around the country. Hawai`i is located within EPA's Region 9, which also includes California, Nevada, Arizona, Guam, American Samoa, and the Northern Mariana Islands.

EPA develops a strategic plan every five (5) years that sets the course for agency environmental policies. The current EPA Strategic Plan titled *Working Together* covers from 2018-2022. DOH strives to keep its goals consistent with the goals in EPA's Strategic Plan.

For more information, please visit: <https://www.epa.gov/sites/production/files/2018-02/documents/fy-2018-2022-epa-strategic-plan.pdf>



EPA's 2018-2022 Strategic Plan emphasizes the EPA's "Back-to-Basics" agenda. This agenda has three (3) overarching goals that aim to create a sense of shared accountability between states, local communities, and the federal government to achieve positive environmental results. Along with faithfully following the rule of law, improving operation processes is a self-acknowledged, key component in advancing EPA's own mission.¹

¹ EPA (2018) – Working Together FY 2018-2022 U.S. EPA Strategic Plan

EPA's three (3) overarching goals are as follows:

Goal 1: "Core Mission" - Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.

Goal 2: "Cooperative Federalism" - Rebalance the power between Washington and the states to create tangible environmental results for the American people.

Goal 3: "Rule of Law and Process" - Administer the law as Congress intended, to refocus the Agency on its statutory obligations under the law.

EPA's strategies for achieving these goals include 1) investment in water infrastructure, 2) sustaining the quality of water resources, and 3) strengthening the implementation of SDWA. Supporting the efforts to modernize the outdated drinking water, wastewater, and stormwater infrastructure is EPA's top priority. Particularly, EPA is promoting construction of infrastructure in tribal and small, rural, and disadvantaged communities through its State Revolving Fund (SRF) and Water Infrastructure Finance and Innovation Act (WIFIA) programs.

EPA intends to help secure water systems through various means. Such means include providing financial assistance; strengthening compliance by enhancing technical, managerial, and financial capabilities of the water systems; protecting and restoring sources of drinking water; addressing known and emerging contaminants; providing guidance, training, and information to different levels of governance; implementing EPA's national security responsibilities for the water sector; providing safe injection of fluids underground for storage and disposal; and enhancing recovery of oil, gas, and minerals.

EPA has outlined three (3) national strategic measures, or objectives, to achieve these goals:

SM-2: By September 30, 2022, reduce the number of community water systems out of compliance with health-based standards to 2,700.

SM-3: By September 30, 2022, increase the \$40 billion the non-federal dollars leveraged by EPA water infrastructure finance programs (CWSRF, DWSRF, and WIFIA).

SM-4: By September 30, 2022, reduce the number of square miles of watershed with surface water not meeting standards by 37,000 square miles.

EPA states "we will modernize and update aging drinking water, wastewater, and stormwater infrastructure which the American public depends on....[by] continuing to leverage the State Revolving Funds (SRFs) and Water Infrastructure Finance and Innovation Act (WIFIA) to assist states, tribes, municipalities and private entities to finance high-priority infrastructure investments."

4.4. Hawai`i Water Conservation Plan

The Hawai`i Water Conservation Plan was developed through a partnership between the U.S. Army Corps of Engineers and DLNR's CWRM with the help of the Water Conservation Advisory Group (WCAG). Finalized in February 2013, the purpose of this plan is to identify and implement water use and deliver efficiency measures to conserve the fresh water resources of the state.

As an island state, Hawai`i has a limited access to natural fresh water supplies. Thus, water supply efficiency is required due to competition, an increasing population, pressures related to development, the growing awareness of environmental water needs, and the impact of global climate change.

To implement this plan, CWRM describes a 10-year planning horizon. CWRM's approach was to initially provide technical assistance and incentives to water conservation programs where possible, and, to later establish or implement regulations, policies, and programs aimed at conserving and protecting water resources. CWRM looks to continue to expand its role in coordinating new and existing water conservation programs, improving water use data collection capacity, exploring policy actions, and pursuing funding opportunities to increase program effectiveness.

The objectives of the Hawai`i Water Conservation Plan include:

- Develop a coordinated statewide water conservation planning strategy and policy framework;
- Establish a statewide water conservation program to implement the planning strategy and policy framework; and
- Work collaboratively with stakeholders to achieve our water conservation objectives.

A near-term action identified in the plan that is currently being implemented is training on conducting annual water audits, as required under Act 169, SLH 2016. These audits work to help educate both the private and municipal sectors about water loss, which will hopefully lead to improved water conservation within the utility distribution systems. An irrigation metering demonstration project has also been created in order to improve surface water diversion measurements and reporting using simpler, less expensive methods². DOH recognizes the importance of these programs to water conservation, and has helped to fund some of these projects.

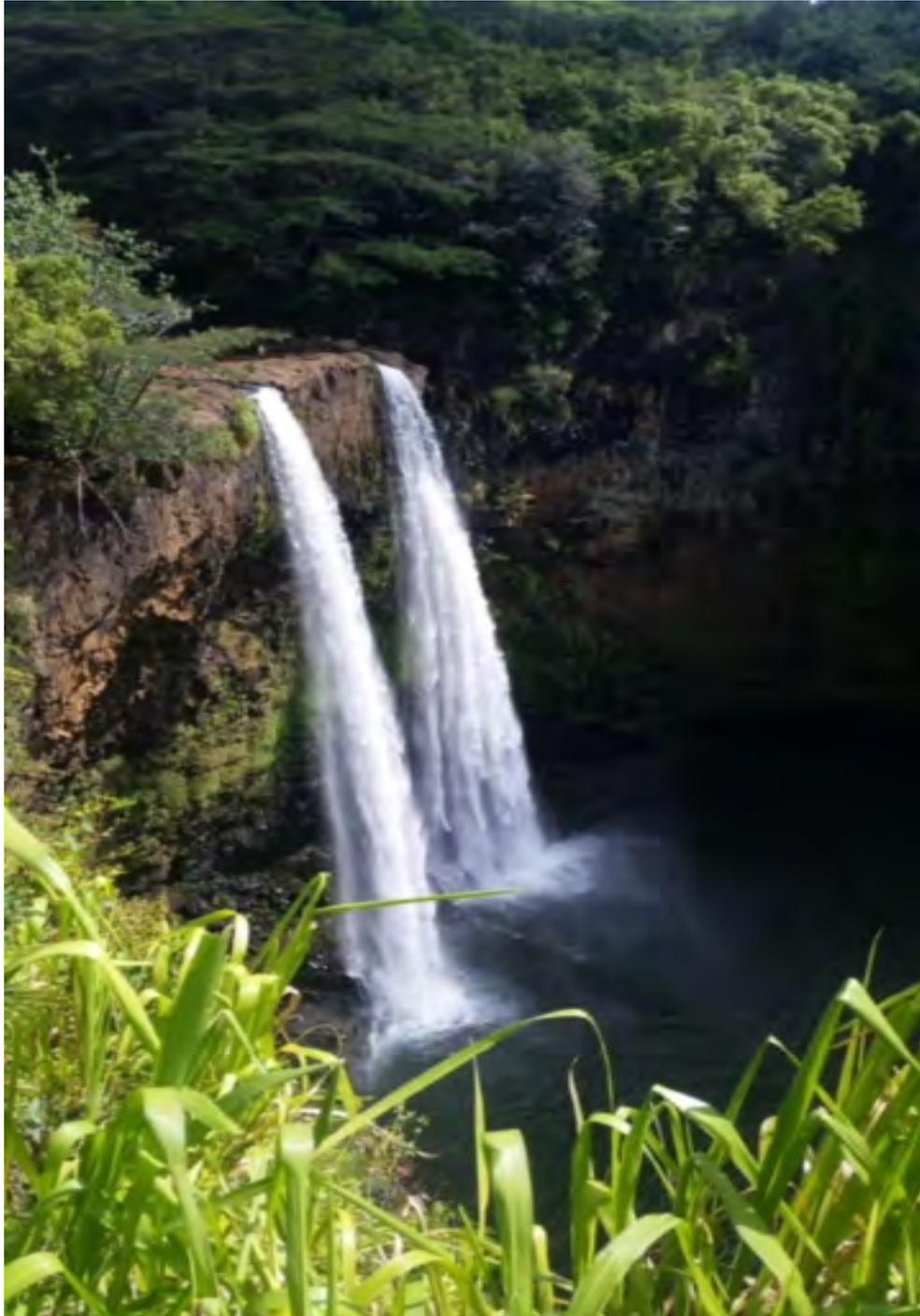
Future initiatives include further educating the public about water conservation and leak detection, incentivize efficiency by publishing water use data, and to create standards for water loss audits. Another future initiative is to create incentives for those who become a part of the water audit program, since there are currently no penalties for both private and public utilities who do not join. The hope is that they can be given either credits or priority loans for water projects as an incentive to those that join the program. Act 169 requires county water systems to submit annual water audits beginning in July 2018, and certain non-county water utilities in July 2020.

For more information on the water audit program, please visit: <http://www.hawaiewaterloss.org/>

For more information on the Hawai`i Water Conservation Plan, please visit: <http://files.hawaii.gov/dlnr/cwrm/planning/hwcp2013.pdf>

² CWRM and Army Corp of Engineers (2013) – Hawaii Water Conservation Plan

Section II: Water Programs



Surface Water Quality

DOH's Clean Water Branch (CWB), Safe Drinking Water Branch (SDWB), and Wastewater Branch (WWB) all play integral roles in protecting surface water quality in Hawai'i. While surface water provides only 5% of the State's drinking water supply, ground water and surface water quality are inextricably linked. Moreover, the quality of surface water provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allows recreational activities in and on the water. This section describes DOH's surface water quality work and sets forth its plans for the future.

1. Clean Water Branch (CWB)

DOH's CWB is the primary administrative office providing oversight on the State's surface water quality. The CWB implements the Surface Water Quality Program (SWQP). The program's core functions are to:

- Protect, restore, maintain, and improve surface water quality;
- Conduct monitoring and assessment of beaches, marine, and inland waters;
- Establish pollution reduction targets;
- Update the water quality standards;
- Issue NPDES permits and Water Quality Certifications;
- Enforce on illegal discharges; and
- Implement programs to prevent or improve areas affected by nonpoint source pollution.

The CWB works in partnership with the EPA to administer the SWQP and has been specifically delegated authority to implement the NPDES program. Most of this work is federally-funded, thus, must meet federal Clean Water Act (CWA) requirements. Program efforts focus on a watershed-based approach to water quality management.

For more information, please visit: <http://health.hawaii.gov/cwb/>



1.1. Monitoring and Analysis Section

The Monitoring Section is an administrative section under the CWB. The Monitoring and Analysis Section is responsible for all activities associated with statewide surface water quality monitoring, analyzing water quality data to identify impaired waterbodies, developing plans to restore impaired waterbodies through TMDLs, and developing and revising state water quality standards. These activities require the collection and evaluation of scientific data from statewide water quality monitoring activities. Major activities of the section include the administration of the Hawai'i Beach Monitoring and Public Notification Program and the State of Hawai'i Water Quality Monitoring and Assessment Report.

Program Goals

The Monitoring Section's long-term goal is to maintain surface waters for the health and safety of people, plants, and animals by:

- Identifying sources of surface water pollution through area surveillance, routine water quality monitoring, and analysis of available statewide water quality data;
- Protecting Hawai'i's aquatic and marine resources;
- Protecting Hawai'i's Water Recreational Community; and
- Generating, collecting, and evaluating data for TMDL, Impaired Waters Report, and Water Quality Standards revision.



1.1.1. Hawai`i Beach Monitoring Program

Beach monitoring is the mainstay of the CWB Monitoring Program. The CWB receives annual funding from the EPA to support the federal Beaches Environmental And Coastal Health (BEACH) Act and will continue to administer the program for as long as resources allow. The long-term goal of the program is to reduce the risk of illness to users of Hawai`i's beaches. To achieve this goal, the CWB provides prompt public notification and risk communication to users of Hawai`i's beaches. In addition, the CWB is required to prepare annual reports to the EPA by compiling monitoring results, notifications efforts and actions taken. In addition, the CWB submits monitoring data to EPA's Water Quality Exchange (WQX) on a monthly basis.

As part of the beach monitoring program, CWB performs routine monitoring of Hawai`i's beaches which encompass sample collection, field measurements, and field observations. Water quality samples are analyzed for the indicator bacteria, enterococci, which may indicate the presence of pathogens. If there is an exceedance in the level of enterococci above the specified threshold, the CWB notifies the public of these exceedances and provides specific actions that they should take to protect their health.

The CWB has developed a beach program decision rule to help guide actions necessary to provide appropriate notification to the public when beach waters do not meet water quality standards. The decision rule specifies a "Beach Action Value" (BAV), the level of indicator bacteria at which the CWB will take appropriate beach management actions. The CWB uses the EPA-recommended enterococci criteria of 130 cfu/100mL as the BAV.

If the BAV is not exceeded, i.e. is less than or equal to 130 enterococci/100 mL during routine monitoring, then no action is required and routine monitoring resumes. If the BAV is exceeded, the CWB will issue an advisory for the affected beach to notify the public of the exceedance. Beach advisories may be viewed at: <https://eha-cloud.doh.hawaii.gov/cwb/#!/landing>. The CWB also issues email advisories to all subscribers. The public may subscribe to receive email advisories at the web address above. Advisories in response to exceedances of the BAV remain in place until follow-up sampling results indicate that the BAV is no longer exceeded.

Public Notification Process

The notification process begins when the laboratory enters qualified results in the Water Quality Data System. If the threshold level is exceeded, an automated notice is generated and sent to CWB. Once the notice has been received, CWB issues the advisories and posts signs on the affected beaches as necessary. Brown water advisories are issued when the National Weather Service issues a flash flood advisory and surface water runoff into the ocean is verified by CWB staff or a reliable source.

Current Program Status

The Beaches Environmental Assessment and Coastal Health (BEACH) Act became an amendment to the CWA in 2000. This act helped to "establish national standard criteria for coastal recreational water monitoring and public notification of possible pollution at beaches." Since Hawai`i is a coastal state, it receives an annual EPA BEACH Act grant to implement the BEACH program, which totaled \$313,000 in the fiscal year beginning Oct. 1, 2018. Under the BEACH Act, the CWB is required to establish a beach monitoring program and to notify the public whenever indicator bacteria levels exceed safe levels. These beach advisories report temporary increases in indicator bacteria levels and brown water

advisories for beaches (most often following rain events). This advisory system is also used for non-BEACH Act purposes to notify the public of sewage spills entering state waters.

As of November 2017, the CWB has made some major upgrades to their website. Information on beach advisories is now more easily accessible for the public, as the new website offers:

- A list that briefly summarizes all active advisories;
- A map of the Hawaiian Islands that includes pins which allow viewers to review details of specific advisories;
- View by types of warnings or specific beach locations; and
- Automated email notifications to all subscribers when an advisory is closed and no longer active.

Information will also be more accessible to those who are interested in conducting research on specific beaches. The list of advisories can now be sorted by island or by its open or closed status. Users may view a list or download a table of all the current and past advisories into an Excel file.

Water quality data may be viewed at:

<http://cwb.doh.hawaii.gov/CleanWaterBranch/WaterQualityData/default.aspx>

For more information, please visit: <https://health.hawaii.gov/cwb/files/2017/05/Hawaii-Beach-Monitoring-Program-170508.pdf>



Table 1. Water Quality at Selected Public Beaches: 2013 through 2017³⁴

Island and beach	Number of samples					Enterococci density*				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Hawai'i	995	700				12.6	14.3			
Hilo Shoreline	263	253	168	179	186	15.1	16.4	17.4	16.0	6.7
Hilo Bay (Canoe Beach)	28	28	22	28	27	12.3	17.4	17.0	11.7	5.1
Honolii Cove (Ocean)	28	28	22	29	27	15.5	25.6	36.7	20.1	8.0
Kona Shoreline	732	447	519	437	245	12.6	13.2	13.7	10.5	4.7
Anaehoomalu Bay	85	53	62	56	32	10.8	11.5	12.4	8.4	4.0
Kahaluu Beach Park	85	54	61	55	31	12.3	17.8	18.1	17.2	7.7
Spencer Beach Park	18	8	12	6	5	19.6	22.8	23.2	15.3	5.2
Maui	1,062	790				12.3	12.4			
Hukilau Hotel Shoreline	83	66	88	75	45	12.1	15.5	14.1	12.5	3.1
Kamaole Beach #1	91	69	86	75	49	11.8	10.7	10.9	9.4	3.0
Kihei (south)	90	70	84	75	44	12.6	11.4	11.5	10.1	4.1
Spreckelsville Beach	80	67	89	75	43	11.4	11.0	11.7	10.3	3.0
Wailea Beach	81	65	85	75	49	10.4	10.2	10.5	9.3	3.0
Oahu	185	917				11.9	12.0			
Ala Moana Park (center)	20	53	48	52	35	10.7	12.5	13.4	9.2	3.3
Hanauma Bay	9	44	41	47	33	11.7	10.2	11.2	10.8	3.8
Kailua Beach Park	9	44	41	52	36	12.7	11.5	12.7	8.6	3.6
Kuhio Beach	19	52	49	54	36	15.9	16.7	16.8	10.1	7.9
Makaha Beach	na	28	29	52	27	na	10.0	10.0	6.8	3.5
Sunset Beach	na	29	31	51	23	na	15.3	10.0	9.2	3.1
Waimea Beach	na	44	31	45	17	na	11.9	14.0	9.8	2.5
Kauai	814	776				16.9	17.7			
Hanapepe Salt Pond	76	75	90	84	67	11.4	11.6	10.9	7.8	2.7
Kalapaki Beach (middle)	75	75	90	84	66	16.5	17.5	18.0	10.6	7.5
Kekaha (Oomano Point)	na	na	23	20	na	na	na	10.0	6.6	na
Lydgate Park (wading pool)	74	75	88	85	68	12.0	14.1	12.4	9.8	3.8
Poipu Beach Pavilion	76	75	89	84	68	11.0	10.7	11.0	10.0	4.2

Source: DBEDT – State of Hawai'i Data Book Section 5: Geography and Environment

na = Not applicable

* The geometric mean standard for Enterococci density was 35 per 100 ml. between 2013 and 2017.

³ DBEDT (2017) – State of Hawaii Data Book

⁴ DBEDT (2016) – State of Hawaii Data Book

1.1.2. State of Hawai'i Water Quality Monitoring and Assessment Report

The State of Hawai'i Water Quality Monitoring and Assessment Report, or Integrated Report (IR), is the second most critical component of the CWB Monitoring Section. The purpose of the IR is to inform EPA and the public of the overall status of water quality statewide, describing the extent to which water quality provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allows recreational activities in and on the water.

The IR is prepared to fulfill the requirements for State reporting pursuant to CWA Sections 303(d) and 305(b), which requires states to provide an assessment report every two (2) years on the quality of all their waters 305(b), and a list of those waters that are impaired or threatened plus a priority ranking of impaired water for TMDL development 303(d). The IR describes the methodology, datasets, and results used to assess the waterbodies. The report is intended to guide future management actions for state waters, provide data for long term trend assessment, and document water quality improvements across the state.

2018 Integrated Report

The 2018 IR provides water quality assessment results for both marine and inland waters. The marine and inland assessment results are reported by assessment units where possible, and/or by individual sampling locations. The State is currently in the process of establishing assessment units for all state waters so that a more holistic assessment can be performed. Some data has been placed into assessment units (e.g. watershed assessment units), while other data is still assessed by individual sampling locations (e.g. off-shore sampling locations) where assessment units have not yet been established.

The assessment period (covering the two-year time frame between November 2015 – October 2017) began where the 2016 IR assessment cycle ended (October 2015). As part of the IR process, the CWB solicited a request for water quality data in June 2017 that closed on November 1, 2017 via the CWB website and local newspapers. Similarly, a draft of the 2018 IR was provided for a 30-day public comment period from May 28, 2018 through June 27, 2018. The CWB did not receive any comments regarding the 2018 IR within the comment period.

The 2018 IR document includes background information, a brief overview of the surface water monitoring and assessment program. Subsequent chapters of the IR describe the assessment methodologies and results used to determine the status of marine and inland waters, document the changes since the 2016 IR, and summarize the current status of all state surface waters.

At the time the 2018 IR was prepared, only the CWB watershed assessment units (AUs) established in the 2016 IR, had been created for marine waters located along the coastline. The AUs consist primarily of points, stretches of beachline, stream segments, and waters located between two (2) geographical locations. AUs are included in the overall assessment of State waters as part of the 305(b), but are not included on the 303(d) list of impaired waters to avoid duplicate listings.

Results

Assessment results show that of the 108 marine water bodies assessed, 88 do not attain water quality standards for at least one or more conventional pollutants. Turbidity was the leading cause of impairment for marine waters, which the CWB believes may be linked to polluted runoff entering nearshore waters. Nutrients are second. Chlorophyll *a*, third. Enterococci WQS was met in 91% of the

marine waters. The assessment resulted in 13 new listings and 22 delistings for marine waters. Turbidity was the pollutant most frequently listed in the 2018 IR, which is consistent with previous IRs.

Marine waters within the larger CWB watershed AUs were also assessed in the 2018 cycle. Of the 544 CWB watershed AUs, only 49 were assessed in this IR cycle. All the CWB watershed AUs that were assessed for nutrients did not meet at least one of the water quality standards for nutrients; however, only 10 of the assessed AUs were assessed for nutrients.

Five inland waters were assessed in the 2018 IR. They include Waioli Stream (Kauai), Heeia Stream (Oahu), Waipa Estuary (Kauai), Hanalei river (Kauai), and Pearl Harbor estuary (Oahu). Waioli Stream is a new impairment listing, exceeding dry season WQS for turbidity and enterococci. Heeia Stream attains all wet season WQS, but does not attain dry season WQS. Waipa estuary and Hanalei river do not meet WQS for turbidity and enterococci. Pearl Harbor estuary continues to meet the WQS for turbidity.

For more information, please visit: <https://health.hawaii.gov/cwb/files/2018/09/Final-2018-State-of-Hawaii-Water-Quality-Monitoring-Assessment-Report.pdf>

1.1.2.1. WATER QUALITY STANDARDS

Federal law requires the state to review and consider all revisions to federal water quality standards and must review Hawai'i's water quality standards contained in Hawai'i Administrative Rules (HAR) title 11, chapter 54 at least once every three years (triennial review). States are not required to adopt all of the changes recommended by EPA; however, if a state chooses not to adopt EPA's recommendations, the state must justify its decision during the triennial review process. The decision whether or not to adopt EPA's recommendation is subject to the public participation process. Part of the public participation process includes input from the public on any aspect of the state water quality standards. The state may revise its water quality standards at any time in response to program needs or public input.

For more information, please visit: <https://www.epa.gov/wqs-tech/water-quality-standards-regulations-hawaii>

Program Goals

The goal of the WQS program is to develop scientifically-based WQS that: (a) meet federal requirements, (b) specify the appropriate uses for state waters and the criteria necessary to protect their designated uses, and (c) define a general policy for reducing the degradation of water quality for all water types.

Current Program Status

In 2014, CWB amended HAR Chs. 11-54 and 11-55 to clarify the overall framework of waterbody types, waterbody classes, protected uses, and evaluative criteria to improve the linkage between specific uses and specific criteria, and to improve the basis for specific, use-based assessment methodologies. CWB also added provisions that address non-compliance with HAR Ch. 11-54; incorporated EPA's 2012 Recreational Water Quality Criteria; and allowed intake credits to adjust effluent limits in NPDES permits for intake water pollutant concentrations.

In 2018, CWB conducted a triennial review of the State's water quality standards and evaluated EPA's new or revised CWA section 304(a) criteria. The CWB also reviewed the latest EPA water quality standards regulatory revisions rule, published in the Federal Register (80 FR 51019) on August 21, 2015.

The CWB is considering amending the State water quality standards by adopting EPA recommendations on a refined definition of how states assign and revise designated uses for individual waterbodies; establish stronger antidegradation requirements; update the regulatory structure for variances to water quality standards, including clarification to provisions authorizing the use of schedules of compliance for Water Quality Based Effluent Limitations (WQBELS) in NPDES permits, and authorize the Use Attainability Analyses (UAAs). The CWB is also considering adopting, or revising the current State water quality criteria to include the 2015 EPA recommended criteria for ninety four chemical pollutants for the protection of human health.

A public comment period is currently being held and a public hearing is scheduled for March 15, 2019. The CWB will review the public comments that are received and will revise the State water quality standards accordingly.

The CWB recently updated the state Water Quality Standards maps (provided via the link below and in Section IV). These maps a geographic representation of Hawai'i's water quality standards, as set forth in HAR Ch. 11-54, and are intended for reference only. They do not substitute for the governing language

in the Water Quality Standards. The CWB is considering proposing amendments to HAR Ch. 11-54 to further clarify the classification of state waters by listing waterbodies by name in the rules.

For more information, please visit: <http://health.hawaii.gov/cwb/clean-water-branch-home-page/water-quality-standards/>

1.1.2.3. TOTAL MAXIMUM DAILY LOAD

Federal law requires the State to identify and prepare a list of waters every two (2) years that do not or are not expected to meet Water Quality Standards after applying existing required controls (e.g., minimum wastewater treatment technology). This information is provided in the state's Monitoring and Assessment Report or IR. For each waterbody/pollutant combination that is listed as impaired in the IR, the State must (a) establish the waterbody's loading capacity (the maximum loading rate at which WQS are met, or "Total Maximum Daily Load"), and (b) allocate this loading capacity among contributing point and nonpoint sources. After these TMDLs are approved by the EPA, the State implements pollutant load reductions through NPDES permits and by funding watershed implementation projects that are designed to reduce nonpoint source pollution.

The CWB continues to establish TMDLs for each listed waterbody/pollutant combination. Progress on establishing TMDLs is included in the State of Hawai'i Water Quality Monitoring and Assessment Report "Integrated Report (IR)", which are typically produced every two (2) years. The CWA §305(b) requires states to describe the overall status of water quality statewide, and the extent to which water quality provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allows recreational activities in and on the water. The CWA §303(d) requires states to submit a list of waters that do not attain applicable water quality standards, plus a priority ranking of impaired waters for TMDL development based on the severity of pollution and the uses of the waters. The 2018 State of Hawai'i Water Quality Monitoring and Assessment Report can be found at:

<https://health.hawaii.gov/cwb/files/2018/09/Final-2018-State-of-Hawaii-Water-Quality-Monitoring-Assessment-Report.pdf>

Program Goals

The goals of the TMDL Program are as follows:

- Quantitatively assess watershed-scale water quality problems, contributing sources, and pollutant load reductions.
- Provide an analytical basis for planning and implementing pollution controls.
- Provide assistance with identifying restoration projects that will improve water quality and protect public and environmental health.

Recommended Actions

To achieve the program goals, the CWB plans to:

- Incorporate CWB program elements (beach and surface water monitoring, polluted runoff control, NPDES permits, etc.) into the TMDL process to develop effective, implementable TMDLs.
- Collaborate with the counties and other state agencies to prioritize watersheds for restoration efforts and support stakeholder stewardship of watershed resources through coordinated efforts.

For more information, please visit: <https://www.epa.gov/tmdl>

1.1.2.4. MONITORING INITIATIVES AND PARTNERSHIPS

While Beach Monitoring continues to serve as the foundation of the CWB Monitoring Program, the CWB lacks sufficient data to properly assess many waterbodies throughout the state for other parameters. In order to obtain data of the required quality and quantity to make accurate and reliable waterbody assessments, the CWB has begun collecting water quality samples for analytes that go beyond fecal indicator bacteria.

- The Monitoring Program is also in the process of finalizing collaborative partnerships with several departments at the University of Hawaii to assess water quality at various locations throughout the state. These projects will help the monitoring program to collect site-specific data for point-in-time assessments as well as to collect *in-situ* continuous monitoring at Kauai beaches and Lahaina, Maui seeps.
 - Partnership with DOH HEER Office, Hawai`i DOA, and USGS, to conduct the Statewide Pesticide Sampling Pilot Project (<http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/pesticides>). Some of the findings from data to help the project included:
 - Surface water samples collected from 24 sites statewide were analyzed for a total of 136 different pesticides or breakdown products.
 - Atrazine, a restricted use pesticide, was the most commonly found pesticide in the study with 80% of the sites tested resulting in detection of atrazine.
 - One (1) pesticide, Dieldrin, a termite treatment that has been banned from sale in Hawai`i since 1980, exceeded state and federal water regulatory limits. The exceedances were found at three (3) urban locations on Oahu.
 - Five (5) other pesticide compounds (Fipronil, Atrazine, Cyfluthrin, Fipronil Sulfone, and Metolachlor) were detected at levels exceeding the most conservative EPA aquatic life benchmark.
 - All other pesticides detected were lower than the most stringent aquatic or human health guideline value.
 - Stream bed sediment was tested at seven (7) sites resulting in detection of glyphosate (trademarked as Roundup) in all samples.
 - In addition, the Monitoring Program is ready to launch the following new initiatives and partnerships.
 - Partnership with USGS to conduct surveys of endocrine active compounds in smallmouth bass and biological effects in Hawai`i, Kauai, and Oahu, to program determine existence of chemical contaminants including herbicides, pharmaceutical, and biogenic hormones:
 - Hawai`i – Honolii River, and Waiakea, Alia, and Waipio Streams
 - Kauai – Hanakapiai, Hanalei, Wailua, and Hanamaulu Streams
 - Oahu – Wahiawa Reservoir, Ala Wai Ditch, Kahana Iki Stream, Kawainui Marsh and Canal, and Anahulu River
 - Partnership with USGS to deploy five (5) Semipermeable Membrane Devices (SPMDs) in West Maui to show how water quality is changing over time. Other projects will help evaluate current water quality indicators to help determine whether alternatives should be considered.

The purpose of these monitoring initiatives and partnerships is to collect monitoring data that has gone through the rigors of Quality Assurance/Quality Control (QA/QC) processes to help shape policy and

management decisions regarding the effective use of resources; identification of impaired waterbodies; prioritization of watersheds and specific waterbodies; and to develop strategies to address identified pollutant sources. These efforts will continue in the foreseeable future as resources permit.

U.S. Environmental Protection Agency National Assessment Studies

In partnership with the EPA, the CWB conducted chemical, bacteriological, and biological monitoring in bays and estuaries for EPA National Coastal Condition Assessment studies:

- National Coastal Condition Assessments in Hawai'i:

2014 National Coastal Condition Assessment (currently in planning and preparation stages) → Island of Oahu (50 sites)

2013 National Coastal Condition Assessment → Island of Maui (50 sites)

2012 National Coastal Condition Assessment → Island of Hawai'i (50 sites)

2011 National Coastal Condition Assessment → Island of Kauai (50 sites)

2010 National Coastal Condition Assessment → State of Hawai'i (50 sites)

- National Coastal Condition Report IV (NCCR IV) (2012):
<http://water.epa.gov/type/oceb/assessmonitor/nccr/index.cfm>

Also, in partnership with the EPA and Department of Land and Natural Resources (DLNR), Division of Aquatic Resources (DAR), the CWB conducted monitoring to develop the following national lakes, rivers, and streams assessment studies:

- 2013-2014 National Rivers and Stream Assessment – Island of Kauai (50 rivers and streams)
(<http://water.epa.gov/type/rsl/monitoring/riverssurvey/>)
- 2012 National Lakes Assessment – Island of Oahu (2 lakes)
(http://water.epa.gov/type/lakes/lakessurvey_index.cfm)

1.2. Polluted Runoff Control Program

The Polluted Runoff Control (PRC) Program's mission is to protect and improve the quality of Hawai'i's water resources by preventing and reducing nonpoint source (NPS) pollution.

Unlike pollution from distinct sources, like industrial operations and wastewater treatment facilities, NPS pollution (also known as polluted runoff) comes from multiple and varied sources. NPS pollution is typically created when precipitation transports natural and manmade pollutants that are eventually deposited in streams, coastal waters, and other state waterbodies. NPS pollution can negatively impact surface and groundwater quality, drinking water supplies, public health, coral reefs and marine life, recreation, and tourism.

In Hawai'i, major sources of NPS pollution include onsite disposal systems (nutrients and pathogens), urban runoff from impervious surfaces and development (nutrients, pathogens, and toxic chemicals), agricultural areas (nutrients and sediment), and conservation land (nutrients and sediment).

§319(h) of the EPA's CWA was enacted in 1987 and requires states to establish NPS management programs, address NPS pollution, and achieve and/or maintain water quality standards. §319(h) also provides federal grant funding to states. The PRC Program annually receives a five-year federal grant from the EPA to fulfill the §319(h) requirements.

The PRC Program implements Hawai'i's Nonpoint Source Management Plan (2015 to 2020) at <http://health.hawaii.gov/cwb/files/2013/05/2015-Hawaii-NPS-Management-Plan.pdf> that outlines specific goals to achieve its mission and meet its §319(h) requirements:

1. Identify water quality trends and watersheds impaired or threatened by NPS pollution (Assessment);
2. Develop strategies, watershed-based plans, and TMDL implementation plans to prevent and reduce NPS pollution (Planning);
3. Implement NPS management strategies to restore impaired waters and protect high quality waters from NPS pollution (Implementation); and
4. Develop and employ an effective statewide program to manage NPS pollution (Statewide NPS Program Development).

Assessment

The PRC Program, with the CWB's Monitoring and Analysis Section, are working together to develop consistent approaches to water quality assessment and monitoring strategies for both coastal and inland waters. The two (2) programs are jointly conducting water quality monitoring efforts in Hanalei Bay watershed and are considering how to efficiently replicate the effort in West Maui watersheds. This data is used to measure the effectiveness of NPS projects in the watersheds and measure coastal water quality health. Data collected by the PRC Program and its contractors is also used to assess the State's waters and incorporated in the State of Hawai'i Water Quality Monitoring and Assessment Report (Integrated Report).

Planning

Priority watersheds are selected based on specific evaluation criteria including, but not limited to, water quality impairments, existing state investments in the watershed, and public interest. When the current NPS Plan was developed in 2015, the PRC Program adopted DOH's three (3) priority watershed regions: Hanalei Bay watersheds, West Maui watersheds, and He'eia watershed. The state directs technical

resources at priority watersheds and targets them for implementation project investments and water quality monitoring and assessments to achieve pollutant load reductions and demonstrate improving water quality trends. The PRC Program intends to evaluate the existing priority watersheds and conduct a prioritization exercise to identify new priority watershed to include in its 2020 update of the NPS Plan.

Watershed-based plans that meet the EPA's nine (9) minimum requirements for effective watershed-based plans are essential to the PRC Program. As mentioned above, the PRC Program cannot use its grant funds in watersheds without these plans. Basically, effective watershed-based plans identify specific NPS issues and detail projects prioritized to address these issues. The PRC Program is responsible for approving plans using the EPA's requirements. Approved watershed-based plans can be found on the [PRC Viewer](https://eha-cloud.doh.hawaii.gov/cwb/#/home) at <https://eha-cloud.doh.hawaii.gov/cwb/#/home>. In 2010, the PRC Program and the Office of Planning jointly funded the [Hawai'i Watershed Guidance](http://health.hawaii.gov/cwb/files/2013/05/Hawaiis-Watershed-Guidance.pdf) at <http://health.hawaii.gov/cwb/files/2013/05/Hawaiis-Watershed-Guidance.pdf> a tool for interested community groups and organizations to develop effective watershed-based plans. Unfortunately, the PRC Program does not have funds to develop new plans at this time.

Implementation

The PRC Program prioritizes implementation due to the immediate potential for measurable water quality improvements and because of federal grant conditions that restrict funding. Up to 50% of the PRC Program's annual §319(h) grant award can be used to fund program expenses (Program Funds) and 50% toward implementing projects (Project Funds). *Program* funds include include personnel and salary costs, travel, supplies, equipment, etc. Remaining program funds can be used for planning, water quality monitoring, outreach, and implementation projects statewide (approximately \$55,000 in federal fiscal year 2019). *Project* funds can be used to fund NPS pollution control projects, water quality monitoring, and outreach projects **in watershed with watershed-based plans that meet the EPA's nine minimum requirements for effective watershed-based plans** at:

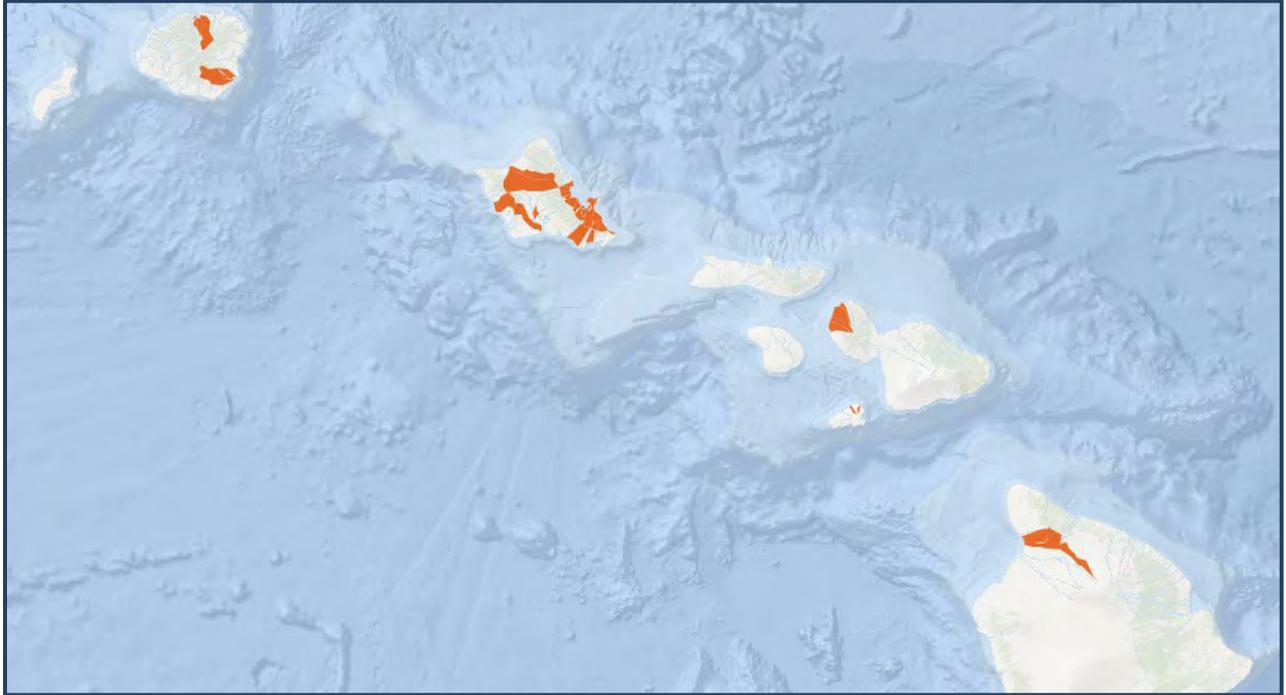
https://www.epa.gov/sites/production/files/2015-12/documents/watershed_mgmnt_quick_guide.pdf.

Projects are selected through Requests for Proposals (RFP) or through direct partnerships with other government agencies and the University of Hawai'i. Contractors selected via RFP can be for-profit or non-profit, although the majority of contractors are non-profit due to in-kind match requirements. Specifically, all project awardees are required to include a minimum of 25% in-kind non-federal match (e.g., request for \$100,000 in funds must also include \$25,000 of in-kind match).

Specific projects that the PRC Program considers funding include restoration of native vegetation in critical watershed areas such as streambanks or riparian corridors; ungulate control and invasive species removal; support for watershed coordinators in DOH priority watersheds; watershed planning; and education and outreach efforts that engage the local community in polluted runoff control issues. Projects funded by the PRC Program shall focus on the implementation of measures or practices that minimize excessive nutrients, sediment, and other pollutants delivered to surface and/or costal waters. The PRC Program places a strong emphasis on funding projects that result in measurable load reductions. More information about PRC Program projects can be found on the [PRC Viewer](https://eha-cloud.doh.hawaii.gov/cwb/#/home) at <https://eha-cloud.doh.hawaii.gov/cwb/#/home>. Information about the PRC Program's Grant program, and a downloadable copy of the PRC Program's most recent RFP, can be found on the [PRC Program's website](http://health.hawaii.gov/cwb/clean-water-branch-home-page/polluted-runoff-control-program/319-grant-program/) at: <http://health.hawaii.gov/cwb/clean-water-branch-home-page/polluted-runoff-control-program/319-grant-program/>.

The PRC Program cannot fund research, permit requirements (i.e., point-source discharge permit conditions), and projects in watersheds that do not have watershed-based plans that meet the EPA's nine (9) minimum requirements.

Below is a current map of state watersheds with approved watershed-based plans:



Statewide NPS Program Development

The PRC Program is committed to developing a statewide Coastal Nonpoint Pollution Control Program per the Coastal Zone Act Reauthorization Amendments (CZARA) section 6217 with the State Department of Business, Economic Development, and Tourism (DBEDT) Office of Planning. Together the programs are drafting and implementing pollution control measures (management measures) to prevent polluted runoff from negatively impacting the state's coastal areas. There are a total of 50 management measures required by CZARA, with 44 management measures approved by the U.S. EPA and the National Oceanic and Atmospheric Administration and six (6) still under development by the state. Failure to receive full approval by 2023 will result in a thirty percent reduction of federal grant funds to the PRC Program and DBEDT's Office of Planning, so attaining approval for the remaining management measures are a priority for both programs.

In addition to DBEDT, the PRC Program also partners with other state and local agencies to achieve its mission and enhance the impact of its limited funding. Currently, the PRC Program is funding three (3) projects in partnership with the Department of Land and Natural Resources (DLNR): a watershed coordinator in West Maui, ungulate control fencing in West Maui, and paddock repair and trough relocation in Pelekane. The PRC Program is funding a project with the University of Hawai'i (UH) to remove invasive mangroves in He'eia fishpond and is funding a project with the Kaho'olawe Island Reserve Commission (KIRC) to plant native plants. The PRC Program also annually sponsors the Waikiki Aquarium's Mauka to Makai Earth Day festival. In the past, the PRC Program funded projects with DLNR,

DBEDT, UH, KIRC, the Department of Education, soil and water conservation districts, and county governments as part of its partnership efforts with other government agencies.

Challenges

As a fully federal-funded program, the PRC Program faces challenges. In the current political climate, there is a possibility that the §319(h) grant program is eliminated or significantly curtailed (the current administration has zeroed out the §319(h) grant program in its annual budget the past three (3) years but funding has been restored by Congress each year). Federal awards have also gone down, from a high of \$2.1M in 2008 to \$1.2M in 2019. At the same time, employee salaries have risen. This impacts the availability of program funds to support the development of new watershed-based plans or add staff to assist with contracting and grant management efforts. With additional funding the PRC Program would commission the development of more effective watershed-based plans, thereby increasing the number of watershed eligible for project implementation.

Results

Even with its limited resources, the PRC Program has been able to make significant progress in achieving its mission. Between 2017 and 2018 the PRC Program awarded \$2.4M of grant funds and an additional \$1.2M of in-kind match for a total of \$3.6M invested in projects to improve water quality. In 2017, reported load reductions from projects totaled 6,500 lbs. of total nitrogen; 1,600 lbs. of total phosphorous; and 2,500 tons of total sediment. More importantly, a result of focusing efforts on DOH priority He`eia watershed resulted in 2016 He`eia Stream delisting for total phosphorous and turbidity (both in the wet season) and a 2018 He`eia Stream delisting for nitrate/nitrite (also during the wet season) in the respective 2016 and 2018 Integrated Reports.



1.3. Engineering Section

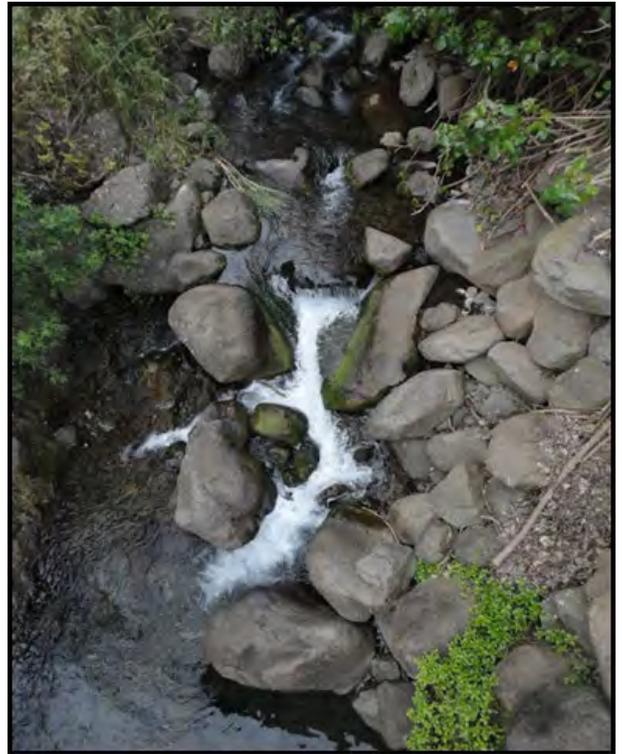
1.3.1. National Pollutant Discharge Elimination System Program

The NPDES Program, administered by the CWB, regulates point source pollution. As defined by EPA, a point source is defined ‘very broadly in the Clean Water Act’ as “any discernible, confined and discrete conveyance...from which pollutants are or may be discharged.”⁵ Examples of point source pollution include industrial wastewater treatment plants, refineries, electricity generating stations, as well as storm water discharges from municipalities, military installations, and other industrial complexes.

An NPDES permit includes water quality-based effluent limits that are based on the State’s Water Quality Standards in HAR, Chapter 11-54, where there is reasonable potential for a discharge to cause or contribute to an excursion above a State Water Quality Standard. An NPDES permit is required to include effluent limits based on the technology available to treat the pollutant (technology-based effluent limits).

The CWB issues two (2) types of NPDES permits – general permits and individual permits. A general permit is an NPDES permit issued as a rule (as Appendices to HAR, Chapter 11-55) that authorize a category of discharges into State waters from a category of sources within a geographical area. As of 2018, the CWB issues NPDES general permits that authorize the following activities:

- Discharges of Storm Water Associated with Industrial Activities
- Discharges of Storm Water Associated with Construction Activities
- Discharges of Treated Effluent from Leaking Underground Storage Tank Remedial Activities
- Discharges of Once through Cooling Water Less Than One Million Gallons Per Day
- Discharges of Hydrotesting Waters
- Discharges Associated with Construction Activity Dewatering
- Discharges of Treated Process Wastewater Associated with Petroleum Bulk Stations and Terminals
- Discharges of Treated Process Wastewater Associated with Well Drilling Activities
- Discharges of Storm Water from Small Municipal Separate Storm Sewer Systems
- Discharges of Circulation Water from Decorative Ponds or Tanks
- Point Source Discharges from the Application of Pesticides



An individual permit is an NPDES permit, other than a general permit, issued to a specified discharger to conduct a point source discharge to State waters at a specified location. The individual permit is written

⁵ USEPA – NPDES Permit Basics

to reflect site-specific conditions based on information submitted by that discharger in a permit application and is unique to that discharger.

The CWA limits the length of NPDES permits to 5 years. However, NPDES permits can be renewed (reissued) at any time after the permit holder applies. NPDES permits cover a variety of program areas, such as aquaculture, biosolids, industrial wastewater, pretreatment, Zone of Mixing, and storm water to name a few.

All NPDES permits application and compliance forms are available on the e-Permitting Portal by clicking on the Form Finder button on the left of the page after searching for and selecting “CWB Individual NPDES Form” for individual permits; “CWB NOI Form” for general permits in HAR 11-55 Appendices B through L; “CWB NOI Form M” for the general permit in HAR 11-55, Appendix M; “CWB No Exposure Certification Form” for no exposure exclusions from industrial storm water permitting; and “CWB Compliance Submittal Form for Individual NPDES Permits and Notice of General Permit Coverage (NGPC).”

All NPDES permits are required to have standard conditions, sometimes called boilerplate conditions. These standard conditions play an important role to effluent limitations, monitoring and reporting requirements, and special conditions because they delineate various legal, administrative, and procedural requirements of the permit. Standard conditions cover various topics including definitions, testing procedures, records retention, notification requirements, penalties for noncompliance, and other discharger responsibilities. DOH’s Standard NPDES Permit Conditions for individual permits and general permits are available at:

<http://health.hawaii.gov/cwb/clean-water-branch-home-page/standard-npdes-permit-conditions/>.

Challenges

Below are challenges that CWB faced with the NPDES permits:

1. Improve processing times for covering construction related projects under the NPDES general permits.
2. Maintain 90% current all of the renewal individual permits (annual EPA work grant commitment).
3. Update the NPDES forms to comply with EPA’s 2019 NPDES Updates Rule.

Results

CWB addressed the challenges as follows:

1. Revised all of the NPDES NOI and individual forms to minimize applicants providing insufficient information and created internal workflow procedures to improve consistency and efficiency. This improved average processing times to cover construction related projects under the NPDES general permits to about two (2) weeks.
2. Created internal workflow and consistency documents with procedures to implement technology-based effluent limits, water quality-based effluent limits, assimilative capacity assessments, antidegradation analyses, and antibacksliding requirements. In 2018, CWB was 95% current on all renewal individual permits.
3. CWB is currently updating the ePermitting forms to comply with EPA’s 2019 NPDES Updates Rule. CWB is also working with a vendor to integrate the ePermitting forms to the branch’s internal database.

1.3.2 Water Quality Certification Program

The CWB administers the CWA, Section 401 Water Quality Certification (WQC) Program. A Section 401 WQC is a statement that asserts that a proposed discharge/activity will not violate applicable State Water Quality Standards (WQS) in HAR, Chapter 11-54 and the applicable provisions of CWA Sections 301, 302, 303, 306, and 307. A Section 401 WQC is required if a project/activity:

1. Requires a federal permit, license, certificate, approval, registration, or statutory exemption; and
2. May result in a water pollutant discharge into State waters.

Federal agencies that issue permits and licenses that could trigger Section 401 WQCs include, but are not limited to, the United States Army Corps of Engineers (USACE), the EPA, the Federal Energy Regulatory Commission, and the United States Coast Guard Office of Bridge Programs.

“Water pollutant” is defined in HRS Section 342D-1. It includes, but is not limited to, allowing the following pollutants to enter State waters: solid waste, sewage, chemicals, biological material, rock/sand/dirt, construction debris, fugitive dust, spray paint, industrial wastes, concrete, sealant, epoxy, heat, agricultural waste, and washing/cleaning effluent.

The purpose of the Section 401 WQC is to provide States with a tool to protect their water quality from potential adverse impacts resulting from activities/projects with federally issued permits and licenses. The CWA prohibits federal agencies from issuing a permit or license that result in exceedance of water quality standards, or other applicable authorities, of the state. This provision of the CWA requires an applicant for a federal license or permit to provide a certification that any discharges from the facility will comply with applicable state water quality standards. Another purpose of the Section 401 WQC is to ensure that a polluter will not be able to hide behind a Federal license or permit and use it as an excuse for violating State WQS. This is the reason the US Congress provided States with power to enforce “any other appropriate requirement of State law” [33 U.S.C. 1341(d)] by imposing conditions, through the issuance of a Section 401 WQC, on federal license for activities that may result in a discharge.

Certification Process

A Section 401 WQC is required to contain the following statements:

1. A statement that DOH has examined the application, or other information, provided by the owner and bases its certification upon an evaluation of the information contained in the application or sufficient information provided;
2. A statement that there is reasonable assurance the activity will be conducted in a manner which will not violate applicable water quality standards; and
3. A statement of any conditions considered necessary or desirable with respect to the discharge resulting from an activity.

An applicant for a Section 401 WQC is required to disclose the location of the proposed discharge; the scope of work or a description of the overall project; the impacts to the existing chemical, physical, biological, and thermal environment; the impacts to the existing uses of the waterbody; the water pollution control measures; and the plan to monitor the receiving State water quality resulting from the discharge. DOH may provide the opportunity for public comment or hearing(s) or both to consider the issuance of a Section 401 WQC.

The Section 401 WQC waiver is applied if DOH fails or refuses to act on a request for a Section 401 WQC within one (1) year after receipt of a completed application, or, if the discharge resulting from an activity receives a determination to be covered under a Nationwide Permit (NWP) authorization fulfilling specific conditions, where DOH will determine on a case-by-case basis, which projects are considered minor and non-controversial in which certification requirements will be waived.

All Section 401 WQC application and compliance forms are available on the e-Permitting Portal by clicking on the Form Finder button on the left of the page after searching for and selecting “CWB Individual Section 401 WQC Form” for individual Section 401 WQCs; “NWP Blanket WQC Notification Form” for notification requirements to request coverage under the Blanket Section 401 WQC; “CWB Compliance Submittal Form for Section 401 WQCs” for Section 401 WQC compliance information submittals; and “VGP DOH Notification Form” for notification requirements for coverage under the Vessel General Permit (VGP) Section 401 WQC.

Loko i`a

HRS 342D-6.5(a) requires DOH to process applications for permits and Section 401 WQCs for the reconstruction, restoration, repair, or reuse of any Hawaiian fishpond or loko i`a defined in HRS 183B-1, before all other permits and Section 401 WQCs. HRS 342D-6.5(b) requires DOH to waive the requirement to obtain a Section 401 WQC for any loko i`a project that received notice of authorization to proceed from the Department of Land and Natural Resources, Office of Conservation and Coastal Lands under the statewide programmatic general permit for the restoration, repair, maintenance, and operation of loko i`a.

Blanket Section 401 WQC

The CWB issued a Blanket Section 401 WQC that covers seven (7) NWPs that are the most frequently used by the USACE in Hawai`i. The seven (7) NWPs are:

1. NWP 3 – Maintenance
2. NEP 5 – Scientific Measurement Devices
3. NWP 6 – Survey Activities
4. NWP 10 – Mooring Buoys
5. NWP 12 – Utility Line Activities
6. NWP 13 – Bank Stabilization
7. NWP 14 – Linear Transportation Projects

The Blanket Section 401 WQC incorporates pollution control measures, monitoring and assessment requirements, as well as other applicable WQS requirements, that are designed to supplement requirements applicable to the seven (7) NWPs and NWP regional conditions in the State of Hawai`i. The Blanket Section 401 WQC was designed to expedite the verification of Section 401 WQC coverage for projects that are ready-to-go with minimal or no impacts. There is no filing fee for the Blanket Section 401 WQC.

Vessel General Permit (VGP)

The CWB issued a Section 401 WQC for the EPA’s 2013 VGP. On December 4, 2018, the Vessel Incidental Discharge Act (VIDA) was signed into law which establishes a management framework for discharges incidental to the normal operation of a vessel. Under VIDA regulations, EPA will be responsible for

establishing standards and the Coast Guard will be responsible for administering and enforcing the regulations. Until the new regulations are implemented, vessel owners and operators are to continue complying with the 2013 VGP.

1.4. Environmental Indicators

An environmental indicator provides a way to measure or keep track of a particular condition in the environment. Indicators help us understand where we are, where we are going, and how far we are from the goal. The indicators listed in the sections that follow provide a way for DOH to track data and use it to determine changes over time.

Brown Water Advisories

The CWB issues brown water advisories, which are general media releases anticipating or responding to heavy storm water runoff events. Brown water advisories usually are not accompanied by shoreline postings.

Table 2. Number of Brown Water Advisories by Island								
Island	2011	2012	2013	2014	2015*	Aug-Dec 2016	2017	2018
Hawai'i	2	0	0	0	n/a	5	8	7
Kauai	5	5	6	5	n/a	2	12	77
Maui	5	0	0	13	n/a	14	16	37
Oahu	5	1	9	2	n/a	12	18	95
TOTAL	17	6	15	20	n/a	33	54	216

Source: For statistics between Aug 2016-2018, DOH CWB Environmental Health Portal CWB System

*Data unavailable due to electronic systems upgrading.

Sewage Spill Advisories

Wastewater or chemical spills and other pollutant releases restrict the public's enjoyment and use of the shoreline and negatively affect aquatic life. The tables below show the number of times wastewater spill events occurred by island. For any wastewater spill, shoreline warnings are posted first, followed by water sampling. The CWB reviews bacteria data prior to allowing removal of warning signs.



Sandy Beach, August 2015



Waikiki Beach, August 2015

Table 3.

Hawai'i

Year	Total	Days of Postings
2010	1	4
2011	1	2
2012	0	0
2013	0	0
2014	0	0
2015	3	13
2016	3	18
2017	6	43
2018	6	220
Total	20	300

Maui

Year	Total	Days of Postings
2010	0	0
2011	1	5
2012	0	0
2013	1	9
2014	0	0
2015	2	11
2016	1	6
2017	3	51
2018	2	66
Total	10	148

Kauai

Year	Total	Days of Postings
2010	1	5
2011	1	5
2012	3	43
2013	3	9
2014	1	7
2015	2	10
2016	2	14
2017	1	7
2018	2	19
Total	16	119

Oahu

Year	Total	Days of Postings
2010	31	141
2011	17	135
2012	20	166
2013	13	121
2014	12	57
2015	14	63
2016	18	96
2017	18	159
2018	21	113
Total	164	1,051

*These numbers do not reflect warning sign postings on streams, lakes, and other inland waters, such as the Ala Wai Canal. Other agencies may post other shoreline warning signs.
Source: DOH CWB – EHA Portal CWB System

2. Safe Drinking Water Branch (SDWB)

While surface water provides only five percent (5%) of the State's drinking water supply, the SDWB's primary function related to surface water is to ensure that it meets State and Federal health-related standards for drinking water, including the Surface Water Treatment Rule, treatment technique requirements, and Maximum Residual Disinfectant Level requirements.

Source Water Assessments are conducted on surface water intakes to drinking water systems. The assessments delineate the areas where potential contaminating activities may impact the water source. The delineated area includes a buffer zone around the water body plus the watershed area for that water body. In Hawai'i, we have two (2) main types of surface water sources that provide drinking water to several water systems, streams and ditches, which by their nature can have long watershed areas. The ditches were usually built by sugar companies to transport irrigation water, such as the Waiahole Ditch on Oahu, the East Maui Irrigation Ditch on Maui and formerly, the Hamakua Ditch on Hawai'i Island.

Unlike ground water sources, contamination impacts on surface water sources can have very quick impact on the quality of the drinking water. Impacts can occur in anywhere from a matter of minutes to several hours after a contamination incident, depending on how far away the incident occurred and how fast the water is moving in the stream or ditch. Of particular concern is runoff from flood conditions, ditch maintenance activities, and possible eradication efforts in the watershed.

While the primary responsibility of the SDWB is to ensure that public water systems meet State and Federal health-related standards for drinking water, monitoring and assessment data from the SDWB may also be useful to other surface water quality programs, such as the CWB's TMDL and PRC Programs.

For more information, please visit: <http://health.hawaii.gov/sdwb/>

3. Wastewater Branch (WWB)

The WWB administers the statewide engineering functions relating to water pollution control, municipal and private wastewater treatment works program, individual wastewater systems program and the water pollution control revolving fund program. WWB's mission is to protect public health and the environment ensuring the use and disposal of wastewater and wastewater sludge does not contaminate or pollute any valuable water resource, does not give rise to public nuisance, and does not become a hazard or potential hazard to the public health, safety, and welfare.

Moreover, WWB aims to advance water reuse and wastewater sludge reuse consistent with public health and safety and environmental quality. WWB acknowledges that when properly treated and used, all recycled water and wastewater sludge are valuable resources with environmental and economic benefits and can be used to conserve the State's precious resources. Water reuse can help alleviate future water supply uncertainties in Hawai'i related to the changing climate by reducing the amount of drinking water that is used for industrial processes and landscape irrigation. The most highly treated recycled water and exceptional quality wastewater sludge can be used for a wide variety of applications with the appropriate restrictions and when best management practices are implemented.

For more information, please visit: <http://health.hawaii.gov/wastewater/>



3.1. Water Reuse

DOH has long been an advocate for the use of recycled water providing that public health and water resources are not compromised. Use of recycled water has become more significant due to the state's growing population, limited potable water resources and wastewater disposal issues.

In January 2016, the DOH's WWB revised its Reuse Guidelines, shortening it from 240 to 70 pages, in order to streamline requirements and promote the increased use of recycled water. Reporting requirements were revised to improve data collection accuracy. Rather than estimating the volume of recycled water used, plant operators now report annually on the volume supplied for use. This data accounts for declines in use due to rainy periods, off-spec water diversion, and equipment malfunctions.

Table 4. Recycled Water Use

Calendar Year	Total Water Supplied for Use (MGD)*	Percent Increase
2015	16.3	-
2016	17.2	5.5%
2017	18.3	6.4%
2018	18.8	2.7%

Source: Department of Health, Wastewater Branch

*= Millions Gallons per Day (MGD)



Depending on its grade, recycled water can be used for such purposes as irrigation, dust control, and sewer line flushing. The highest grade of recycled water is R-1 which is filtered and disinfected, followed by R-2 which is disinfected, and R-3 which is neither filtered nor disinfected. Following are the number of recycled water plants in Hawai'i of various grades:

Table 5. Number of Reuse Plants Plant Grade	No. of Plants in Hawai'i*
R-1	17
R-2	13
R-3	5
Total	35

*As of 2018.

Oahu is currently the largest user of recycled water, followed by Maui, Kauai, and Hawai'i Island.

Table 6. Recycled Water Used by Island in 2018		
Island	Recycled water Supplied for Use (MGD)	Percent of State
Oahu	12.1	64
Maui	3.1	17
Kauai	2.6	14
Hawai'i	0.9	5

Current Program Status

In 2018, DOH was required to convene a task force to identify barriers and solutions to expanding water reuse in the State of Hawai'i under House Concurrent Resolution No. 86 S.D.1 of Hawai'i's 2018 Legislative Session (HCR86). The task force collaborated with other federal, state and county agencies and private entities. They also reviewed findings of how water reuse and gray water regulations are administered in other states, localities, and countries, and assess the feasibility of implementing similar regulations in Hawai'i. The task force also examined proposed language for future regulation or policy changes in Hawai'i and identify and rank potential demonstration projects for water reuse in Hawai'i.

Recommendations from the task force were provided in a 2019 Legislature Report and can be found at the following website:

<https://health.hawaii.gov/opppd/files/2019/01/Water-Reuse-Task-Force-Legislative-Report.pdf>

Recommended Actions

The DOH Wastewater Branch continues to promote an increase in the safe use of recycled water in order to conserve our limited potable water supply.

For more information, please visit: <http://health.hawaii.gov/wastewater/home/reuse/>

3.2. Wastewater Treatment Plant Operation & Maintenance Compliance

The Wastewater Branch also performs annual operation and maintenance inspections of wastewater treatment plants to ensure compliance with HAR Chapter 11-62, Wastewater Systems. Many of the wastewater treatment plants use injection wells for effluent disposal. The inspections are performed to ensure that plants are being properly operated and maintained to prevent ground water and surface water contamination.

Table 7. Wastewater Treatment Plant Operations & Compliance

Calendar Year	Total Number of Plants	Number of Plants Inspected	Number of Plants Rated Unsatisfactory	Percentage in Compliance
2006	180	93	14	92%
2007	180	102	33	82%
2008	180	34	15	92%
2009	180	119	38	79%
2010	180	114	13	93%
2011	180	62	17	91%
2012	190	58	13	93%
2013	190	58	16	92%
2014	190	82	30	84%
2015	214	71	34	84%
2016	214	52	19	91%
2017	214	61	29	86%
2018	214	117	32	85%

Source: Department of Health, Wastewater Branch



Groundwater Quality

DOH's SDWB and WWB play an integral role in protecting the State's ground water quality through a variety of programs. Ground water supplies the vast majority of the State's drinking water.

4. Safe Drinking Water Branch (SDWB)

The primary function of the SDWB is to ensure public water systems meet state and federal health-related standards for drinking water. These standards include: 75 maximum contaminant levels (MCLs), ten (10) treatment technique requirements, and three (3) maximum residual disinfectant level (MRDL) requirements.

The Safe Drinking Water Branch:

- Regulates the 130+ Public Water Systems in the state;
- Provides low interest loans under the Drinking Water State Revolving Fund (DWSRF) Program;
- Conducts the Source Water Assessment and Protection (SWAP) Program;
- Drives the Hawaii Groundwater Protection Strategy;
- Operates the Underground Injection Control (UIC) Program;
- Updates the Groundwater Contamination Viewer; and
- Provides guidance for Rainwater Catchment Systems.

4.1. Underground Injection Control Program

The goal of the Underground Injection Control (UIC) Program is to protect existing and potential sources of drinking water from contamination by injection well wastewater disposal. The program issues and administers permits for injection well facilities and limits the areas where certain types of injection well wastewater disposal can be sited (HAR Chapter 11-23).

In 2016, there are 943 UIC-permitted facilities with 6,303 injection wells in Hawai'i. The majority of injection wells in Hawai'i fall under one of the following three (3) types: drainage, sewage, or industrial injection wells. There are also aquaculture and geothermal injection wells in Hawai'i, but they are less common.

Drainage injection wells dispose of primarily rainfall runoff water and can sometimes include runoff from landscape irrigation. Almost two-thirds of the UIC-permitted facilities in the State are drainage injection well facilities.

Sewage injection wells dispose of primarily domestic wastewater. The domestic wastewater can be either treated or untreated before being discharged into the injection wells. Because of the federal government's mandate to ban large capacity cesspools, the majority of permitted sewage injection wells receive wastewater that has undergone some level of treatment.

Industrial injection wells dispose of wastewaters from electric power generation, product manufacturing, food and water processing, carwashes, and laundries. Cooling water for electric power generation produces the largest volume of injected industrial wastewater.

The UIC Program developed a new data system that utilizes more efficient electronic record and information storage. The old, outdated database, which consisted of hard-copy records, is no longer being maintained. The goal of the program for calendar years 2017 through 2019 is to fill the new data system with both new and existing data. Therefore, the data presented in this report regarding the UIC will not be current until the new data system has been completely filled and updated.



➤ **Program Goals**

- The UIC Program has set goals to:
 - Reduce the number of unpermitted underground injection well facilities; and
 - Assure the proper abandonment of Underground Injection Control (UIC) wells to prevent them from becoming conduits for groundwater contamination.

Percentage of UIC Wells in Compliance with a Permit

The overall percentage of underground injection well facilities in compliance with State and Federal regulations (those with a current permit) for state fiscal year 2016 has remained at 56%, the same as in 2015. Most of the non-compliant injection well facilities use drainage injection wells for rainfall runoff disposal. Sewage and industrial-related wastewater disposal injection wells had a higher compliance percentage at 65%. The Program processes permit renewals for sewage and industrial-related injection before permit renewals for drainage injection because the former pose a higher risk of causing groundwater contamination.

Table 8. Underground Injection Control (UIC) Well Compliance

Calendar Year	Total UIC Permits	Total Expired Permits	Percent of Total with Current Permits	Percent of Current Sewage & Industrial UIC Permits
2004	677	298	56%	77%
2005	679	345	49%	57%
2006	714	358	50%	56%
2007	768	364	53%	60%
2008	796	379	52%	60%
State Fiscal Year				
2009	818	374	54%	63%
2010	857	385	55%	67%
2011	879	394	55%	67%
2012	911	393	57%	71%
2013	926	389	58%	72%
2014	934	402	57%	69%
2015	935	413	56%	65%
2016	943	415	56%	65%
2017*				
2018*				

Source: Department of Health, Safe Drinking Water Branch

*Due to database upgrades, archival data is currently unavailable.

For more information, please visit: <http://health.hawaii.gov/sdwb/underground-injection-control-program/>

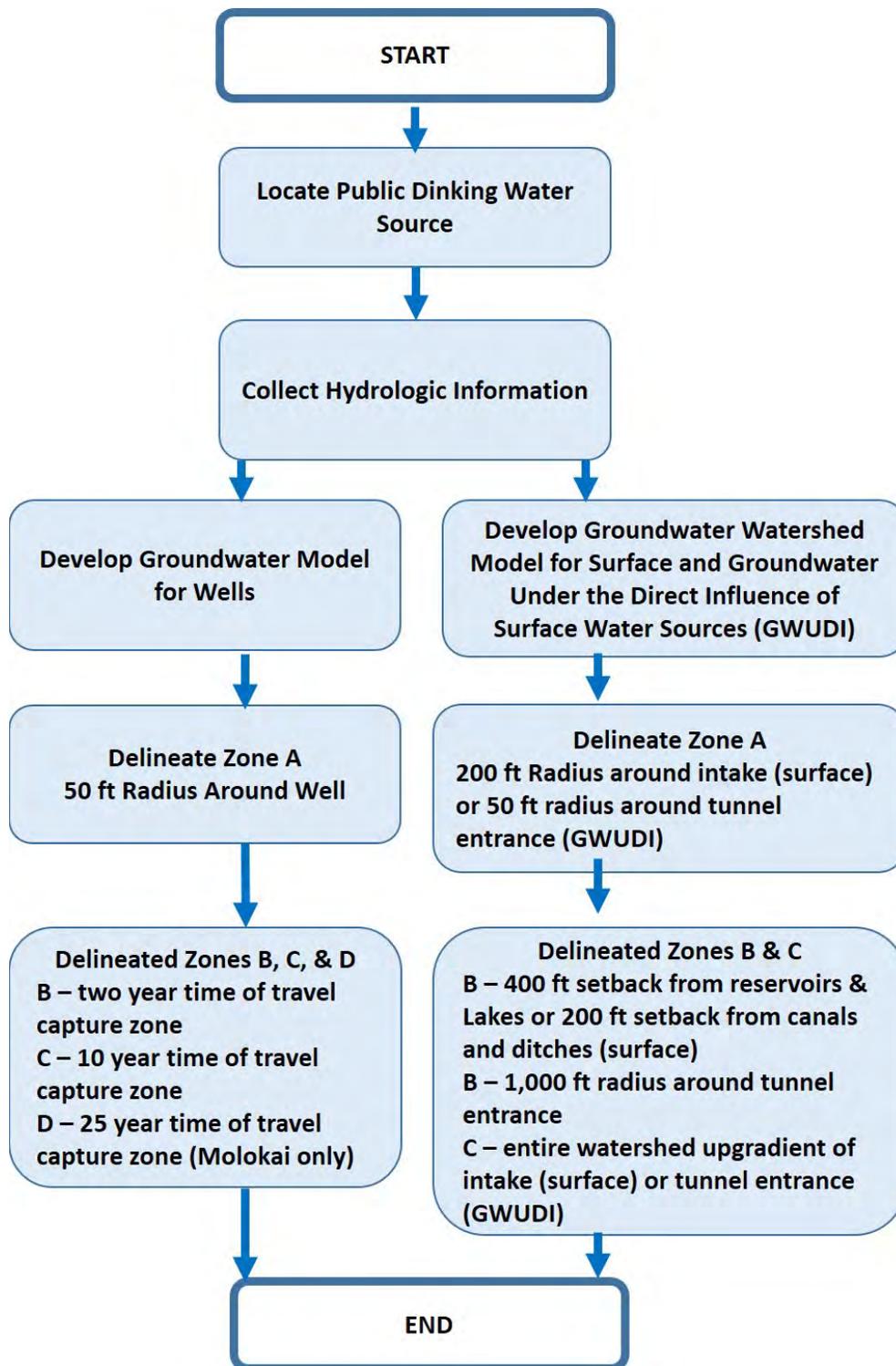
4.2. Source Water Assessment and Protection Program

The 1986 reauthorization of the Federal Safe Drinking Water Act (SDWA) mandated that each state develop a Wellhead Protection Program (WHPP), to protect groundwater resources which supply drinking water to public water supply systems from contamination.

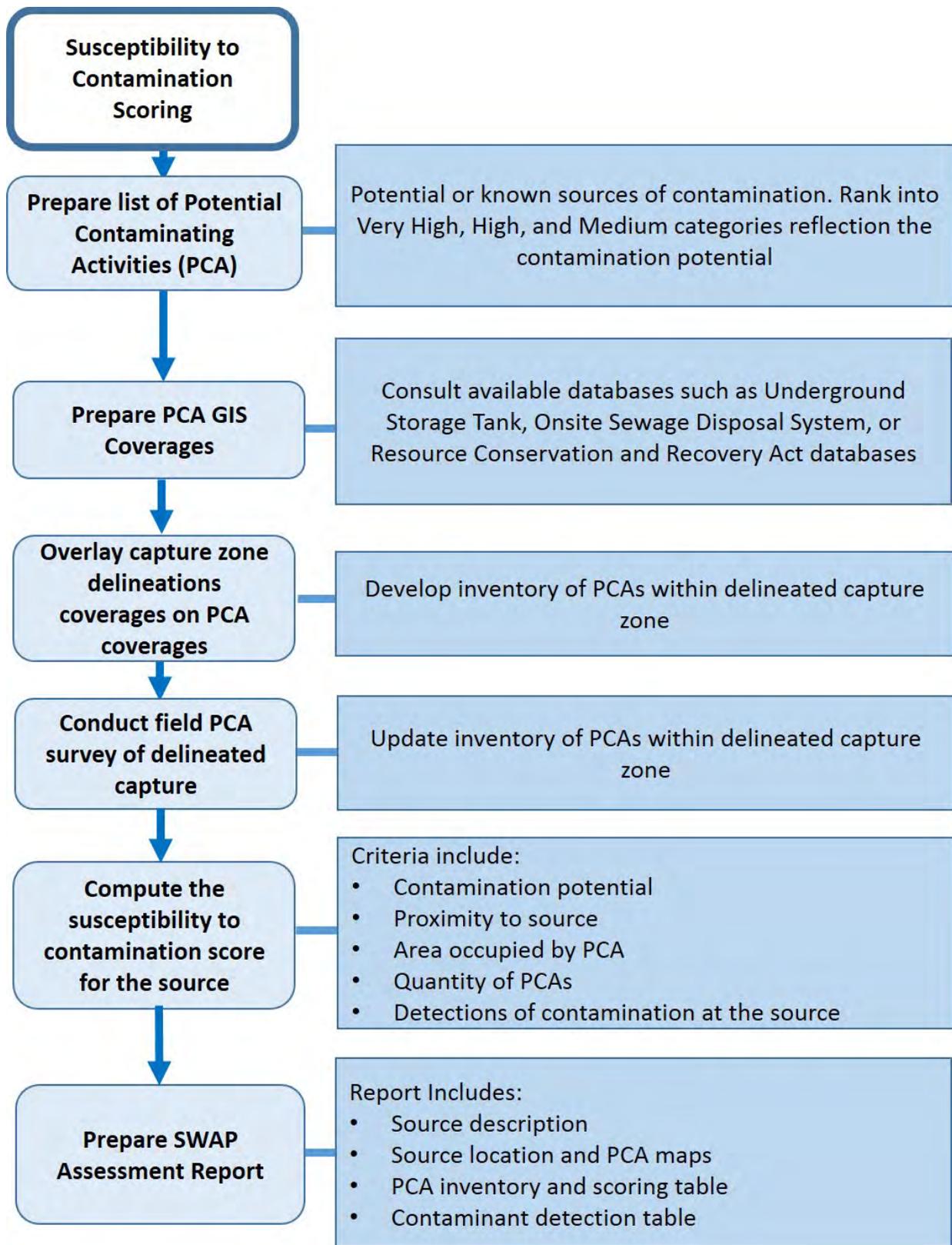
The 1996 reauthorization of the SDWA included an amendment requiring states to develop a program to assess sources of drinking water, and encouraging states to establish protection programs. The objectives of this program were to assess the susceptibility of all drinking water sources to activities that have a significant potential to release contaminants to these water sources.

Each state was required to submit a Source Water Assessment & Protection (SWAP) Program Plan that identifies and describes the methodology and procedures to follow to determine the susceptibility of a drinking water source and public water supply system. The State submitted this SWAP Program Plan to EPA by February 1, 1999. Upon EPA approval of the SWAP Program Plan in November 1999, the State was required to conduct Source Water Assessments on all of its drinking water sources. These assessments consisted of delineating the water source capture zone, inventorying potential contaminating activities within the capture zone, and determining the water source's susceptibility to contamination.

The initial round of SWAP assessments were completed in 2004. This included susceptibility to contamination assessments for 417 wells, 31 groundwater under the direct influence of surface water sources, 12 surface water sources, and three (3) catchment sources. DOH completes SWAP assessments as part of the approval process for new water systems. As of December 31, 2018, SWAP assessments have been done for more than 560 public drinking water sources.



Delineating the zone of contribution to drinking water sources referred to as capture zone delineations (CZD), identifies the area in the land surface where contaminating activities may degrade the water quality of the drinking water source.



Suceptibility to contamination assessments, are the next step towards identifying specific threats to drinking water sources, informing measures to protect them.

Program Goals

The goals of the SWAP Program are:

- Assess the susceptibility of public drinking water sources to contamination;
- Protect public drinking water sources from contamination; and
- Use source water assessment information to meet drinking water requirements.

Recommended Actions

To achieve the program goals, DOH implemented the following actions:

- Assess all existing drinking water sources;
- Assess new and proposed drinking water sources;
- Periodically review and update these assessments;
- Create and implement state and local source water protection workgroups;
- Work with public water systems to develop and implement protection strategies and plans for protecting drinking water sources;
- Work with government agencies, county water and planning departments, and stakeholder organizations to integrate protection strategies and plans;
- Develop and implement the Wellhead Protection Financial Assistance Program (WHP-FAP);
- Work with public water systems to use assessment information as a starting point for meeting various drinking water requirements; and
- Develop and implement a drinking water monitoring program based on possible contaminants from Potential Contaminating Activities (PCAs) located within Source Water Assessment and Protection Capture Zones (SWAP-CZ).

Current Source Water Assessment Program Status

- Assessments have been conducted on over 500 existing drinking water sources throughout the state. In 2004, DOH completed the *Hawaii Source Water Assessment Program Report, Volume I, Approach Used for the Hawaii Source Water Assessments*. Assessments are continuing for all new and proposed drinking water sources.
- The current EPA approval has resulted in the funding of protection projects by various public water systems (including the County Water Departments for Hawai'i, Kauai, and Maui, plus several privately owned public water systems). The (WHP-FAP application is currently being updated to use funds for protection projects from the Drinking Water State Revolving Fund 15% Set-Aside for Local Assistance and Other State Programs beginning in Federal Fiscal Year 2021.
- The SWAP program continues to provide expert groundwater assistance to the Wastewater Branch and the Clean Water Branch to support the State's effort to resolve our legacy of nearly 88,000 cesspools.
- The SWAP program continues to provide expert groundwater assistance to the Solid and Hazardous Waste Branch and EPA in the oversight of Red Hill Fuel Storage Facility Administrative Order on Consent.
- DOH is working with county water departments and other agencies to create water protection workgroups.
- DOH SDWB will utilize source water assessment data/information (as applicable) in meeting drinking water requirements.

- As of October 2018, over \$3.2 million has been spent or encumbered under the (WHP-FAP.
- The SWAP will partner with the University of Hawai`i to increase our knowledge of groundwater flow patterns in the State of Hawai`i with an emphasis on concisely defining the zones of contribution to public drinking water wells.

For more information, please visit: <http://health.hawaii.gov/sdwb/swap/>



4.3. Hawaii Groundwater Protection Strategy and Protection Program

The overall goal of the Hawaii Groundwater Protection Strategy is to protect human health and sensitive ecosystems through the protection and enhancement of the groundwater quality throughout the State of Hawai'i. It was approved by EPA, Region 9, on June 29, 2017, and is the guiding document for the future of groundwater protection in Hawai'i.

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*)

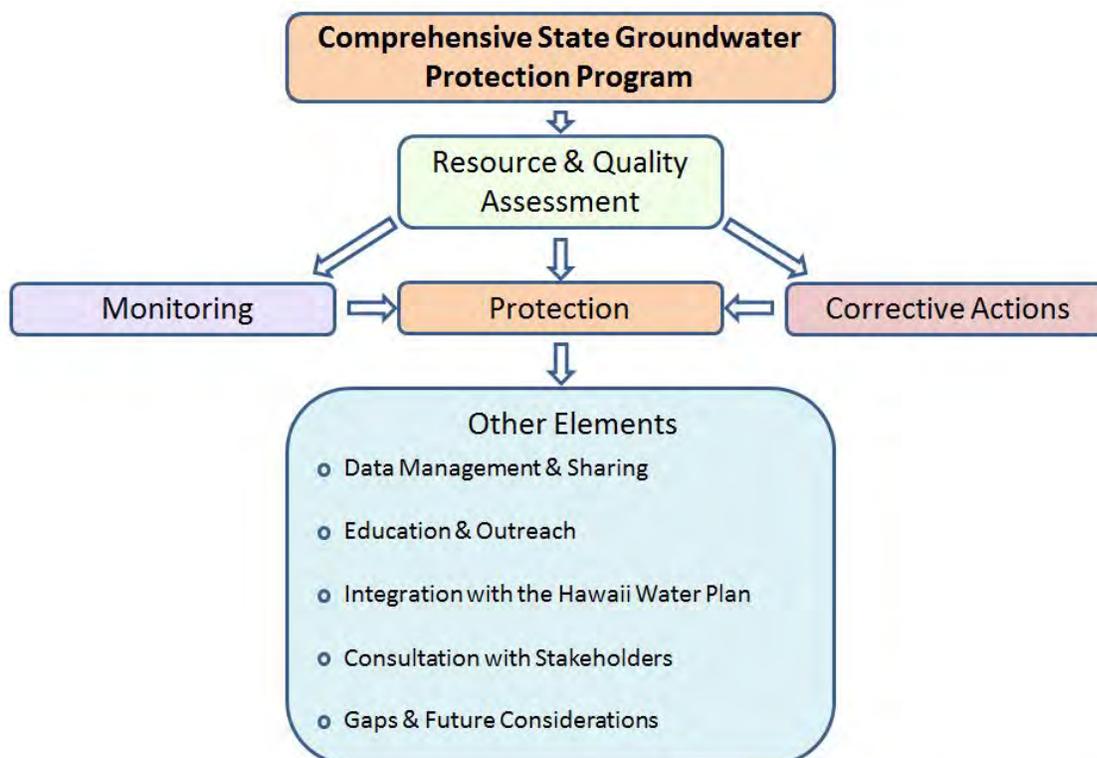
Objective 3: Coordinate the regulatory framework used by each branch/office/agency to protect groundwater from the prioritized contamination threats (e.g., Code of Federal Regulations, Hawaii Revised Statutes, Hawaii Administrative Rules, EPA Guidelines and online tools).

The major goals of the Groundwater Protection Strategy are:

- Monitor and assess groundwater quality;
- Identify and prioritize groundwater contamination threats; and
- Mitigate priority contamination threats and prevent contamination.

The SDWB manages the Groundwater Protection Program (GWPP) which is a non-regulatory program whose goal is to protect human health and sensitive ecosystems by protecting groundwater resources. This approach should increase coordination between related water and protection programs to improve effectiveness and reduce duplicative efforts. It will also delineate roles and define processes for coordinating efforts between programs.

Comprehensive State Groundwater Protection Program



Source: State of Hawaii Department of Health,
Environmental Planning Office

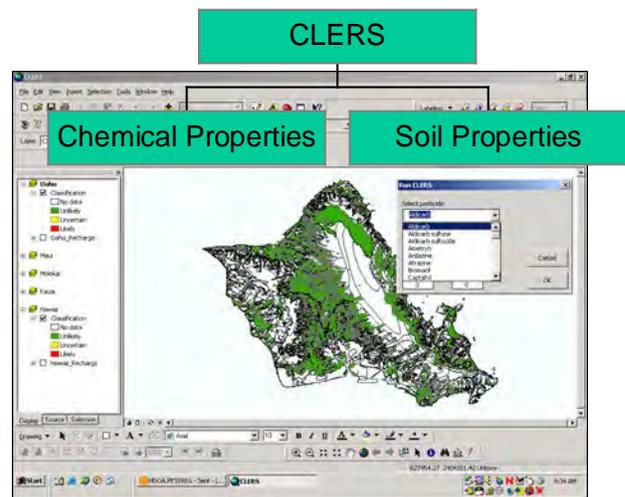
The following goals will guide the program's development and implementation:

- Provide the State with greater flexibility to direct its Groundwater Protection (GWP) activities relative to various sources of contamination across the federal, state, and local programs and geographic areas, to achieve comprehensive resource-based ground water protection.
- Increase coordination between related programs to improve effectiveness and reduce duplicate efforts that cause ineffective expenditures of resources by the various Groundwater Protection programs.

- Demonstrate the State's proactive approach to Groundwater Protection, thus justifying increased funding for program development and additional flexibility from the EPA and other federal agencies.
- Clearly delineate the appropriate roles of federal, state, and local governments as partners in ground water protection and define processes for coordinating efforts between programs.
- Establish a mechanism for better recognition and understanding of the relationships between ground water quantity and ground water quality concerns.
- Improve public understanding of Groundwater Protection concerns within the State, and provide a broader context for public participation.
- Build a consensus across all levels of government, regarding the need for comprehensive Groundwater Protection and the basic structure of comprehensive protection programs.

Current Program Status

- Recent Monitoring Projects Completed
 - Lahaina Groundwater Tracer Study
 - Hawaiian Paradise Park Shallow Groundwater Quality Monitoring
 - PPCP Leachability Model Monitoring Project
 - Historical Detections and Drinking Water Monitoring
 - Atrazine/Degradation By Product Monitoring
 - Pharmaceutical and Personal Care Products Monitoring
- The GWP Program works collaboratively with various government agencies and programs to provides assistance on groundwater protection related activities, including Wastewater Branch (cesspools and water reuse), Department of Agriculture (pesticides), and the Safe Drinking Water Branch (underground injection control program).
- Promotes public education and outreach activities on various aspects of groundwater protection through its involvement with the County Fairs, Earth Day events, participation in Statewide Project WET (Water Education for Teachers) Program, as well as collaborating on education/outreach activities with other government agencies such as the County Water Departments and the City & County Stormwater Quality Program.



Lahaina Tracer Study



Sampling of public water systems

Contaminant Leaching Model



Sampling of shallow private groundwater wells



SDWB Judging Water-Related Projects at Hawaii State Science and Engineering Fair



SDWB Participating in Earth Day event at UH-Hilo



Joint Government Water Conference



Maui Wellhead Protection Community Meeting

Recommended Actions

DOH plans to complete the development and implementation of a Comprehensive State Groundwater Protection Program by the end of 2020. The program plan has six (6) strategic activities intended to foster more efficient and effective protection of ground water. The strategic activities are:

1. Establish specific Groundwater Protection goals to guide the relevant federal, State, and local programs operating within the State;
2. Establish priorities, based on a characterization of the resource, identification of sources of contamination, and delineate the program's needs, to guide relevant federal, state, and local programs and activities;
3. Define authorities, roles, responsibilities, and resources, and coordinating mechanisms between relevant federal, State, and local programs to address identified Groundwater Protection priorities;
4. Define the necessary efforts consistent with the established priorities, detail the responsibilities of each program, and the coordination mechanisms between programs necessary to implement these efforts;
5. Evaluate the effectiveness of the Groundwater Protection efforts by coordinating information collection to measure progress made toward the specific Groundwater Protection goals, then re-evaluate priorities and methods, and revise as-needed to increase the effectiveness of all ground water related programs; and
6. Improve public education and participation in all aspects of Groundwater Protection.

For more information, please visit: <http://health.hawaii.gov/sdwb/monitoring/>

4.4. Groundwater Contamination Viewer (Maps)

The Groundwater Contamination Viewer has eliminated the tedious nature of developing yearly updated maps using GIS software, as the maps are now more easily updated and are made more readily available to the public. The Groundwater Contamination Viewer for the State of Hawai'i represent current information available to the DOH and are based on monitoring data for public drinking water wells, select non-drinking water wells (such as irrigation and industrial wells), and fresh water springs. Besides generating its own data, the DOH accepts data from other testing agencies such as the University of Hawai'i, Hawai'i Department of Agriculture, Hawai'i Department of Land and Natural Resources and the U.S. Geological Survey.

These maps identify organic contaminants that have been detected by the DOH and other agencies and have been confirmed through repeat testing in drinking water wells, select non-potable wells, and fresh water springs throughout the state. Organic contaminants are generally a measure of human impact on the environment, since they rarely occur naturally. Contaminants include herbicides, pesticides, industrial solvents, fuels and other sources that are applied, spilled, leaked, or disposed of into the ground. Groundwater contamination is an especially significant concern in Hawai'i since nearly all of Hawai'i's drinking water comes from groundwater sources.

The intent of the Viewer is to identify only those wells with detectable levels of groundwater contamination. This is done by reporting the actual groundwater contamination, or the quality of the water directly out of the ground prior to any treatment to remove contaminants. Naturally occurring contaminants are not included in these reports. Not all contaminated wells are listed due to a lack of confirmed data and reporting, or because they have not yet been tested. Levels of groundwater contamination may fluctuate for a number of reasons, including actual diminishing or increasing levels of contamination, chemical breakdown of contaminants, variability in sampling and analytical methods, the effects of pumping rates, and other factors. Groundwater sources previously reported as contaminated, but later tested negative for contaminants are no longer included in this report. Some data is extremely out-dated due of the inaccessibility of the source, or lack of resources to perform resampling.

The Viewer shows that groundwater contamination continues to occur in Hawai'i. Our knowledge base concerning chemicals continues to grow about the contamination potential of many chemicals, their behavior as they travel down the soil column, their degradation or lack of degradation, the mechanisms that serve to promote or restrict groundwater contamination, and much more. Today, many activities strive to prevent groundwater contamination through regulation and clean-up requirements. Unfortunately, contamination initiated years ago, and prior to these activities, may just now be showing up in our groundwater. Further, the use of new and innovative chemicals will continue to challenge our groundwater protection efforts. Therefore, the ability of the Viewer to be more regularly updated is important in order to ensure the health and safety of Hawai'i residents.

For more information, please visit: <http://health.hawaii.gov/sdwb/groundwater-contamination-viewer/>

4.5. Drinking Water State Revolving Fund Program

The Drinking Water Treatment Revolving Loan Fund is commonly known as the Drinking Water State Revolving Fund (DWSRF). The DWSRF must be administered, operated, and maintained to remain available in perpetuity to provide loans and other financial assistance to eligible public water systems for projects or activities eligible under HRS Section 340E-35 and the SDWA. In 1997, the Hawai'i State Legislature passed Act 218, which established a Drinking Water Treatment Revolving Fund that was able to receive a federal capitalization grant. It was further amended in 2009 by Act 98⁶.

Since 1997 the Hawai'i DWSRF has financed over \$344 million in county drinking water infrastructure improvement projects related to public health, including storage, treatment, source, and distribution. The resulting public health benefits and water and energy savings for over 1 million rate-paying residents statewide, coupled with the favorable debt service opportunity for the county entity (interest rates vary between 1% and 2% depending on the project loan amount), is a win-win for all parties. In addition, the DWSRF continues to provide additional subsidization (zero percent interest + principal forgiveness) to a select few projects, thus reducing the effective interest rate to even lower levels. Significantly, most of the DWSRF program's financed projects have benefitted *small water systems* serving less than 10,000 persons.

For example, the Hakalau Spring Improvements Project for the Hawai'i County Department of Water Supply's (HDWS) Hakalau-Wailea water system, PWS #154 (population: 400) consisted of construction improvements to an existing spring-fed drinking water source that was periodically contaminated by storm waters. This condition would have forced the HDWS to construct a costly filtration plant and undertake rigorous monitoring of drinking water quality at the plant and in the distribution system based on new federal drinking water rules. Instead, the County utilized a \$606,167 DWSRF construction loan to demolish the existing spring box and build a newer, more robust and secure enclosure that eliminated the potential for storm water contamination, thus preserving a pristine spring source for drinking water use, and avoiding the need for costly treatment and monitoring.

The DWSRF program has also been marketing to privately-owned water systems to let them know that the program will be able to provide low interest loans to non-county systems beginning in SFY 2019.

For more information, please visit: <http://health.hawaii.gov/sdwb/drinking-water-state-revolving-fund/>



⁶ To see HRS Section 340E-35, visit: http://www.capitol.hawaii.gov/hrscurrent/Vol06_Ch0321-0344/HRS0340E/HRS_0340E-0031.htm

4.6. Environmental Indicators

Percentage of Population Served Safe Drinking Water

Drinking water that exceeds Maximum Contaminant Levels (MCLs) creates a risk of harm to human health. In calendar year 2018, 100% of Hawai'i's residents and visitors were served drinking water that fell below all of the MCLs on a monthly basis. Even using conservative assumptions, the compliance rate has consistently exceeded 95.0%. Whenever a violation is found in a public water system, the public is notified through electronic media, hand-delivered notices, or published notices. About 40,000 persons are served by small, unregulated systems such as individual home rainwater catchment systems. These systems are excluded from the indicators shown in the table. SDWB employs many programs to strengthen public water system protection.

Table 9. Percentage of Population Served Safe Drinking Water

Calendar Year	Total Population Served Drinking Water	Population Served Water Below MCLs*	Percentage Population Served Water in Compliance with MCLs*
2007	1,341,430	1,329,748	99.1%
2008	1,416,384	1,411,729	99.7%
State Fiscal Year			
2009	1,440,715	1,432,116	99.4%
2010	1,471,887	1,470,664	99.9%
Calendar Year			
2011	1,473,960	1,472,420	99.9%
2012	1,476,931	1,476,931	100%
2013	1,505,329	1,448,126	96.2%
2014	1,505,329	1,489,254	98.93%
2015	1,507,848	1,502,032	99.61%
2016	1,513,713	1,512,713	99.93%
2017	1,513,713	1,513,361	99.99%
2018	1,514,058	1,514,025	100.00%

* Maximum Contaminant Level

Cumulative Sanitary Surveys of Safe Drinking Water Systems

One of SDWB's most significant responsibilities is conducting sanitary surveys because they provide a review of the water system field conditions. Sanitary surveys are conducted periodically to determine the condition of various aspects of the public water system including sources, facilities, record-keeping, management, financial status, and operation. DOH's goal is to regularly conduct "Sanitary Surveys" of all public water system source, treatment, and distribution operations over a five-year period. There are a few public water systems which are on a three-year sanitary survey cycle.

Table 10. Cumulative Sanitary Surveys of Drinking Water Systems

Calendar Year	Target Number of Systems Surveyed Annually	Surveys Actually Completed Annually	Target Cumulative Number of Systems Surveyed	Actual Cumulative Number of Systems Surveyed
2007	26	23	26	23
2008	26	31	52	54
2009	26	28	78	82
2010	26	27	104	109
2011	26	41	130	150
2012	26	43	130	193
2013	26	20	132	213
2014	26	28	208	241
2015	26	28	234	269
2016	26	28	260	297
2017	26	37	286	334
2018	26	25	312	359

Source: Department of Health, Safe Drinking Water Branch (SDWB) completed surveys as of 12/31/2018.

Note: SDWB tries to do at least 26 surveys a year so that each system is inspected at least every 5 years. The five-year cycle began in 2017.

5. Wastewater Branch (WWB)

At the moment the Wastewater Branch is very focused on upgrading and eliminating cesspools. A cesspool is used to dispose of urine and feces, and more generally of all sewage and refuse. It is a much more antiquated solution than a sewer system.

5.1. Upgrading and Eliminating Cesspools

In March of 2016, DOH announced that Governor David Ige signed new Wastewater System rules that banned the construction of new cesspools statewide. New rules also implement a 2015 law providing a tax credit of up to \$10,000 for cesspools upgraded to sewer or septic systems during the next 5 years,



CESSPOOL WITHOUT ITS COVER

limited to \$5 million or about 500 cesspool upgrades per year. Wastewater treatment facilities and septic systems treat wastewater before discharging it to the environment, but cesspools do not. Cesspools are little more than holes in the ground, an outmoded 15th century technology that discharges raw, untreated human waste directly into the ground, where it can spread and contaminate ground water, drinking water sources, streams, and the ocean by releasing disease-causing pathogens. Therefore, it is important for the health of the public and the environment to rid of cesspools.

The Wastewater Branch is proposing that when connection to a wastewater collection system is not practical, a septic system should be installed to contain and treat wastewater before disposal. A septic system allows solids to settle in a tank where anaerobic organisms slowly digest organic solids and allow liquids to flow into a shallow absorption bed. A proper soil bed has a biologically active area in the first three (3) feet of the soil layer where oxygen can support microorganism activity that neutralizes pathogens. The studies indicate that soil treatment is very effective in removing bacteria (fecal coliform was only 13 colony forming units (cfu) per 100 milliliters (mL) in leachate after soil treatment, versus 1,000,000 cfu/mL for cesspools).⁷ Septic systems with soil treatment also greatly reduce the amount of nitrogen and phosphorus compared to cesspools. An evaluation using the data from the Whittier and El-Kadi studies indicates that replacing cesspools with septic systems with soil treatment would reduce nitrogen discharges by more than 90% and phosphorus by more than 80%.

In contrast, when waste is delivered directly into subsoil that is too coarse or lacks oxygen, as usually happens with cesspools, biological activity to treat wastewater cannot be supported. Coarse, porous soil conditions and fractured lava or lava tubes are a problem particularly on the island of Hawai'i (Big Island), where the majority of the cesspools in the State are located. Porous rock cannot effectively filter

⁷ Wittier, B. & El-Kadi, A. I. (2014). Human Health and Environmental Risk Ranking of On-Site Sewage Disposal Systems for the Hawaiian Islands of Kauai, Molokai, Maui, and Hawaii.

wastewater but instead allows easy flow within tubes and caves, as documented by the Hawai'i Chapter of the National Speleological Society.⁸ Other potential contamination arises from cesspools along the coast in close proximity to the ocean and/or ground water table.

Hawai'i was the only state in the US that allowed construction of new cesspools. There are currently approximately 90,000 cesspools in the State—nearly 50,000 located on the Big Island, almost 14,000 on Kauai, over 12,000 on Maui, over 11,000 on Oahu, and over 1,400 on Molokai. Each year an additional 800 new cesspools were approved for construction.

Hawai'i's cesspools release approximately 55 million gallons of untreated domestic wastewater into the ground each day. Untreated wastewater contains pathogens such as bacteria, protozoa, and viruses that can cause gastroenteritis, Hepatitis A, conjunctivitis, leptospirosis, salmonellosis, and cholera. Pharmaceuticals in wastewater, including disruptive hormones, also may adversely affect human health and aquatic organisms.

Hawai'i's cesspools also release as much as 23,700 pounds of nitrogen and nearly 6,000 pounds of phosphorus into the ground each day, which can stimulate undesirable algae growth, degrade water quality, and impact coral reefs. Health risks from cesspool chemical contamination include methemoglobinemia (or blue baby syndrome), when elevated nitrogen levels interfere with the transport of oxygen in the blood stream of young children.



WASTEWATER FROM A LEAKING CESSPOOL

Studies performed for DOH have designated “receptors of concern” as sensitive ecosystems that can potentially be adversely affected by cesspool effluent, or areas where potential human contact with cesspool contaminated waters may occur. These studies considered three (3) receptors of concern: (1) drinking water sources; (2) streams and watersheds; and (3) coastal waters. Setback zones were delineated around each receptor of concern based on either a fixed distance or a groundwater time of travel to the receptor of concern. Based on these studies, it was determined that there are approximately **87,000** cesspools that pose a risk to Hawai'i's water resources. The purpose of these studies was to identify the cesspools and other individual wastewater treatment systems that have the potential for adverse receptor of concern impact. The presence of a cesspool within a receptor of concern's setback zone is considered to have the potential for a negative impact.

Cesspool effluent can also negatively impact drinking water wells by introducing biological and chemical contamination into a well's intake. Two (2) setbacks were delineated for public drinking water wells based on the ground water travel time to the well intake. A two-year time-of-travel setback for drinking water wells identifies those cesspools that have the potential to introduce chemical and biological contamination into a well. It is assumed that pathogens will not survive longer than two (2) years, but chemical contamination can persist much longer. A 10-year time-of-travel setback identifies those cesspools located near enough to a drinking water source that chemical decay and mixing with other ground water may not be adequate to ensure the desired quality of water captured by the drinking water well. There are approximately 2,700 cesspools that are located in areas within a two (2) year

⁸ Halliday, W.R. Raw sewage and solid waste dumps in lava tube caves of Hawaii Island

time-of-travel to the intake of a public drinking water well. An additional 3,200 cesspools are located within a 10 year time-of-travel to a public drinking water well.

Cesspool effluent entering a stream can introduce pathogens and increase the nutrient loads in the streams, resulting in excessive plant growth. A 200 foot setback from the stream channel identifies those cesspools with the potential to introduce both pathogen and nutrient contamination to a stream. Perennial streams depend on discharge of groundwater to the surface water to support stream flow during periods with no or little rainfall. Cesspools located within a perennial watershed can increase the nutrient load of the streams within that watershed.

There are approximately 6,700 cesspools located within 200 feet of a perennial stream channel in the State. There are approximately 31,000 cesspools located within perennial watersheds on the islands of Hawai`i, Kauai, Maui, and Molokai. The number of cesspools within perennial watersheds on Oahu was not evaluated.

As with streams, cesspool effluent can introduce pathogens and nutrients to the coastal waters. The 200 foot coastal setback identifies those cesspools with the highest potential to introduce pathogen and nutrient contamination into the coastal waters. The two (2) year time-of-travel setback identifies those cesspools that have the potential to increase the nutrient load in the coastal waters. There are approximately 1,900 cesspools located within 200 feet of the shoreline and 41,000 cesspools within the two (2) year time-of-travel of ground water to the shoreline.

The studies indicate that Hawai`i Island and Kauai have the most high-risk areas for water quality degradation from on-site disposal systems:

- **Hawai`i Island:** The northeast coast and west coast from Hualalai to south of Captain Cook have elevated risk of harm to coastal waters and drinking water. Hilo has high concentrations of on-site disposal systems. The Keaau/Mountain View District has an even higher concentration of on-site disposal systems—50% higher than the level EPA considers “high density.” Hydrologic studies in the Keaau area indicate that the infiltration time of water from the ground surface to the water table is on the order of several hours to a few days.⁹ This infiltration time is much shorter than the survival time of many pathogens, so there is a higher risk of pathogens entering the water table.⁵ Hawaiian Paradise Park has about 4,100 cesspools in proximity to over 200 private domestic drinking water wells. DOH has found a troubling rate of human waste bacteria detection (fecal coliform) in 12% of the 57 drinking water well samples collected in Hawaiian Paradise Park. Pahoa, Kapoho, Pahala, Naalehu, Hawaiian Ocean View Estates, and Waimea are also areas of elevated risk.
- **Kauai:** In Wailua/Kapaa, there is a dense clustering of on-site systems in perennial watersheds and within a two-year travel time to the ocean, with higher risk of harm. The south shore from Poipu to Hanapepe, and Nawiliwili also have high risks.
- **Maui** has the highest number of on-site systems within the specified zones of contribution for drinking water wells, especially in up-country, but also in the Iao and Waihee Aquifer Sectors. There are elevated risks in coastal zones in Kaanapali, Kihei to Makena, Waihee/Waiehu, and the coastal area fronting the northwest slope of Haleakala.

⁹ Novak, E. A. (1995). A Conceptual Model of Shallow Groundwater Flow Within the Lower East Rift Zone of Kilauea Volcano, Hawaii.

- On **Oahu**, Koolauloa, Pupukea-Sunset Beach, Kahaluu, and Waialua are the areas with highest risk.
- On **Molokai**, there is elevated risk near the coast fronting the un-sewered areas near Kaunakakai.

Hawai'i is behind all other states in eliminating cesspool pollution. Even Rhode Island, which has the second largest number of cesspools in the nation (25,000), banned the construction of new cesspools **46 years ago** in 1968. Rhode Island's Cesspool Act of 2007 mandates replacement of cesspools that are located within 200 feet of shoreline or wells. Other states, including Iowa, New Jersey, and Massachusetts, require cesspools to be upgraded to septic systems whenever property ownership changes. Requiring cesspool upgrades when property is sold makes sense because the cost of the upgrade can be shared between the buyer and seller at a time when sellers, with proceeds from the sale, are better able to afford upgrading costs, and buyers, who are usually borrowing already for their purchase, may obtain additional financing for eliminating a cesspool.

The conditionally approved Coastal Nonpoint Pollution Control Program identifies on-site wastewater disposal systems as one of four remaining conditions Hawai'i must address in order to gain full approval of the program. There are approximately **87,000** cesspools in Hawai'i that pose a potential risk to our water resources.

Current Program Status: The Wastewater Branch seeks to protect public health and preserve our natural resources by working on developing a long-range plan for cesspool conversions with other stakeholders. Act 125 of State Law Hawaii 2017 mandated that all cesspools not granted an exemption shall be upgraded or converted to a septic system or aerobic treatment unit or connected to a sewer system by 2050. Act 132 SLH 2018 established a Cesspool Conversion Working Group (CCWG) to develop a long-range, comprehensive plan for cesspool conversions statewide for all cesspools not granted an exemption by 2050.

For more information, please visit: <http://health.hawaii.gov/wastewater/cesspools/>

Approximate Number of Cesspools by Island

Island	Number of Cesspools	Percent of State
Hawai'i	50,000	57%
Kauai	14,000	16%
Maui	12,000	14%
Oahu	11,000	12%
Molokai	1,400	2%
TOTAL	88,400	100%

Source: Department of Health, Wastewater Branch



5.2. Clean Water State Revolving Fund Program

The Federal Water Quality Act of 1987 (the Act) created the State Revolving Fund Loan Program (commonly known as the Clean Water State Revolving Fund). The Act authorized low interest loans for the construction of publicly owned wastewater treatment works (POTWs), for implementation of a nonpoint source (NPS) pollution control management program, and for implementation of an estuary conservation and management program. In 1988, the Hawai'i State Legislature passed Act 365 establishing a State Water Pollution Control Revolving Fund to receive the federal capitalization grant. This Act was later superseded by HRS Chapter 342D-Part V.



The Clean Water State Revolving Fund Program assists in financing the construction of water pollution control projects necessary to prevent contamination of our ground water and coastal water resources and to protect and promote the health, safety, and welfare of the citizens of the State of Hawai'i. The Program provides low interest loans to county and state agencies to construct point source and nonpoint source water pollution control projects. Since it was established in 1988, the Program has issued over \$900 million in low interest loans, providing significant savings in interest costs to the counties.

The Clean Water State Revolving Fund Program will assist with financing projects that will protect the public health and environment from both point source and non-point source pollution. It has provided funding to Hawai'i and Kauai Counties for the replacement of large capacity cesspools. Kauai County used the funds to replace 27 large capacity cesspools for County parks and facilities. Hawai'i County used the funds for three (3) large capacity cesspool replacement projects, Komohana Heights LCC Replacement, Honokaa LCC and Queen Liliuokalani Village LCC Replacement. A total of 47 large capacity cesspools were closed as a result of these projects. The County of Hawai'i also used the funds to replace 90 large capacity cesspools at County parks and facilities.

The Clean Water State Revolving Fund Program also provides assistance to the Counties to use reclaimed water. The Program provided funding to the County of Kauai for their Waimea Wastewater Treatment Plant Expansion, Phase I Project. The project involved expanding the treatment plant capacity from 300,000 to 700,000 gallons per day and allowed new sewer service connections which were restricted due to lack of treatment capacity. The project has incorporated UV disinfection to produce R-1 quality water that can be used on the dry westside of the island of Kauai. In addition to contributing to water efficiency, a 124 kW photovoltaic system was constructed to provide renewable energy to make the plant more energy efficient.

For more information, please visit: <http://health.hawaii.gov/wastewater/home/cwsrf/>



6. Compliance and Enforcement

The Clean Water Branch and Wastewater Branch carry out enforcement cases for violations of water pollution control laws. The Safe Drinking Water Branch carries out enforcement cases for violations of safe drinking water laws and underground injection control laws. The branches conduct field inspections, issue warning notices and field citations, initiate enforcement cases, and resolve formal cases. The penalty funds received for each year vary based on whether payments are collected once at the close of an enforcement case, or incrementally, based on an agreed-upon payment schedule. The penalties sought and received provided in the tables below do not take into account costs incurred by alleged violators for Supplemental Environmental Projects (SEPs) as a result of a settlement with DOH. SEPs are environmentally-beneficial projects related to the violation at issue, where costs for the SEPs are paid in exchange for a reduction in penalty amount.

For more information on CWB Compliance Section, please visit: <http://health.hawaii.gov/cwb/clean-water-branch-home-page/about-cwb/history-and-mission-statement/>

For more information on SDWB Compliance Section, please visit: <http://health.hawaii.gov/sdwb/compliance-section/>

For more information on WWB Construction and Operations Section, please visit: <http://health.hawaii.gov/wastewater/>

Challenges and New Initiatives

7. Intra-agency Coordination

One of the greatest challenges that the Clean Water Branch, Safe Drinking Water Branch, and Wastewater Branch face is finding ways to more effectively coordinate and collaborate amongst their programs and individual sections. Each program must meet its own legal requirements, and often it is difficult to spend the time and energy necessary to take a step back to see how the work of each fits into the bigger picture in terms of watershed-based and statewide water quality protection and restoration.

To better address this issue, the Water Branches co-hosted working sessions in June 2014 with the U.S. EPA Region 9 staff members. The goal of the meetings was to re-introduce the tools each program has to better implement the watershed-based approach. Examples of these tools included a more clear understanding of the funding sources available (e.g., CWA 319(h) grants, Clean Water State Revolving Fund, and Drinking Water State Revolving Fund) and the interconnectedness of the work accomplished cross-programmatically. Some new initiatives that the water programs discussed with EPA at the June 2014 meetings included development of planning and assessment to better target staff and funding resources for project implementation, such as:

- 1) Development of a Standardized Water Quality Assessment Methodology to better streamline monitoring conducted for NPDES permits, CWA 319(h) projects, and DOH Beach Monitoring;
- 2) Development of Regional Monitoring Plans;
- 3) Development of a prioritization matrix to prioritize impaired waterbodies and determine priority watersheds; and
- 4) Development of TMDL –Watershed Based Plans (Hybrid Plans) to fulfill dual purposes of TMDL implementation in National Pollutant Discharge Elimination System (NPDES) permits as well as Watershed Based Plan (WBP) funding eligibility under CWA 319(h) grants.

Since these meetings, the Water Branches continue to meet with the EPA Region 9 to review the success of these plans and to develop on-going projects.

8. Inter-agency Coordination

The Water Quality Plan also provides a unique opportunity to identify areas for inter-agency coordination and resource-sharing, as discussed in the Statewide Framework for Updating the Hawai'i Water Plan. The Safe Drinking Water Branch met regularly with the Commission on Water Resource Management to discuss water issues and ground water protection projects, and the Water Quality Plan update and the Commission's ongoing update of its Water Resource Protection Plan, provide an opportunity to pinpoint places where the agencies can pool resources and share information about areas of concern. In addition, DOH's Environmental Information Manager has developed systems that allow for data sharing between Branches and Programs that are also available to other agencies and the public, which provide detailed environmental information about particular locations or sites around the State. For example, the recently-updated Environmental Health Warehouse allows users to search for facility owner's name, the type, ID number, and effective date of environmental permits, and geopolitical data about the site, including watershed and congressional and council district. This provides the opportunity for agencies to locate the point sources, nonpoint sources, and natural features in an area, and collaborate around planning and pollution control in that watershed.

For more information, please visit: <http://eha-web.doh.hawaii.gov/ehw/>

9. Funding Issues

One of the other challenges DOH's water programs face is re-building their workforce after losing staff to the 2010 reduction-in-force, and retirement. Recently, Clean Water Branch has been able to fill previously vacant positions to issue NPDES permits, and to conduct more regular water quality monitoring, research, and assessment, and it will soon fill vacant positions in the Polluted Runoff Control Program (Planner IV) and Monitoring & Analysis Section (Water Quality Standards Specialist).

In this Bienium Legislative Session, the Safe Drinking Water Branch requested three (3) Environmental Health Specialists positions for Kauai, Maui, and Kona. In addition, in 2015, it established a Geologist I, General Professional IV, and Chemist IV to assist with the Drinking Water State Revolving Fund fifteen percent (15%) set-aside, Wellhead Protection – Financial Assistance Program and Technical Assistance. Vacant Engineer and Environmental Health Specialist are in the process of being filled. Two (2) Geologist I positions will be established to ensure continuity of operations in the UIC Program.

The Wastewater Branch is still trying to prioritize its workload after losing a total of eight (8) positions to the reduction-in-force. There are approximately 110,000 existing Individual Wastewater Systems (IWSs) and 250 wastewater treatment plants in the State and every year, the total number of new individual wastewater systems (IWSs) is increased by approximately 800 – 1,000. The number of new wastewater treatment plants is also increasing at a rate of 5-10 per year. Wastewater Branch currently has a limited number of staff (12) to assist with managing these two (2) programs. It does see the need to hire additional staff, however, finding the funding to support these new positions has been a challenge.

With a greater focus on collaboration, the targeting of resources under the watershed-based approach, and with a fuller staff, the Clean Water Branch, Safe Drinking Water Branch, and Wastewater Branch look forward to what lies ahead as they continue to protect and restore Hawai'i's precious water resources.

10. Climate Change

Climate change is having broad-reaching effects in Hawai`i, the United States and throughout the world. The DOH Water Programs are taking climate change into account as they move forward with their water quality work. DOH's Clean Water Branch is planning to conduct studies to examine the effects of changing weather patterns and ocean chemistry as a result of climate change as it works to update its Water Quality Standards. Also, to help alleviate future water supply uncertainties related to the changing climate, the Wastewater Branch updated its Guidelines for the Treatment and Reuse of Recycled Water to promote increased water reuse for activities such as landscape irrigation, which reduces the amount of drinking water that is used for these purposes. This is particularly important because some of Hawai`i's drinking water wells have experienced and will continue to experience an increase in salinity as sea levels rise over the next several decades, and water reuse helps to reduce the pressure on drinking water supplies. In addition, DOH is working with other agencies and groups throughout the state to increase collaboration, streamline decision-making processes, and promote information-sharing related to climate change to help elevate awareness of environmental impacts and the need for adaptation. The State of Hawai`i is in the process of developing policies and plans for climate change adaptation that will apply to many of the State's agencies. The Governor, State Office of Planning, and the Department of Land and Natural Resources are taking the lead on developing these policies. There were many climate change bills proposed in the 2019 Hawaii Legislative Session.

For more information, please visit: <http://health.hawaii.gov/epo/climate>

Section III: Water Quality Support



1. Water Quality Supporting Activities

In addition to the ongoing Water Program activities discussed in Section II., there are also many other Branches and Offices within DOH that do not focus solely on water issues, but nonetheless do work that assists the Water Programs with protecting State water quality. This includes diverse activities such as:

- Analyzing water samples;
- Monitoring groundwater near landfills;
- Directing cleanups of releases of hazardous materials to protect surface and groundwater supplies;
- Assisting with the creation of Water Quality Standards maps; and
- Helping develop on-line information systems that allow for improved coordination and data-sharing both between DOH Branches, and with other agencies and the public.

The following Section discusses these various Division, Branches and Offices, and their contributions to assessing and improving water quality in Hawai'i.

2. State Laboratories Division

The State Laboratories Division's (SLD's) Environmental Health Analytical Services Branch (EHASB) and District Health Laboratories (Maui, Kauai, and Big Island of Hawai'i) provide the Department of Health programs various types of analytical support related to water quality, including both routine regulatory monitoring and special projects support to DOH's Safe Drinking Water and Clean Water Branches. The laboratories are credentialed by US EPA directly (EHASB) or through the SLD's primacy to certify laboratories (District Health Labs), which is a prerequisite to performing regulatory analyses of drinking water. Regulatory and investigative sample analyses adhere to available EPA-approved methods and strict quality assurance protocols.

New chemistry instrumentation has been scheduled for purchase within the next year. These instruments will replace aging or obsolete instrumentation. In previous years, the acquisition of a purge-trap-gas chromatograph-mass spectrometer (PT-GC-MS) provided faster turn-around times with definitive identification of contaminant volatile organic compounds in drinking water samples. Definitive identification of volatile organic compounds (VOC) was not possible with the old PT-GC method. Other replacement instruments included ICP-MS for heavy metals and HPLC for carbamates analyses. The SDWB continues to provide funding for the maintenance of the equipment.

The EHASB has filled positions, including the Drinking Water Microbiology supervisor and a Water Quality Assurance Microbiologist position that are vital to the laboratory. The new staff will allow the Branch to meet the program needs.

The SLD and EHASB administer the Drinking Water Lab Certification Program, which provides drinking water laboratory certification for laboratories performing regulatory analyses. There are currently five (5) chemistry and nine (9) microbiology laboratories that are inspected, audited, and certified annually. There are 35 mainland laboratories approved for analytical chemistry and two (2) microbiology laboratories for cryptosporidium using a combination of state reciprocity, third-party certification, and documentation audits. No out-of-state laboratories are approved for microbiology analyses because of transportation limitations. This certification program performs admirably on annual EPA audits.



2.1. Laboratory Testing

The EHASB and District Health Laboratories provide both routine regulatory monitoring and special projects support to DOH's SDWB and CWB. In 2015 and 2016, the State Laboratory examined 74,481 samples and conducted 16,132 tests. In 2016, drinking water special projects included sodium levels in groundwater on Big Island and detection of atrazine and degradation products in ground water. In 2015 and 2016, clean water special projects included wastewater investigations and joint projects with the University of Hawai'i.

Data from 2017 to 2019 is not available. Updates will be provided in next version of WQP.



3. Solid and Hazardous Waste Branch

The Solid and Hazardous Waste Branch (SHWB) operates under the Federal Resource Conservation and Recovery Act (RCRA) (42 U.S.C. § 6901 et seq.), HRS chapters 342G, 342H, 342I, 342J, and 342L, and relevant sections of HAR Title 11. All of the SHWB's various activities can benefit water quality because they help to prevent solid and hazardous waste from polluting surface and ground waters. The SHWB consists of the Hazardous Waste Section, Office of Solid Waste Management, Solid Waste Section, and Underground Storage Tank Section. The Hazardous Waste Section regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. The Office of Solid Waste Management oversees statewide solid waste planning and manages statewide recycling programs, such as the Hawai'i Electronic Device Recycling Program and the Deposit Beverage Container Program. The Solid Waste Section regulates solid waste management facilities, such as landfills, incinerators, transfer stations, and recycling, composting, and waste treatment facilities. The Underground Storage Tank Program regulates underground storage tank systems that store hazardous substances.

For more information, please visit: <http://health.hawaii.gov/shwb/>

3.1. Underground Storage Tank Program

The Program regulates underground storage tank (UST) systems, which store petroleum or hazardous substances. A UST is a tank, and any underground piping connected to the tank, that has at least 10 percent (10%) of its combined volume underground. In the latest rule update, effective July 15, 2018, previously deferred tanks that meet the definition of airport hydrant fuel distribution USTs, which are tank systems directly connected to underground hydrant piping used to fuel aircraft, and field-constructed USTs became subject to additional requirements including the installation of release detection and operator training. Owners and operators of regulated tanks are also now required to perform periodic walk through facility inspections, sump integrity testing, and to phase out outdated equipment.

The largest regulated UST facility, also a field-constructed tank system, is the Joint Base Pearl Harbor-Hickam Red Hill Bulk Fuel Storage Facility. Constructed between 1940 to 1943, this facility consists of 20 field-constructed underground storage tanks, each with a capacity of 12.6 million gallons. Two (2) of the 20 tanks are permanently out of service. The tanks currently contain jet fuel propellant (JP-5 and JP-8) and marine diesel fuel (F-76). Approximately 2.5 miles of pipeline to Pearl Harbor pump station service the tanks for delivery and dispensing. The Red Hill Bulk Fuel Storage Facility sits over a drinking water aquifer that services 25% of Oahu's population.

In response to a 27,000-gallon release from the facility, the U.S. Navy became subject to an enforceable agreement in 2015 called the Administrative Order on Consent (AOC). The DOH Solid and Hazardous Waste Branch, the Safe Drinking Water Branch and the U.S. Environmental Protection Agency are currently evaluating the risk of future releases at the Red Hill Bulk Fuel Storage Facility. An integral part of this evaluation is the installation of monitoring wells in and around the facility (Figure 2). Currently there are 14 monitoring wells that are sampled regularly, with three more approved and being developed.

Depending on the outcome of the evaluation, several options exist to minimize any identified threat and improve the Red Hill Bulk Fuel Storage Facility. These options include:

- Improvements in Fuel Storage Infrastructure, including Evaluation of Secondary Containment;

- Improvements in Tank Inspection, Repair and Maintenance Procedures ;
- Improvements in Evaluating and Controlling Corrosion and Metal Fatigue;
- Improvements in Leak Detection;
- Further Development of a Sentinel Monitoring Well Network (Figure 2);
- Groundwater Flow and Contaminant Transport Modeling; and
- Development and Implementation of Improved Catastrophic Release Contingency Plans, in Reference to Drinking Water Receptors (Figure 1).

Along with the existing State UST regulations, the work under the AOC ensures that this facility operates and is upgraded in a manner that is protective of the drinking water resource below it.

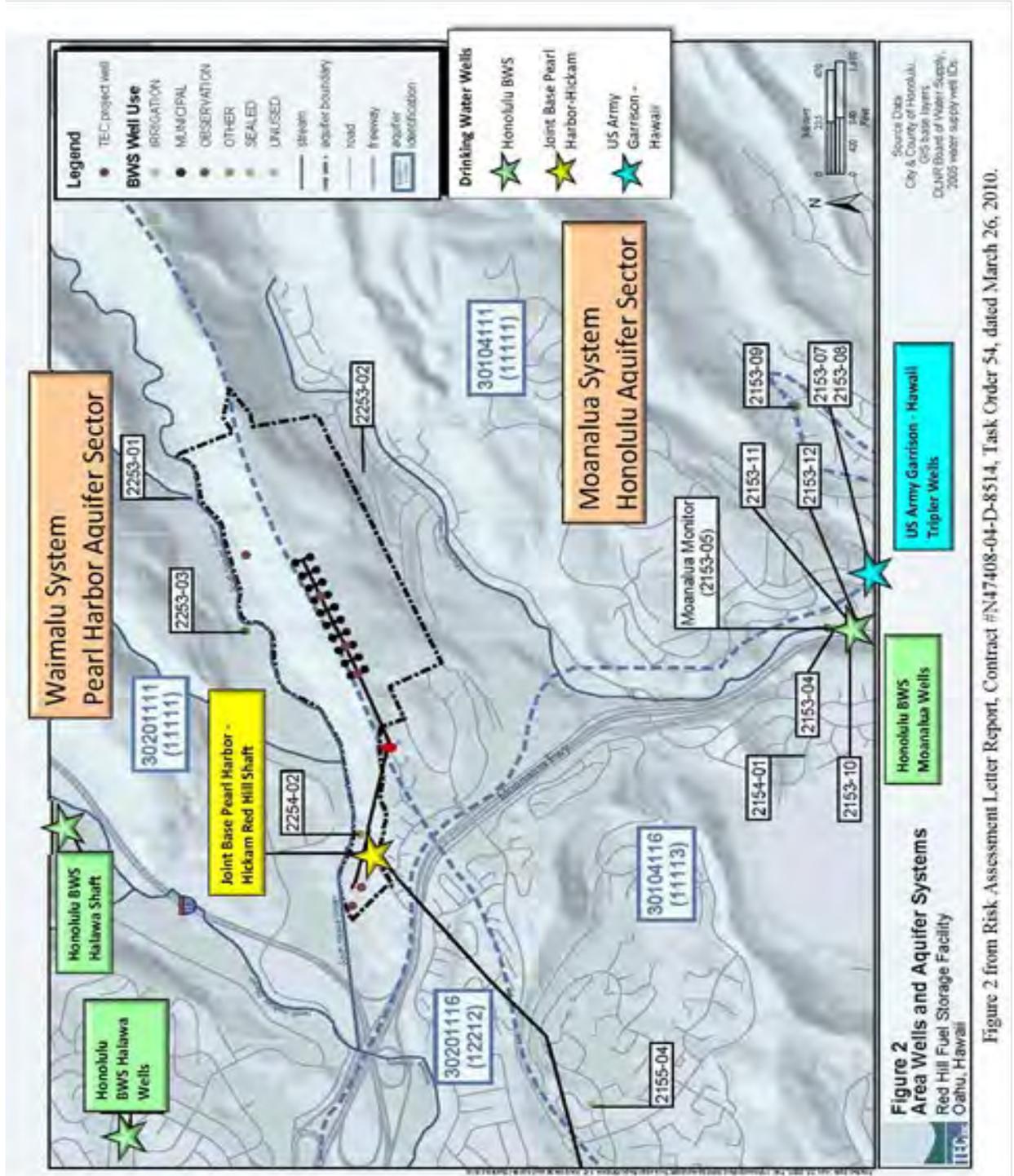


Figure 2 from Risk Assessment Letter Report, Contract #N47408-04-D-8514, Task Order 54, dated March 26, 2010.

Figure 1 Map of Drinking Water Receptors Relative to the Red Hill Tanks from Risk Assessment Letter Report, Contract N47408-04-8514, Task Order 54, dated March 26, 2010.

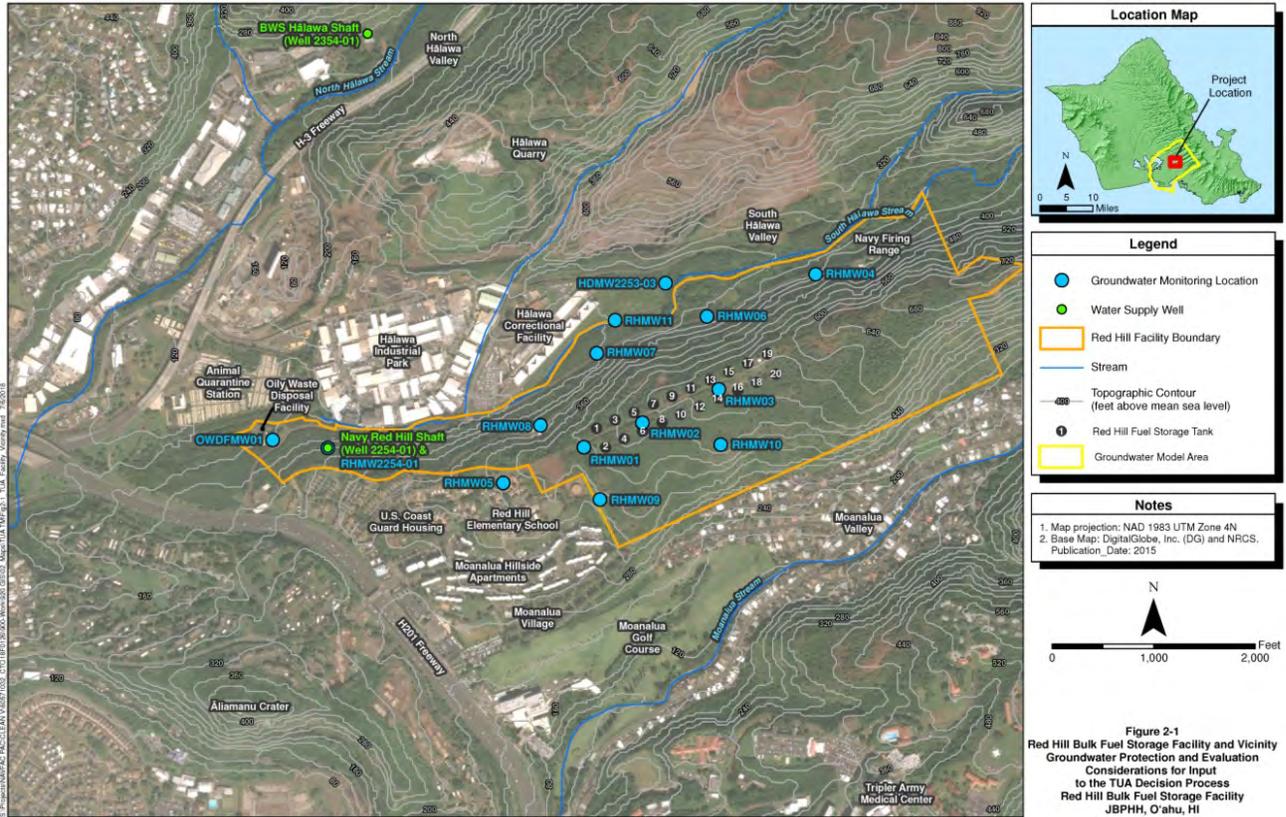


Figure 2 Map of 14 Monitoring Wells at the Red Hill facility from the Groundwater Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility, Contract # N62742-17-D-1800, CTO18F0126, dated July 27, 2018.

DOH conducts compliance inspections of Hawaii’s 742 regulated facilities, large and small, to ensure that they comply with State regulations. In 2017, the UST Program conducted 118 state-led inspections and issued 47 field citations. Failure to properly conduct or pass a test on spill prevention equipment at least every 365 days was the most common violation found.

In addition, the Solid and Hazardous Waste Branch (SHWB) project officers verify that UST owners and operators remediate any releases or spills from a USTs system. The table below summarizes the releases.

Table 11. Number of Leaking Underground Storage Tanks

Calendar Year	Total Tanks	Active Tanks	Closed Tanks	Confirmed Releases	Clean-ups Partially Addressed	Clean-ups Not Initiated	Cumulative Completed Clean-ups
2006	7,832	2,001	5,831	1,875	206	94	1,574
2007	7,916	1,895	6,021	1,909	192	86	1,631
2008	7,845	1,770	6,075	1,955	184	76	1,695
2009	7,873	1,701	6,172	1,989	154	80	1,755
2010	7,897	1,679	6,248	2,019	180	45	1,794
2011	7,904	1,639	6,265	2,037	142	35	1,860
2012	7,974	1,653	6,321	2,052	109	36	1,907
2013	7,990	1,657	6,333	2,053	109	37	1,907
2014	7,994	1,615	6,379	2,076	98	40	1,938
2015	8,018	1,602	6,416	2,103	96	46	1,961
2016	8,031	1,634	6,397	2,119	93	53	1,973
2017	8,043	1,555	5,488	2,134	95	49	1,990
2018	8,088	1,571	6,517	2,153	75	54	2,024

Source: Department of Health, Solid & Hazardous Waste Branch

3.2. Hazardous Waste Section

The Hazardous Waste Program is a regulatory program, authorized under HRS 342J, that oversees the proper management, handling, and disposal of hazardous waste in Hawai'i. Under HAR Title 11, Chapters 260.1-279.1, the State Hazardous Waste Program staff inspect, monitor, and if necessary, take enforcement action against businesses handling hazardous waste. These businesses include generators, transporters, and treatment, storage, and disposal facilities. The Program also permits certain hazardous waste and used oil activities, oversees corrective action, which includes clean-up of contaminated sites, and conducts compliance assistance and outreach to small businesses to help minimize their hazardous waste.

3.3. Solid Waste Management Program

The Solid Waste Management Program consists of the Solid Waste Section and the Office of Solid Waste Management. The Solid Waste Section issues permits, monitors compliance, responds to complaints and, if necessary, takes enforcement against solid waste management facilities, such as landfills, waste-to-energy facilities, transfer stations, composting operations, and remediation, salvage, and waste treatment facilities. The Office of Solid Waste Management oversees statewide planning of solid waste management through state- and county-developed integrated solid waste management plans, promotes waste diversion from landfills through outreach and education, and implements statewide recycling programs such as the Glass Advance Disposal Fee (ADF) program and the Deposit Beverage Container Program (DBC or "Hi-5"). The SHWB monitors the amount of waste disposed, diverted from disposal, and DBC redemption rate.

Table 12. Solid Waste Recycled in Hawai'i (in tons)

State Fiscal Year	Generated	Disposed	Diverted	Percent Diverted
2000-01	1,794,496	1,441,000	353,496	19.7%
2001-02	1,971,336	1,478,668	492,668	25.0%
2002-03	2,115,313	1,489,974	625,339	29.6%
2003-04	2,140,648	1,517,915	622,733	29.1%
2004-05	2,116,724	1,427,904	688,820	32.5%
2005-06	2,227,124	1,425,752	801,373	36.0%
2006-07	2,526,134	1,733,889	792,245	31.4%
2007-08	2,617,350	1,778,009	839,341	32.1%
2008-09	2,532,370	1,629,397	902,973	35.7%
2009-10	1,636,298	988,444	647,854	39.6%
2010-11	1,786,343	1,159,027	627,316	35.1%
2011-12**	1,593,887	1,147,194	608,857	38.2%
2013	2,471,320	1,566,642	904,678	36.6%
2014	2,300,696	1,455,078	845,618	36.8%
2015	2,417,650	1,377,611	1,040,039	43.0%
2016	NA	NA	NA	NA
2017	NA	NA	NA	NA
2018	NA	NA	NA	NA

Source: Department of Health, Solid & Hazardous Waste Branch

** Incomplete: Statistics for diversion and generation from the County of Maui are currently unavailable.

The state's solid waste management priority is to consider source reduction, then recycling and bioconversion over landfilling and incineration. The goal of source reduction is to create less waste in the first place, which can be done through the reuse of products or materials. The second priority is to recycle—the reuse of secondary resources that would otherwise be disposed as waste and is an integral part of a manufacturing process aimed at producing a marketable product; and/or to bioconvert, which includes composting.



4. Hazard Evaluation and Emergency Response Office

The mission of the Hazard Evaluation and Emergency Response (HEER) Office is to address all aspects of releases of hazardous substances and pollutants, including oil, into the environment. The HEER Office work includes preventing, planning for, and responding to hazardous substance releases, or risks of releases, including those into water. It accomplishes this mission by addressing contaminated sites with the highest risk to human health and the environment first, preventing contamination rather than cleaning up after the fact, and basing decisions on sound scientific principles and common sense. More information on the HEER office is available at: <http://eha-web.doh.hawaii.gov/eha-cma/Org/HEER/>

HEER Office Hazard Evaluation Section provides ecological and human health risk assessment, conducts toxicological assessments of chemical threats to human health, establishes appropriate cleanup levels for chemical contamination, and assists the public with information concerning the health effects of chemicals. HEER works closely with other programs to assess safety our drinking water supplies, local fisheries and recreational waters.

4.1. Pesticides

In 2013, in response to House Concurrent Resolution (HCR) 129, the HEER Office released a Legislative Report investigating current and historic uses of atrazine use in Hawai'i, its impact on groundwater and surface waters in the State. The study reaffirmed the safety of the drinking water supply and made recommendations to address data gaps. This report is available on line at: <http://co.doh.hawaii.gov/sites/Leg>.

To address data gaps identified in the Atrazine Report, and to address growing public concern about offsite impacts of pesticides used in large agricultural operations, HEER Office scientists worked closely with the Clean Water Branch (see Section II.C.i.b., above), DOA and USGS to develop and implement a Statewide Pesticide Sampling Pilot Project that was completed in early 2014. The study gathered data on the levels of 136 different pesticides in surface water at 24 sites around the state. For more information on the findings, and to see the draft report, please visit: <http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/pesticides>. HEER and DOA are currently gathering public input about the draft study and compiling recommendations for future actions.

In 2013, HEER worked with the University of Hawai'i Cancer Center to respond to numerous community inquiries regarding suspected elevated rates of cancer among residents of Kaua'i. Community members and medical professionals raised concerns on Kauai about the health impact on local communities from pesticides used by agricultural chemical companies. The Hawai'i Tumor Registry (HTR) evaluated the incidence of cancer on Kauai compared to the entire state of Hawai'i. The evaluation found that there is not a higher incidence of cancer for the specific geographic regions on the island, as compared to the state of Hawai'i overall. The report and a fact sheet, and other information about ongoing pesticide work at DOH are available on HEER's website at <http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/HDOH-Pesticide-Studies-and-Coordination-with-other-Agencies>.

For more information about the HEER Office, please visit: <http://eha-web.doh.hawaii.gov/eha-cma/Org/HEER/>

5. Environmental Resources Office

The Environmental Resources Office (ERO) provides administrative oversight, services, and technical assistance to all programs within EHA. This includes coordinating the State budgeting process, human resources management, financial management, procurement, fiscal administration of federal grants (including time and effort reporting), contract administration, assessment of program structure and effectiveness, and facilities requirements. Also, the ERO Water Revolving Fund Staff (WRFS) specifically provides loan management and financial administration for the CWSRF and DWSRF programs. In 2016, the ERO WRFS were administratively assigned to the Wastewater Branch.

5.1. Grants

Table 15. Number of Grants Managed

Type of Grant	2018
Surface Water Pollution Control	18
Drinking Water Protection	12
Solid Waste Management & Protection	3
Wastewater Treatment	8
Hazard Evaluation and Emergency Response	3
Information Management and Technology	5
TOTAL	49

Source: Department of Health, Environmental Resources Office

5.2. State Revolving Fund Loans

The ERO, WRFS (formerly known as the Grant Management (GM) section) is tasked with managing, tracking, and reporting the fiscal and loan activities of the Water Pollution Control Revolving Fund (WPCRF, also known as the Clean Water State Revolving Fund (CWSRF), and the Drinking Water Treatment Revolving Loan Fund (DWTRLF, also known as the Drinking Water State Revolving Fund (DWSRF)). For more information on these loan programs, see Section II.E. The WPCRF program was established in 1988 to provide below-market interest rate loans in perpetuity to county and state agencies for the construction of wastewater treatment facilities, as required by the CWA of 1987. Similarly, the DWTRLF program was established in 1997 to provide funding for drinking water infrastructure projects using the successful WPCRF program as its model. The DWTRLF is responsible for implementing the provisions of the Safe Drinking Water Act Amendments (SDWAA) of 1996 that require the fund to issue low interest loans to public water systems that need improvements. WRF staff issue loans, provide customer service to borrowers, track and report the project loan agreements, disburse loan funds, collect loan repayments, and oversee administrative expenses, financial reporting, cash management, and all other related activities.

Photo: Hawaii Loa Ridge, Oahu



6. Environmental Planning Office (EPO)

Due to federal EPA funding reductions, the EPO closed effective May 2, 2018 and no longer provides services. The information posted on the EPO website will temporarily remain in place for public reference. In the past, EPO assisted the entire Environmental Health Administration (EHA) with a variety of internal and external projects, including the creation of internal plans, strategic planning, land use reviews, legislative coordination, environmental justice, public outreach and communication.

For more information, please visit: <http://health.hawaii.gov/epo>



EPO administered an Environmental Geographic Information Systems (eGIS) program that provided support to the EHA programs with creating, analyzing, and mapping data. Managing people and environmental resources safely and effectively presents great challenges, and GIS facilitates informed decision-making by providing vast amounts of disparate information in the context of the geographic location as the key indexing variable.

The eGIS program collaborated with CWB to update the Hawai'i State Water Quality Standards Maps, which geographically depict the WQS set forth in HAR Chapter 11-54. The updated maps for the Main

Hawaiian Islands are available on the CWB's Water Quality Standards webpage at <http://health.hawaii.gov/cwb/clean-water-branch-home-page/water-quality-standards/>.

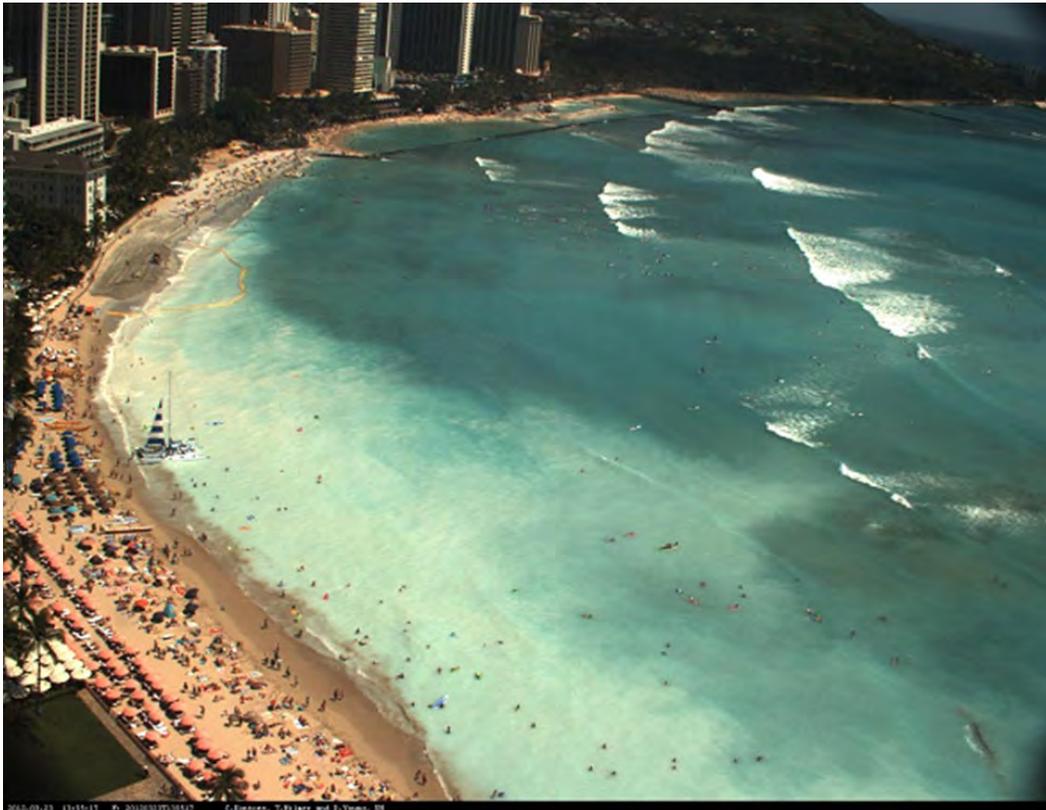


7. Compliance Assistance Office

In accordance with HRS § 342B-63, the Compliance Assistance Office is a one-stop, non-regulatory office that can assist small businesses understand and comply with the environmental regulations that DOH administers. The services the Compliance Assistance Office offers are confidential, free of charge, and provide a point of access to government to facilitate the exchange of information and communication. As a neutral party and mediator, the office can help by investigating and resolving disputes and increase DOH's and other government agencies' understanding of small business concerns. The Compliance Assistance Office works with government and business representatives to develop proposals which remove unwarranted hurdles to small businesses. The Compliance Assistance Office also, conducts voluntary site assessments of businesses to determine compliance with applicable environmental regulations, including those under the CWA, Safe Drinking Water Act, and other statutes that affect State water quality; provides regulatory guides and other documents; and assists businesses which have exhausted readily available dispute resolution mechanisms within DOH.

In 2018, the Compliance Assistance Office held 80 meetings with members of the business community to improve their understanding of environmental regulations and laws pertaining to the NPDES permit process.

For more information, please visit: <http://health.hawaii.gov/cao/>



8. Environmental Information Manager

The Environmental Information Manager (EIM) oversees the coordination, collaboration, strategic planning, and facilitation of EHA's information management and information technology (IM/IT) activities, many of which relate to water quality and have improved the accessibility of and ability to share water quality-related data. The State has been working towards government transparency and streamlining environmental business processes, and the EIM has been collaborating with EHA's environmental programs to develop information systems that benefit the public and the regulated community.

The EIM implemented systems that provide government transparency and streamline processes, including the e-Permitting Portal application, the Environmental Health Warehouse (EHW), the Water Pollution Control (WPC) Viewer, Water Quality Data Viewer, the Sample Analysis Tracking System, the Sample Collection and Reservation System, the Groundwater Contamination Viewer, the Polluted Runoff Control (PRC) Program Viewer, the Underground Injection Control (UIC) System, the Sanitary Survey and Mobile Inspection System.

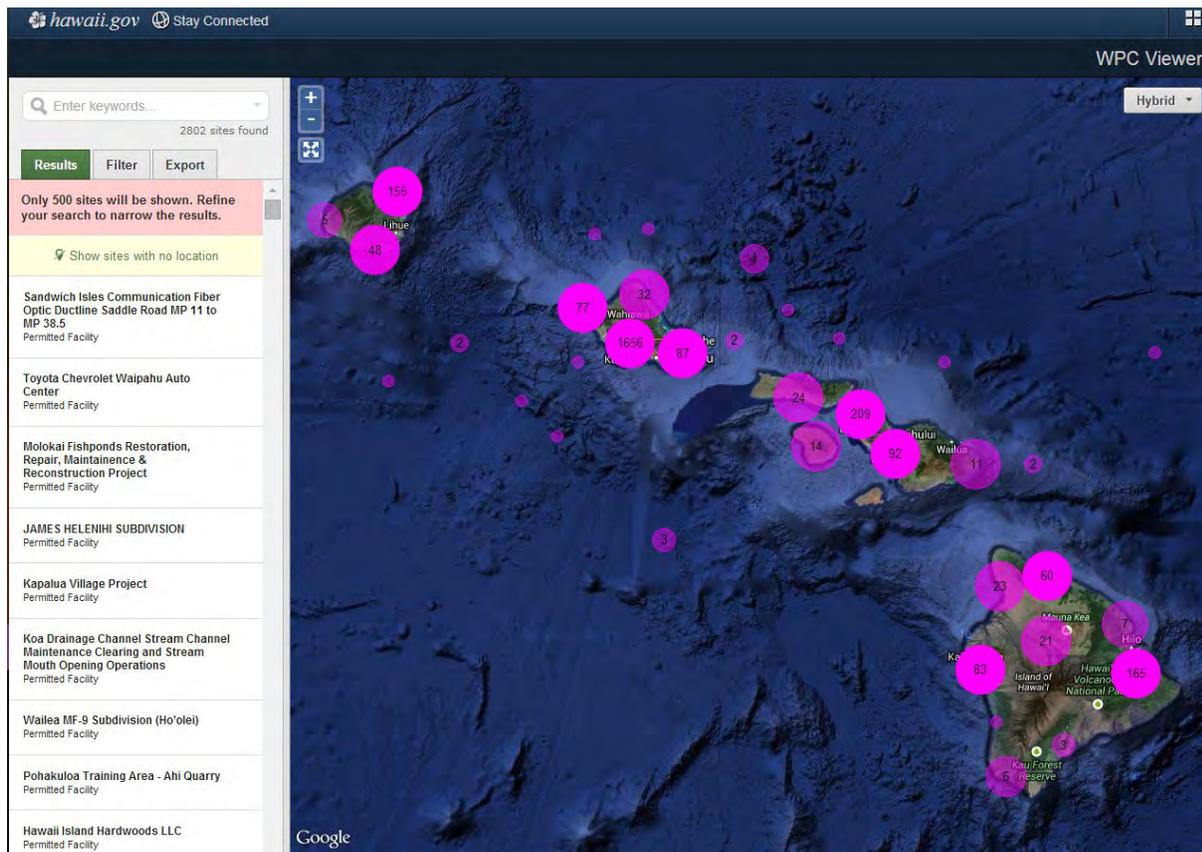


These systems help to meet the Hawai'i Water Plan Statewide Framework's recommendation that DOH develop linkages between inter-agency programs, because they assist with:

- Coordinating data collection and monitoring efforts;
- Developing a common database and ensuring data consistency; and
- Establishing a protocol for more effective data sharing.

The EIM developed and implemented the **Environmental Health Warehouse (EHW)** to provide EHA programs with integrated access to environmental facilities and sites in geospatial mapping and tabular formats. The EHW identifies facilities with NPDES permits, as well as drinking water facilities (internal only), underground storage tank (UST), and hazardous waste sites. The EIM's goal is to include EHA-regulated facilities in the EHW, which will enable EHA to make better environmental decisions by sharing information across programs.

The **e-Permitting Portal** was developed to streamline the environmental permitting process. The regulated community and public can access all of EHA's environmental permit applications through the Portal, and can learn about, complete, and submit applications online. It also allows the user to pay permit application fees online and track the status of submitted applications.



The **Water Pollution Control (WPC) Viewer** shares NPDES data with internal and external stakeholders, such as permit profiles for the facility/project, and contact, permit, inspection, and enforcement information. It also provides access to over 50,000 Clean Water Branch documents. The NPDES program controls water pollution by regulating point sources that discharge pollutants into State waters.

The EIM also developed the **Water Quality Data Viewer**, which provides the public with the ability to query water quality information and return results in a spatially enabled and/or tabular format. It also allows the user to view beach warnings, advisories and postings, and it offers drill-down capabilities to find water sampling test result data. The Viewer allows authorized personnel to create and post beach warnings, advisories, and other postings by drawing affected areas with polygons using a mapping tool.

The **Sample Analysis Tracking System (SATS)** is a Web-based system that allows the State Laboratory Division and three (3) neighbor island District Health Laboratories to track and manage chemistry, microbiology, and lead/copper drinking water samples. The system was designed to manage information about the collected sample, analysis results, and other notes recorded by laboratory analysts. The system also facilitates the laboratory quality assurance, review, and approval process. SATS includes a feature that allows a user to export drinking water sample result information into the electronic format required by SDWB for automatic import into other reporting systems.

The SDWB has developed the **Safe Drinking Water Information System (SDWIS) Viewer** for geospatial sampling points and extracting various SDWB data. The SDWIS Viewer uses EPA's SDWIS-State database platform, SATS, and a Google interface to provide decision makers a user friendly spatial tool. In general, out of the box GIS has a high learning curve, but SDWIS View has made it easy for Non-GIS users by customizing functionality and making reviewing and extracting data simple. One function of the Viewer is the connectivity to county and private decision makers through the internet.

The EIM has assisted the following programs with new IT systems:

Clean Water Branch

- Water Quality Data Viewer (Beach & Stream Warnings, Advisories, Postings)
- WPC System
- Beach Notification Data Exchange Flow to EPA
- Mobile Field Inspection System
- Integrated Compliance Information System (ICIS)-NPDES Data Exchange Flow to EPA
- WPC and e-Permitting Integration (In-progress)
- PRC System (In-Progress)

Safe Drinking Water Branch

- SDWIS Viewer
 - For more information, please visit: <https://eha-cloud.doh.hawaii.gov/portal>
- GPS Device Location Coordinate Capture Application
- SATS
- Sample Collection & Reservations System (SCRS)
- Groundwater Contamination Viewer
- UIC System (In-Progress)

Solid and Hazardous Waste Branch

- Publicly-accessible Environmental Health Warehouse (EHW) that identifies all Leaking Underground Storage Tank (LUST) facilities in mapping or tabular formats

Hazard Evaluation and Emergency Response Office

- Website Redesign & Content Management Application (CMA)
- Homeland Emergency Response Exchange (HERE) Application
- iHEER System

State Laboratories Division: Environmental Health Analytical Services Branch

- SATS
- SCRS

Office of Environmental Quality Control (OEQC)

- OEQC Viewer
- A portal to view all publicly-available systems is available online.



9. Office of Environmental Quality Control

The Office of Environmental Quality Control (OEQC) is an attached agency under the administration of DOH that is charged with implementing the Hawai'i Environmental Policy Act (HEPA), Hawai'i's environmental review law, which is set forth in HRS Chapter 343. The Office receives and reviews hundreds of land use and other environmental disclosure documents every year, many of which have the potential to affect water quality. It publishes The Environmental Notice twice a month, which provides information to the public on Environmental Assessments and Environmental Impact Statements that are under review and available for comment.

The Office of Environmental Quality Control was created in recognition of the interdependence and critical relationship between our economy and our environment. Water provides a perfect example of how the economy and the environment go hand in hand. Unless we have adequate, clean supplies of water, our economy and human activities cannot and will not function properly.

Wai is water in Hawaiian, *waiwai* is wealth, and the two go together, inextricably. This Plan on water and water quality is critical to Hawai'i's future – our health and our wealth. Planning and preparing for future needs and challenges can and will only happen if we have information on the existing supplies and quality of our water, and we take the time to study and understand the clear challenges ahead of us.

The Hawai'i State Environmental Council Annual Report provides a snapshot of the issues, challenges, and accomplishments of the Environmental Council (EC) and the OEQC in monitoring the progress of state, county, and federal agencies in achieving the state's environmental goals and policies.

The subject of the 2012 and 2013 annual reports was the Genuine Progress Indicator (GPI). The GPI is a holistic set of 26 economic, environmental, and social indicators used to track “good” things that are important to us (like leisure time) as well as “bad” things that are undesirable (like pollution) not captured in traditional measures of economic prosperity such as gross domestic product (GDP). The GPI goes further than GDP by incorporating benefits we receive from the environment or society that can't be bought or sold in the market yet nevertheless contribute to our well-being. GPI also accounts for incidental costs such as pollution externalities, ecosystem degradation, and income inequality.

The GPI study included an analysis of the cost of inland and coastal water pollution. The inland water pollution cost value was developed using State stream impairment ratios and a per capita value developed in a reference GPI study. In 2012, the cost of water pollution for the State of Hawai'i was valued at \$42 million (adjusted to 2,000 US dollars).

From OEQC's initial efforts in 2014 to build a GPI for Hawai'i, we learned that the standard GPI framework provides an excellent foundation, but focus needs to be redirected on localizing the GPI for our island setting. As of 2018, some new developments for GPI include 'Aloha + Dashboard', where GPI is included as an economic prosperity indicator and a new focus on the link between GPI and Income Inequality within the state.

This report is provided in compliance with HRS Chapter 341-6: “The council shall monitor the progress of state, county, and federal agencies in achieving the State's environmental goals and policies and with the assistance of the director shall make an annual report with recommendations for improvement to the governor, the legislature, and the public no later than January 31 of each year.”

Source: 2012 HI State Environmental Council Annual Report

Simply said, when it comes to water-related challenges, there is no scarcity. That is one more reason state agencies, the private sector, and the public must not look for solutions to water resource problems separately, haphazardly, or only after it is too late. This Plan will help everyone examine water issues carefully, with thoughtful planning ahead and plenty of public input. The results will be better management, use, and protection of our precious water resources, promoting the public interest and maximizing our collective prosperity.

For more information, please visit: <http://health.hawaii.gov/oegc/>

Section IV: Literature Review



1. Introduction

The Water Quality Plan covers a wide variety of topics that pertain to the health of Hawai'i's water systems. A few of these topics may not be familiar to the public, or are of a greater concern and may warrant more discussion. In this literature review, these topics are discussed to help the public have a better understanding and deeper knowledge of how Hawai'i's water systems work, and what they can do to help protect them. These topics include: surface and ground water systems in Hawai'i, TMDLs, cesspools, water reclamation, climate change and its effect on Hawai'i's water resources, and the main causes of water pollution and main pollutants in Hawai'i.

2. Surface Water and Ground Water Systems in Hawai'i

There are two (2) distinct types of fresh water sources in Hawai'i: surface water and ground water. Surface water is rain and condensation from fog that flows across land surfaces, which then enters rivers and streams. Rain is the main source of surface water, and is most prevalent in the mountains that reach 2,000 to 6,000 feet. Rain replenishes surface water stores in two (2) ways. The first is through storm flow, which is the rapid flow of water that occurs during, and shortly after, rain events. The second is through base flow, which occurs when rain water moves slowly across permeable surfaces and begins to percolate through the ground, where it then becomes ground water¹⁰. Ground water is the unseen water source deep underground, and is Hawai'i's largest and most exploited aquifer. This ground water creates a fresh water lens that sits above the salt water. The zone in which the salt water and fresh water mix is called brackish water. This can be seen in the figures below¹¹.

Figure 3a. Typical Freshwater Lens System, Showing a "Transition Zone" of Brackish Water



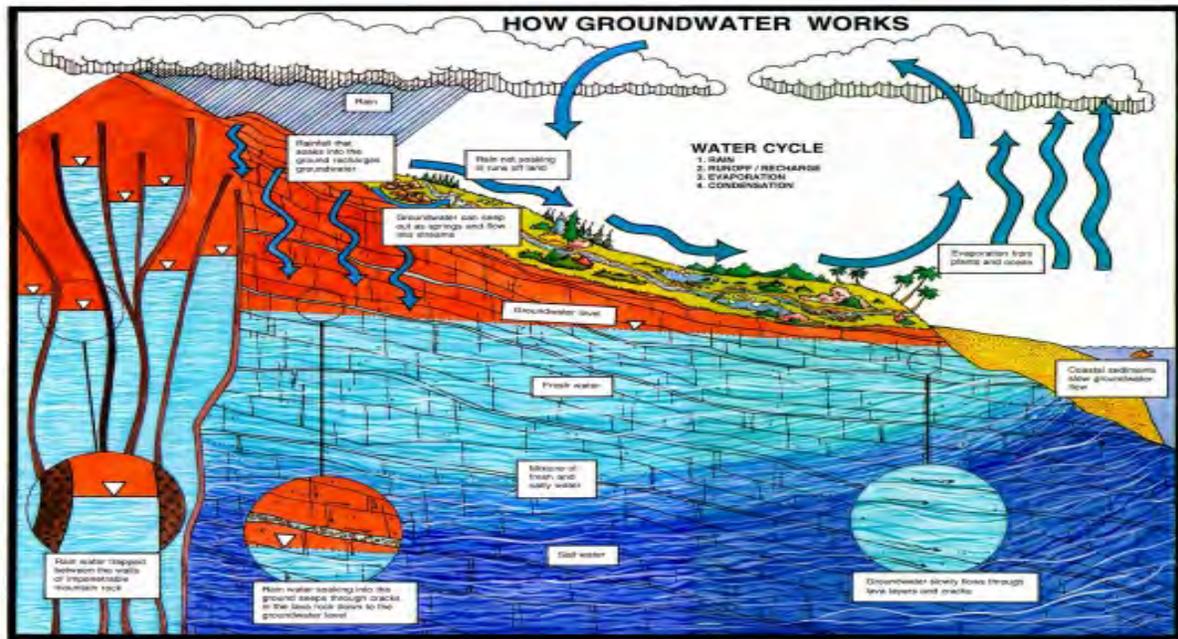
U.S. Geological Survey illustration of a typical freshwater lens system, showing a transition zone from salty to fresh water.

Courtesy of U.S. Geological Survey, Pacific Water Science Center. Reproduced from G. W. Tribble, *Ground Water on Tropical Pacific Islands—Understanding a Vital Resource: U.S. Geological Survey Circular 1312 1, 24* (2008), available at <http://pubs.usgs.gov/circ/1312/>.

¹⁰ Walls grove, R. & Penn, D. (2012). Water Resources and Climate Change Adaptation in Hawaii: Adaptive Tools in the Current Law and Policy Framework.

¹¹ Wallsgrove & Penn, 2012.

HAWAI'I'S GROUNDWATER



The flow of surface water from the mountains to the ocean helped to create the Hawaiian Ahupua`a water systems. Ahupua`a's are tracts of land that contained all the forest resources, cultivation areas, and shore and ocean zones that families and communities living within those tracts needed to survive^{12,13}. Before perched aquifers were discovered in the late 1800's, people depended on surface water flows and reservoirs as their source of fresh water. Between 1770 and the mid 1800's, nearly all of the forests throughout the islands were being destroyed by livestock that had been introduced by the Europeans. This led to the disappearance of rivers and streams during the dry season, and then flash flooding and excessive runoff during the rainy season. It was because of this decrease in surface water stores that ground water aquifers were discovered, and soon became the main source of fresh water in Hawai'i. Today, Hawai'i still uses some of its surface water stores (only about 20%) to supply the state's water needs. However, ground water supplies most of the state's water needs by fulfilling the other 80%¹⁴. Even though Hawai'i relies on groundwater resources, the cultural and sustainable importance of the ahupua`a system has been recognized and is being protected and implemented through Act 288. The purpose of the act is to formally recognize the ahupua`a system and, with the help of DLNR and the aha moku advisory committee, protect and restore it as best as possible¹⁵.

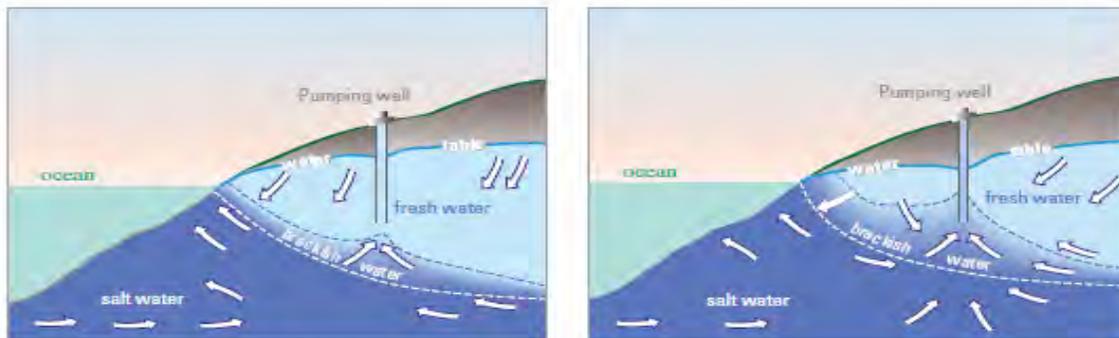
¹² Kamehameha Schools/Mernice Pauahi Bishop Estate. (1987).

¹³ DLNR. (2010). Hawaii Statewide Assessment of Forest Conditions and Resource Strategy 2010 (1): 58-78. f

¹⁴ DLNR, 2010.

¹⁵ Act 288 can be viewed at: http://www.ahamoku.org/wp-content/uploads/2011/09/GM1405_signed.pdf

Ground water stores are naturally vulnerable to depletion. As ground water is drawn out from the aquifer, salt water from below tends to be pulled up as well, which causes more mixing. This leads to an even faster depletion of freshwater stores, as the fresh water stores becomes more and more brackish (seen in the figure below)¹⁶. Therefore, it is important to ensure that water usage does not exceed the recharge rate to our ground water aquifers to ensure fresh water in Hawai'i for future generations.



U.S. Geological Survey illustration of overpumping causing a rising transition zone and increasing salinity near the pump.

Courtesy of U.S. Geological Survey, Pacific Water Science Center. Reproduced from G. W. Tribble, *Ground Water on Tropical Pacific Islands—Understanding a Vital Resource*: U.S. Geological Survey Circular 1312 1, 24 (2008), available at <http://pubs.usgs.gov/circ/1312/>.

¹⁶ Wallsgrove & Penn, 2012.

3. Total Maximum Daily Loads

TMDLs are the total amount of pollutants that can accumulate in a waterbody while still complying with the state water quality standards. The definition also includes the process of calculating the amount and type of TMDLs that occur within a waterbody¹⁷. The components of TMDLs include: assessing the quality of a water body or bodies; listing the impaired water bodies under the CWA §303(d); identify the causes of water degradation; removing pollutant loads in order to achieve state water quality standards; and managing to improve water quality and remove waters from §303(d) list. The overall goal of the TMDL is to restore and protect waters for their designated uses¹⁸.

These pollutants can come from either point or non-point sources¹⁹. Point source pollution is pollution that comes from a specific point or location, such as a toxic-waste spill site. Nonpoint source pollution is pollution that comes from an underminable source or location, and is usually the result of runoff²⁰. Common pollutants that are calculated in TMDLs include nitrogen, phosphorus, and lead.

¹⁷ Oklahoma Department of Environmental Quality. (n.d.) Oklahoma Total Maximum Daily Load Practitioners Guide.

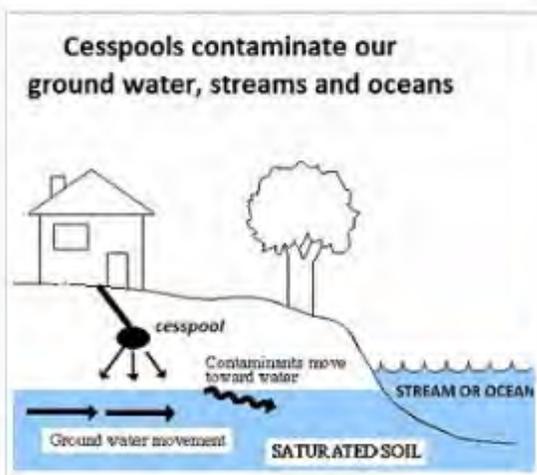
¹⁸ Karr, J. R. & Yoder, C. O. (2005). Biological Assessment and Criteria Improve Total Daily Load Decision Making.)

¹⁹ Oklahoma Department of Environmental Quality, n.d.

²⁰ Loague, K. and Corwin, D. L. 2006. Point and Nonpoint Source Pollution. Encyclopedia of Hydrological Sciences. 8:94.

4. Cesspools

Cesspools are containment systems (either in the form of a tank or pit) that are used to hold untreated human waste²¹. Most cesspools are used for residential purposes, which can include single homes or larger capacity tanks for multiple residents²². The location of these cesspools is a determining factor in their impact on water quality. Cesspools are generally located deep within the ground, where they have a significant chance of being in direct contact with ground water. This wastewater can very easily seep into the ground water, contaminating it with a host of pathogens, nutrients, and other substances²³. This ground water then flows into drinking water wells, streams, and the ocean, which can pose a threat to the health of the public and the environment by possibly polluting beaches and coral reefs. There are about 40,000 cesspools throughout Hawai'i that are located within 200 feet of perennial stream channels or within perennial watersheds throughout the state. This proximity to water sources makes them highly susceptible to contamination as well. The following figure depicts how cesspools can contaminate these different types of water sources.



Hawai'i is the cesspool capital of the United States. There are approximately 90,000 cesspools in the state, 87,000 of which pose a risk to the state's water sources. The cesspools throughout Hawai'i are estimated to release about 55 million gallons of untreated sewage into the ground per day. This includes about 23,700 pounds of nitrogen and about 6,000 pounds of phosphorous (the main polluting nutrients) into the ground each day. These excess pollutants and nutrients are known to cause harmful algal growth, greatly degrade water quality, and negatively impact the coral reefs.

²¹ WWB. Cesspools in Hawaii.

²² Manz, R. et. al. (2014). Environmental Assessment for Closure of Cesspools and Implementation of Wastewater Management and Treatment Measures at Bellows Airforce Station, Hawaii.

²³ Peng, M. & Oleson, K. L. L. (2017). Beach Recreationalists' Willingness to Pay and Economic Implications of Coastal Water Quality Problems in Hawaii.

5. Water Reclamation

Hawai'i has been utilizing reclaimed water for a little over 20 years²⁴. Prior to the water reclamation program, treated wastewater was simply dumped into the ocean²⁵. However, Hawai'i water systems began feeling pressure from the large influx of Japanese tourists in the 1970's and 1980's, whom led to an increase in the development of resorts and golf courses throughout Hawai'i. Both resorts and golf courses require a large amount of water resources, so a search was conducted for nonpotable (not for human consumption) water sources that would be used to supply their water needs. In the 1990's, Hawai'i's Department of Health decided that there needed to be better guidance on how to utilize and manage reclaimed water, and later released the "Guidelines for the treatment and Use of Reclaimed Water" in November of 1993²⁶.

Reclaimed water, or recycled water, is wastewater that is treated in a way that it is suitable for uses such as agriculture, landscape irrigation, industrial processes, toilet flushing, or possibly groundwater recharge. The water is treated depending on its planned use²⁷. For instance, water is treated less when its intended use is irrigation, but is further treated when its intended use is sink water. So far, there has been no record of human health issues resulting from contact with recycled water that has been properly treated. There are three (3) classes of recycled water: R-1, R-2, and R-3. R-1 water includes the highest quality of recycled water, which has been both filtered and disinfected. R-2 water has gone through secondary treatment and is disinfected, but greater restrictions on its use than R-1 water. R-3 water is the lowest quality recycled water. It has gone through secondary treatment, but is not disinfected, and therefore has the most limited use²⁸.

Reclaimed water comes from several sources. Greywater is wastewater that comes from bathtubs, showers, bathroom sinks, and laundry machines. Black water is wastewater that contains human or biological wastes, such as discharge water from bathrooms and kitchens. Reclaimed water can also come from natural sources, such as rainwater and storm water runoff²⁹.

Water reuse is important because it saves water, energy, and money³⁰. By reusing water, we are reducing the amount of freshwater we draw up from our aquifers for nonpotable reasons. Drawing up of this water requires a lot of energy and money as freshwater sources are depleted and become more difficult to extract. Freshwater aquifers take a long time to replenish, and it is imperative that we have enough to fulfill the freshwater needs for people who live in, and visit, Hawai'i. Water reuse has many environmental benefits as well, such as: creating a more dependable water supply; decreasing the need to divert water from ecosystems; reducing the discharge of wastewater that leads to water pollution;

²⁴ Gushiken, E. C. (2012). Reclaimed Water Use in Hawaii (US-HI-Reuse). Guidelines for Water Reuse: U.S. Case Studies.

²⁵ Water Recycling. (n.d.) Board of Water Supply.

²⁶ Gushiken, 2012.

²⁷ Pacific Southwest Region 9. (n.d.). Water Recycling and Reuse: The Environmental Benefits.

²⁸ Gushiken, 2012.

²⁹ Kehoe, P. (2016). San Francisco's Non-Potable Water Program.

³⁰ Pacific Southwest Region 9, n.d.

and it can help to create or enhance wetlands and riparian habitats. Infrastructure for water reuse requires a high initial investment, but monetary benefits and returns may be realized in the future³¹.

6. Climate Change and Its Effect on Water Resources

Climate change is a highly controversial topic. However, it is important to plan for the worst so that we can insure the health and stability of future generations. One concern of climate change is that it will have a major impact on our future water resources. This is of even more concern in Hawai`i since we are so isolated and cannot divert water from nearby sources to help supplement our water needs³². The threats from climate change that are of the greatest concern in Hawai`i are changes in rainfall, changes in the frequency and intensity of storm events, ocean acidification, and sea level rise.

Changes in rainfall: It is estimated that the global hydrological cycle will be intensified. Some areas around the world will experience more evaporation and drought, while others will experience more rain and flooding. This will lead to a greater unequal distribution of water resources around the world³³. There has been a noticeable decrease in precipitation in Hawai`i over the last century, which has led to a decrease in stream flow. This poses an issue for our freshwater aquifers, as it decreases the amount of groundwater recharge that can occur. It can also have a negative impact on native species and sensitive ecosystems that rely on rainwater to survive. Some of the species that are under threat include taro and breadfruit, which were a traditional food sources for the native Hawaiian people. Another threat to native species is the invasive or non-native species. Some of the non-native species are far better adapted to the warmer, drier climate, and can therefore easily replace the native species³⁴.

Hawai`i's persistent trade winds are what drives the rainfall throughout the state. These winds blow from north to south-west consistently throughout the year. This wind pattern is what creates the "windward" and "leeward" halves of the island as the winds blow moisture rich clouds from the ocean over the islands. Climate change has the potential alter the circulation patterns that drive the trade winds. This is an issue because it would have a major impact on the amount of rainfall that the islands would receive³⁵.

Changes in storm events: increased evaporation leads to higher humidity, which can lead to more extreme storm events³⁶. Climate change is also causing ocean waters to warm. Warm water is known to fuel bigger, stronger hurricanes and tropical storms³⁷. Hurricanes are already a major threat to the islands, and stronger storms would mean even more destruction than ever before.

Ocean acidification: It is well known that human activities are releasing copious amounts of carbon dioxide (CO₂) into the atmosphere. The ocean absorbs a significant amount of atmospheric CO₂, and is the largest CO₂ sink on the planet. As the oceans absorb atmospheric CO₂, chemical reactions occur between the CO₂ and calcium carbonate from corals and other marine animals to create carbonic acid.

³¹ Pacific Southwest Region 9, n.d.

³² Wallsgrove & Penn, 2012.

³³ Arnell, Nigel. (1999). Climate change and global water resources.

³⁴ What Climate Change Means for Hawaii. (2016). United States EPA.

³⁵ Wallsgrove & Penn, 2012.

³⁶ What Climate Change Means for Hawaii, 2016.

³⁷ Wallsgrove & Penn, 2012.

The more CO₂ the oceans absorb, the more acidic they become. The acidity of the Pacific Ocean has increased by about 25% in the last three hundred years, and is expected to continue to increase³⁸. This ocean acidification has been seen to have a major impact on Hawaiian coral reefs and crustose coralline algae (the main food source for corals), reducing their growth and calcification by about 20%. Acidification also inhibits the growth of biota that rely on the coral reefs, plankton, mollusks, and other creatures that are composed of calcium carbonate, which will greatly disrupt the marine food web. The destruction of coral reefs and marine life will also have a significant impact on Hawai`i's economy. It is estimated that Hawai`i's natural resources earn about \$385 million a year through tourism, direct consumption (i.e. fresh water and agriculture), and commercial fisheries³⁹.

Sea level rise: The Greenland and Antarctic ice sheets are melting due to increasing temperatures, causing sea level to rise around the world. Since 1960, sea level has risen 2-8 inches in Hawai`i alone. This can have huge negative implications throughout Hawai`i, as large waves, hurricanes, tsunamis, and extreme tide events will have an even greater impact on the islands since there is less of a buffer between the water and coastal communities and infrastructure. Both the natural and built environments in Hawai`i are in danger when it comes to coastal impacts from these phenomena, such as increased flooding, elevated ground water tables, storm surge, and erosion. Soon, we may see the destruction of land, coastal artifacts, and culturally significant sites, along with the relocation of coastal communities⁴⁰.

Climate change adaption measures can be used to help avoid disastrous effects that may occur due to climate change. Adaptation works to create greater resilience and reduced vulnerability of the island to possible impacts of climate change⁴¹. This can be done by ensuring that laws and policies consider future climate trends and resulting variability, remaining flexible to change and irregularities, and using models and data to come up with more informed decision making. Some adaptive tools that can be utilized in Hawai`i include: make water conservation and recycling plans mandatory, adopt climate-conscious water extraction and use standards, enforce and expand water resource monitoring and reporting throughout the state, and encourage water-conscious construction and modifications with green-building benefits and credits. Another response to climate change would be mitigation, which is the attempt to limit the magnitude of future climate change. This can be done by reducing the amount of CO₂ that is being released into the atmosphere, creating levees that decrease storm surge, and building further inland⁴².

³⁸ What Climate Change Means for Hawaii, 2016.

³⁹ Giardina, Christian, et. Al. Climate Change in the Hawaiian Islands.

⁴⁰ What Climate Change Means for Hawaii, 2016.

⁴¹ Wallsgrove & Penn, 2012.

⁴² Wallsgrove & Penn, 2012.

7. Main Causes of Water Pollution in Hawai`i

There are two (2) distinct types of pollutant sources: point source pollution and non-point source pollution. Point source pollution is pollution that can be traced back to a certain location. This type of pollution is easier to control, identify, and measure since it comes from a known source. However, these pollutants are generally more toxic. Point source pollution often draws in a lot of public attention because it can have major impacts on a specific area, and is usually the result of some type of event. Examples of point sources include hazardous spills, underground storage tanks, and septic tanks.

Non-point sources of pollution are contaminants that are dispersed in the air, water, or soil, and whose source cannot be traced. These pollutants are impossible to trace because they are being introduced into the environment over a large area and a sporadic timeframe. Since these pollutants are so dispersed, they are generally less toxic. However, if they are allowed to accumulate over extended periods of time, it can result in water sources that are harmful to human health, or cause soil and aquatic degradation. These pollutants generally come from agricultural activities, urban and industrial runoff, erosion from construction, pesticide application, livestock waste, and many other possible sources⁴³. Both point and non-point source pollution are occurring here in Hawai`i, and have had negative impacts on our water. Some of the main reasons behind this pollution are urbanization and a growing population, deforestation, and invasive species.

Hawai`i is becoming increasingly more populated and urbanized. According to Hawai`i's 2016 census, there were about 1.5 million people living in the islands. This figure does not include the millions of tourists that are visiting Hawai`i every year. There has been a huge increase in construction and urbanization to support these growing populations of both visitors and residents. This development can be very detrimental to the health of Hawai`i's watersheds. Hawai`i's water naturally flows from the mountains to the sea. Building over these streams and natural flows greatly degrades these watersheds. Stream impairment is recognized when 15% of the watershed is covered by impervious materials, while severe degradation occurs when anywhere between 30-70% of the watershed is covered by impervious surfaces (such as cement and asphalt)⁴⁴. Creating more impervious surface not only blocks existing water systems, but makes areas highly vulnerable to flooding. When flash flooding occurs in these urban areas, there is a large amount of freshwater discharge, which carries sediments and other pollutants into the ocean⁴⁵.

The islands were all once covered in lush forests and wetlands, but many of those were cut down and destroyed to make room for more buildings and urban areas. Deforestation has had major impacts on Hawai`i's watersheds. Firstly, deforestation destroys wildlife habitat, which has an indirect impact on water quality due to changing the structure of plants and animals that keep these water systems healthy. It also has a direct impact on water sources by decreasing both the water and habitat quality through a loss of debris and leaf litter (which act as necessary oxygen inputs into the water); a lack of shade, which leads to more photosynthetically active radiation and an increase in water temperatures; stream narrowing, which allows less water and more sediment to flow through the stream channel; and

⁴³Loague & Corwin, 2006.

⁴⁴ Richard D. Klein. (1979). Urbanization and Stream Quality Impairment.

⁴⁵ DLNR, 2010.

no more buffer zone to protect the water from nonpoint source pollutants⁴⁶. Trees and shrubs are needed to keep Hawai'i's watersheds healthy and flowing.

The next issue that relates to water quality is invasive species. Deforestation and urbanization has made it easier for new species to come in and replace the native species. We are seeing nonnative plant species shading out or choking out native plant species. Strawberry guava (*Psidium cattleianum*) or albizzia (*Falcataria mulucana*) are some plant species that are known to significantly alter the microhabitat in a way that it can no longer support the native plant species. Loss of this native flora, especially around streams, leads to degradation of the natural water systems. Non-native feral fauna, such as pigs, goats, sheep, deer, and cattle are known to trample and destroy vegetation, leaving the ground bare and exposed. This makes the land more susceptible to erosion and runoff during rain and storm events, leading to further water degradation⁴⁷. This water degradation can lead to a loss of ecosystem services, including recreational fishing, boating, and swimming; municipal, industrial, and agricultural water supply; and forest products⁴⁸.

⁴⁶ Sweeney, B. W., et. al. (2004). Riparian deforestation, stream narrowing, and loss of stream ecosystem services.

⁴⁷ DLNR, 2010.

⁴⁸ McCormick, F., Contreras, G. & Jonson, S. (2009). Effects of Nonindigenous Invasive Species on Water Quality and Quantity.

8. What Can You Do to Help?

Ensuring the health of our water systems here in Hawai`i is very important. The Hawai`i Department of Health and its many branches work very hard to protect the island's water, but they cannot do it alone. There are many ways that the public can help to protect our water sources, most of which are very easy changes that can be made in our daily activities.

Honolulu Board of Water Supply recommends seven (7) ways for people to save water. These include:

1. Water lawns only 2-3 times a week.
2. Don't water lawns between 9 am and 5 pm as to avoid evaporation.
3. Check for leaks in plumbing and toilets.
4. Install water-efficient plumbing fixtures.
5. Take shorter showers. Every minute you shower, you use about six (6) gallons of water.
6. Put a nozzle on your garden hose. A running garden hose can waste over 100 gallons in a few minutes.
7. Don't let the faucet run.

For more information, please visit: <http://www.boardofwatersupply.com/conservation/7-ways-to-save-water>

The Clean Water Branch has a list of things that you can do to protect our water sources as well. Their first step is to prevent toxins and bacteria from water bodies. This can be done by picking up after pets; disposing of trash, cleaners, poisons, or other chemicals at a recycling or disposal center (instead of pouring them down the drain); conduct a soil test before applying fertilizers to see which nutrients your soil needs; regularly maintain vehicles and check for leaks; and use biodegradable, nontoxic, recycled and recyclable products whenever possible. The next step is to prevent runoff and erosion. They recommend planting certain vegetation next to streams or rivers; not mowing or cutting up to the water's edge; watering in the early morning or late afternoon; not leaving exposed dirt on your property; fertilizing your lawn when rain is not expected for at least a few days; and to use commercial car washes, or wash your car on an unpaved surface to reduce sediment and soap runoff. The last step is to maintain septic and cesspool systems. If septic systems and cesspools are not maintained correctly, they can cause sewage-containing bacteria, nitrogen, and phosphorus to pollute nearby water resources. They recommend that if you have a cesspool, you should replace it with a septic system or reduce your water usage to minimize sewage movement into ground water and surface water. Septic systems should be professionally inspected every three (3) years, and pumped every five (5) to seven (7) years.

For more information, please visit: <http://health.hawaii.gov/cwb/clean-water-branch-home-page/polluted-runoff-control-program/what-you-can-do/>

The Hawai`i Department of transportation also has a list of recommendations on how the public can help to protect Hawai`i's waters. One recommendation is to connect your rain gutters to a rain barrel, which reduces the amount of pollutants that can be transported as runoff. You can also recycle this water for irrigation, gardening, or washing your car. Another recommendation is to disconnect and redirect downspouts so that they flow into a permeable area, such as directly into your garden. They also recommend planting trees and shrubs, especially native species, which reduce soil erosion and

runoff. Lastly, they recommend that you should allow, or create, a vegetation buffer along waterways to filter and slow down runoff.

For more information, please visit: <http://www.stormwaterhawaii.com/resources/big-steps/>

Another way in which people can help is to participate in beach cleanups. One organization that runs beach cleanups throughout the islands is the Surfrider Foundation. Along with running beach cleanups, they have a list of things people can do daily to reduce their plastic pollution. They see plastic as one of the serious issues that plagues our oceans and marine life. Most plastics that end up in the ocean started off as beach, street, or sidewalk litter. These plastics do not easily degrade, and it is believed that virtually all plastic that was ever made still exists, except for the bit that has been incinerated. They list 10 ways in which people can “rise above plastics”:

1. Reuse shopping bags and bottled water. Try to use cloth bags or reusable metal bottles whenever possible.
2. Say no to single-serve packaging, excessive packaging, straws, and other single-use, disposable plastics. Try to carry around reusable utensils and containers.
3. Use reusable lunch bags, boxes, and containers.
4. Bring a to-go mug or cup whenever you go to the coffee shop or smoothie shop.
5. Buy digital versions of music and movies.
6. Find alternatives to the plastic items that you rely on.
7. Recycle. If you have to use plastic, look for the most recycled plastics, which include #1 (PETE) or #2 (HDPE).
8. Volunteer at beach cleanups.
9. Support plastic bag bans, polystyrene foam bans, and bottle recycling bills.
10. Talk to friends and family about plastics and the simple changes they can make to reduce their plastic use.

For more information, please visit: <http://www.surfrider.org/programs/plastic-pollution>

Section V: Relevant Statutes and Rules



1. Introduction

There are a variety of federal and state statutes that establish requirements for DOH water quality work. These statutes set forth basic regulatory mandates, and DOH's water programs use these as a starting point to develop their various policies and regulations.

2. Federal Statutes

The CWA and the SDWA are the two most relevant Federal Acts in regards to the Hawai'i State Water Quality Plan.

3. Clean Water Act

Clean Water Act (CWA): <http://www2.epa.gov/laws-regulations/summary-clean-water-act>
33 U.S.C. §1251 et seq. (1972), also referred to as CWA §101 et seq. (1972)

The CWA establishes the basic structure for regulating discharges of pollutants into waters of the United States and water quality standards for surface waters. The basis of the Act was enacted in 1948 and was called the Federal Water Pollution Control Act, but it was significantly reorganized and expanded in 1972. Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry and setting water quality standards for all contaminants in surface waters. EPA has delegated authority to the State of Hawai'i to administer the National Pollutant Discharge Elimination System (NPDES) program.

Relevant Clean Water Act Statutory Sections

§303(d)	Governs listing of impaired waters and establishment of TMDLs
§305(b)	Governs Water Quality Monitoring and Assessment Reports (Integrated Reports), which are due every two (2) years on even years
§319	Governs nonpoint source management programs
§401	Governs Clean Water Act Water Quality Certification
§402	Governs NPDES permitting
§404	Governs regulation of the discharge of dredged and/or fill materials in waters of the U.S., including wetlands



4. Safe Drinking Water Act

Safe Drinking Water Act (SDWA): <https://www.epa.gov/laws-regulations/summary-safe-drinking-water-act>

42 U.S.C. §300f et seq. (1974)

The Federal SDWA, originally passed by Congress in 1974, is the statute that establishes regulation of drinking water in the United States. It was originally enacted to ensure that the public had a safe and healthy source of drinking water. Under the SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. The law underwent significant amendments in 1986 and 1996 that require many actions to protect drinking water sources. Additional amendments to various portions of the SDWA occurred in America's Water Infrastructure Act (AWIA) of 2018 (<https://www.congress.gov/bill/115th-congress/senate-bill/3021/text>).

Consistent with the SDWA, DOH's administrative rules define a public water system (PWS) as "a system which provides water for human consumption, through pipes or other constructed conveyances if such system has at least fifteen service connections or regularly serves at least twenty-five individuals or an average of twenty-five individuals daily at least sixty days per year." HAR § 11-20-2. Human consumption includes: drinking, bathing, showering, cooking, dishwashing, and maintaining oral hygiene (from 63 FR 41941, August 5, 1998)⁴⁹. The SDWA does not regulate private drinking water wells or rainwater catchment systems that serve fewer than 25 individuals.

The Underground Injection Control (UIC) Program established in the SDWA is responsible for regulating the construction, operation, permitting, and closure of injection wells that place fluids underground for storage or disposal to prevent contamination of underground drinking water resources. EPA has delegated authority to the State of Hawai'i to administer the Safe Drinking Water program, but not the Underground Injection Control Program.

Relevant SDWA Statutory Sections

§1412	Governs Regulatory Program (e.g., Standards and Regulation Development, Byproducts, Small Systems Technology)
§1413	Governs Public Water Supply Supervision
§1414	Governs Consumer Awareness (requires the annual "consumer confidence report")
§1419	Governs Operator Certification
§1420	Governs Capacity Development
§1429	Governs State Ground Water Protection
§1445	Governs Monitoring
§1452	Governs Drinking Water State Revolving Fund (DWSRF)
§1453	Governs Source Water Protection
§1458	Governs Drinking Water Studies and Research

⁴⁹ <http://www.gpo.gov/fdsys/pkg/FR-1998-08-05/pdf/98-20904.pdf>



5. State Statutes

All State Statutes are available at: <http://www.capitol.hawaii.gov/hrscurrent/>

- Water Quality Plan: HRS Chapter 174C (State Water Code)
- Solid Waste: HRS Chapter 340A
- Wastewater Treatment Personnel: HRS Chapter 340B
- Safe Drinking Water: HRS Chapter 340E
- Hawaii Law for Mandatory Certification of Public Water System Operators: HRS Chapter 340F
- Water Pollution: HRS Chapter 342D
- Nonpoint Source Pollution Management and Control: HRS Chapter 342E

6. Hawai`i Administrative Rules

All Hawai`i Health Administrative Rules are available at:

<http://health.hawaii.gov/opppd/departments-of-health-administrative-rules-title-11/>

- Emergency Plan for Safe Drinking Water: HAR Chapter 11-19
- Public Water Systems: HAR Chapter 11-20
- Backflow and Cross-Connection Control: HAR Chapter 11-21
- Underground Injection Control: HAR Chapter 11-23
- 12/21/2000 Amendment, Underground Injection Control: HAR Chapter 11-23a
- Certification of Public Water System Operators: HAR Chapter 11-25
- Water Quality Standards: HAR Chapter 11-54
- Water Pollution Control: HAR Chapter 11-55
- Wastewater Systems: HAR Chapter 11-62
- Environmental State Revolving Funds (Clean Water State Revolving Fund and Drinking Water State Revolving Fund): HAR Chapter 11-65

7. Traditional and Customary Rights

Kuleana Act of 1851 – native tenants' rights: HRS Section 7-1

Hawaiian use: HRS Section 1-1

1978 Hawai`i Constitution Article XII, Section 7



Section VI: Information Sources



1. General

1.1. Statewide

- Engineering Hawai'i's Future - Environment section: <http://governor.hawaii.gov/action-plan/environment>

1.2. Department of Health

- Department of Health website: <http://health.hawaii.gov/>
- DOH Strategic Plan: <https://health.hawaii.gov/opppd/files/2013/04/Hawaii-Department-of-Health-Strategic-Plan-2015-2018-081616.pdf>

1.3. Environmental Health Administration:

- Environmental Health Management Report: <http://health.hawaii.gov/epo/home/environmental-health-management-report/>

2. DOH Water Programs

2.1. Clean Water Branch (CWB)

- Clean Water Branch website: <http://health.hawaii.gov/cwb/>
- State of Hawaii Integrated Reports (Clean Water Act §§ 303(d), 305(b)): <http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/integrated-report-and-total-maximum-daily-loads/>
- 2013 Water Quality Maps: <http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/water-quality-standards/>
- Polluted Runoff Program: <http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/polluted-runoff-control-program/>
- Hawaii's Implementation Plan for Polluted Runoff Control: <http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/polluted-runoff-control-program/prc-hawaiis-implementation-plan/>
- Coastal Nonpoint Pollution Control Program Management Plan: <http://planning.hawaii.gov/czm/initiatives/coastal-nonpoint-pollution-control-program/hawaii-cnppc-management-plan-1996/>
- End of Fiscal Year Reports: <http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/polluted-runoff-control-program/>
- Watershed Planning Guidance: http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/hi_watershed_guidance_final.pdf

2.2. Wastewater Branch (WWB)

- Wastewater Branch website: <http://health.hawaii.gov/wastewater/>
- Guidelines for the Treatment and Reuse of Recycled Water: <http://health.hawaii.gov/wastewater/files/2013/06/reuse-final.pdf>
- Guidelines for Livestock and Waste Management: http://health.hawaii.gov/wastewater/files/2013/06/livestock_appendix.pdf
- DOH Large Capacity Cesspools Memorandum: <http://health.hawaii.gov/wastewater/files/2013/06/lccmemo.pdf>
- Clean Water State Revolving Fund: <http://health.hawaii.gov/wastewater/home/cwsrf/>

2.3. Safe Drinking Water Branch (SDWB)

- Safe Drinking Water Branch website: <http://health.hawaii.gov/sdwb/>
- Groundwater Protection Program: <http://health.hawaii.gov/sdwb/gwprotection/>
- Groundwater Protection Plan
- Water Resource Protection Program
- Groundwater Contamination Viewer:
<http://health.hawaii.gov/sdwb/groundwater-contamination-viewer/>
- Hawaii Groundwater Protection Strategy (2017)
- Groundwater Quality Monitoring Plan
- Groundwater Resources Assessment Strategy/Plan
- Underground Injection Control Program: <http://health.hawaii.gov/sdwb/uicprogram/>
- Source Water Assessment and Protection Program: <http://health.hawaii.gov/sdwb/swap/>
- Drinking Water State Revolving Fund:
<http://health.hawaii.gov/sdwb/drinking-water-state-revolving-fund/>

3. Supporting Division, Branches and Offices

3.1. State Laboratories Division (SLD)

- State Laboratories Division website: <http://health.hawaii.gov/statelab/>
- Environmental Health Analytical Services Branch: <http://health.hawaii.gov/statelab/ehasb/>

3.2. Solid and Hazardous Waste Branch (SHWB)

- Solid and Hazardous Waste Branch website: <http://health.hawaii.gov/shwb/>
- Guidance Documents: <http://health.hawaii.gov/shwb/hazfaq/>
- Underground Storage Tank Closure and Release Response Technical Guidance Manual:
- Screening for Environmental concerns at Sites with Contaminated Soil and Groundwater:
<http://eha-web.doh.hawaii.gov/eha-cma/Downloads/HEER/ealvolume2app2to9fall2011.pdf>

3.3. Environmental Planning Office (EPO)

- Environmental Planning Office website (last updated May 2018):
<http://health.hawaii.gov/epo/>
- Land Use Planning Reviews: <http://health.hawaii.gov/epo/home/landuse-planning-review-program/>
- Climate Change: <http://health.hawaii.gov/epo/climate-change/>

3.4. Compliance Assistance Office (CAO)

- Compliance Assistance Office website: <http://health.hawaii.gov/cao/>

3.5. Environmental Information Manager (EIM)

- Environmental Information Manager website: <https://eha-cloud.doh.hawaii.gov/>

3.6. Office of Environmental Quality Control (OEQC)

- Office of Environmental Quality Control website: <http://health.hawaii.gov/oeqc/>

4. Others

4.1. Commission on Water Resource Management (CWRM)

- Hawaii Water Plan: <http://dlnr.hawaii.gov/cwrmp/planing/hiwaterplan/>
- Water Resource Protection Plan: <http://dlnr.hawaii.gov/cwrmp/planing/hiwaterplan/wrpp/>

4.2. Department of Land and Natural Resources (DLNR)

- Engineering Division: State Water Projects Plan:
<http://dlnr.hawaii.gov/cwrp/planning/hiwaterplan/swpp/>
- The Rain Follows The Forest Plan: <http://dlnr.hawaii.gov/rain/plan/>
- Hawaii Water Conservation Plan: <http://files.hawaii.gov/dlnr/cwrp/planning/hwcp2013.pdf>

4.3. Department of Agriculture (DOA)

- Agricultural Water Use and Development Plan – (December 2003)
<http://hdoa.hawaii.gov/wp-content/uploads/2013/07/AWUDP-Dec2003rev2004.pdf>

4.4. Department of Business, Economic Development, and Tourism

- Coastal Zone Management: <http://planning.hawaii.gov/czm/>
- Ocean Resources Management Plan: <http://planning.hawaii.gov/czm/ocean-resources-management-plan-ormp/>

4.5. U.S. EPA

- EPA Strategic Plan: <http://www2.epa.gov/planandbudget/strategicplan>

4.6. Counties:

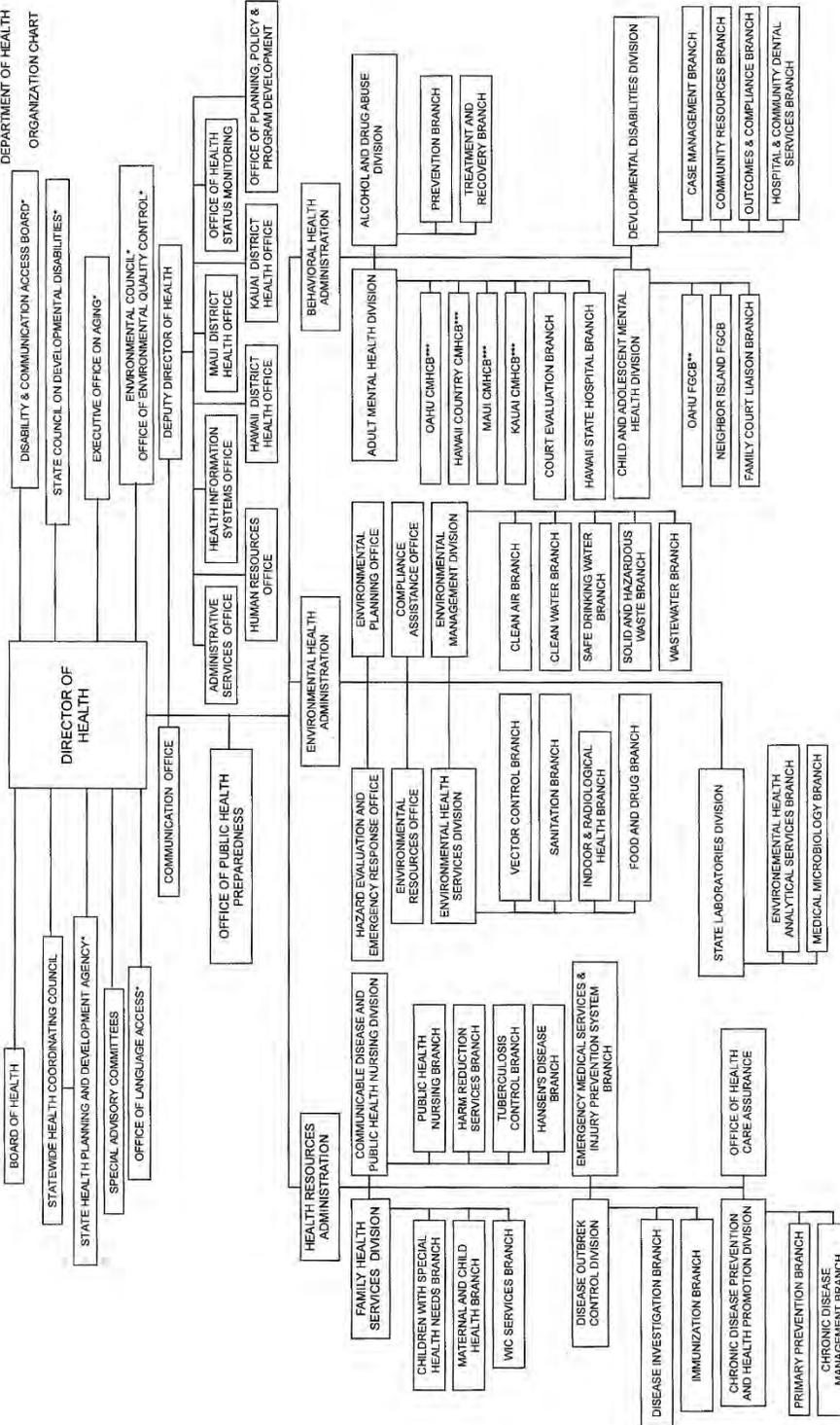
- County Water Use and Development Plans:
<http://dlnr.hawaii.gov/cwrp/planning/hiwaterplan/countyplans/>
- Kauai Water Use and Development Plan
<http://files.hawaii.gov/dlnr/cwrp/planning/wudpka1990.pdf>
- Oahu Water Management Plan
<http://files.hawaii.gov/dlnr/cwrp/planning/wudpoa1990.pdf>
- Maui County Water Use and Development Plan
<http://files.hawaii.gov/dlnr/cwrp/planning/wudpoa1990.pdf>
- Hawaii County Water Use and Development Plan
<http://files.hawaii.gov/dlnr/cwrp/planning/wudpha2012.pdf>

5. DOH Water Program Organizational Chart

DOH is one of the largest, most diverse, and multifaceted agencies in Hawaii. It has a broad mandate to monitor, protect, and enhance the State's health and environment. It is comprised of four (4) administrations, including Environmental Health, Health Resources, Behavioral Health, and General Administration and has four (4) neighbor island district health offices located on Hawaii (Kona and Hilo), Maui, and Kauai.



STATE OF HAWAII
DEPARTMENT OF HEALTH
ORGANIZATION CHART



ACT 202, S41 (1994) ESTABLISHED THE HAWAII HEALTH SYSTEMS CORPORATION, WHICH SHALL BE A PUBLIC BODY CORPORATE AND POLITIC AND INSTRUMENTALITY AND AGENCY OF THE STATE. THE CORPORATION SHALL BE PLACED WITHIN THE DEPARTMENT OF HEALTH FOR THE ADMINISTRATIVE PURPOSES SPECIFIED IN SECTION 24-33. *ASSIGNED FOR ADMINISTRATIVE PURPOSES. **COMMUNITY MENTAL HEALTH CENTER BRANCH. ***COMMUNITY MENTAL HEALTH CENTER BRANCHES.

June 30, 2018

00000000 (8-11-18)

ENVIRONMENTAL HEALTH ADMINISTRATION ORGANIZATION

HAWAII DOH, ENVIRONMENTAL HEALTH ADMINISTRATION
 Deputy Director of Environmental Health, Keith Kawaoka (586-4424)

Environmental Health Services Division

Lynn Nakasone (586-4576)

Indoor and Radiological Health Branch

Jeff Eckerd (586-4700)

Sanitation Branch

Peter Oshiro (586-8000)

Vector Branch

Gracelda Simmons (586-4708)

Food and Drug Branch

Lori Nagatoshi (586-4725)

Environmental Management Division

Vacant (586-4305)

Clean Water Branch

Alec Wong (586-4309)

Solid and Hazardous Waste Branch

Vacant (586-4226)

Safe Drinking Water Branch

Joanna Seto (586-4258)

Clean Air Branch

Marianne Rossio (586-4200)

Wastewater Branch

Sina Pruder (586-4294)

Hazard Evaluation & Emergency Response Office

Vacant (586-4249)

Environmental Planning Office (closed)

Environmental Resources Office

Nancy Bartter (586-4575)

Compliance Assistance Office

Genevieve Salmonson (586 4527)

Environmental Information Manager

Vacant (586-4641)

State Laboratories Division

Vacant (453-6650)

Environmental Health Analytical Services Branch

Wanda Chang (453-6683)

Medical Microbiology Branch

Dayna Ornellas (453-6711)

Laboratory Preparedness and Response Branch

Vacant (453-5993)

6. Water Quality Standards Maps

