WATERSHED SUMMIT 2009

June 8, 2009 9 a.m. – noon
Office of Planning Conference Room,
6th Floor Leiopapa a Kamehameha Bldg.
235 S. Beretania St.

Agenda

1. Introductions and Overview (10 minutes)

2. Background information on the Coastal Nonpoint Pollution Control Program (CNPCP) (20 minutes)
   - general program description
   - program status
   - role of State and county agencies in program implementation
   - funding issues

3. Watershed Planning and Management in the Context of the CNPCP: the Watershed Planning Guidance Process (55 minutes)
   -why watershed planning and management
   -updated CNPCP management measures
   -watershed prioritization process and process for identifying future priority watersheds
   -watershed planning guidance concept and process
   -questions and answers

BREAK (10 minutes) – review handouts on ongoing watershed efforts

4. Facilitated Discussion (75 minutes)
   -input on watershed planning guidance
   -discuss areas of common or overlapping interest and needs with regard to watershed planning
   -discuss how can we better coordinate efforts
   -discuss how can CNPCP complement and benefit existing watershed efforts
   -brainstorm incentives for collaboration
   -suggestions for next steps/items for follow-up

5. Closing Comments (10 minutes)

   OP and DOH follow up:

   -Request input from agencies on pre-test and outreach implementation strategy
   -I Invite agencies to participate in a quarterly watershed caucus associated with the Ocean Resources Management Plan (ORMP) working group

Hawaii's Coastal Nonpoint Pollution Control Program

When Congress reauthorized the Federal Coastal Zone Management Act in 1990, it added a section 6217 “Protecting Coastal Waters.” This section requires coastal states to develop and submit to the Environmental Protection Agency (EPA) and National Oceanic and Atmospheric Administration (NOAA) for approval a Coastal Nonpoint Pollution Control Program (CNPCP). The purpose of the program is “to develop and implement management measures for nonpoint source pollution to restore and protect coastal waters, working in close conjunction with other State and local authorities.”

EPA and NOAA required that states implement a set of management measures (goal statements related to water quality) and administrative elements based on guidance published by EPA to address the major sources of polluted runoff: agricultural activities, silviculture, urban development, marinas and recreational boating, and hydromodifications (dams, stream channel modifications, etc.). There are also management measures to protect and restore wetlands and riparian areas, which serve to attenuate polluted runoff. To receive approval from NOAA and EPA, each state was required to submit a management plan describing the regulatory mechanisms and non-regulatory programs in place within the state to address the management measures.

At the State level, the Department of Health (DOH) and Coastal Zone Management (CZM) Program have been responsible for developing the State's program since the early 1990s. Hawaii submitted its CNPCP management plan for Federal approval in 1996, covering 70 management measures and administrative elements. The State received conditional approval of its program in 1998, subject to conditions on 46 management measures and administrative elements that must be met for Hawaii to receive final approval of its program. There have been many changes to statutes, rules and regulations since 1996, and watershed management has been integrated into many agencies' programs. Since 1998, the State has periodically submitted documentations of these changes to address specific management measures that have not yet received approval. The State would like to focus its limited resources on program implementation to improve water quality.

There are still 14 management measures or administrative elements with remaining conditions that have not received approval from EPA and NOAA. These include management measures for roads, highways, and bridges, watershed protection, hydromodifications (*e.g.*, impacts as a result of stream channelization), protection of wetlands and riparian areas, and multiple urban measures. The diverse nature of these remaining measures reflects the difficulty in demonstrating the existence of relevant programs and policies on a measure-by-measure basis.

While DOH and CZM were tasked with developing the program, in reality, its actual implementation is undertaken by a number of agencies at the State and county levels. A variety of agencies at the State and county levels are involved in managing specific aspects of polluted runoff control, requiring an integrated, networked approach. For this reason, a watershed approach makes most sense for successful program implementation.

In 2008, the State submitted its *Strategy for Addressing Remaining Management Measures for Hawaii Coastal Nonpoint Pollution Control Program* to NOAA and EPA. The Strategy proposes a watershed approach as a way to collectively address multiple management measures. It focuses largely on using a comprehensive watershed planning approach and watershed planning guidance to facilitate implementation of management practices to address polluted runoff from *mauka* to *makai*.

A watershed planning guidance package is being developed to guide the preparation and implementation of watershed plans in Hawaii. There are several efforts underway to develop the watershed guidance package. DOH currently has a contract to provide a comprehensive update of the management measures of the CNPCP management plan in a consolidated form and to develop recommendations for a reporting mechanism for management measure implementation in a way that is least burdensome and most useful to the affected agencies. CZM currently has a contract to help determine where and how to focus watershed efforts by developing a process to identity priority watersheds where watershed plan development and implementation will be targeted.

CZM is in the process of contracting for the preparation of a "user-friendly" watershed planning guidance handbook and outreach strategy/incentive program. This "handbook" will guide the preparation and development of watershed plans in Hawaii and be patterned after EPA's new Watershed Handbook. It will reference the CNPCP management measures and provide a menu of recommended BMP's consistent with EPA's Guidance Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters. The "handbook" will be designed to help organizations and agencies navigate the process of developing watershed plans, and provide a stronger linkage to the CNPCP management measures as a means to implement watershed plans and improve water quality. DOH and OP are also required to submit an implementation schedule and a letter of commitment of resources to EPA and NOAA.

While it is unrealistic to think that the State can develop watershed plans for over 500 watersheds in the State, the above efforts will provide community watershed organizations with tools with which to make watershed planning easier.

What is a Management Measure?

When Congress reauthorized the Federal Coastal Zone Management Act in 1990, it added a section 6217 "Protecting Coastal Waters." This section requires coastal states to develop and submit to EPA and NOAA for approval a Coastal Nonpoint Pollution Control Program (CNPCP). The purpose of the program "shall be to develop and implement management measures for nonpoint source pollution to restore and protect coastal waters, working in close conjunction with other State and local authorities." EPA and NOAA developed a guidance document that specifies 56 management measures that states must address through their CNPCP. There are management measures to address sources of pollution from agriculture, forestry, urban activities, marinas and recreational boating, and hydromodifications (channels, channelization, and dams, streambank and shoreline erosion). There are also management measures to protect wetland and riparian areas.

"Management measures" are defined in section 6217(g)(5) as:
"....economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives."

So, what is a management measure, really??

Each management measure can be thought of as a goal towards which the State, counties, and local communities can strive in order to improve water quality. The goal can be addressed at the State and county levels through regulations or non-regulatory programs. It can also be addressed "on the ground" by agencies, communities and individuals through the implementation of specific management practices.

Examples of urban management measures that relate specifically to watershed planning and management include:

B. Watershed Protection Management Measure

Develop a watershed protection program to:

(1) Avoid conversion, to the extent practicable, of areas that are particularly susceptible to erosion and sediment loss;
(2) Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota; and
(3) Site development, including roads, highways, and bridges, to protect to the extent practicable the natural integrity of waterbodies and natural drainage systems.

A. Existing Development Management Measure

Develop and implement watershed management programs to reduce runoff pollutant concentrations and volumes from existing development:

(1) Identify priority local and/or regional watershed pollutant reduction opportunities, e.g., improvements to existing urban runoff control structures;
(2) Contain a schedule for implementing appropriate controls;
(3) Limit destruction of natural conveyance systems; and
(4) Where appropriate, preserve, enhance, or establish buffers along surface waterbodies and their tributaries.

CNPCP Management Measures to be Addressed by Watershed Strategy

CATEGORY: URBAN AREAS
SUB-CATEGORY: URBAN RUNOFF

Watershed Protection Management Measure

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Existing Development Management Measure

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3) Limit destruction of natural conveyance systems; and
4) Where appropriate, preserve, enhance, or establish buffers along surface waterbodies and their tributaries.

CATEGORY: HYDROMODIFICATION
SUB-CATEGORY: CHANNELIZATION AND MODIFICATION

Physical and Chemical Characteristics of Surface Waters Management Measure

1) Evaluate the potential effects of proposed channelization and channel modification on the physical and chemical characteristics of surface waters in coastal areas;
2) Plan and design channelization and channel modification to reduce undesirable impacts; and
3) Develop an operation and maintenance program for existing modified channels that includes identification and implementation of opportunities to improve physical and chemical characteristics of surface waters in those channels.

Instream and Riparian Habitat Restoration Management Measure

1) Evaluate the potential effects of proposed channelization and channel modification on instream and riparian habitat in coastal areas;
2) Plan and design channelization and channel modification to reduce undesirable impacts; and

3) Develop an operation and maintenance program with specific timetables for existing modified channels that includes identification of opportunities to restore instream and riparian habitat in those channels.

Eroding Streambanks and Shorelines Management Measure

1) Where streambank or shoreline erosion is a serious nonpoint source pollution problem, streambanks and shorelines may need to be stabilized. Vegetative methods are strongly preferred. Structural methods may be necessary where vegetative methods cannot work and where they do not interfere with natural beach processes or harm other sensitive ecological areas.
2) Protect streambank and shoreline features with the potential to reduce nonpoint source pollution.
3) Protect streambanks and shorelines from erosion due to uses of either the shorelands or adjacent surface waters.
4) Where artificial fill is eroding into adjacent streams or coastal waters, it should be removed.

CATEGORY: WETLANDS AND RIPARIAN AREAS

Protection of Wetlands and Riparian Areas Management Measure

Protect from adverse effects wetlands and riparian areas that are serving a significant nonpoint source pollution abatement function and maintain this function while protecting the other existing functions of these wetlands and riparian areas as measured by characteristics such as vegetative composition and cover, hydrology of surface water and ground water, geochemistry of the substrate, and species composition

CATEGORY: CRITICAL COASTAL AREAS AND ADDITIONAL MANAGEMENT MEASURES AND TECHNICAL ASSISTANCE

The State must:

1) identify its threatened or impaired coastal waters and the land uses that cause or threaten these waters;
2) delineate critical coastal areas;
3) develop a process for determining whether additional measures are necessary to attain or maintain water quality standards in the threatened or impaired waters;
4) describe the additional management measures the State will apply to the identified land uses and critical coastal areas; and
5) develop a program to ensure the implementation of additional management measures.

SUMMARY OF WATERSHED PLANNING GUIDANCE PACKAGE COASTAL NONPOINT SOURCE POLLUTION CONTROL

1. A document for the general public that provides all the approved Coastal Nonpoint Pollution Control Management Measures and the status of those still in process for approval.

2. Targeted Watershed Prioritization and Implementation Schedule. This lists priority targeted watersheds; describes the process/criteria used to identify/list priority watersheds and provides a schedule for developing and implementing watershed plans in these priority watersheds.

3. Letter of Commitment of Resources from Department of Health and Coastal Zone Management Program.

4. The Watershed Planning Guidance Handbook. This is intended to guide the preparation and implementation of watershed plans in Hawaii. EPA's new Watershed Handbook (www.epa.gov/nps/watershed_handbook) should be used for general guidance on developing a watershed plan and the WPG guidance should summarize pertinent information to direct those interested in developing watershed plans to the Handbook.

    a. The guidance shall be a "user-friendly" guide. It is intended as a "how to" guide to help preparers of watershed plans walk through the steps of preparing a plan.
    b. The guidance shall direct preparers of watershed plans to use the CNPCP management measures as an implementation menu and provide a mechanism to ensure that as watershed plans are developed and updated the CNPCP management measures will be incorporated as appropriate.
    c. In preparing the watershed planning guidance, sub-tasks shall include but not be limited to:

        i. Use the EPA's Watershed Handbook (2008) as general guidance as to how to prepare a watershed plan;
        ii. Incorporate EPA's nine minimum elements in the watershed planning guidance; and
        iii. Integrate EPA's nine minimum elements with Hawaii's proposed Department of Health contract provisions found on pages eight (8) to eleven (11) of the "Strategy" and place in the appropriate section of the Watershed Planning Guidance.
        iv. Incorporate pollution control strategies/best management practices for each of the six CNPCP management plan sources into the guidance.
        v. Obtain input from the Department of Health, Department of Land and Natural Resources and watershed planning organizations.

5. Outreach strategy or incentive program that the State will use to make watershed groups and others aware of the guidance and encourage its use.

List of Confirmed and Invited Participants

NAME	TITLE	OFFICE
Audrey Shileikis	NPS Coordinator	USEPA
Abbey Mayer	Director	OP
Mary Lou Kobayashi	Administrator	OP
Doug Tom	Program Manager, CZM	OP
Kenny Roberts	CNPCP Coordinator	OP
Larry Lau	Deputy Director	DOH
Alec Wong	Clean Water Branch Chief	DOH/CWB
Hudson Slay	PRCP - NPS IPA	DOH/CWB
Brian Hunter	PRCP - Planner	DOH/CWB
Lawana Collier	PRCP - Public Participation Coordinator	DOH/CWB
Phil Anderson	for Kelvin Sunada EPO	DOH
Paul Conroy	Administrator, DOFAW	DLNR
Lisa Ferentinos	Planner	DLNR
Jackie Robinson	Planner	DLNR
Ronald Cannarella	DOFAW - SWARS Coordinator	DLNR
Lenore Ohye	Planning Branch Chief - CWRM	DLNR
Jeremy Kimura	Hydrologist	DLNR
Bob Freitas	for Deputy Director Kaulana Park	DHHL
Larry Yamamoto	Director	NRCS
Sharon Sawdey	Civil / Hydraulic Engineer	NRCS
Risa Oram	Coordinator LAS - LBP	Univ. of Hawaii
Derek Chow	Chief, Civil & Public Works Branch	USACE
Kristen Chun		USACE
Debbie Solis		USACE
Barry Usugawa	Water Resources Program Administrator	BSW
Gordon Tribble	Director, USGS Pacific Isl.	USGS
Kitty Courtney	Consultant	Tetra Tech EM, INC.
Kevin Kelly	Consultant	Tetra Tech EM, INC.

Invited but Unable to Attend

Kathy Chaston	Coral & Coastal Management Specialist	NOAA
Laura Thielen	Director	DLNR
Dan Polhemus	Administrator, DAR	DLNR
Craig Rowland	Conservation Partnerships Coordinator	USFWS
Cindy Barger	Biologist/Project Manager	USACE
Dean Nakano		BSW

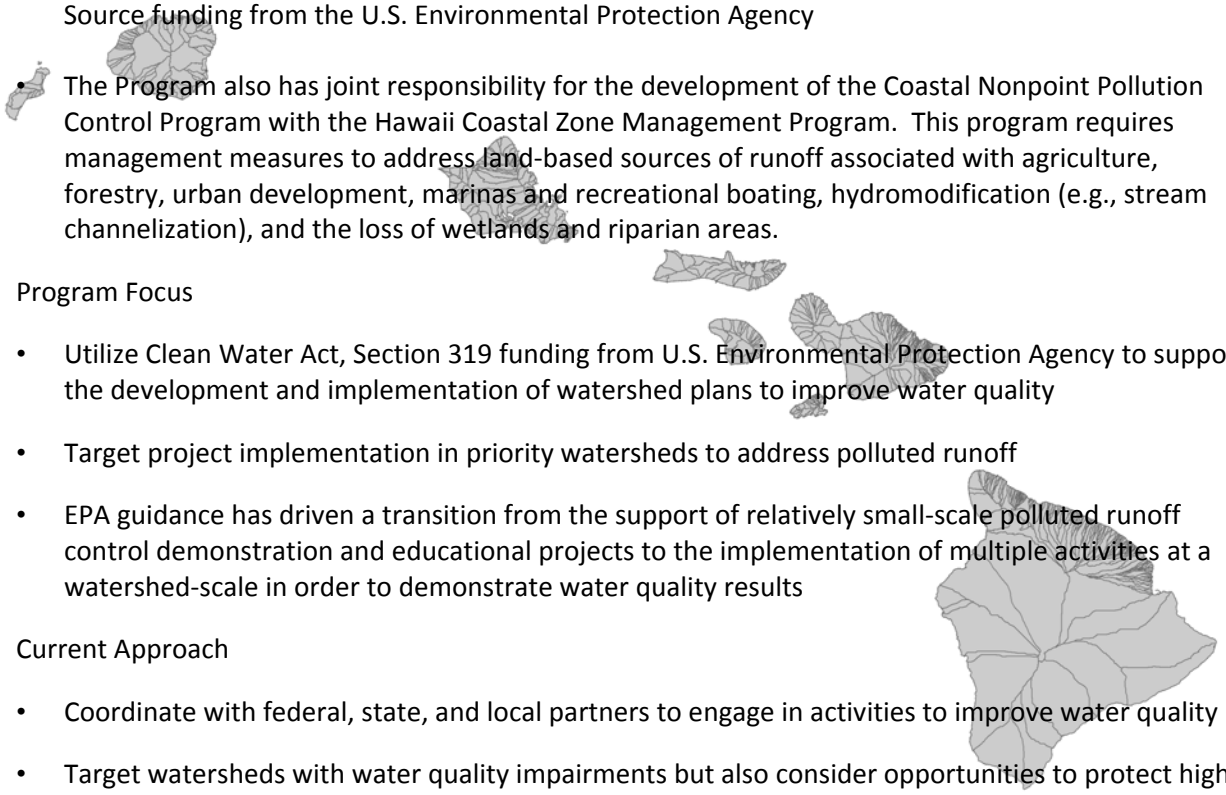
Hawaii Department of Health (DOH)
Watershed Efforts

Improving Water Quality on a Watershed Basis

- Polluted Runoff Control Program Efforts
- DOH/EPA Priority Watershed Efforts

Polluted Runoff Control Program

- The Polluted Runoff Control Program is part of the DOH Clean Water Branch
- The Program has responsibility for the administration of Clean Water Act, Section 319/Nonpoint Source funding from the U.S. Environmental Protection Agency
- The Program also has joint responsibility for the development of the Coastal Nonpoint Pollution Control Program with the Hawaii Coastal Zone Management Program. This program requires management measures to address land-based sources of runoff associated with agriculture, forestry, urban development, marinas and recreational boating, hydromodification (e.g., stream channelization), and the loss of wetlands and riparian areas.



Program Focus

- Utilize Clean Water Act, Section 319 funding from U.S. Environmental Protection Agency to support the development and implementation of watershed plans to improve water quality
- Target project implementation in priority watersheds to address polluted runoff
- EPA guidance has driven a transition from the support of relatively small-scale polluted runoff control demonstration and educational projects to the implementation of multiple activities at a watershed-scale in order to demonstrate water quality results

Current Approach

- Coordinate with federal, state, and local partners to engage in activities to improve water quality
- Target watersheds with water quality impairments but also consider opportunities to protect high quality waters
- Implement recommended actions in existing plans (watershed plans, total maximum daily loads (TMDLs))
- Focus on project results/outcomes through appropriate monitoring

Funding

- Up to **$1 million/year** available for eligible projects as defined by EPA Section 319 Guidance and DOH priorities
- Watershed plan or TMDL required to access majority of funding
- Funding awarded through a competitive Request for Proposals or negotiation with state/county entities

Highlighted Contracts/Projects

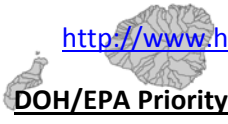
- Implementation of Koolaupoko watershed based plan (Kaelepulu bioretention, Heeia streambank restoration, Waimanalo soil and water conservation practices)

- Development of watershed based plans (Waiulaula, Hanalei, Wailupe, Southwest Maui) watershed based plan

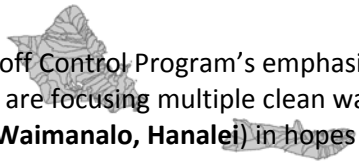
- Contract with the Hawaii Association of Conservation Districts to support for 4 conservation specialists at Soil and Water Conservation Districts on Oahu, Maui, Kauai, Hawaii. Conservation specialists provide assistance with conservation planning activities as well as watershed planning and implementation

- Contract to support for the Hawaii Youth Conservation Corps to provide assistance for partner activities in priority watershed efforts

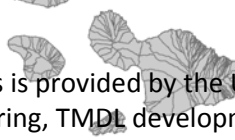
http://www.hawaii.gov/health/environmental/water/cleanwater/prc/index.html



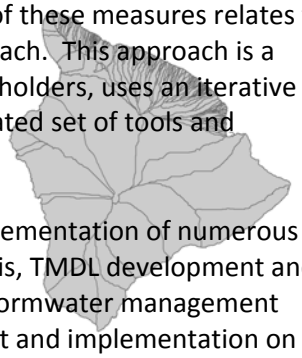
DOH/EPA Priority Watersheds



- In addition to the Polluted Runoff Control Program's emphasis on watershed planning and implementation, DOH and EPA are focusing multiple clean water program efforts in 3 priority watershed areas (**West Maui, Waimanalo, Hanalei**) in hopes of recognizing water quality improvement.



- Support for DOH water quality management activities is provided by the U.S. EPA. Activities supported include: permitting, enforcement, monitoring, TMDL development, and polluted runoff control. EPA's overall agency performance and funding to support State activities has been linked to several measures related to the improvement of water quality. One of these measures relates to the improvement of water quality conditions using the watershed approach. This approach is a process that focuses on a hydrologically defined area, involves key stakeholders, uses an iterative or adaptive management process to address goals and utilizes an integrated set of tools and programs.



- DOH responsibilities in these three watersheds vary but include the implementation of numerous activities related to Clean Water Act programs such as watershed analysis, TMDL development and implementation, water quality monitoring and assessment, municipal stormwater management (MS4 NPDES permit conditions) and nonpoint source TMDL development and implementation on agricultural lands. EPA responsibilities are to provide funding, technical assistance, and training to protect and restore water quality.

- Expected Outcomes for the three watersheds include: improvement in estimated load reductions and baseline water quality by 2012 and partial restoration of water quality in the watershed by 2012.

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586-4309

WATERSHED PARTNERSHIP MEMBERS

Voluntary alliances of landowners and other partners protecting forested watersheds for water recharge and conservation values

Kaua'i Watershed Alliance
(144,004 acres)

Ben A. Dyre Family Limited Partnership
Department of Water of the County of Kaua'i
Kamehameha Schools
Kaua'i Ranch, LLC
Lihue Land Company
McBryde Sugar Company, Ltd.
Princeville Corporation
State Department of Land and Natural Resources
Grove Farm Company, Incorporated
State Department of Hawaiian Home Lands
National Tropical Botanical Garden

Ko'olau Mountains Watershed Partnership
(98,737 acres)

Bishop Museum
City & County of Honolulu Board of Water Supply
Dole Food Company, Inc.
Hawai'i Reserves, Inc.
Kamehameha Schools
Kualoa Ranch
O'ahu Country Club
Queen Emma Land Company
State Agribusiness Development Corporation
State Department of Hawaiian Home Lands
State Department of Land and Natural Resources
Tiana Partners, et al.
UH Mānoa/Lyon Arboretum
US Army
US Fish & Wildlife Service

KMWP Associate Partners

The Nature Conservancy
Pacific Cooperative Studies Unit
State of Hawai'i Department of Health
US Environmental Protection Agency
US Forest Service
USDA Natural Resources Conservation Service
US Geological Survey

East Moloka'i Watershed Partnership
(19,000 acres)

Kalaupapa National Historical Park
Kamehameha Schools
Kapualei Ranch
Kawela Plantation Homeowners Association
Ke Aupuni Lōkahi Enterprise Community Governance Board
Hawai'i Department of Health
Maui County
Maui County Department of Water Supply
Moloka'i-Lāna'i Soil and Water Conservation District
State Division of Forestry and Wildlife
The Nature Conservancy *
USDA Natural Resources Conservation Service
US Environmental Protection Agency
US Fish & Wildlife Service
US Geological Survey

Lāna'i Forest and Watershed Partnership
(20,000 acres)

Castle & Cooke Resorts, LLC*
County of Maui
Hui Mālama Pono O Lāna'i
Lāna'i Water Advisory Committee
Maui County Board of Water Supply
Moloka'i-Lāna'i Soil and Water Conservation District
State Department of Land and Natural Resources, DOFAW and CWRM
The Nature Conservancy *
USDA Natural Resources Conservation Service
US Fish & Wildlife Service

West Maui Mountains Watershed Partnership
(48,000 acres)

County of Maui
Kahoma Land Company LLC
Kamehameha Schools
Ka'anapali Land Management Corp.*
Mākila Land Company LLC
Maui County Department of Water Supply
Maui Land & Pineapple Co., Inc.*
State Department of Land and Natural Resources
The Nature Conservancy *
Wailuku Water Company, LLC

East Maui Watershed Partnership
(100,000 acres)

East Maui Irrigation Co., Ltd.
County of Maui
HaleakalāāNational Park
HaleakalāāRanch Co.*
Hāna Ranch Partners, LLC
State Department of Land and Natural Resources
The Nature Conservancy *

Leeward Haleakalā Watershed Restoration Partnership
(43,000 acres)

County of Maui
HaleakalāāNational Park
HaleakalāāRanch
Kamaole Ranch
Kaonoulu Ranch
Kaupo Ranch
Nu'u Mauka Ranch
State Department of Hawaiian Home Lands
State Department of Land and Natural Resources
Ulupalakua Ranch
Jerry Thompson
John Zwaanstra

Kohala Watershed Partnership
(65,500 acres)

Hawai'i County Department of Water Supply
Kahuā Ranch, Ltd.
Kamehameha Schools
Laupāhoehoe Nui, LLC
Parker Ranch, Inc.
Ponoholo Ranch, Ltd.
State Department of Hawaiian Home Lands
State Department of Land and Natural Resources
Surety Kohala Corp.
The Nature Conservancy *
Queen Emma Land Company

Three Mountain Alliance
(1,116,300 acres)

Kamehameha Schools
National Park Service
State Department of Land and Natural Resources
State Department of Public Safety
US Fish & Wildlife Service
US Forest Service
US Geological Survey, Biological Resources Division
The Nature Conservancy *
USDA Natural Resource Conservation Service

**Also a participant in the DLNR Natural Area Partnership Program*

For more information contact:

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Or visit www.hawp.org

HAWP
Hawai'i Association of Watershed Partnerships

PETER MENZEL

Hawai'i Association of Watershed Partnerships

Working to ensure our future water supply

HAWAI'I ASSOCIATION OF WATERSHED PARTNERSHIPS

Voluntary alliances of landowners and other partners protecting forested watersheds for water recharge and conservation values

Our Water Supply is at Risk

Forested lands cover 1.5 million acres, or more than one-third of our state. These forests are our islands' primary watersheds, supplying us with hundreds of billions of gallons of fresh water each year. In no other state is the relationship between water and forest cover more closely interwoven than in Hawai'i, yet today our forests are slowly degrading from an onslaught of invasive plants and animals, fire, disease, and inappropriate human use. Minimizing these threats will protect both our native forests and our water supply for future generations. The Hawai'i Association of Watershed Partnerships was formed to address this need.

A Billion Dollar Resource

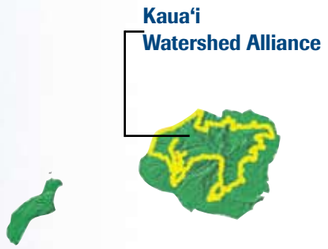
Hawaii's forests capture and conserve water, protect the health of our reefs and beaches, clean and cool our air, and are our best defense against flood and drought. Consider the cost of replicating any one of these essential services through feats of technology or engineering and you begin to appreciate the contribution our forests make to our economy and quality of life. How much are our forests worth? A study by the University of Hawai'i estimated the value of the Ko'olau Mountain forests – one of 12 major watershed areas in the state – to be between $7.4 and $14 billion.

A Lack of Investment

Few places are more renowned for their natural environment than Hawai'i. Yet as a state we devote little money to its protection and take for granted the many benefits it provides. The State of Hawai'i, which is charged with stewardship of almost half of the islands' forested lands, currently spends less than 1% of its budget to protect and manage all of its natural and cultural resources. Hawaii's state-owned forest reserve system is the 11th largest in the country, yet we rank almost last in spending.

Support Watershed Protection

The State's Natural Area Reserve Fund is the only assured source of annual funding to protect and manage our forested watersheds. These state funds are leveraged to secure competitive federal grants as well as county and private investment in forest protection. A top priority of the Hawai'i Association of Watershed Partnerships is to ensure that the State's Natural Area Reserve Fund is fully supported by the State Legislature.

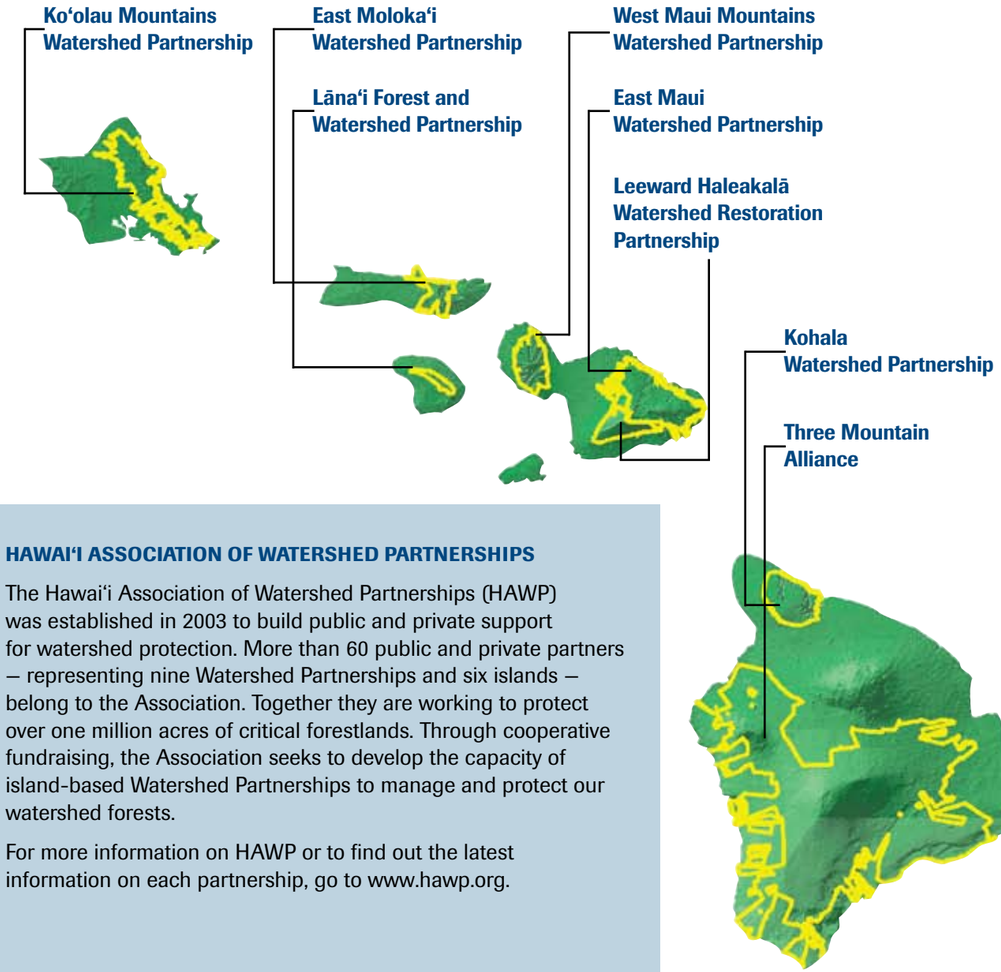


Our Forests are Our Future

As a society we have a great responsibility, and a practical need, to protect our future water supply. Fresh water is not an unlimited resource, and its ready availability, quality and sustainability are linked to the health of our forested watersheds. When we fail to protect our forests, we put our future prosperity and quality of life at risk.

WORKING TO ENSURE OUR FUTURE WATER SUPPLY

- Nine member partnerships on six islands
- More than 60 public and private partners represented
- Over one million acres of forested lands identified for management
- Eight island-based watershed management plans completed
- More than 40 miles of protective fences constructed
- Thousands of invasive plants removed
- Over 30,000 native and rare plants outplanted
- Over 1,500 students, teachers, and citizen volunteers reached



HAWAI'I ASSOCIATION OF WATERSHED PARTNERSHIPS

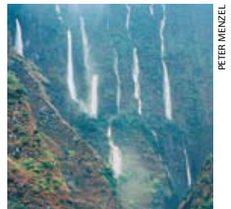
The Hawai'i Association of Watershed Partnerships (HAWP) was established in 2003 to build public and private support for watershed protection. More than 60 public and private partners – representing nine Watershed Partnerships and six islands – belong to the Association. Together they are working to protect over one million acres of critical forestlands. Through cooperative fundraising, the Association seeks to develop the capacity of island-based Watershed Partnerships to manage and protect our watershed forests.

For more information on HAWP or to find out the latest information on each partnership, go to www.hawp.org.


RICHARD A. COOKE III


ERIC NISHIBAYASHI


RANDY BARTLETT


PETER MENZEL


GRAHAM OSBORNE

Commission on Water Resource Management (CWRM)
Watershed Protection Goals and Objectives

CWRM's authority to engage in watershed protection activities is established in Article XI, Section 7 of the Hawaii State Constitution:

"The State has an obligation to protect, control and regulate the use of Hawaii's water resources for the benefit of its people.

The legislature shall provide for a water resources agency which, as provided by law, shall set overall water conservation, quality and use policies; define beneficial and reasonable uses; protect ground and surface water resources, watersheds and natural stream environments; establish criteria for water use priorities while assuring appurtenant rights and existing correlative and riparian uses and establish procedures for regulating all uses of Hawaii's water resources. [Add Const Con 1978 and election Nov 7, 1978]" [emphasis added]

Although the State Water Code (Chapter 174C HRS) does not include specific watershed protection policies or expressly provide for watershed protection responsibilities or mandates, §174C-5(6) HRS does provide that the CWRM "*[s]hall cooperate with federal agencies, other state agencies, county or other local governmental organizations, and all other public and private agencies created for the purpose of utilizing and conserving the waters of the State, and assist these organizations and agencies in coordinating the use of their facilities and participate in the exchange of ideas, knowledge, and data with these organizations and agencies.*"

The State Water Code also states that coastal waters are not subject to its provisions; however, coastal waters are very much part of the watershed system and should be addressed in comprehensive water management programs and plans.

CWRM supports a holistic approach using the principles of integrated water resource management, recognizing that all things in a watershed are interconnected and interrelated and that we need to achieve a balance between social needs, economic development, and the environment within an entire watershed. Watershed protection and the preservation of ecohydrologic processes are integral to CWRM's primary duty to protect the ground and surface waters of the State. Healthy watersheds promote aquifer recharge and help to ensure adequate streamflow quality and quantities.

CWRM has identified the following goals and objectives for watershed management and protection:

- Protect watershed health to ensure long-term sustainability of surface and ground water resources.
- Encourage integrated programs at the watershed level to address the conflicts and disconnects that currently exist between mauka- and makai-area interests, urban issues and conservation priorities, and economic goals and pollution prevention programs. Integration of programs will help educate the public on the causal relationships between land use, sustainable water resources, and water quality.
- Encourage the integration of programs that better facilitate distribution and use of funding and resources. The existing governmental structure and jurisdictional divisions, which tend to separate land use and water resource issues, have resulted in programs that are either short-sighted in planning, or are unable to realize their full effectiveness, due to disjointed and sometimes conflicting mandates. Integrated planning and establishment of communication networks and protocols will encourage dialogue and cooperation between government agencies, community groups, private interests, and the public.
- Support integrating and applying traditional land management practices in watershed protection and management, as may be appropriate in urban, agricultural, and conservation areas.
- Support research on the effects of climate change on water resources in Hawaii, which would include any impacts to the watershed/ahupuaa and its ability to support and sustain our ground and surface water resources.

While CWRM may not be the lead agency to carry out watershed protection projects, CWRM is supporting the efforts of other agencies and organizations. Specific actions taken by CWRM include:

- Increasing public awareness of the connectivity of all anthropogenic activities within the watershed from mauka to makai.
- Being an active member of groups engaged in watershed restoration, such as the watershed partnerships.
- Disseminating available hydrologic data to government and non-government entities engaged in watershed restoration or research.
- Facilitating the culmination of funds and/or resources for the protection and restoration of natural resources within the watershed.
- Providing regulatory guidance for activities related to the riparian environment or affecting ground water aquifers.

U.S. Fish and Wildlife Service

Conservation Partnerships Program

Pacific Islands Fish and Wildlife Office

Cooperative efforts to restore native habitats.

The Conservation Partnerships Program provides cost-share funds, as well as information on habitat restoration techniques, native species, Safe Harbor Agreements, additional funding sources, required permits, & potential vendors of restoration services.

For more information contact:
Craig Rowland,
Conservation Partnerships Coordinator
U.S. Fish and Wildlife Service
ph: (808) 792-9400
email:
craig_rowland@fws.gov

Voluntary habitat restoration programs with the goal of restoring native Pacific Island ecosystems through collaborative projects.

Pacific Islands Coastal Program	**Funding and technical assistance to private landowners, non-profit organizations, government agencies and others to protect and restore coastal and marine habitats and the native species that live there.** http://www.fws.gov/pacificislands/coastal.html
Partners for Fish and Wildlife	**Cost-share funding and technical assistance for long-term habitat restoration projects on private land.** http://www.fws.gov/pacificislands/partners.html
Hawaii Fish Habitat Partnership	**A developing program that will work to coordinate the restoration of freshwater and estuary habitats.** http://fishhabitat.org/
Recovery Land Acquisition Grants	**Acquisition of habitat for the conservation of threatened and endangered species.** http://www.fws.gov/pacificislands/publications/rlafactsheetnov06.pdf
National Coastal Wetlands Conservation Grants	**Acquisition, restoration and enhancement of coastal wetlands.** http://www.fws.gov/coastal/CoastalGrants/

CPP Annual Report	http://www.fws.gov/pacificislands/publications/fy08%20cpp%20annual%20report.pdf
CPP Website	http://www.fws.gov/pacificislands/cpp.html

Pacific Islands Fish and Wildlife Office

Tools for Partners and Landowners

Conservation Partnerships Program

The Conservation Partnerships Program is a collection of voluntary habitat restoration programs with the goal of restoring native Pacific Island ecosystems through collaborative projects. This program seeks to implement large-scale conservation efforts for the benefit of native ecosystems by working cooperatively with private landowners, conservation organizations, community groups, and other government agencies. The Conservation Partnerships Program can provide cost-share funds, as well as information on habitat restoration techniques, native species, Safe Harbor Agreements, additional funding sources, required permits, and potential vendors of restoration services (fence contractors,

The mission statement of the Conservation Partnerships Program is to restore and protect native habitats by developing positive relationships with landowners, identifying biological resources and threats, implementing projects, monitoring results, and sharing information."
This reflects the mission statement for the U.S. Fish and Wildlife Service which is "working with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people." It acknowledges that working cooperatively with partner organizations, private landowners, local communities is the best way to approach long-term conservation of our native ecosystems.
The Conservation Partnerships Program is comprised of the following:

Partners for Fish and Wildlife – Cost-sharing and technical assistance for long-term habitat restoration projects on private land.

Pacific Islands Coastal Program – A new effort to identify important coastal resource problems and solutions, develop partnerships to carry out on-the-ground conservation projects, and encourage community action in high priority coastal areas.

Hawaii Fish Habitat Partnership - Seeks to cooperatively develop and implement aquatic conservation projects in Hawaiian streams and estuaries.

Recovery Land Acquisition Grant Program - This program provides funds to states, territories, and commonwealths to purchase habitat from willing sellers in order to benefit threatened and endangered species. Proposals can be developed by third parties in conjunction with the above mentioned government agencies.

Other Funding - The Conservation Partnerships Program has been able to obtain funding from various other USFWS programs for a number of partnership programs.

The North Kona Dryland Forest Restoration Group
The ʻOlaʻa-Kilauea Partnership
Imi pono no ka aina: A Partnership for Environmental Education
Habitat Restoration Resources

For additional information contact:
Craig Rowland, Conservation Partnerships Coordinator
U.S. Fish and Wildlife Service, Pacific Islands Office
300 Ala Moana Blvd., Rm. 3-122
Box 50088, Honolulu, HI 96850
(808) 792-9400
(808) 792-9581 fax
email: Craig_Rowland@fws.gov

The Natural Resources Conservation Service works towards its vision of productive lands and a healthy environment on a watershed scale through the following mechanisms:

- Watershed Protection and Flood Prevention Act (aka the PL-566 programs)
- Emergency Watershed Protection program (EWP)
- Conservation Technical Assistance program (CTA)

The **WATERSHED PROTECTION AND FLOOD PREVENTION ACT** is implemented through three programs:

- **Watershed Surveys and Planning** program
  - Enables NRCS to provide technical assistance to state and local sponsors, generally through a 50:50 cost share agreement for Watershed Plan development and EIS preparation.
  - At least 20 percent of the total project benefits must be directly related to agriculture and/or rural communities.
  - Measures proposed in the Watershed Plan must be owned and operated by the sponsoring local organizations and participating individuals.
  - Sponsors may submit completed Watershed Plans for further federal cost-share funding consideration under the Watershed Operations program.
- **Watershed Operations** program
  - Enables NRCS to provide technical and financial assistance for installation of measures specified in authorized Watershed Plans, subject to annual Congressional appropriations.
  - Sponsors must provide a local share of funds, usually at 50 percent of the total costs to design and construct proposed measures.
  - Sponsor-funded activities include conducting public meetings to assure local involvement, and obtaining all land and water rights and permits required for installation of measures.
  - Sponsors operate and maintain works of improvement.
- **Watershed Rehabilitation** program
  - Enables NRCS to assist state, local and private entities with maintenance and repair of reservoir dams.
- Congressional funding for these programs has been limited in recent years, and the President's 2010 Budget seeks to terminate these programs. Even so, existing projects have been progressing through available federal funds and through the funds of project sponsors and granting agencies. Active progress is occurring with the following projects and sponsors:

  Watershed Planning
  - Lower Kula Stormwater Reclamation Study / Central Maui Soil and Water Conservation District
  - South Kona Irrigation Study / Hawaii Department of Agriculture

  Watershed Operations
  - Upcountry Maui Irrigation System / Hawaii DOA
  - Lower Hamakua Ditch Irrigation System / Hawaii DOA
  - Lahaina Flood Prevention and Sediment Control / County of Maui
  - Wailuku-Alenaio Flood Prevention / County of Hawaii

Upcountry Maui Main Distribution Pipeline

Lower Hamakua Ditch Flume Replacement

NRCS Natural Resources Conservation Service
P.O. Box 50004 Rm. 4-118
Honolulu, HI 96850
808-541-2600

EMERGENCY WATERSHED PROTECTION program (EWP)

- Enables NRCS to provide up to 75 percent of the funds needed to restore the function of areas impacted by a natural disaster.
- Local sponsor cost-share can include in-kind services, for activities that include clearing debris from flood-clogged waterways, stabilizing river banks, and restoring vegetation.
- Recent EWP projects and sponsors have included:
  - Kiholo Bay Earthquake Irrigation System Repairs / Hawaii Department of Agriculture
  - Upper Waiohuli Wildfire Revegetation / Hawaii Department of Land and Natural Resources
  - Makaua Stream Restoration / Hawaii Department of Land and Natural Resources

Kiholo Bay Earthquake - Water Intake Repair

Upper Waiohuli Wildfire Revegetation

CONSERVATION TECHNICAL ASSISTANCE program (CTA)

- Is the foundation of NRCS efforts to assist individuals, groups, and units of State and local government who work to improve natural resource conditions on private and non-federal lands.
- CTA activities include:
  - Providing soils information and interpretation to aid sound decision making in the wise use and management of soil resources.
  - Assisting with conservation plan design and regulatory compliance.
  - Disseminating information about the status, condition, and trend of soil, water, and related natural resources. The NRCS **Rapid Watershed Assessment** framework is being used to compile information for Pacific Islands Area watersheds that have strong potential to participate in USDA conservation financial assistance and easement programs.
- Rapid Watershed Assessments (RWAs) have been recently completed or are in progress for the following watersheds:
  - Hilo, Hawaii
  - Honaunau Bay, Hawaii
  - Kealakekua Bay, Hawaii
  - Kamaole, Maui, Hawaii
  - Kaluakoi, Molokai, Hawaii
  - North Shore, Oahu, Hawaii
  - Ugum, Guam
  - Ngerdorech, Babeldaob Island, Palau
  - Leone, Tutuila Island, American Samoa

Hawaii Coral Program Watershed Activities

The Hawaii Coral Program has identified the most critical threats to Hawaii's coral reefs to be fishing, climate change, recreational impacts to reefs, lack of awareness and land-based sources of pollution. Multi-agency steering committees were formed to facilitate the development and implementation of a local action strategy (LAS) to address each threat. These committees include members from state and federal government agencies, non-governmental organizations, academia, industries, and community groups.

The steering committee that oversees implementation of the Coral Reef Land-based Sources of Pollution Local Action Strategy (CRLBP LAS) includes representatives from the US. Environmental Protection Agency (EPA), U.S. Department of Agriculture Natural Resource Conservation Service (NRCS), National Oceanic and Atmospheric Administration (NOAA), U.S. Geological Survey (USGS), U.S. Fish and Wildlife Service, Hawaii State Department of Land and Natural Resources Division of Aquatic Resources (DLNR-DAR), Hawaii State Department of Health, Hawaii State Coastal Zone Management Program, and The Nature Conservancy.

The CRLBP LAS is a watershed-based strategy that incorporates holistic management aspects of traditional Hawaiian land and natural resource management at the watershed or ahupua'a level. The LBSP LAS was written in 2004 and focuses work in three priority watersheds: Honolua, Maui; Hanalei, Kauai; and Kawela to Kapualei, Moloka'i and Maunalua Bay, O'ahu.

The CRLBP LAS strategy was developed to: Provide a mechanism to document, consolidate, and share ongoing efforts to address land-based pollution threats to coral reefs in Hawai'i; Identify new actions needed to address land-based pollution threats for priority funding; and Improve coordination and collaboration between federal and state agencies responsible for pollution prevention and coral reef management in Hawai'i.

The goal of the CRLBP LAS is to improve coastal water quality and coral ecosystem function and health by reducing land-based pollution. The objectives include: 1) Reduce pollutant load to surface water and groundwater through site-specific actions and best management practices; 2) Improve understanding of the links between land-based pollution and coral reef health through focused scientific research and monitoring; 3) Increase awareness of pollution prevention and control measures statewide.

Below is a list of projects that the CRLBP LAS has supported per site:

<u>Hanalei:</u>
USGS Sedimentation and sediment transport monitoring
Coral disease screening
Fish pond restoration
Livestock exclusion fences
Water quality monitoring
Analysis of 10-yr coral cover data
Centralized wastewater treatment design
Upgrade beach restrooms
Sediment load study

Best management practices
Cesspool replacement
Hydrologic and sediment modeling
Impacts of biological resources on water quality
Volunteer water quality monitoring

<u>Moloka'i:</u>
Watershed Plan
Center for Watershed Protection (CWP) workshop and support
Feral animal control program and fencing
Soil erosion monitoring
Sediment basin feasibility study
Fire management
Suspended sediment variability, transport and coral response
Tracing sediment history
Coral Reef Assessment and Monitoring Program (CRAMP)

<u>Honolua:</u>
CWP workshop and assistance
Synthesis of land use and marine data
Stormwater and wastewater workshop
Visitor use study
CRAMP
USGS west Maui circulation study
Pesticide and herbicide screening

<u>Maunalua Bay:</u>
Technical assistance in watershed planning
Volunteer water quality monitoring

<u>Statewide initiatives:</u>
Regional workshop to develop indicators & protocols to assess coral reef health & threats from land-based pollution
Coordinator for LAS implementation & monitoring
Development of indicators of sediment stress in corals

The CRLBP LAS has effectively improved collaboration between State & Federal Agencies and Community Groups. It has focused research and management efforts in priority watersheds and has successfully leveraged over 3 million dollars from partners to implement projects.

For more information contact the CRLBP LAS Coordinator, Risa Oram, at risaoram@gmail.com or (808) 956-4065.

May 2009

INFORMATION PAPER

SUBJECT: Honolulu District's Civil Works Program, Hawaii and Pacific Territories

1. Purpose: To provide information on the future of the Honolulu District's Civil Works (Water Resources Development) Program

2. Points of Major Interest and Facts.

a. The U.S. Army Corps of Engineers (USACE), Honolulu District (POH), area of responsibility is the largest in USACE. POH assists local governments throughout the State of Hawaii, and Pacific Territories of American Samoa, Guam, and Commonwealth of the Northern Marianas Islands with their water resources development needs.

b. Beginning in the 1920's, POH has helped the various island communities with addressing its navigation (commercial and small boat harbors) and storm damage (flood control and shoreline protection) problems. POH has studied almost every navigation alternative in the State of Hawaii and the Territories and has implemented projects determined to be of greatest benefit to the community. POH has also assisted local governments with mitigating damages from shoreline erosion and flooding, and will continue to do so as urbanization and development progresses throughout POH's areas. With the number of completed projects growing, POH has placed a greater emphasis on operation and maintenance.

c. While POH may not implement as many navigation and storm damage reduction as in the past, POH's role will increase in ecosystem restoration and watershed planning. More and more communities are better understanding the need to protect and restore the environment. This has led to an increase in ecosystem restoration projects. In some cases, where past studies have indicated the lack of benefits or sponsorship, the addition of ecosystem restoration as a purpose may increase the likelihood of project implementation. USACE has become more involved in comprehensive water resources planning and development. Watershed planning offers a comprehensive evaluation of the problems and activities (past, current, and projected future) occurring in the watershed. Comprehensive planning is conducted in a structured framework and involves collaboration amongst federal, state, and county government agencies, land owners, and the communities in the identification of the problems and opportunities, and development of coordinated solutions/actions. As local governments struggle to meet increasing community demands, comprehensive planning allows POH to assist the local governments with prioritizing efforts and identify available federal assistance. This assistance will enable local government agencies to best apply their limited resources.

d. There may be an impact in the number of projects actually constructed for the Civil Works program; however, the overall District assistance to the local governments is expected to increase. Correspondingly, POH's in-house support capabilities will shift to more

comprehensive planning services. Being that POH's Civil Works programs are mostly congressionally driven, we must help the State, counties, and territories develop strategies for carrying out their responsibilities with less federal assistance. It is imperative that the POH works with the local governments by identifying their priorities such that it addresses items that are most critical for the communities.

e. The main purposes of the Corps' Civil Works program are economic development and environmental protection/restoration. POH's Civil Works program is lead by program/project managers in the Civil & Public Works Branch with technical engineering and economic support from the Civil Works Technical Branch and environmental support from the Environmental Branch. Regulatory, though not directly tied into the POH Civil Works program, ensures that development occurs in an environmentally acceptable and sustainable manner.

f. The Civil & Public Works Branch consists of 11 positions. Currently the Administrative Assistant and two PM position are vacant. There are three program managers in the Branch: for American Samoa; for Continuing Authorities Program/Guam; and for the Specifically Authorized Program/CNMI. Project managers are assigned duties based on their strengths, interests, and experiences. Many of the PM's are registered professional and hold advanced degrees. The Civil Works program receives between $20M to $30M per fiscal year.

g. The POH CW staff are fully committed individuals in serving our island communities through the application of federal water resources programs. Staff are advocates for their partners and work to enable our local sponsors to better serve their constituents.

PROTECTING OUR WATERSHEDS

What Threatens the Watershed?

Dense vegetation and flowing streams nurture O'ahu's watersheds.

For more than a million years, native Hawaiian birds, animals and insects played an integral part of a healthy watershed by pollinating and spreading the seeds of plants. However, foreign plants and animals introduced by Western settlement threaten our Hawaiian rain forest by destroying native plants and animals and invading the environment, and reduce the watershed's ability to catch and retain water.

The following are examples of non-native plants and animals that have invaded our Hawaiian forest:

Strawberry guava (*Psidium cattleianum*)

Miconia, Christmas Berry, Guava, and Clidemia are examples of plants that displace native forest plants and kill understory growth, causing erosion of watershed land.

Photo by T. Yoza

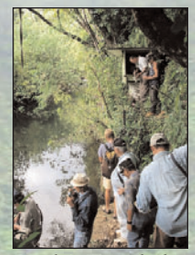
Wild pigs uproot native plants and the soil, disrupting the delicate balance of the watershed environment.

Pigs, goats, and sheep eat and uproot native plants, creating soil erosion and space for foreign plants to grow.

Introduced birds like the Bulbul compete for food and harbor diseases transmitted via mosquitoes, reducing or completely destroying remaining native bird and insect populations driving them to extinction.

WATERSHEDS NEED OUR HELP

You can help to protect and restore our Hawaiian rain forests and watersheds by working with others in the community, participating in on-going protection programs, and educating others of the importance of our watersheds. No effort is too small, and every effort will help to protect this fragile environment.



Punalu'u Watershed Alliance – *Looking at a USGS stream gage.*

Here are ways that you can help:

- Support the enforcement of existing laws and agriculture quarantine to prevent the introduction of foreign plants and animals in the watershed.
- Participate in projects that remove invasive plants and animals to allow native Hawaiian plants and animal populations to recover areas where they were displaced.
- Join community watershed partnerships, which plan and organize activities for watershed protection, restoration, and education.

Koli'i (*Trematolobelia macrostachys*)

- Conserve water everyday, all year long. Water conservation reduces the need to use ground water that is essential for healthy watershed forests and stream ecosystems.

Wiliwili (*Erythrina sandwicensis*)

GETTING INVOLVED

For more information on how you can join the effort to protect our watersheds and forests, please contact:

Board of Water Supply
(808) 748-5936 or 748-5940

State Department of Land and Natural Resources
(808) 587-0166

Board of Water Supply partnerships include:

- Ko'olau Mountain Watershed Partnership
- Makua Implementation Team
- Mōhala I Ka Wai
- Punalu'u Watershed Alliance
- Wai'anae Kai Community Forest Partnership
- Waihe'e Ahupua'a Initiative (WAI)

Waihe'e Ahupua'a Initiative – *Children planting native plants.*

Mōhala I Ka Wai – *Wai'anae High School students installing Makaha stream gage.*

Wai'anae Kai Community Forest Partnership – *Installation of erosion control material.*

www.boardofwatersupply.com
bws/rev05

PROTECTING OUR WATERSHEDS

By protecting our watersheds, the watersheds will continue to sustain the natural cycle of water and support our need for a reliable water supply.

Board of Water Supply
City & County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843
www.boardofwatersupply.com

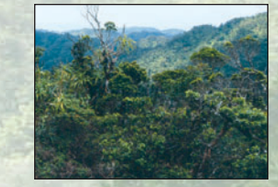
WATERSHEDS PROVIDE OUR WATER FOR LIFE

What is a Watershed?

A watershed is an area of land enclosed by mountain ridges that catches and collects rainwater to continually replenish ground water supplies.

Hahai no ka ua i ka ululāʻau – *Rains always follow the forest.*
(Ancient Hawaiian proverb)

Here on Oʻahu, water from the ocean is heated by the sun and is carried in-land by trade winds. As the moisture-laden air approaches the high mountain ranges, it rises, cools and condenses, which causes rain on the island.



Hawaiian forest

Oʻahu's watershed can also be described as a Hawaiian rain forest, which captures and saves large amounts of water. Tall trees shade other trees and plant life from the sun and slows the rain as it falls toward the ground. Although the trees themselves use water, the overall purpose is to reduce the amount of rainfall lost through evaporation and transpiration in the forest.

Shrubs and dense vegetation block the wind, which draws moisture from the ground, and stabilize the soil, allowing the water to seep into the earth to recharge the underground aquifer or to flow in streams to the ocean.

The Board of Water Supply (BWS) pumps water from the underground aquifer to meet the daily demands for water by Oʻahu residents.

Where are Watersheds Located?

Look to the mountains. The Koʻolau Range – from the North Shore, along the Windward coast, the backdrop for metropolitan Honolulu, and along the Central Oʻahu plains in the east; and the Waiʻanae Range – along the Central Oʻahu plains on the west and the Leeward coast; shelter our Hawaiian rain forests.

The Waiʻanae Range in the west and the Koʻolau Range in the east shelter Oʻahu's Hawaiian watershed forests.

Who is Responsible for the Watershed?

The State Department of Land and Natural Resources and the BWS are the governmental agencies entrusted with the protection and care of Oʻahu's watersheds. Because the watershed benefits everyone, we are all stewards of the watershed and share the responsibility to safeguard these forested lands.

HEALTHY WATERSHEDS ENSURE OUR WATER FOR LIFE

Hawaiian watershed forests are unique and fragile environments, and need our special care to flourish. Their uniqueness sustains the natural cycle of water, from rain falling on forested lands, captured by trees and plants, and eventually absorbed by the ground to seep into our ground water supplies.

What is a Healthy Watershed?

Multi-layered forest

Our Hawaiian rain forests are highly effective at capturing water. Each stratum of plant life within the forest serves a purpose, and collectively they form a multi-layered forest that soaks up rainfall and retains moisture in the ground and streams. Trees, shrubs, grasses, and other vegetation are integral parts of a healthy watershed.

Emergent Trees

These trees are the first to receive the rain. Their branches and leaves emerge from the forest cover and intercept rainfall and moisture from the air. In some cases, they produce fog drip. Water runs from the leaves, down branches, to plants near the ground.

Koa (*Acacia koa*)

Canopy Trees

These tall trees shape the canopy of the forest and receive most of the rain and condensation. Water drips through the trees and runs down the branches to the trunk, where its momentum slows as it moves over the bark.

ʻŌhiʻa (*Metrosideros polymorpha*)

Sub-canopy Trees and Shrubs

Raindrops and condensation filter through the leaves of the upper canopy and fall on the shorter trees and shrubs below. Some flow along leaf stems to seep into the ground. The dense shorter vegetation keeps the air near the ground saturated and slows evaporation from this layer of plants.

Kōpiko (*Psychotria* sp.)

Hesperomannia arbuscula

Understory

Ferns and low shrubs absorb water falling from the tall trees and also cushion the soil from the impact of water dripping from leaves and branches.

Palapalai (*Microlepia strigosa*)

Ground Cover

Plants like moss and grass form a spongy, porous plant layer just above the soil. They reduce evaporation from the ground and slow runoff, preventing soil erosion.

Elaphoglossum fern

USGS Watershed Capabilities

The USGS provides reliable and impartial information so that stakeholders can manage resources and address natural hazards. We do not regulate, set policy, or advocate management decisions.

The USGS has approximately 110 employees working in the fields of Hawaiian biology, geography, coastal and marine geology, geomorphology, volcanology, and hydrology.

Relevant research capabilities include:

- Characterization of biologic communities and ecosystem function; modeling ecologic interactions between species and environmental factors
- Characterization of coastal and nearshore properties such as erosion, sedimentation, physical (waves, currents) and chemical aspects; modeling water movement and material transport in coastal settings
- Evaluation of sediment sources, geomorphic processes, and erosion rates; modeling watershed-scale geomorphic processes
- Measurement of stream flow, sediment loads, and modeling rainfall-runoff characteristics; assessing water quality in streams as affected by land use
- Determining groundwater recharge and flow characteristics, and modeling effects of pumping; determining the dynamics of groundwater discharge in coastal settings

Some key data sets relevant to watershed science are:

- Inventories and population studies of native Hawaii flora and fauna, plus assessment of the spread of invasive species
- Geospatial libraries and periodic contracts to improve coverage and resolution
- Online access to hydrologic data from streams, rain gages, and wells in Hawaii

Research is carried out statewide to address stakeholder needs. Major watershed activities are S. Molokai and Hanalei (Ridge to Reef), Hawaii Volcanoes NP and Haleakala National Park, Auwahi forest restoration project on Maui, Maunalua Bay (Oahu). Some of this work is funded by USGS programs and some is funded by reimbursement from other federal, state and county agencies.

Future directions are likely to emphasize increasingly sophisticated models and a strong push towards understanding the likely consequences of global climate change on Hawaiian ecosystems and watersheds.

he kaí kanalaní kõ Maunalua

THE ABUNDANT SEA OF MAUNALUA

restoring the riches of a famed ocean resource

Welina, welcome, to Maunalua

Maunalua, meaning "two mountains," refers to two prominent peaks: Koko Head and Koko Crater. Located in urban Southeast Oʻahu, this region stretches from Kawaihoa to Kūpikipikiʻō (Koko Head to Black Point) and to the summit of the Koʻolau Mountains – covering roughly 22 square miles of land, 7 miles of shoreline, and 6.5 square miles of ocean waters. More than 60,000 people call this place home.

photo cover: Andrea Charuk
photo above: Ryan Tabata
photo right: Ray Jerome Baker, Bishop Muesum
photo back: Pauline Sato

Maunalua of Days Past

Hawaiian place names of the Maunalua Bay region such as Kuliʻouʻou (knee sounding – referring to a knee drum) and Wailupe (kite water – where kites were flown) paint a picture of an area enjoyed by people. Moʻolelo, Hawaiian stories, talk of areas visited by Pele and Kamapuaʻa, legendary figures of Hawaiian folklore. Several moʻo (water spirits) lived in the area, guarding over sites and bringing blessings of the abundance of fish.

Early residents of the region engaged in fishing, gathering, and subsistence agriculture. Fishing shrines (koʻa) dedicated to ʻamaʻama (mullet) and akule (scad) suggest that these were the major catch in the area. The bay was also known for various types of weke (goatfish) and heʻe (octopus). There were several Hawaiian fishponds, most famously at Wailupe and Niu, in which fish were cultivated for consumption in a sustainable manner. An inland fishpond, Keahupua O Maunalua, now called Kuapā, was one of the largest fishponds on Oʻahu. The coastal plains were famous for sweet potatoes. These resources were managed carefully by konohiki (land stewards) appointed by aliʻi (chiefs). The konohiki could impose various seasonal and other restrictions, exercising his or her responsibility to protect the resources.

The 1880s brought an influx of foreigners, particularly Americans and Portuguese. Maunalua became a prime cattle grazing area and in Kuliʻouʻou, the ranches and dairy farms produced the most milk in the Pacific.

Up until the 1950s, Maunalua continued to be important for farming and well known for its abundant fisheries. Rapid development starting in the 1950s created the suburban character of this region. Today, most of the valleys and ridges are clothed with residences overlooking Maunalua Bay.

While the pig farms and crop farming are mostly gone, farmers in Kamilo Nui Valley still produce vegetables and flowers sold across the island. A drive to these farms harkens back to a time when a thin dirt road was the main artery through the Maunalua region.

Maunalua Today

Maunalua's value as a cultural resource has changed but not diminished. It provides recreational areas such as parks and a boat launching ramp. Canoe paddlers, kayakers, divers, surfers, boaters, and fishers use the bay daily. Hiking trails are generally easy to access, some reaching all the way to the summit of the Koʻolau Mountains. Important cultural sites that can still be observed are a petroglyph/settlement site near Mariners Ridge, and Pahua heiau near Kamilo Iki Ridge.

photo: Ryan Tabata

WHAT COULD THE NAMES MEAN?

Waiʻalae Nui
large mudhen water
Waiʻalae Iki
small mudhen water
Wailupe
kite water
Niu
coconut
Kuliʻouʻou
knee sounding
Hahaʻione
sand broken
Kamilo Nui
large milo tree
Kamilo Iki
small milo tree

Watersheds of the Region

The watersheds of the Maunalua Bay region generally, but not exactly, match ahupuaʻa (Hawaiian land division) boundaries, running from the sea to the mountain top. From west to east, they are: Waiʻalae Nui, Waiʻalae Iki, Wailupe, Niu, Kuliʻouʻou, Hahaʻione, Kamilo Nui and Kamilo Iki.

When healthy, these watersheds capture rainfall in this relatively dry Kona district of the island, allowing it to remain on the land and percolate slowly underground. Plants from trees to ferns serve as a filter as water moves downhill, especially during heavy downpours.

The most dramatic change has been paving of these valleys and ridges. Human-made drainage systems and the overall hardening of the land have altered the natural system of the watersheds, resulting in excessive outputs of sediments and land-based pollution. This harms the bay's reefs and all life that depend on clean water. If we want a healthy bay, we must address these problems.

Kamilo Iki

Kamilo Nui

Marine Resources and Wildlife

Long-time Maunalua residents recall a bay rich with resources that were relatively easy to gather. Maunalua Bay became a significant commercial fishery, and boats bringing in tons of catch were common. Much of that has changed over the past 50 years. Areas covered by coral reefs have shrunk, and catching mature fish within the reef flats is challenging. Lobster and the limu (algae) beds have all but disappeared.

photo: John Johnson

Though the diversity and abundance of reef species have diminished, there still remain healthy pockets of coral reefs and native seagrass beds. Honu (Green sea turtles) and even endangered ʻĪlioholoikauaua (Hawaiian monk seals) can be found within the bay. And koholā (Humpback whales) are common visitors that never fail to please whalewatchers.

Parts of Kuapā Pond and Paikō Lagoon provide habitat to the endangered Hawaiian Stilt, aeʻo, as well as other migratory birds.

photo: Pauline Sato

photo: John Johnson

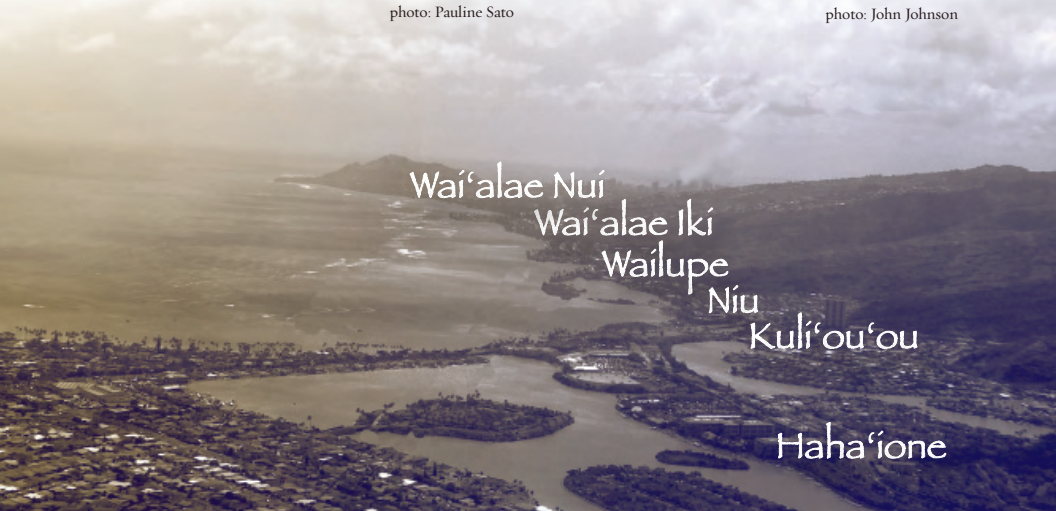


photo: Alyssa Miller

Threats to the Bay

Maunalua Bay is well loved, but unfortunately, not well cared for. A major problem is sedimentation and land-based pollution, deriving from a variety of sources. These sources include storm runoff, channelized waterways, poorly maintained wastewater systems, and construction sites. Coral, a living animal, cannot build colonies and survive in poor conditions. Invasive species, both plant and animal, also change the balance of the bay. Several species of alien algae now blanket parts of the reef system. Lowered populations of reef fish, a result of unsustainable fishing pressure and poor habitat conditions, are unable to keep the algae in check.

photo: Pauline Sato

What Can We Do?

As there are many threats, there is no single solution. However, change is within reach, and the ability of marine habitats to rebound gives hope. Everyone can do something to make a difference.

photo: John Johnson

photo: Andrea Charuk

Tips on How You Can Help

1. Clean up streams and waterways that enter the bay as well as beaches. Keep yard waste, litter, and mud out of storm drains – they drain right into the bay.

2. If you have a yard, let it breathe! Don't cover it up with concrete or asphalt. Let water settle and feed your lawn.

3. Keep pollutants such as motor oil, antifreeze, pesticides, fertilizer, and soap from entering storm drains.

4. Control construction erosion and urge developers to use best management practices.

5. Treat storm water as a resource. Use a rain barrel or other means to store rainwater for use in the landscape, home and commercial areas.

6. Join efforts to learn about and remove alien seaweed from the bay. Some types, when dried, can be used as fertilizer.

7. Pick up and properly dispose of used fishing gear and nets. Monofilament line can strangle marine animals as well as break coral.

8. Follow the rules of the bay, including all fishing regulations. Lay gillnets are now banned in Maunalua Bay.

9. Join the Maunalua Makai Watch team. These volunteers help to educate bay users, conduct biological and human use monitoring, and observe for compliance with laws.

10. Involve children in caring for the bay.

11. Share your knowledge, skills, time and expertise with others. Mālama Maunalua, Hui Nalu Canoe Club, Livable Hawai'i Kai Hui, Friends of Hanauma Bay, and B.E.A.C.H. are just some of the non-profit community groups that care for the bay and would appreciate your help.

MĀLAMA MAUNALUA

The mission of Mālama Maunalua is to conserve and restore a healthy and productive Maunalua Bay through community kuleana. For more information, please contact Mālama Maunalua, a community based organization & a project of Community Links Hawai'i, a non-profit organization.

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