

HAWAI'I WATER WORKSHOPS

WATER RESOURCE PROTECTION PLAN UPDATE

MARCH 2015

Commission on Water Resource Management



Agenda



1. **Why Water?**
2. Water Management in Hawai'i
3. Commission on Water Resource Management
4. Where does our water come from?
5. Hawai'i Water Plan
6. Water Resource Issues
7. Water Management Strategies
8. Breakout Discussion
Local Water Issues and Actions
9. Reconvene
Summary of Breakout Discussion
10. Next Steps



WHY WATER?



The human body is up to 60% water! Water...

- ... is a building material for our cells;
- ... regulates body temperature;
- ... metabolizes and transports carbohydrates and proteins;
- ... Flushes wastes;
- ... lubricates joints;...



Source: The USGS Water Science School
<http://water.usgs.gov/edu/propertyyou.html>

WHY WATER?



Water is critical for life!

- All known organisms need at least some water to survive.



WHY WATER?



Water is essential for food production...

- Crop irrigation;
- Aquaculture;
- Aquaponics;
- Washing;...

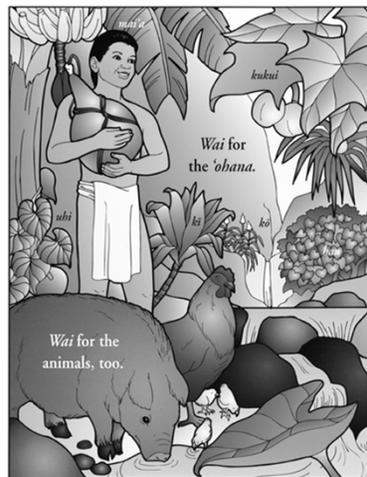


WHY WATER?



...cultural practices...

- Kalo cultivation;
- Fishing;
- Gathering;
- Recreation;...



Source: Williams, Julie. 2006. Wai'anae: Where I Live. Kamehameha Schools Press.

WHY WATER?



...and many other purposes.

- Public health;
- Power generation;
- Recreation;
- Fire protection;...



Diversion weir. Photo source: The Garden Island
http://thegardenisland.com/news/local/altered-waters-altered-life/article_f44350f8-c4c4-11e0-b6b4-001cc4c03286.html



Honolulu Advertiser. Crews contain Nanakuli fire. May 11, 2005.

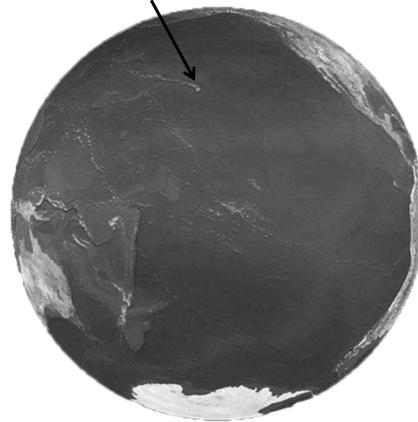
WHY WATER?



Water covers 71% of the Earth's surface!

- The world's oceans contain 332.6 million cubic miles = 366 quintillion (3.66×10^{20}) gallons of water
- That's about 97% of all water on Earth (USGS)

You are here



Source: USGS Water Science for Schools
<http://water.usgs.gov/edu/watercycleoceans.html>

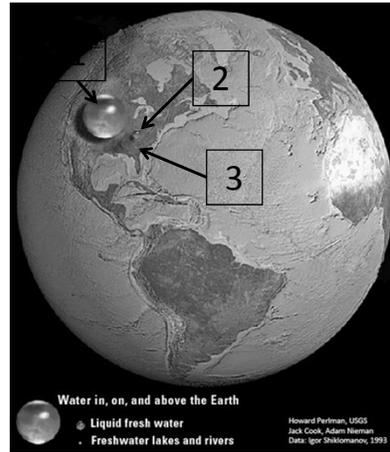
WHY WATER?



Only about 1% **2** of all of the water on Earth is fresh water

All Earth's water, liquid fresh water, and water in lakes and rivers. Spheres showing:

1. All water (sphere over western U.S., 860 miles in diameter) is 0.1% of the size of the entire earth.
2. Fresh liquid water in the ground, lakes, swamps, and rivers (sphere over Kentucky, 169.5 miles in diameter), is 0.00004% of the size of the entire earth.
3. Fresh-water in lakes and rivers (sphere over Georgia, 34.9 miles in diameter) is 0.0000004% of the size of the entire earth.



Source: Woods Hole Oceanographic Institution & USGS Water Science School
<http://water.usgs.gov/edu/earthwherewater.html>

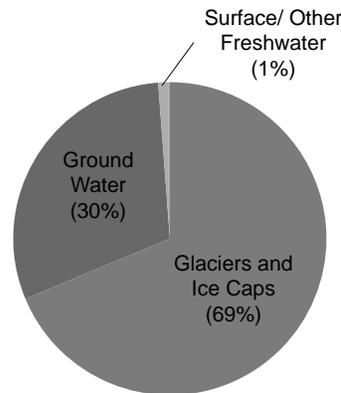
WHY WATER?



Of the 1% fresh water...

- Most of the Earth's fresh water is locked up in glaciers and ice caps and is unusable
- Surface water serves most of life's fresh water needs, but accounts for only 1% of the fresh water on Earth.

Where is the Earth's Fresh Water?



Source: USGS Water Science School
<http://water.usgs.gov/edu/earthwherewater.html>

Hawai'i's Natural Water Systems



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Water Management in Hawai'i



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Water Management in Hawai'i



The Hawaiian language and culture has hundreds of "WAI" words and place names

- Wai ali'i
- Wai ani ani
- Wai 'apo
- Wai au
- Wai 'eli
- Wai hā
- Wai hau
- Waiholomoku
- Waihona
- Waihona
- Waiwai
- Wai hū
- Wai kahe
- Wai kai
- Wailana
- Wailele
- Waiwai
- Waiāhole
- Waiakamilo
- Waiākea
- Wai'alaie
- Wai'ale'ale
- Wai'anae
- Waiiau
- Waikalua
- Waikāne
- Waikele
- Waikīkī
- Waikoloa
- Wailea
- Waimānalo
- Waimea
- Waipahu
- Waipi'o

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Water Management in Hawai'i



1840 Constitution

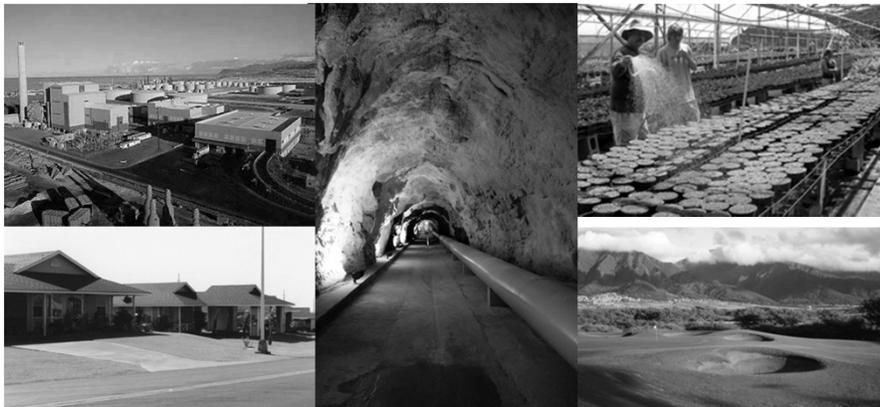
*“Kamehameha I, was the founder of the kingdom,
and to him belonged the land
from one end of the Islands to the other,
though it was not his own private property.*

*It belonged to the people, and the chiefs in common,
of whom Kamehameha I was the head,
and had the management of the landed property.”*

Water Management in Hawai'i



The need for a different type of management



Water Management in Hawai'i



Hawai'i State Constitution, Article XI, Section 7

(emphasis added)

"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 resource agency** which... shall set overall water conservation, quality and use policies; define reasonable and beneficial 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."*

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Commission on Water Resource Management



- Water **QUANTITY** is managed by CWRM (i.e. streams and ground water).
- Water **QUALITY** is managed by the Department of Health.
- Seven members:
 - Five members are appointed by the Governor and confirmed by the State Senate
 - Chairperson of BLNR (Chair of Water Commission)
 - Director, State DOH (ex-officio voting member)

Kē Kahuwai Pono

“The trustee who oversees the rightful sharing of water.”



Commission on Water Resource Management



Branches

- Ground Water Regulation
- Stream Protection and Management
- Planning
- Survey



Commission on Water Resource Management



Public Trust Doctrine

“...all public natural resources are held in trust by the State for the benefit of its people.”

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

State Constitution, Article XI

Commission on Water Resource Management



Precautionary Principle

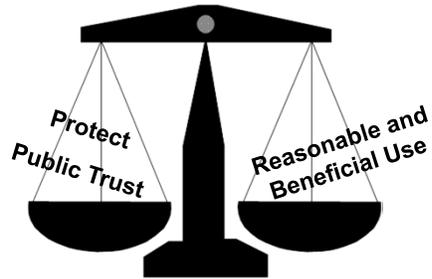
There is a duty to take anticipatory action to prevent harm to public resources.



Commission on Water Resource Management



Protect the Public Trust and Ensure Reasonable and Beneficial Uses



Agenda



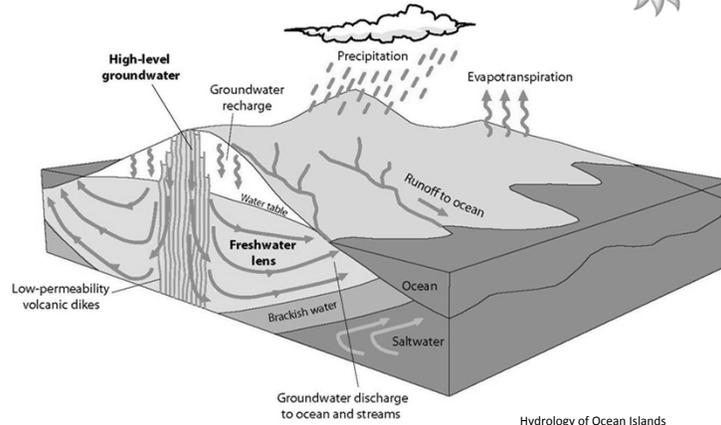
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Where does our water come from?



The Water Cycle

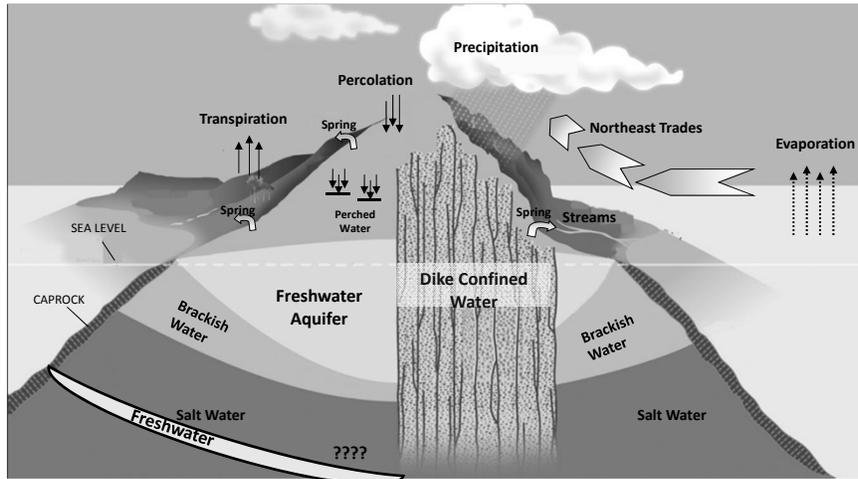


Hydrology of Ocean Islands
 USGS Pacific Islands Water Science Center
<http://hi.water.usgs.gov/studies/GWRP/islhydro.html>

Where does our water come from?



Ground Water



Where does our water come from?



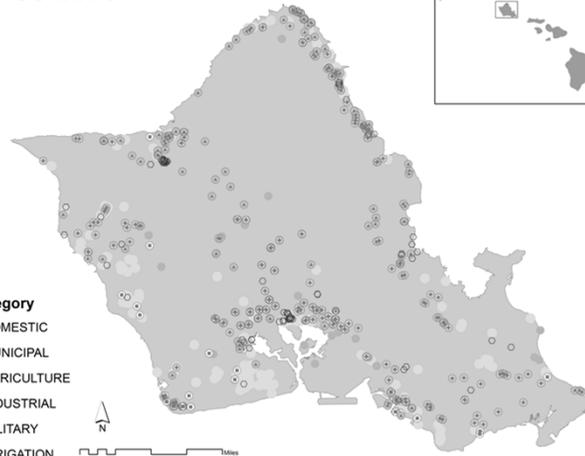
Ground Water

Production Wells - O'ahu



Use Category

- DOMESTIC
- MUNICIPAL
- AGRICULTURE
- INDUSTRIAL
- MILITARY
- IRRIGATION



Where does our water come from?

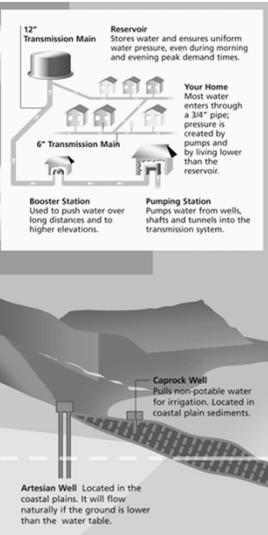
Ground Water

- Wells
- Shafts
- Tunnels



How We Deliver Water

When you turn on your tap, you set in motion a fantastic journey. Water is pumped from the aquifer via wells, shafts and tunnels. Once up on the surface, it enters an island-wide transmission system. Within the system, water is moved from pumping stations, sometimes via booster stations, to mains and reservoirs where it is stored until needed by homes and businesses.



Source: Honolulu Board of Water Supply

Where does our water come from?



Surface Water



Pump near an auwai



Collection box along stream channel



Irrigation ditches carry water to agricultural fields



Pipe intake



Beginning of an auwai

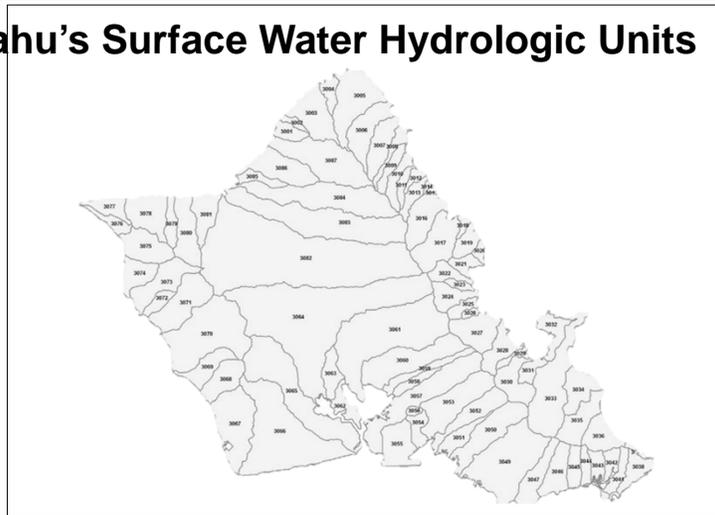


Measuring stream flows

Where does our water come from?



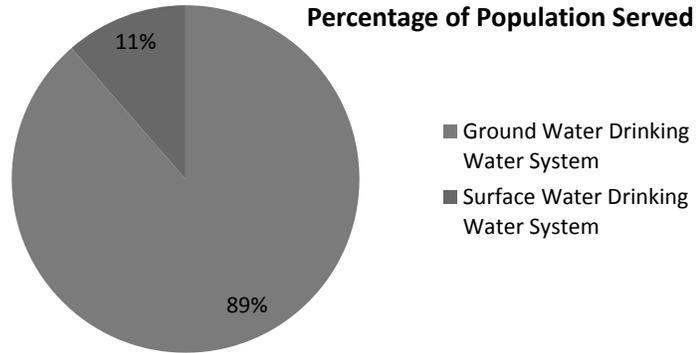
O'ahu's Surface Water Hydrologic Units



Where does our water come from?



In Hawai'i most of our drinking water is ground water.



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Hawai'i Water Plan



*“There is a need for a program of **comprehensive water resources planning** to address the problems of supply and conservation of water.*

*The **Hawaii water plan**...is accepted as the guide for developing and implementing this policy.”*

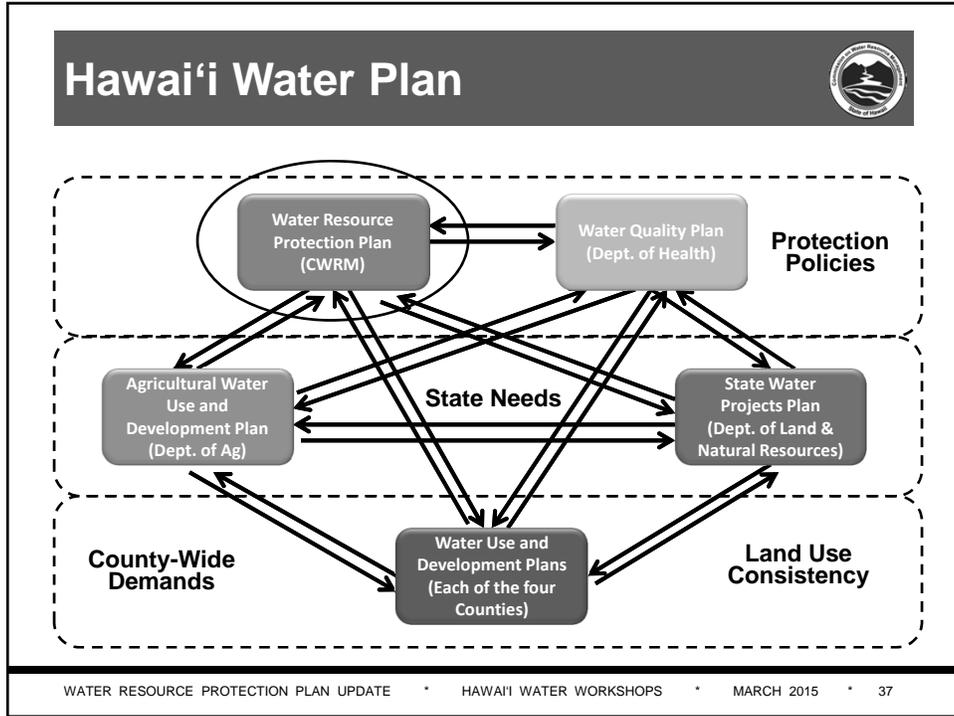
(§174C-2(b) HRS)
(Emphasis added)

Hawai'i Water Plan



Objectives

- Set water resource policies
- Proper conservation and development of water
- Reasonable and beneficial use of water
- Ensure adequate water quality
- Control water for public purposes
- Provide for DHHL needs
- Recognize county home rule



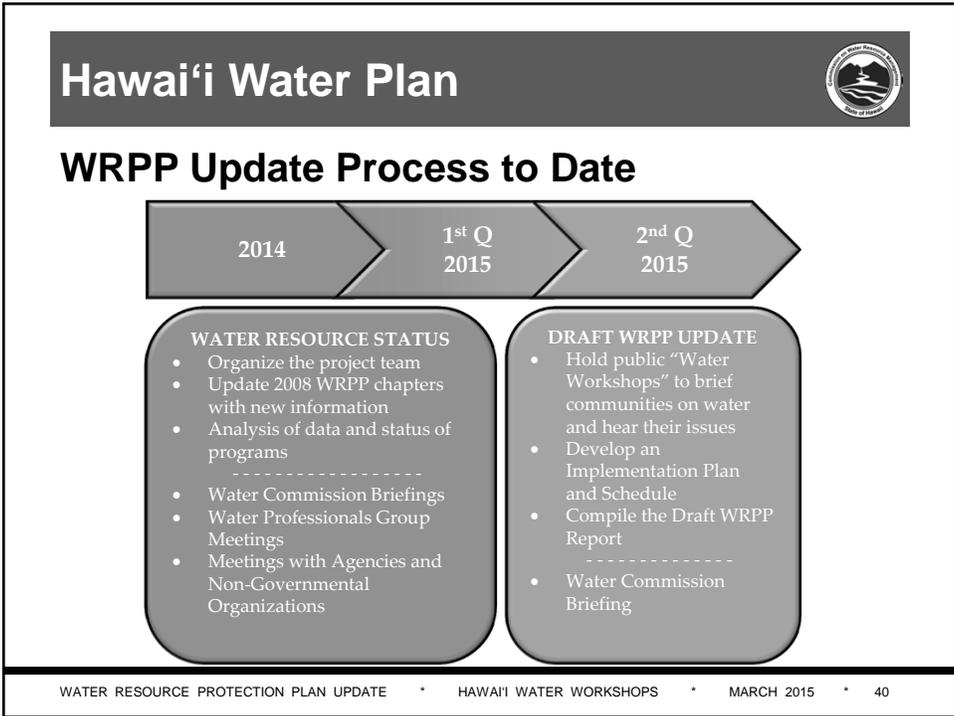
Hawai'i Water Plan

Water Resource Protection Plan (2008)

1. Introduction
2. General Water Resource Management Principles and Policies
3. Inventory and Assessment of Resources
4. Monitoring of Water Resources
5. CWRM Regulatory Programs
6. Existing and Future Demands
7. Resource Conservation and Augmentation
8. Drought Planning
9. Watershed Protection
10. Water Quality
11. Priority Recommendations and Implementation Plan
12. References

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<h1 style="margin: 0;">Hawai'i Water Plan</h1>	
<p>WRPP Update (current)</p> <p>Table of Contents</p> <ol style="list-style-type: none"> 1. Introduction 2. Summary of Water Resource Trends and Issues 3. Action Plan 4. Plan Implementation 	<p>Appendices</p> <ol style="list-style-type: none"> A. Planning Context for the WRPP B. Legal Authorities and Guidance C. Stakeholder Outreach Process D. Inventory and Assessment of Resources E. Monitoring of Water Resources F. CWRM Regulatory Programs G. Existing and Future Demands H. Resource Conservation and Augmentation I. Drought Planning J. Watershed Protection K. Water Quality L. Five-Year Action Plan Project and Program Descriptions M. Long-Term Actions N. Water Resource Agencies
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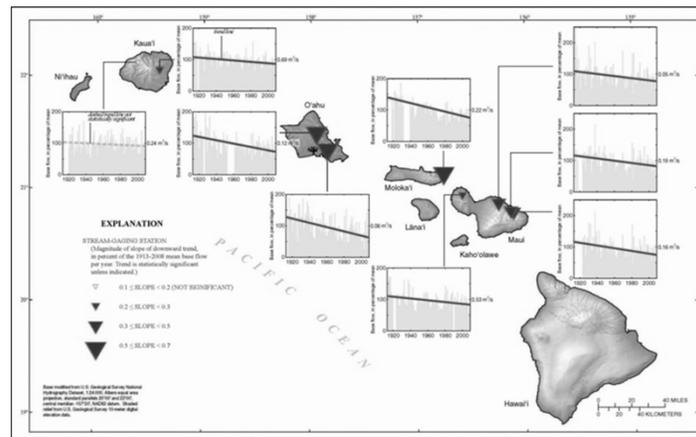
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Water Resource Issues



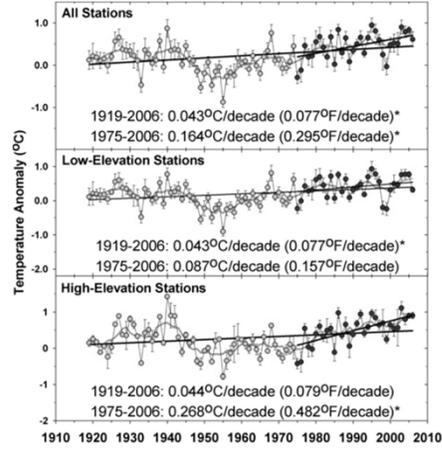
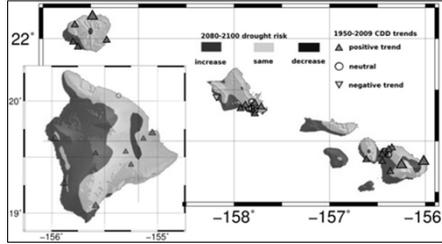
Climate Change



Water Resource Issues



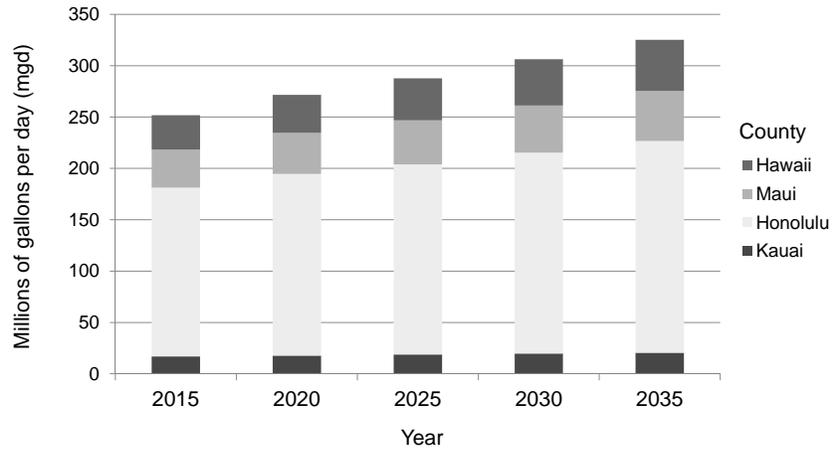
Climate Change



Water Resource Issues



Increasing Water Demand

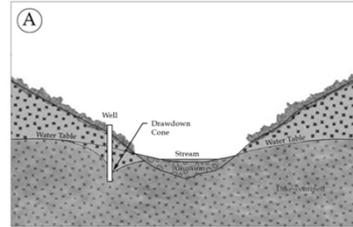


Water Resource Issues

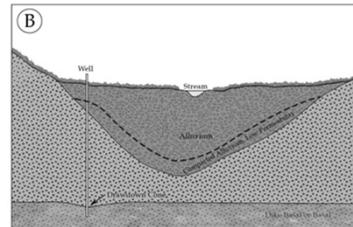


Ground and Surface Water Interaction

- In some locations, ground water withdrawal affects the amount of water in nearby surface water bodies.
- There is a need to better understand these ground-surface water interactions in order to make better management decisions.



Well Affecting Stream Flow



Well Not Affecting Stream Flow

Water Resource Issues



Protection of Water Rights

- Correlative
- Riparian
- Appurtenant
- Traditional and Customary
- Department of Hawaiian Home Lands

Water Resource Issues



Watershed Management



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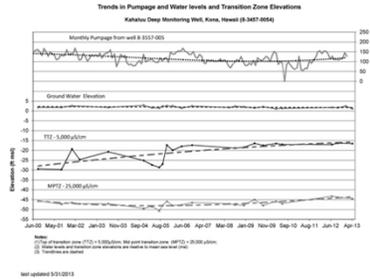
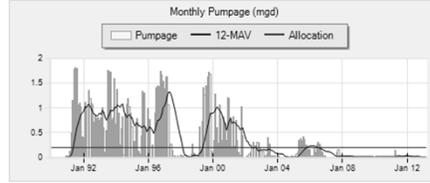


Water Management Strategies



Resource Monitoring

- Water Use Reporting
- Deep Monitor Wells
- Water Level Observation Wells
- Climate
- Chlorides
- Streamflow



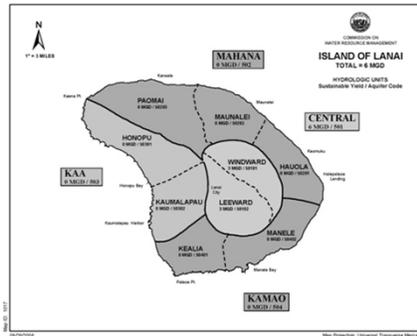
Water Management Strategies



Resource Assessments

Sustainable Yields

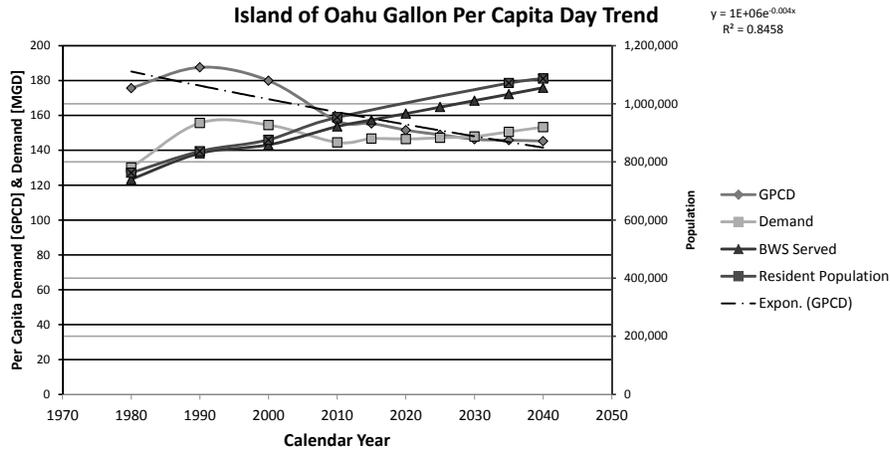
Instream Flow Standards



Water Management Strategies



Conservation



Water Management Strategies



Resource Augmentation

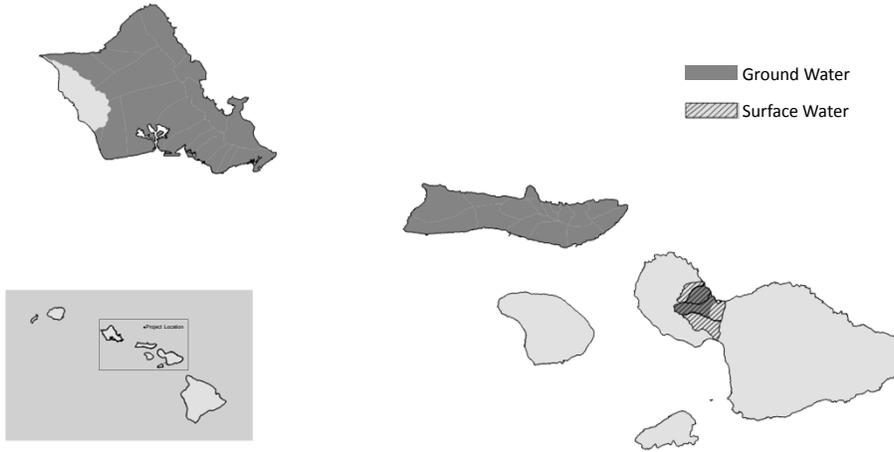
- Recycled Water
- Desalinated Water
- Storm Water



Water Management Strategies



Water Management Areas



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Breakout Discussion



45 minutes

Break out into small groups to allow for more detailed discussions on specific topics. We will reconvene after 45 minutes to share the top issues from each group.



Photo: Honolulu BWS

Breakout Discussion



What is your #1 water resource issue?

What can/should we do about it?



Reconvene Large Group



What were the top three
water resource issues for your group?



Next Steps



Hawai'i Water Workshops 6:30 pm – 8:30 pm

March 3 - O'AHU
DLNR Board Room
1151 Punchbowl Street

March 19 - KAUA'I
Planning Commission Meeting Room
4444 Rice Street

March 11 - LANA'I
Lana'i Senior Center
309 Seventh Street

March 24 - KONA
West Hawai'i Civic Center
Community Meeting Hale
74-677 Kealahou Parkway

March 12 - MAUI
Wailuku Community Center
395 Waena Place

March 30 - HILO
Aupuni Center
101 Pauahi Street, Suite 1

March 17 - MOLOKA'I
DHHL/OHA Conference Room
600 Mauna Loa Highway, Suite D-2

Next Steps



2014	1st Q 2015	2nd Q 2015	3rd Q 2015	4th Q 2015	1st Q 2016
<p>WATER RESOURCE STATUS</p> <ul style="list-style-type: none"> Organize the project team Update 2008 WRPP chapters with new information Analysis of data and status of programs <hr/> <ul style="list-style-type: none"> Water Commission Briefings Water Professionals Group Meetings Meetings with Agencies and Non-Governmental Organizations 	<p>DRAFT WRPP UPDATE</p> <ul style="list-style-type: none"> Hold public "Water Workshops" to brief communities on water and hear their issues Develop an Implementation Plan and Schedule Compile the Draft WRPP Report <hr/> <ul style="list-style-type: none"> Water Commission Briefing 	<p>PUBLIC REVIEW</p> <ul style="list-style-type: none"> Distribute Public Review Draft WRPP Solicit and respond to public comments <hr/> <ul style="list-style-type: none"> Water Commission Briefing Public Hearings <ul style="list-style-type: none"> Kona Hilo Maui Lāna'i Moloka'i O'ahu Kaua'i 	<p>FINAL WRPP UPDATE</p> <ul style="list-style-type: none"> Revise Draft WRPP Update Report Finalize WRPP Update Report <hr/> <ul style="list-style-type: none"> Water Commission Briefing 		

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Water Resource Protection Plan

Contact Information

<p style="text-align: center;">Jeremy Kimura Commission on Water Resource Management (808) 587-0269 dlnc.wrm@hawaii.gov</p>	<p style="text-align: center;">Sherri Hiraoka Townscape, Inc. (808) 536-6999, ext. 6 sherri@townscapeinc.com</p>
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<http://dlnc.wrm@hawaii.gov/cwrm/planning/hiwaterplan/wrpp/>