

# HAWAI'I WATER WORKSHOPS

**WATER RESOURCE PROTECTION PLAN UPDATE**

**MARCH 2015**

**Commission on Water Resource Management**



## Agenda



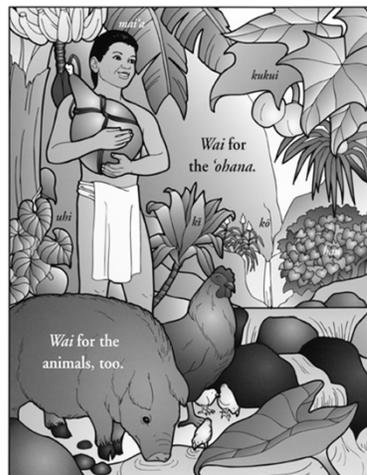
1. **Why Water?**
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8. Breakout Discussion  
Local Water Issues and Actions
9. Reconvene  
Summary of Breakout Discussion
10. Next Steps



# WHY WATER?



- The human body is up to 60% water
- All known organisms need at least some water to survive
- Water is essential for:
  - Public health
  - Food production
  - Cultural Practices
  - Recreation
  - Power Generation
  - Fire Protection
  - and much more!



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

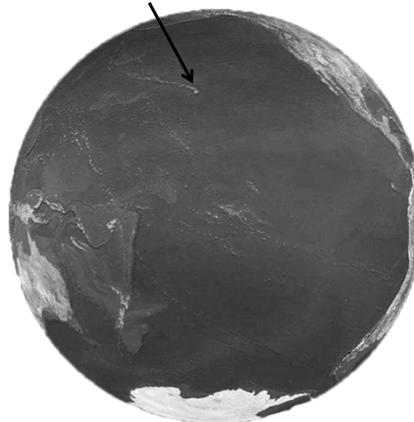
# WHY WATER?



**Water covers 71% of the Earth's surface!**

- The world's oceans contain 332.6 million cubic miles = 366 quintillion ( $3.66 \times 10^{20}$ ) 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>

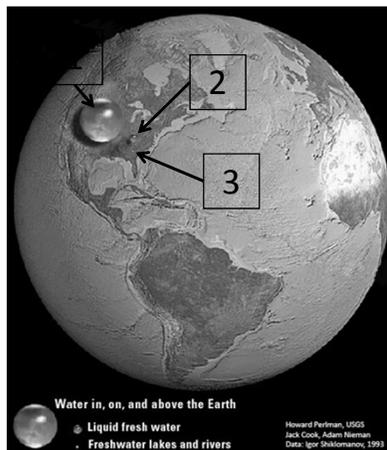
# WHY WATER?



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>

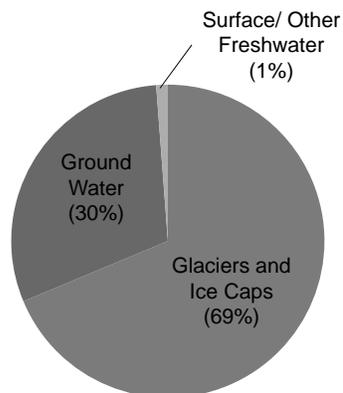
# WHY WATER?



Of the fresh water on Earth...

- Most of the fresh water is locked up in glaciers and ice caps and is unusable
- Surface water (streams, rivers, lakes, etc.) 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



TRADITIONAL MĀUI LAND USES

- HUMAN ACCESS/HABITATION
- RESOURCE ACCESS TRAIL
- COASTAL ACCESS TRAIL
- TEMPORARY HAILE
- KAUIHALE
- LO'I
- FRESH WATER STOUCES
- FORESTED AREA
- CULTURAL SITE
- IRRIGATED FARMLAND
- NON-IRRIGATED FARMLAND

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# Water Management in Hawai'i

**The Hawaiian language and culture has hundreds of “WAI” words and place names**

<ul style="list-style-type: none"> <li>• Huawai</li> <li>• Kahewai</li> <li>• KawaihaeKauluwai</li> <li>• Kawaihau</li> <li>• Kawaihoa</li> <li>• Kawai Iki</li> <li>• Kawaikini</li> <li>• Kawailena</li> <li>• Kawailoa</li> <li>• Kawaiipapa</li> <li>• Kawaiipoko</li> <li>• Kawai'ula</li> <li>• Kūmelewai</li> <li>• Kunawai</li> <li>• Lo'ipūnāwai</li> <li>• Lokowaiaho</li> <li>• Luawai</li> <li>• Manawai</li> <li>• Muliwai</li> <li>• Nāwaihulili</li> <li>• Nininiwai</li> </ul>	<ul style="list-style-type: none"> <li>• Niuhelewai</li> <li>• Papawai</li> <li>• Piliwai</li> <li>• Pūhāwai</li> <li>• Pu'ukawaiwai</li> <li>• Pu'uwaihu'ena</li> <li>• 'Umiwai</li> <li>• Waiāhole</li> <li>• Waiakamilo</li> <li>• Waiākea</li> <li>• Wai'alalā</li> <li>• Wai'alae</li> <li>• Wai'ale'ale</li> <li>• Wai ali'i</li> <li>• Wai'anae</li> <li>• Wai ani ani</li> <li>• Wai 'apo</li> <li>• Wai au</li> <li>• Wai 'eli</li> <li>• Wai hā</li> <li>• Wai hau</li> </ul>	<ul style="list-style-type: none"> <li>• Waiholomoku</li> <li>• Waihona</li> <li>• Wai hū</li> <li>• Wai kahe</li> <li>• Wai kai</li> <li>• Wailana</li> <li>• Wailele</li> <li>• Waikalua</li> <li>• Waikamoi</li> <li>• Waikāne</li> <li>• Waikapuna</li> <li>• Waikele</li> <li>• Waiki'i</li> <li>• Waikīkī</li> <li>• Waikoloa</li> <li>• Wailea</li> <li>• Waimānalo</li> <li>• Waimea</li> <li>• Waipahu</li> <li>• Waipi'o</li> <li>• Waiwai</li> </ul>
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## Water Management in Hawai'i



### 1840 Constitution

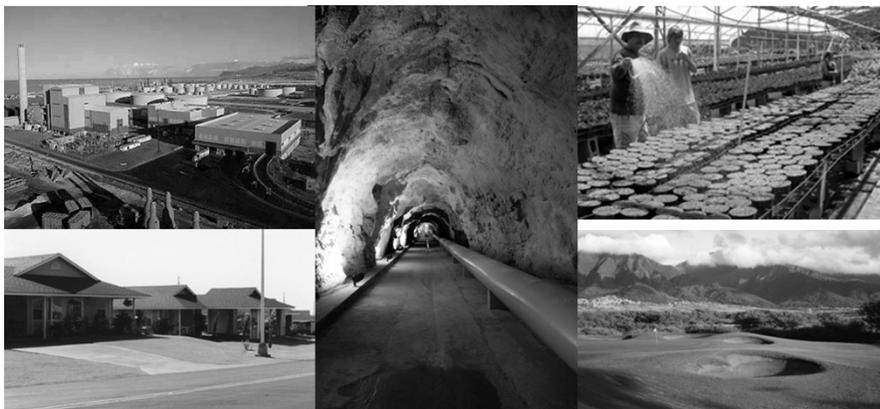
*“Kamehameha I, was the founder of the kingdom,  
and to him belonged the land  
from one end of the Islands to the other,  
though it was not his own private property.*

*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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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
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## Commission on Water Resource Management



- 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)
- Water **QUANTITY** is managed by CWRM (i.e. streams and ground water).
- Water **QUALITY** is managed by the Department of Health.



## 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**

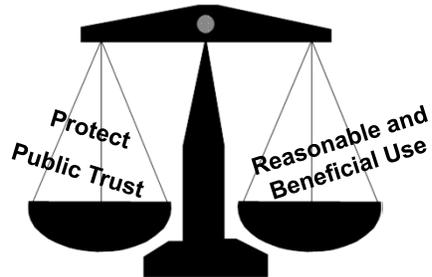
There is a duty to take anticipatory action to prevent harm to public resources.



## Commission on Water Resource Management



# Protect the Public Trust and Ensure Reasonable and Beneficial Uses



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## Where does our water come from?

A 3D cutaway diagram of a landscape. On the left, a large tree stands on a circular base. In the center, a mountain range is shown. On the right, a body of water is depicted. Arrows indicate water flow: precipitation falling from a cloud, runoff from the mountain into the water, and groundwater flowing from the mountain base towards the water. A sun icon is in the top right corner.

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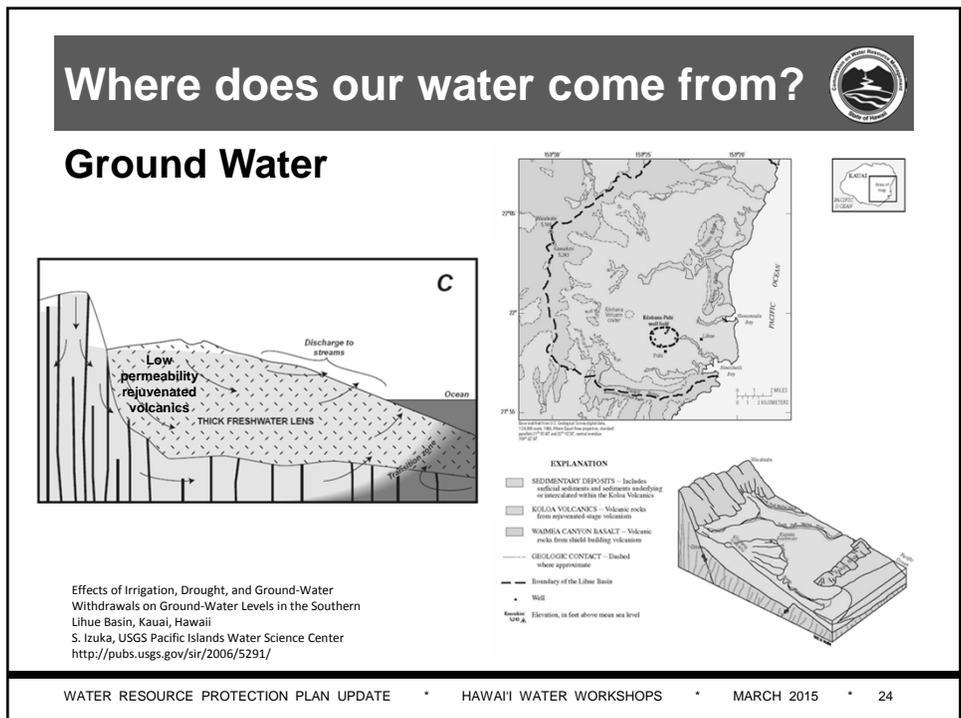
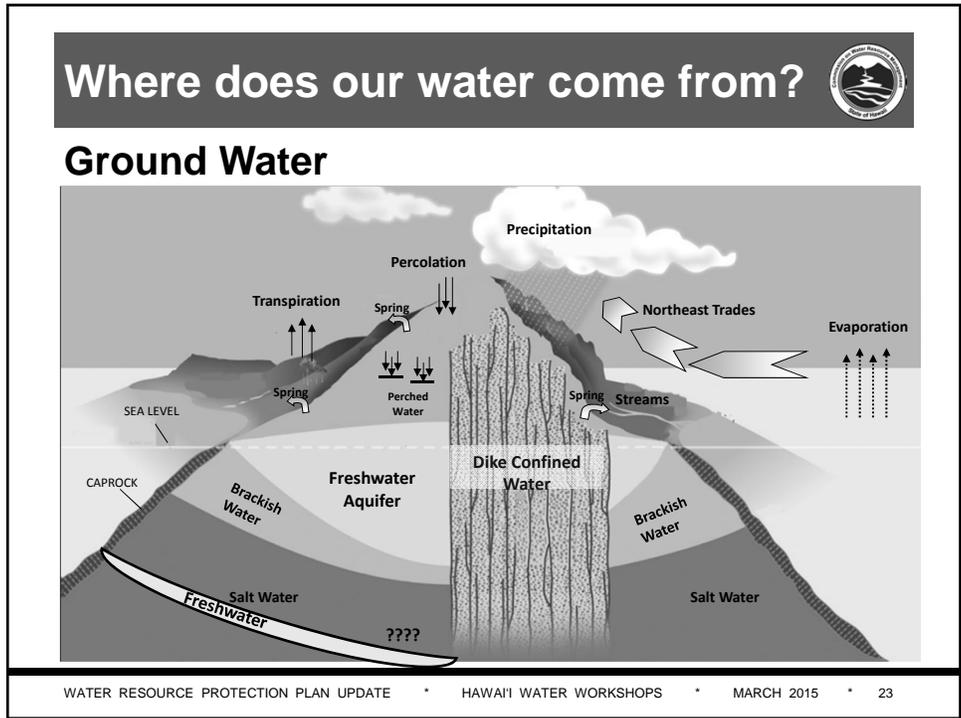
## Where does our water come from?

### The Water Cycle

A detailed 3D cutaway diagram of an island's hydrology. Labels include: Precipitation (rain falling from a cloud), Evapotranspiration (upward arrows from the surface), High-level groundwater (top layer of water in the mountain), Groundwater recharge (water moving down from the surface), Water table (the boundary between fresh and brackish water), Freshwater lens (the upper layer of groundwater), Brackish water (the lower layer of groundwater), Low-permeability volcanic dikes (vertical barriers in the mountain), Saltwater (the ocean), Runoff to ocean (water flowing from the mountain to the sea), and Groundwater discharge to ocean and streams (water flowing from the lens to the ocean and streams). A sun icon is in the top right corner.

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

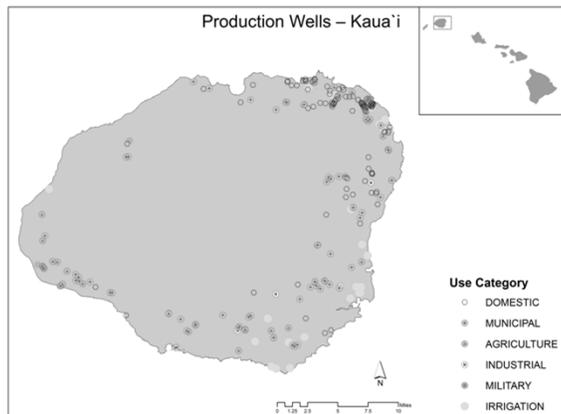
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# Where does our water come from?



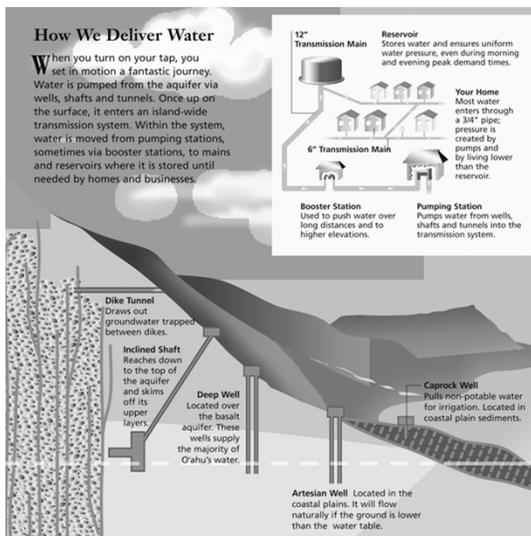
## Ground Water



# Where does our water come from?

## Ground Water

- Wells
- Shafts
- Tunnels

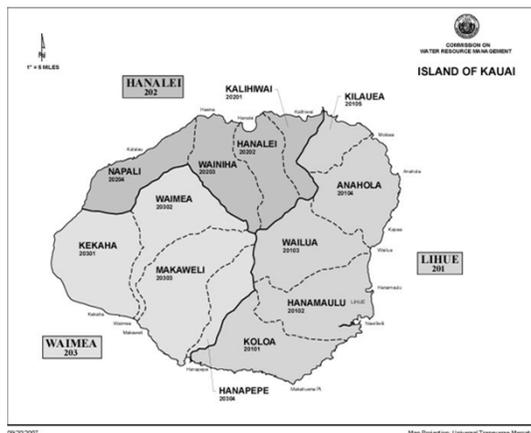


Source: Honolulu Board of Water Supply

# Where does our water come from?



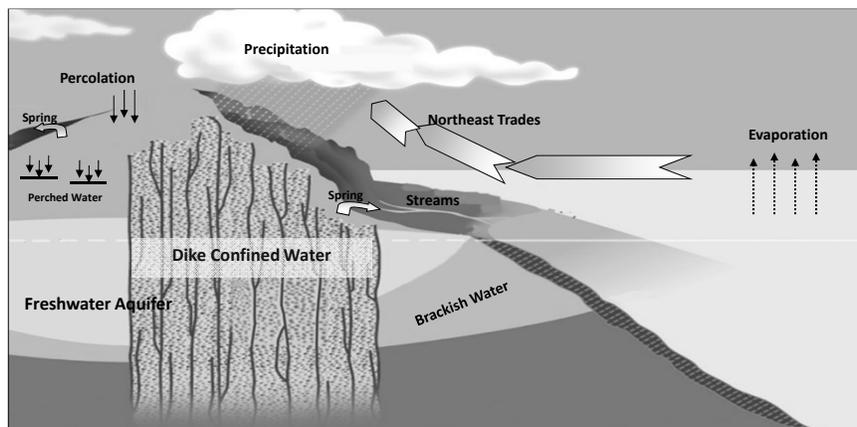
## Kauai's Ground Water Hydrologic Units



# Where does our water come from?



## Surface Water



# 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

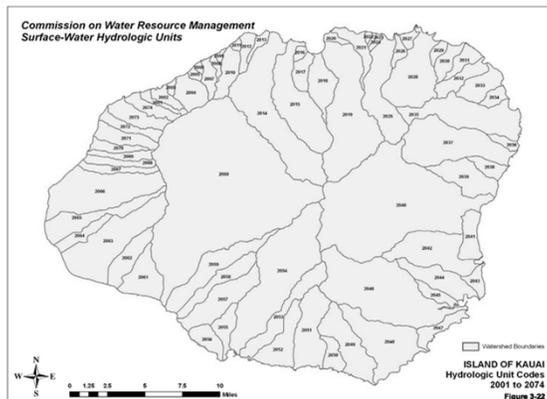


Measuring stream flows

# Where does our water come from?



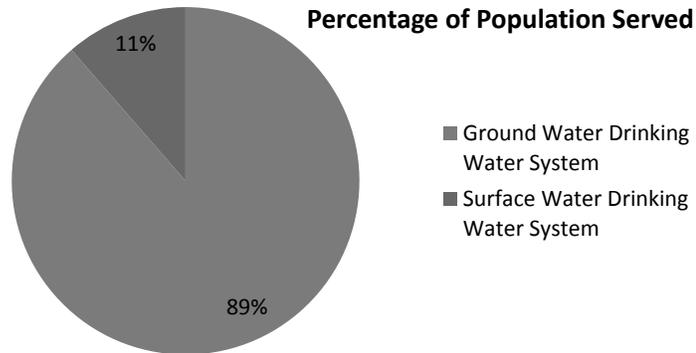
## Kauai's Surface Water Hydrologic Units



# 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.”*

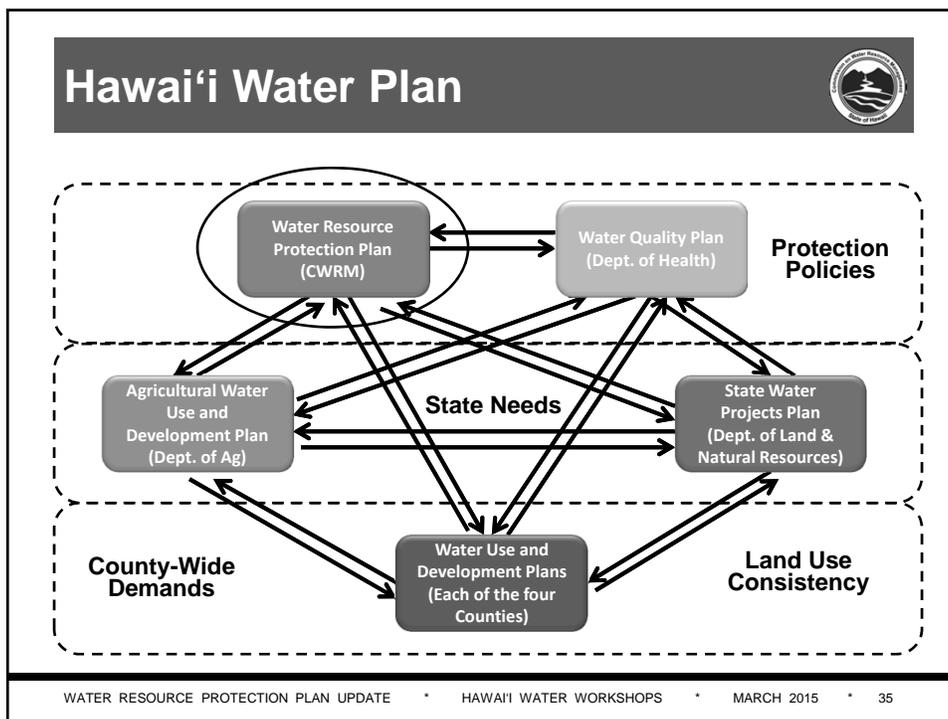
(§174C-2(b) HRS)  
(Emphasis added)

## Hawai'i Water Plan



### Objectives

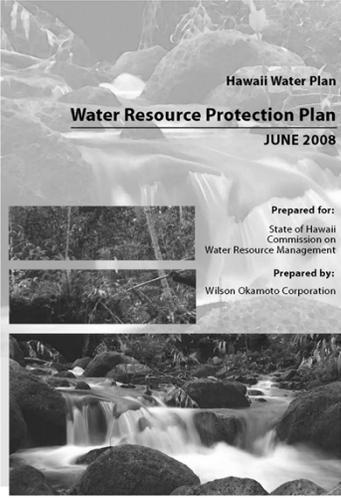
- Set water resource policies
- Proper conservation and development of water
- Reasonable and beneficial use of water
- Ensure adequate water quality
- Control water for public purposes
- Protect water rights
- Recognize county home rule



## 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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# Hawai'i Water Plan

**WRPP Update (current)**

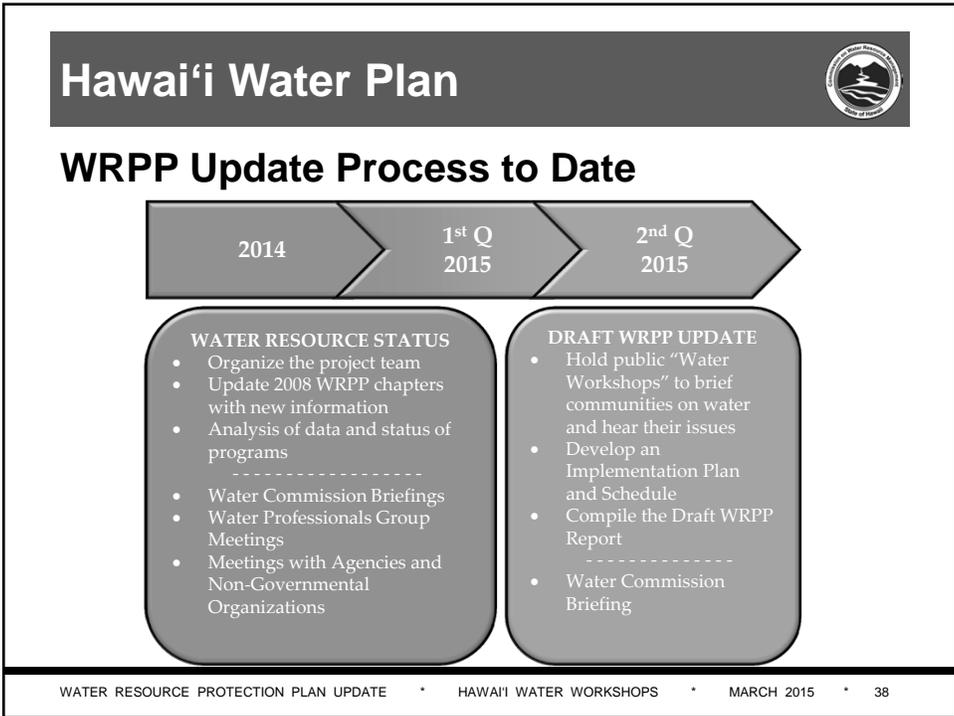
**Table of Contents**

1. Introduction
2. Summary of Water Resource Trends and Issues
3. Action Plan
4. Plan Implementation

**Appendices**

- 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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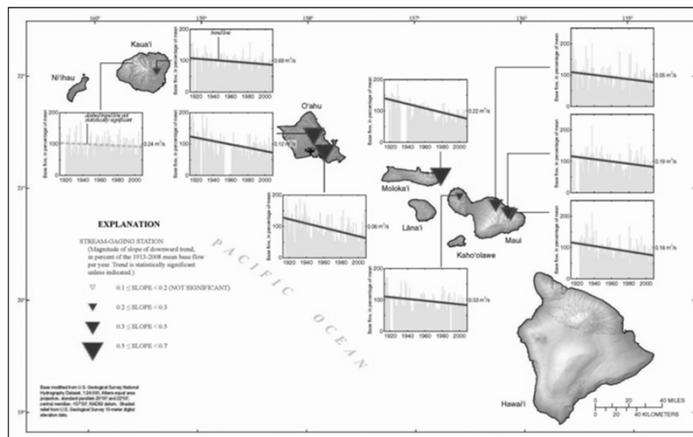
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# Water Resource Issues



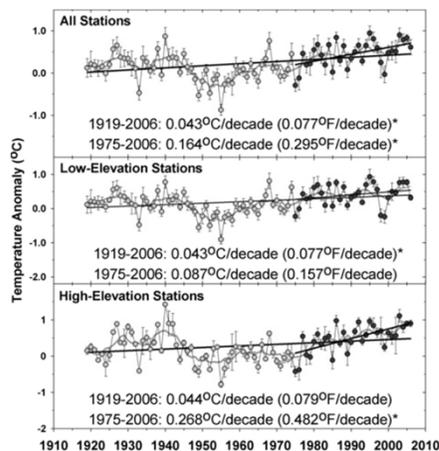
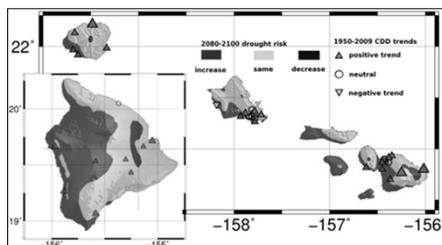
## Climate Change



# Water Resource Issues



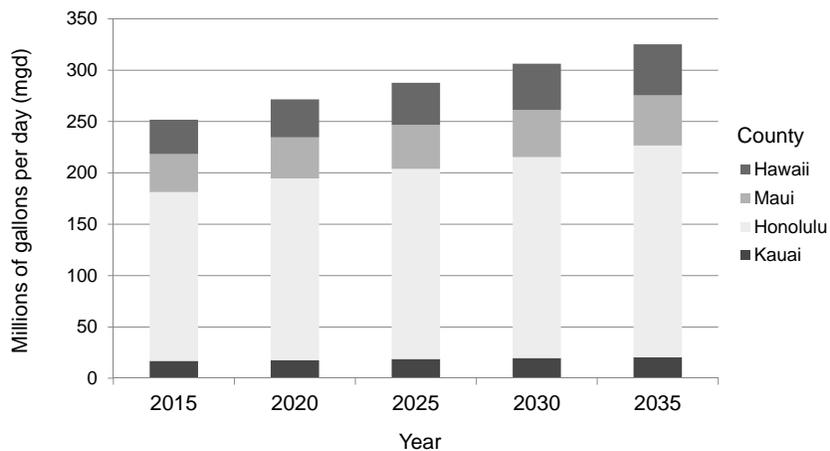
## Climate Change



# Water Resource Issues



## Increasing Water Demand

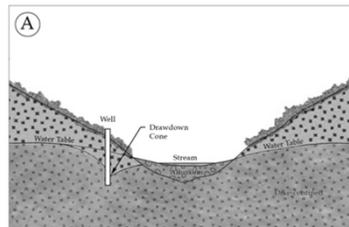


## Water Resource Issues

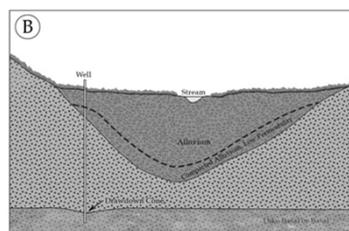


### Ground and Surface Water Interaction

- 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



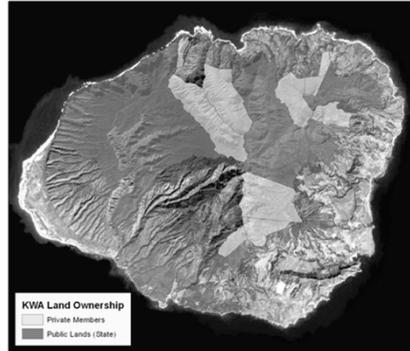
### Protection of Water Rights

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

# Water Resource Issues



## Watershed Management



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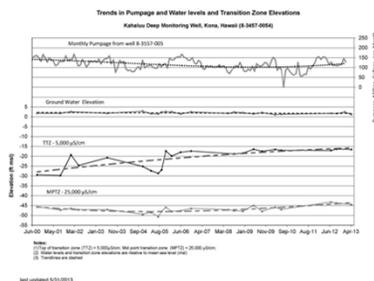
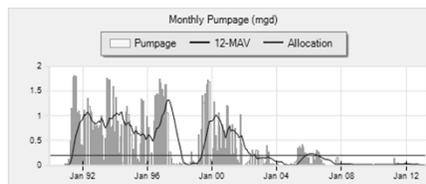


# Water Management Strategies



## Resource Monitoring

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



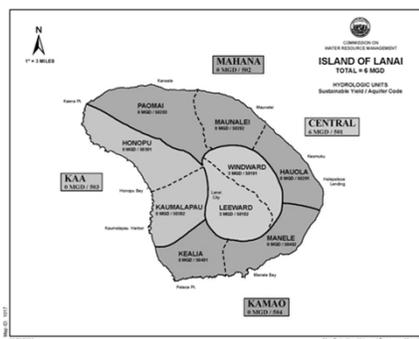
# Water Management Strategies



## Resource Assessments

### Sustainable Yields

### Instream Flow Standards



# Water Management Strategies



## Permitting and Enforcement

- Water Use Permit
- Well Construction and Pump Installation Permit
- Stream Diversion Works Permit
- Stream Channel Alteration Permit

# Water Management Strategies



## Long-Range Planning

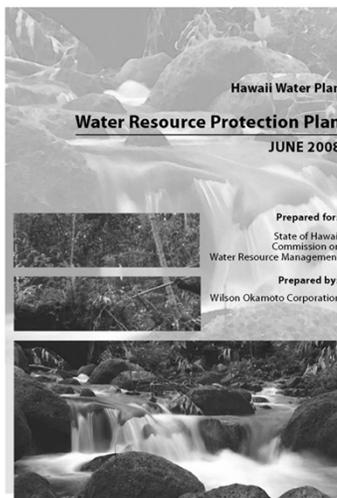
- Hawaii Water Plan
- Drought Planning
- Water Conservation Planning
- Resource Augmentation Planning
- Research and Studies
- Coordination and Outreach

# Water Management Strategies



## Implementation of 2008 WRPP

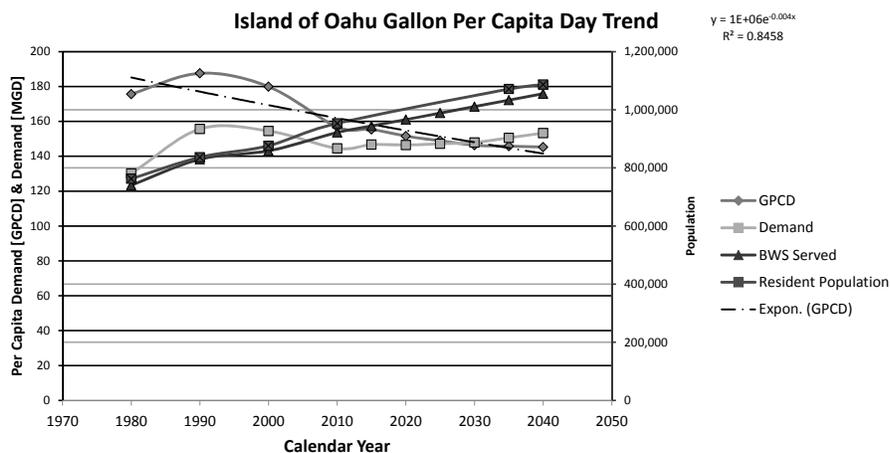
- 86 Actions Identified
- 58 Actions Implemented
- Focused on:
  - Monitoring and Data Collection;
  - Resource Investigations and Assessments; and
  - Water Conservation and Water Shortage Planning



# Water Management Strategies



## Conservation



# Water Management Strategies



## Resource Augmentation

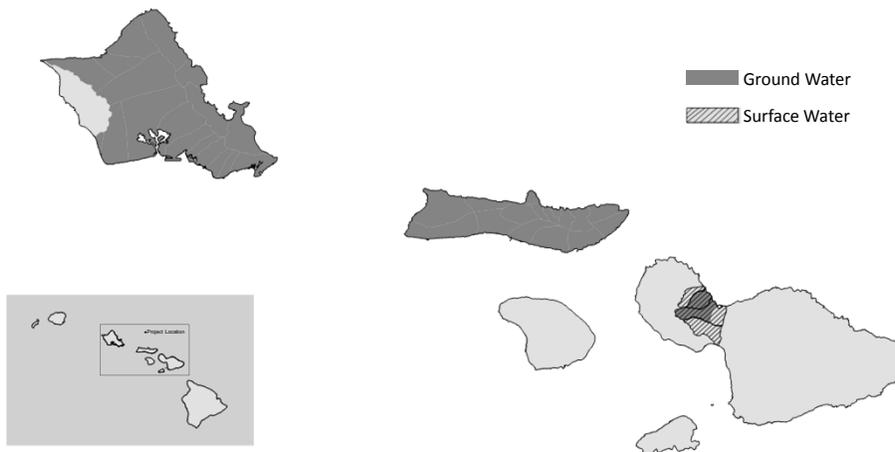
- Recycled Water
- Desalinated Water
- Storm Water
- Grey Water



# 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

<p><b>March 3 - O'AHU</b> DLNR Board Room 1151 Punchbowl Street</p>	<p><b>March 19 - KAUA'I</b> Planning Commission Meeting Room 4444 Rice Street</p>
<p><b>March 11 - LANA'I</b> Lana'i Senior Center 309 Seventh Street</p>	<p><b>March 24 - KONA</b> West Hawai'i Civic Center Community Meeting Hale 74-677 Kealahou Parkway</p>
<p><b>March 12 – MAUI</b> Wailuku Community Center 395 Waena Place</p>	<p><b>March 30 - HILO</b> Aupuni Center 101 Pauahi Street, Suite 1</p>
<p><b>March 17 - MOLOKA'I</b> DHHL/OHA Conference Room 600 Mauna Loa Highway, Suite D-2</p>	

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Next Steps

<div style="background-color: #ccc; padding: 5px; border-radius: 10px;"> <p style="text-align: center; font-weight: bold; font-size: 12px;">WATER RESOURCE STATUS</p> <ul style="list-style-type: none"> <li>Organize the project team</li> <li>Update 2008 WRPP chapters with new information</li> <li>Analysis of data and status of programs</li> </ul> <hr style="border: 0; border-top: 1px dashed #ccc;"/> <ul style="list-style-type: none"> <li>Water Commission Briefings</li> <li>Water Professionals Group Meetings</li> <li>Meetings with Agencies and Non-Governmental Organizations</li> </ul> </div>	<div style="background-color: #ccc; padding: 5px; border-radius: 10px;"> <p style="text-align: center; font-weight: bold; font-size: 12px;">DRAFT WRPP UPDATE</p> <ul style="list-style-type: none"> <li>Hold public "Water Workshops" to brief communities on water and hear their issues</li> <li>Develop an Implementation Plan and Schedule</li> <li>Compile the Draft WRPP Report</li> </ul> <hr style="border: 0; border-top: 1px dashed #ccc;"/> <ul style="list-style-type: none"> <li>Water Commission Briefing</li> </ul> </div>	<div style="background-color: #ccc; padding: 5px; border-radius: 10px;"> <p style="text-align: center; font-weight: bold; font-size: 12px;">PUBLIC REVIEW</p> <ul style="list-style-type: none"> <li>Distribute Public Review Draft WRPP</li> <li>Solicit and respond to public comments</li> </ul> <hr style="border: 0; border-top: 1px dashed #ccc;"/> <ul style="list-style-type: none"> <li>Water Commission Briefing</li> <li>Public Hearings                             <ul style="list-style-type: none"> <li>Kona</li> <li>Hilo</li> <li>Maui</li> <li>Lana'i</li> <li>Moloka'i</li> <li>O'ahu</li> <li>Kaua'i</li> </ul> </li> </ul> </div>	<div style="background-color: #ccc; padding: 5px; border-radius: 10px;"> <p style="text-align: center; font-weight: bold; font-size: 12px;">FINAL WRPP UPDATE</p> <ul style="list-style-type: none"> <li>Revise Draft WRPP Update Report</li> <li>Finalize WRPP Update Report</li> </ul> <hr style="border: 0; border-top: 1px dashed #ccc;"/> <ul style="list-style-type: none"> <li>Water Commission Briefing</li> </ul> </div>
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## Water Resource Protection Plan



### Contact Information

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<http://dlnr.hawaii.gov/cwrm/planning/hiwaterplan/wrpp/>

## Water Resource Protection Plan



*Thank you!*

