

Central Oahu Watershed Management Plan Community Meeting #1

December 11, 2014



Agenda

- Background and Overview of the Oahu Water Management Plan
- Central Oahu Watershed Profile
- Watershed Issues
- Next Steps

For tonight's agenda:

- Background and overview of the Oahu Water Management Plan.
- The Central Oahu watershed profile.
- Preliminary watershed issues.
- And the next steps in our planning process.

We want to emphasize the importance of getting your feedback and input.

If you have questions about specific slides, please ask, otherwise we will have a section at the end of the presentation for discussion and additional input.

Water Resource Strategies

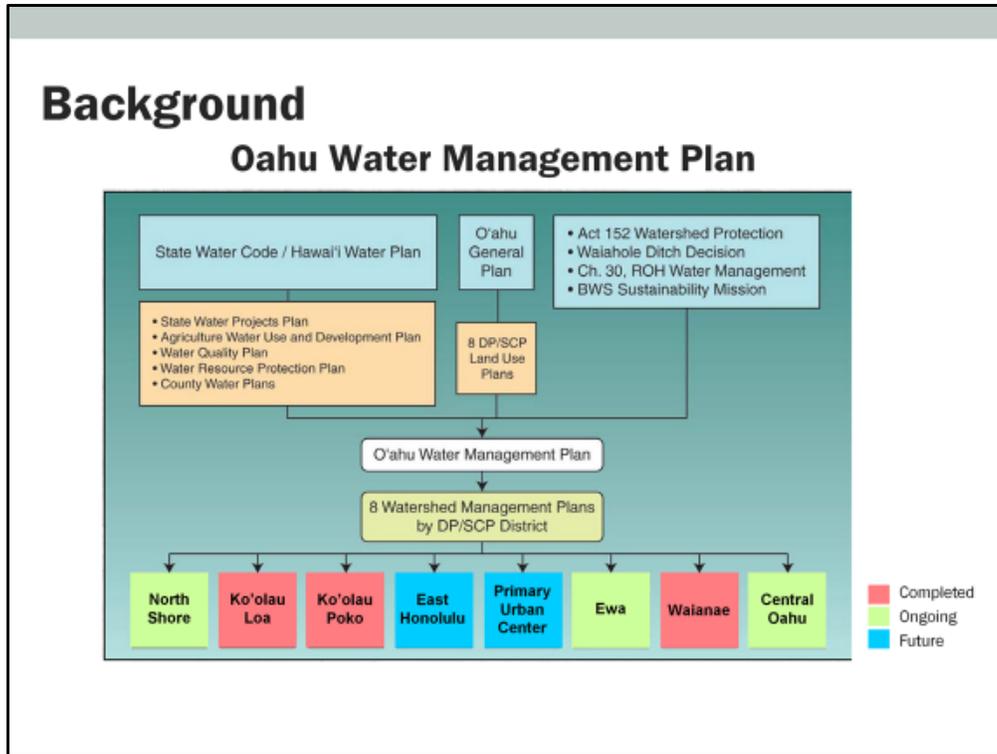
- Watershed Management
 - Protect Forested Recharge Areas
 - Control Invasive Species
 - Source Water Protection
- Water Conservation
 - Resource
 - Demand-Side Management
 - Infrastructure Efficiency
- Natural and Alternative Water Supplies
 - Groundwater
 - Surface water
 - Recycled and brackish non-potable
 - Desalination
 - Brackish and Seawater
 - Renewable Energy – Energy Efficiency



Brown and Caldwell

The key to long-term sustainability on an island with limited land and water resources requires a strategic and balanced approach to water resource mgt. Because land & water is so interconnected, a holistic, watershed based approach to resource mgt. is a viable model that balances resource protection, development and conservation.

- There are 3 main Water Resources Strategies that BWS is pursuing to ensure resource sustainability for Oahu.
- Watershed Management protects the supply of potable water.
 - Protection of forested recharge areas. The Community Growth Boundary helps to support this.
 - Control and removal of invasive species in the native forests.
 - Source water protection.
- Water Conservation preserves the resource.
 - Water conservation preserves the resource for future generations.
 - Demand side management programs reduce water use.
 - Infrastructure efficiency reduces water loss in delivery systems.
- Existing and Alternative Water Supplies
 - Oahu's drinking water is 100% groundwater
 - Surface water is used for agriculture in balance with instream uses.
 - Use of non-potable (recycled and brackish water) irrigation helps to offset potable water usage.
 - Desalination is also part of the mix of options.
 - Energy efficiency and renewable energy systems can reduce costs and dependence on imported oil.



The overall goal and objectives of the Oahu Watershed Management Plan (OWMP) reflects community, landowner, BWS and other agency values, issues, and concerns. The purpose of the OWMP is to protect and sustain Oahu's water, striking a balance between resource protection and providing water for human consumption and economic growth.

The regional WMPs fulfill requirements of the Code and Ordinance and make up the components parts of the OWMP. These plans are being developed in coordination with the respective Sustainable Community Plans and Development Plan areas

There are 8 watershed management plans: in red are the completed ones, green are ongoing, and blue are future plans to be developed.

Goal of the Oahu Water Management Plan:

To formulate an environmentally holistic, community-based, and economically viable watershed management plan that will provide a balance between:

- The preservation and management of Oahu's watersheds; and
- Sustainable ground water and surface water use and development to serve present users and future generations

Key Planning Principles:

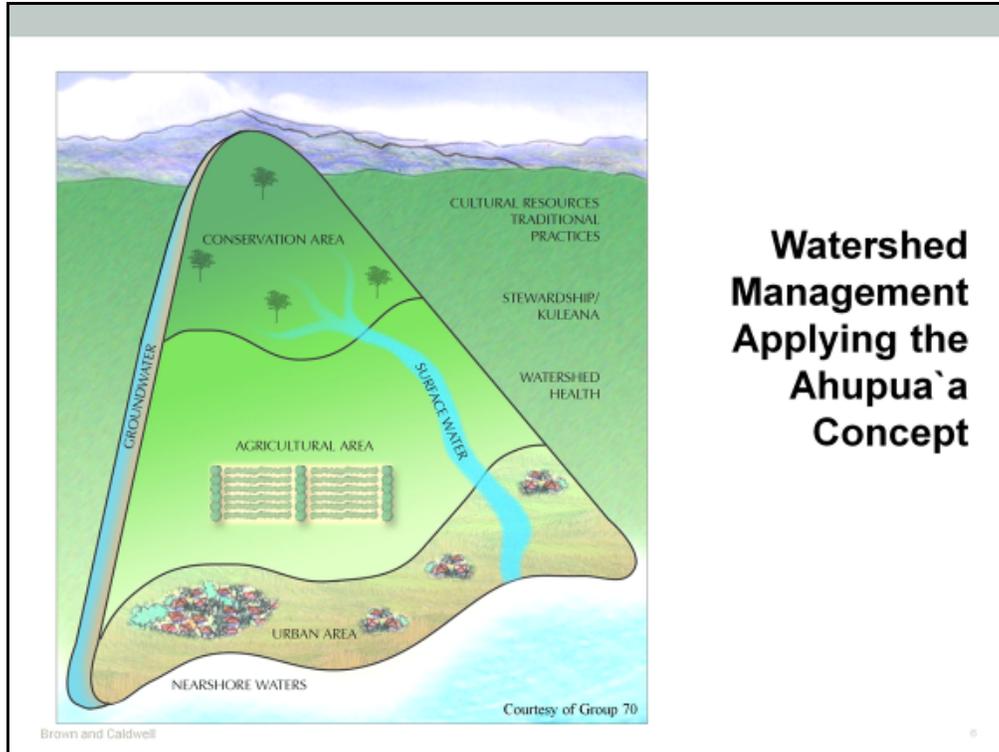
- Community participation and consultation
- Holistic management of watershed resources
- Alignment with important State and City policies and programs
- Action oriented: Implementation of important watershed management programs
- Ahupua'a management principles

The goal of the Oahu Watershed Management Plan (OWMP) is to formulate an environmentally holistic, community-based, and economically viable watershed management plan.

The Plan will reflect community, landowner, BWS, and other agencies' values, issues, and concerns.

It aims to balance the preservation of Oahu's watersheds with being able to provide water to meet current and future demands.

The purpose of the OWMP is to protect and sustain Oahu water resources incorporating (5) key planning principles.



The ahupuaa concept embodies the efficient management and use of land and water from mauka to makai (i.e., from the mountains to the sea). The forests in the upper elevations receive rainfall, surface water was efficiently used, stream flows continued to the ocean, along with recharge of our groundwater aquifers. The forested areas should be protected and conserved to help sustain our water resources.

Oahu Water Management Plan

Objectives:

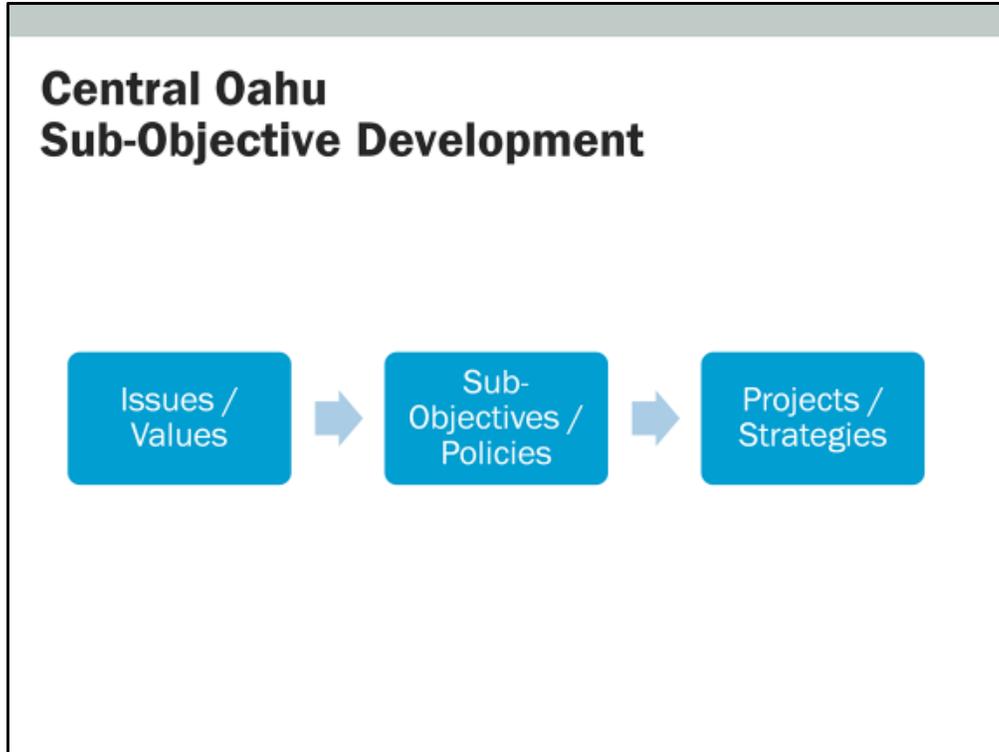
1. Promote sustainable watersheds
2. Protect and enhance water quality and quantity
3. Protect Native Hawaiian rights and traditional customary practices
4. Facilitate public participation, education, and project implementation
5. Meet future water demands at reasonable costs

The WMP has five overall objectives that are consistent for each of the eight planning districts.

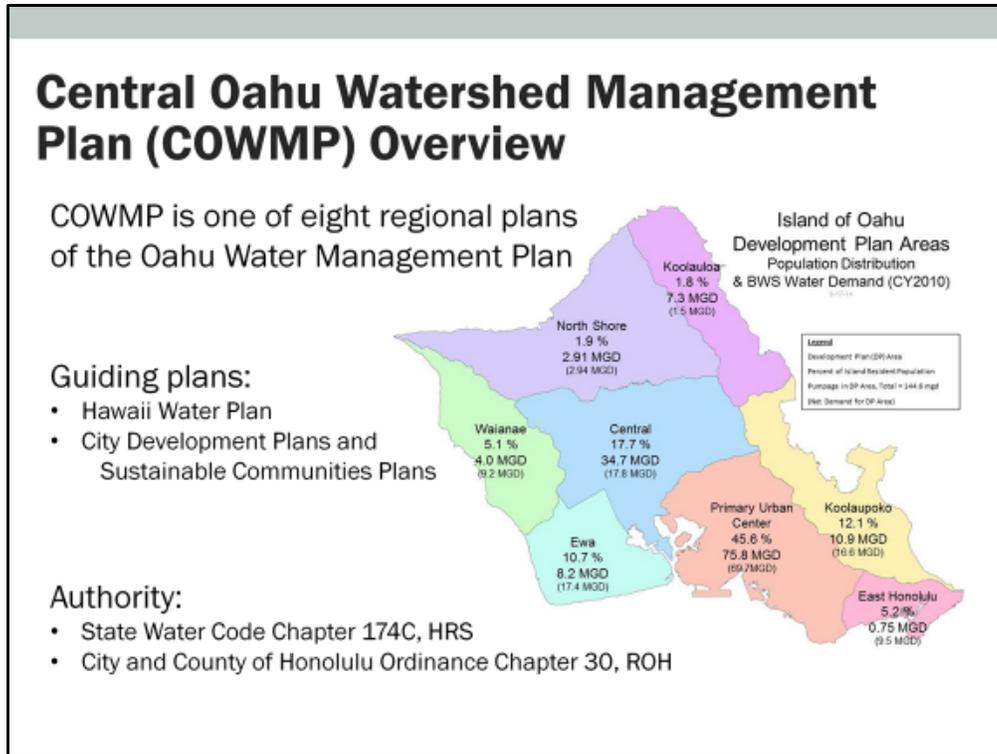
The goal of the planning process is to fulfil all five objectives.

Each WMP will identify sub-objectives that are specific to that particular district.

These sub-objectives will be drawn from discussion and feedback from stakeholder interviews and community meetings.



The plan will first collect data on issues, values, water demand and supply, that are Central-Oahu specific. Throughout the process we will be seeking public consultation to determine sub-objectives and policies that address the identified issues, and come up with projects and strategies to address them.



The Watershed Management Plans represent Oahu’s long-range water resource/management plans. They include policies and strategies that will guide future water use, development, and watershed management actions. These eight WMPs will collectively form the updated Oahu Water Management Plan.

Central Oahu Watershed Management Plan Contents:

Chapters

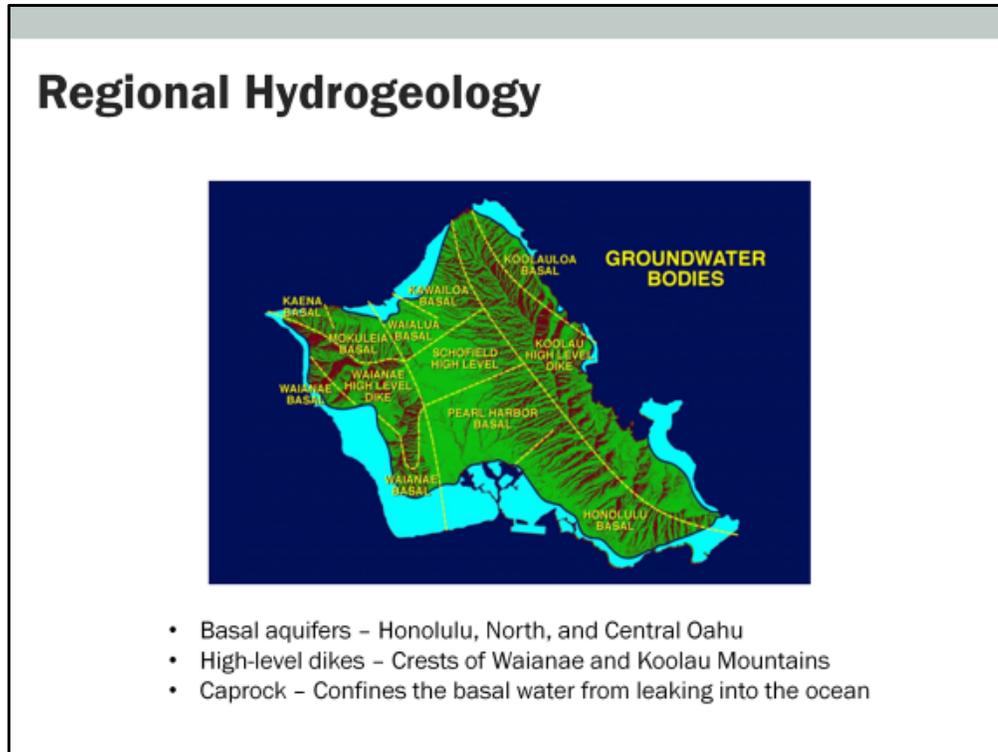
Executive Summary

1. Oahu Water Management Plan Overview
2. Central Oahu Watershed Profile
3. Water Use and Projected Demand
4. Plan Objectives and Water Supply and Watershed Management Projects and Strategies
5. Implementation

Appendices

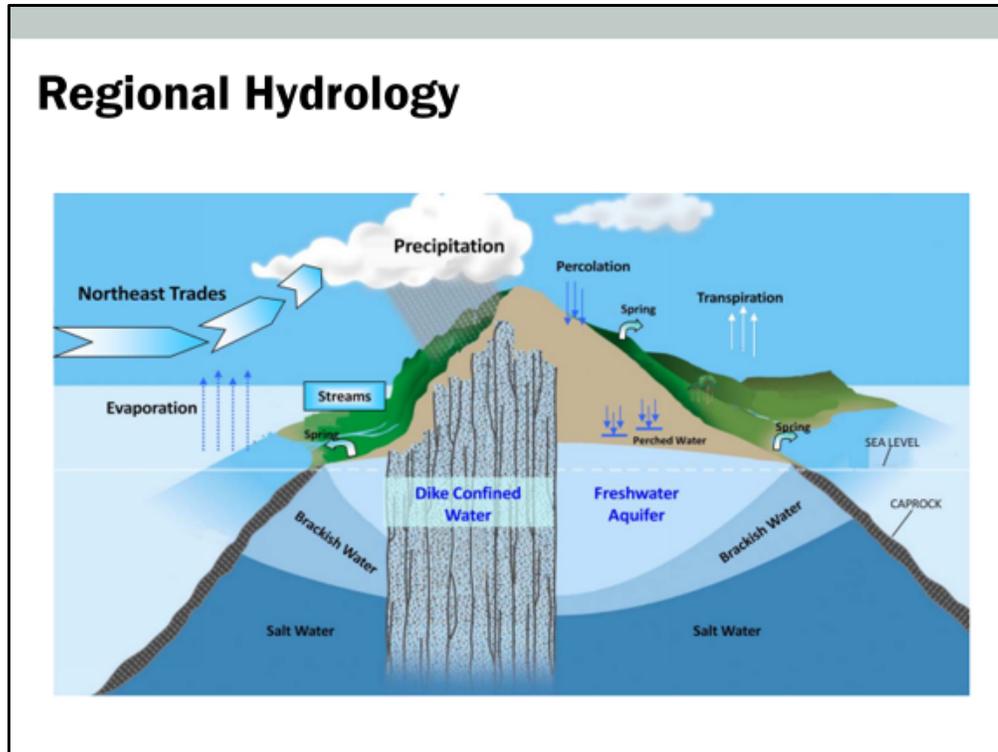
- A. Oahu Watershed Management Plan Framework
- B. Plans, Policies, Guidelines, and Controls
- C. Oahu Water Use Permit Index
- D. Overview of Oahu Hydrogeology
- E. Water Use and Demand – Methodology
- F. Neighborhood Board Endorsements

Each WMP follows a similar framework with these chapters and appendices, which will eventually be combined into one overall water management plan/document for Oahu.



Oahu's hydrogeology is made up of three formations:

1. The basal aquifers are in the Honolulu, North, and Central Oahu corridors.
2. The high level dikes are found along the crests of the Waianae and Koolau Mountains. The dikes are smaller in volume than the basal aquifers and are more prone to drought.
3. The coral and marine sediment caprock in the light blue confines the basal water from leaking into the oceans.



Central Oahu is located over a freshwater lens. This is a cross-section of Oahu that shows the high level dikes, basal aquifers, and the caprock.

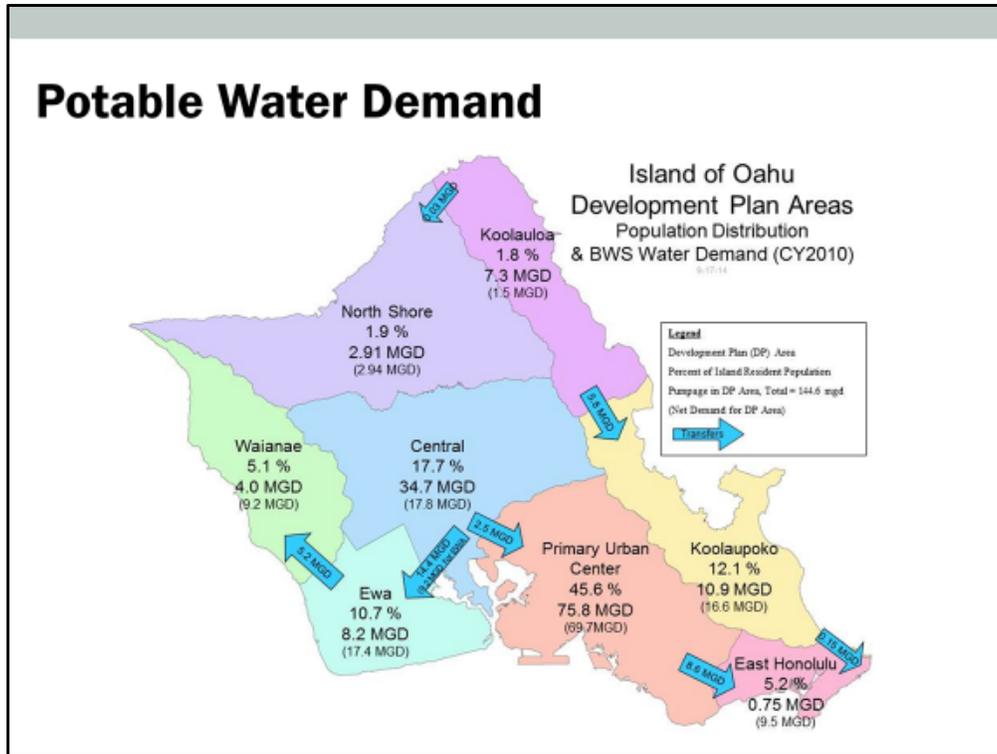
The basal aquifers are up to 700 feet thick, which is thicker than the basal aquifers of the outer islands.

Due to density differences, a lens of fresh water sits on top of the salt water, with an intermediate area of brackish water.

This diagram also shows how the northeast tradewinds uplift due to the Koolau mountains, where temperatures cool the moist tradewinds and it condenses into rain.

About 60 percent of Oahu's rainfall comes from this uplifting, causing windward and mauka showers.

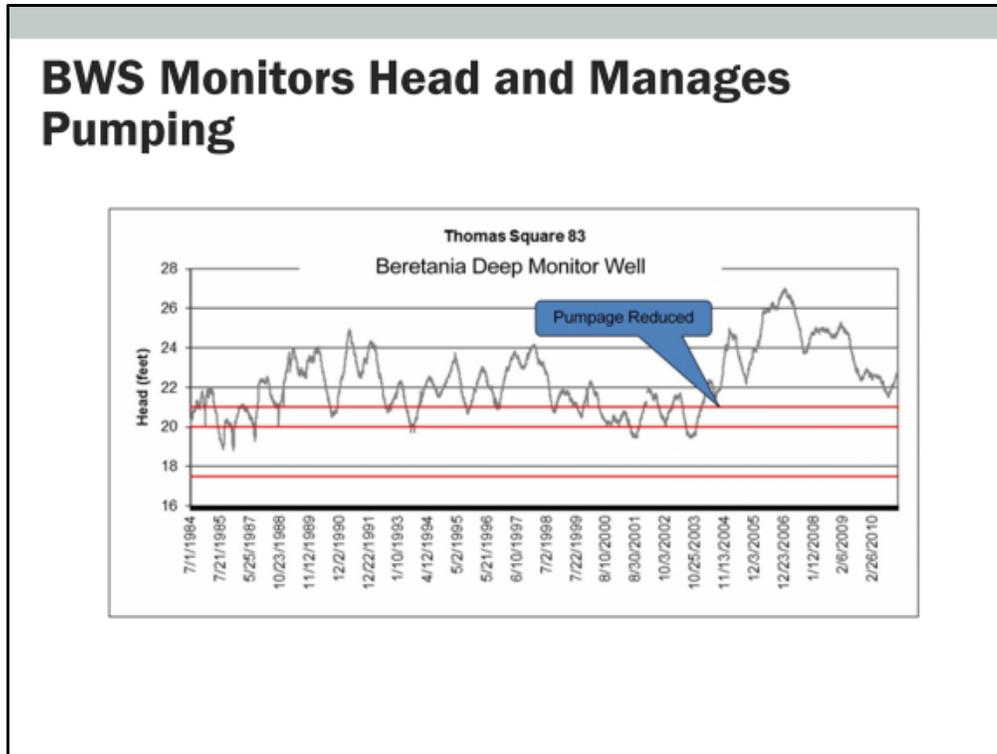
The other 40 percent of rainfall comes from Kona storms or frontal systems moving West to East.



This map shows how the water supply moves within the BWS potable system among the (8) land use districts.

- The resident population is shown by % of the total population based on calendar year 2010 projections.
- The number below is the water pumpage in million gallons per day within each district
- The number in parentheses is the water use within each district.
- The arrows show the water transfers and quantities between districts.

(updated map as of 12-8-14)

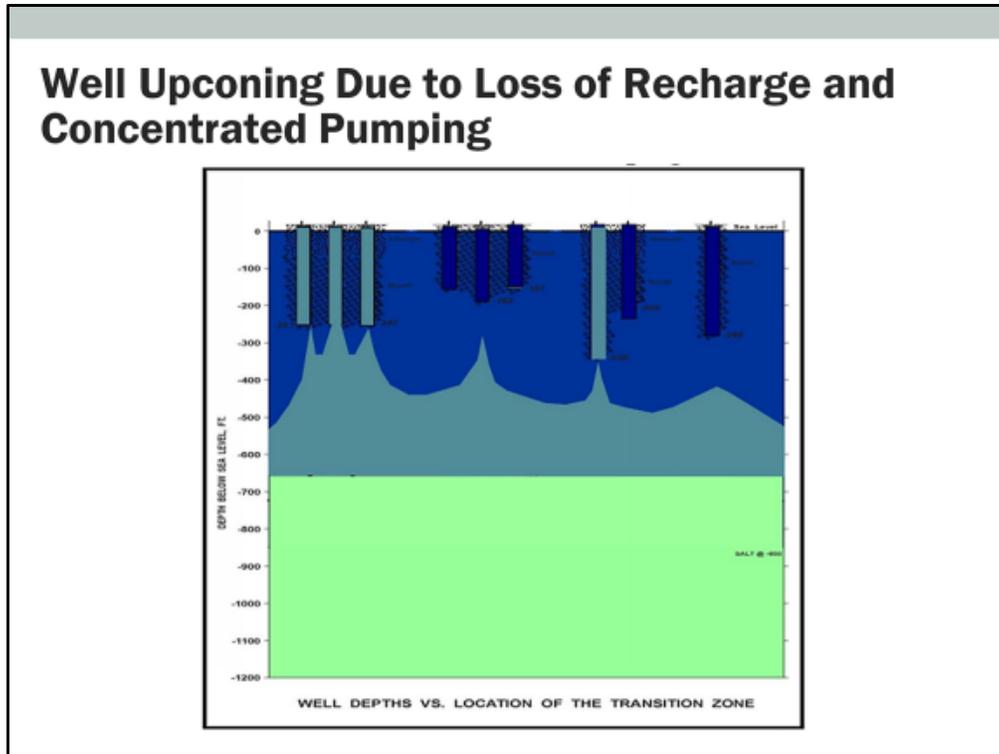


BWS monitors head levels and manages its pumping to meet demand while ensuring protection of the freshwater lens.

The three red lines are the BWS low groundwater levels for its 14 index monitor wells:

- Top line is the Caution level.
- Mid line is the Alert level.
- Bottom line is the Critical level.

As an example, since 2004, BWS has reduced the pumpage at its Beretania well from 7 MGD to 5 MGD, causing the head levels to rise due in large part to the success of BWS's water conservation programs.

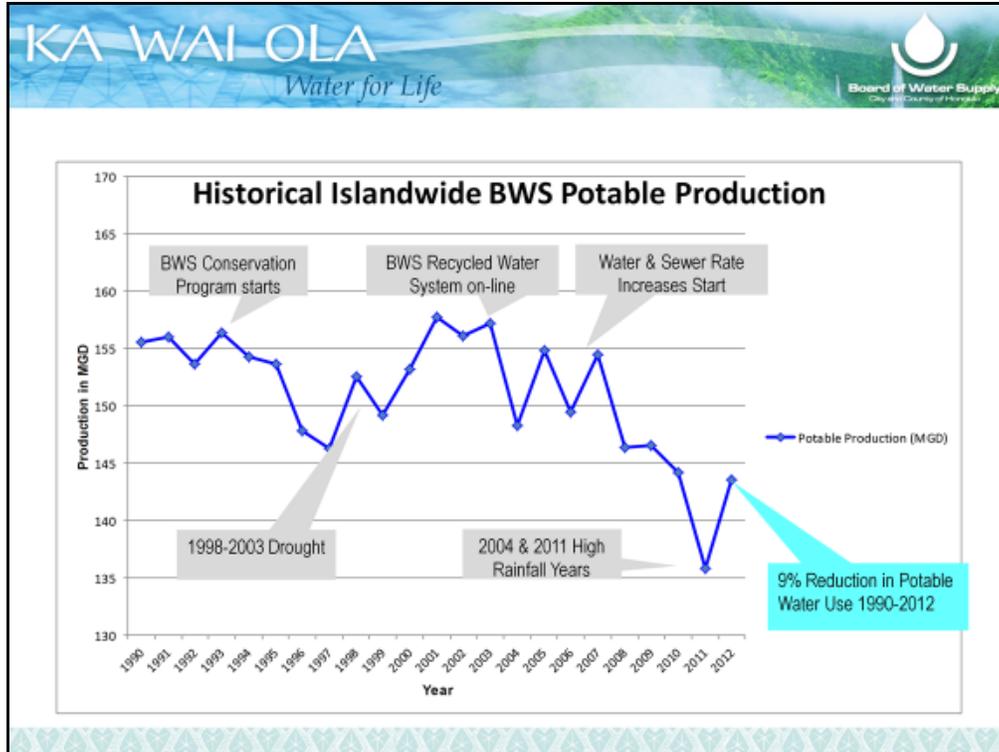


Concentrated pumpage (coupled with loss of aquifer recharge and storage) can cause upconing of brackish water into drinking water wells.

BWS monitors water levels and chloride content to determine the thickness of the freshwater lens.

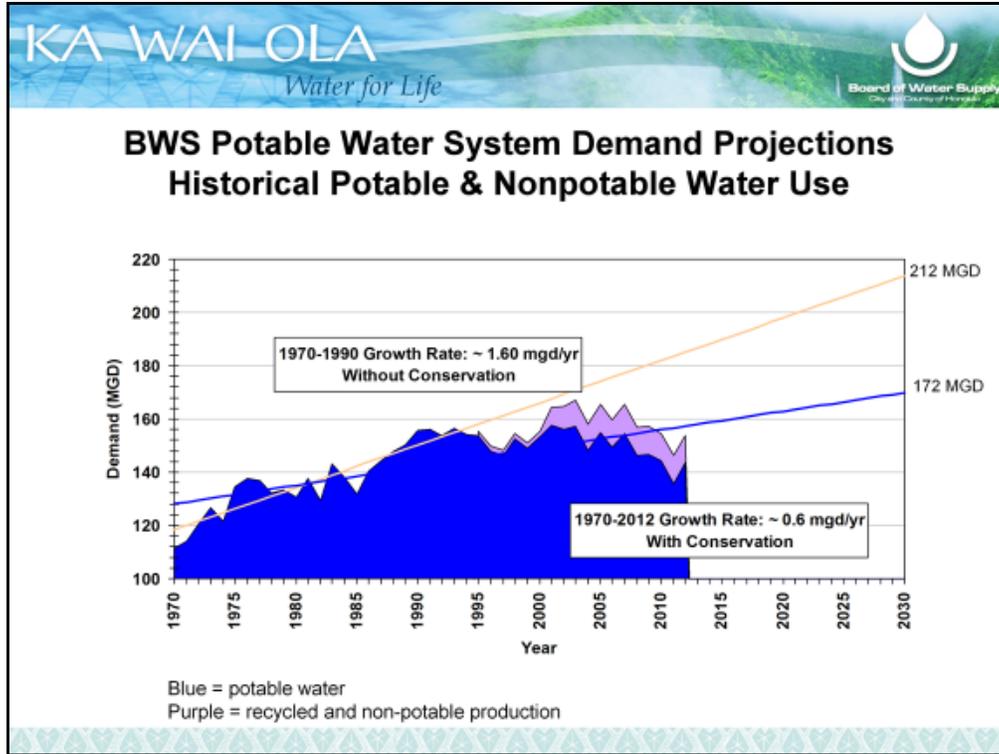
This image shows the potable water in dark blue, brackish water in teal, and salt water in green.

You can see the effect of upconing of the brackish water in wells that are overpumping.



Oahu's potable water production has dropped 9% from 1990-2012 due to water conservation efforts.

This graph shows how significant events such as the BWS Water Conservation Program and extreme weather years have affected water demand.



This graph shows how water conservation programs have, on average, decreased the annual water demand growth rate from 1.6 MGD to 0.6 MGD. Potable water demand is shown in blue, and non-potable water use is shown in purple.

Hawaii's Climate is Changing

- Rainfall (-15%) and stream discharge have decreased
- Air temperature is increasing (0.3°F/decade)
- Rainstorm intensity has increased (+12%)
- Sea surface temperature is rising (0.22°F/decade)
- Ocean has grown more acidic
- Sea level is rising

Courtesy of Dr. Chip Fletcher, UH-Manoa 2011

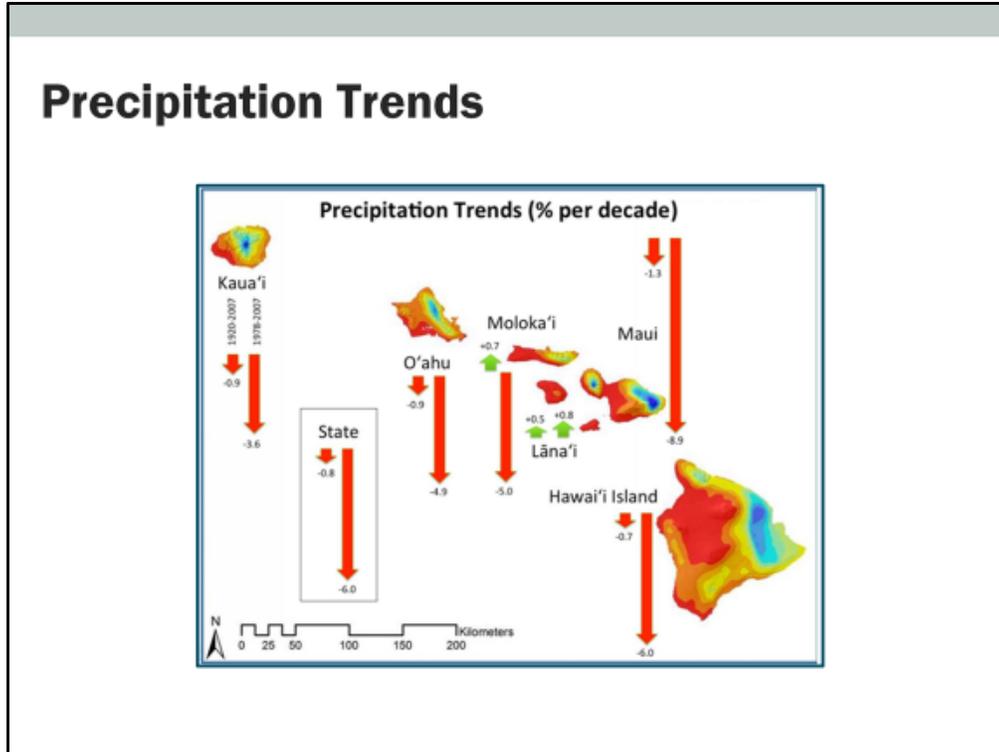
Rainfall has decreased by 15% and stream discharge has decreased.

The air temperature is increasing by 0.3 degrees F per decade.

The intensity of rain events has increased by 12%.

The temperature of the sea surface is rising by 0.22 degrees F per decade.

The ocean is more acidic and sea level is rising.

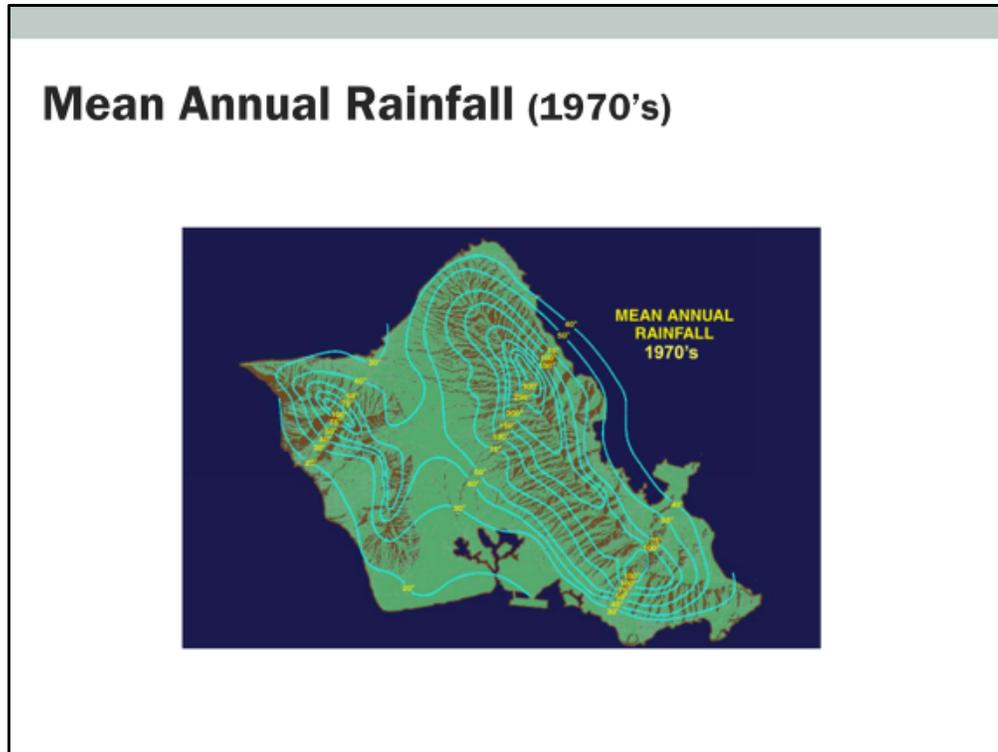


There are two arrows for each island.

The arrow on the left shows the precipitation change in % per decade between 1920 and 2007.

The arrow on the right shows it for the years between 1978 and 2007

Looking at Oahu specifically, the precipitation trends show an accelerated decrease in precipitation per decade from 1978 to 2007 at -4.9% per decade.



This is an image of Oahu showing the rainfall isohyets, which are lines of equal annual rainfall from the 1970's.

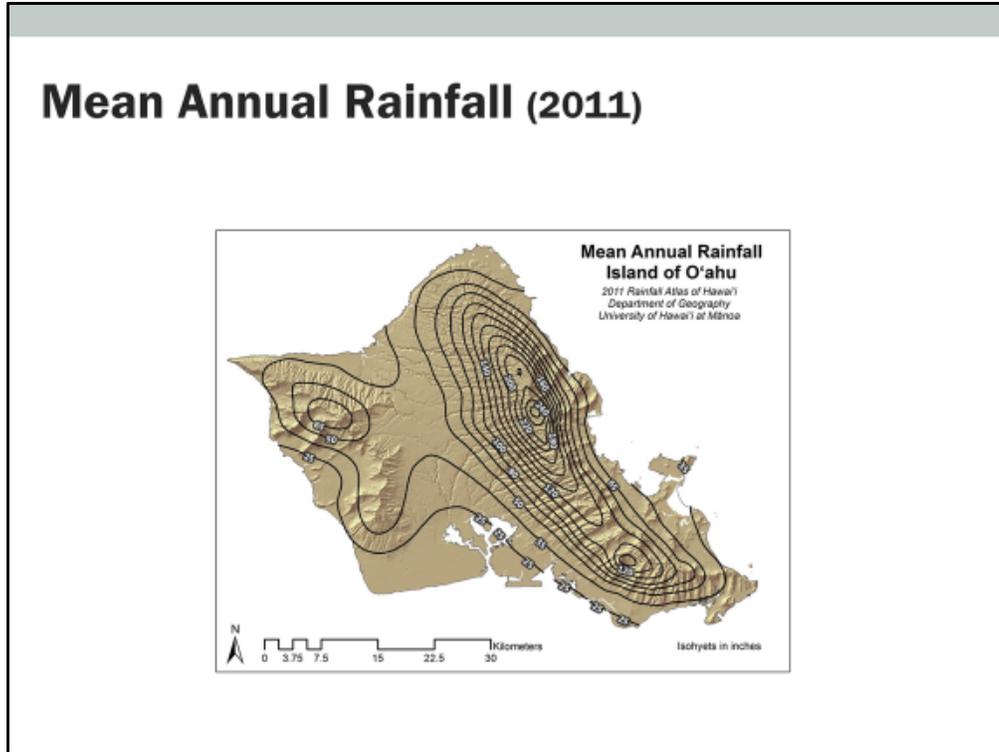
There are two theories about why the annual rainfall is decreasing:

1. Northeast tradewinds hit the Koolau Mountains and are uplifted, creating windward and mauka showers.

- UH Professor Pao Shin Chu documented a cyclic shifting of the tradewinds from the Northeast direction to an Easterly direction.

- Easterly tradewinds hit the Koolau Mountains at an angle which reduces the amount of uplift and subsequent rainfall.

2. As air temperatures rise, the Koolau Mountains become too short, and when uplifted moisture doesn't cool enough to condense and fall as rain, this tradewind moisture passes over the mountains.

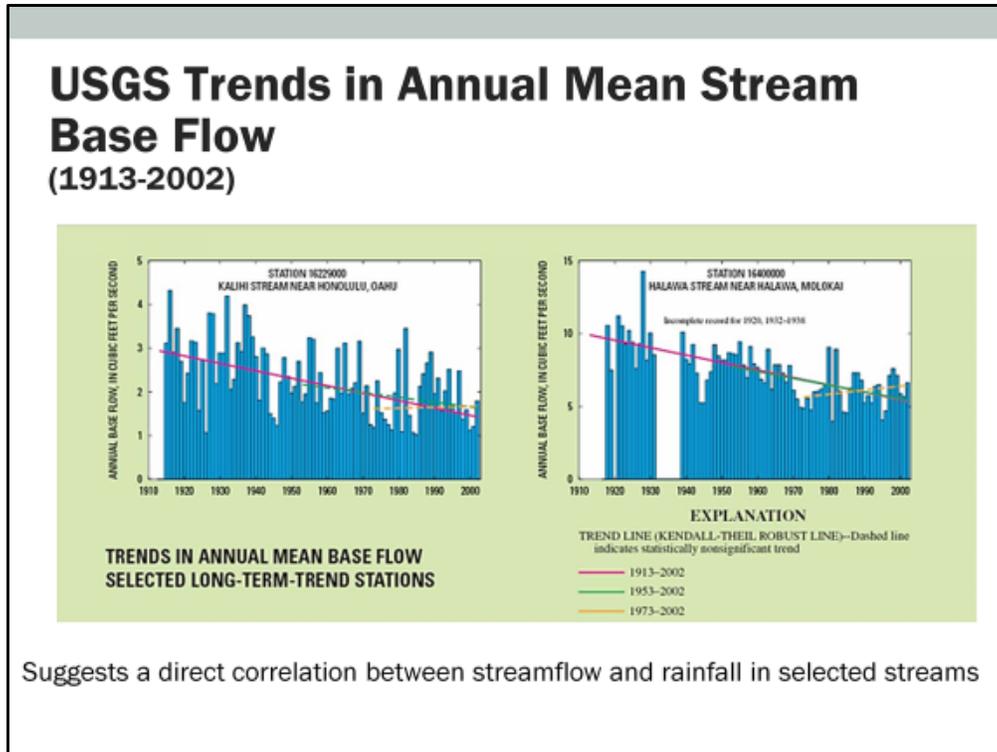


Rainfall has decreased between the 1970's and 2011.

From the 1970's to 2011, the mountain crests of Wahiawa-Kahana-Punaluu were at the 300" isohyet and is now at the 240" and Manoa was at the 150" isohyet and is now at 120."

The dike aquifers on the windward side of Oahu are small and are prone to drought.

With the decreasing annual rainfall, we need to ensure that we are pumping sustainable amounts that meet demand and take into account potential drought.

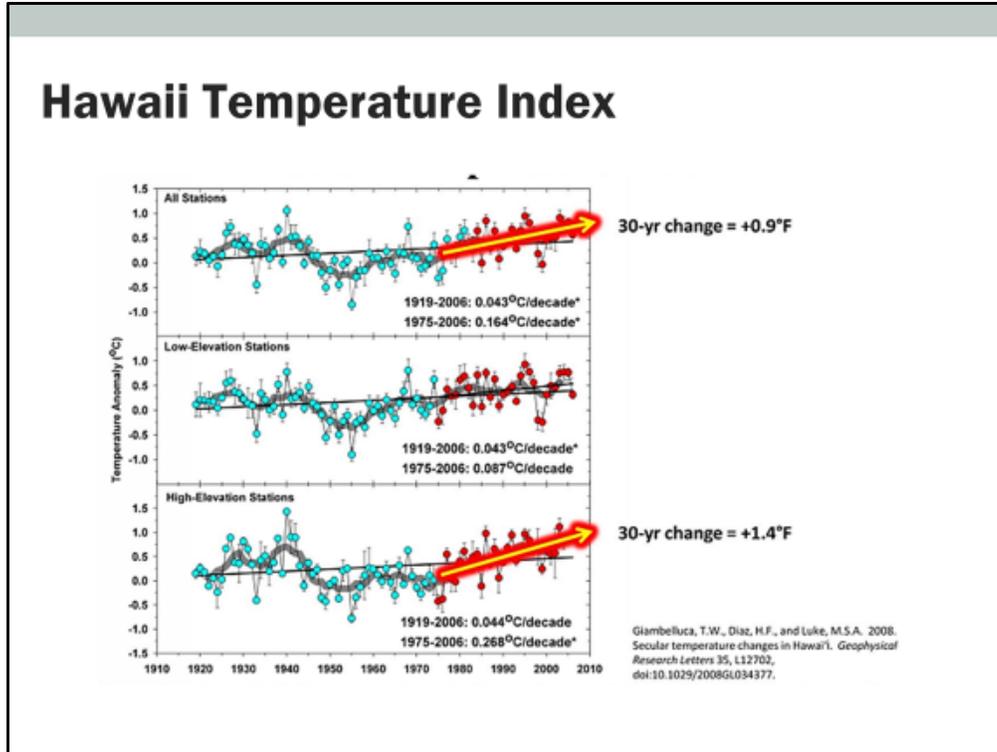


The 2004 USGS *Fact Sheet Trends in Streamflow Characteristics in Hawaii, 1913-2002*, shows a decreasing trend in stream base flows.

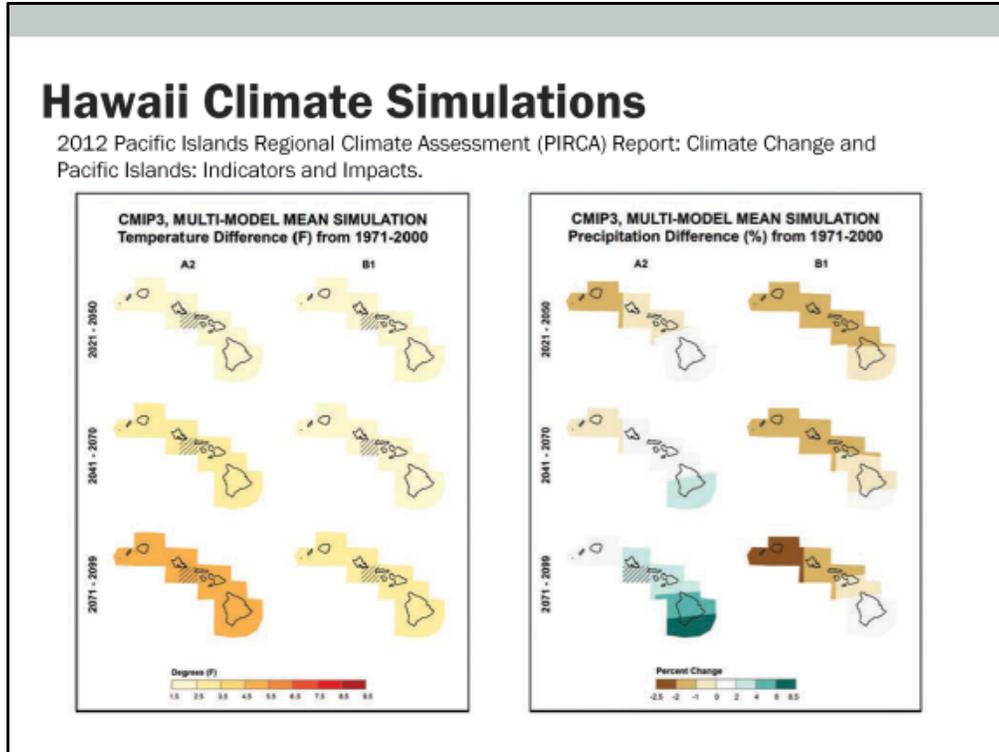
USGS suggests a direct correlation between streamflow and rainfall in selected streams.

The Kalihi Stream shown on the left does not have any water sources, which means that the stream flow is correlated to rainfall.

Although the historical trend is downward, we do not know if rainfall and stream base flows will continue to decrease.



UH research has shown that air temperature is rising.
Within the last 30 years, this percent increase has accelerated.
The trend in temperature change for all stations was an increase in 0.9 degrees F, while the trend in temperature change for high elevation stations was +1.4 degrees F.



These are downscaled climate models with 2 scenarios taken from the PIRCA report in 2012.

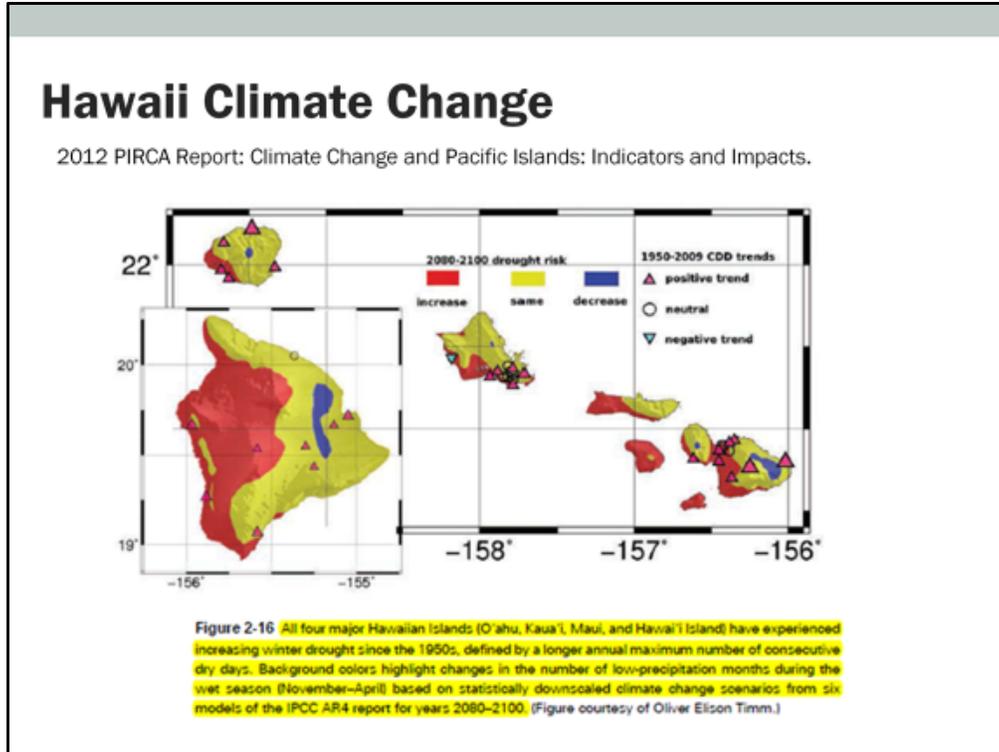
The first image shows temperature change and the second image shows precipitation change.

According to these 2 scenarios, by 2099 the temperature of Hawaii may increase between 2.5 degrees and 4.5 degrees.

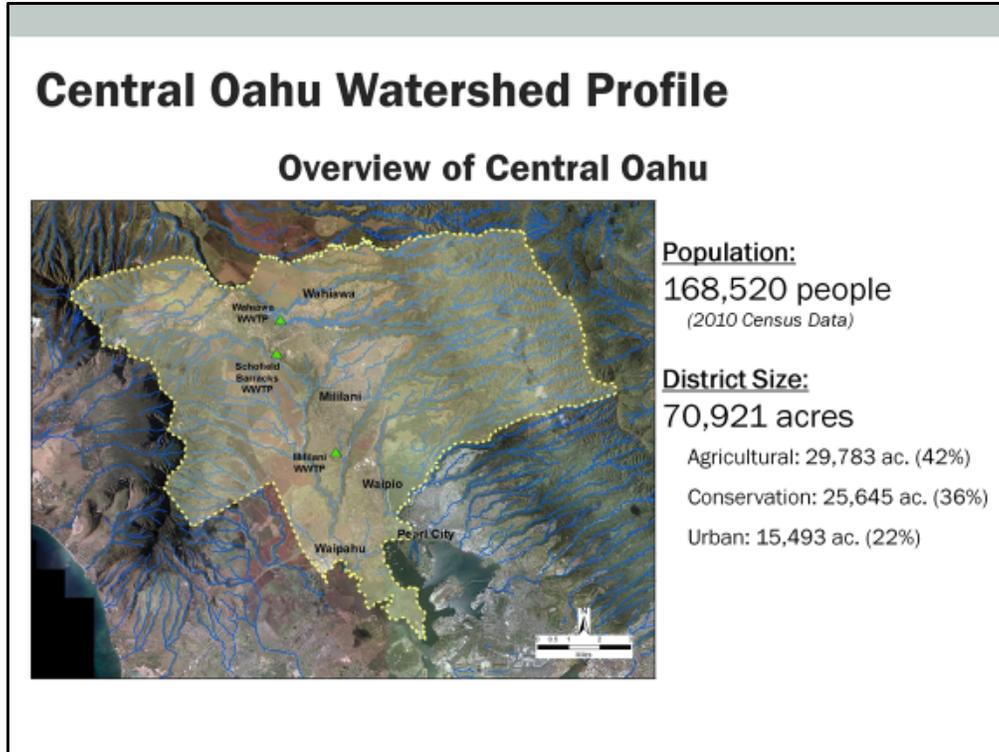
Rainfall on Oahu may also range from an increase in 2% of precipitation to a 1-2% decrease in precipitation.

The previous climate change trends showed a decrease in rainfall, but these updated models show that

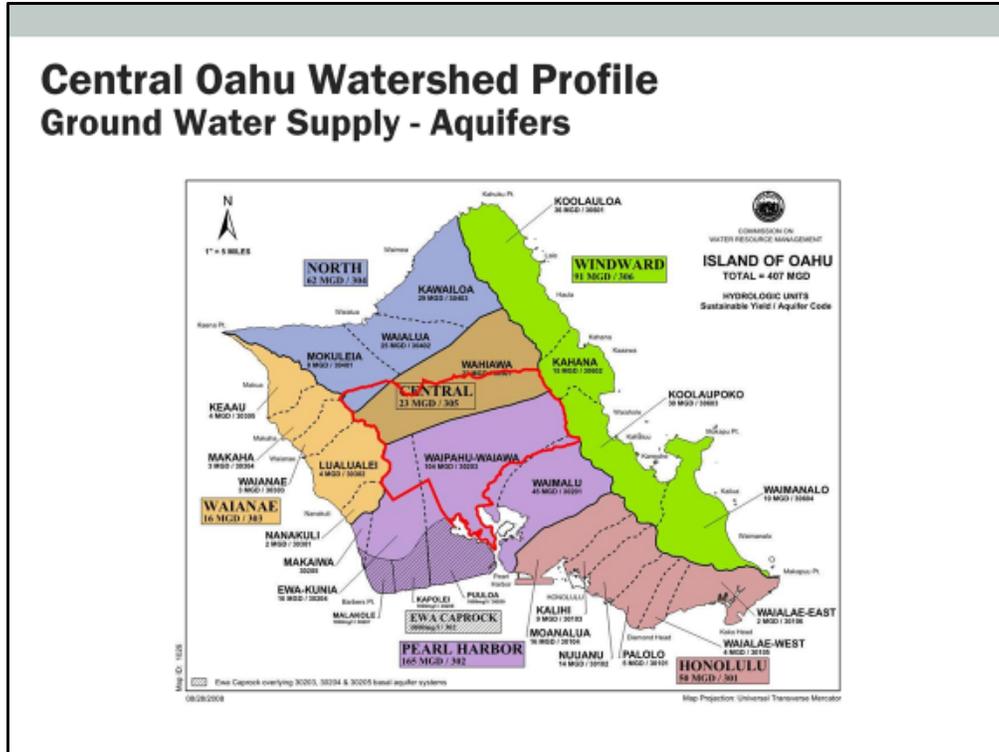
although temperatures should increase, rainfall may possibly stabilize in the future.



This image shows the drought risk in winter months in Hawaii. The model shows that by 2100, the drought risk for the leeward sides of the islands will increase.



Central Oahu has a population of nearly 170,000 people according to the 2010 Census. It is about 71,000 acres in size, where 42% of the land is zoned for agriculture, 36% for conservation, and 22% for urban.



This map shows Oahu's groundwater aquifers, and the red outline shows the Central Oahu Watershed Management Plan boundary which is the same as the Central Oahu Sustainable Communities Plan boundary.
This Central Oahu boundary spans 5 different aquifers.

Central Oahu Watershed Profile

Ground Water Supply - Aquifers

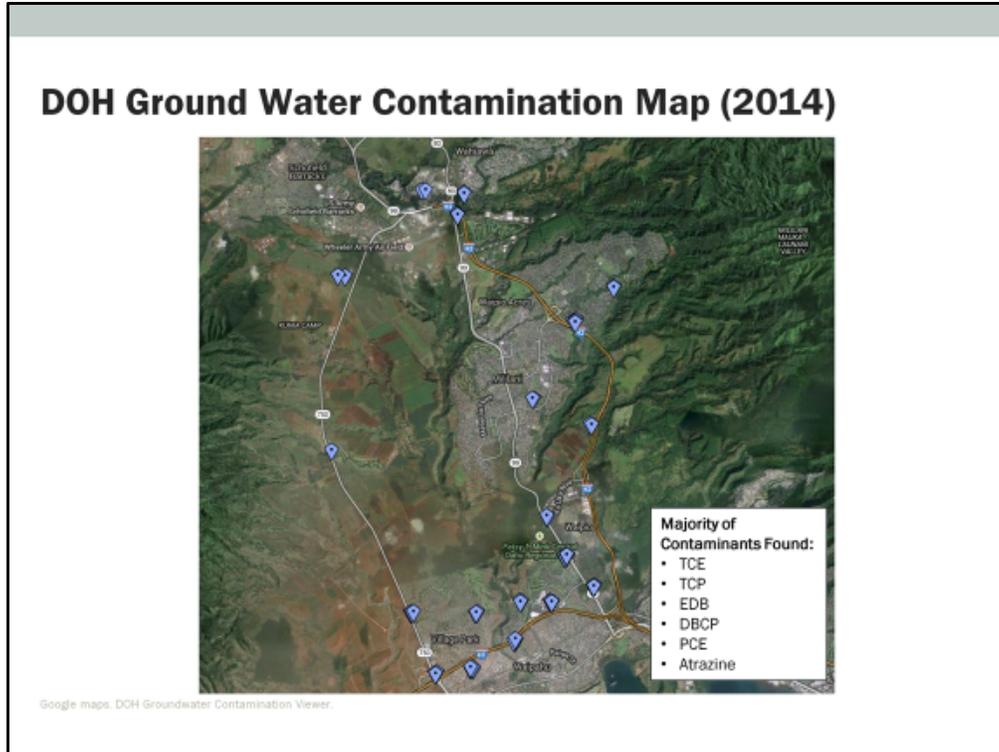
Aquifer System	Sustainable Yield (SY) (mgd)	Permitted Use (mgd)	SY Available (mgd)	12-MAV (mgd) as of 12/31/13	SY Minus Pumpage (mgd)
Waimalu	45	46.951	-1.951	34.449	10.551
Waipahu-Waiawa	104	84.856	19.144	47.776	56.224
Ewa-Kunia	16	15.045	0.955	12.043	3.957
Wahiawa	23	22.663	0.337	8.958	14.042
Mokuleia	8	8.314	-0.314	0.359	7.641
TOTAL	196	177.829	18.171	103.585	92.415

The 5 groundwater aquifers within the COWMP boundary are:

- Waimalu
- Waipahu-Waiawa
- Ewa-Kunia
- Wahiawa
- Mokuleia

This table shows the sustainable yield for each aquifer, the permitted allocation (i.e., how much each is permitted to pump), the actual pumpage based on a 12 month moving average, and how much water is remaining.

The total sustainable yield is 196 MGD, and the available sustainable yield based on pumpage is about 92 MGD, which means that about 47% of the sustainable yield is still available.



The Department of Health's groundwater contamination map was updated earlier this year and shows wells in Central Oahu where contaminants were found in the most recent testings.

The majority of the contaminants found were:

- TCE
- TCP
- EDB
- DBCP
- PCE
- Atrazine

The majority of these wells have been contaminated by previous agricultural practices.

Central Oahu Watershed Profile

Groundwater Quality

- BWS regularly tests for about 100 chemical and bacterial contaminants
- There has been pollutant detection in aquifers beneath agricultural fields in Central Oahu
- Water is treated with granular activated carbon (GAC)
- Residual agricultural chemicals from sugarcane and pineapple cultivation, such as TCP and DBCP, are found in some Central Oahu wells
- TCE was also found at Schofield

The Board of Water Supply regularly tests for chemical and bacterial contaminants. For Central Oahu, prior agricultural practices for pineapple and sugarcane have led to some contamination of the groundwater.

The water below Schofield has also detected TCE which is a result of previous military land usage.

Drinking water wells are treated with Granular Activated Carbon which removes certain elements, particularly organic chemicals, from the water.

Atrazine – herbicide

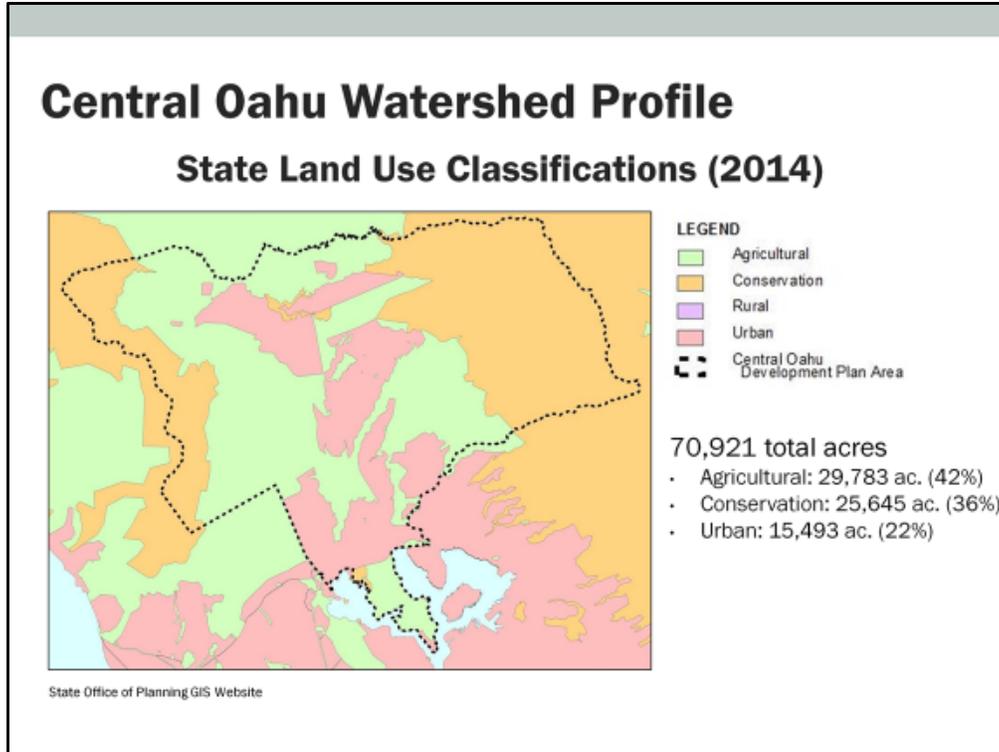
TCE – industrial solvent

PCE – solvent for organic materials

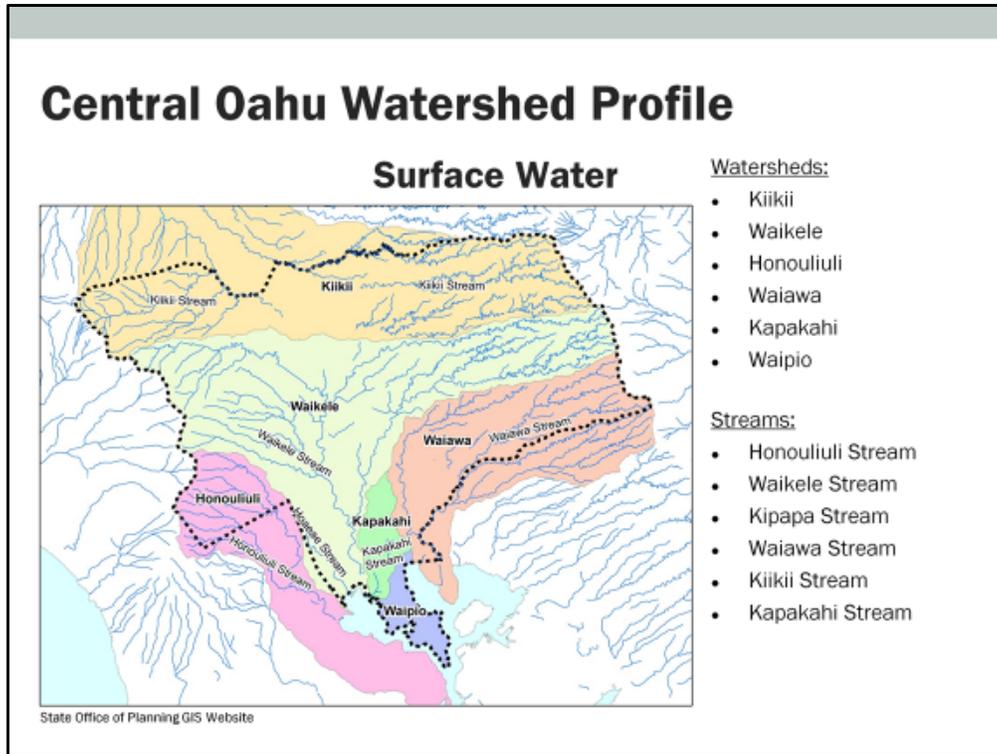
TCP – soil fumigant

DBCP – soil fumigant

EDB - pesticide



This data is from the State Office of Planning.
The State Land Use District map shows the breakdown of agricultural, conservation, urban, and rural land use districts in Central Oahu.
Agricultural land makes up 42% of the land while urban lands make up 22%.



There are 6 major stream systems in Central Oahu, which originate from both the Koolau and the Waianae ranges.

The six watersheds in the Central Oahu region are Kiikii, Waikele, Honouliuli, Waiawa, Kapakahi, and Waipio.

This information is based on data from the State Office of Planning and the Commission on Water Resource Management.

Central Oahu Watershed Profile

Brief History and Culture

- **Kukaniloko Birthstones:** First ancient site on Oahu to have been officially recognized, preserved, and protected.
- **Late 1800's:** Western development of Central Oahu
 - The Waipio ahupua'a was conveyed to William Jarrett, a high-ranking official in the Hawaiian government
 - Pearl City and Waipahu were settled by independent farmers and fishermen
 - Plantation villages were built around the Waipahu Sugar Mill
- **1913-1916:** Waiahole Ditch was built
- **1939-1944:** 3,000 acres of sugar cane lands were converted to military use
- **1950-1955:** 2,000 acres of sugar cane lands were converted to pineapple fields



This brief history of the Central Oahu area describes the changes in land use over the years. The Kukaniloko birthstones were the first ancient site on Oahu to be officially recognized, preserved, and protected.

In the late 1800's, western development of Central Oahu began.

Pearl City and Waipahu were settled by farmers and fisherman.

Between 1913 and 1916, Waiahole Ditch was constructed.

Between 1939 and 1944, the military converted 3,000 acres of sugar cane lands for their own use.

And between 1950 and 1955, another 2,000 acres of sugar cane land were converted to pineapple fields.

Central Oahu Watershed Profile

Brief History and Culture

- **1960's:** the start of housing developments in Central Oahu
- **1968:** Mililani was built and was the first master-planned community in Hawaii
- **Since 1985:** 3,000 acres of land have since been taken out of agricultural production
- **1995:** The Oahu Sugar Company closed
- **2006:** Del Monte farms closed
 - Shift from monocrop farming - pineapple lands became used for diversified agriculture
- **Future:** Koa Ridge Makai development and proposed solar farms on the former Waiawa by Gentry and Royal Kunia lands

In the 1960's, housing developments started being built.

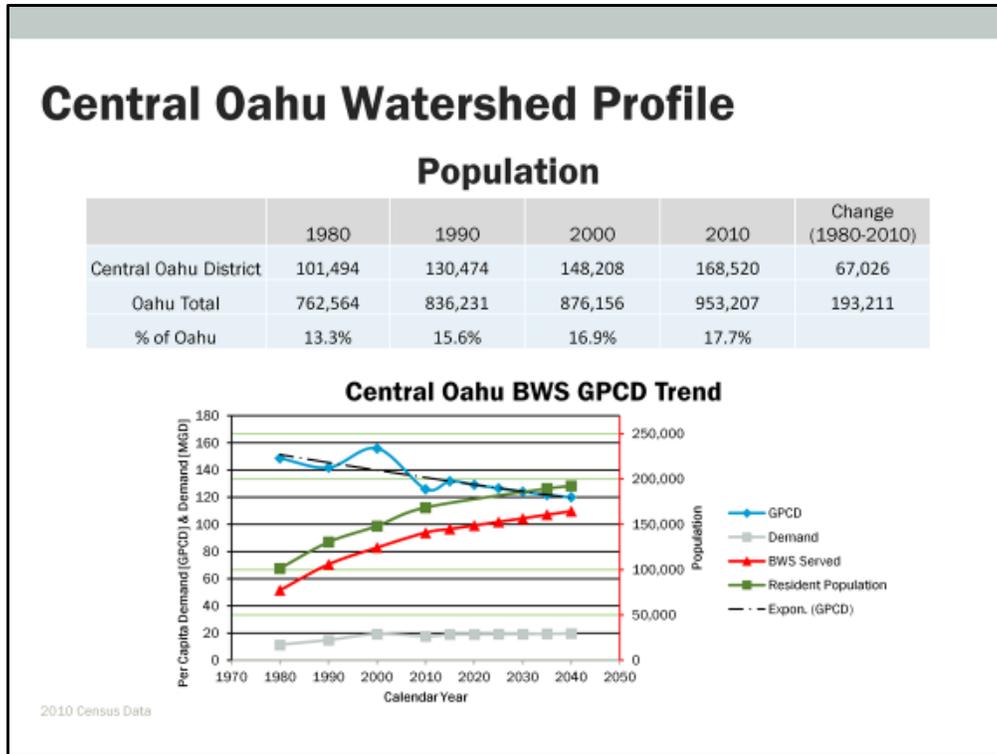
In 1968, Mililani became the first master-planned community in Hawaii

Since 1985, 3,000 acres of land have been taken out of agricultural production.

In 1995 the Oahu Sugar Company closed, and in 2006, Del Monte farms closed.

This led to a shift from monocrop farming to diversified ag.

In the future, there is the Koa Ridge Makai development and proposed solar farms on the former Waiawa by Gentry and Royal Kunia lands.



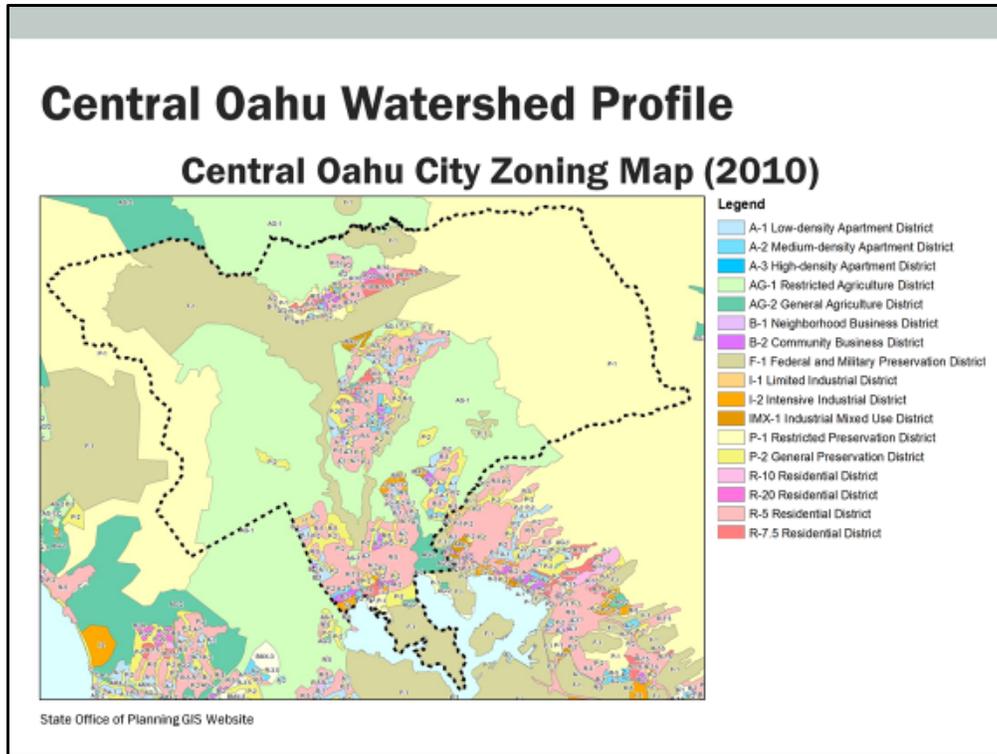
This table shows the population growth over the past few decades for Central Oahu as well as the entire island of Oahu.

The graph below shows the Central Oahu BWS Gallons per capita per day trend through 2040.

The green line shows the resident population of Central Oahu, and the red line shows the BWS population served.

The difference between these lines accounts for the military and private water systems.

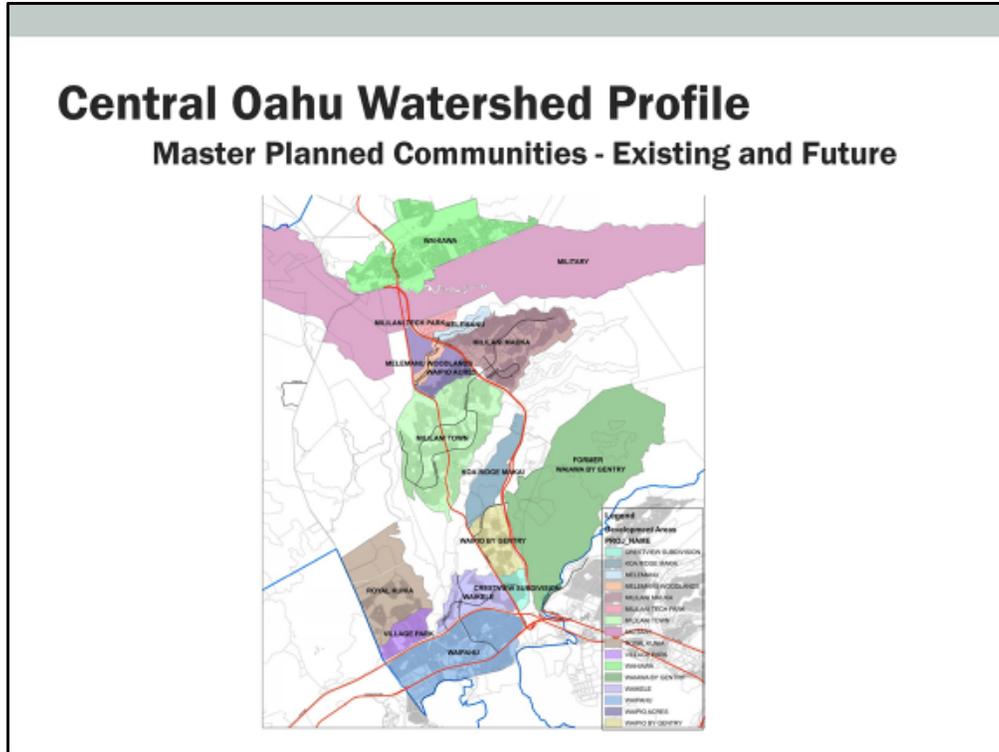
The important thing to note is that although the population is increasing, the demand shown in grey has plateaued and is expected to continue at this level of about 20 MGD.



This map was last updated in 2010.

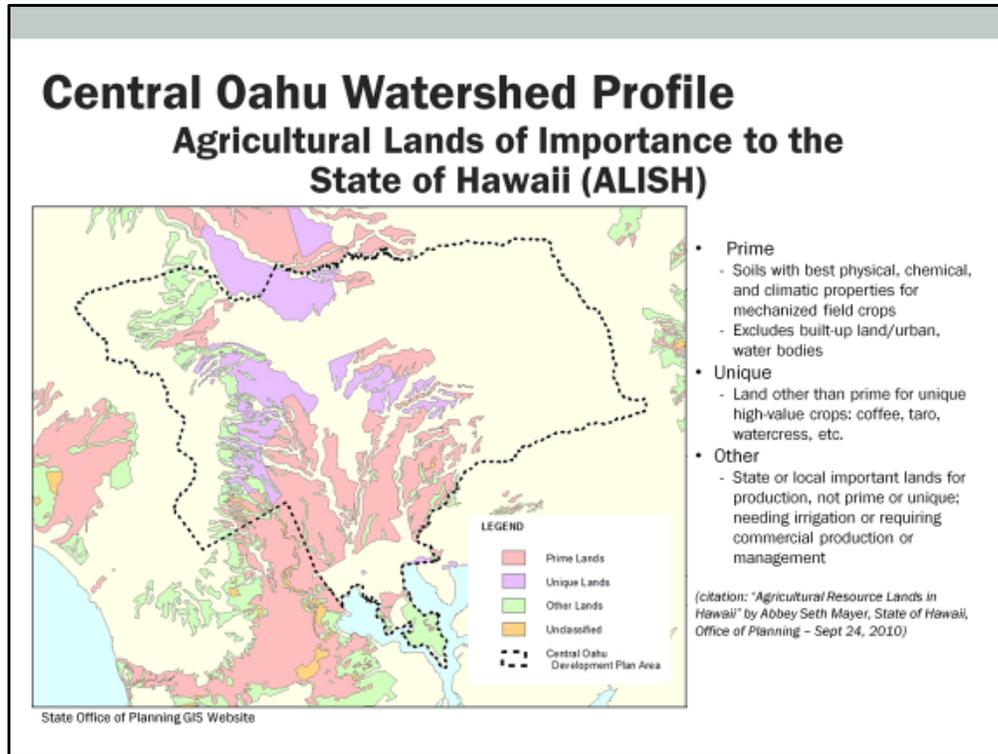
There are 17 City zoning classifications in Central Oahu.

- Green depicts various agricultural lands.
- Yellow shows preservation lands.
- Olive shows federal and military lands.
- Blue and pink show apartments and residential districts.
- Purple shows neighborhood business districts.



This map shows the existing and planned communities within Central Oahu. The non-master planned communities include the military properties, Wahiawa, Waipahu, and Crestview Subdivision.

The areas that have been master planned are Royal Kunia, Koa Ridge Makai, Mililani Mauka, Mililani Town, Waikele, Melemanu, Melemanu Woodlands, Mililani Tech Park, Village Park, Waipio Acres, and Waipio by Gentry.

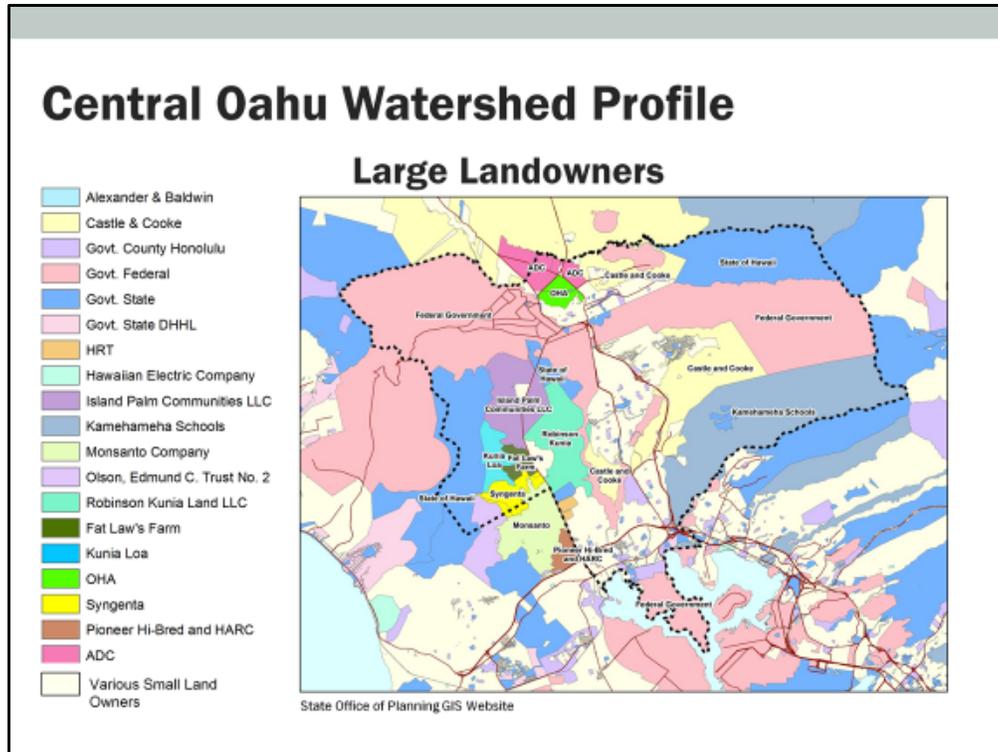


This slide shows the Agricultural Lands of Importance to the State of Hawaii as of 1977. Many of these prime and unique lands were used for pineapple and sugar cane but are now used for diversified agriculture. The light yellow areas represent non-agricultural lands.

Prime lands are classified as lands with soils with the best physical, chemical, and climatic properties for mechanized field crops.

Unique lands are lands other than prime lands for unique high-value crops such as coffee, etc.

Lands labeled Other are used for production but are not as high quality as prime and unique, often used for pasture land.



This map shows the large landowners in Central Oahu.

In the north are the former Galbraith Estate lands which are now owned by ADC and OHA.

The federal government and the State of Hawaii own large areas of land.

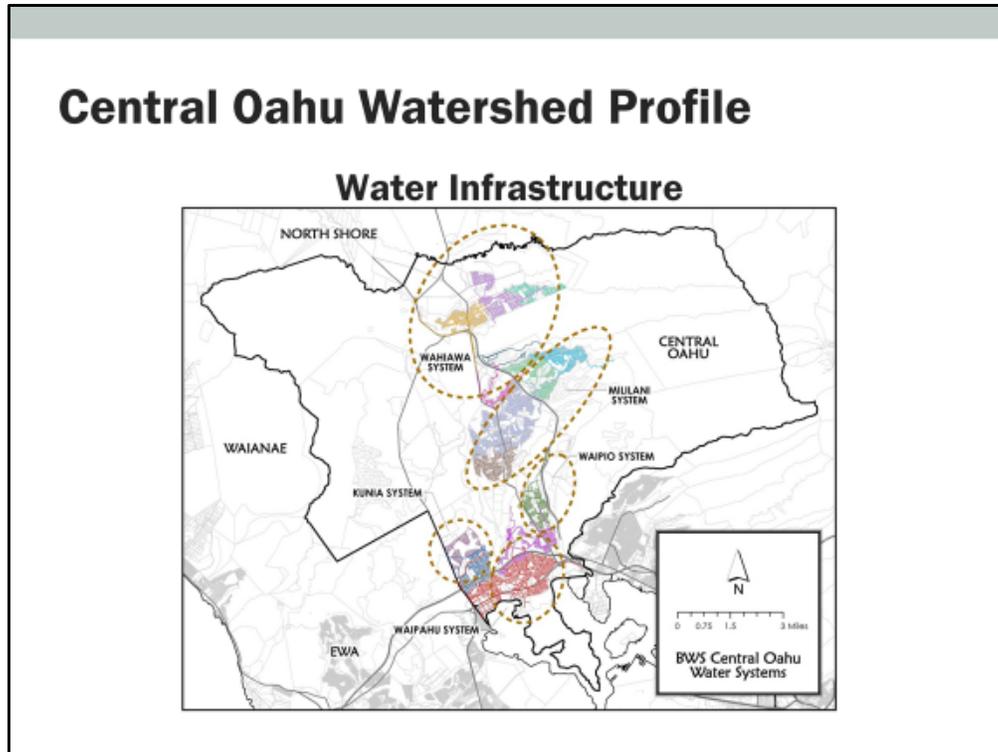
Along Kunia Road, there is land owned by the State Department of Agriculture, Island Palm Communities, Fat Law's Farm, Robinson Kunia, and Syngenta.

Castle and Cooke also owns land in the northern and central parts of this region.

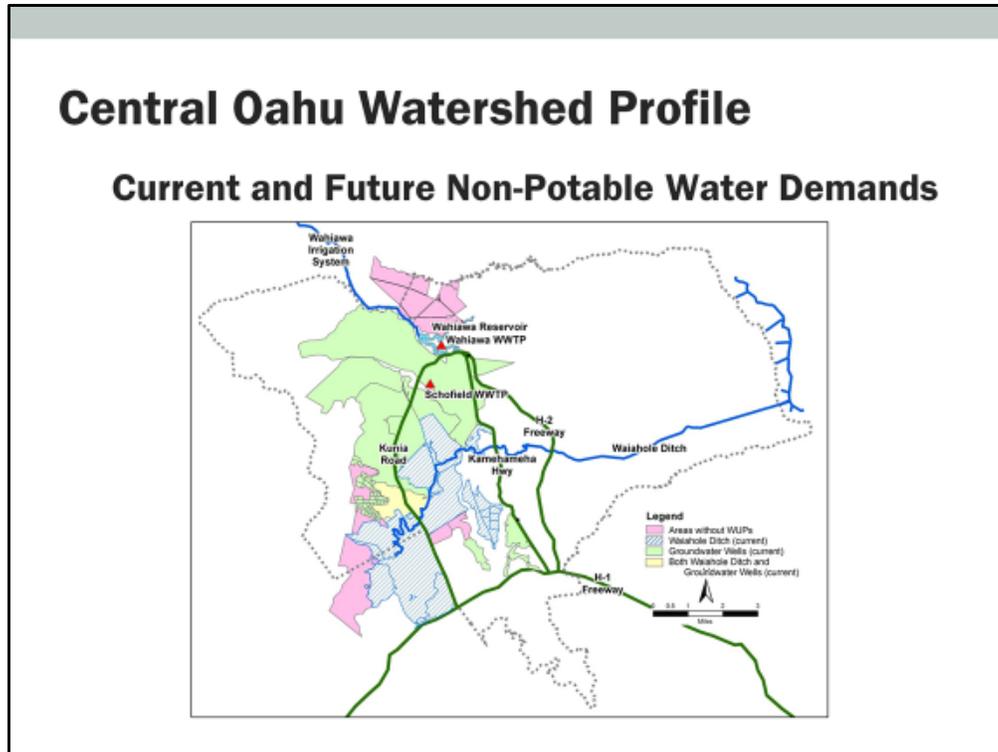
The Koolau Watershed Partnership consists of 17 landowner partners and 8 associate partners:

The landowner partners are:

- Bishop Museum
- City and County of Honolulu Board of Water Supply
- Dole Food Company, Inc
- Hawaii Reserves Inc
- Hiipaka LLC dba Waimea Valley
- Kamehameha Schools
- Kualoa Ranch
- Oahu Country Club
- Ohulehule Forest Conservancy LLC
- 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 Manoa/Lyon Arboretum
- US Army
- US Fish and Wildlife Service – Refuges



These are the 5 BWS water systems in the Central Oahu region: Wahiawa, Mililani, Kunia, Waipio, and Waipahu.



This map shows the major areas where non-potable water is currently being used or can potentially be used in Central Oahu.

The Green areas show areas that are being irrigated with groundwater wells; the blue striped areas show parcels being irrigated with Waiahole Ditch water; and the yellow areas are being irrigated with both groundwater and Waiahole Ditch water.

The areas in pink currently do not have Water Use Permits or are not currently being irrigated but have the potential to be irrigated with non-potable water in the future.

There are about 15,000 acres of agricultural land available in the Central Oahu area along Kunia Road and in the former Galbraith Estate lands that could use non-potable water.

Based on current water use permit allocations, there is about 19.79 MGD being supplied by groundwater wells and Waiahole Ditch to supply areas that could potentially use non-potable water

Future projected water demand is estimated to be around 33.6 MGD.

Applicable Central Oahu Sustainable Community Plan Vision and Policies

Vision:

- Preservation, conservation, and enhancement of community resources
- Protect open space outside the Community Growth Boundary from development
- Efficient use of all water supplies through conservation measures , distribution system leak repair, and reclaiming non-potable water from wastewater, where feasible

Policies:

- Protect prime watershed recharge areas and the Pearl Harbor potable aquifer which underlies the Central Oahu area
- Preserve natural gulches and ravines as drainageways and storm water retention areas
- Provide long range protection for prime agricultural lands and a sufficient water supply to meet diversified agricultural needs for Central Oahu
- Ensure adequacy of water supply before zoning approval of new residential or commercial developments
- Use of non-potable water for irrigation and other suitable uses to conserve the supply of potable water
- Protect water recharge areas above the 50-inch isohyet as recommended by the 2007 Central O'ahu Watershed Study Final Report (COWSFR)
12/11/2014

These are the applicable visions and policies from the Central Oahu Sustainable Communities plan which is currently being updated.

The vision includes the:

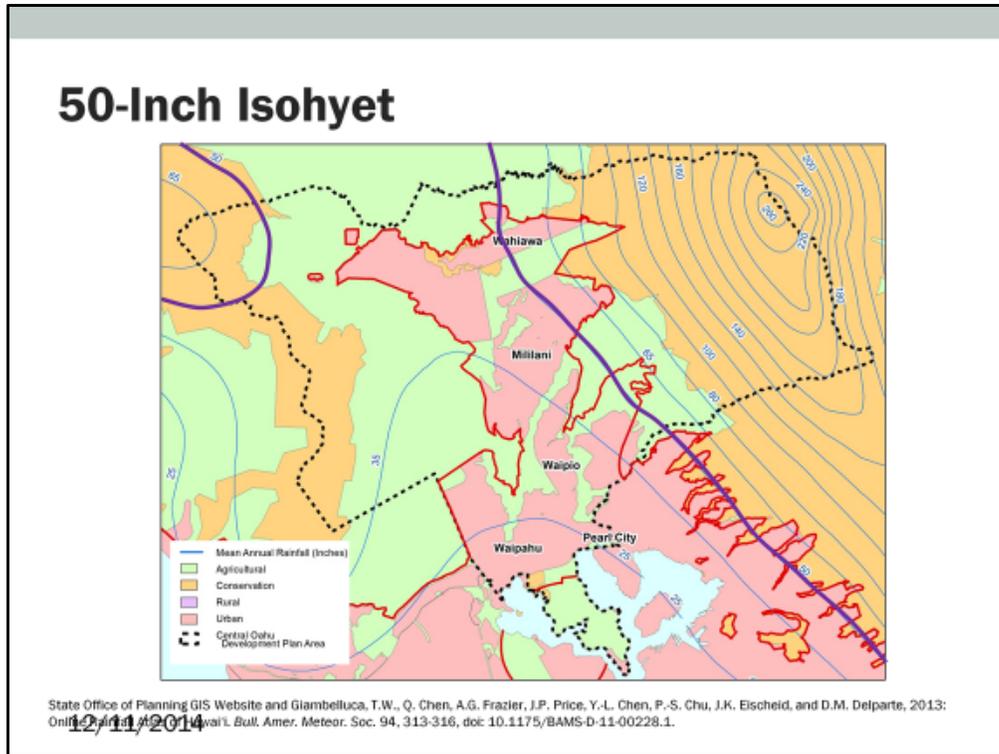
- Preservation, conservation, and enhancement of community resources
- Protection of open space outside the Community Growth Boundary from development
- And efficient use of water supplies

The relevant policies include:

- To protect prime watershed recharge areas and the Pearl Harbor potable aquifer
- Preserve natural gulches and ravines as drainageways and storm water retention areas
- Provide long range protection for prime ag lands and a sufficient water supply to meet water needs for diversified ag
- Ensure that there is enough water before zoning approval of new developments
- Use of non-potable water for irrigation to conserve the potable water supply
- And to protect water recharge areas above the 50-inch isohyet



This map shows the Central Oahu region with the Sustainable Communities Plan Community Growth Boundary shown in red. As you can see, the majority of urban-zoned land falls within this boundary. The boundary is used to curb urban sprawl and keep developments within a confined area.



This map overlays the isohyets that show annual rainfall, and was taken from the 2011 Rainfall Atlas.

The 50-inch isohyet is shown in purple.

A policy that is being proposed within the updated Central Oahu Sustainable Communities Plan is that there should be no new developments above the 50-inch isohyet.

The reason for this is that rainfall amounts above the 50-inch isohyet line leads to direct groundwater recharge.

Rainfall falling below this line is for the most part lost through evapotranspiration.

This is why it is deemed important to minimize impervious surfaces above the 50-inch isohyet.

Stakeholders Consulted to Date

- 5 Neighborhood Boards
- Agribusiness Development Corporation
- Aqua Engineers
- U.S. Army
- Castle and Cooke
- Hawaii Department of Agriculture
- Hawaii Department of Health – Safe Drinking Water Branch and Wastewater Branch
- Office of Planning - Coastal Zone Management
- Department of Environmental Services
- U.S. Environmental Protection Agency
- Hawaii Agriculture Research Center
- Koolau Mountains Watershed Partnership
- Kunia Water Association
- Kunia Water Cooperative
- UH Water Resources Research Center and UH Sea Grant
- U.S. Geological Survey

These are the stakeholders that we have met with to date.

They include the 5 neighborhood boards in Central Oahu, private landowners, and governmental agencies.

There are still more that we plan to meet with to get their input regarding Central Oahu watershed issues

Central Oahu Watershed Preliminary Issues

#1: Promote sustainable watersheds

- We need to preserve and restore native forest areas
- Enhance mitigation of invasive species
- Promote resource conservation and low-impact development concepts

#2: Protect and enhance water quality and quantity

- We need to reduce sediment runoff into streams and the Pearl Harbor basin
- Programs are needed to ensure land uses will not negatively impact water quality
- Optimize pumpage to meet water system demands and avoid detrimental impact to the aquifer
- Evaluate aquifer sustainable yields (SY) as allocations and pumpage approach SY limits

12/11/2014

These preliminary issues identified for the Central Oahu Watershed are based on stakeholder input, agency consultations, and prior Central Oahu watershed-related studies.

Central Oahu Watershed Preliminary Issues

#3: Protect Native Hawaiian rights and traditional and customary practices

- Incorporate traditional Hawaiian values and cultural practices into the modern context
- Plan for the enhancement of Native Hawaiian water rights and cultural and traditional uses
- Develop partnerships to restore significant archaeological, cultural, and historic sites, including protecting and restoring the Pearl Harbor coastal, estuarine, and marine habitat

#4: Facilitate public participation, education, and project implementation

- Promote public participation in planning and implementation of watershed management projects and programs
- Foster community-government partnerships to help with plan implementation
- Increase public awareness and educational efforts regarding Central Oahu's potable and non-potable water supply and demand
- Establish watershed protection educational curriculum and programs on sustainability in area schools and organizations to educate future generations.

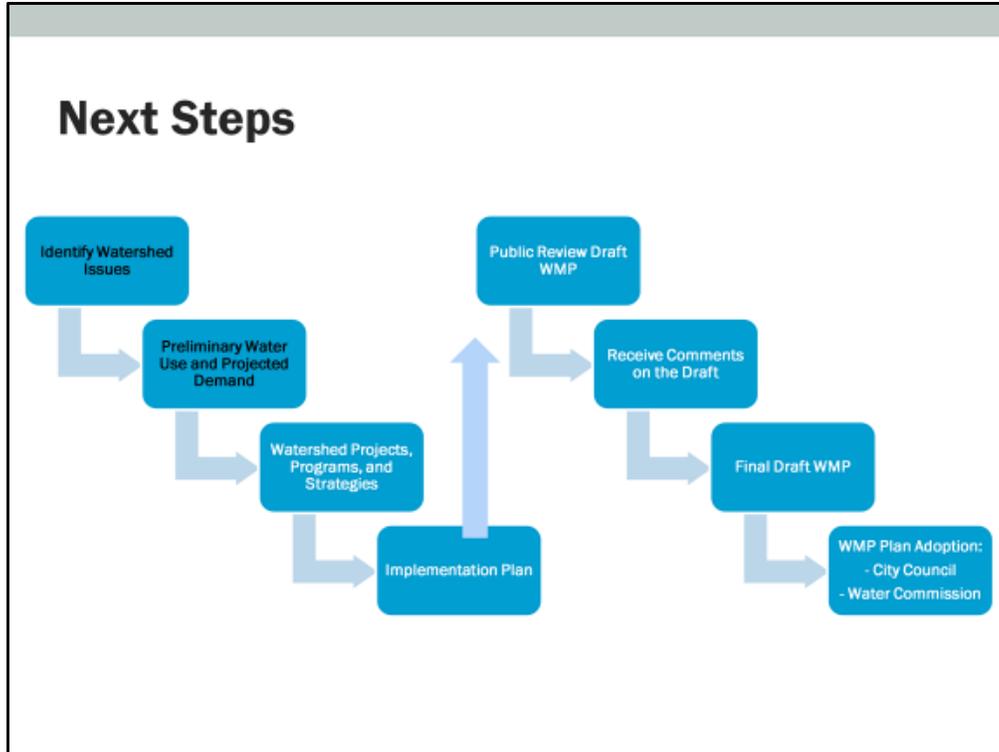
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Central Oahu Watershed Preliminary Issues

#5: Meet future water demands at a reasonable cost

- Explore options to diversify Central Oahu's municipal water supply
- Explore opportunities for using non-potable water for non-potable purposes (in lieu of using potable ground water)
- Promote appropriate demand-side management programs
- Maintain and improve BWS island-wide system reliability, adequacy, and efficiency
- Support alternate energy and/or energy efficiency projects to reduce conventional power generation costs for existing facilities
- Provide water for diversified ag

12/11/2014



To date, we have conducted stakeholder interviews and have preliminarily identified watershed issues.

We will continue working on determining projected water demands and will follow up with additional stakeholder meetings and two more community meetings.

The goal is to develop strategies and/or programs and projects that address these issues.

In the last phases of the project, we will develop a public review draft of the WMP and solicit additional public comments on it.

Our intent is to get Neighborhood Board endorsement from all 5 Neighborhood Boards in Central Oahu.

The plan will then need to be adopted by both the City Council and the State Water Commission.

Feedback

- Did we capture your comments correctly?
- Are there other issues and concerns about water that the plan needs to consider?

Overall COWMP Schedule		
Phase 1	<ul style="list-style-type: none"> . Conduct background research on Central Oahu's water resource needs and issues . Develop Central Oahu-specific sub-objectives . Quantify current and future agricultural water supply and demands . Develop future (potable/non-potable) water use scenarios: low, mid, high, and ultimate 	 Stakeholder and Public Outreach, including Community and Neighborhood Board Meetings 
Phase 2	<ul style="list-style-type: none"> . Identify water resource management strategies to address critical water resource issues . Research and document watershed management projects that address critical water related issues 	
Phase 3	<ul style="list-style-type: none"> . Develop and compile Preliminary Draft COWMP . Present the Public Review Draft to the community/stakeholders for input 	
Phase 4	<ul style="list-style-type: none"> . Compile and review comments from the Public Review Draft of the COWMP . Revise the Public Review Draft of the COWMP . Compile Final Draft of COWMP 	
Phase 5	<ul style="list-style-type: none"> . Present the Final Draft COWMP to the (5) Neighborhood Boards for endorsement of the plan . CWRM Adoption Process . City Council Adoption Process 	

These are the 5 phases of the COWMP. As you can see, stakeholder and public outreach is a main component throughout all 5 phases.

**Central Oahu
Watershed Management Plan**

FOR MORE INFORMATION, PLEASE CONTACT:

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Please feel free to reach out to us with your comments and questions. This is our contact information and we have our business cards at the front.