

North Shore Watershed Management Plan

**Community Meeting
July 19, 2012**



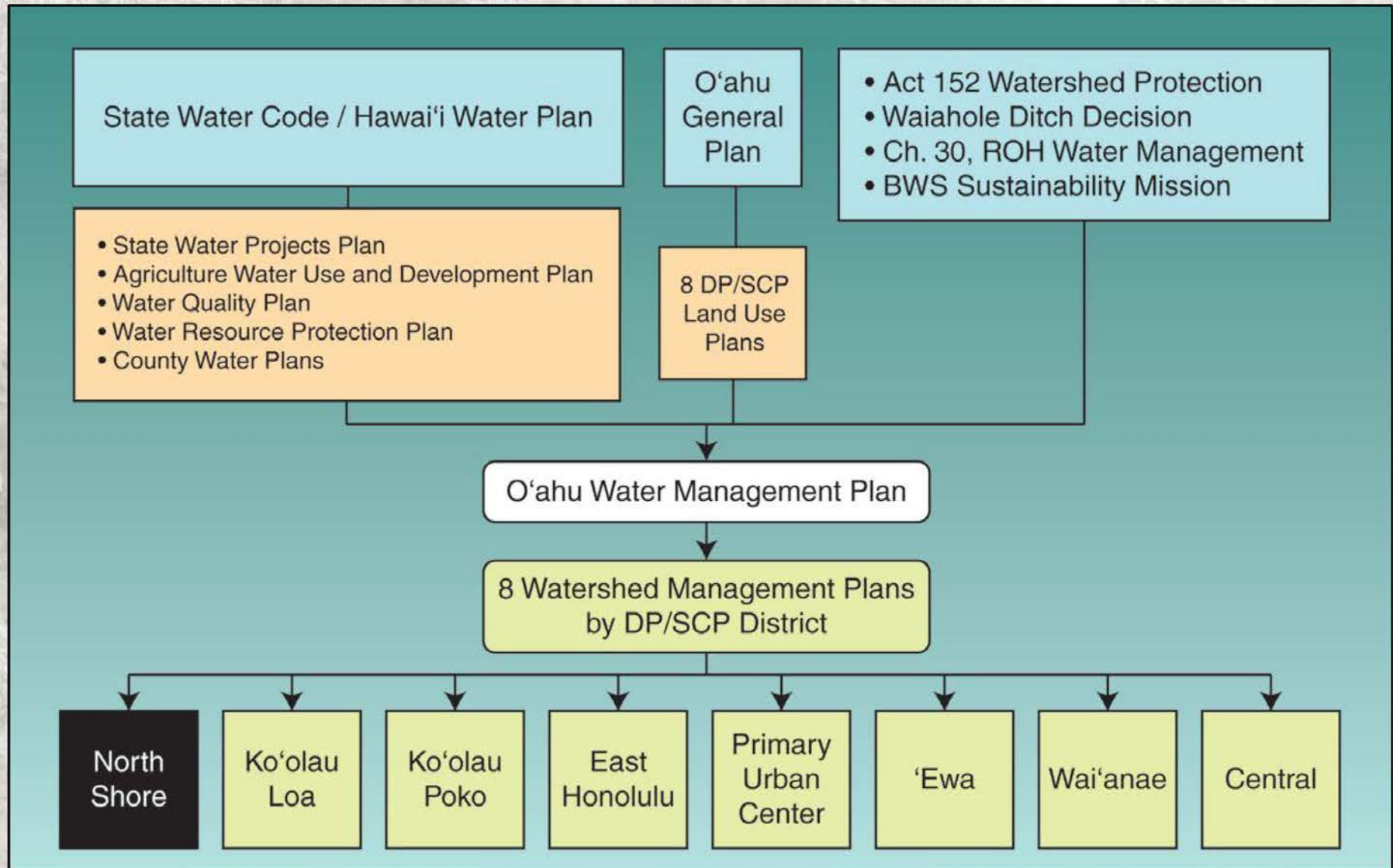
Board of Water Supply
City and County of Honolulu

Background and Context

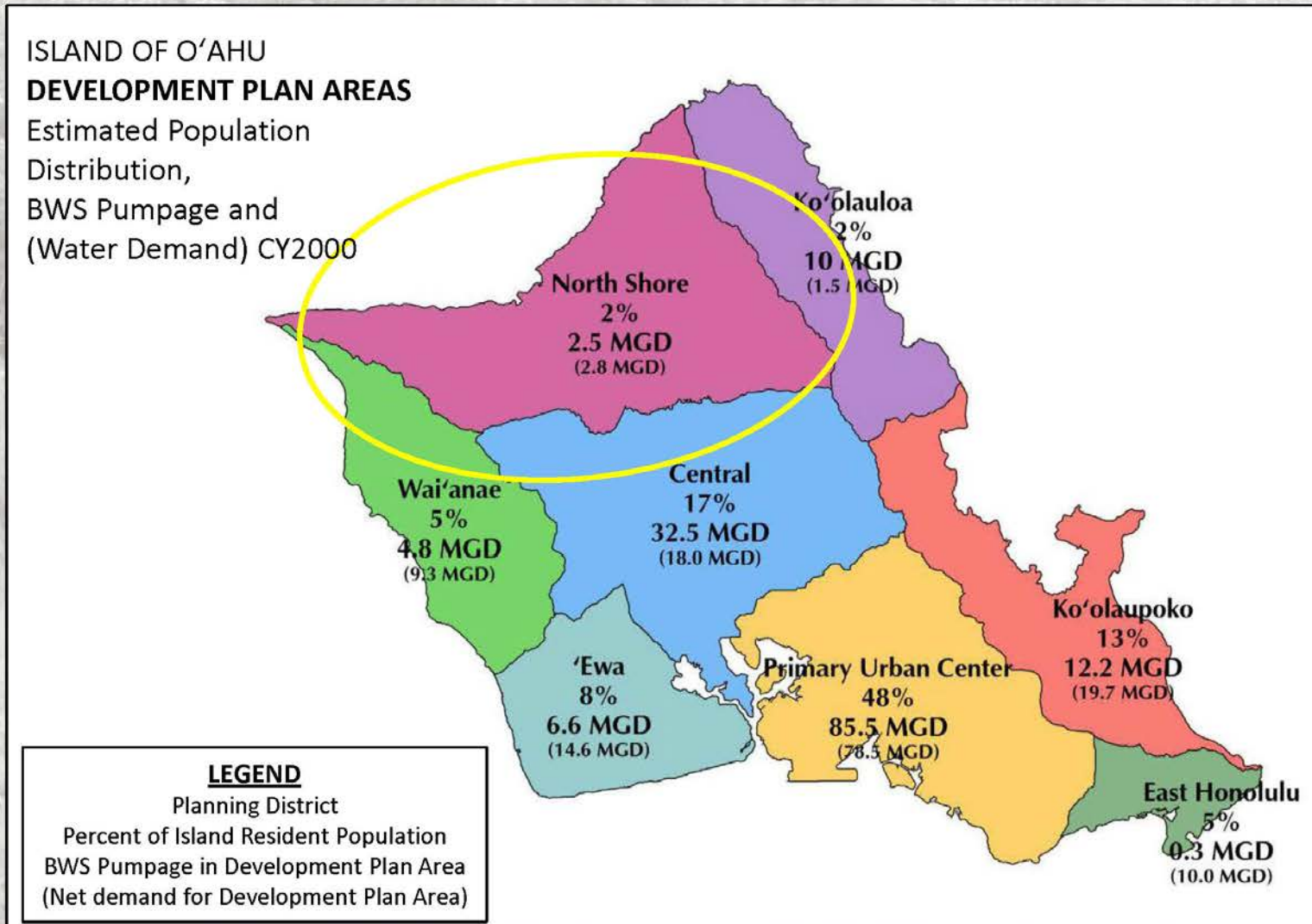
- County level “**Water Use and Development Plans**” are required by the **State Water Code**
- **Revised Ordinances of Honolulu Chapter 30** established the “O‘ahu Water Management Plan” to be developed by the Department of Planning and Permitting
- Guiding plans include the **Hawai‘i Water Plan** and the City **Development Plans** and **Sustainable Communities Plans**
- BWS and DPP elected to develop watershed management plans **by District** to parallel the Development Plans/Sustainable Communities Plans and to provide for community-specific strategies
- **Key Planning Principles** for these Plans
 - Community-Based
 - Environmentally Holistic
 - Ahupua‘a management perspective
 - Action-oriented
 - In alignment with State and City water and land use policies



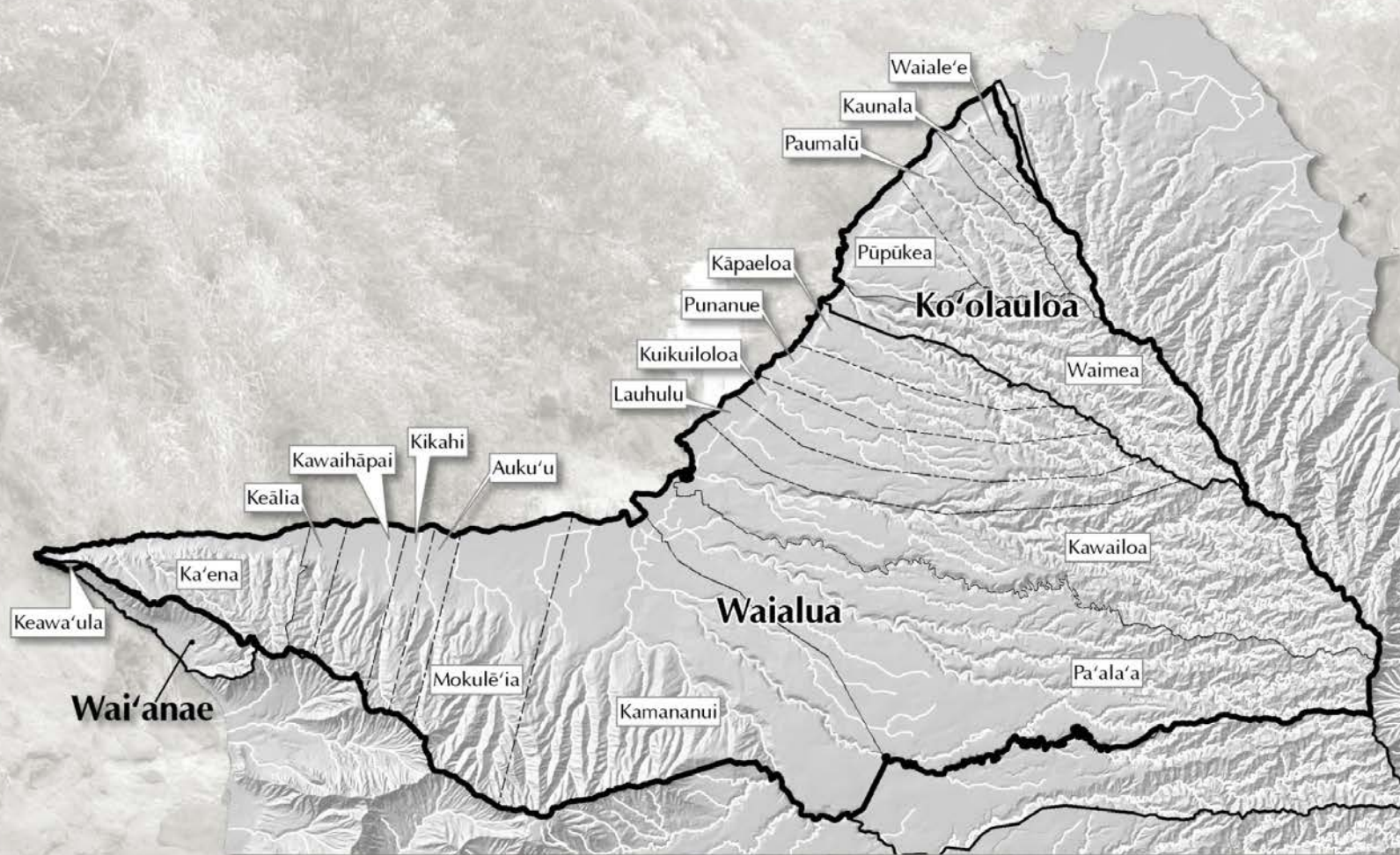
O'ahu Water Management Plan



O'ahu Water Management Plan: North Shore



North Shore Watershed Management Plan Project Area



North Shore Sustainable Plan Area



Applicable North Shore Sustainable Community Plan Elements

- Promote a Diversified Agricultural Industry
- Maintain the Community Growth Boundary to Protect Agricultural, Open Space, and Natural Resources
- Enhance the Region's Recreational and Educational Potential
- Provide Adequate and Appropriately-Sized Public Infrastructure, Facilities, and Services
- Preserve and Protect Cultural and Historic Resources
- Adapt the Ahupua'a Concept as a Framework for Land Use and Natural Resource Management
- Integrate Principles of Sustainability into Decision-Making Processes



Watershed Management Plan Goal

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

- (1) the protection, preservation and management of O'ahu's watersheds
- (2) sustainable ground and surface water use and development to serve present users and future generations



Watershed Management Plan Objectives

1. Promote Sustainable Watersheds
2. Protect and Enhance Water Quality & Quantity
3. Protect Native Hawaiian Rights and Traditional & Cultural Practices
4. Facilitate Public Participation, Education & Project Implementation
5. Meet Future Water Demands at Reasonable Costs



NSWMP Contents

CHAPTERS

Executive Summary

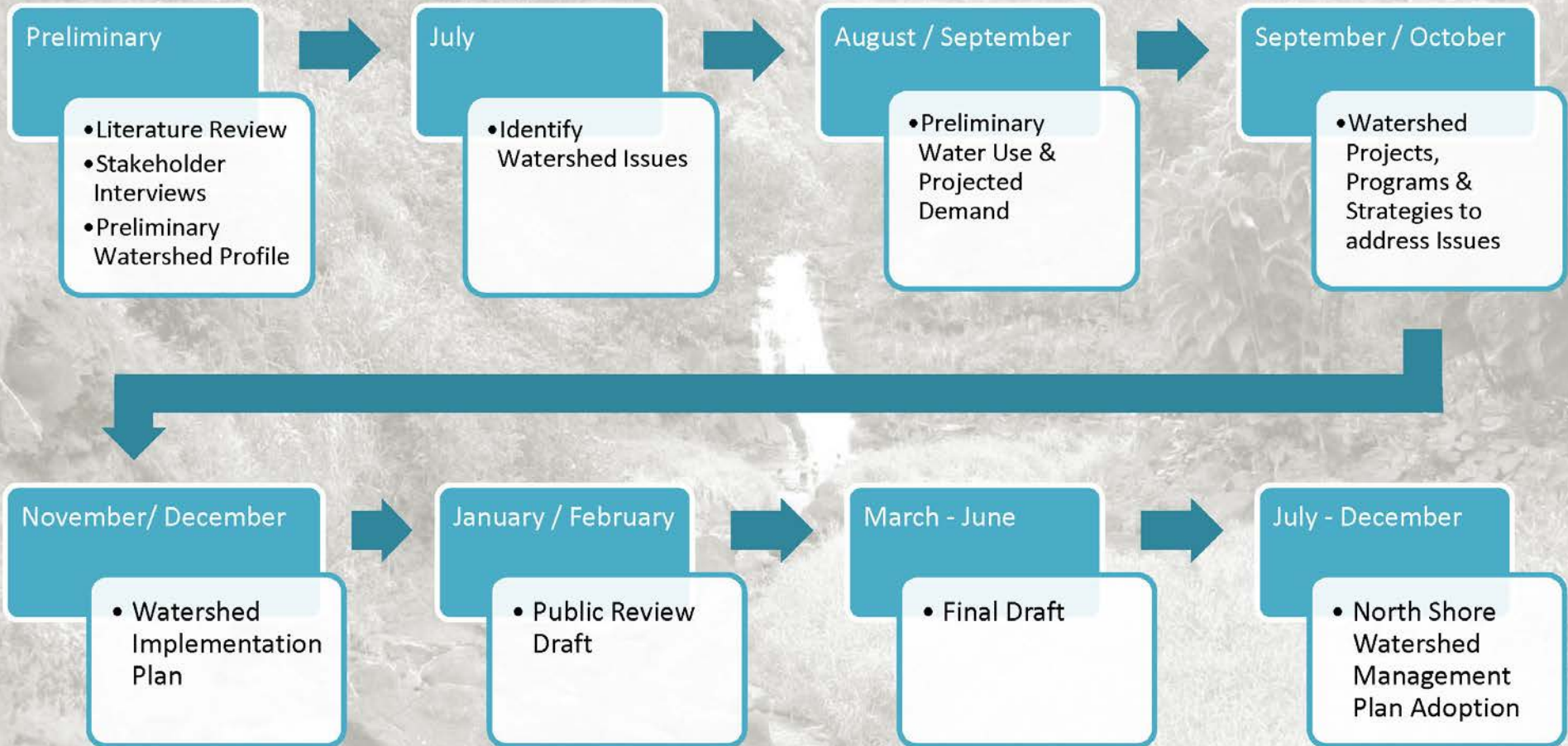
1. O'ahu Water Management Plan Overview
2. North Shore Watershed Profile
3. Water Use and Projected Demand
4. Plan Objectives, Water Supply and Watershed Management Projects and Strategies
5. Implementation

APPENDICES

- A. O'ahu Watershed Management Plan Framework
- B. Plans, Policies, Guidelines, and Controls
- C. O'ahu Water Use Permit Index
- D. Overview of O'ahu Hydrogeology
- E. Water Use and Demand – Methodology
- F. BWS Wahiawa Irrigation System Survey
- G. Neighborhood Board Endorsements



Scope



Information Sources

- Preliminary watershed analysis using reports and available 2010 population data include:
 - The North Shore Greenprint (TPL, 2012)
 - North Shore Regional Wastewater Alternatives Plan (CCH, 2012)
 - North Shore Sustainable Communities Plan (CCH, 2011)
 - O'ahu Agriculture: Situation, Outlook and Issues (DPP, 2011)
 - Waialua-Kaiaka Watershed Study (TSI, 2010)
 - Rapid Watershed Assessment – North Shore Watershed (NRCS, 2009)
 - Kaiaka Bay Watershed Participatory Assessment and Action Project (Yost, 2008)
 - Assessment of the Wahiawa Irrigation System (ADC, 2007)
 - Interviews and meetings

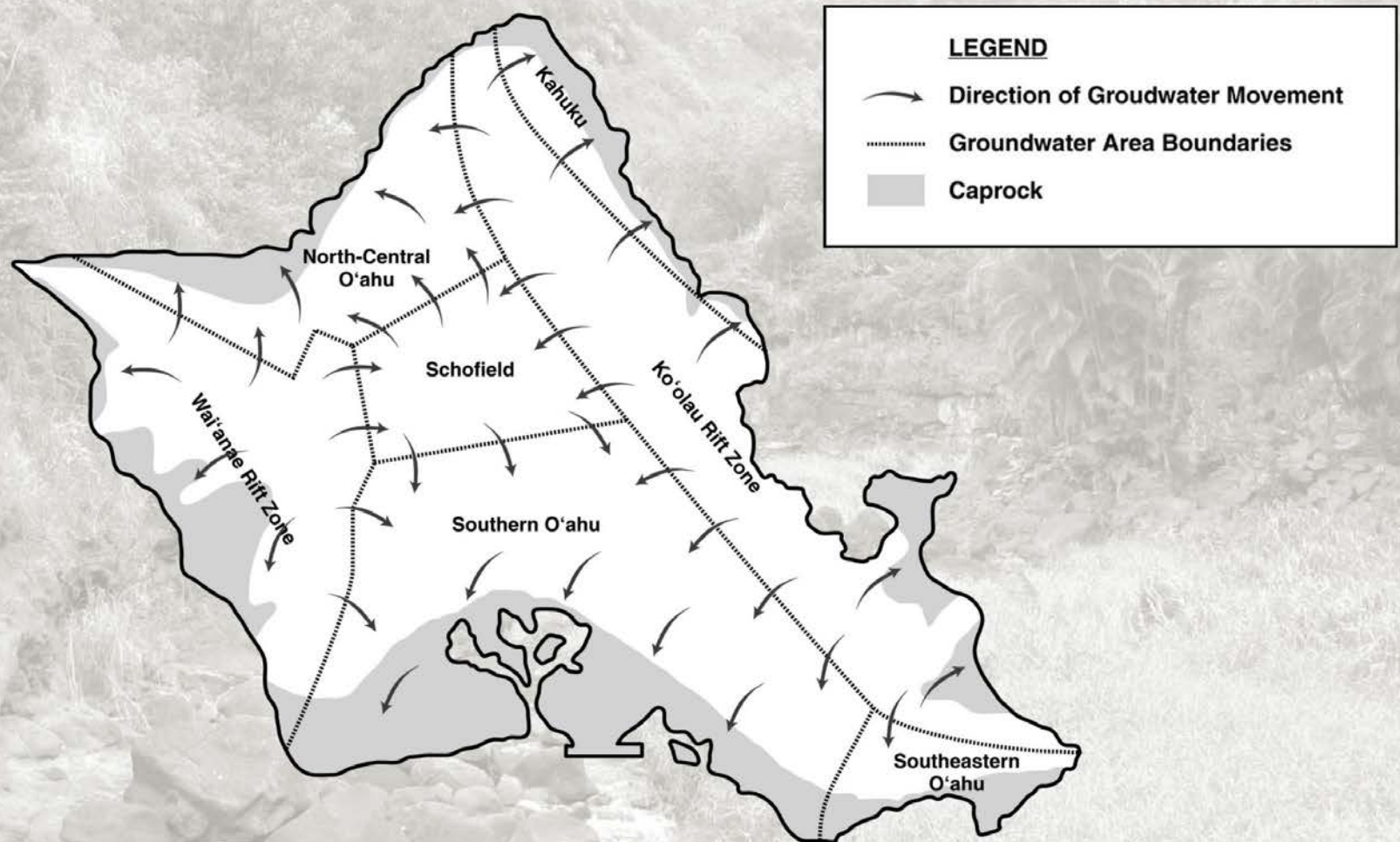


Watershed Topics

- Groundwater
- Surface Water
- Nearshore and Terrestrial Ecosystems
- North Shore History
- Demographics
- Land Use



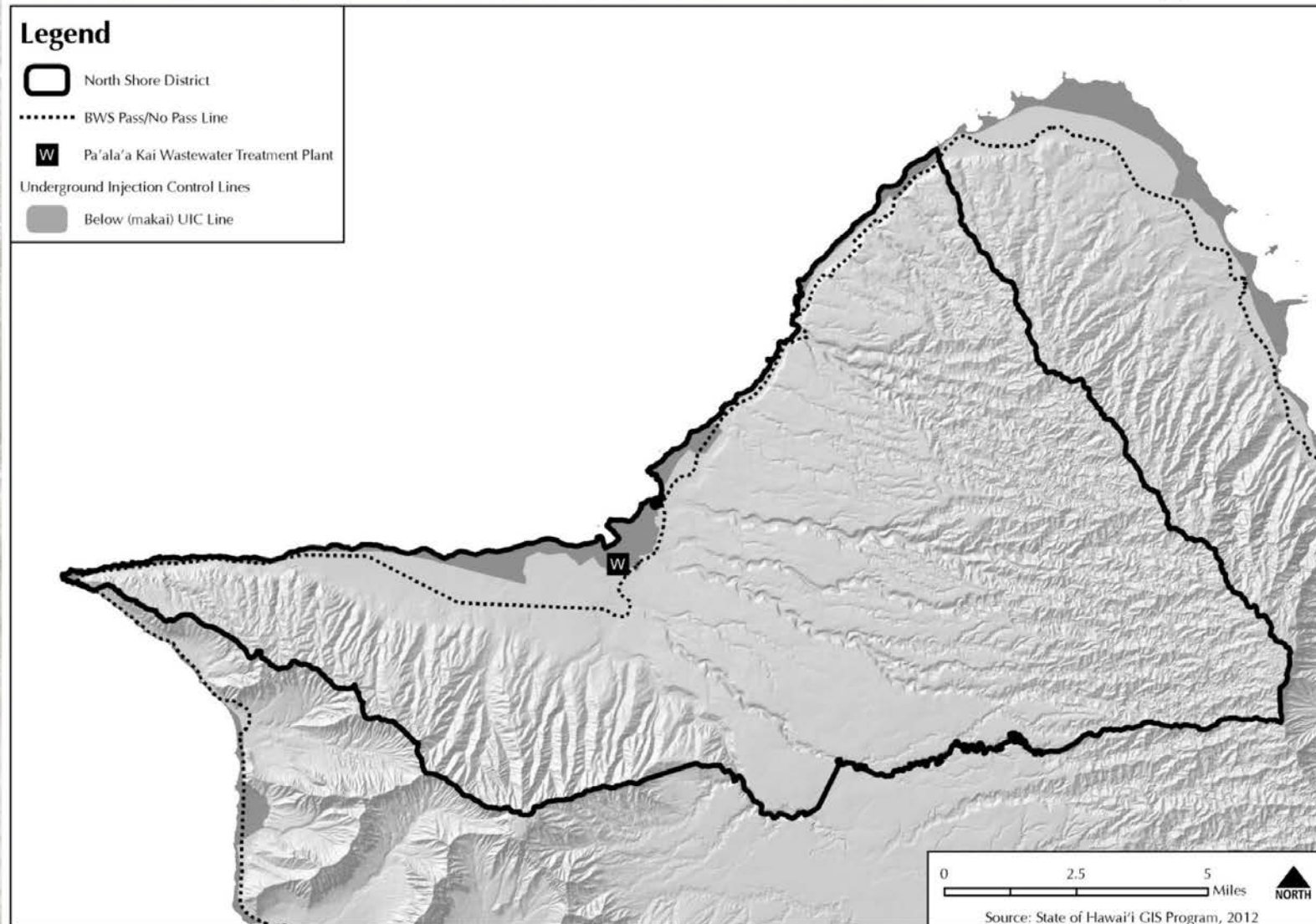
Regional Hydrology



The North Shore District overlays the North-Central Oahu groundwater area, one of seven major groundwater areas on Oahu delineated by the U.S. Geological Survey. North-Central Oahu groundwater contains both of Oahu's two primary volcanic-rock aquifers: the Koolau Basalt and the Waianae Volcanics. Within the freshwater lens system, groundwater generally moves from upper inland areas towards the ocean. Along the coast, water is confined in the underlying aquifers by coastal-plain deposits known as caprock. This creates positive pressure, where water can rise above the land surface and create a spring. Numerous springs can be found throughout the North Shore district near sea level.



Groundwater Quality



North Shore groundwater quality is generally considered high. The Board of Water Supply (BWS) 2011 Consumer Confidence Report found that the groundwater provided to North Shore meets the Federal and State drinking water standards.

Known Issues - Nine North Shore wells used for drinking water or irrigation supply have shown detectable levels of one or more chemical contaminants commonly found in solvents or pesticides, but this is not so much of a concern because most reported levels are below federal or state drinking water standards, and appropriate public health protection measures are implemented in those cases where water is used for human consumption. Suspected soil and/or groundwater contamination from the operation of the Waialua Sugar Mill were addressed under a Voluntary Response Program Agreement in 2004. Heavy metals and dioxins were present at concentrations exceeding Department of Health (DOH) Environmental Action Levels.

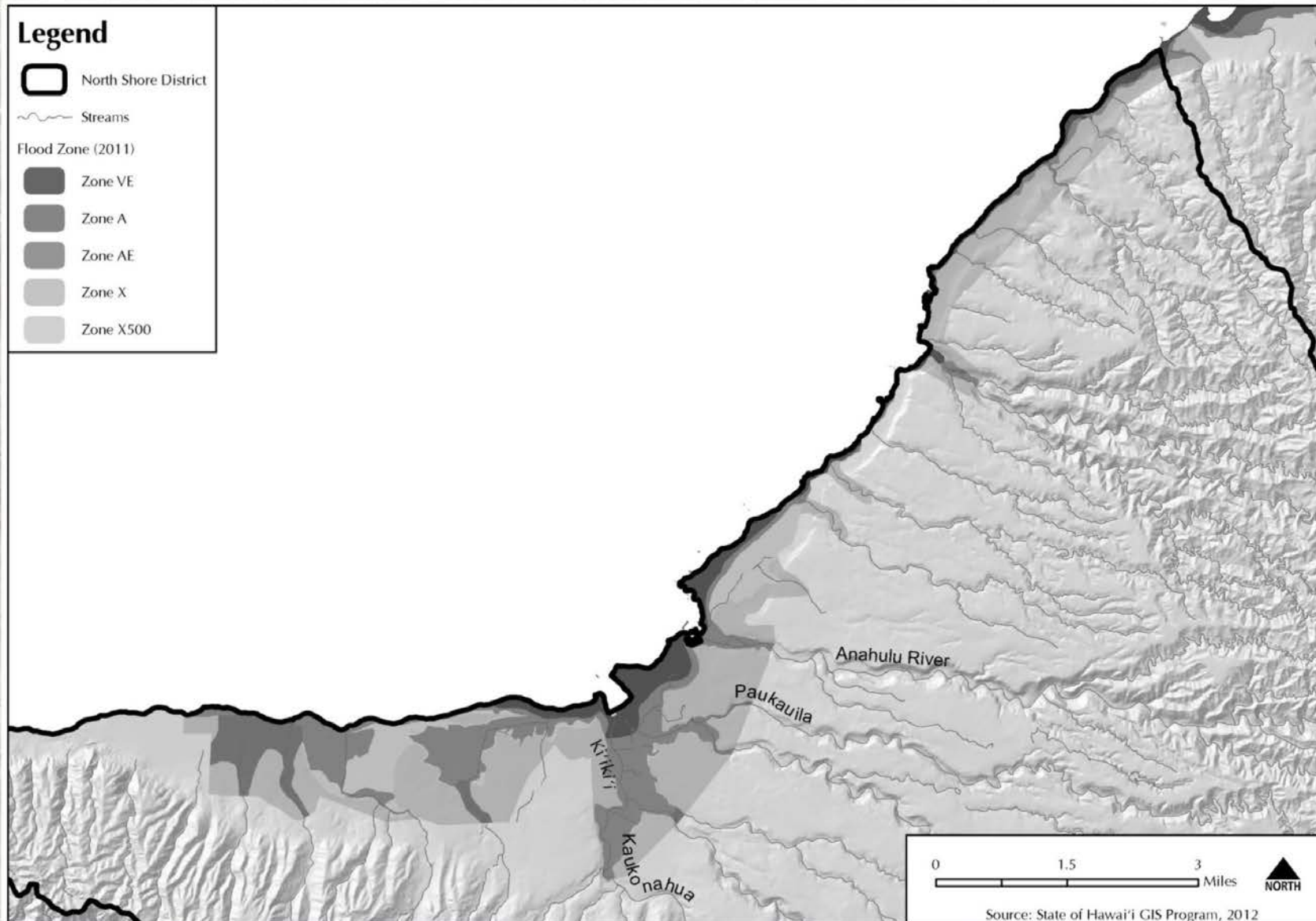
Potential Issues - Groundwater also has the potential for contamination from cesspools. Cesspools do not provide much, if any, treatment of wastewater prior to it flowing into the surrounding ground. Contaminants typically found in wastewater can migrate to the groundwater where they can find their way to streams and shorelines, posing potential health risks to terrestrial and aquatic environments, and human populations as well. However, environmental sampling and analysis data on soil and water in the North Shore region are very scarce. This slide shows the BWS and DOH demarcation lines where disposal of wastewater is allowed, separating it from our drinking water supply.





The North Shore wetlands are home to endangered water birds, including the alae ula, koloa, a'eo, alae keokeo, auku'u, and an occasional pueo.

Flooding



And now a closer look at flooding, here we see how the streams come together and create these flood zones, concentrated in Waialua and Haleiwa, and some areas in Mokuleia.





These are some pictures from the 2008 flood.

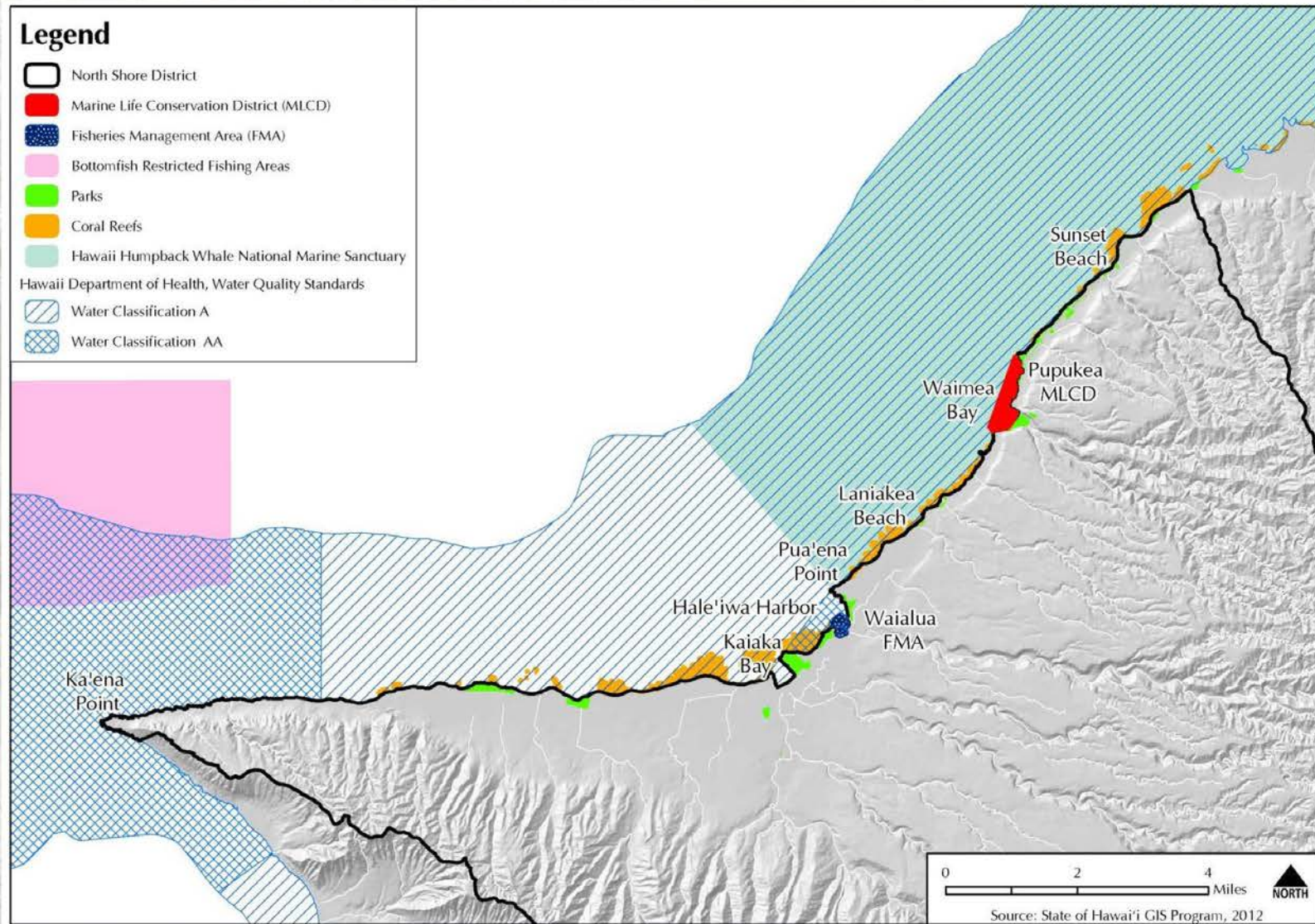
Surface Water Quality



This slide shows the Wahiawa Wastewater Treatment Plant (WWTP), which disposes its effluent into Lake Wilson. This is considered R-2 water. The waters from Lake Wilson are what feed the Wahiawa Irrigation System. R-2 waters can be used for irrigating crops where it doesn't touch the part we eat, such as tree crops like papaya or coffee. The WWTP is currently undergoing renovations so that the water will be considered R-1. R-1 water can then be used on vegetable crops.



Nearshore Resources



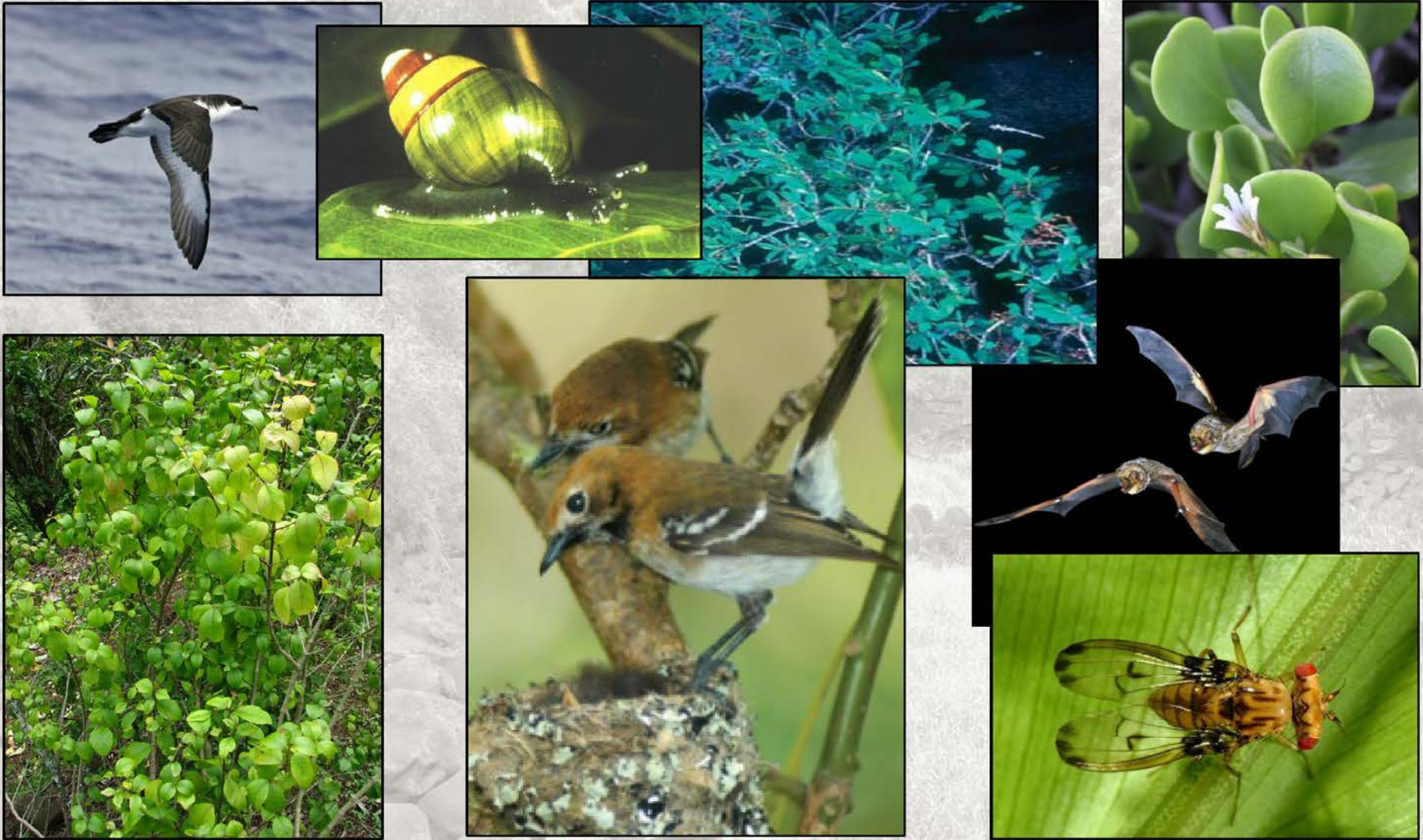
Three major embayments make up the nearshore waters of North Shore: Waimea Bay, Waialua Bay, and Kaiaka Bay. Marine Waters Class A are for recreational purposes and aesthetic enjoyment, and Class AA shall remain in their natural pristine state as nearly as possible. The Department of Land and Natural Resources recognizes the importance of the Pupukea Marine Life Conservation District (MLCD) as a center for marine recreation, conservation, and fishery replenishment. However, fish stocks appear to be depleted at the MLCD because of virtually unrestricted fishing activity. There is also a Fisheries Management Area in Waialua Bay. Off the coast of Kaena Point is a Bottomfish Restricted Fishing area that restricts fishing for seven bottomfish species known as the Deep 7. The corals along the shore could be impacted by sediment and cesspools, but this shore is also heavily impacted by high waves and storms, so these are not your lush coral reefs but more characterized by a limestone pavement consisting of fossilized coral. Studies indicate that the reef was alive about 5,000 years ago, about the time researchers think an extraordinary, large swell associated with strong El Niño years began hitting the Hawaiian Islands. The most recent large wave event occurred in 1998, wiping out all of the corals and resetting the age of the reef back 5,000 years.





Here you can see many species of beautiful marine life off the coast of the North Shore.

Terrestrial Endangered Species



The North Shore is home to many threatened and endangered species. The three natural areas reserves on Oahu are all within the North Shore district, and the State is participating in management activities such as fencing and weeding.



Ecosystem Threats



Water Infrastructure



Although we will be discussing water infrastructure more in the next meeting, I wanted to touch base on it here because it is an identified issue.

The North Shore has an amazing irrigation system supplying water for agricultural needs. There is some concern about the condition of the irrigation system and its ability to transport the needed water to farmers. However, Dole and Kamehameha Schools have invested millions of dollars in the repair and maintenance of these systems.

E I show this next picture due to the concerns related to private water companies. In addition to BWS, there are private water companies that
V would like to turn over their systems to BWS, but the systems will not be accepted until the necessary repairs have been made. There is also concern regarding enough water pressure and the installation of fire hydrants in Mokuleia.



North Shore History

900
Hawaiians
settle in
Anahulu and
Waimea
Valley

1800s
Sandalwood
trade causes
many taro
lo'i to
become
fallow

1840s
Cattle
grazing
causes
destruction
to sweet
potato fields
and taro lo'i

1859
Whaling
industry
reaches its
peak



1779
Captain
Cook's ship
arrives in
Waimea
after his
death on
Hawai'i
Island

1832
Protestant
Missionaries
settle in
Waialua

1850
First road
built from
Honolulu to
Waialua



North Shore History

Late 1800s
Chinese immigrants cultivate rice where taro once grew

1899
Waialua Agricultural Co. harvests first crop of sugarcane and Hale'iwa Hotel opens

1952
OR&L Railroad closes

1996
Waialua Sugar Company closes

1897 / 1898
Dillingham purchases over 10,000 acres of land and OR&L Railroad connects Honolulu to Waialua

1900-1911
Irrigation ditches built

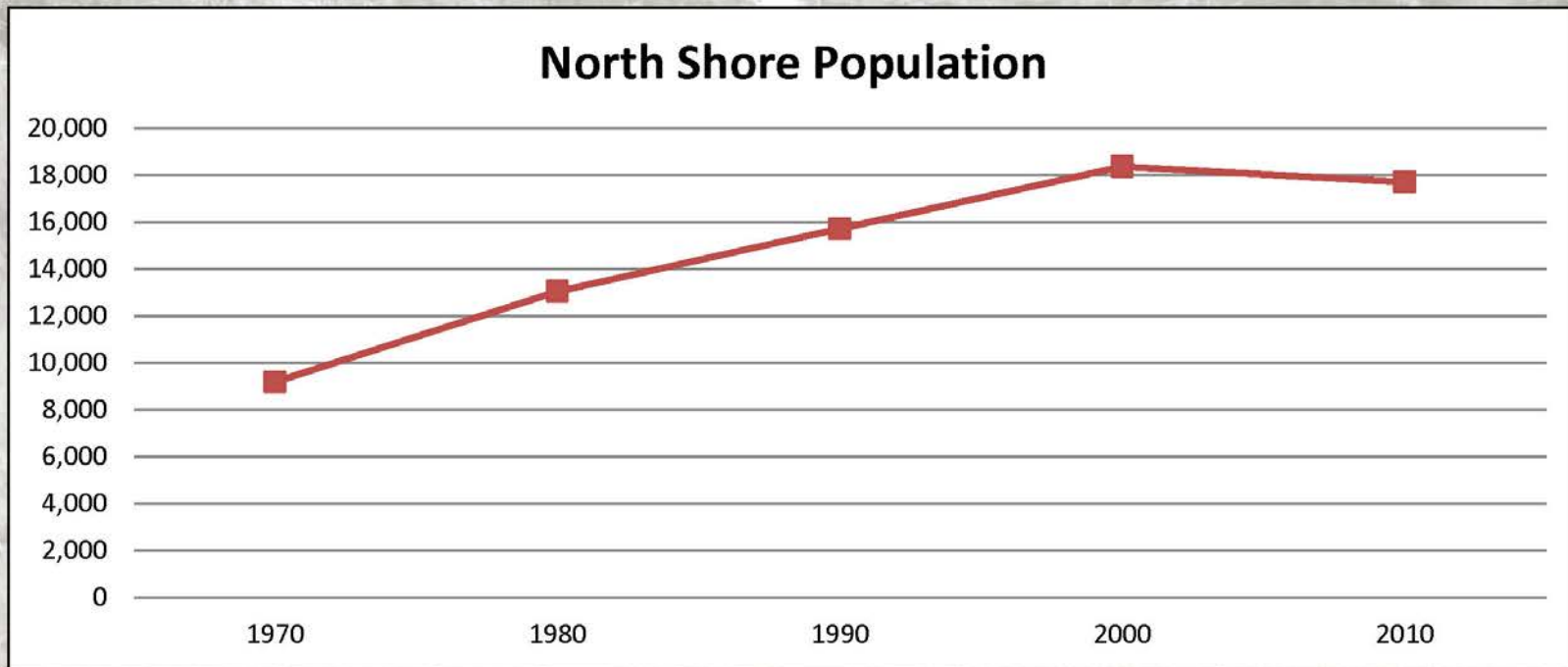
1966
Hale'iwa Harbor completed

2004
Del Monte ceases pineapple operations in Poamoho



Demographics

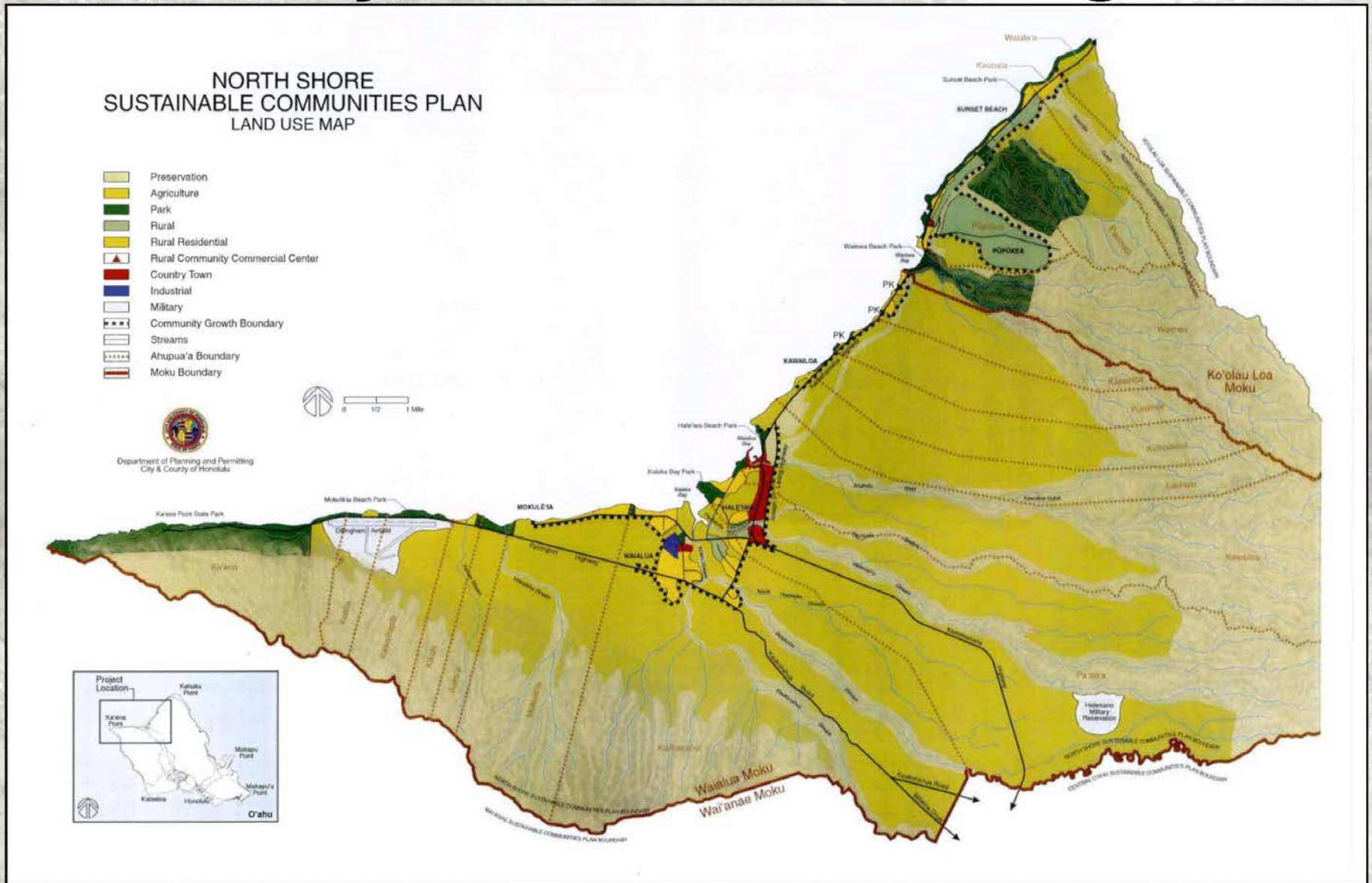
	ACTUAL POPULATION				
	1970	1980	1990	2000	2010
North Shore	9,200	13,061	15,729	18,380	17,720
O'ahu	630,528	762,565	836,231	876,156	953,207
% of O'ahu	1.5%	1.7%	1.9%	2.1%	1.9%



Over the years, the population in the North Shore has continued to increase. There was a slight decrease from 2000 to 2010, but projections show that it will continue to increase. Again this will be covered more in the next meeting, but the population forecast shows that the population will remain at 1.9% of Oahu's population.



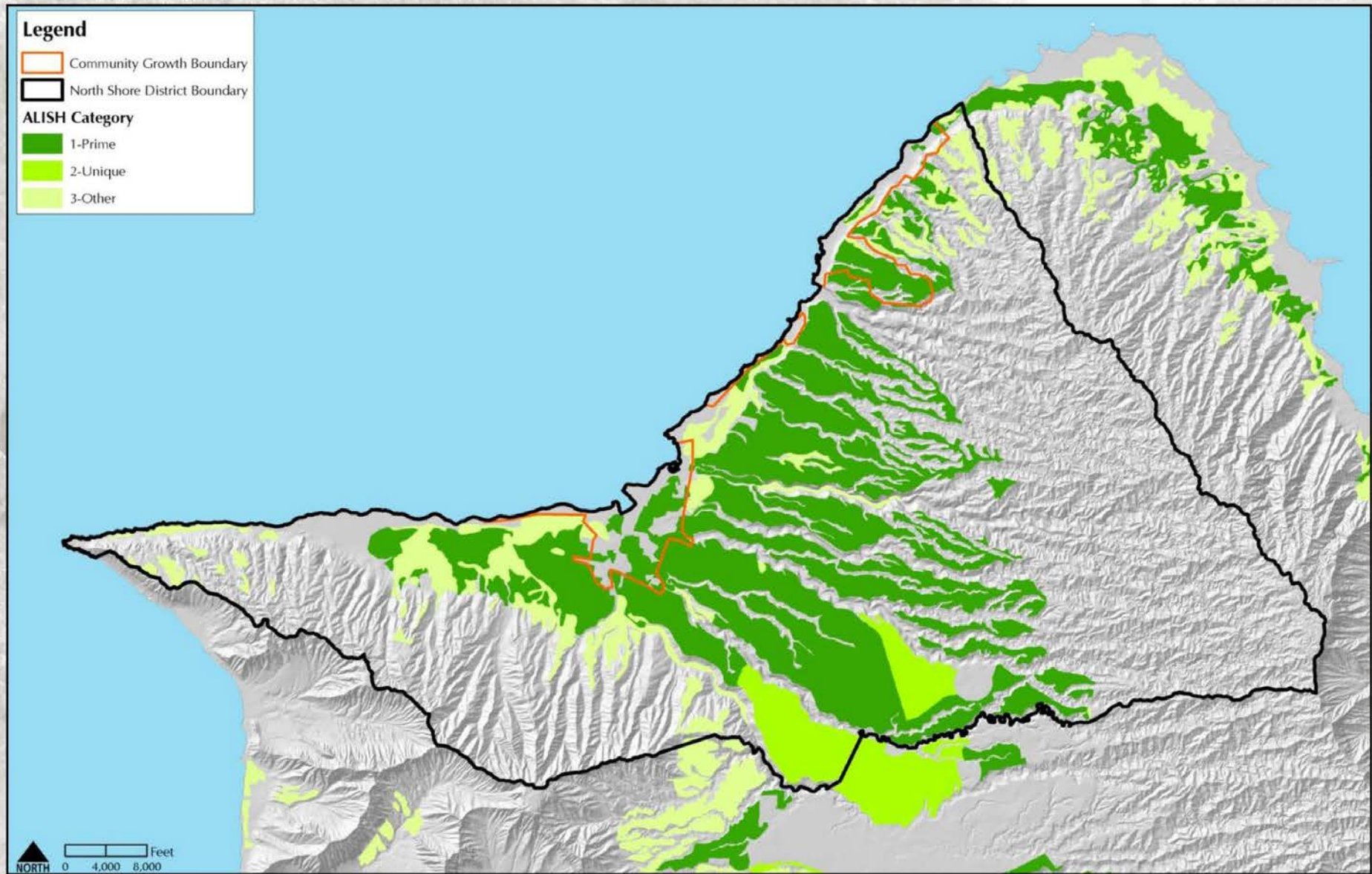
City Land Use Zoning



This map is from the Sustainable Communities Plan, and shows areas of military, agriculture, rural, country town, residential and industrial in Wai'alu. The dotted line shows the community growth boundary where development is directed.



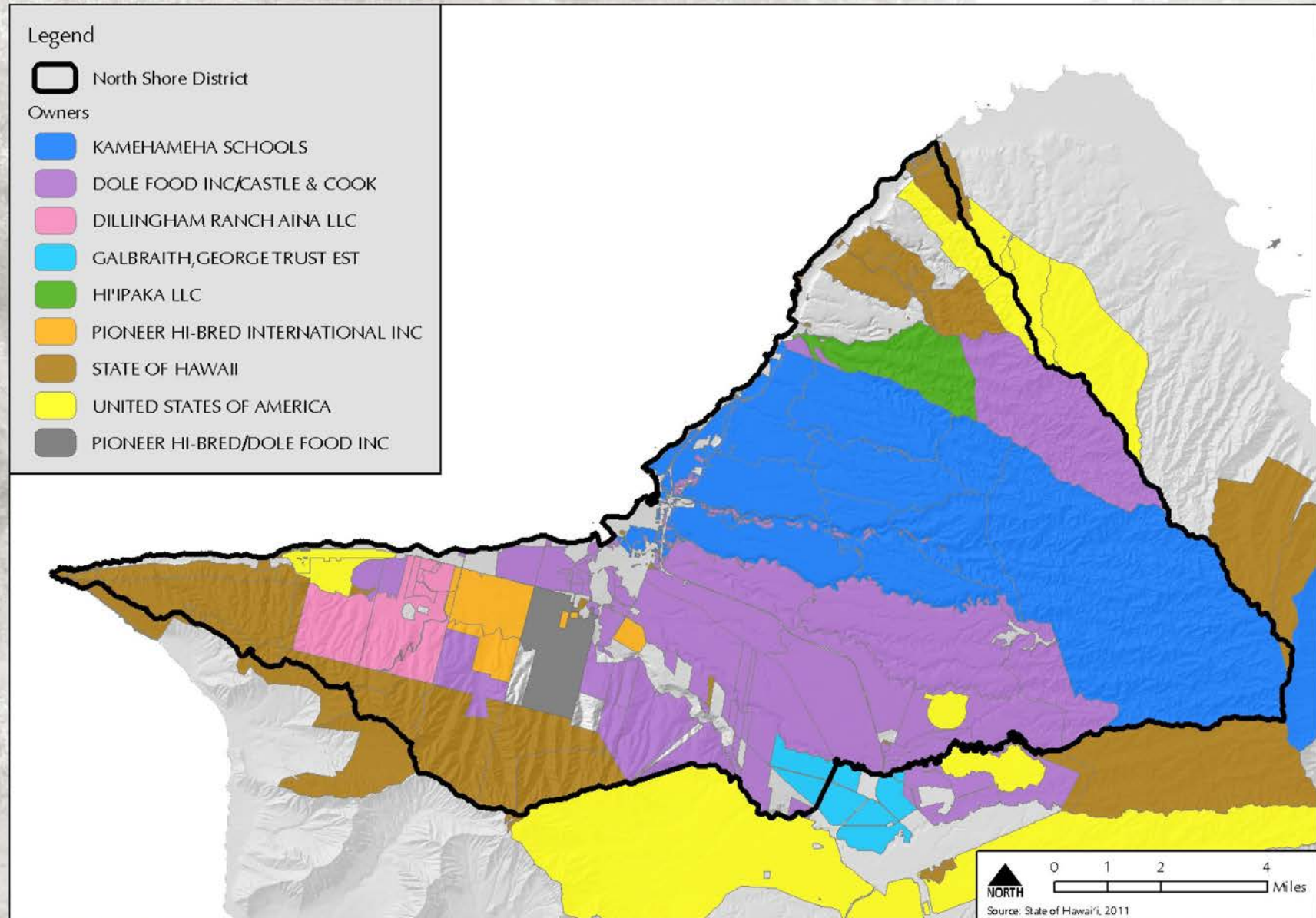
North Shore ALISH Lands



This slide shows the Agricultural Lands of Importance to the State of Hawaii. In general, the darker lands at one time were mostly in sugar production, and the neon green more in pineapple. Many of these lands are now in diversified agriculture or pasture. I wanted to touch on the effects of climate change here, which has a decisive effect on agriculture. Storms and droughts are becoming more intense, either flooding crops and leading to rot, or increasing pressure to use groundwater vs. surface irrigation water. These are issues we need to consider when determining water demand.



Large Landowners



For your reference, this is a map of the major landowners in the North Shore.

Preliminary Issues

- Adequate water for future agricultural needs?
- Effects of agricultural practices and cesspools on water quality
- Potential for improved water quality of Wahiaiwā Reservoir (R-2 to R-1)
- Flooding in Waialua and Hale'iwa
- Effects from Erosion / Sedimentation
- Watershed Protection / Invasive Species Control
- Potential climate change impacts
- State of water infrastructure
 - Wahiaiwā Irrigation System
 - Private water systems



Example Project Pages

CHAPTER 4: PLAN OBJECTIVES, WATER SUPPLY AND WATERSHED MANAGEMENT PROJECTS AND STRATEGIES

PROJECT #34: Waimānalo Waste Water Treatment Plant Recycled Water Reuse

Project Location: Waimānalo

Project Champion: ENV

Project Partners: USACE, DLNR, DOA, DOH

Project Background: The Waimānalo Waste Water Treatment Plant (WWTP) currently treats its waste water to an R-2 level of water quality and disposes the treated waste water via injection wells. The existing WWTP has a capacity of 1.1 mgd. Its current average flow is 0.7 mgd.

The idea of utilizing recycled water from the Waimānalo WWTP for irrigation was first proposed in the 1980 NRCS "Waimānalo Watershed Plan and EIS." Recycled water reuse from the Waimānalo WWTP was also mentioned as a recommendation in the 1999 "Waimānalo Wastewater Facilities Plan" and 2006 "BWS Island-wide Non-potable Water Master Plan." Potential demand for non-potable water from the Waimānalo WWTP would come from: DOA farm lots, Olomana Golf Course, Waimānalo Polo Field, Waimānalo Beach Park, Waimānalo Bay State Recreation Area, Waimānalo District Park, Hawai'i Job Corps, National Guard Armory, and the WWTP itself.

KPWMP Objectives Project Addresses:

- Objective #1: Promote sustainable watersheds
- Objective #5: Meet future water demands at reasonable costs



Waimānalo WWTP facility

KO'OLAU POKO WATERSHED MANAGEMENT PLAN – PUBLIC REVIEW DRAFT

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CHAPTER 4: PLAN OBJECTIVES, WATER SUPPLY AND WATERSHED MANAGEMENT PROJECTS AND STRATEGIES

Project Goals:

- Conserve potable water resources by utilizing recycled non-potable water for irrigation and other appropriate non-potable water uses
- Reduce hydraulic loading of the WWTP injection wells and nutrient loading on near shore waters

Project Desired Outcomes:

- A new reliable source of non-potable water for non-potable water uses has been developed
- The amount of waste water being disposed of via injection wells has decreased

Project Status: Ownership of the Waimānalo WWTP is still in the process of being transferred to ENV from DLNR. The transfer of ownership should be completed within the next year.

ENV and the USACE are jointly funding a \$300,000 planning study (\$150,000 federal funds and \$150,000 City funds) to address full R-1 compliance. Some of the considerations that the study will look at include UV disinfection, increasing existing storage capacity for recycled water, and an EIS update. In 2006, BWS completed its "Island-wide Non-Potable Water Master Plan". Part of the 2006 BWS plan estimated the potential cost for various non-potable water supply projects on O'ahu. The Waimānalo WWTP was identified in the plan as a potential future source of non-potable water supply. The plan estimated the cost to upgrade the WWTP and construct a distribution system at \$4.5 million.

Also as a part of the ENV and USACE planning study, a market use survey will be conducted to better gauge potential customer acceptance of utilizing R-1 recycled water. In the past, DOA investigated the possibility of integrating recycled water into its system. The previous DOA proposal received strong concerns from Waimānalo farmers. The farmers fear that their sales may diminish if they begin using recycled water to grow their crops as potential customers such as restaurants or stores may have a negative perception of crops that are irrigated with recycled wastewater. The study is expected to begin in December 2010 and take one year to complete.

References: 2006 Honolulu Board of Water Supply Island-wide Non-potable Water Master Plan O'ahu, Hawai'i; personal communications with ENV and USACE staff

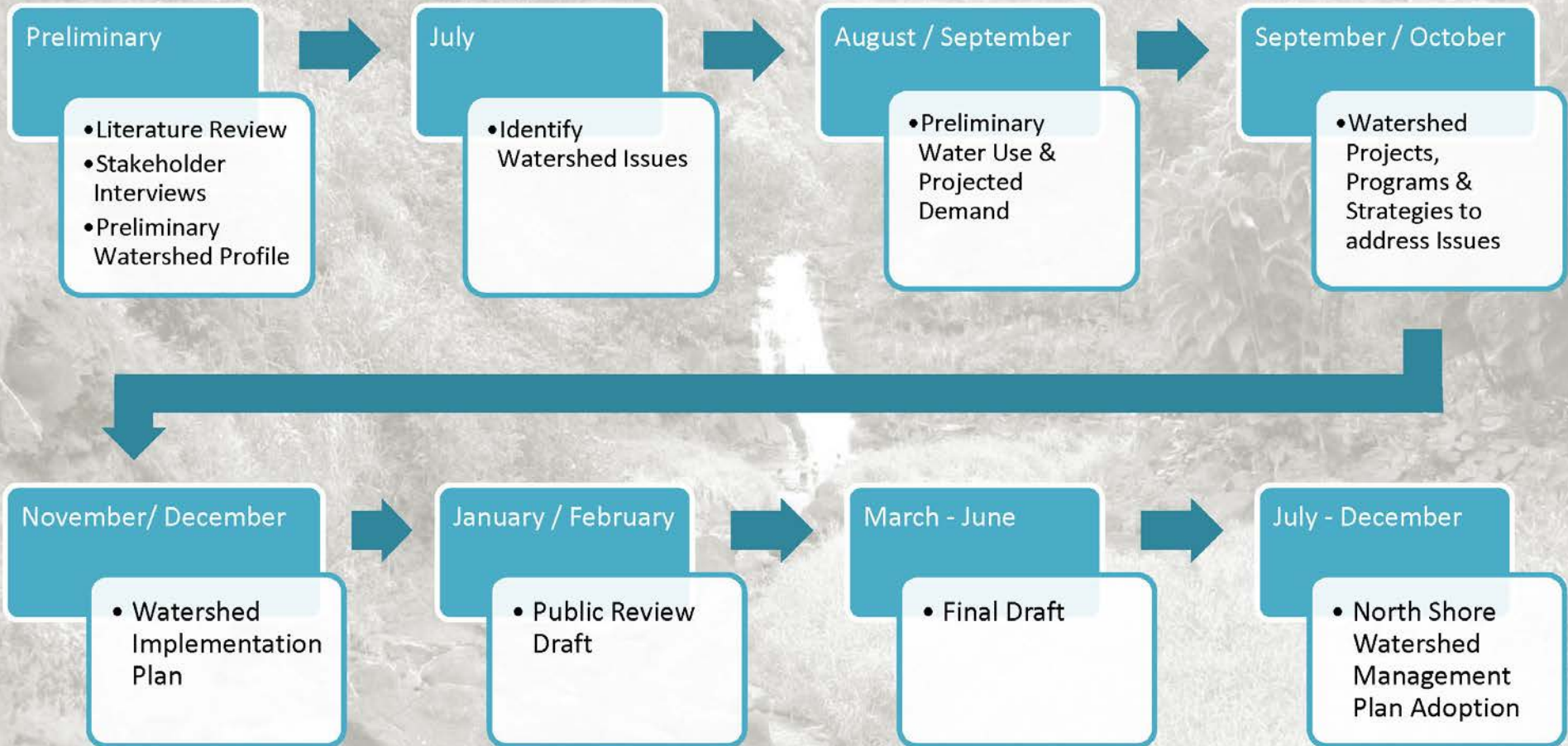
KO'OLAU POKO WATERSHED MANAGEMENT PLAN – PUBLIC REVIEW DRAFT

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This is an example of what a project will look like to address these issues. We will give the project a heading, identify the location, and determine if there is a project champion or lead, and any partners. We'll discuss background on the project, and identify goals and outcomes. We'll also identify the current status of the project, and of most concern, how much it is going to cost and possible places to find funding.



Next Steps



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MAHALO

