Oahu Water Management Plan Update

3rd Annual Joint Government Water Conference

"Implementing Hawaii Water Plans"

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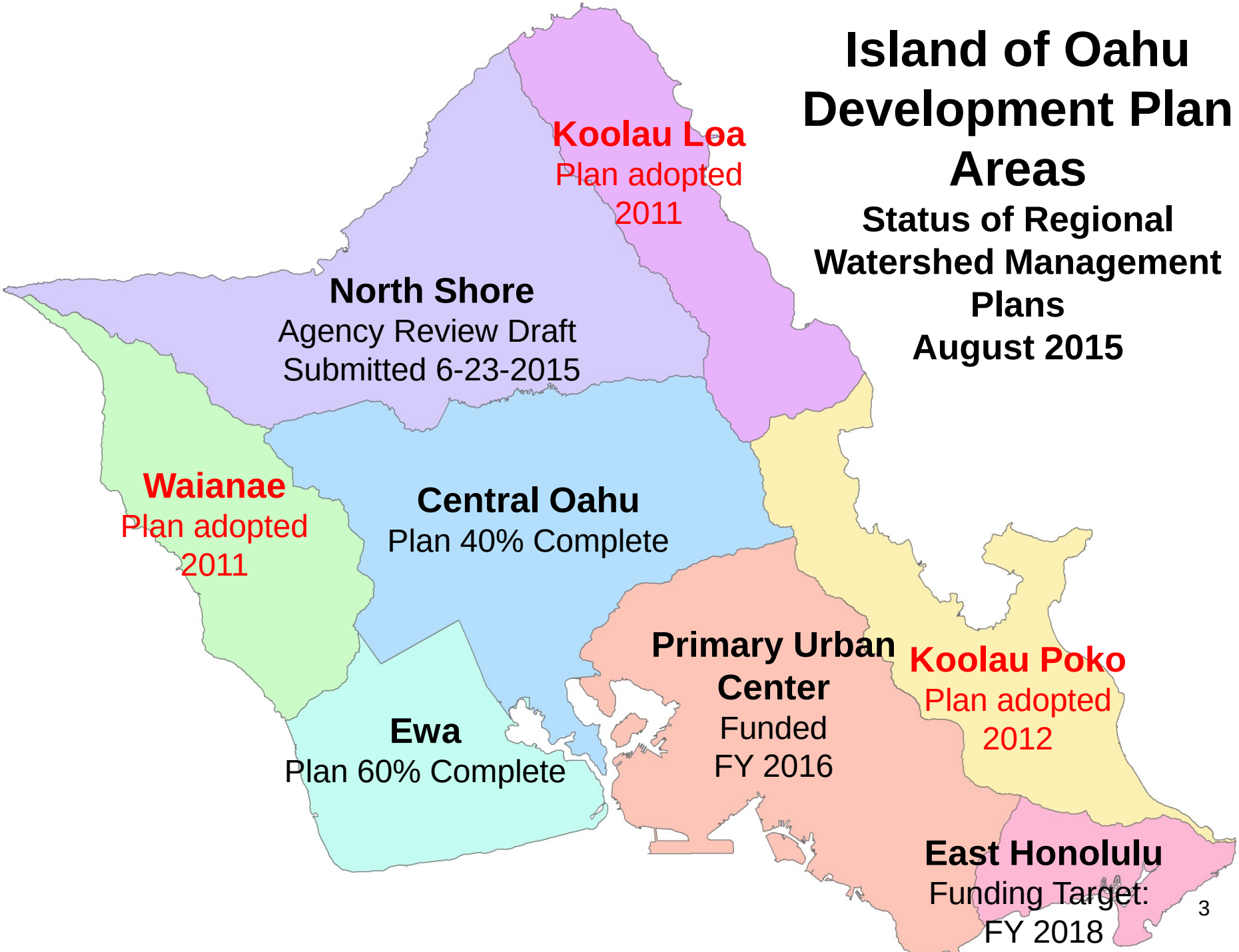
Honolulu Board of Water Supply

Presentation Outline

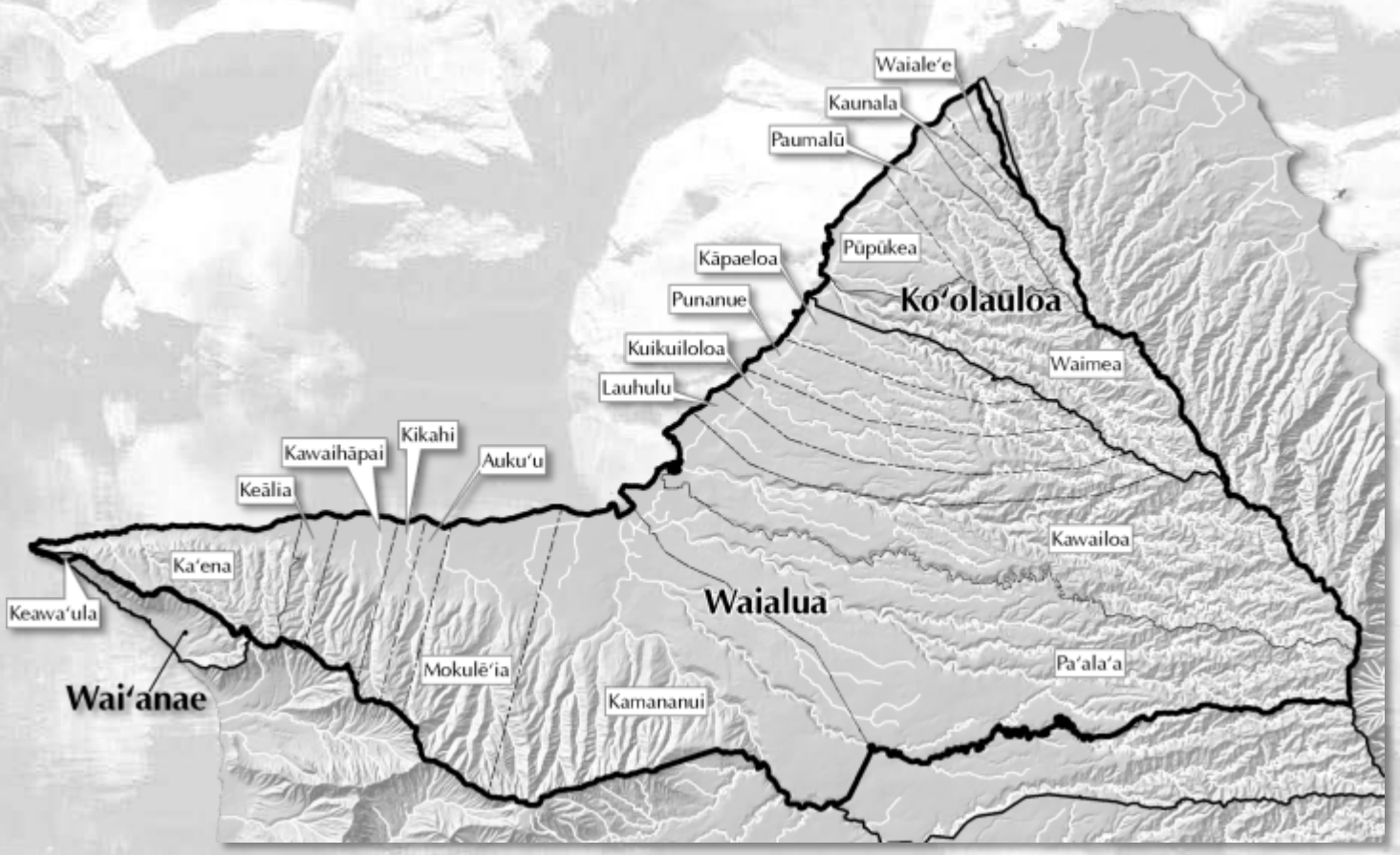
- Oahu Water Management Plan Status
- North Shore Watershed Management Plan
  - Supply and Demand
  - Priority Watersheds and Catalyst Projects that Drive Implementation

Island of Oahu Development Plan Areas

Status of Regional Watershed Management Plans August 2015



North Shore Watershed Management Plan Project Area



North Shore Sustainable Plan Area

Applicable North Shore Sustainable Communities 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

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3. Water Use and Projected Demand
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5. Implementation

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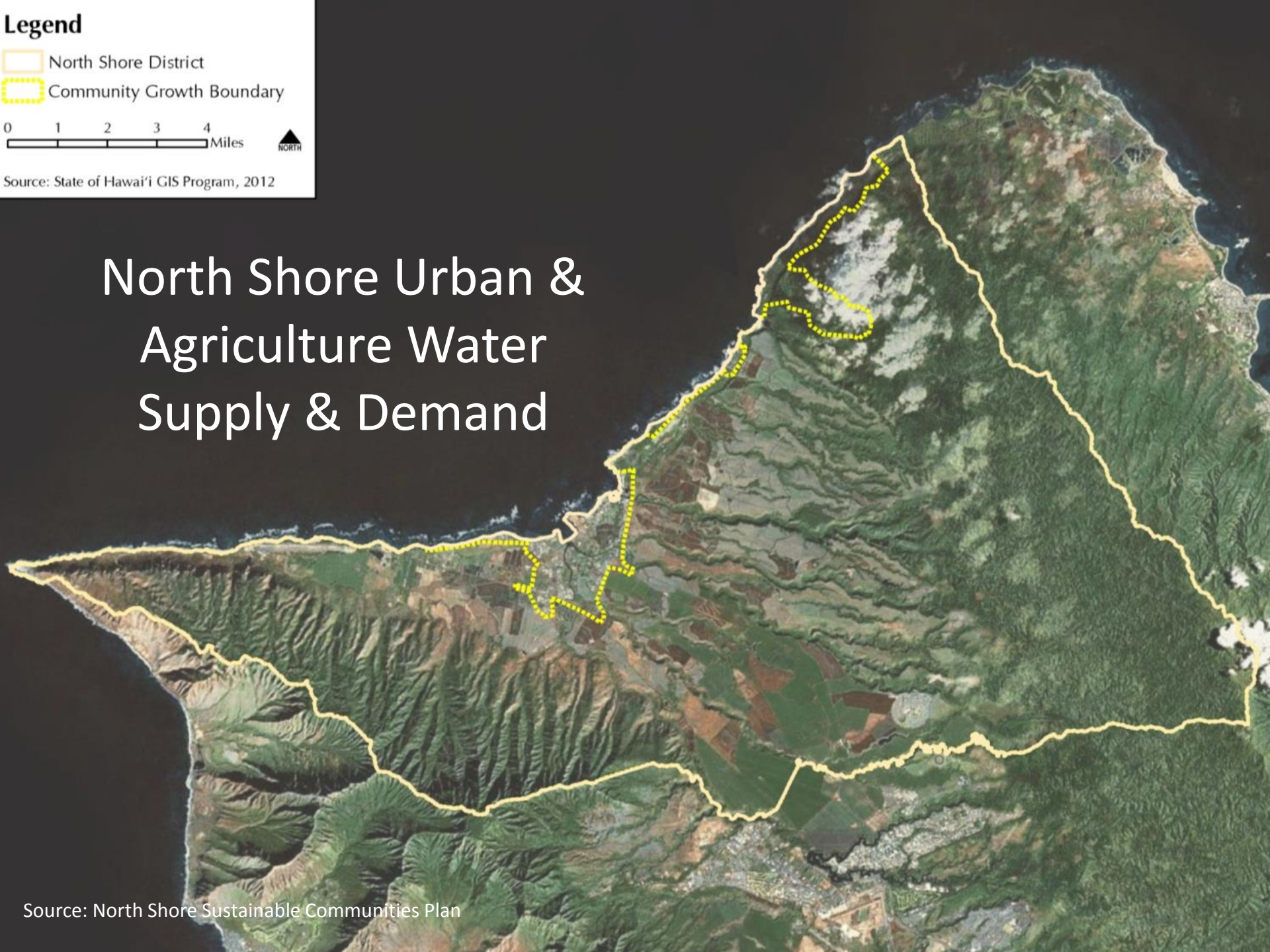
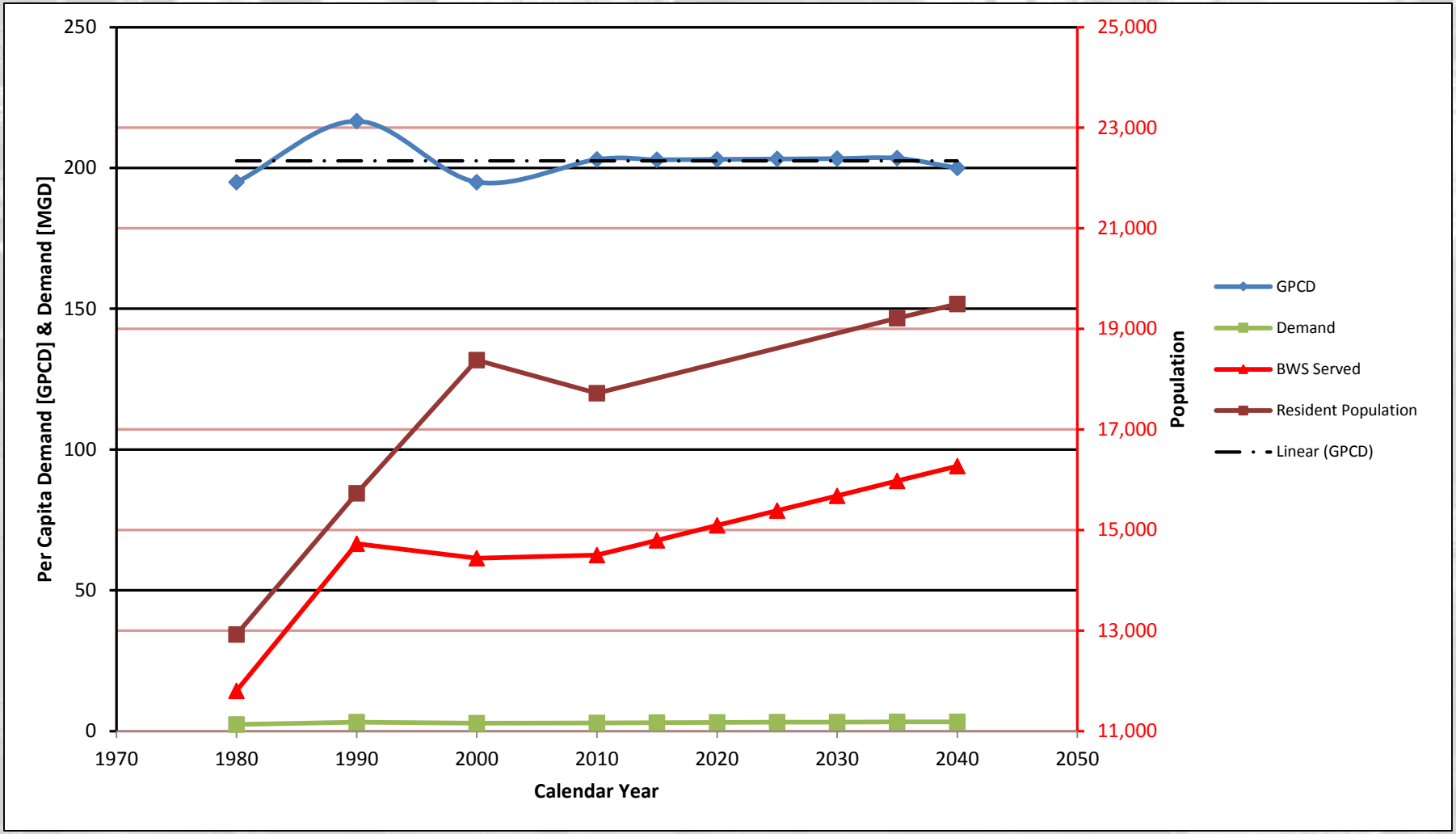
C. O`ahu Water Use Permit Index
D. Overview of O`ahu Hydrogeology
E. Water Use and Demand – Methodology
F. BWS Wahiawa Irrigation System Survey
G. Neighborhood Board Endorsements



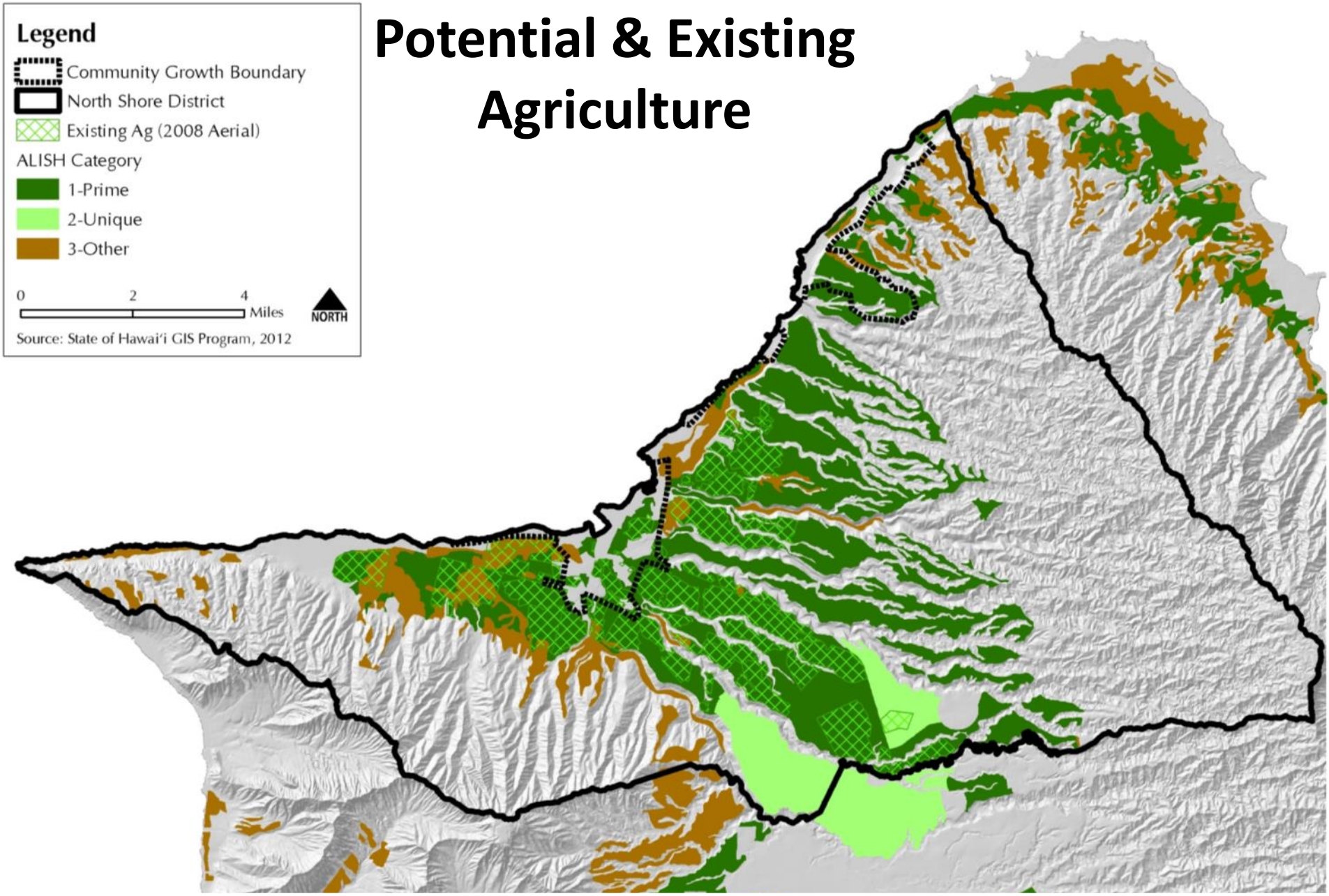
North Shore Urban & Agriculture Water Supply & Demand

Source: North Shore Sustainable Communities Plan

North Shore
BWS Gallons per Capita Day Trend

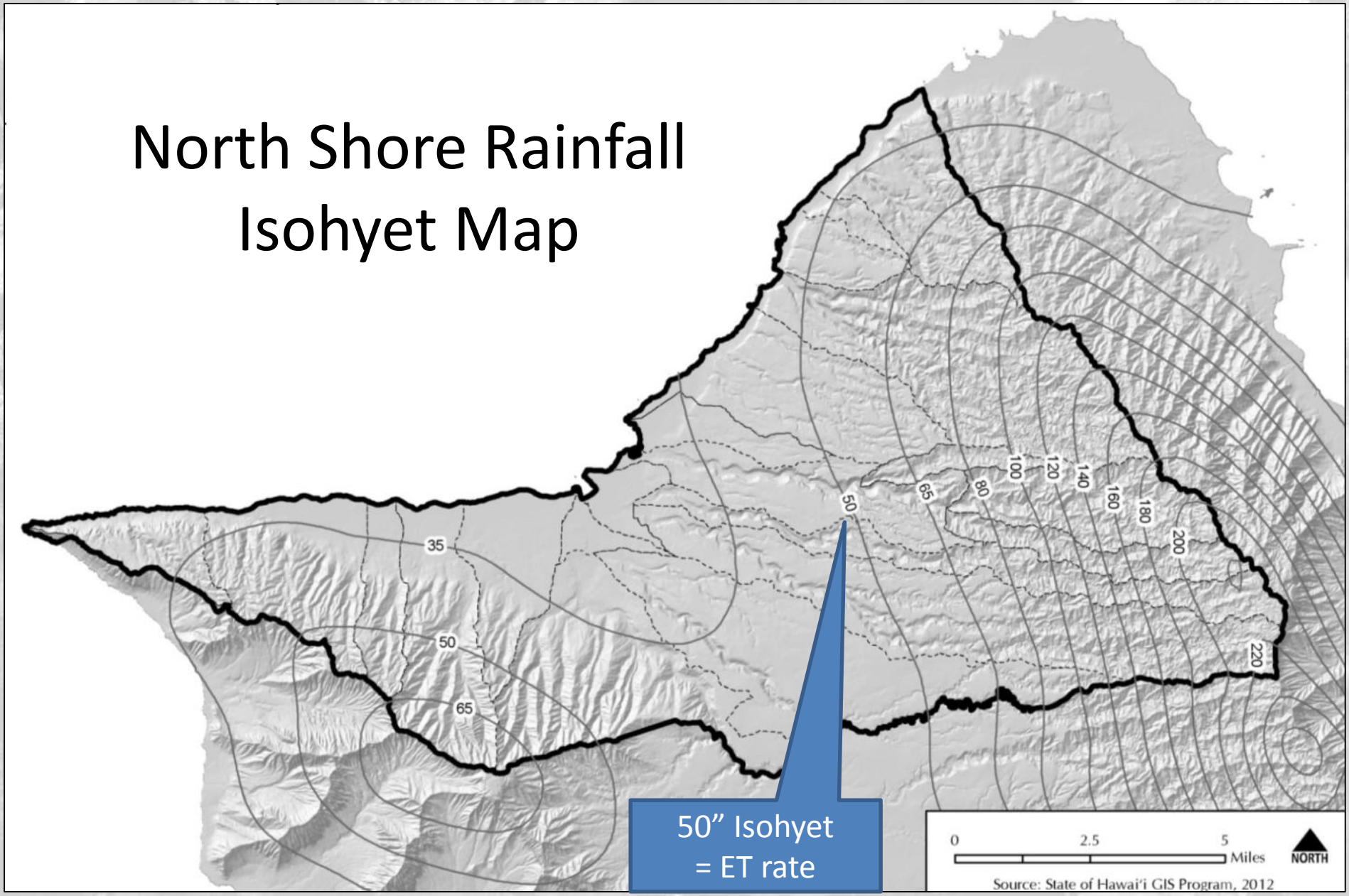


Potential & Existing Agriculture

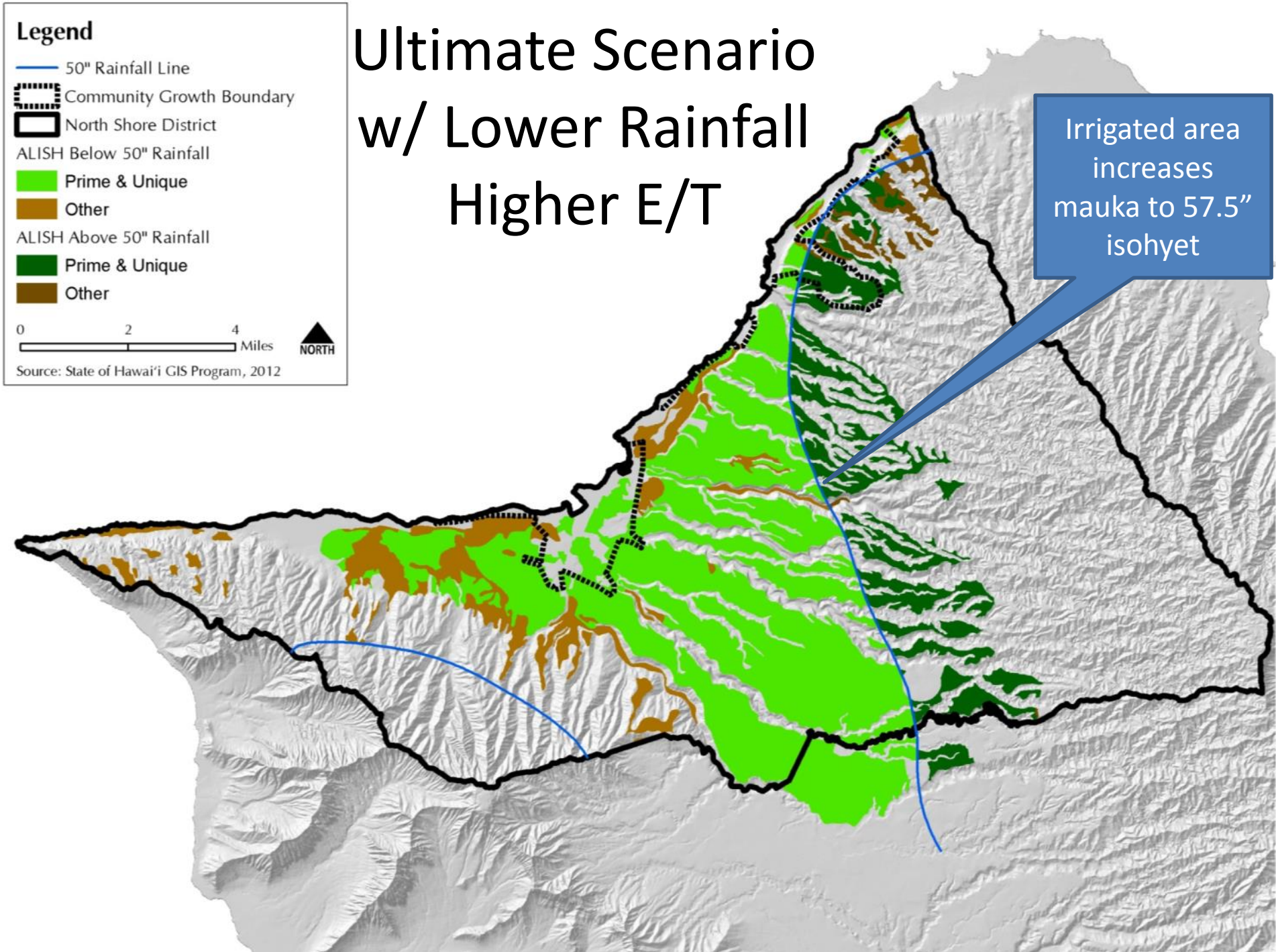


Agricultural Activity	Diversified Agriculture	Pineapple	Lo'i Kalo
Water Use Coefficient (gpad)	3,400	1,600	100,000

North Shore Rainfall Isohyet Map



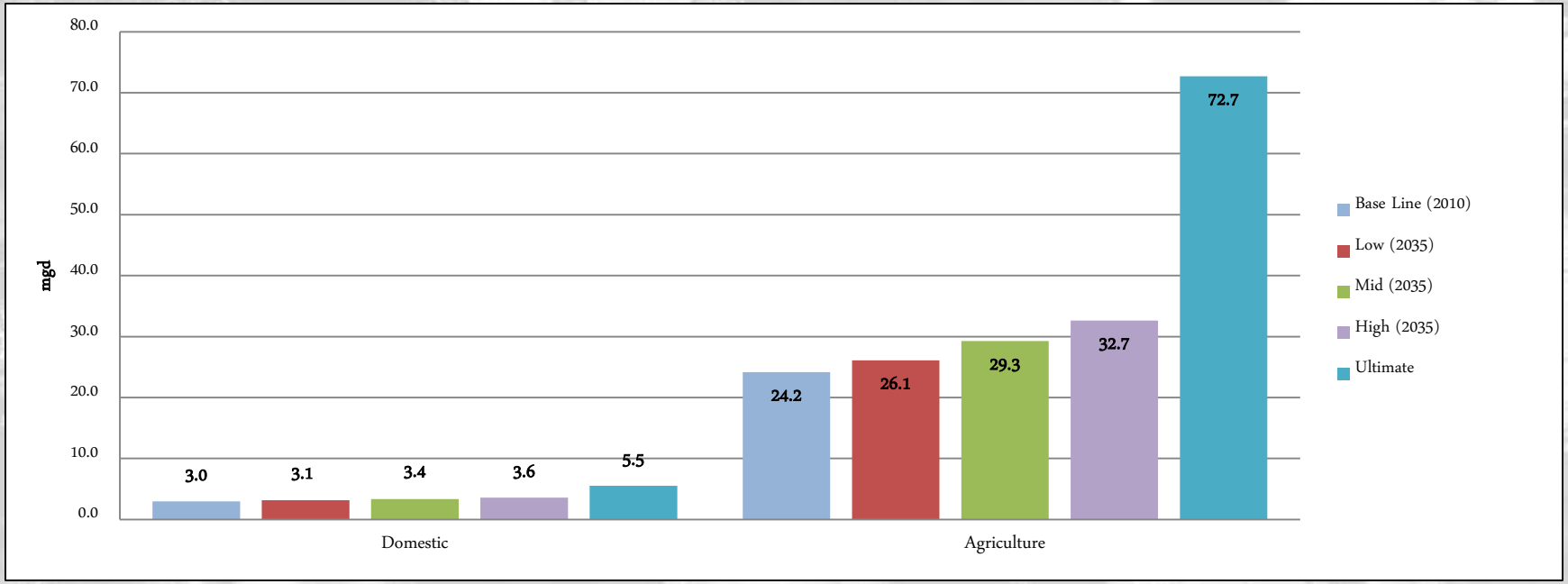
Ultimate Scenario w/ Lower Rainfall Higher E/T



North Shore Demand Projections Scenario Assumptions

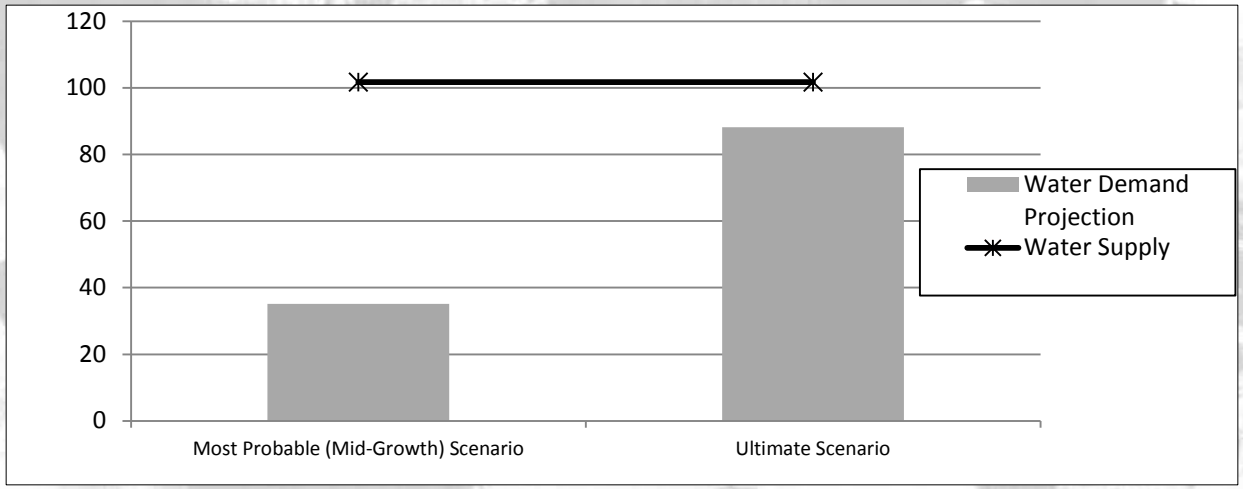
Water Use Sector	Baseline Data (2010)	2035 Growth Scenarios			Ultimate Growth Scenario
		Low-Growth	Mid-Growth Most Probable	High-Growth	
Domestic	17,720 persons	+900 persons less than DPP Policy Projections	+1,800 persons based on DPP Population Projections	+3,000 persons based on historic population trends	+ 800 acres is developed within the Community Growth Boundary
Diversified Agriculture	6,000 acres	+500 acres based on DPP ag jobs projections	+ 1,500 acres Based on Oahu Outlook (2011) report	+ 2,500 acres or 50% of ALISH lands outside of Community Growth Boundary	+ 13,200 acres
Pineapple	2,500 acres	2,500 acres Status quo	2,500 acres Status quo	2,500 acres Status quo	
Kalo	10 acres	10 acres Status quo	25 acres Modest expansion	45 acres Robust expansion	100 acres

Water Demand by Water System



Water System	2010 (mgd)	2035 (mgd)			Ultimate Scenario
		Low Scenario	Mid Scenario	High Scenario	
Domestic Water Systems					
Board of Water Supply	2.8	2.8	3.0	3.2	
Dole Foods	0.0	0.1	0.1	0.1	
North Shore Water Company	0.1	0.1	0.2	0.2	
Dillingham Airfield	0.1	0.1	0.1	0.1	
Total Domestic Water System	**3.0**	**3.1**	**3.4**	**3.6**	**5.5**
Agricultural System					
Total Agriculture	24.2	26.1	29.3	32.7	72.7
TOTAL	**27.2**	**29.2**	**32.6**	**36.2**	**78.2**

Ultimate Demand Scenario and Supply



ULTIMATE DEMAND (all units in mgd)	
Domestic	6
Agriculture	73
Kalo	10
TOTAL DEMAND	**89**
ULTIMATE SUPPLY (all units in mgd)	
Groundwater Sustainable Yields (Waialua, Kawailoa, Mokuleia aquifer systems)	62
Groundwater Permitted Uses (for North Shore wells in Wahiawa aquifer system)	5
Recycled Water (Wahiawā WWTP)	2
Surface Water (CWRM Diversion Listing)	33
TOTAL SUPPLY	**102**
Balance = Supply - Demand	**13**

North Shore Water Issues

- Adequate water for future agricultural needs
- Effects of agricultural practices & cesspools on water quality
- Improve Water Quality of Wahiawa Reservoir (R-2 to R-1)
- Flooding in Waialua and Hale'iwa
- Effects from Erosion / Sedimentation on Nearshore waters
- Watershed Protection / Invasive Species Control
- Sustain Historical & Native Hawaiian Practices
- Climate Change Impacts, Wildfires, Drought, Sea Level Rise
- Aging, Inefficient Water Infrastructure
  - Wahiawa Irrigation System
  - Private water systems

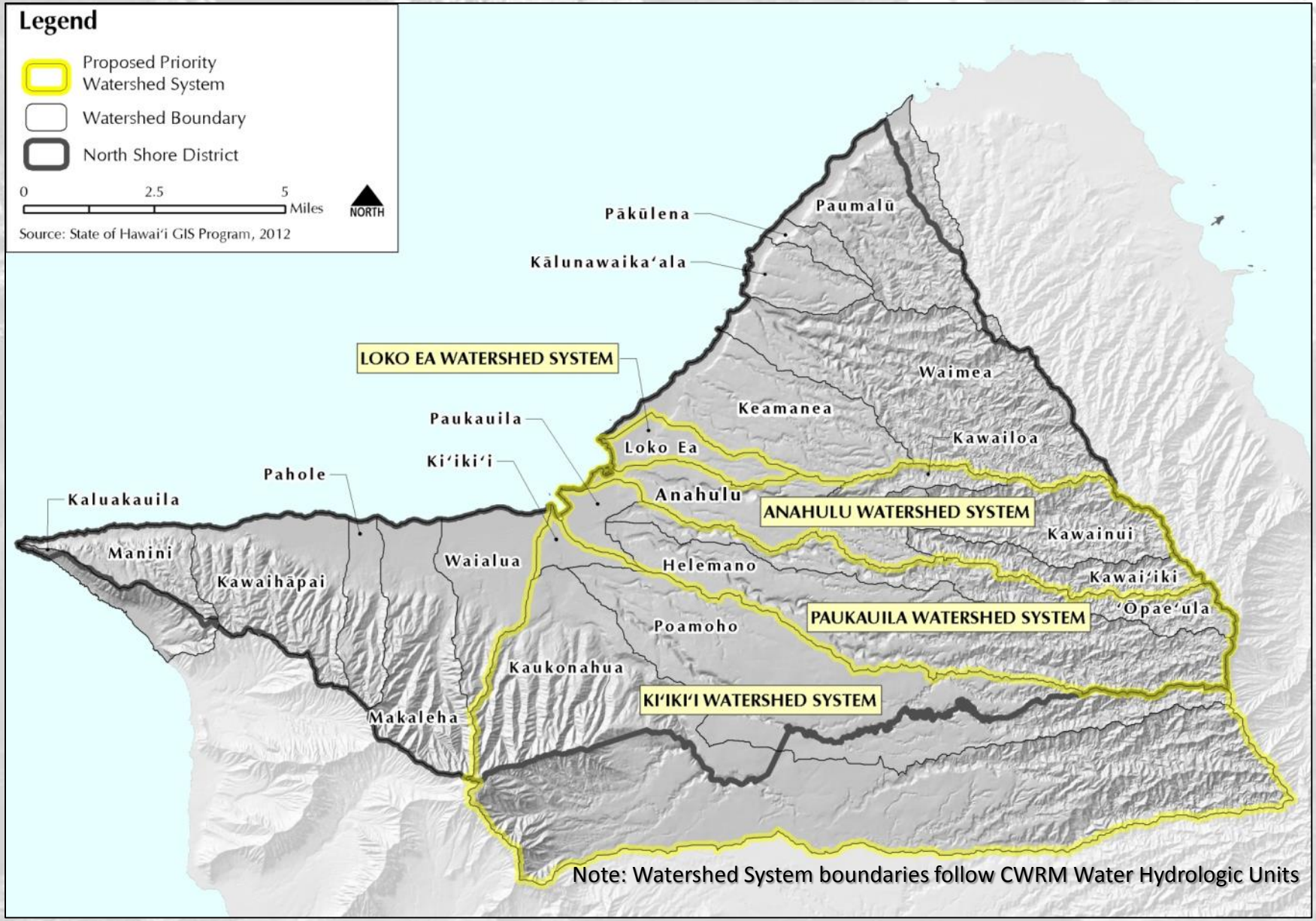
The Challenge of Plan Implementation

- To address each North Shore water issue the plan creates:
  - **14 Watershed Policies**: that support 5 plan objectives & reflect unique resources and needs of North Shore
  - **16 Watershed Projects w/ Champions**: to build upon real projects already being implemented
  - **15 Watershed Strategies**: important series of actions that have regional application, like drought mitigation or do not have a champion.
- The Plan Goal and Objectives are achieved if the above policies, projects and strategies are pursued

Priority Watersheds & Catalyst Projects

- Of the 21 watersheds in North Shore, **11 are considered priority watersheds** based on importance and threats and also provide a geographical focus
- Are especially aligned with the **5 Plan Objectives**
- **Catalyst projects** are key projects within a priority watershed that when implemented will provide guidance, connectivity, collaboration and drive for other projects and programs

Priority Watersheds



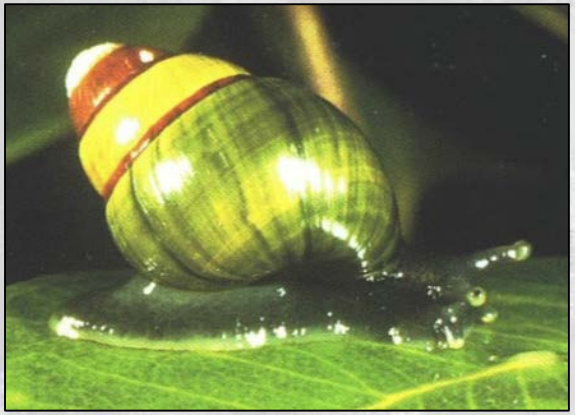
Note: Watershed System boundaries follow CWRM Water Hydrologic Units

Plan Objectives

1. Promote Sustainable Watersheds
2. Protect and Enhance Water Quality and 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

Objective 1: Promote Sustainable Watersheds

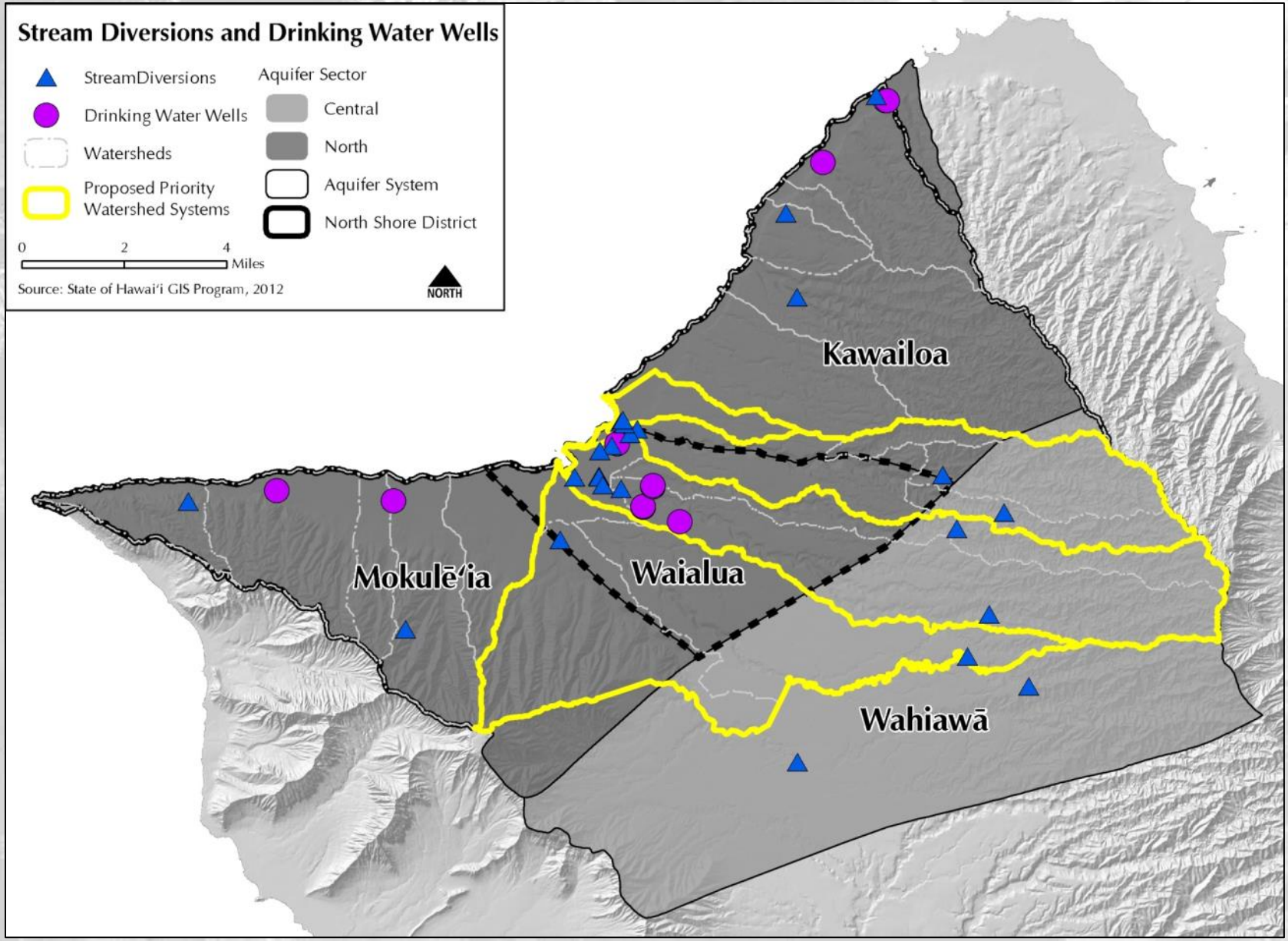
1. **Anahulu, Paukauila and Ki‘iki‘i watersheds are highly rated.** (*Atlas of Hawaiian Watersheds,* 2008)
2. **Anahulu River** is #4 in the O‘ahu **Potential Diverted Valuable Streams** (1998 *Multi-Attribute Prioritization of Streams Project*).
3. **Largest pig free enclosure** and **large areas of ‘Ōhi‘a** are in the priority watershed areas.



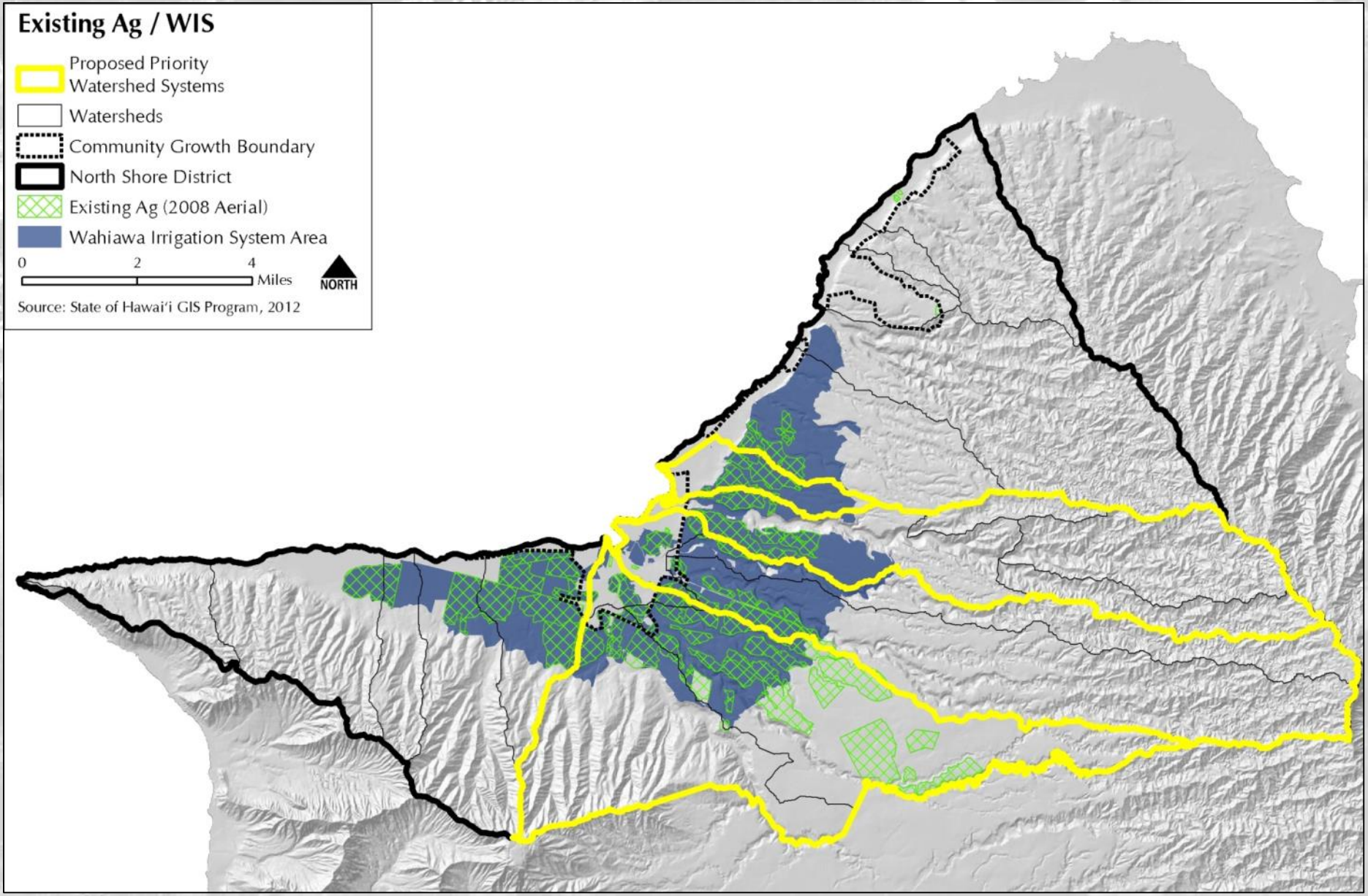
Objective 2: Protect and Enhance Water Quality and Quantity

- **Drinking water wells** in the **Waialua aquifer**
- **Surface water sources and diversions for agricultural irrigation**
- High priority for restoration due to **not meeting** (or threat of not meeting) **water quality standards.**
  (*Hawai'i Unified Watershed Assessment,* 1998 & the *2008/2010 State WQ Monitoring & Assessment,* 2012).

Drinking and Ag Irrigation Water Sources



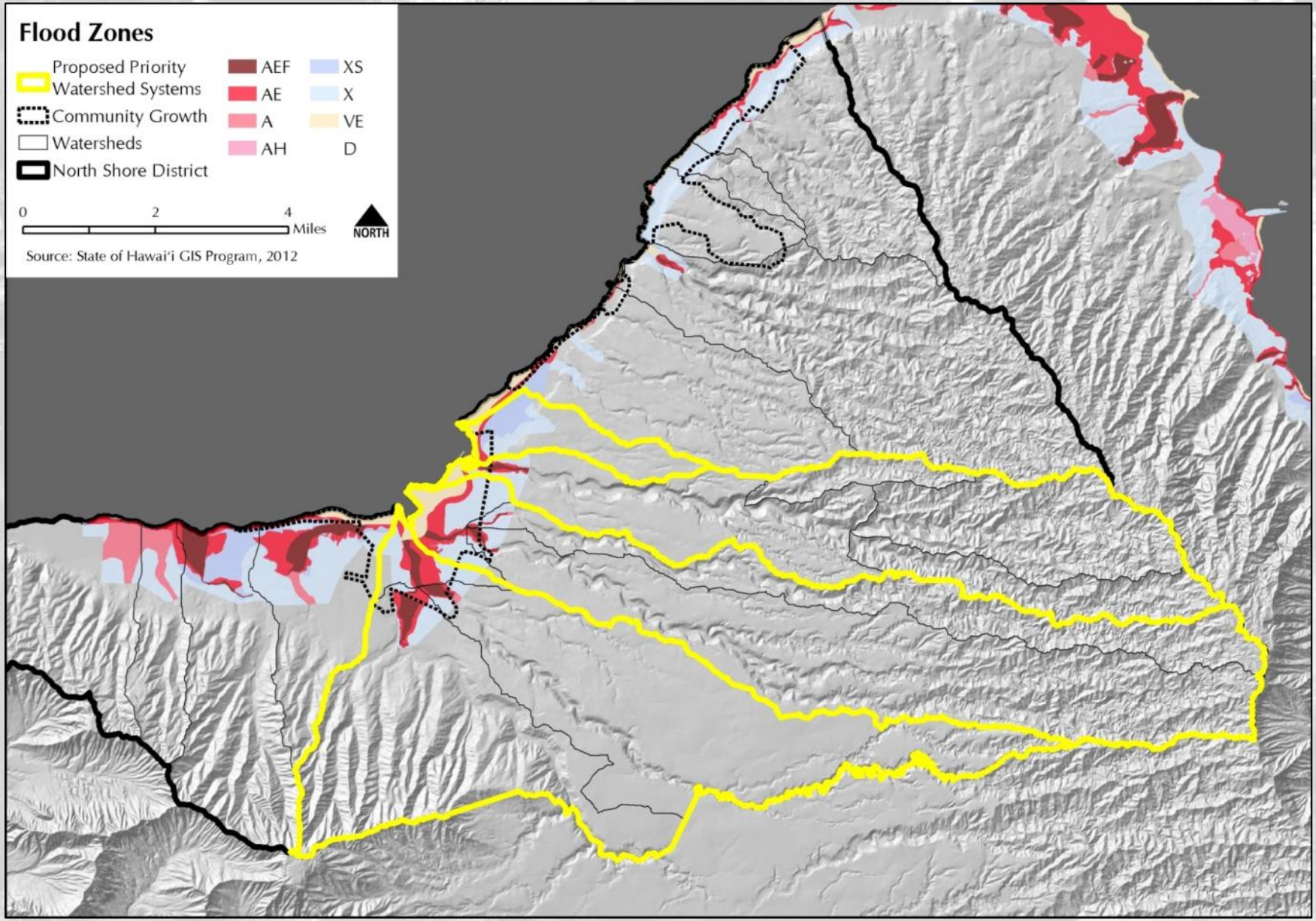
Ag & Potential Ag Areas



Objective 2: Protect and Enhance Water Quality and Quantity

- **Flooding-prone areas** with major population are included within the **Ki‘iki‘i** and **Paukauila** watersheds

Flood Zones


Flood Zones
Proposed Priority Watershed Systems
Community Growth
Watersheds
North Shore District
AEF
AE
A
AH
XS
X
VE
D
0
2
4
Miles
NORTH
Source: State of Hawai'i GIS Program, 2012

Objective 3: Protect Native Hawaiian Rights and Traditional & Cultural Practices

- **Anahulu watershed** is part of an **ancient system of sustenance** for large numbers of Native Hawaiians.
- **Loko Ea Fishpond** and **‘Uko‘a Marsh** were also **important cultural resources for food production**.

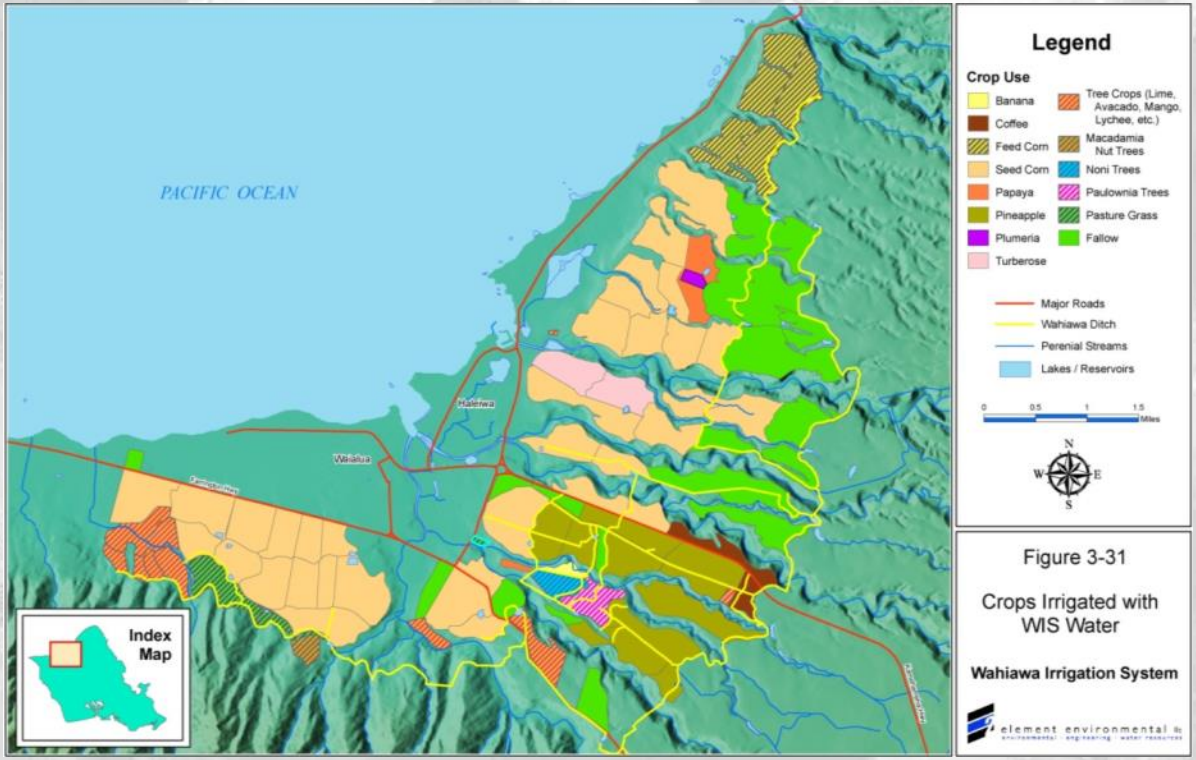
Objective 4: Facilitate Public Participation, Education & Project Implementation

- **Agricultural water system solutions** will need input from farmers and others.
- Securing **legislative funding for flood studies** will require community initiative.
- **Waialua–Kaiaka Plan** needs community champions.
- **Paukauila and Anahulu watersheds** need restoration and **have interested and capable stakeholders**.

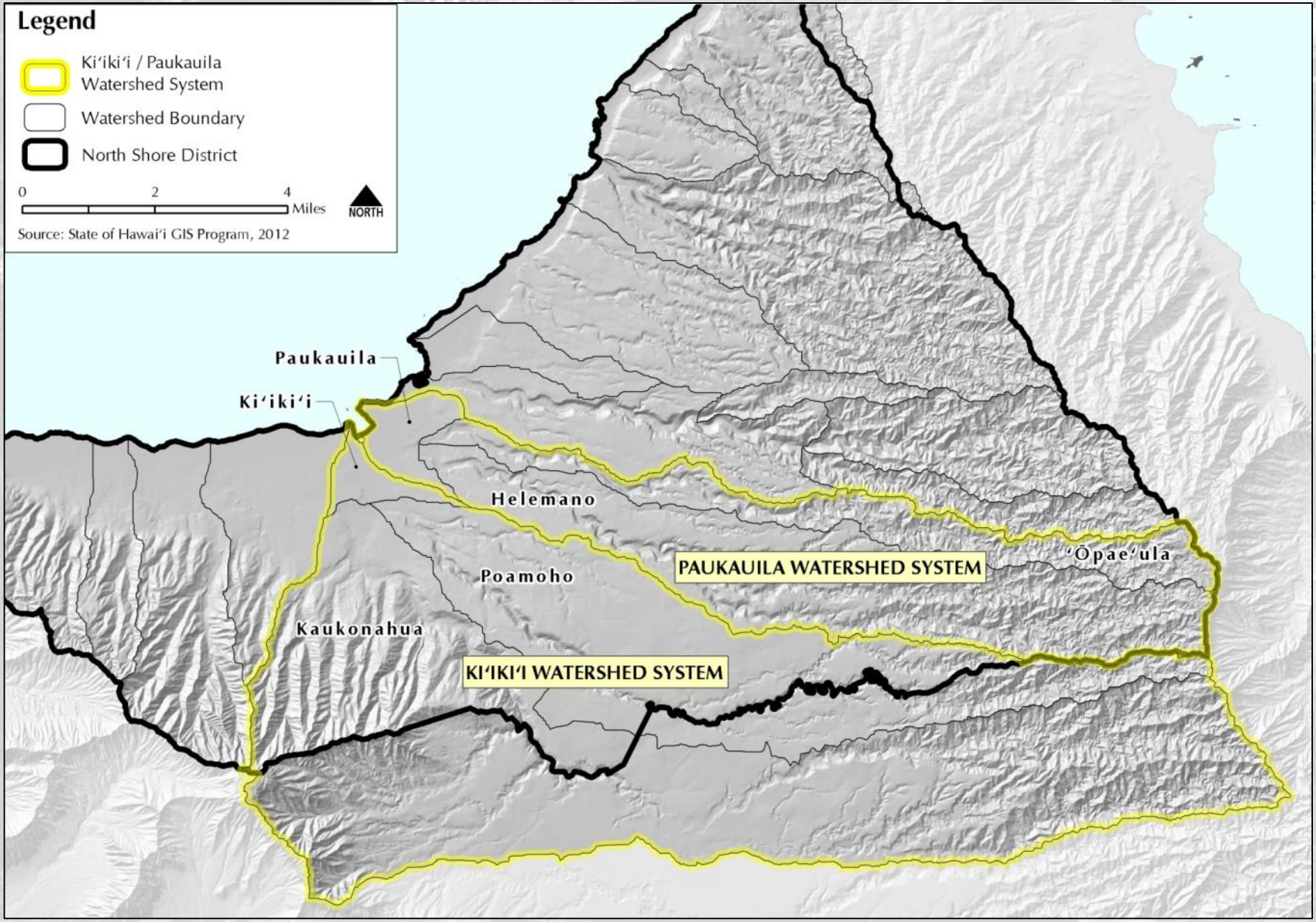
(*Statewide Assessment of Forest Conditions*, 2010)

Objective 5: Meet Future Water Demands at Reasonable Costs

- Major portions of the **Wahiawā Irrigation Systems** irrigated agricultural fields are in the priority watershed system areas.



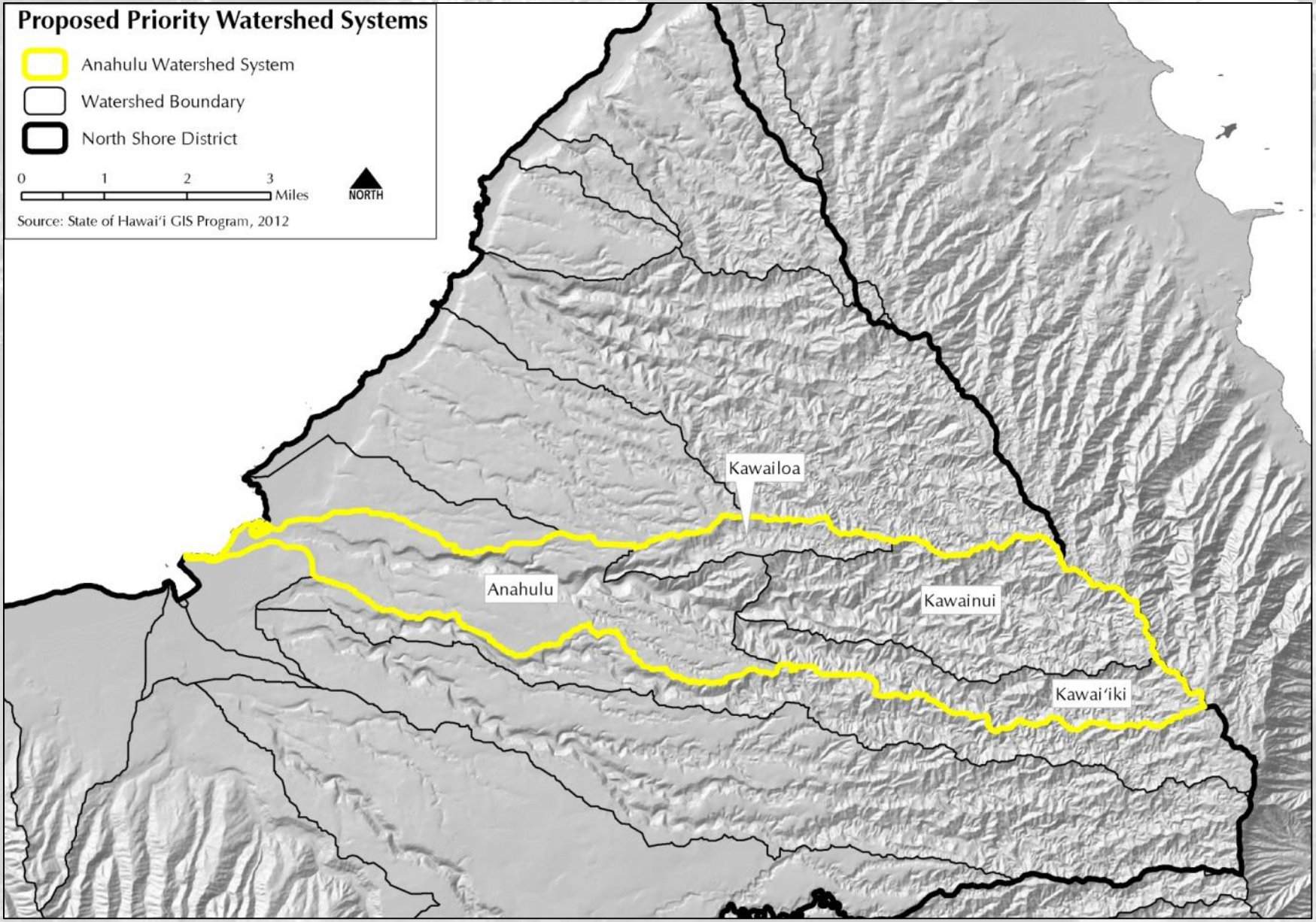
Ki‘iki‘i/Paukauila Watershed System



Ki‘iki‘i/Paukauila Catalyst Projects

- Wahiawā Irrigation System Improvements
- Waialua Flood Drainage Study
- Waialua-Kaiaka Watershed Area Study

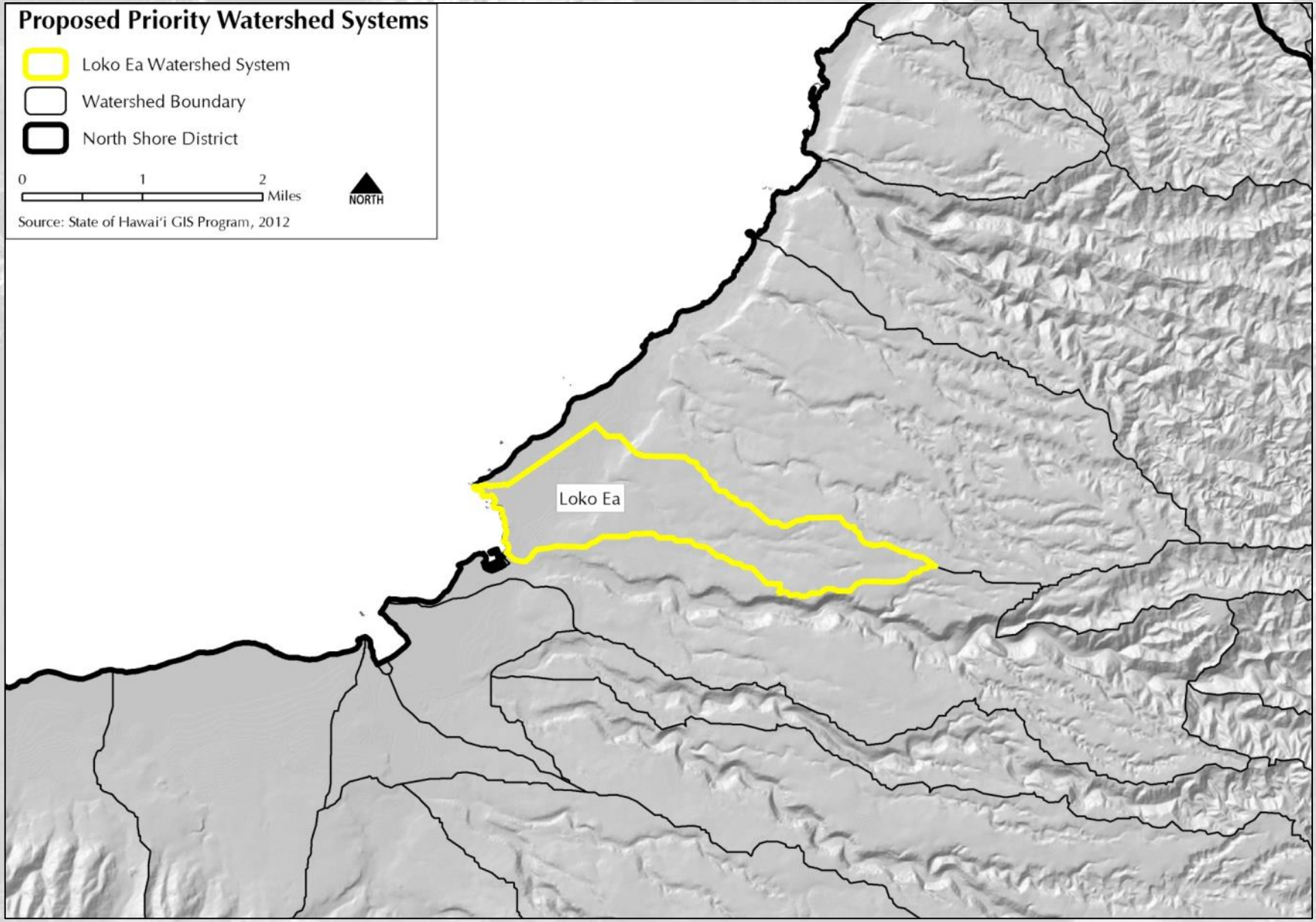
Anahulu Watershed System



Anahulu Catalyst Project

- Traditional Agriculture Restoration

Loko Ea Watershed/Catalyst Projects



Loko Ea Catalyst Projects

- Kamehameha Schools Loko Ea Fishpond
- ‘Uko‘a Marsh Restoration

Water is Essential for Life