

**3<sup>rd</sup> Annual Joint Government Water Conference  
“Implementing Hawaii Water Plans”**

# **County of Kaua‘i Water Use & Development Plan Update**



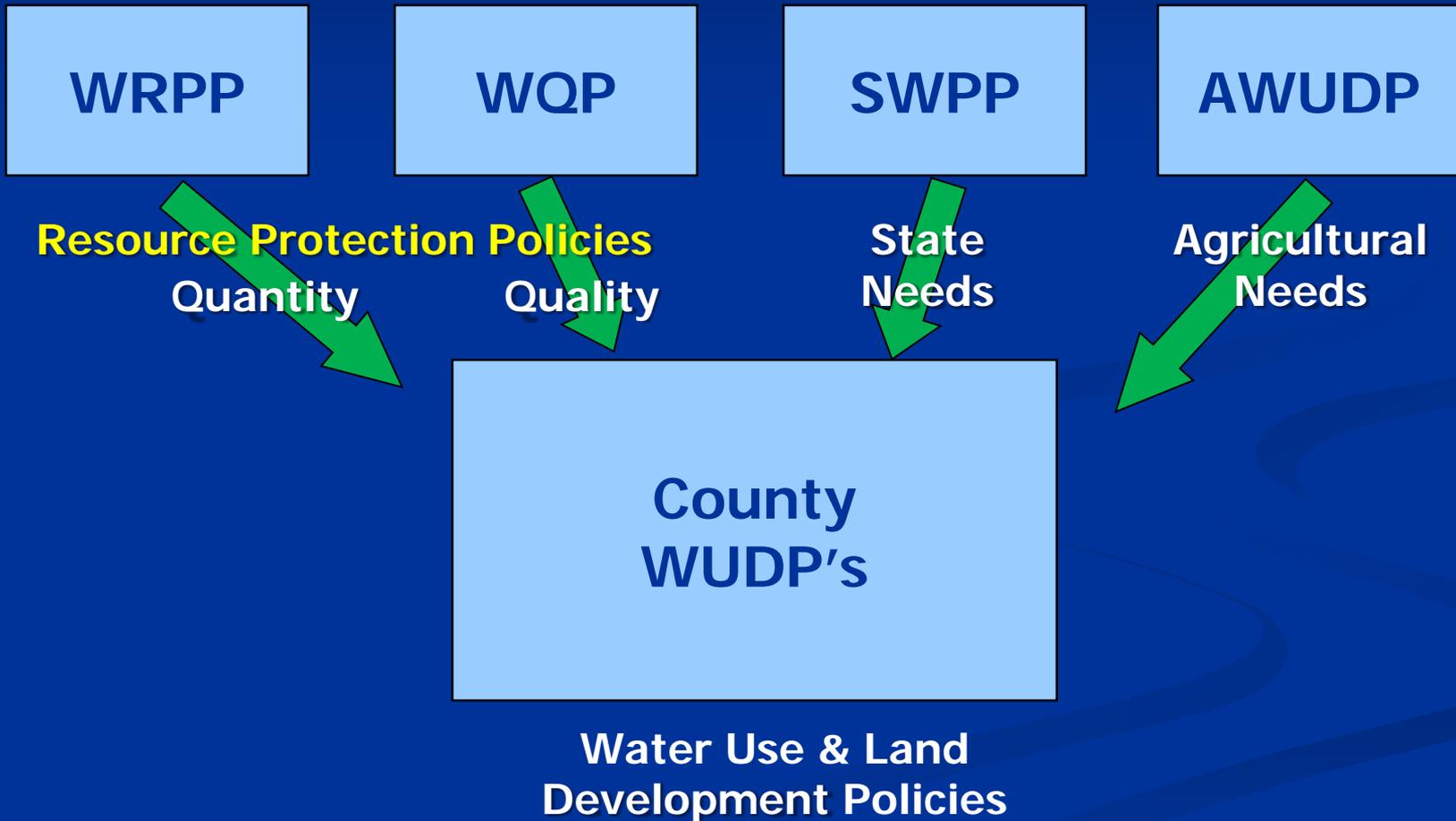
**Department of Water  
County of Kaua‘i**

**Fukunaga & Associates, Inc.**

# Presentation Outline

- Background – Hawai‘i Water Plan
- Plan Objective & Goals
- Technical Approach – Kaua‘i WUDP
- Kaua‘i County WUDP Update Schedule

# Hawai'i Water Plan



# The Hawai'i Water Plan Update Status (since 1990)

Hawai'i Water Plan Document	Status
Water Resource Protection Plan	2008 2 <sup>nd</sup> Update in Progress
Water Quality Plan	2014 Draft Update
State Water Projects Plan	2003 2 <sup>nd</sup> Update in Progress -DHHL -Statewide
Agricultural WUDP	Ph 1 Update 2003 Ph 2 Update 2004 Ph 3 Update in Progress
Hawai'i County WUDP	2011 2 <sup>nd</sup> Partial Update in Progress
Oahu & Maui WUDP	1 <sup>st</sup> Update in Progress
Kaua'i WUDP	1 <sup>st</sup> Update in Progress

# County WUDP Objective

*. . . to set forth the **allocation of water to land use** through the development of policies & strategies to guide the County in its planning, management and development of water resources to meet projected demands.*

# Key Goals

- Provide guidance for the management of the island's water resources to ensure that future water needs of the County are met, while preserving the integrity of the island's water resources.
- Ensure that sustainable water resources are integrated into the formulation and development of land use policies by the County.

# Statewide Framework (adopted in 2000) *Guidelines for Water Plan Updates*

*. . . to facilitate coordination, integration, and consistency of the components of the Hawai'i Water Plan.*

- Data & Analyses based on hydrologic units established by CWRM
- Prepare a Project Description for CWRM approval
- Continuous coordination with CWRM
- Include Stakeholder & Public involvement

# Technical Approach

## Guiding Principles

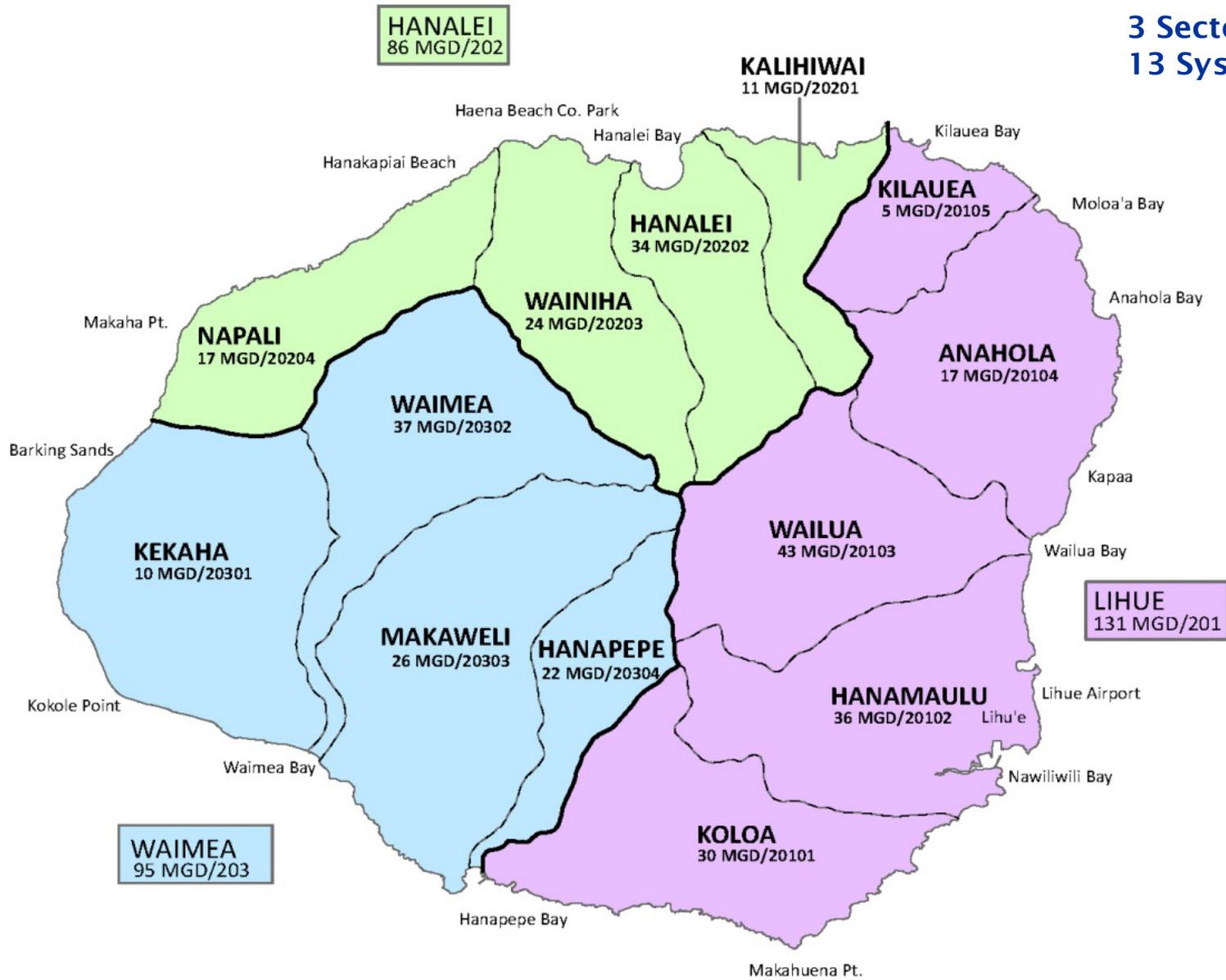
- **Public Trust Doctrine – *...waters of the State are held for the benefit of the citizens of the State.***
- **Water is a most precious resource & shall be used wisely – to be conserved; not wasted**
- **Highest quality water shall be used for the community's highest beneficial uses**
- **Lower quality water (reuse water, surface water, brackish water) should be used whenever possible**

# Technical Approach

## Key Tasks

- Inventory Existing Sources
- Inventory Existing Uses
- Identify Existing Water Systems
- Assess Land Use Plans & Policies
- Project Future Water Demands
- Identify Resource Options
- Obtain Stakeholder and Public Input & Review

3 Sectors  
13 Systems

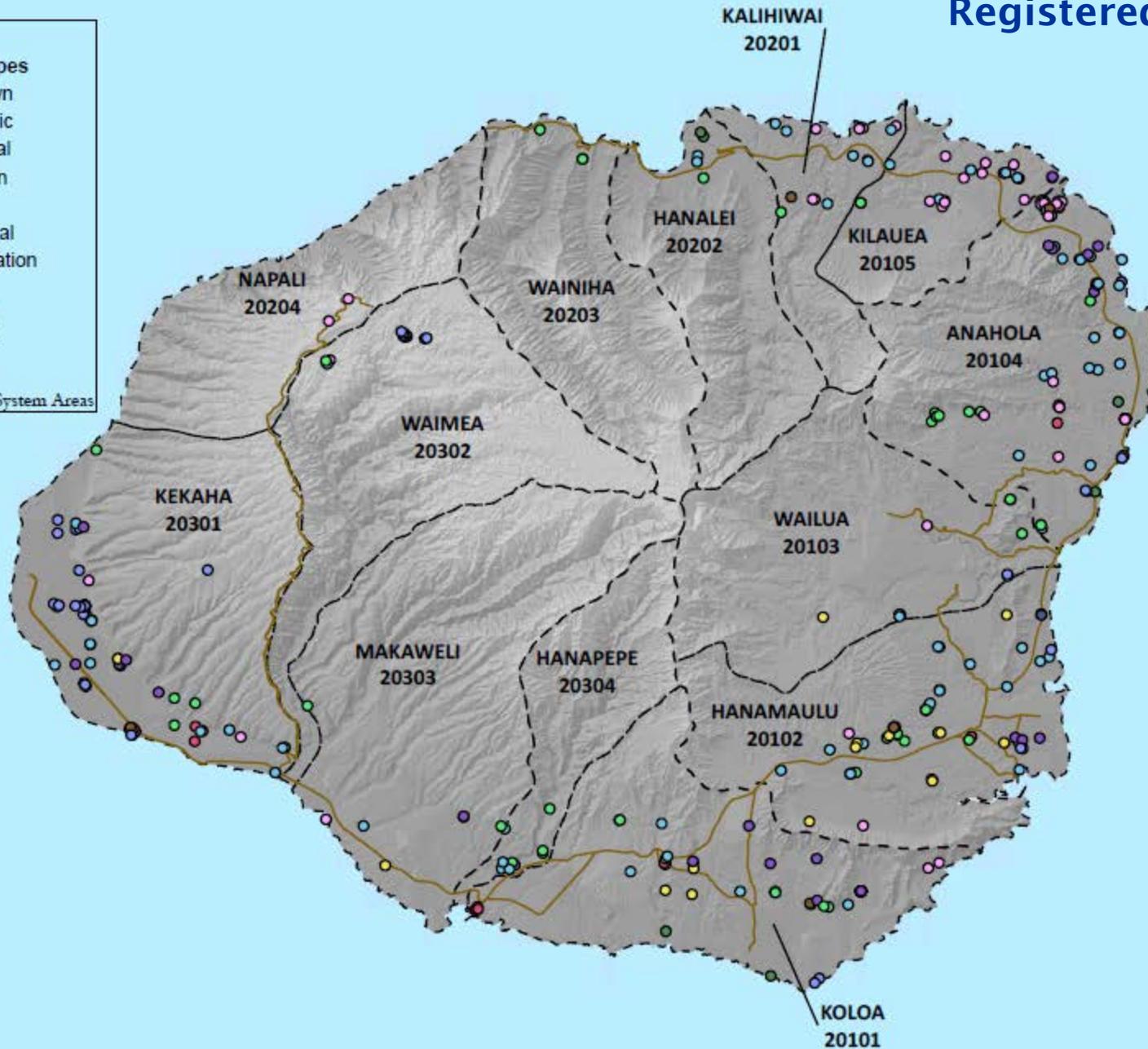


**Legend**

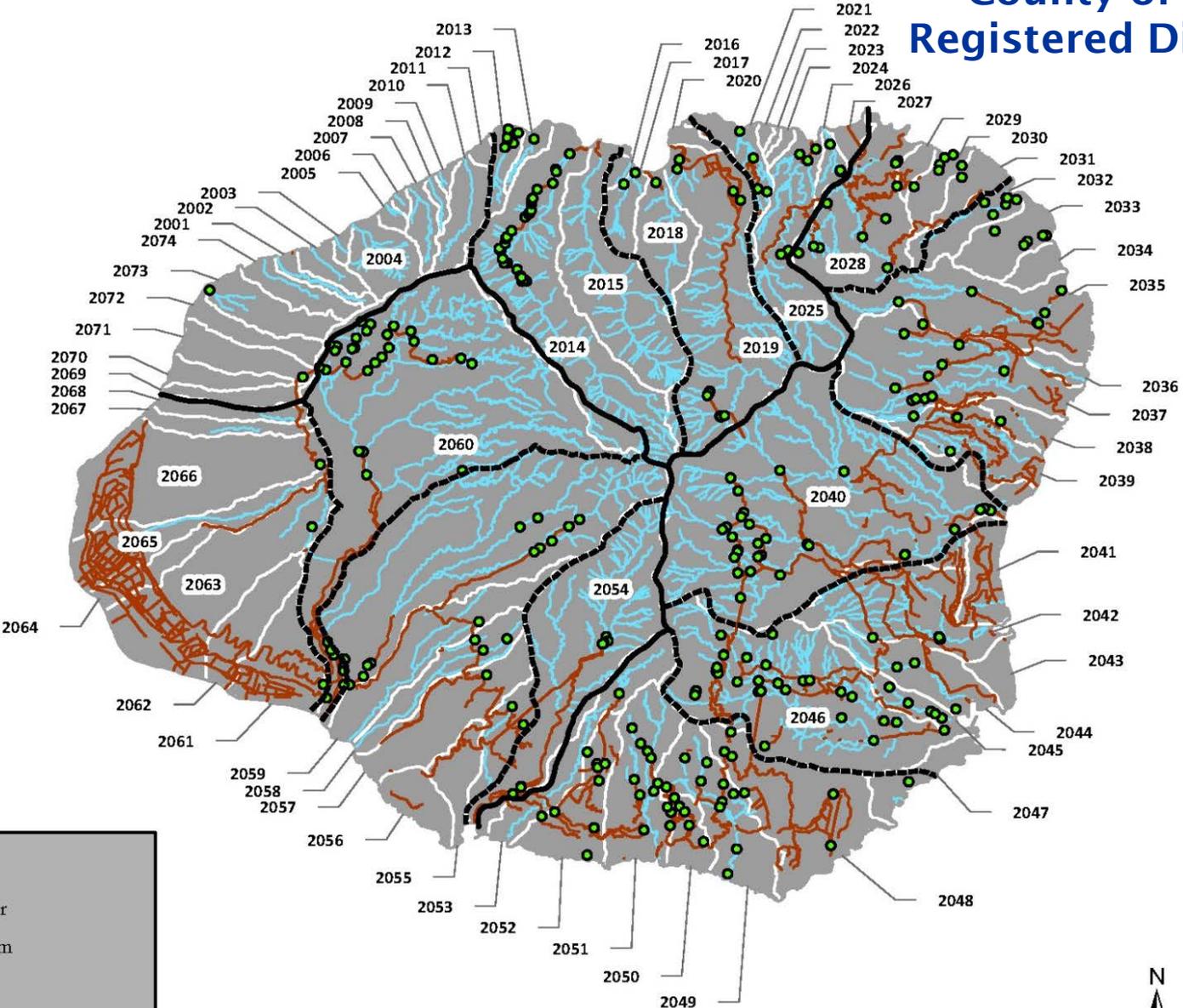
- Aquifer Sector Areas
- - - Aquifer System Areas

**Island of Kaua'i**  
**CWRM Ground Water Hydrologic Units & Sustainable Yield**

# County of Kaua'i Registered Wells

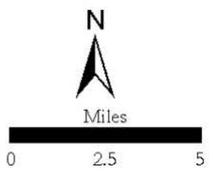


# County of Kaua'i Registered Diversions



**LEGEND:**

- Aquifer Sector
- - - Aquifer System
- Diversions
- Surface Water Hydrologic Units
- Irrigation Line
- Perennial Streams



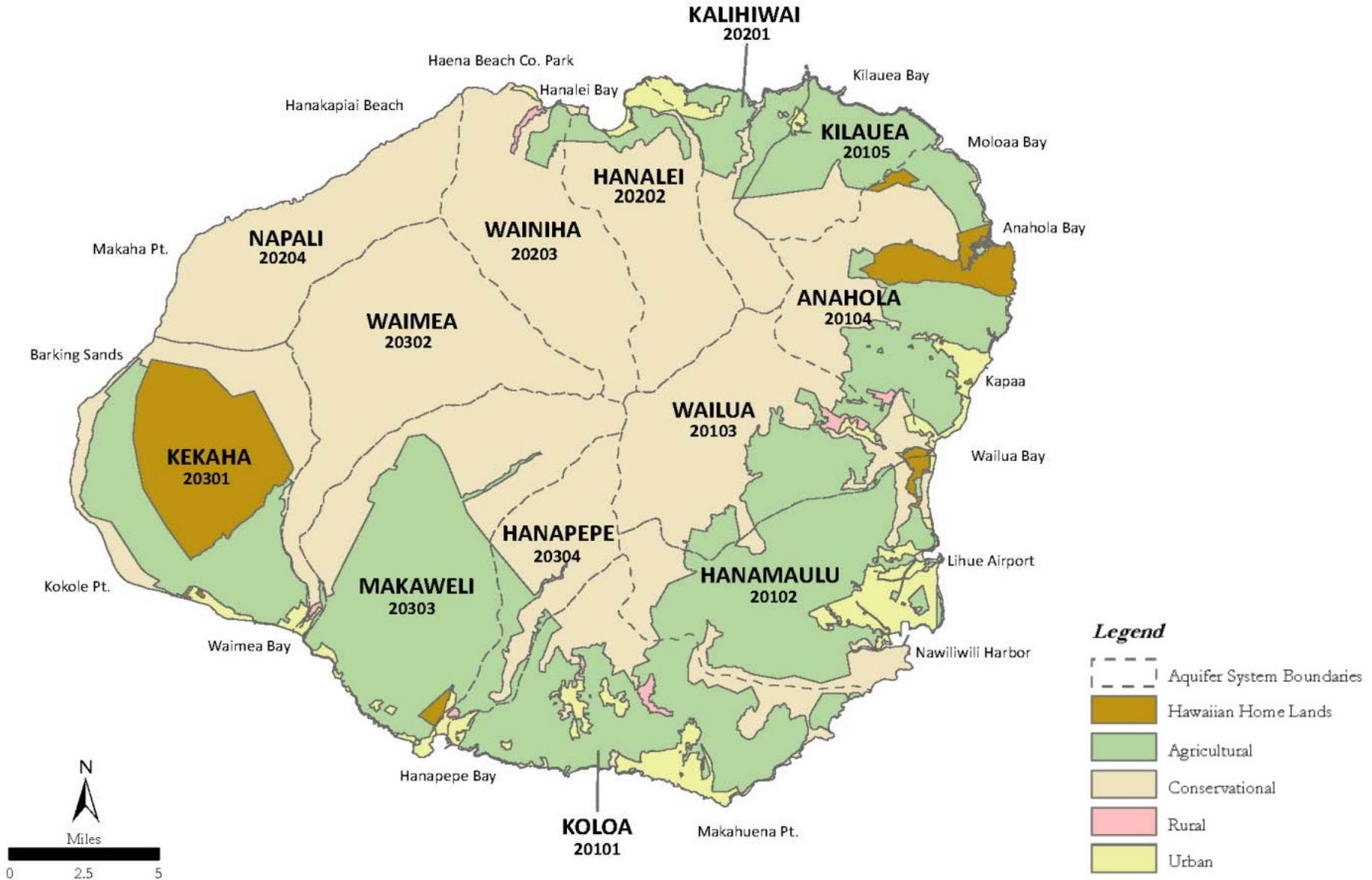


# Land Use Plans & Policies

- **State Land Use Classifications (SLUC)**
  - Generalized land use policy by SLUC
- **County General Plan**
  - Conceptual land use (County “Vision”)
- **Community Plans**
  - Local Community based land use vision
- **County Zoning**
  - Allowable Development by Ordinance

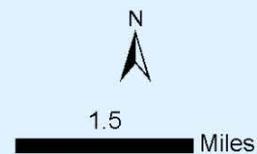
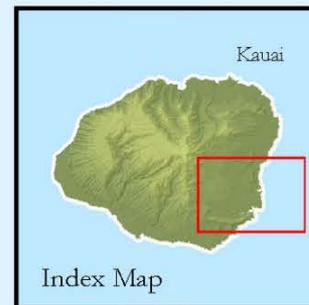
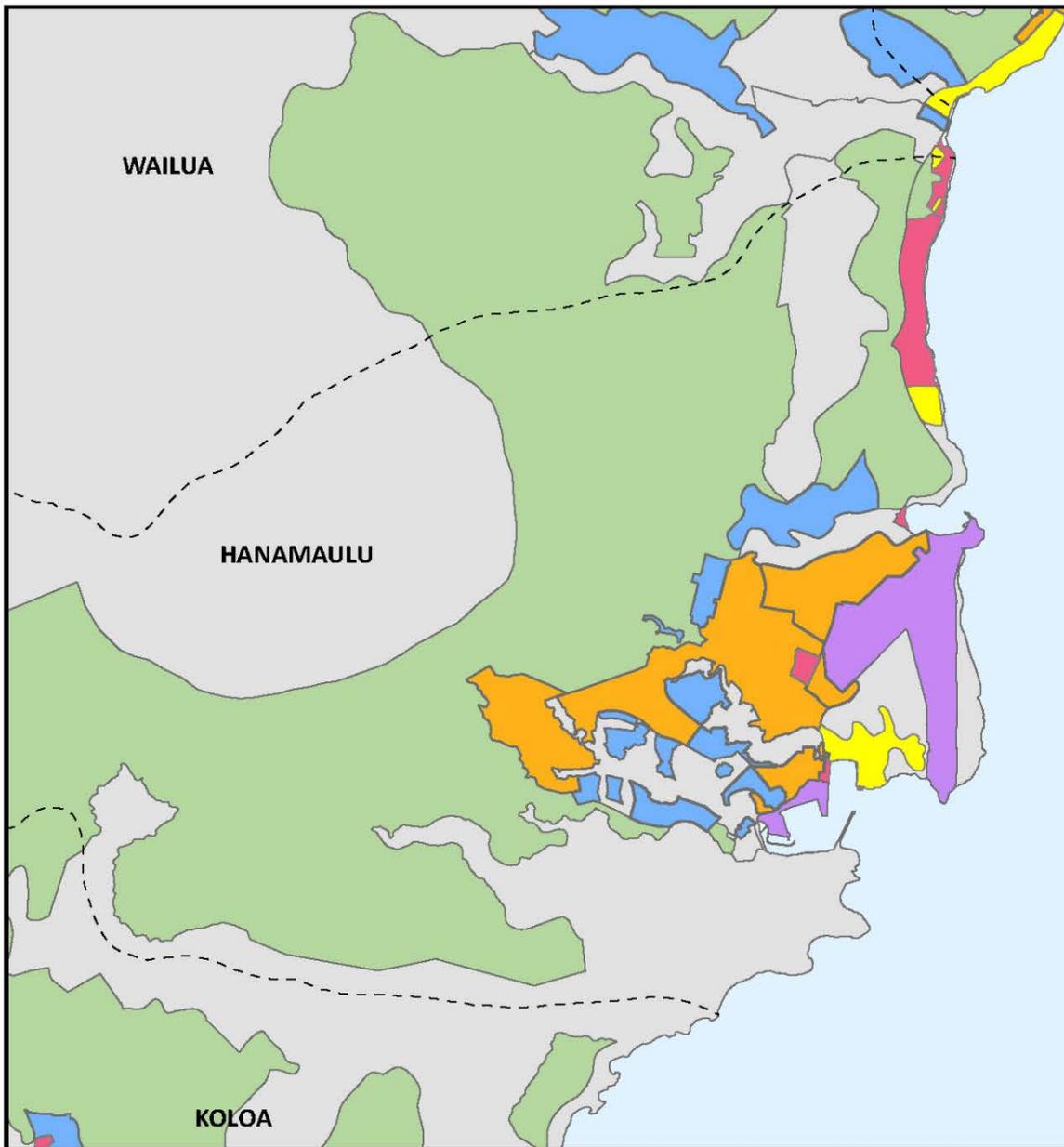
# State Land Use Classification

## State Land Use Commission

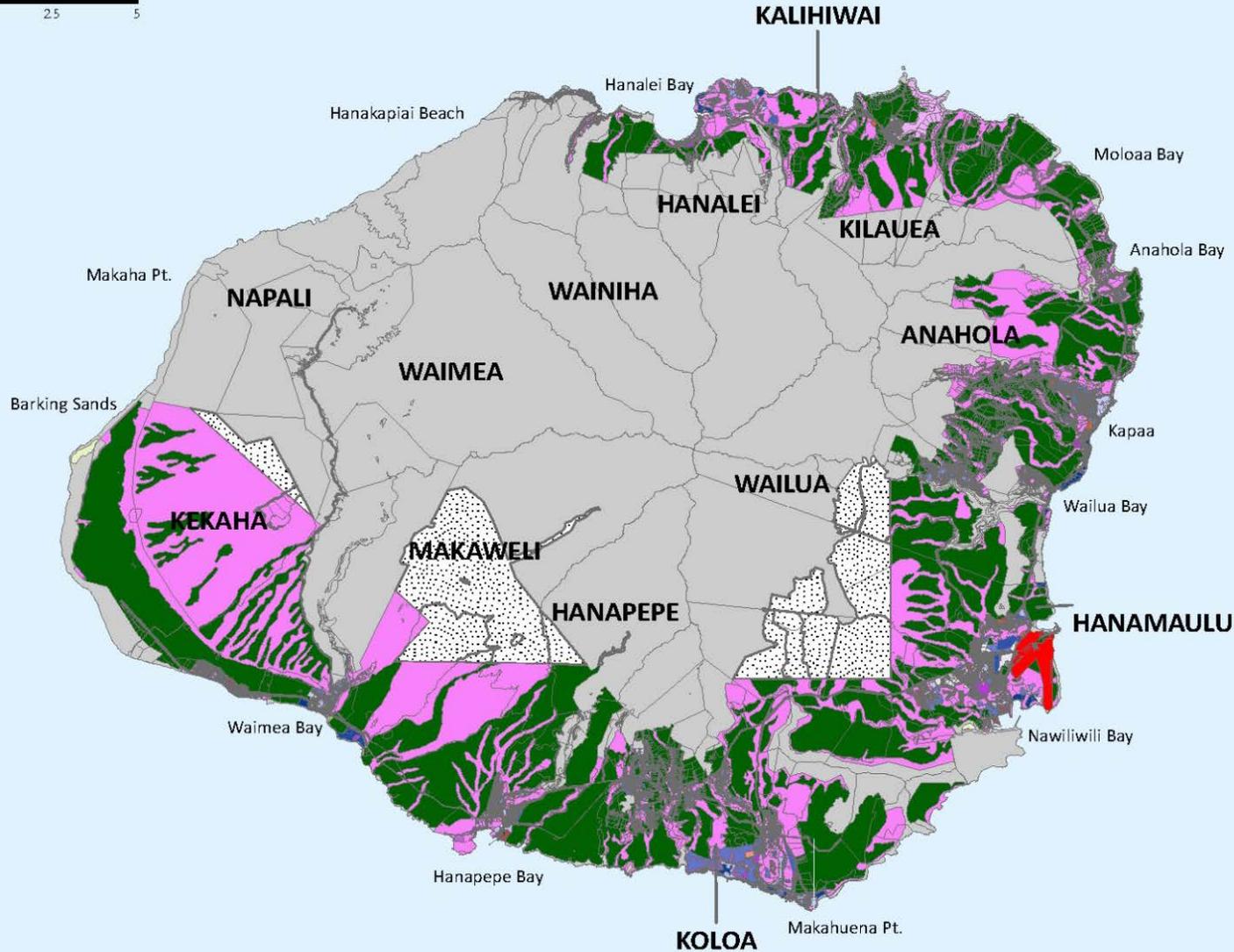
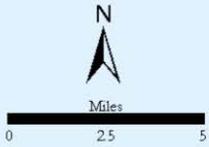




# General Plan Land Use Lihue - Hanamaulu

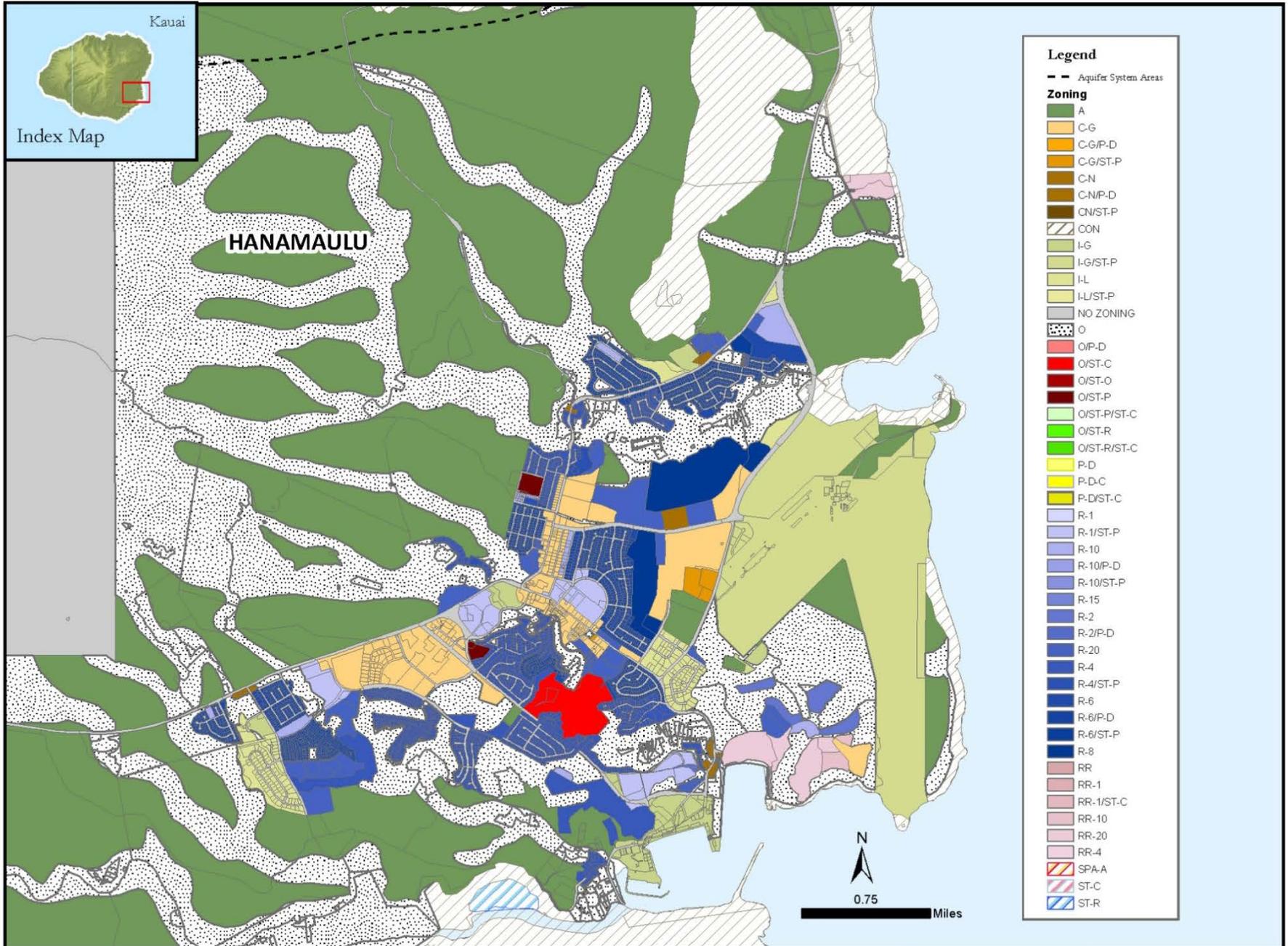


# Island of Kaua'i County Zoning



Legend	
Zoning	
[Green]	A
[Light Grey]	C-G
[Dark Grey]	C-G/P-D
[Medium Grey]	C-G/ST-P
[Light Grey]	C-N
[Light Grey]	C-N/P-D
[Light Grey]	CN/ST-P
[Light Grey]	CON
[Red]	I-G
[Red]	I-G/ST-P
[Orange]	I-L
[Orange]	I-L/ST-P
[Dotted]	NO ZONING
[Light Purple]	O
[Light Purple]	O/P-D
[Light Purple]	O/ST-C
[Light Purple]	O/ST-O
[Light Purple]	O/ST-P
[Light Purple]	O/ST-P/ST-C
[Light Purple]	O/ST-R
[Light Purple]	O/ST-R/ST-C
[Black]	P-D
[Black]	P-D-C
[Black]	P-D/ST-C
[Light Blue]	R-1
[Light Blue]	R-1/ST-P
[Light Blue]	R-10
[Light Blue]	R-10/P-D
[Light Blue]	R-10/ST-P
[Light Blue]	R-15
[Light Blue]	R-2
[Light Blue]	R-2/P-D
[Light Blue]	R-20
[Light Blue]	R-4
[Light Blue]	R-4/ST-P
[Light Blue]	R-6
[Light Blue]	R-6/P-D
[Light Blue]	R-6/ST-P
[Light Blue]	R-8
[Light Blue]	RR
[Light Blue]	RR-1
[Light Blue]	RR-1/ST-C
[Light Blue]	RR-10
[Light Blue]	RR-20
[Light Blue]	RR-4
[Light Green]	SPA-A
[Light Green]	ST-C
[Light Green]	ST-R

# County Zoning - Lihue-Hanamauulu



# Assessment of Land Use Plans & Policies

- **Initial Assessment  
(Uniform Island-wide Comparison)**
  - Preliminary evaluation of sustainability of land use policies
  - Identification of “sensitive” and “less-sensitive” areas
  - Concept of “Full Build-out” scenarios
  - Application of standard water planning methods to existing land use plans and policies
  - Focus on domestic demands and groundwater sources

***Full Build-out Scenario – ALL land area to be developed to its theoretical maximum extent***

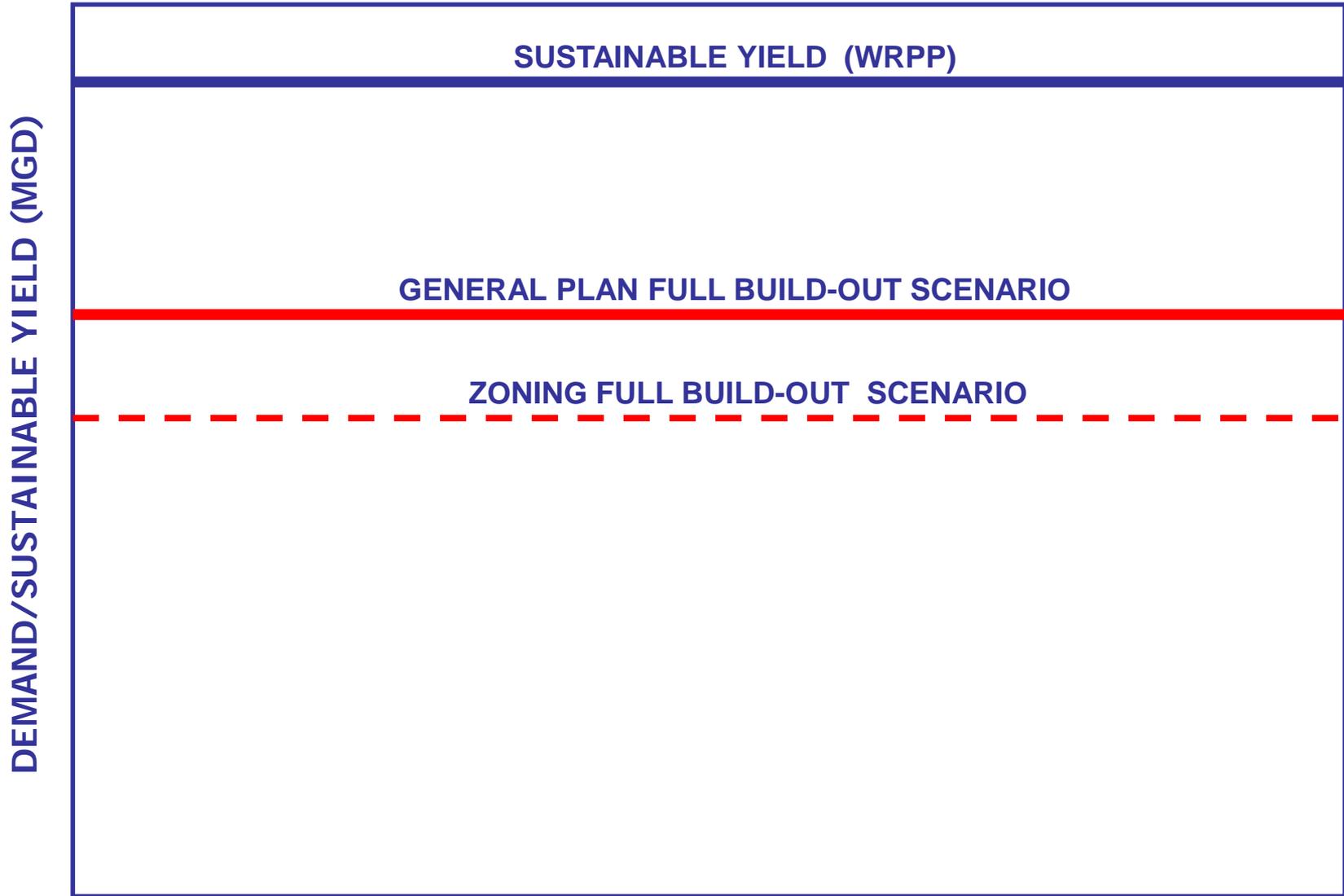
# Water Use Unit Rates

*from County "Water System Standards"*

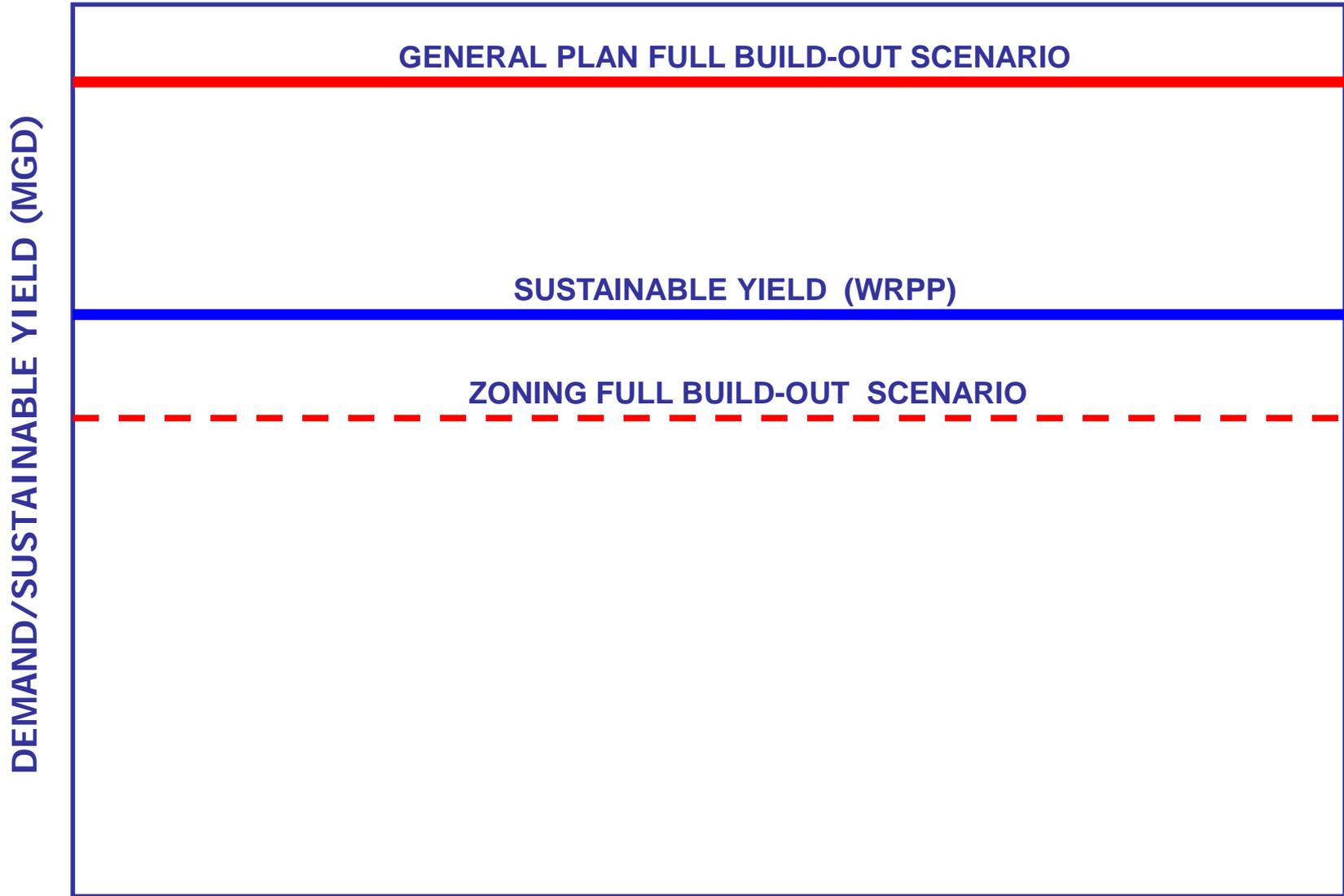
<b>Zoning Designation</b>	<b>Average Daily Demand</b>
RESIDENTIAL: Single Family or Duplex Multi-Family Low Rise Multi-Family High Rise	500 gals/unit 350 gals/unit 350 gals/unit
COMMERCIAL: Commercial Only Commercial/Industrial Mix	3,000 gals/acre 5,000 gals/acre
RESORT:	350 gals/unit
LIGHT INDUSTRY:	4,000 gals/acre
SCHOOLS, PARKS:	4,000 gals/acre or 60 gals/student
AGRICULTURE:	3,400 gals/acre*

\*Agriculture average daily demand based on AWUDP water application rate for diversified crops.

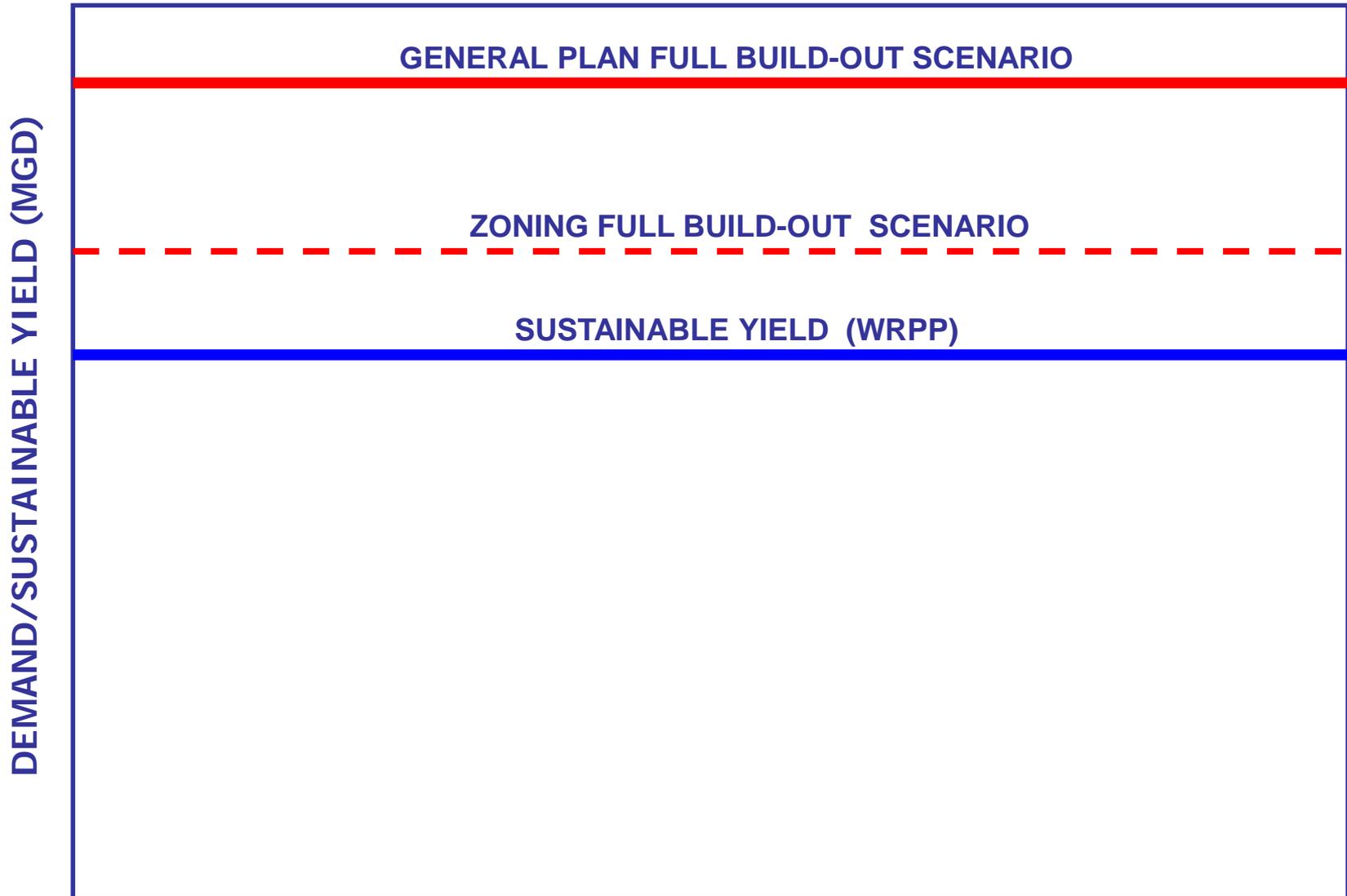
# SUSTAINABILITY OF LAND USE POLICIES



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# SUSTAINABILITY OF LAND USE POLICIES



# Initial Assessment Considerations

- It is understood that the assessments are conservative – objective is to identify sensitive and non-sensitive areas on the island.
- Sustainable yield values from WRPP are conservative estimates that establish safe limits to avoid degradation of the ground water resources.
- Full build scenarios are inherently conservative, based on gross areas, irrespective of development limitations.
- Typically, if an area is deemed non-sensitive, the water resources in the area are well within sustainable limits.
- If areas are found to be sensitive, more refined analyses of existing development is conducted, and adjustments to future development can be implemented.

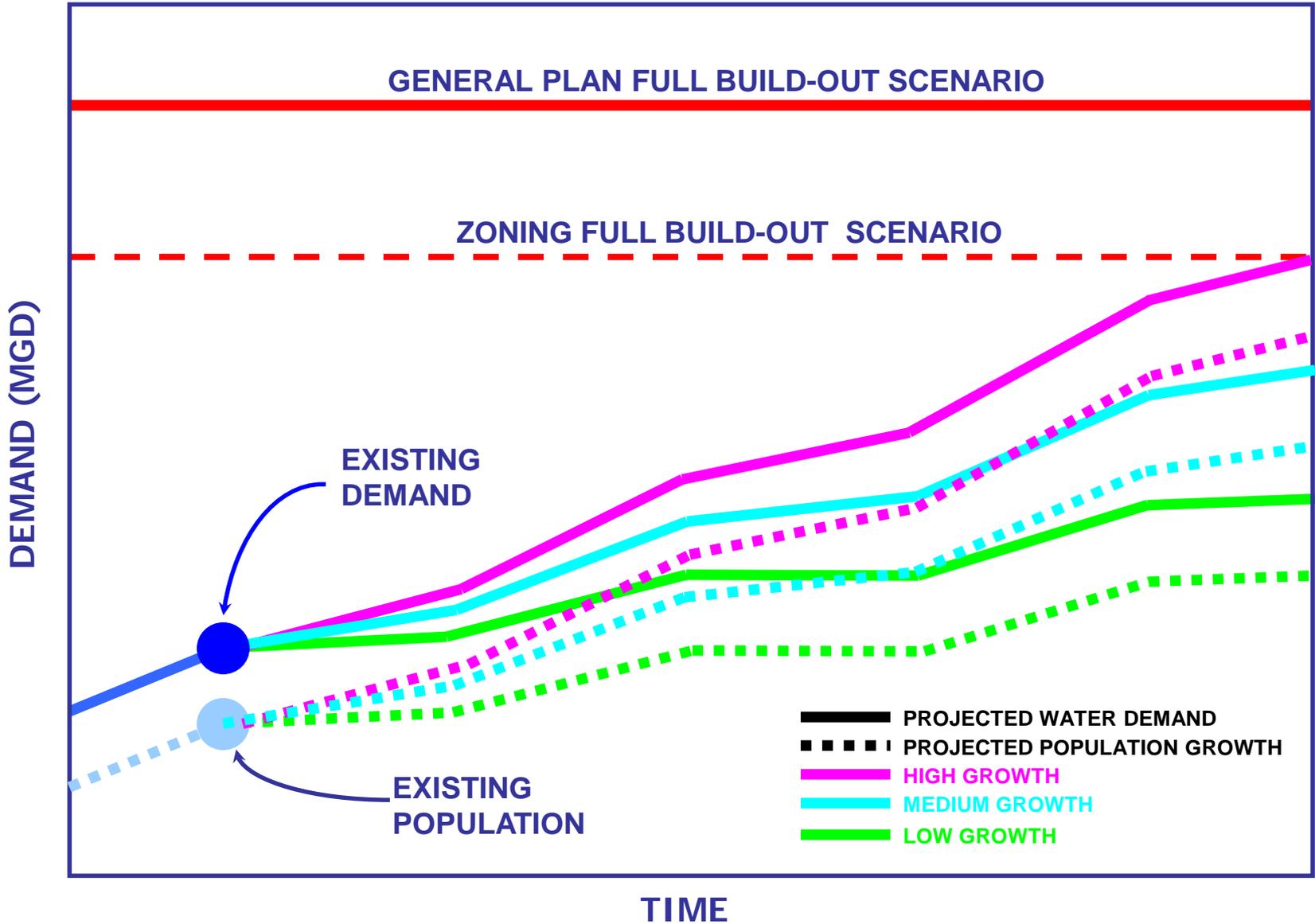
# Initial Assessment – Island-wide Summary (Domestic, Commercial & Industrial Demands)

Code	Aquifer System	Sustainable Yield	Current Pumpage	Full Build-Out	
				County Zoning	General Plan
20101	Koloa	30	3.99	7.01	18.19
20102	Hanama'ulu	36	2.39	11.82	20.18
20103	Wailua	43	0.43	1.00	1.88
20104	Anahola	17	1.99	5.5	10.85
20105	Kilauea	5	0.82	0.43	0.49
<b>201</b>	<b>LIHUE</b>	<b>131</b>	<b>9.62</b>	<b>25.81</b>	<b>51.52</b>
20201	Kalihiwai	11	1.1	1.32	9.99
20202	Hanalei	34	0.23	1.01	2.93
20203	Wainiha	24	0.31	0.23	0.50
20204	Napali	17	0.00	0.00	0.00
<b>202</b>	<b>HANAIEI</b>	<b>86</b>	<b>1.85</b>	<b>2.56</b>	<b>13.42</b>
20301	Kukaha	10	1.48	2.07	4.82
20302	Waimea	37	0.00	0.35	0.32
20303	Makaweli	26	0.26	1.88	1.64
20304	Hanapepe	22	0.58	0.28	0.45
<b>203</b>	<b>WAIMEA</b>	<b>95</b>	<b>2.32</b>	<b>4.58</b>	<b>7.23</b>
<b>TOTAL</b>	<b>Island of Kaua'i</b>	<b>312</b>	<b>13.79</b>	<b>32.95</b>	<b>72.17</b>

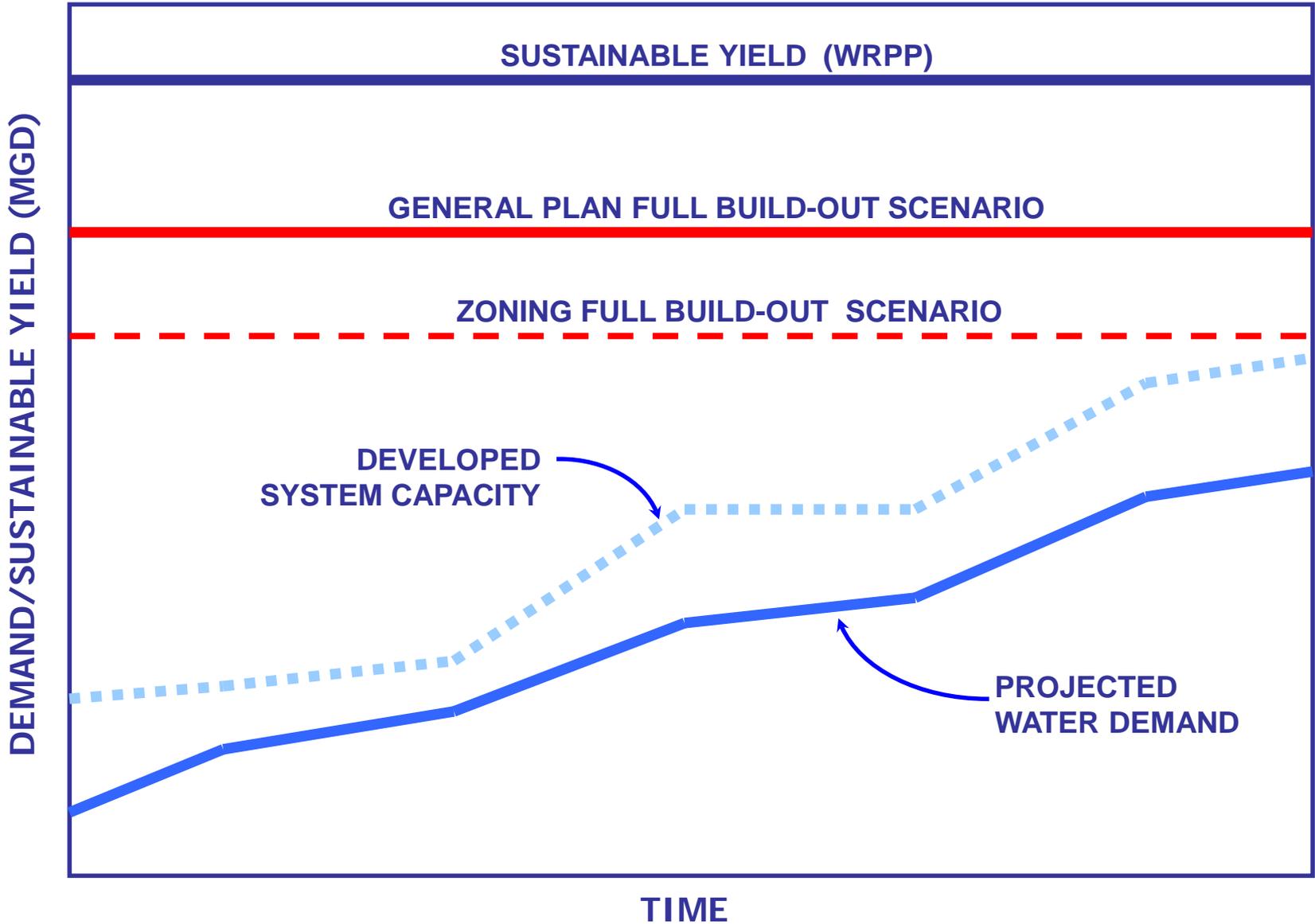
# Projected Water Demands

- Establish baseline of existing water use (e.g. water meter records; monitoring; pumpage)
- Project “infill” of undeveloped or under-developed lands (growth based on socio-economic activity)
- Based on Population Growth Scenarios (low, medium & high – consistent with methods of County Planning Department)
- Assume that types of future development in a given region will be similar in character with existing conditions.

# PROJECTED DEMAND



# MEETING PROJECTED DEMANDS



# Technical Approach

## Agricultural Water Use Projections

- Work with County Planning, State Department of Agriculture & Agribusiness Development Corporation
- AWUDP to determine most reasonable projection – initially using a rate of 3,400 gpad
- Important Agricultural Lands Study as the Basis
- Select crops that can be propagated with ambient rainfall whenever possible
- Utilize capability of existing and former irrigation systems – rehabilitate & repair – AWUDP initial focus
- Maximize use of lower quality water (reuse water, surface water, brackish water) whenever possible

# Technical Approach

## Identify Resource Options

- **Protection of Watershed Reserves**
- **Consistently apply demand-side measures**
  - Conservation Programs and Policies
  - Xeriscape/Landscape management
  - If necessary – reduce allowable development density
- **Maximize use of lower quality water (reuse water, surface water, brackish water) whenever possible**
- **Develop and maintain conventional water system infrastructure prudently**

# Technical Approach

## Public & Stakeholder Participation

- Stakeholder Advisory Committee
- Provide a series of Public Informational Meeting (8 meetings currently proposed)
- Conduct milestone briefings to the CWRM
- Approval of Updated Plan by the Board of Water Supply
- Acceptance by CWRM for inclusion in the Hawai'i Water Plan

# Challenges

## Limited Information

- Based on the best available information
- Information on stream diversion and instream use is limited – WRPP
- AWUDP projections not available and information on irrigation system capacities limited
- Requires reasonable judgment & assumptions

# Challenges

## Opportunity to Focus Future Efforts

- Identification of data needs
- Identification of “sensitive” areas requiring more detailed evaluation and careful land use planning
- Linking of land planning policies with infrastructure & resource availability
- Utilization of technological tools (e.g. GIS) for more dynamic planning
- Identification of new water sources difficult

# Implementation Plan

- **Kauai Water Plan 2020**
  - Infrastructure Masterplan
  - 20-year CIP
- **Initiation of New Programs**
  - Findings of WUDP assessment
  - Identification of “sensitive” areas requiring more detailed evaluation and careful landuse planning





# Questions?

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Mount Wai'ale'ale

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