County of Kaua‘i
Water Use & Development Plan Update

Kīlauea, Kaua‘i
August 31, 2023

Department of Water
County of Kaua‘i

Fukunaga & Associates, Inc.
Presentation Outline

- Background – Hawai‘i Water Plan
- WUDP Objective
- Key Tasks and Findings
- Timeline/Next Steps
Background - Legislative Mandate

- 1987 – Hawai‘i Water Code (HRS Chapter 174C)
- Protect Hawai‘i’s surface & ground water resources
- Established the Commission on Water Resource Management (CWRM)
- Developed the Hawai‘i Water Plan – “a long range planning guide for CWRM”
Hawai‘i Water Plan

Protection Policies
- Water Resource Protection Plan
  CWRM
- Water Quality Plan
  DOH

State Needs
- State Water Projects Plan
  DLNR
- Agricultural Water Use and Development Plan
  DOA

County-Wide Demands
- County Water Use and Development Plans

Land Use Consistency
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

- Preserve integrity of the island’s water resources
- Direct water resources to the needs of the County
- Guide the management of the island’s water resources
- Integrate sustainable water resources into the formulation and development of land use policies by the County
AQUIFER SYSTEM AREA (ASYA) CHAPTER
ASYA Chapter

Sections:

- System Area Profile
- Types of Water Resources
- Existing Water Use
- Projected Future Water Use
- Resource and Management Recommendations
System Area Profile

- General background, including
  - Population and population projections
  - Land use (General Plan, Zoning)
  - Estimated community densities

Table 2-2 Estimated Residential Community Densities

<table>
<thead>
<tr>
<th>ASYA</th>
<th>ASYA Code</th>
<th>Density (Unit/Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kōloa</td>
<td>20101</td>
<td>5.40</td>
</tr>
<tr>
<td>Hanamā'ulu</td>
<td>20102</td>
<td>7.41</td>
</tr>
<tr>
<td>Wallua</td>
<td>20103</td>
<td>3.08</td>
</tr>
<tr>
<td>Anahola</td>
<td>20104</td>
<td>4.83</td>
</tr>
<tr>
<td>Kīlauea</td>
<td>20105</td>
<td>5.42</td>
</tr>
<tr>
<td>Kalihiwai</td>
<td>20201</td>
<td>6.84</td>
</tr>
<tr>
<td>Hanalei</td>
<td>20202</td>
<td>5.92</td>
</tr>
<tr>
<td>Wainiha</td>
<td>20203</td>
<td>2.49</td>
</tr>
<tr>
<td>Nāpali</td>
<td>20204</td>
<td>N/A</td>
</tr>
<tr>
<td>Kekaha</td>
<td>20301</td>
<td>4.66</td>
</tr>
<tr>
<td>Waimea</td>
<td>20302</td>
<td>3.24</td>
</tr>
<tr>
<td>Makaweli</td>
<td>20303</td>
<td>5.74</td>
</tr>
<tr>
<td>Hanapēpē</td>
<td>20304</td>
<td>3.58</td>
</tr>
</tbody>
</table>

Table 2-3 Estimated Resort Densities

<table>
<thead>
<tr>
<th>ASYA</th>
<th>ASYA Code</th>
<th>Density (Unit/Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kōloa</td>
<td>20101</td>
<td>13.72</td>
</tr>
<tr>
<td>Hanamā'ulu</td>
<td>20102</td>
<td>18.97</td>
</tr>
<tr>
<td>Wallua</td>
<td>20103</td>
<td>N/A</td>
</tr>
<tr>
<td>Anahola</td>
<td>20104</td>
<td>20.00</td>
</tr>
<tr>
<td>Kīlauea</td>
<td>20105</td>
<td>N/A</td>
</tr>
<tr>
<td>Kalihiwai</td>
<td>20201</td>
<td>7.46</td>
</tr>
<tr>
<td>Hanalei</td>
<td>20202</td>
<td>12.37</td>
</tr>
<tr>
<td>Wainiha</td>
<td>20203</td>
<td>8.00</td>
</tr>
<tr>
<td>Nāpali</td>
<td>20204</td>
<td>N/A</td>
</tr>
<tr>
<td>Kekaha</td>
<td>20301</td>
<td>4.00</td>
</tr>
<tr>
<td>Waimea</td>
<td>20302</td>
<td>N/A</td>
</tr>
<tr>
<td>Makaweli</td>
<td>20303</td>
<td>1.00</td>
</tr>
<tr>
<td>Hanapepe</td>
<td>20304</td>
<td>N/A</td>
</tr>
</tbody>
</table>
ASYA Chapter

Sections:

- System Area Profile
- Types of Water Resources
- Existing Water Use
- Projected Future Water Use
- Resource and Management Recommendations
Types of Water Resources

- Ground Water
- Surface Water
- Rainwater Catchment
- Recycled Water
Sustainable yield is the maximum rate at which water may be withdrawn from a water source without impairing the utility or quality of the water source, as determined by CWRM.
Water Resource Management

- Surface Water
  - Streams
  - Irrigation Systems
  - Diversions
  - Interim Instream Flow Standards
Types of Water Resources

- Rainwater Catchment
- Recycled Water
ASYA Chapter

Sections:

- System Area Profile
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- Projected Future Water Use
- Resource and Management Recommendations
**Existing Water Uses**

**Table 20202-6: Existing Water Use by Category – Hanalei ASYA**

<table>
<thead>
<tr>
<th>CWRM Category</th>
<th>Ground Water (mgd)</th>
<th>Other Sources (mgd)</th>
<th>Total (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Industrial</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Irrigation</td>
<td>0.53(^1)</td>
<td>0.53</td>
<td>0.53</td>
</tr>
<tr>
<td>Agriculture</td>
<td>TBD(^2)</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Military</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Municipal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOW System</td>
<td>0.14</td>
<td></td>
<td>0.14</td>
</tr>
<tr>
<td>Private-Public WS</td>
<td>0.32</td>
<td></td>
<td>0.32</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>0.46</strong></td>
<td><strong>0.53</strong></td>
<td><strong>0.99</strong></td>
</tr>
</tbody>
</table>

\(^1\) Recycled Water  
\(^2\) Surface Water – TBD from AWUDP
20105 Kīlauea – Existing Water Use by Category

*Values to be determined by other components of the Hawai'i Water Plan*
20201 Kalihiwai – Existing Water Use by Category

Water Use (MGD)

<table>
<thead>
<tr>
<th>Category</th>
<th>Water Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal</td>
<td>PPWS = 1.07</td>
</tr>
<tr>
<td>Domestic</td>
<td>DOW = 0.00</td>
</tr>
<tr>
<td>Industrial</td>
<td>GW = 0.00</td>
</tr>
<tr>
<td>Military</td>
<td>GW = 0.00</td>
</tr>
<tr>
<td>Irrigation</td>
<td>SW = TBD*</td>
</tr>
<tr>
<td>Agriculture</td>
<td>SW = TBD*</td>
</tr>
</tbody>
</table>

*Values to be determined by other components of the Hawai‘i Water Plan.
20202 Hanalei – Existing Water Use by Category

Potable

Non-Potable

<table>
<thead>
<tr>
<th>Water Use (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.00</td>
</tr>
<tr>
<td>4.00</td>
</tr>
<tr>
<td>3.00</td>
</tr>
<tr>
<td>2.00</td>
</tr>
<tr>
<td>1.00</td>
</tr>
<tr>
<td>0.00</td>
</tr>
</tbody>
</table>

CWRM Water Use Category

- Municipal
- Domestic
- Industrial
- Military
- Irrigation
- Agriculture

**Values to be determined by other components of the Hawai’i Water Plan**

- PPWS = 0.32
- DOW = 0.14
- RW = 0.53
- GW = 0.00
- SW = TBD*

*Values to be determined by other components of the Hawai’i Water Plan*
20203 Wainiha – Existing Water Use by Category

- **Potable**
  - Municipal: PPWS = 0.00
  - Domestic: DOW = 0.15
- **Non-Potable**
  - Irrigation: RW = 0.00, GW = 0.00
  - Agriculture: SW = TBD

*Values to be determined by other components of the Hawai‘i Water Plan*
ASYA Chapter

Sections:

- System Area Profile
- Types of Water Resources
- Existing Water Use
- Projected Future Water Use
- Resource and Management Recommendations

Assess land use plans and policies and future projected water demands
Projected Future Water Use

- Based on Full Build-Out Water Demands
  - Reviewed existing land use plans and policies
  - Conservative approach – assumes ALL land area developed to its theoretical maximum extent
  - Based on existing water system standards and allowable density
  - Focused on domestic, commercial and industrial demands and groundwater source availability
SUSTAINABILITY OF LAND USE POLICIES

<table>
<thead>
<tr>
<th>DEMAND/SUSTAINABLE YIELD (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUSTAINABLE YIELD (WRPP)</td>
</tr>
<tr>
<td>GENERAL PLAN FULL BUILD-OUT SCENARIO</td>
</tr>
<tr>
<td>ZONING FULL BUILD-OUT SCENARIO</td>
</tr>
</tbody>
</table>

Less sensitive area
PROJECTED DEMAND

DEMAND (MGD)

TIME

EXISTING DEMAND

EXISTING POPULATION

PROJECTED WATER DEMAND

PROJECTED POPULATION GROWTH

HIGH GROWTH

MEDIUM GROWTH

LOW GROWTH

GENERAL PLAN FULL BUILD-OUT SCENARIO

ZONING FULL BUILD-OUT SCENARIO
20105 Kīlauea – Water Demand Projections and Full Build-Out

General Plan Full Build-Out Scenario = 1.23
Zoning Full Build-Out Scenario = 1.16
Total Existing Demand = 0.81

Note: Total existing demand includes municipal, domestic, industrial, military, and irrigation water uses. It does not include agriculture water use. For future agricultural water use analysis, please see Section 20105-4.1.1 County of Kaua'i Important Agricultural Lands Study.
20201 Kalihiwai – Water Demand Projections and Full Build-Out

![Graph showing water demand projections and full build-out](image)

- **SY = 16**
- **General Plan Full Build-Out Scenario = 4.98**
- **Zoning Full Build-Out Scenario = 2.23**
- **Total Existing Demand = 1.07**

Note: Total existing demand includes municipal, domestic, industrial, military, and irrigation water uses. It does not include agriculture water use. For future agricultural water use analysis, please see Section 20201-4.1.1 County of Kauai’s Important Agricultural Lands Study.
20202 Hanalei – Water Demand Projections and Full Build-Out

General Plan Full Build-Out Scenario = 3.04
Zoning Full Build-Out Scenario = 1.63
Total Existing Demand = 0.99

Note: Total existing demand includes municipal, domestic, industrial, military, and irrigation water uses. It does not include agriculture water use. For future agricultural water use analysis, please see Section 20202-4.1.1 County of Kaua’i Important Agricultural Lands Study.
20203 Wainiha – Water Demand Projections and Full Build-Out

General Plan Full Build-Out Scenario = 0.54
Zoning Full Build-Out Scenario = 0.29
Total Existing Demand = 0.15

Note: Total existing demand includes municipal, domestic, industrial, military, and irrigation water uses. It does not include agriculture water use. For future agricultural water use analysis, please see Section 20203-4.1.1 County of Kaua‘i Important Agricultural Lands Study.
Projected Future Water Use

- Projected Agricultural Water Use

<table>
<thead>
<tr>
<th>20105 Kīlauea – Irrigation of Agricultural Lands</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Water Supply*</td>
<td>0.32 mgd</td>
</tr>
<tr>
<td>Agricultural Lands</td>
<td>1,737 acres</td>
</tr>
<tr>
<td>with score ≥ 28 in the Important Agricultural Lands study</td>
<td></td>
</tr>
<tr>
<td>% IAL that can be irrigated @ 3,400 gal/ac/day</td>
<td>5%</td>
</tr>
</tbody>
</table>

*Declared surface water use from diversions
**20201 Kalihiwai – Irrigation of Agricultural Lands**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Water Supply*</td>
<td>0.09 mgd</td>
</tr>
<tr>
<td>Agricultural Lands with score ≥ 28 in the Important Agricultural Lands study</td>
<td>1,306 acres</td>
</tr>
<tr>
<td>% IAL that can be irrigated @ 3,400 gal/ac/day</td>
<td>2%</td>
</tr>
</tbody>
</table>

*Declared surface water use from diversions*
### 20202 Hanalei – Irrigation of Agricultural Lands

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Water Supply*</td>
<td>0.57 mgd</td>
</tr>
<tr>
<td>Agricultural Lands with score $\geq 28$ in the Important Agricultural Lands study</td>
<td>494 acres</td>
</tr>
<tr>
<td>% IAL that can be irrigated @ 3,400 gal/ac/day</td>
<td>34%</td>
</tr>
</tbody>
</table>

*Declared surface water use from diversions
<table>
<thead>
<tr>
<th><strong>20203 Wainiha – Irrigation of Agricultural Lands</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surface Water Supply</strong>*</td>
<td>0.65 mgd</td>
</tr>
<tr>
<td><strong>Agricultural Lands with score ≥ 28 in the Important Agricultural Lands study</strong></td>
<td>57 acres</td>
</tr>
<tr>
<td><strong>% IAL that can be irrigated @ 3,400 gal/ac/day</strong></td>
<td>338%</td>
</tr>
</tbody>
</table>

*Declared surface water use from diversions*
ASYA Chapter

Sections:

- System Area Profile
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- Existing Water Use
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Resource and Management Recommendations

- Water Resource Availability
  - Full Build-Out vs. SY
  - 20-Year Population Projection vs. SY

- Water Resource Management
  - Conventional Water Resource Measures
  - Water Conservation
  - Alternative Water Resource Measures
  - Development Density Control
Resource Planning Objectives

- Public Trust Doctrine – waters of the State are held for the benefit of all citizens of the State

- Quality of water source should be matched to the quality of water required. Utilize the highest quality of water for the most valuable end use

- Promote water conservation – water is a most precious resource and shall be used wisely

- Meet future demands at a reasonable cost
Recommended Alternatives

- Alternative Water Resources
- Conservation
- Ground Water
- Surface Water
- Demand-Side Management
NEXT STEPS
Summary

KWUDP is a living document that integrates information from the other 4 components of the Hawaii Water Plan

Based on the best available information
Opportunity to Focus Future Efforts

- Coordination of data needs from the other 4 components of the Hawaii Water Plan
- Coordination of land planning policies with infrastructure & resource availability
Next Steps

- **May 2023**
  - Stakeholder meeting

- **August 2023**
  - Public Meetings

- **Summer/Fall 2023**
  - Brief CWRM

- **Pre-Final WUDP Update**
- **Present Pre-Final WUDP Update to Kauai BWS**
- **Present Pre-Final WUDP Update to CWRM for adoption**
Email comments to wrp@kauaiwater.org
Subject line: KWUDP

http://kauaiwater.org/kwudp.asp

Mount Waiʻaleʻale