Maui County
Water Use and Development Plan
Update

Board of Water Supply
Briefing

June 15, 2017
Maui County Department of Water Supply

OLA NĀ MEA A PAU I KA WAI
By Water All Things Find Life

Presentation Outline

- Status & Timeline
- Regulatory Framework and Board of Water Supply Process
- Review Part I: Introduction and Technical Approach
- Summary Part II: Water Resource Management, Strategies and Recommendations
- What's Next: Part III: Regional Plans

Background and Timeline

Maui Island

WUDP public process reignited	Winter 2015
Public meetings, Targeted Stakeholder Meetings	Spring 2016
Public Workshops……	Spring 2016
Brief CWRM/Board of Water Supply…….	Summer 2016
3rd Round Public Meetings Preliminary Strategies	Fall/Winter 2016
Draft Plan Sections Brief Board of Water Supply	Spring 2017
Final Draft Board of Water Supply Review/Public Hearings	Summer – Fall 2017
County Council/CWRM Final Plan Approval…….	Fall 2017 - 2018

Molokaʻi

Commence process……

Where we left off

- Incorporate findings from final round of public workshops
- Refine regional strategies (Sector Reports)
- Recommendations and Implementation

MAUI ISLAND WATER USE & DEVELOPMENT PLAN DRAFT

http://co.maui.hi.us/2051/Maui-Island-Water-Use-Development-Plan

Regulatory Framework and Board of Water Supply Process

Dual mandate: State Commission on Water Resource Management (*State Water Code HRS§174C-31*) **and the County** (*Maui County Code Chapter 14.02*)

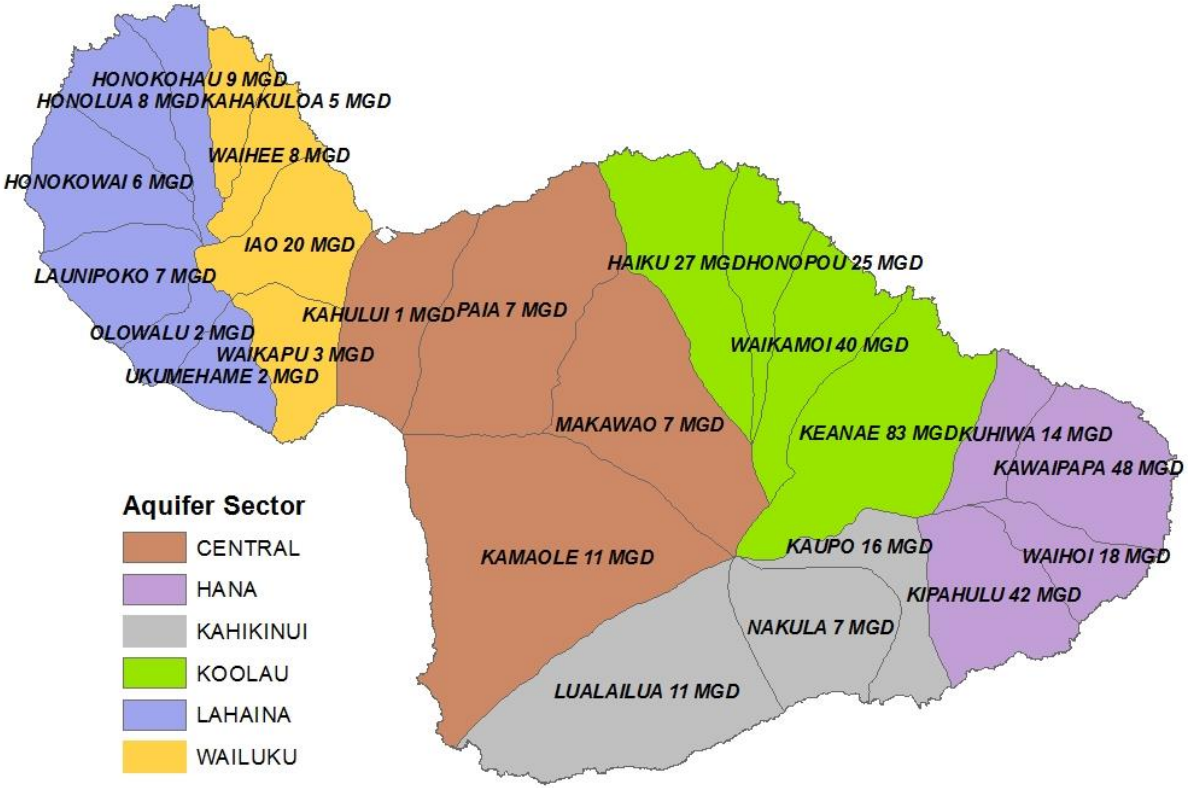
Guide and advise the Maui County Council and the state CWRM in planning, management, water development and use and allocation of the island's water resources

1. DWS transmits proposed updates to BWS and CWRM for review.
2. BWS to hold one or more public hearings on the proposed update in the affected district, transmit the proposed update with its findings and recommendations to the department within 180 days
3. The department to review BWS recommendations and if deemed necessary by the director, make revisions. The director to transmit the proposed update to County Council within 60 days of receipt of BWS recommendations
4. County Council to pass the proposed update by ordinance within 180 days (may extend by resolution)
5. County Clerk to transmit the ordinance to the CWRM for final review, acceptance, and incorporation into the Hawaii Water Plan.

Review Part I: Introduction and Technical Approach

- The WUDP is part of the *Hawai'i Water Plan: a* long-range planning guide for use by CWRM for the protection, conservation, and management of Hawai'i's water resources.
- The plan is based on hydrologic units as required by the State Water Code and the planning period extends to 2035. There are six Aquifer Sector Areas with a total sustainable yield of 427 million gallons per day (mgd) of groundwater.
- Long range strategic water resource plan to inform and guide the Department of Water Supply capital improvement program (source, storage, infrastructure, conservation)

- CIP program identifies site specific improvements and costs
- Apply to DWS and other county agencies, privately owned public water systems as it relates to potable and non potable water use and conservation
- Set forth allocation of water to land use by identifying water supplies (and conservation strategies) for planned growth per the Maui Island Plan



Review Part I: State Regulatory Framework

The *Statewide Framework*, 2000, provides guidance in updating WUDPs to insure a consistent and coordinated plan for the protection, conservation and management of our water resources, effective implementation by the counties, and use by the CWRM for resource management purposes. The Statewide Framework includes the following recommended plan elements for the County WUDP update process:

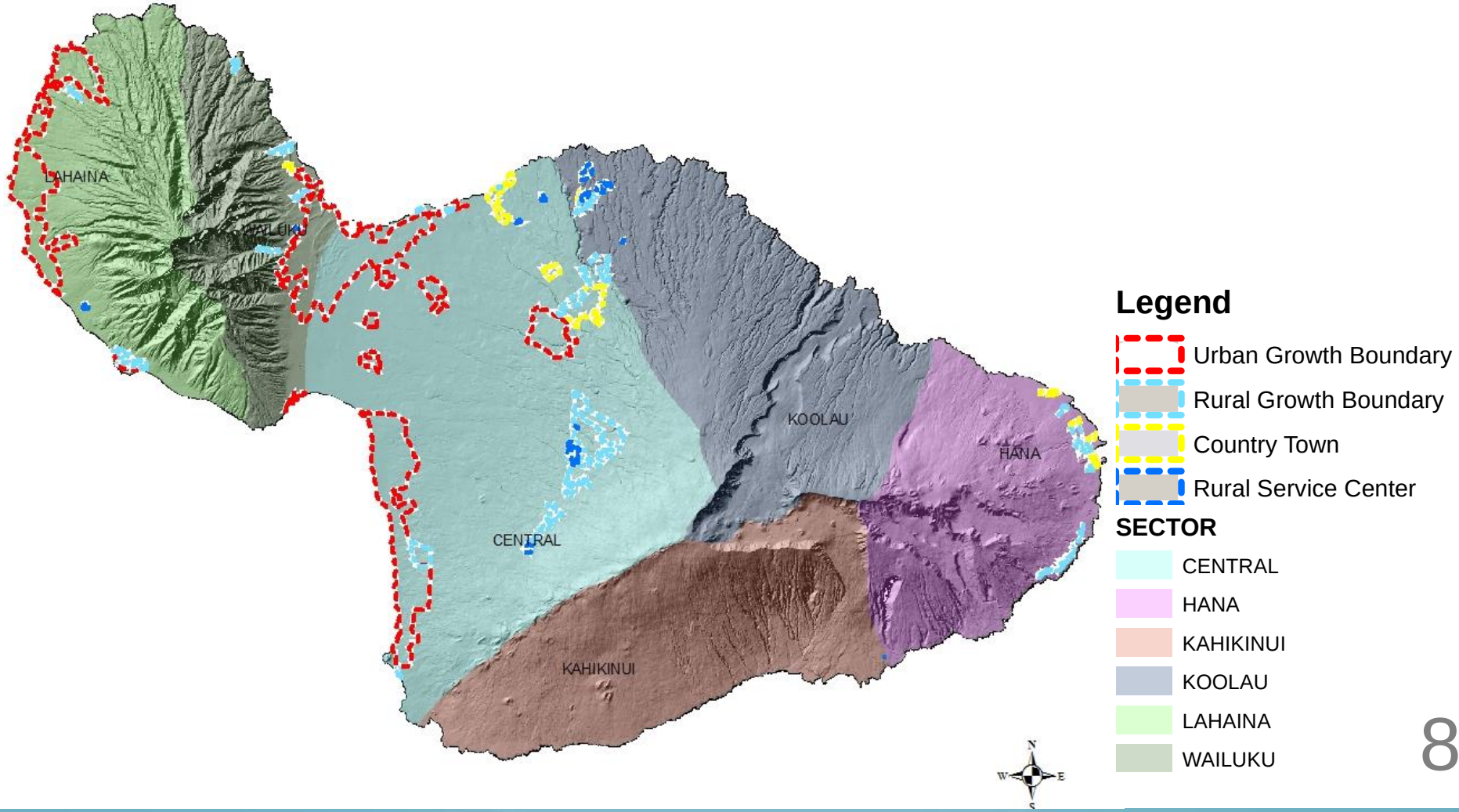
- County-Specific WUDP Project Description
- Coordination with CWRM on Water Resource Management
- Stakeholder and Public Involvement
- Development of Policy Objectives and Evaluation Criteria
- Description of Water System Profiles
- Identification of Resource and Facility Options
- Development and Evaluation of Strategy Options
- Implementation Plan

Native Hawaiian Water Rights

Supreme Court Ka Paʻakai O Ka ʻAina v. Land Use Commission: Agencies protect native Hawaiian customary and traditional practices to the extent feasible. For the purposes of this plan, proposed uses of water resources should be accompanied by inquiries into the impacts on traditional and customary rights to ensure that proposed water resource uses are pursued in a culturally appropriate way.

County Regulatory Framework

- Aid the County in the conservation, development, and use of the water resources of the County
- Set forth the allocation of water to land use through the development of policies and strategies which shall guide the County in its planning, management, and development of water resources to meet projected demands
- Consistency with Maui General Plan; Community Plans; and other Policy Plans including DHHL



Management Framework

Issues and Concerns:

- East/Hana: The impacts of water transport from East Maui streams on the ecosystem and public trust and other local uses. Relates to alternative ways to meet the future water needs of dependent regions.
- West/Lahaina: Alternative ways to meet the future water needs of public trust and other local uses in the region given increased growth, climatic changes and potential decreased water supplies, while managing resources in a sustainable way.
- Central/South: Alternative ways to meet the future water needs of all water uses and users in the region given increased growth especially in south Maui and reduced water transport from East Maui streams and Na Wai ‘Eha.
- Upcountry: Alternative ways to provide reliable supply to the region including the potential for increased storage, given increased growth, climatic changes, and highly variable water supply in the face of reduced transport.

Values and Principles

- Ecologically holistic and sustainable
- Based on ahupua'a management principles
- Legal, science and community-based
- Action-oriented

Planning Objectives

Sustainability	Availability
Water Resources	Quality
Streams	Reliability
Environment	Efficiency
Equity	Cost
DHHL	Equity
Agriculture	Conformity
Cultural Resources	Viability

Management Framework

Criteria	Planning Objectives							
	Sustainability Resources Streams Environment	Ag	Equity DHHL Culture	Availability	Quality	Reliability	Efficiency Cost	Plan Viability Conformity
Groundwater sustainable yield levels are maintained over time	X			X				X
Stream flows restored to level to support stream ecosystems	X		X	X				X
Watersheds protected from invasive animals and plants	X			X				
Interim flow standards adopted for watersheds	X		X					
Scientific studies for aquifer systems complete (support science-based SY)	X							
Water resources and water system use is based on aquifer recharge and stream flows under drought conditions	X		X		X	X		
Chloride levels in wells remain stable (salt water intrusion)	X	X		X	X	X	X	
Use of recycled water increased	X			X		X		
Graywater and catchment systems installed	X			X				
Infrastructure projects increase recycled water use and stormwater capture	X			X				
Watershed collaboration increased	X			X				X
Native Hawaiian community consultation process instituted			X					X
Per capita water use decreased	X			X		X	X	
MDWS prioritize DHHL needs over lower priority needs			X					

Management Framework

Criteria	Planning Objectives							
	Sustainability Resources Streams Environment	Ag	Equity DHHL Culture	Availability	Quality	Reliability	Efficiency Cost	Plan Viability Conformity
Potable and irrigation systems water loss decreased	X			X			X	
Potable water use for nonpotable needs decreased	X							
Community water education increased	X						X	
Incentives for water conservation increased	X			X			X	
Drinking water standards met at all times				X	X	X		
Aquifer health maintained	X				X			
Public system water shortages to serve existing customers avoided				X		X		
Public water supply drought shortages avoided				X		X		
Contingencies in place to support water supply systems functions during emergency conditions				X		X		
Renewable energy use increased						X	X	
Water is available to timely serve development in MIP			X	X				X
Implementation plan for WUDP is incorporated into County budget and CIP planning						X		X
Strategies to meet all needs incorporated into WUDP			X					X

Planning Scenarios

Evaluate future water resources and demands over the planning horizon 2015-2035

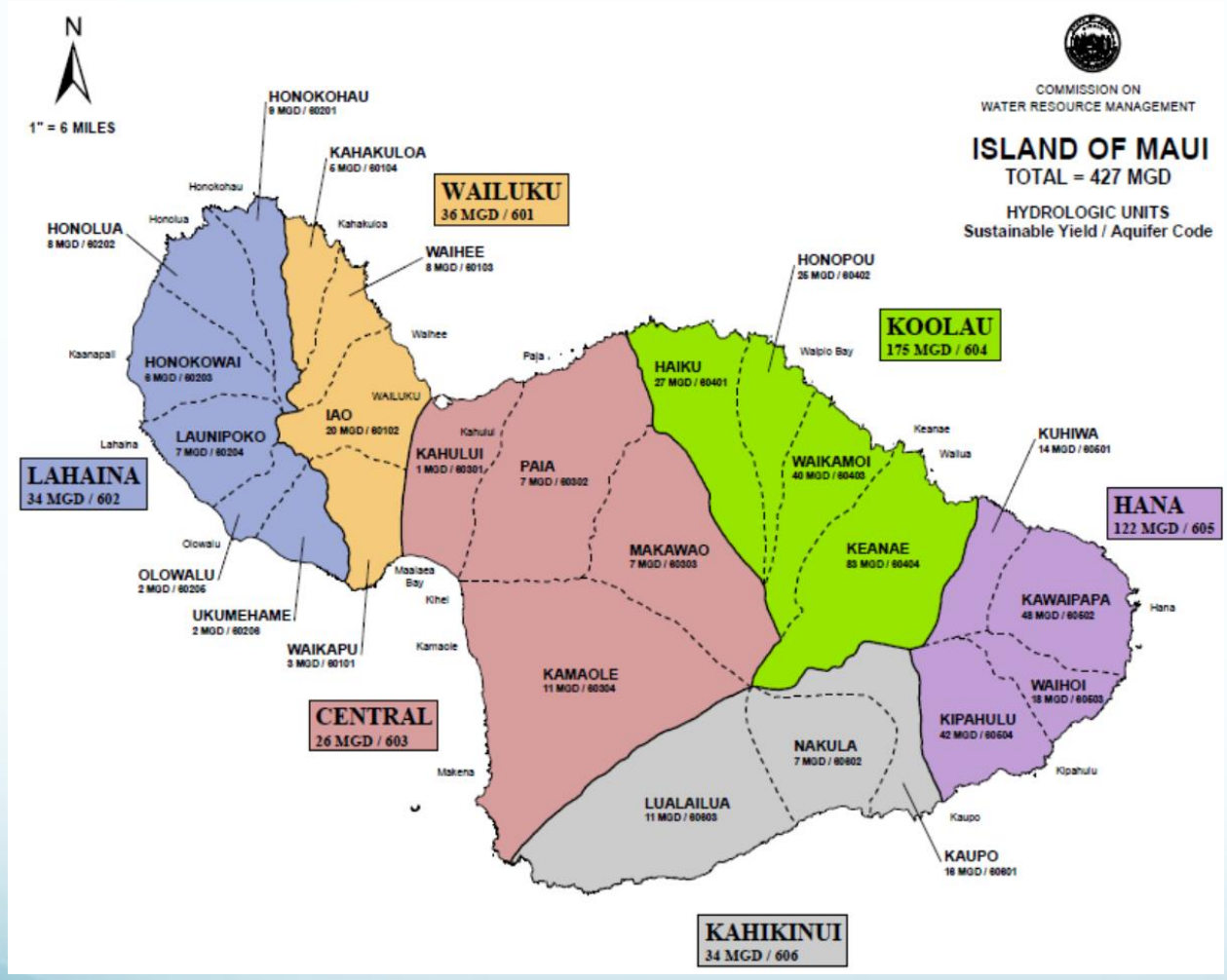
Population Based Water Demand Scenario: Based on the population growth rates for each community plan area in the Maui Island Plan, with updated growth rates in the 2014 Socio-Economic Forecast. Takes into account all water sectors excluding large agricultural demands which are not correlated with population growth. High and Low Cases are generated based on Socio-Economic Forecast. Projected agricultural water demand over the 20-year period is then added as a separate component for a comprehensive assessment of water demands.

Land Use Full Build Out Scenario: An alternative scenario projects water demand based on full development of the County General Plan, County Zoning and DHHL land use plans over an undetermined period

Drought and Climate Change: Uncertainty about natural climate and weather patterns, and about relationships among factors, make regional and long-term predictions very complex. *Climate Change Adaptation Priority Guidelines* incorporated to increase resilience and reduce vulnerability to risks related to climate change.

Agricultural Water Demand Scenario: Uncertainty about agricultural products market and regional crop water demand, the transition of sugarcane lands to other crops, potential future use of kuleana lands, and associated legal issues relating to water rights and priorities of use. Scenarios rely on stated assumptions and best data available.

Water Resource Availability: Groundwater



- The primary source of supply for the majority of water users on the island served by both county-owned and private public water systems.
- Replenished by rainfall including fog recharge and classified as a renewable resource. The amount of groundwater that can be developed is limited by the amount of natural recharge
- The groundwater sustainable yield (SY) is the maximum rate that groundwater can be withdrawn without impairing the water source as determined by the Commission on Water Resource Management

Water Resource Availability: Groundwater

- Sustainable yield of basal aquifers represents the maximum aquifer pumping rate assuming optimal placement of wells and pump sizes
- Drought conditions significantly impact recharge compared to average climate conditions, with a projected mean 23% decrease in annual recharge
- Withdrawals are also limited by:

➢ Water use permit allocations in water management areas

➢ Water quality/groundwater contamination

➢ Development cost and risk

Aquifer Sector	2008 SY	Drought Recharge Reduction (%)
Wailuku	36	29%
Lahaina	34	24%
Central	26	25%
Ko'olau	175	21%
Hāna	122	19%
Kahikinui	34	37%
Total	427	

Water Resource Availability: Surface Water

- There are 90 perennial streams in Maui, 82 of which have been diverted to some extent
- Supplies a small proportion of drinking water island-wide but is a significant source of supply in West Maui and Upcountry.
- Availability is uncertain due to multiple factors effects of diversions on the ecosystem, lack of numerical instream flow standards, lack of gages and legal issues.
- The CWRM's mandate is to establish instream flow standards (IFS) that will protect instream uses while allowing for reasonable and beneficial offstream use

Flows and IIFS	Low Q50	Low Q70	Low Q90	Q90
Na Wai Eha	63	49	31	31
East Maui	44	25	14	14
Lahaina (USGS)	40	31	22	22
Total	147	105	68	68
				IIFS (or Q90)
Na Wai Eha CWRM 2010	69	55	43	35.4
East Maui CC 1/15/16 CWRM H.O.	40		19	40
Lahaina (USGS)	40	31	22	22
Total	149	86	84	97

Reported Diversions, 2011-2015 Ave.
IIFS (Best Guess): East Maui 1/16/15 Hearing Officer+Q90Lahaina+Q90NaWaiEha
Issue: IIFS only represent a portion of the streams

IIFS versus Q on streams covered by the IIFS

Alternative Water Resources

Recycled Wastewater

WWRF	Treatment Level	WWRF Design Capacity	Recycled Water Produced	Recycled Water Used	% of Total Produced Used	% of Design Capacity Used	Application
Wailuku-Kahului	R-2	7.9	4.7	0.25	5.3%	3.2%	None
Kihei	R-1	8	3.6	1.5	41.5%	18.7%	Golf Course, Ag, Dust Control, Landscape, Fire Protection
Makena (Private)	R-1	0.75	0.08	0.08	10.6%	10.6%	Golf Course
Pukalani (Private)	R-1	0.29	0.19	0.19	100%	65.5%	Landscape
Haleakalā (Private)		N/A	0.18	N/A	N/A	N/A	Closed loop system; Sanitary purposes
Lahaina	R-1	9	3.84	0.88	22.9%	9.8%	Golf Course, Landscape, Nursery, Agriculture
Total		**25.9**	**12.6**	**2.65**			

Rainwater Catchment: Feasible where consistent rainfall

Stormwater Reuse : Capture and reuse of surface water runoff can provide non-potable water uses. Range in technologies: source reuse (ex. rain barrels and cisterns); small lot reuse (ex. vegetated infiltration basins), stormwater capture (injection well), stormwater storage (ex. detention basin), stormwater distribution (ex. ditch or pipe network)

Desalination: Seawater, brackish water or treated wastewater can be processed through several desalination methods. Brine disposal and cost have posted significant impediments

Resource Availability & Use

Resource	Available	Used	Balance
Groundwater	427	91	336
Potable Uses		29	
Nonpotable Uses		62	
Surface Water	Undetermined	362	
Potable Uses		11	
Nonpotable Uses		351	
Recycled Water	26	3	23

Demand Projections Water Use Rates

Land use based build-out: Based on water system standards 2002 *Water System Standards*, Domestic Consumption Guidelines and applied to equivalent zoning district. Residential use rates adjusted based on empirical consumption data. Agricultural use rates adjusted to comport with the Agricultural WUDP.

Department of Hawaiian Homelands: Water system standards applied to DHHL land use designations

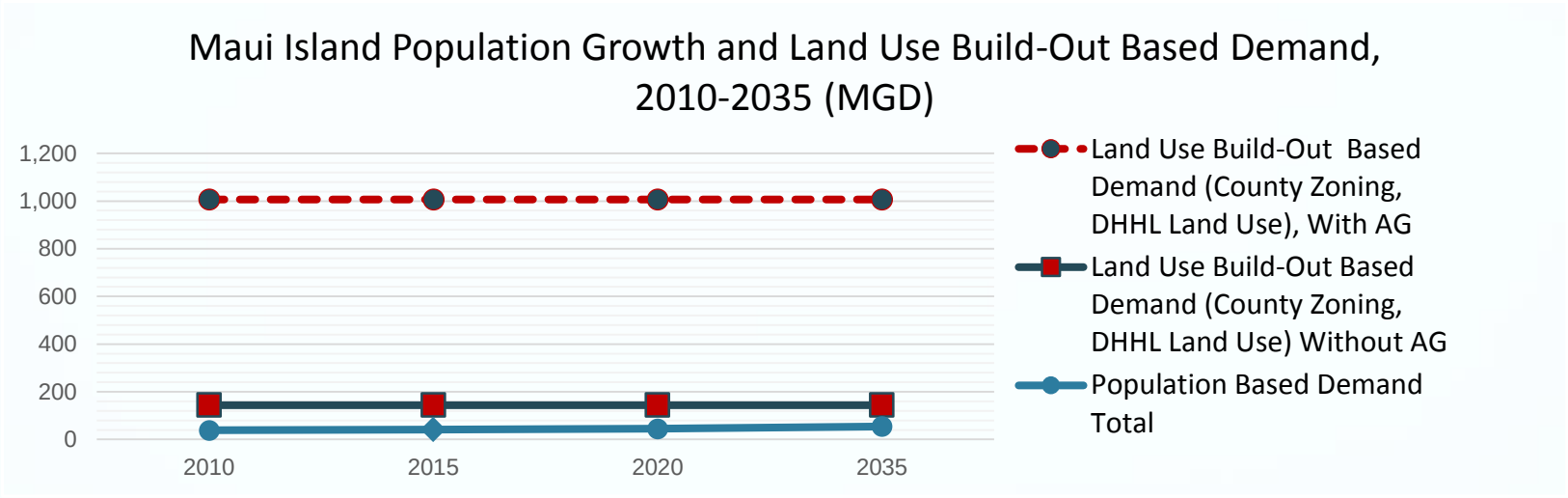
Population growth based: Projected based on actual demand, compared to historic use. Range includes high and low growth alternatives per 2014 Socio-Economic Forecast

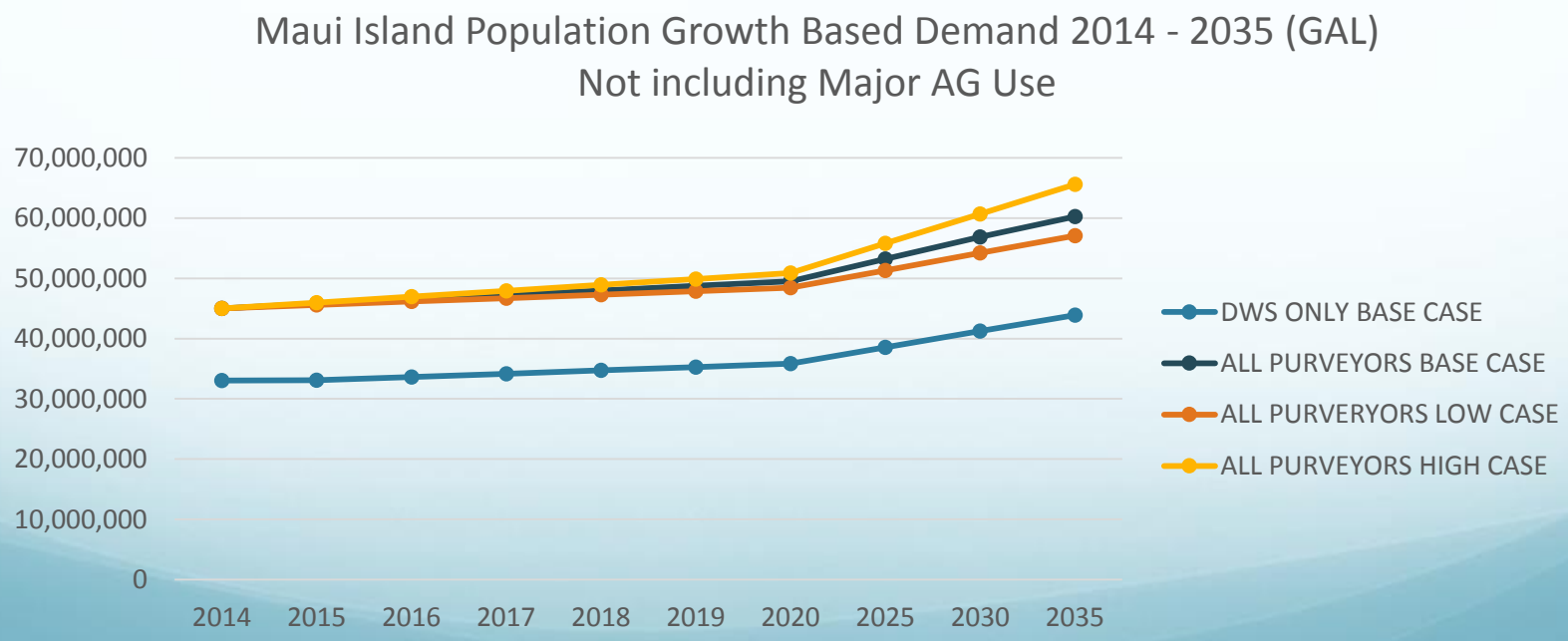
Diversified Agriculture: Average per acre water use based on Department of Ag water rates and CWRM

Lo'i Kalo: Per acre water inflow into lo'i and consumptive use based on CWRM data/contested cases

HC&S Lands: Potential use categories: Diversified crops, Irrigated Pasture, Biofuel, Monocrops and Forestry. Range include HC&S crop specific rates per the March 2016 "Diversified Agricultural Plan" and DOA crop specific rates

Projected Demand Scenarios





Projected Agricultural Demand

Agricultural Use	Total MGD
Kuleana/Lo'i Kalo	10.89 – 15.52
Department of Hawaiian Homelands	31
Diversified Ag	20.86 – 25.0
HC&S lands	22.5 – 124.45

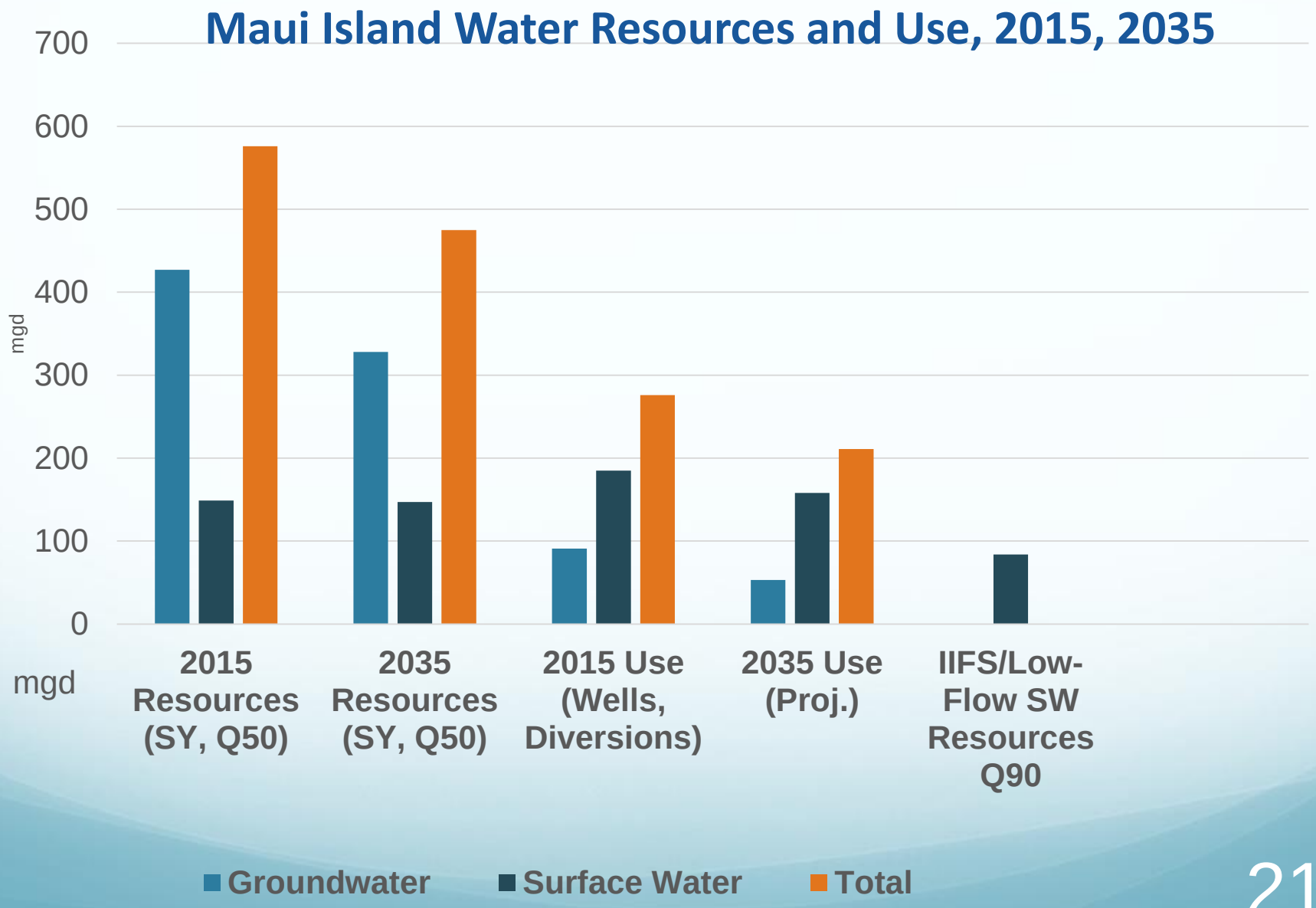
Kuleana/Lo'i Kalo: Range based on 2015 Ag Baseline and CWRM IIFS proceedings. Accounts for stream taro use

DHHL: DHHL's regional and island plans. Non potable demands for ag and pastoral use.

Diversified Ag: Range based on 2015 Ag Baseline and 20% increase, includes Kula Ag Park Expansion. Not including sugarcane and taro

HC&S lands: Range based on low to high scenarios: low: 25% of Important Ag Lands farmed; high: 100% of Important Ag Lands farmed. (HC&S "Diversified Agricultural Plan", 100% of plantation acreage represents 107.79 mgd)

Water Resource Adequacy



Plan Implementation

- 62 Island Wide Strategies and Policies that support planning objectives and reflect guiding principles
- Long range strategic water resource plan to inform and guide the MDWS capital improvement program (source, storage, infrastructure, conservation)
- CIP program identifies site specific improvements and costs
- Guide and advises the Maui County Council and the state CWRM in planning, management, water development and use and allocation of the island's water resources
- Apply to MDWS and other county agencies, privately owned public water systems as it relates to potable and non potable water use and conservation
- Sets forth allocation of water to land use by identifying water supplies (or conservation strategies) for planned growth per the MIP
- Island wide and regional plans to guide CIP with costs assessed on a 1 – 6 year basis
- There are several issues associated with a conservation program. Mandatory codes and regulations (e.g., requiring installation of fixtures that are more efficient than existing standards or that restrict some types of water use) are generally more effective and less expensive to implement than incentive programs, but in order to be effective some enforcement measures may be required. "Policing" conservation measures is resource intensive and not supported by the community. Lastly, while programs may reduce customer bills due to less consumption, rates are not likely to be reduced due to fixed utility costs. While it is beyond the scope of this WUDP to provide a programmatic plan for each public water system, the WUDP provides a framework for programs that can be evaluated and implemented to sustainably and cost-effectively manage the county's water resources.

Plan Implementation

- 62 Island Wide Strategies and Policies that support planning objectives and reflect guiding principles
- Refined regional strategies for source development (Sector Reports)
- Implementation: The plan goals and objectives are achieved if the adopted policies and strategies are pursued

http://co.maui.hi.us/2051/Maui-Island-Water-Use-Development-Plan

Mahalo!

Maui County DWS
Water Resources & Planning