

MEASURES	NOTES/CONSTRAINTS	SUPPLY (MGD)	20 YR EST COST (Capital, O&M) / 1000 gal)	CURRENT PATH	RESOURCE ORIENTED	YOUR STRATEGY - Do you agree with the various measures; are there others you would propose?
CENTRAL, WAILUKU & KO'OLAU (WEST PORTION) STRATEGIES - APRIL 30				Key Points:	Key Points:	Key Points:
The following generalized strategies are based on public input, studies and document review.				Bring water to needs	Protect water resources	
They are intended to gauge public acceptance of and feedback on generalized policies or measures.				Use existing infrastructure	Ahupua'a focused	
For your information, the columns labeled Current Path and Resource Oriented provide a sense of how the measures in the 1st column relate to existing practice as well as a more resource focused path.				Increase efficiency	Reduce water transport	
At this stage we focus on the range of options and their acceptability. In the next stage of the process options will be bundled and more costs provided. The information in the Central/Wailuku and Upcountry Region Descriptions provide useful background information.				Protect water resources	Adapt to local constraints	
					Diversified system	
Watershed and Aquifer Protection						
Invasive alien plant control, Native plant propagation, Reforestation, Ungulate control, similar activities.	DWS supports watershed partnership programs. Leverage state and private funding			X	X	
Expand watershed protection to lower elevations	Programs now focus on higher elevations (3000+-)				X	
Ahupua'a watershed based planning and management approach	Ecosystem ridge to ocean approach focused on stream system				X	
Watershed partnership grant program to maintain and improve watershed recharge and function.	Maintain and improve watershed recharge and function. DWS funding (\$2M 2016), leverage other funding			X	X	
Communicate with local experts, moku and community on resource management	Gain local knowledge, buy in and partnership				X	
Wellhead protection restricting land uses posing high risk of contamination	Proposed Well Protection zoning ordinance for County adoption			X	X	
Cesspool to septic system conversion reduce well contamination potential	State Tax Act 120 - \$10,000 tax credit to 2020 for qualifying conversions. Publicize, add incentives?				X	
Protect and recharge ground water during non drought periods to stabilize supply	Reduce pumping from aquifers - increased use of surface water, aggressive conservation and alternative sources				X	
Scientific studies to support decision making	Increase understanding of hydrogeologic and ecological conditions; increased monitoring			X	X	
Recharge ground water during nondrought periods to stabilize supply.	Craft programs to advance this goal.				X	
Use drought conditions as baseline to evaluate water supply and effects of water use	Future conditions not well understood. May vary geographically.				X	

Conventional Water Source Development						
Makawao aquifer basal well development at 1500 ft + elevation for growth and backup	Aquifer not well studied. High elevation pumping costs	4 to 6	\$4.5 - 6.00	X		
Ha'iku Aquifer basal well development. (Potential resource/medium-term)	Sustainable yield confidence ranking moderate, no deep monitor well present. USGS studies to assess high level groundwater and define hydrologic conditions and ground and surface water interaction needed. East Maui Consent Decree - difficulties initiating hydrologic studies	8 to 12	\$4.50	X		
Waikapu Aquifer basal well development	Private wells drilled for available sustainable yield	0 - 3		X		
Waihe'e Aquifer basal well development	High capital cost, smaller wells for limited yield of N Waihee per USGS study	3 to 4	\$3.8	X		
Surface water- Increase wet season use, provided Instream Flow Standards, kuleana, appurtenant, traditional and customary needs met	Surface water less expensive than well sources	?		X	?	
Add raw surface water storage at Kamole, Olinda or Pi'iholo Water Treatment Facilities	IFS, EMI diversion permits, EMI contract, land and critical watershed issues	300 MG storage = 1-2.5 mgd potential	\$5.15	X	?	
Increase capacity at Kamole Water Treatment Facility for wet season use	Flow characteristics of Wailoa Ditch and intake structure configuration, IFS, EMI diversion permits, EMI contract	6	\$3.50	X	?	
Increase capacity at 'Iao Water Treatment Facility for wet season use	Appurtenant rights, water use permits	9		X	?	
Honopou, Waikamoi, Keanae basal well development	Extend transmission for medium elevation well development. Aquifers not studied, sustainable yield likely to be adjusted down. IFS and transmission easement constraints	>20				
Increase Water System Reliability/ Flexibility						
Surface water-Connect Kamole Water Treatment Facility to Central Maui System	EMI contract	n/a		X	?	
Develop and maintain back-up wells even if more expensive	In event of major leak, equipment failure or other supply problems. Efficiency, reliability			X		
Increase Alternative Resources						

Kamole Aquifer, basal well development. Brackish wells for non potable uses for new development. Dual or private systems	Brackish quality appropriate for irrigation, desal and other nonpotable uses. Reported pumpage incomplete to assess available sustainable yield	?		X	X	
Expand R-1 system from Kihei Wastewater Treatment Facility	Committed service connections in dry season use leaves 0.7 mgd unused capacity. Restricted nonpotable uses	< 1	\$5.65 - 5.95	X	X	
Expand R-2 Kahului Wastewater Treatment Facility distribution and/or upgrade to R-1	Upgrade to R-1 needed, limited service areas	2.2		X	X	
Expand requirement for commercial properties within more than 100 feet of reclaimed water system to connect and use R-1 water for landscape irrigation	Amend Maui County Code, Chapter 20.30 which requires connection within 100 feet				X	
Desalination of brackish or sea water for ag irrigation	Energy costs. Disposal of brine	unlimited	\$5.2 for brackish, \$12.7 for seawater			
Capture stormwater for treatment or utilize HC&S reservoirs to store irrigation supply for diverse ag	IFS, EMI diversion permits, EMI contract, stringent state regulations for reservoirs. Insurance issues				?	
Program to use small greywater systems for small residential/commercial	State and possibly County regulation amendments needed				X	
Incentives for residential/small commercial catchment systems	Roof, tank, underground storage systems can be used for landscape water use				X	
Low impact project design for onsite water retention	Permeable surfaces, swales, water retention. Amend County code. Apply to new projects, cost effective				X	
Surface water efficiency programs	Improvements to stream diversions, conveyance systems, storage, agricultural meters to reduce loss				X	
Increase Conservation						
WaterSense standard for new development and existing retrofits	Amend County code. 20%-30% more water efficient than standard fixtures and appliances				X	
Convert to smart water meters	Provide consumers the means to monitor water use in real time, education, identify leaks				X	
Increase water fixture retrofit programs for existing development	Rebates, retrofits, give-away programs for residential and small commercial uses					
Large residential and commercial water audits and direct install	Conduct audit and immediately address issues.				X	

Require all new landscape irrigation systems to be water efficient	Amend County code, require plumbing permit. Est. 50% of potable residential water use is for landscape watering					X	
Adopt outdoor watering controls in dry areas	Amend County code, use community policing					X	
Outdoor water wasting and use controls (disallow overspray, washing without hose nozzle, etc.)	Amend County code, use community policing					X	
Water conserving landscape requirements for resorts, golf courses, public facilities	Amend County code to set standard. Golf courses currently must use nonpotable water					X	
County facility water conserving landscape program	Set an example. Use climate appropriate landscaping					X	
Incentive programs to convert existing landscape to water conserving	Turf removal programs are an example					X	
Require aggressive conservation in new development	Craft program to carry out policy					X	
More aggressive landscape water conservation measures in dry areas	Some standards or programs vary geographically					X	
Pursue a policy of aggressive water conservation at all times	Craft program to carry out policy					X	
Use water rates as means to encourage conservation	Tiered pricing can have this effect; equity is an issue				X	X	
Increase leak detection and water audits	Identify discrepancies between water produced and water consumed (billed). Increase system efficiency; may delay need to develop source		X		X	X	
Public education and outreach	Array of methods to instill water conserving culture; community events, media, schools, awards, etc.				X	X	
Targeted public education and conservation programs to large water users	Large users, schools, restaurants, etc.				X	X	
<i>This is a generalized and simplified exercise to demonstrate choices. Assume that all legal needs will be met.</i>							