

## Maui Water Use & Development Plan Survey Feedback Summary - Water Issues and Solutions

To better understand the wishes and concerns of residents and interests on Maui Island, community members were polled on topics through paper and online surveys. These surveys were constructed to gather public input on local water resource issues and potential solutions. The Maui water Use and Development Plan survey had **166 respondents; 51 handwritten (March 2016 Survey) and 115 online (Preliminary Options and Measure, June 2016)**.

❖ Of the total, most originated from Upcountry areas (Kula, Makawao, Pukalani, and Ha'iku) at 62 respondents (**or 37%**), Central Maui at 33 (**20%**), East Maui (Hana, Kaupo, Ke'anae, Nahiku) at 30 (**21%**), Kihei and Lahaina with 21 (**15%**) and 10 (**6%**), and responses respectively. Pa'ia and Pu'unene had one response each. Notable themes gathered from Maui residents centered on issues and potential solutions that include\*:

- Public Trust Doctrine and other legal issues related to water rights and diversion
  - Native Hawaiian cultural uses
  - Technologies for re-use, capture, storage, and preservation of water resources.
  - Drinking water quality protection
  - Groundwater resource over-extraction
  - HC&S closure
  - Agricultural support
  - Runoff
  - Restrictions on new and current land development
  - Meter waitlists
  - Water pressure concerns in specific areas
  - Improving communication with county residents
  - Increasing educational outreach to schools
- \*All themes not present in every region*

Written responses regarding water issues and solutions differed significantly between regions and professions.

- Four mailed in surveys discussed water quality, prevention of water contamination at all stages, runoff, reefs, taro farming, stream diversions, equity, critical infrastructure protection and calls to monitor all new growth and development.
- Upcountry residents are concerned with water service capacity, the secondary effects of HC&S closing (including spring loss), water support for agriculture, water quality preservation, fire prevention in former sugarcane lands, limiting wastefulness, service disconnections, drought mitigation, and implementing rainwater catchments. Residents discussed limiting aquifer use.
- Hana residents surveyed want stream water restored at scales ranging from proposed requirements of 100% rainwater catchment for new development and any stream extraction out of the question to interest in equally sharing water with the rest of Maui. Residents view themselves as having the primary rights to water from the watershed area.
- Hana High School students tend to believe that Maui DWS and the county at large is talking down or misleading them and a majority are strongly interested in learning more about Maui's water situation. 100% of those surveyed wanted stream flows returned. They worry about water for East Maui subsistence farmers and the health effects of septic system contamination at Hana Bay.

- Central Maui is strongly concerned with streamflow return, affordable housing before new development permits, status of Maui aquifers and mentioned greywater toilets and landscaping, cultural use of stream waters, and allowing neighbors to join together to share cost of public line extensions.
  - South and West Maui were concerned with water resource contamination, HC&S water issues, recommended greywater utilization, invasive species control, and native plant restoration.
- ❖ 112 online respondents answered 13 questions, some with the option for write-in responses.
- Questions 1, 2, and 3 regarded demographic information including residency (see introduction), use of Maui County Water system (**92%**), and whether they use the same method to irrigate their landscape (**84%**). 3 respondents (two plus one write-in) indicated they used greywater for irrigation or other outdoor uses, 2 others indicated they used rainwater catchments, and three reported they used stream water for irrigation.
  - Question 4 asked how knowledgeable do residents consider themselves about water issues on Maui, with 42 saying they are very knowledgeable (**37%**), 67 are somewhat knowledgeable (**58%**), and 6 are not very knowledgeable (**5%**).
  - Question 5 had 86 respondents discuss what would help them learn more about water issues and solutions. Respondents mentioned newsletters to homeowners, public meetings, commitments to transparency, email announcement opt-in, presentations on specific methods (e.g., wastewater treatment and reuse), county expansion to social media, region-specific sharing of information, news columns, and seminars on water law.

**6. WOULD YOU BE WILLING TO INCREASE YOUR WATER BILL TO SUPPORT ONE OR MORE OBJECTIVE – BY HOW MUCH?**

	No more	10%	20%	30%	up to 50%	more than 50%	Total
A. Adequate water to meet the needs of all users -- with limited restrictions on water use	52.94% 27	11.76% 6	11.76% 6	7.84% 4	7.84% 4	7.84% 4	51
B. Reliable water service -- with minimal service interruptions or drought restrictions	11.36% 5	43.18% 19	22.73% 10	15.91% 7	4.55% 2	2.27% 1	44
C. Adequate water for diversified agricultural needs -- available when its needed	25.00% 13	25.00% 13	26.92% 14	9.62% 5	7.69% 4	5.77% 3	52
D. Adequate water resources for future generations -- characterize and protect ground and surface water resources	15.19% 12	30.38% 24	15.19% 12	15.19% 12	12.66% 10	11.39% 9	79

#	Other (please specify)	Date
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- Respondents to Question 6 discussed commitments for which that residents would pay more on their water bill. Some written responses noted the inability to pick more than one option for different parts of the question. This potentially introduced *error* into the responses, as some mentioned they'd pay the same increased rate for two different things. (NOTE: The survey is found to contain an error because it did not allow respondents to choose both A and B, or both C and D.)

Fig. 1: Q6

Further write in answers for question 6 (33 responses) discussed allocating funds from different areas, drought use restrictions, allowing contested case and surface water use permit application decisions to be made before

CWRM approves water allocations, impact fees for new water meters, increase of water storage, and subsidization for local agriculture production. A significant number stated opinions about stream water diversion without the question being asked.

**7. WATERSHED AND AQUIFER PROTECTION MEASURES – DO YOU GENERALLY AGREE OR DISAGREE WITH THE FOLLOWING MEASURES?**

	Agree	Disagree	No opinion or not sure	Total
A. Use an ahupua'a (comprehensive ridge to reef) approach to watershed management	66.96% 75	14.29% 16	18.75% 21	112
B. Expand programs to control invasive and nonnative plants and ungulates (pigs, deer, etc.) and expand reforestation measures (existing County Dept. of Water Supply program)	90.18% 101	6.25% 7	3.57% 4	112
C. Expand watershed protection to lower elevations (the County Dept. of Water Supply program focuses on upper watersheds, while lower watersheds also affect ground and surface water)	82.57% 90	6.42% 7	11.01% 12	109
D. Increase funding and involvement by state and non-county water system providers in watershed protection partnerships and reforestation programs (County Dept. of Water Supply currently provide significant funding)	85.32% 93	5.50% 6	9.17% 10	109
E. Water providers should fund watershed management programs in proportion to the benefits on groundwater recharge	55.45% 61	19.09% 21	25.45% 28	110
F. Water providers should fund watershed management programs with broader ECOLOGICAL benefits, even if groundwater recharge benefits are less direct	55.45% 61	16.36% 18	28.18% 31	110
G. Consult with the Native Hawaiian community, Mokus, and local experts on watershed resource management	61.11% 66	20.37% 22	18.52% 20	108
H. Near drinking water wells, restrict land uses that have a high risk of well contamination (a 'wellhead protection ordinance' based on well capture zones is proposed)	83.64% 92	10.91% 12	5.45% 6	110
I. Maximize groundwater recharge during non-drought periods to stabilize supply (reduce pumping, increase use of surface and alternative water sources, require aggressive conservation)	86.24% 94	4.59% 5	9.17% 10	109
J. Increase funding for scientific studies of hydro-geologic and ecological conditions to support decision making	78.18% 86	13.64% 15	8.18% 9	110
K. Use drought conditions as the baseline for determining water supply availability (average climate conditions are currently used, drought conditions are more cautious)	66.36% 73	16.36% 18	17.27% 19	110
L. Do not allow new stream diversions for non-instream uses until numerical 'instream flow standards' are adopted by the State	62.04% 67	19.44% 21	18.52% 20	108

- In the 19 write-ins for question 7, respondents advocated developing ecology-focused best management practices, adding a visitor or rent-a-car fee for groundwater protection, consulting with the Native Hawaiian community, mauka to makai stream flows, public hearings at accessible times, and expansion of reforestation programs at lower elevations. Respondents also questioned the jurisdiction of the county over these matters, whether the type of pesticide and/or best management strategies would be taken into account regarding wellhead protection areas, and whether Maui DWS is working with ranchers and watershed partnerships to restore riparian ecosystems.

## 8. WATER CONSERVATION – DO YOU GENERALLY AGREE OR DISAGREE WITH THE FOLLOWING MEASURES?

	Agree	Disagree	No opinion or not sure	Total
A. Adopt a restrictive water conservation standard for NEW development	80.00% 88	15.45% 17	4.55% 5	110
B. Provide low and no cost water fixture retrofit programs for existing development	77.48% 86	12.61% 14	9.91% 11	111
C. Existing and new development should EQUALLY bear the responsibility for water conservation	78.90% 86	18.35% 20	2.75% 3	109
D. Adopt outdoor water use and wasting controls that apply to everyone (must use a hose nozzle, do not allow water to run off your property when irrigating or washing car, etc.)	73.39% 80	17.43% 19	9.17% 10	109
E. Adopt water-conserving landscape requirements for resorts, golf courses, and public facilities-- even in cases where reclaimed water is used	78.38% 87	17.12% 19	4.50% 5	111
F. Provide incentive programs to convert existing landscape to water-conserving landscape	82.73% 91	10.91% 12	6.36% 7	110
G. Require aggressive conservation measures in NEW development in ALL AREAS of Maui Island	76.15% 83	14.68% 16	9.17% 10	109
H. Require more aggressive landscape water-conserving measures in DRY areas than in wet areas	74.31% 81	17.43% 19	8.26% 9	109
I. Pursue a policy of aggressive water conservation AT ALL TIMES (not just during drought)	66.36% 73	25.45% 28	8.18% 9	110
J. Continue to use water rates as way to encourage conservation (equity can be an issue)	58.72% 64	25.69% 28	15.60% 17	109

- Question 8 had 24 write-in responses about water conservation measures. Proposed ideas written in discussed stopping South Maui water-intensive residential landscaping, relaxation on restrictions on use of reclaimed water (including R1 water), raising of water rates, enforce ban on mid-day lawn watering, marginal water rates increasing on consumption, increase of reclaimed water infrastructure and water catchments, develop a well at Pu'unene Naval Air Station, consider having the state take over EMI ditches. Suggestions included leading by example by not planting where irrigation is necessary, uncoupling sewer and water rates (for equity reasons), and restriction of stream contamination.

## 9. ALTERNATIVE WATER RESOURCES – DO YOU GENERALLY AGREE OR DISAGREE WITH THE FOLLOWING MEASURES?

	Agree	Disagree	No opinion or not sure	Total
A. Maximize reclaimed wastewater use for irrigation uses (reclaimed water supply is limited, relatively high cost, less reliable than groundwater)	78.18% 86	10.91% 12	10.91% 12	110
B. Require commercial properties to bear more responsibility for using reclaimed water (costs will increase; currently properties within 100 feet of reclaimed water lines must connect)	69.44% 75	18.52% 20	12.04% 13	108
C. Adopt programs to facilitate grey water systems for small residential and commercial irrigation uses (grey water generally comes from showers and laundry)	91.74% 100	3.67% 4	4.59% 5	109
D. Provide incentives for residential and small commercial catchment systems	87.04% 94	5.56% 6	7.41% 8	108
E. Require 'low impact' project design for new development (increase onsite water retention, provide water for landscape irrigation or aquifer recharge)	89.81% 97	8.33% 9	1.85% 2	108
F. Increase desalination of brackish water or sea water for irrigation (energy intensive, brine issues)	33.33% 36	44.44% 48	22.22% 24	108
G. Capture wet season or flash storm water for storage in unused reservoirs for MUNICIPAL uses (diversion and reservoir requirements are issues, priority uses must be satisfied first)	79.25% 84	9.43% 10	11.32% 12	106
H. Capture wet season or flash storm water for storage in unused reservoirs for diversified AGRICULTURE (diversion and reservoir requirements are issues, priority uses must be satisfied first)	91.74% 100	0.92% 1	7.34% 8	109
I. Continue to maintain existing plantation irrigation systems for movement of water for potable and non-potable uses (resolve ownership and management issues)	69.09% 76	15.45% 17	15.45% 17	110

- Question 9 had respondents discuss alternative water resource measures. Leading responses included adopting grey water for small residential and commercial (92%), storm water capture into reservoirs for 'diversified agriculture' (92%), and mandating 'low impact' project design (90%). Desalination rated the least favorable, with 44% of respondents disagreeing with the idea, the second least favorable was requiring commercial properties to bear the responsibility of using reclaimed water at 19% disagreeing. See table on next page.
- 21 Written responses to question 9 called for wide adoption of water storage & greywater, increasing requirements for preservation and/or creation of coastal wetlands (especially at golf courses), calls for public ownership of EMI and A&B water to be distributed according to public trust doctrines, and incorporating systems thinking into planning.

**10. WATER SYSTEM FLEXIBILITY AND RELIABILITY – DO YOU GENERALLY AGREE OR DISAGREE WITH THE FOLLOWING MEASURES?**

	Agree	Disagree	No opinion or unsure	Total
A. Develop groundwater to maximize reliable water supplies (within the sustainable yield of aquifers; more expensive than use of surface water)	50.48% 53	24.76% 26	24.76% 26	105
B. Diversify water sources to the most cost-effective combination of groundwater, surface water, and aggressive conservation (after kuleana and public trust uses are satisfied)	84.91% 90	3.77% 4	11.32% 12	106
C. Promote surface water efficiency programs to reduce water loss (improvements to diversions, ditches, storage, metering, etc.)	90.48% 95	2.86% 3	6.67% 7	105

- Question 10 polled residents on three strategies to promote water system reliability and flexibility. In summary, the responses gathered strongly favored prioritization of the use of surface water efficiency programs (90%) followed closely by diversified use of water resources (85%). Groundwater polled over 50% with nearly 25% disagreeing on its further development.
- 16 residents wrote in about other measures to insure water system flexibility and reliability. Recommendations included water catchments, grey water, and tree planting requirements for big box stores, implement automatic shutdown showers at beaches, R1 wastewater reuse, efficient agricultural methods, insure “mauka to makai stream flows,” and concerns that any further groundwater development would far exceed maximum sustainable yields and damage the basal lens.



## 11. CONVENTIONAL WATER SOURCES - DO YOU GENERALLY AGREE OR DISAGREE WITH THE FOLLOWING MEASURES?

	Agree	Disagree	No opinion or not sure	Total
A. Increase use of surface water for municipal needs during the wet season when kuleana and public trust uses are satisfied (may require expanded water treatment facilities and increasing storage facilities)	75.53% 71	12.77% 12	11.70% 11	94
B. West Maui: Develop wells in northern part of the West Maui region (Honolua and/or Honokahou aquifers) and transport water to growth areas in the central part of the West Maui region (within sustainable yield of aquifers)	46.81% 44	30.85% 29	22.34% 21	94
C. Central/Upcountry: Develop basal wells in Makawao aquifer (at 1500+ foot elevation for growth and backup; aquifer not well studied, sustainable yield of aquifer is uncertain)	45.26% 43	27.37% 26	27.37% 26	95
D. Central/Upcountry: Develop basal wells in Ha'iku aquifer (maintain a buffer from the sustainable yield of aquifer until aquifer studies and impacts on streams are determined; legal constraints)	58.33% 56	18.75% 18	22.92% 22	96
E. Central/South/Upcountry: Develop brackish basal wells in Kamole aquifer to serve new development (for irrigation, desalination, other non-potable uses; remaining sustainable yield of aquifer is uncertain)	49.47% 47	26.32% 25	24.21% 23	95
F. Central/Upcountry: Connect Kamole Water Treatment Facility, which currently serves Upcountry only, to Central Maui System (instream flow standards and East Maui Irrigation diversions and long-term management are issues)	48.42% 46	25.26% 24	26.32% 25	95
G. Central/Upcountry: Add water storage at Kamole, Olinda or Pi'iholo Water Treatment Facility (critical watershed areas, land ownership issues)	76.04% 73	7.29% 7	16.67% 16	96

- Question 11 asked residents about technical measures concerning water resource development. Increasing surface water for municipal needs after public trust issues are satisfied and adding water storage at Kamaole, Olinda, and/or Pi'iholo areas were agreed with at 75.5% and 76% respectively. Northern West Maui was viewed as the worst area for well development.
- Question 11 had 19 respondents voice opinions on potential changes to water supply systems. Write in responses discussed using former Maui Land & Pineapple wells, worries that Haiku groundwater is contaminated, worries about high costs of developing wells and modeling sustainable yields, start taking water from the A&B EMI surface water systems, and implementing pumped storage for water and R-1 reclaimed water systems.

## ANY OTHER COMMENTS ON IMPORTANT PROBLEMS, PRIORITIES OR SOLUTIONS RELATED TO WATER RESOURCE PLANNING, MANAGEMENT OR USE ON MAUI ISLAND OVER THE NEXT 10-20+ YEARS?

- Question 12 had 42 give input about about important problems, priorities and solutions that should be incorporated into the Maui water use and development plan. Responses recommended sharing figures on water resource availability and environmental impacts with the community, public volunteering coordination, stopping or slowing development, water department operated wastewater recycling systems, distributed wastewater processing, have a serious look at options for upcountry metering (including new meters in existing subdivisions), attract talent at Department of Water Supply by raising engineer salaries, limit stream diversion as best as possible, and provide water for Native Hawaiian uses.

According to the feedback generated by these public surveys, DWS should put forth a plan reduces concerns with perceived overuse of **groundwater**, ensures **stream flows and cultural use** based on law and case law, addresses **meter waitlists**, ambitiously incorporates **new technologies**, preserves **water** quality, improves **community dialogue and educational outreach**, supports **local agriculture**, and addresses primary and secondary implications of **HC&S closure**.

## Survey Handed out at Meetings in Spring 2016

During the first round of meetings, a survey was handed out at meetings and placed online for a short time. The results of those surveys follow.

- Mailed in (~4)
  - Write-in Water Issues
    - Insure water quality+
    - Prevent groundwater and surface water contamination
    - Runoff+
    - Reef health
    - Save the turtles
    - Taro Farming
    - Water Pressure in Kelaweia Mauka Park
    - Stream diversion
    - Fairness
    - “Show me the Water”
    - Critical infrastructure protection
  - Write-in Water Solutions
    - Monitor growth and development
- Upcountry Residents (~10)
  - Write-in Water Issues
    - Limit developments in upcountry Maui
      - Except Hawaiian Homelands
    - Supply farmers water supply+
    - Capacity +++++
    - Water Quality++
    - Conservation
    - Equity+
    - Waste
    - Disconnections
    - Upcountry Meter List++
    - Unused wells
    - Inadequate waterlines on Oma’opio road to farm
    - Perception of under-regulated tourism industry while private residents is highly regulated.
    - Climate Change
    - Drought++
    - Agriculture
    - A&B to maintain existing ditch system
    - Fire prevention in former cane fields
    - Secondary effects of A&B closure+ (e.g. spring loss at Maliko)
  - Write-in Water Solutions
    - Rainwater catchment
    - Groundwater storage to alleviate lack of water meter??
    - Restore Some water to all East Maui streams
    - Continue ditch use to preserve secondary water users after A&B operations cease
    - Issuance of Meters to existing upcountry landowners++



- Central Maui (~10)
  - Write-in Water Issues
    - Streamflow Return+++
    - Traditional and customary rights
    - In-stream flow standards
    - Native plants
    - Agricultural Practices
    - Show me the water enforcement
    - Enforce affordable housing provisions before new development takes water+
    - Aquifer status and quality of surveys
    - Chloride ion concentrations in monitors wells
    - Drought awareness
  - Write-in Water Solutions
    - Implement strategies for increases in clean water going aquifers (“recharge”). +
    - Changing focus on selling all available water
    - Address groundwater deficits+
    - Graywater Toilets
    - Composting Toilets – example at [bullitcenter.org](http://bullitcenter.org)
    - Ban water intensive landscaping
    - Xeriscaping
    - Rainwater catchment and storage
    - Set in-stream flows
    - Take over Wailuku water company
    - Stay on new permits before new development
    - Replant Taro in areas inundated by restored stream.
    - Preserve & improve wetlands
    - Visibly report chloride concentrations in wells
    - Ag use should not include golf courses
    - Gray water for yard irrigation
    - Charge developers on project basis
    - Allow multiple users share cost for public line extensions
- South Maui(~4)
  - Write-in Water Issues
    - Water inf. Contamination
    - o HC&S Water+
  - Write-in Water Solutions
    - HC&S Water redistribution
    - Support for Composting Toilets
    - Graywater (home & commercial)
    - Invasive species – incentives for control
    - Native plant restoration
    -
- Hana (~3)
  - Write-in Water Issues
    - Stream Flows++
    - Wastewater Treatment and Injection wells
    - Return of East Maui Water
    - “Mauka to Makai”+

- Write-in Water Solutions
  - Graywater Irrigation
  - Composting Toilets
  - Restoration of Stream flows++
    - With enough to go to high pop. Areas
    - All back to streams+++
    - With future assessment to determine distribution
  - Stop All Development
  - Rainwater Catchment
    - Relax regulations on rainwater catchment for county users
- Hana High School (~19)
  - Write-in Water Issues
    - Return of East Maui Water (100% mentioned)
      - “People are in need of water where the water is being taken for the rest of the people”
    - East Maui Streams (100% mentioned)
      - Stream Health++++
    - Estuaries++
      - Fishing and prawning impacts
    - “Mauka to Makai”
    - Hana Bay waste effluent contamination
    - Taro (Kalo) Farmers+++++
      - Keanae
    - Water Pressure
    - Perceived continuance of deprivation of East Maui Taro Farmers even after HC&S stoppage
    - Perception of being lied to/talked down to++++
  - Write-in Water Solutions
    - Give Back East Maui waters for stream flow (100% mentioned)
      - Complete restoration++++
      - New development *should* only get water from rainwater catchment, not from streams
      - Develop a plan to equally share water between east and the Rest of Maui
      - Extraction from east maui “out of the question”
      - To insure right to water use before other uses+
    - Incorporate Cultural uses into water plan.
      - Cultural and water resources often viewed as same thing
      - Common complaint – why put redundant things on the questionnaire?
    - Follow Public Trust Doctrine (not said directly but spoke of laws relating to water rights by public) with respect to East Maui water+++++++
      - Water code Ch. 174C
      - Perception that A&B actions are Illegal++
    - Throw out HB2501
    - Increase Outreach and education efforts regarding how water system functions+++++++
      - Specific knowledge++
      - How to survive drought conditions
      - Available online
      - Simple concise language
      - Market outreach efforts+
      - Direct outreach in schools+++
      - More information about laws regarding water++