

Summer 2019 Maui Island Edition

Sustainable Aloha

It's a Lifestyle...

Research - Analysis - Insight - Advocacy - Solutions



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The background of the entire page is a lush, detailed illustration of various tropical plants. It features large, dark green monstera leaves with characteristic holes, smaller green leaves, and palm fronds. The colors range from deep forest green to bright, vibrant greens, creating a dense and naturalistic feel.

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Note From the Publisher..

Someone recently asked me if I believed that I could get people to take action if there is not an immanent crisis impacting their lives. I get it – people in general are very busy these days and it can be difficult to spark their interest in anything but survival. I told him I believe there are different ways to get people's attention. Given that crisis prevention is the primary goal of Sustainable Aloha, I had to say YES – I believe people will act before there is a crisis. However, I believe it requires outreach and education combined with patience and persistence.

I hope our readers appreciate that we avoid sensationalism and exaggeration while sticking to the facts. We believe our readers are intelligent and capable of making their own decisions. We also like to make the information enjoyable to read and absorb.

That said, I believe our bias with regard to sustainability is obvious. Our goals are stated in our mission statement. We want people to be thoughtful stewards of this land and its resources. Most of all, we want people to be INVOLVED in the process!

This issue focuses on water. When it comes to island life, ensuring the sustainability of natural resources is intrinsically important. We cannot realistically borrow from any other system as folks do in larger geographical areas. Furthermore, restoration of natural resources, once destroyed, may take much more than several generations. Some of our planet's islands have been rendered uninhabitable because of human neglect and abuse.

We have the technology and knowledge to prevent the destruction of the Hawaiian Islands. As a matter of fact, many of our laws are sufficient to protect the resources, but we lack proper management and implementation. We have been engaging in the “cherry picking” style of environmentalism, which is a slow and arduous way to accomplish our goals.

Systems thinking, the establishment of proper departments and the development of a sustainability plan for each island is something that needs to be done before it is too late.

Furthermore, it is not wise to continue to believe we may litigate ourselves into integrity. I encourage readers to understand that we can't just wait for the government to fix our problems and continue to pass them off as someone else's responsibility. It is going to take the education and action of citizens to get our county government to implement proper sustainability goals and establish best practices. We may need to bring in outside experts as well. We will also have to use more mediation and task force development in order to get things on their way.

Modern humans have walked far away from the practices of the ancient Hawaiians. In early days everybody had their role. Today, everybody needs to ask their heart – “What is my kuleana?” We are all on the same team and everybody is needed.

You won't find a list of complaints and blaming in Sustainable Aloha. We like to take a

Ideas expressed in Sustainable Aloha (SA) by our variety of writers, advertisers and artists are not necessarily the views of the organization.

*We vow to do our best to deliver honest and accurate information. If you find something in SA that you believe is inaccurate, please contact our staff at:
info@sustainablealoha.solution
Mahalo*

problem-solving approach to the issues we bring up. I hope you will take the time to read the well- researched stories in this issue and consider supporting SA with an ongoing donation, one time donation or by becoming an advertiser. The more people we can reach, the more likely we are to influence folks to become involved before it is too late. You may make a donation by going to our website at: <http://www.sustainablealoha.solutions>.

*Alana Kay
Publisher and Editor*



The Hawai'ian language uses diacritical marks. SA acknowledges and respects their use, however, we will be using them only in proper names until the time when we have a large enough staff to make sure all of the Hawai'ian words are presented accurately.

Mission Statement:

Seeing the need for a coordinated effort between residents, visitors and government to create/re-create a sustainable Maui Island, we are providing an information hub for expression, discovery, analysis and idea sharing with our on-line and in-print publications.

We believe that everybody has a role to play in sustaining our natural resources and believe that it is important to equip people with an abundance of information so they may make decisions and take necessary action.

We further emphasize that sustainability is an ever-evolving concept that requires a systems approach in order to be successful. All aspects of our lives are intertwined and inseparable - from natural resource services to the economy and everything in between.

Engaging in an open forum concept of problem solving, Sustainable Aloha is committed to being a beacon to that is always fertile, inspirational, life-giving and life affirming.

Kaheawa Wind Power is one of the largest wind farms in Hawaii. It is located on the island of Maui above the town of Maalaea in the West Maui Mountains. Phase one (KWP I) of the project was completed in 2006 by developer and operator First Wind and produces 30 MW from 20 GE Energy 1.5 MW wind turbines. Do you believe this is a wise choice for clean energy? Send in an editorial comment if you have an opinion.





Photo by Alana Kay

Every Day Sustainable Solutions

with Alicia Wood

Water is an important resource that every person, animal, and plant needs for survival. Here in Hawaii, we are blessed with plentiful freshwater for drinking and irrigation. However, that could change if we continue to mismanage this precious resource. The water system functions mauka to makai, from the top of the mountains, down the streams, and into the ocean. The forest gathers water from rain and almost 50% from fog, recharging groundwater supplies and preventing erosion, which protects coastal environments from sedimentation. Native forests are best equipped for this job but are being taken over by invasive species, which gather much less water and can actually increase erosion. Devastatingly, half of Hawaii's original watershed forests have been destroyed, and only 13 percent of those that remain are in active protection.

On the Hawaiian islands, freshwater commonly occurs as a body of water called a freshwater lens that floats on saltwater and is separated from the saltwater by a transition zone of brackish water. USGS surveys reveal the shocking fact that freshwater lenses across the Hawaiian islands have shrunk, meaning less freshwater is available in our groundwater storage. Not only have we reduced our ability to recharge our water supplies with the destruction of our native forests and reduction in orographic rainfall due to climate change, but, as population and tourism continue to increase, so will the demands we place on our water supplies unless we change our lifestyles.

Water Conservation- What can you do?

When most people think about conserving water, they only think about direct usage, which is the best, first step. However, much of the water we consume is in the form of other products or services, called a virtual water footprint. For example, it takes 3 liters of water to produce 1 liter of bottled water. One pound of chicken requires about 518 gallons of water versus one pound of beef, which requires 1847 gallons! So, cutting back on beef is actually cutting back on your personal water consumption (and risk of heart disease, and methane in the atmosphere).



SustainableLiving808.com

Everyday Sustainable Solutions



It is important to note that water intensity isn't the only factor to consider when choosing what to eat or what products to use but it is good to be aware and make water minded choices when possible. It is also a good practice to make sure your high water intensity items are not being grown or produced in a water-deprived region.

Here are some items to help reduce your direct water use

Shower heads

Since 1992, a maximum of 2.5 gallon per minute (GPM) is the federally mandated flow rate for new shower heads but some states require that it be 2 gpm. The lower you go, the more water and energy savings you get.

Install low flow aerators to your sinks

Low-flow aerators reduce the flow of water from the faucet without reducing pressure, saving both water and energy. Depending on the aerator and usage, you can save anywhere from 2 to 16 gallons of water per day.

Install a Toilet Tank Bank

This is a simple device that you place in the tank of your toilet to use less water per flush. Avoid using bricks or rocks because they are materials easily eroded by water and can damage plumbing.

Water Footprint Calculator

A water footprint calculator is a great tool to get a general sense of how much water you use and what you can do to save. It only takes a few minutes and can be a great learning tool for adults and keiki alike.

*The goal of Maui County is to reduce water use by 8% and together we can make it happen!
Visit SustainableLiving808.com to calculate your water footprint today and get product links.*





*To purchase Darcy Fiero's photography, go
to www.darcyfiero.com*



Darcy Fiero (95)
PHOTOGRAPHY

Maui County Fair

Photo by Alana Kay

This year's fair is October 3-6

www.mauifair.com





Featured Farm

By Maggie Lloyd

As I made the drive from Wailuku to Kula, I wasn't sure what to expect with O'o Farm. I had done a few google searches, browsed their website, and had seen pictures of a modest farm with smiling workers, but I still didn't have a clear picture in my head of what the farm would entail. In a brief phone call to set up an interview, Ancil Clancy, the General Manager of the farm, gave me instructions to drive up a dirt road and park where I saw other cars parked at the top, passing the "The Tour Starts Here" lot. The hand painted sign at the entrance was a clear indicator that I was at the right place, and the drive up a hill past an orchard was a beautiful greeting to the farm. Clancy was eating when I caught up with him; his lunch consisting of fresh vegetables, and by fresh, I mean the veggies were picked (at the farm) maybe an hour before he ate. He was gracious enough to talk to me during his break.

The farm was started 19 years ago when two surfers, Louis Coulombe and Stephan Bel-Robert, wanted to have a true farm-to-table restaurant on Maui; in fact, they wanted to own the farm and grow the food specifically for the restaurant. At 8 acres, they produce 32,000 pounds a year in food, half of which goes to their restaurant, Pacific'o, in Lahaina, and the other half is served right there on the farm at the end of the tour. They have a quick turn-around - about 50 days - with 130 different crops, every week planting and harvesting about 6 rows of crops, all with 17 employees. The food they grow is organic, and is even fertilized with horse manure that they get from the horse ranch next door to them, which the farm then donates carrots to go towards feeding the horses. The coffee that they grow is recognized in the top ten percent of specialty coffees in the world. They grow, mill, roast, barista and sell the coffee right there on the property. The name O'o came from a mix of the two restaurants that they originally opened: Pacific'O and I'O. O'o is also a type of large steel breaker bar for breaking up rocky soil, and became better known as a planting stick later on.

With the growing popularity of agricultural tourism, O'o Farm is proof of how agro-



*O'o Farms is located at 651 Waipoli Rd., Kula, HI
Website: www.oofarm.mybigcommerce.com
Phone Number 808-667-4341*

tourism can boost the economy and help create a sustainable environment for agriculture. The Hawaii Tourism Bureau helps support the movement by bringing out 5-6 groups a year with tour guides from all around the world so they can experience the farm to help promote the business. It's not just with O'o Farm, though, as they can create an entire day experience from touring the farm for coffee and lunch, go to the lavender farm for soaps and lotions, spend some time in the pumpkin patch across the street, go for a wine tasting, etc., all of which is upcountry and in a close area. While they do promote agrotourism, Clancy made sure to say that the farm welcomes and appreciates kama'aina, and offers a discount for lunch. They accept volunteers every Wednesday from 8:30-11:30 and welcome tourists and kama'aina to join in the fun. They do have intern opportunities as well, and accept interns from the high schools and the local colleges.

After the interview, I had a chance to roam around the farm, while Clancy had to continue about his day with driving over to the neighboring ranch to pick up more horse manure to spread around and fertilize the crops. There was healthy growth everywhere I looked, from the orchard to the coffee trees (my favorite) to the rows upon rows of fresh vegetables. Everyone I spoke with was pleasant and happy to share their experiences or even what they were doing that day. The gift shop at the top of the hill boasts coffee, fresh vegetables, jams and jellies that were made by the Chef from extra vegetables and fruits, as well as a

great view of the farm. There were plenty of snacks to pick up, and some souvenirs, such as shirts and hoodies, to purchase. The hope for those that visit the farm, is that they will want to learn about farming, and to leave feeling inspired to plant and grow food on their own, whether they are flying back home or driving.

A single quote from Clancy during the interview sums up the experience entirely: "Good food for good people."

For more information or to make reservations for the farm tour or Pacific'O, please visit their website: <http://oofarm.mybigcommerce.com/>





O'o Farms

*Photography by
Maggie Lloyd*





Silversword on Haleakala
by Alana Kay



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Darcy Farnell
PHOTOGRAPHY

174C-2(a) It is recognized that the waters of the State are held for the benefit of the citizens of the State. It is declared that the people of the State are beneficiaries and have a right to have the waters protected for their use.

Riparian Rights

174C-7 (a) There is established within the department a commission on water resource management consisting of seven members which shall have exclusive jurisdiction and final authority in all matters relating to implementation and administration of the state water code, except as otherwise specifically provided in this chapter.

Appurtenant Rights

174C-48 (a) No person shall make any withdrawal, diversion, impoundment, or consumptive use of water in any designated water management area without first obtaining a permit from the commission.

Department of Water Supply *Konohiki Rights*

14.06A.050 The director, with approval of the mayor, may declare a water shortage whenever the water supply becomes inadequate in any area in the County or County Water system because of a period of drought, an infrastructure or mechanical malfunction, natural disaster, or other event causing a water shortage.

Department of Land and Natural Resources

Commission on Water Resource Mgmt.

14.01.070 Native Hawaiian Water Rights. Article 1 of this title shall not be construed to amend or modify rights or entitlements to water as provided for in section 221 of the Hawaiian Homes Commission Act, 1920, as amended, and native Hawaiian rights customarily and traditionally exercised for subsistence, cultural, and religious purposes in accordance with article XII, section 7 of the Constitution of the State of Hawaii.

Board of Water Supply

14.01.020 The County water code is intended to comply with and complement the State water code, chapter 174C, Hawaii Revised Statutes. The County water code seeks to provide a just and fair distribution of water to the people of the County of Maui.

Native Hawaiian Rights

Correlative Rights

West Maui Watershed



Na Wai Eha


East Maui Watershed

Untangling our Streams

Does Maui Island Really Have Enough Water to Sustain Current Population Growth Rates?

By Alana Kay

Abundantly self-sustaining, Maui Island, Hawaii is a miracle of creation. More than one million years in the making, from the silver sword adorned peaks of Haleakala to the streams of Iao Valley, the natural resources have been negatively impacted since the first humans stepped foot on its shores. The East and West Maui watersheds are some of the most prolific on the planet, boasting 90 perennial streams, yet Maui's water supply is in jeopardy. Is it possible to reverse decades of mismanagement?



Nestled between the volcanic formations of the West Maui Mountains, the rushing waters of the Wailuku River make their way through Maui's I'ao Valley under a shroud of misty clouds on most days. Consistently ranking as one of the rainiest spots on the planet, the Pu'ukukui rain gauge atop the 5800-foot high crest of the mountains records an average of 362 inches of rainfall per year. As a result, Na Wai Eha (The four rivers) Waihe'e, Wai'ehu, Wailuku and Waikapu, provide Maui Island with tens of millions of gallons per day of fresh rainwater. The underlying Iao Aquifer supplies the lion's share of Maui's fresh water supply.

Often referred to as Kepaniwai, Iao Valley is a State Park and National Natural Landmark situated a short distance north of Wailuku town.

Na Wai Eha are central to the original ahupua'a delineations in this, the Pu'ali Komo-hana moku.

33 miles away on the windward side, approximately 5400' above Hana town is Big Bog. Situated on the border of Haleakala National Park, it has recently been discovered that it may be the rainiest spot on the planet, outpacing Pu'ukukui and Mount Waiele'ele on Kaua'i Island. There are three moku on the Eastern side of Maui, Hamokua-loa, Koolau and Hana. These Moku contain 32 ahupua'a, due to the large number of streams there.

Why is the rainfall on Maui Island so prolific?

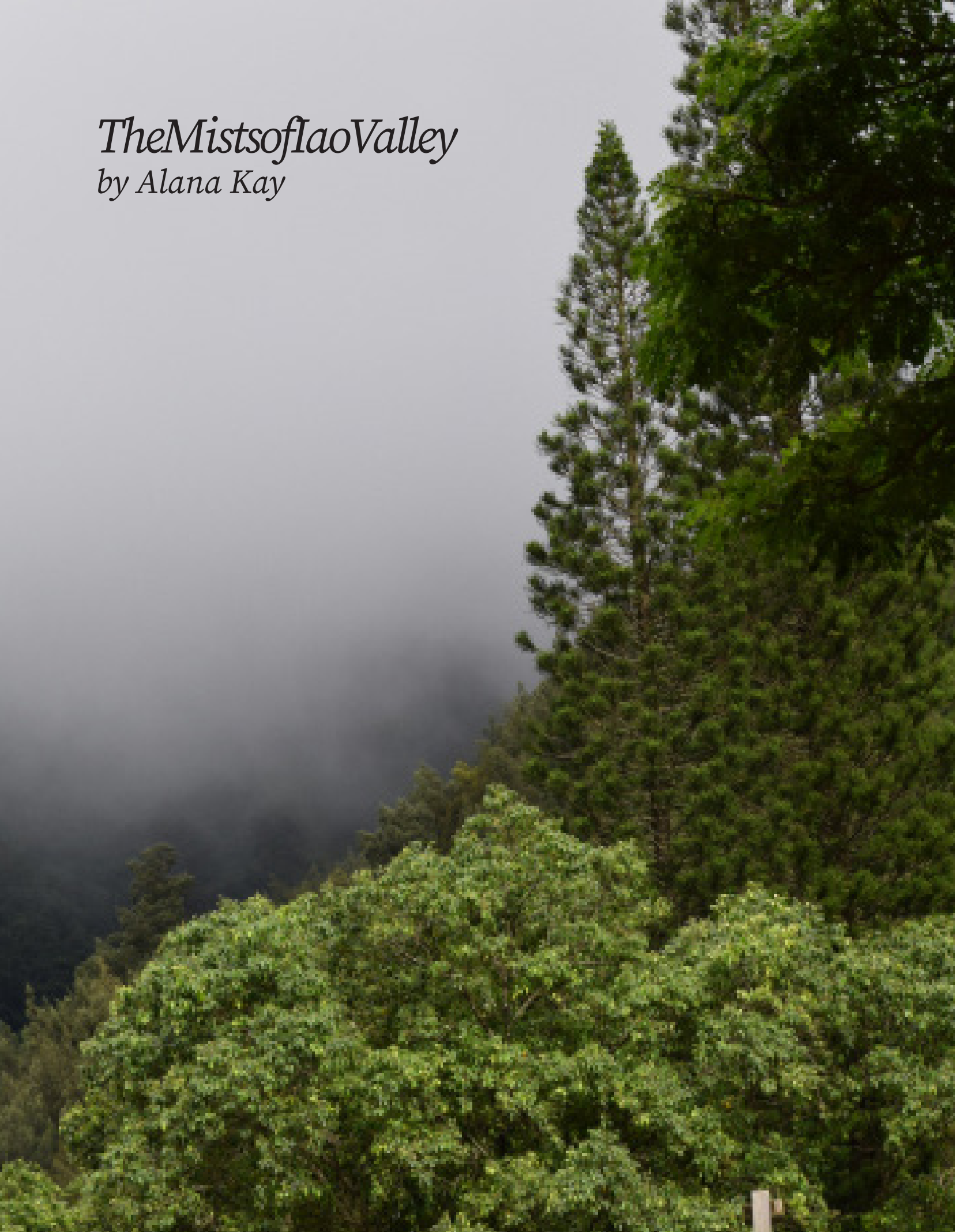
Most of the rainfall on Maui Island is from orographic rain. Orographic rainfall is the result of winds and moisture interacting with the geography and topography of a region. The elevation and slopes of the island are ideal for the formation of this type of precipitation. This feature is the primary reason why, even though the island is surrounded by a salt water ocean, it is miraculously self-sufficient, especially with regard to fresh water. Islands such as Lana'i, with an entirely different topography do not produce such abundant precipitation.

Is there a reason to believe Maui has a water shortage?

Continued on Pg. 30



The Mists of Lao Valley
by Alana Kay



Given that most of Maui's water comes from Na Wai Eha, the demise of the Iao Aquifer is cause for alarm. The fresh water lens of the I'ao Aquifer as well as the brackish transition zone between sea water and the lens continue on a gradual track of demise. Concern by citizens has been expressed as early as 1990. Adjacent wells show the same level of demise. Testing of the I'ao aquifer and nearby Waihe'e and Wai'ehu wells began in 1984 and figures are available, but difficult to find and decipher. The Commission on Water Resource Management (CWRM) provided me with the graphs that show the tracking of the different levels that are being monitored. These graphs are challenging to comprehend by the lay person, including myself. The graphs measure mean sea level, fresh water, brackish transition zone and underlying sea water. There will always be fluctuations, but the important thing is how they measure in relation to each other. All of these levels have moved out of natural integrity since monitoring began and as far as I can tell, there has not been any improvement as a result of any efforts made over the past two decades.

A petition to designate the aquifer as a State groundwater management area was initiated in 2001 by the Maui Meadows Homeowner's Association. In 2003, the CWRM seized control of the I'ao aquifer because the County of Maui failed to take necessary measures to mitigate the demise. A quote in an article on the Earth Justice (Fragile Maui Aquifer to be managed by State Authorities) website from July 2003 outlines the issue:

"We petitioned to designate the I'ao Aquifer because it's our primary source of drinking water and, unless management efforts are stepped up, the aquifer will continue down a path to certain destruction: ground water levels are declining; the chloride content of pumped water

(which measures the salt content of water) is increasing and has seriously contaminated certain wells; and there is a continual increase in the level of salt water underlying the fresh water lens. All the while, Maui County Department of Water Supply has done little to nothing to develop alternative sources of water. Indeed, the Water Director at the time that we filed our petition stated that there was no source problem. We came to believe that the concerns of the public would only be addressed by intervention of the State through the designation process. Our agenda was simple: protect the aquifer," explained Jim Williamson, Vice President of Maui Meadows Homeowners Association.

Since the aquifer was designated, has anything been done to slow or reverse the damage?

According to Jeff Pearson, Director of the DWS, "We have spread our pumping over a larger area.....ceased using some wells... and continue to look for other sources."

The DWS is looking at tapping into the fresh water that has been discovered to lie well below the aquifer. Given everything we know that keeps the integrity of the aquifer intact, this would not be wise. A quest such as this does not address the conservation side of the equation, it merely moves crisis out to a further point in time.

According to the CMRM:

"We have encouraged the County Water Department to spread its pumping from a few wells to a wider configuration of sources. Over the years, it has ceased using two wells, sealed the huge Wailuku Shaft fairly recently, replacing its yield with four other wells. There were potentially three contested cases regarding their wells (caprock, basal, and high-level aquifers),

Protection of the Hydrologic Cycle is integral feature of sustainability of water supply:

(Information taken from the State of HI Water Resource Protection Plan)

The hydrologic cycle refers to the constant movement of water between the ocean, the atmosphere, and the Earth's surface. A continuous cycle of water can be easily traced on small oceanic islands like Hawaii. Solar energy drives the hydrologic cycle by causing evapotranspiration. Evapotranspiration is the loss of water from soils and open water bodies through evaporation and the transfer of water from plants to the air through transpiration. Moisture in the air is carried by trade winds up mountain sides, where it cools and condenses, and finally falls to the land surface as rain or fog drip. Plants immediately absorb and use some of the rain and fog drip, but the remaining volume of water infiltrates through the ground surface, runs off to the ocean or streams, or evaporates into the atmosphere.

Infiltration is key to sustaining ground water resources. Human activities, especially agricultural and urban activities, alter infiltration and runoff patterns, affecting the components of the hydrologic cycle. As rainwater wets the land surface, shallow infiltration saturates the uppermost soil layer and replaces soil moisture used by plants. Thereafter, excess water percolates slowly downward and to recharge ground water bodies and support stream flow in perennial sections. One factor that affects the rate of infiltration is the permeability of the ground surface. Permeability describes the ease with which water travels through a substance. Ground surfaces with high permeability allow rapid infiltration of rainfall. Conversely, low permeability surfaces like concrete and asphalt inhibit infiltration, causing water to pond or flow across the surface as runoff. Therefore, different land uses can encourage or inhibit infiltration depending on the built environment.

and one dispute over Wailuku Shaft. The dispute was resolved and now that it is sealed, all matters are completed. The caprock case was withdrawn, and the high-level case resolved with the stream contested case (Na Wai 'Eha). We have discouraged the county from excessive pumping from the neighboring Waihee Aquifer System Area, warned about reliance on Maui Lani wells that depended on return irrigation flow from sugar irrigation, and presided over new wells in Waikapu Aquifer System Area – and warned that proposed capacity there exceeds sustainable yield; so far, that capacity has not come on line – negotiations between private owners and the county for operations manage-

ment continue. We continue to discourage requests for new wells.

The Commission continues to monitor water levels and the thickness of the transition zone in Iao, which is very slowly approaching a new equilibrium upset by years of concentrated pumping. We have deep monitor wells in Iao and in Waihee. We also track reporting from all wells to gage performance across the aquifers. The Commission has been continually contributing to research efforts to improve estimates of recharge, and to evaluate total yield on a conservative basis.“

Some action has been taken, yet the numbers are still fairly grim. None of the comments from these key agencies address the supply side of the problem. Also, conversations I have had with department heads reveal that as long as we maintain the status quo, everything is fine as far as they are concerned. Furthermore, several key people believe that climate change has a great deal to do with the decline of the aquifer, therefore they don't see an urgent need to change our immediate behavior here.

Others, including myself believe we should think globally but act locally. We do not have immediate control over climate change, but we do have immediate control over the health of our water system and there are certainly things we can and should do.

In addition to climate change, what is causing the diminished capacity?

Fresh, brackish and salt water are held in delicate balance throughout a system that consists of dikes, rocks of varying porosity – some above ground level and some below. Through time, the water flows generally from the higher elevations to the sea with denser bounding rock holding everything in integrity. Almost everything that humans do affects this delicate balance. The fresh water lens needs to be replenished by natural means and it should also not be over-pumped by humans.

With regard to the I'ao Aquifer, at this time, we are burning the candle on both ends. Although we have a maximum daily withdrawal rate that is set by the CWRM, many still believe that we are pumping too much from the system with regard to sustainability. At the same time, unabated human activities have impaired the orographic rain and aquifer replenishment processes. Not much is being done about the

supply side of the equation.

Invasive species, heat islands, pavement, construction and stream diversions, to name a few, interfere with nature's processes:

1) Maui does not have the carrying capacity of older islands. To get a perspective on this, consider that Oahu is 18% smaller than Maui, yet current figures show that the sustainable yield of Maui's aquifers is 357 mgd compared to 393 mgd for Oahu. Many people believe it is not possible to control population growth. Population growth on Maui is higher than that on some of the other islands. Tourism plays a role in natural resource consumption with approximately 40% of the inhabitants of Maui at any time are tourists. Perhaps an economy that is gradually steered away from tourism would be a large part of the solution.

2) During the last few decades, Hawaii Commercial and Sugar Company (HC&S), whose parent company is Alexander and Baldwin (A&B), diverted tens of millions of gallons of water from Na Wai Eha and the East Maui Watershed for sugar cane production. Mahi Pono, the new owners of 41,000 acres of ag land in the central valley, are trying to maintain the right to continue the same level of stream diversion as the previous owner, A&B. Some experts believe that their diversified agriculture plans do not require near as much water as they claim to need. These excessive diversions are throwing off the natural flow of water through the island.

3) Warmer air holds more moisture than cooler air before it turns into rain. Heat islands (artificially elevated temperatures due to human development, roads and vehicles) created as a result of the development of the windward slopes and valleys create a condition where the moisture in the air has to rise further on the moun-



Maui Department of Water Supply Grants to Watershed Protection Groups:

Auwahi Forest Restoration Project \$120,000
Countywide Watershed Protection \$305,000
East Maui Watershed Protection \$550,000
East Molokai Watershed Protection \$250,000
Hawaii Agriculture Research Center \$56,500
Honokowai/Wahikuli Watershed Management \$75,000
Leeward Haleakala Forest Restoration \$200,000
Miconia Containment and Removal \$260,000
Puu Kukui Watershed Preserve \$320,000
West Maui Watershed Protection \$480,000

*Departments and Boards involved in Water Health, Conservation
and Distribution*

Federal:

U.S. Geological Surveys
Environmental Protection Agency

State:

Commission on Water Resource Management
Department of Land and Natural Resources
Department of Health

Maui County:

Department of Water Supply
Board of Water Supply
Water Resources Committee

Important Water Supply Documents

*State of Hawaii Water Code
Maui County Water Use and
Development Plan
Hawaii Water Resource Protection Plan
Hawaii Stream Flow Assessments*

tain slope before it turns into orographic rain.

4) There is low permeability of the land over the aquifer because of human development, diminishing the recharge that occurs when water freely flows and trickles into the ground.

5) The diverted water from Na Wai Eha by Wailuku Water Company (WWC) is used to supply water to South Maui, which is a biological desert and does not produce its own water. Water from this hydrologic unit is also used to supply parts of Paia and the North shore because the Hamakuapoko well there has been contaminated for decades and is only used during emergency drought circumstances. A legal settlement between the County of Maui and Du Pont Chemical Company provided funds to rehab the well, but the time period provided to make use of the funds lapsed before the county made use of them. Should we spend the money to clean the water in this well?

6) Invasive trees have canopies and root systems that interfere with the flow of water through watersheds. Some of the watershed protection partnerships are working on this.

7) Wetlands that have been filled in and developed for housing were created by nature to be a buffer zone for waters moving into and out of the island. As a result, the natural brackish buffer zone has been substantially diminished

causing sea water encroachment on ground water supplies.

Any number of these things can and should be addressed. None of these has anything to do with climate change. They are all human interference and we simply need to decide on our priorities and change our ways.

Maui Island has an abundance of water, but it has been mismanaged for so long. The DWS has tried to address the demand side of the equation, but nothing has been done to address the supply side of the equation – the ecosystem. Our ecosystem has been seriously disrupted and Maui County is not doing near enough to abate and rectify the damage. Are we waiting for the state or the federal government to fix our problems or will we take responsibility?

What roles do the CWRM and DWS, and the Department of Sustainability and Environment play in these issues?

The CWRM is charged with managing 376 perennial streams in the State of Hawaii. It is simply common sense to draw the conclusion that it would be difficult to properly manage an inventory of this volume. They are a legislative and enforcement body. This department has been responsible for producing detailed scientific reports that may be used as the basis for integrated water resource management. I recommend taking a quick look at them, as they are pretty impressive. They include, but are not limited to:

*Hawaii Stream Assessment
Instream Flow Standards*

The DWS concerns itself delivering clean water efficiently and finding new sources. It is an administrative body with approximately 205 em-

ployees. It is not equipped or educated in science, ecology and environmental causes. The Water Use and Development (WUDP) plan that was mandated by the establishment of the State Water Code in 1987 and created under the direction of the department, addresses environmental conservation extensively and intelligently, but it is not really equipped to concern itself with it as far as I have been able to determine.

When I asked DWS head, Jeffrey Pearson what his department was doing to protect the eco-system, he stated that the DWS provides grants to several watershed protection and restoration groups. (See info box on pg. 34) While it is certain some of the money is being put to good use, the motivation of some of the groups may be questionable because it would appear that the foxes are guarding the chicken coup. When asked if there is accountability for the use of the funds, I was told there is accountability, but exact details were not given. A local water quality specialist told me that she does not believe there is proper accountability for the expenditure of these grants. At the very least, I do not believe that they are working toward predetermined goals. In the absence of a master plan, it would be difficult to quantify results.

Realistically, it takes a staff of water engineers and educated environmental scientists to properly manage a water system such as ours. Highly qualified professional level personnel in other fields, such as health care, are in short supply on Maui. It follows that finding highly qualified personnel for the DWS would also be challenging. I will let the readers decide if they feel Maui County government, and subsequently the tax payers, should invest in more qualified personnel on the county level.

The Department of Sustainability and Environmental Protection is not yet established as to its roles.

The Mayor's office has an Environmental Coordinator under the Department of Economic Development who acts as his environmental liaison.

If we destroy our water supply, is desalination a solution?

Desalination is expensive and a huge bio-hazard in and of itself. The WUDP also discourages desalination. This is simply a biological band aid anyway. Band aids prove to be temporary solutions in the long run because they always cause another problem. Nature had things working just fine, so let's work with nature to keep things in proper working order.

Other problems caused by years of human manipulation:

- 1) The problem with the previously established sustainable yields in the central area of the island is that millions of gallons of diverted water has created artificially high sustainable yields in the related aquifers. These artificially established sustainable yields are likely to diminish substantially because of the public mandate to slow the large corporate diversions. Alexander and Baldwin's ability to do so was based on an antiquated concept of water use. Citizens and watchdog groups have been prevailing in legal battles to reclaim public trust water rights in recent years. Because of the changes in sustainable yields in already developing areas such as Kahului, urban plans need to be revised.

2) Maui County does not own all of the water delivery infrastructure. Wailuku Water Company (WWC), owns a substantial amount of diversion and delivery infrastructure and subsequently charges the county of Maui for delivery of water that it diverts. WWC charges the county 860% more than East Maui Irrigation, with others such as Maui Land and Pine and Hawaiian Homes charging even more.

3) WWC is largely responsible for water delivered to South Maui. South Maui is a biological desert and produces no precipitation, yet it uses 70% of the water from the I'ao hydrologic unit. Development continues in South Maui at a fairly rapid pace, but common sense suggests this may be a fatal error.

4) Hawai'ian cultural practices as well as river flora and fauna have been negatively impacted by the massive diversions. Indigenous Hawai'ians used the water from the rivers for farming and kalo production, while native fish, crustacea and mollusks that spawn in the stream and return to the ocean relied on the mauka to makai connection of the natural stream flows. Fish ponds that relied on brackish water have also been affected.

What is being done at this time to take care of our water?

Instream Flow Standards have finally been established by the CWRM. An instream flow standard (IFS) defines a quantity of flow of water or depth of water which is required to be present at a specific location in a stream at certain specified times of the year to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.

These standards were mandated with the establishment of the water commission, but were very detailed and complicated, so it has

taken a long time to be completed. The document is available on line.

Maui County Water Availability Policy dubbed Show Me the Water was an attempt to put responsibility for determining water sources on the developer. It is a bit complex, so if you are interested, please go on line to Maui County Code, Chapter 14.12 to study it. This approach does not generally fit into integrated water resource management.

Purchase of WWC is regularly on the negotiating table. Many do not feel that the existence of a private utility of this type should be legal. However, it indeed is legal as long as it is approved by the Public Utilities Commission. In fact, WWC's legality has not yet been solidly established because they were denied, appealed and then put on hold while instream flow standards were established. In the meantime, the county of Maui has made a few efforts to reclaim the infrastructure owned and controlled by WWC, with the most recent attempt made by mayor Alan Arakawa in 2018.

The council did not approve the purchase, with some council members such as Kelly King questioning whether the purchase cost could be recouped in the long term. It seems to me that the money spent would be worth it in so many ways, notwithstanding the fact that it is difficult to convince for profit ventures to put conservation in front of profits. This company has clearly demonstrated that it does not put conservation first. It seems that the water use issues will not be solved unless Maui County takes back control of this vital infrastructure. What do you think?

IFS for the East Maui streams have been set and settled by a contested case hearing. The CWRM prioritizes small stream users over

Doing Their Part

We have been following Steve and June Jolicoeur on their journey to Hawaii Island to build eco-friendly housing. They encountered a mountain of obstacles, notwithstanding the eruption of Mauna Loa in 2018. They were able to continue their project despite the fact that the eruption was looming just five miles away. As a matter of fact, the tiny house on wheels turned out to be a viable solution for folks living in number one lava zones!





Continued on Pg. 44

Capturing the Beauty of *Hawaii*



Darcy Fiero (D.F.)
PHOTOGRAPHY



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Darcy Fiero (D.F.)
PHOTOGRAPHY

corporate entities, so any continued corporate water diversions, including Mahi Pono, regardless of the duration, will not impact the recent returns of water to those streams.

Conclusions:

Our naturally balanced and sustainable water system has been tangled up by human manipulation for centuries. The fix is not going to be easy, but if humans are going to continue to live on Maui or any other island for that matter, they are going to have to change their thinking. Beginning with an accurate analysis of the problems and engaging in systems thinking, restoration may be achieved. To continue down a path of certain destruction does not make sense. Integrated Water Resource Management (IWRM) appears to be the latest best practice and in an ecosystem such as Maui Island, I believe it to be an imperative.

According to Robert M. Hirsch, Chief Hydrologist, USGS:

“Traditionally, management of water resources has focused on surface water or ground water as if they were separate entities. As development of land and water resources increases, it is apparent that development of either of these resources affects the quantity and quality of the other. Nearly all surface-water features (streams, lakes, reservoirs, wetlands, and estuaries) interact with ground water. These interactions take many forms. In many situations, surface-water bodies gain water and solutes from ground-water systems and in others the surface-water body is a source of ground-water recharge and causes changes in ground-water quality. As a result, withdrawal of water from streams can deplete ground water or conversely, pumpage of ground water can deplete water in streams, lakes, or wetlands. Pollution of surface water can cause degradation

of ground-water quality and conversely pollution of ground water can degrade surface water. Thus, effective land and water management requires a clear understanding of the linkages between ground water and surface water as it applies to any given hydrologic setting.”

The author further asserts that, “Effective policies and management practices must be built on a foundation that recognizes that surface water and ground water are simply two manifestations of a single integrated resource.”

According to the United Nations Department of Economic and Social Affairs, the Integrated Water Resources Management approach has now been accepted internationally as the way forward for efficient, equitable and sustainable development and management of the world’s limited water resources and for coping with conflicting demands.

With regard to IWRM, there are computer models that use all known water data to determine any action’s effect on the entire system. It appears we are well on our way to having a great deal of the necessary information needed to accomplish this. Please refer to the documents completed by the CWRM and DWS over the last several years.

After years of investigating I have to honestly say coordinating the work of all related departments and working toward quantifiable goals is no man’s land and this is why we are not solving our problems. All aspects of water supply and delivery are managed separately, and each department or entity is doing what it believes it should be doing and simply putting one foot in front of the

Continued on next Pg.

other. At this time, there is no department at the county level that is truly at the helm. This could be achieved if we establish a department for IWRM. IWRM needs to be at the forefront of everything we do and be the overarching function that brings everything together.

Instead, conservation is cherry picked and heavily litigated. Furthermore, water is highly politicized. If we continue on this path we will soon be living on an island where only the really wealthy can afford to live (some may feel we are already there, but that is another story) because the water will be too scarce and expensive, or we may not be able to live here at all. Perhaps a handful of people would remain and live close to the land as the ancestors did. This has already happened on some of our planet's islands.

Many I have talked to through the years believe Maui Island should be an example for the rest of the planet. A good place to begin would be by demonstrating our ability to work together to restore our eco-system. I believe it can be done.

Questions, comments, corrections and clarifications of the information in this article are welcomed. Please send your comments to info@sustainablealoha.solutions. Please mention if you would like your comments published in the next issue as an editorial.

A huge Mahalo to the State Commission on Water Resource Management, especially Charley Ice and all of the other departments to include the Office of Economic Development and the Department of Water Supply, who answered questions quickly and participated in interviews.



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Mana Kay



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KULEANA

OPPORTUNITIES TO
VOLUNTEER

Leilani Farm Sanctuary www.leilanifarmsanctuary.org

Join us on Monday and Wednesday mornings at 9:00 a.m. to help out at the farm. Projects may include cleaning the barn, gardening, carpentry, spreading wood chips, animal grooming, handyman jobs, deck cleaning, tree trimming, manure collection, weed whacking, mulching, window washing, cleaning rabbit pen, grass cutting, chain sawing, chipping, painting, concrete work, trail maintenance, invasive plant removal, fence installation/repair, and more. Your help will make a meaningful difference to the animals and visitors at Leilani Farm Sanctuary. To participate, please email your RSVP to info@leilanifarmsanctuary.org

Auwahi Forest Restoration Project www.auwahi.org

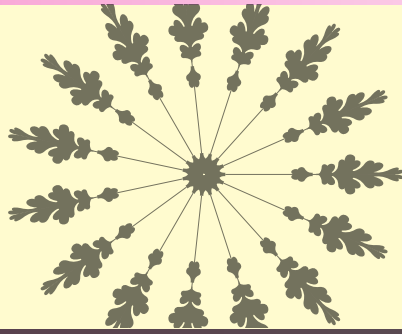
Disproportionately impacted by grazing, wildfire, and displacement by agriculture and human settlements, tropical leeward forests are among the most critically threatened of ecosystems in Hawai'i and worldwide. Despite their degraded state, Hawaiian leeward forests remain important refugia harboring high numbers of threatened species including over 25% of Endangered Hawaiian plant species.

Auwahi leeward forest was previously known to be among the most diverse of Hawaiian ecosystems. Currently, Auwahi is among the world's most endangered tropical dry forests with 9 species listed as Endangered with USFWS and 7 listed as endangered with IUCN Red List status. Culturally, leeward forests are highly valued by native Hawaiians for ethnobotanical source materials, especially durable hardwoods for tools and weapons, and species with utilitarian, medicinal or religious significance. Please go to their website to sign up to be a volunteer and to see the schedule.

Pacific Whale Foundation www.volunteersonvacation.org

Volunteering on Vacation is a free program that makes it easy for Maui visitors and residents to help protect Maui's unique and fragile forests, shorelines, beaches and open lands. These programs are offered as a community service by the Pacific Whale Foundation.

Haleakala National Park Project: There's no other place on earth like this unique ecosystem! Project includes free transportation from two convenient locations, free park admission, hiking, removing invasive plants and a visit to the summit. (Continued on next page)



Pacific Whale Foundation continued...

Hawaiian Islands Land Trust: Visit Waihee Coastal Dunes and Wetlands Refuge, a remarkable coastal area rich in Hawaiian history and bird watching. Help clear invasive weeds in this unique area.

Malama Honokowai: Among Hawaiian archaeological sites in beautiful Honokowai Valley, learn about Hawaiian culture as you help remove invasive weeds and possibly plant native species.

Hoaloha'aina: Work along South Maui's scenic coast, maintaining an ocean-side trail, restoring sand dunes, picking up litter and removing invasive species.

O'o Farm: Lend a hand with farm chores at an exquisite organic farm in the misting forest of Waipoli in Upcountry Maui.

Beach Clean-ups: Clean up your favorite Maui beach! Gloves, bags and marine debris data sheets provided.

Learn more about volunteer projects.

Sign up for one that fits your schedule and interests.

Call Pacific Whale Foundation at:

(808) 249-8811 ext. 1

Daily, 6am - 9pm HST

Waihe'e Coastal Dunes and Wetlands Refuge www.hilt.org

The Land Trust took fee ownership of this very sensitive 277-acre site in 2004. Active restoration programs have enhanced critical native wildlife habitat, while preserving the area's rich archaeological and cultural resources. Once populated with two thriving ancient Hawaiian villages, an extensive inland fishpond and several heiau, the Waihe'e Refuge is among the most significant cultural sites in the state.

As a testament to the returning health of the ecosystem, eight different endangered species have taken up residence at the Refuge in recent years. With the wetlands primarily cleared and habitat-appropriate plants now thriving, the area is host to many

*Systems Thinking
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Maui Island was here more than one million years before humans were and it was fine without us. Ancient Hawaiians engaged the ahupuaa system which was designed with impeccable sustainability in mind. How will modern humans address the protection of water - our most valuable resource?

By Tim Botkin

As we improve our understanding of sustainability issues and analysis, knowing it is all about our human conduct, the ultimate drive is to get things right – that is to avoid unsustainability. The key to that is to consider the entirety of the problem from the outset. In reality there is lots of noise around sustainability which confuses the term itself, resulting in a dull response. In my view this occurs both because of a lack of understanding about what it takes to think more sustainably as a society, but also due to the impression that taking on the totality of related issues is too complex. When we consider problems such as climate change, transportation, affordability, natural resource degradation, etc., we often speak at high levels but act on fragmented elements, resulting in a cycle of unsustainability.


Breaking bigger systems into pieces is our conventional means of addressing apparently complicated topics, and there is no better example than our treatment of water, a critical resource and sustainability issue on Maui. In this arena the complication comes primarily from an historic regulatory fracture of water policy into potable water, wastewater, stormwater and stream flows, etc.; all in the context of limited supply and accrued ‘rights’ of use. While Maui’s island boundaries exacerbate the ensuing problems, the approach is similar in most other places. But if we apply common sense to natural function, we might find things less complicated than we thought.

Some time ago I was directing a major economic development project which had as



Tim Botkin holds a J.D. from the University of Oklahoma and Masters in Sustainability Management from each James Madison University and the University of Malta. At UHMC he is Coordinator of the Sustainable Science Management BAS program, sponsor of the Student Ohana for Sustainability, sits on the campus sustainability and budget committees, and teaches terrific sustainability courses. His background includes work in environmental law, mediation, elected office and as sustainability consultant. His favorite applied research project seeks to build decision-making processes which consider all connected interests, costs and benefits; and instill sustainable thinking and practices across organizations and communities. Working on Maui through UHMC provides bountiful opportunity to pursue sustainability in this manner.

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A photograph of a lush tropical forest. The scene is filled with various types of trees, some with thick trunks and others with thinner, more delicate branches. The foliage is a vibrant green, with sunlight filtering through the canopy, creating a dappled light effect. In the foreground, there are several large, dark tree roots extending from the ground. The overall atmosphere is one of a dense, thriving ecosystem.

The hydrologic cycle is a continuous exchange of water in its many forms. While Earth has its own hydrologic cycle, Islands such as Hawai'i depend on orographic rain derived from their unique, individual hydrologic cycle. Human activity interferes with the cycle, which affects the volume of orographic rain and consequently the available water supply.

its initial centerpiece a new facility with the highest rating for green build. One integral element was its water use design which required no water lines in or out. It collected rainwater (stormwater), used it, reclaimed it and continued to use it until ultimate disposal for irrigation or into the ground for final re-purification. No sewer, water meter or storm drains needed. Proud of this design we presented it to a grant fund rewarding innovative stormwater designs, thinking we had designed the ultimate. The result? It was denied because the funders said we could not qualify as we had no stormwater!

Sometimes the incentive and process completely overlook the importance of water resource efficiency in the name of isolated perspectives which obscure systems-based review. Health regulations limit rain harvest as unsanitary and stormwater designs send rain away instead of using it, all while supplies dwindle. And though the rules may intend to protect and extend the resource, they sometimes create barriers to innovation and progress.

On Maui, our history of stream diversion and more recently aquifer pumping have left most of us wondering just how much water is available for use. Conversely, we now know certain things about water and hydrology on our island which we should keep in mind as we shape our practices and evolve our policies.

- All of the water we use on Maui originated as rain on Maui. A relatively small amount of that flows across the surface naturally.*
- As rain infiltrates into the ground it feeds*

streams or seeps down to our main aquifer, known on islands as a basal lens.

- The name 'lens' comes from the general shape of the aquifer which rests upon and is bounded on bottom and sides by saltwater. Like an iceberg most of it is below sea level. Its edges are not clear, rather there is a broad 'transition zone' which becomes progressively saltier as it moves to the outside of the fresh lens.*
- Once outer areas of a freshwater lens are contaminated with saltwater, studies show it takes a very long period of time to be restored to fresh.*
- Currently between 55-60% of our domestic water supply is pumped from the Maui lens.*
- A characteristic of a lens is that its saline boundary retains its general shape even as it grows or contracts, which allows some opportunity to detect changes and estimate availability.*
- A USGS study a few years ago measured the changes in our main source, that is wells in the Iao region, and by extrapolation it shows that we used approximately 40% of that source in the years 1985-2013.*
- It is almost impossible using current technology to determine precisely the volume or exact boundaries of a lens.*
- It remains unclear if there is a separate lens under Haleakala, or if that is connected under the Central Valley to form a single Maui basal lens.*

Now flip to the reality of how we most commonly act regarding water.

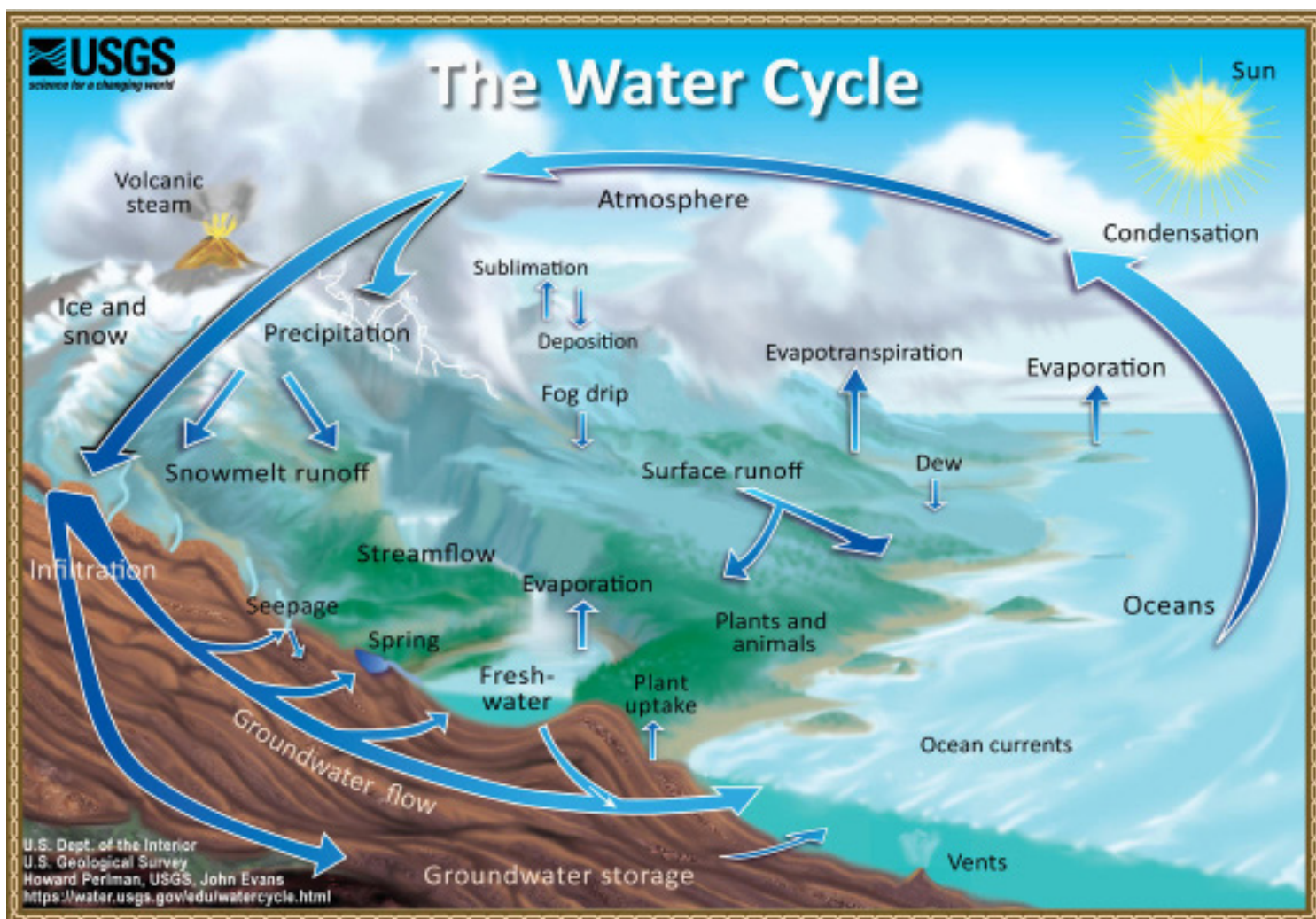
- Early landowners and entrepreneurs discovered the value of water, particularly for agriculture, and secured strategic land rights which were originally tied to exclusive wa-*

ter rights.

- ‘Ownership’ of the sources led to construction of sophisticated piping systems in order to sell water harvested from naturally rainy/stream regions to drier areas, also severely depleting natural stream flows and reducing near-shore nutrients.
- While some diverted water was used for domestic (drinking/flushing) purposes, over the years municipal suppliers dug wells to tap the lens/aquifer system, increasing the capacity to draw down this supply without clearly understanding the impacts.
- A watershed Hawaii legal case in 1980 concluded that the State is responsible to make sure all waters are managed in trust for the benefit of natural systems

and people. This has led to a slow implementation of new streamflow standards and a hierarchy of water uses.

- In the meanwhile, as Maui grew, large amounts of land which previously infiltrated rain to refill the lens have been covered with pavement, rooftops or other ‘impervious surfaces’.
- The result of another of our somewhat careless consumption habits, that is fossil fuel use, projections are that as our island experiences warming, we will see a reduction in our normal windward side orographic rains, making lens recharge even less substantial.
- This has left a sustainability concern about our groundwater supply; more of it is being drawn out by wells and less is going



back in through infiltration.

- In addition to reducing infiltration, impervious surfaces have converted water as resource to water as a nuisance, or stormwater. This surface flow also picks up oils and chemicals as well as increasing quantities which can erode or even flood local areas.
- We have built ponds and pipes and ditches to direct stormwater as quickly as possible to the near-shore, also sending the pollutants there to settle and damage reefs and ecosystems.
- Meanwhile, we have started fledgling programs to reclaim and reuse water for at least irrigation purposes, but still dump millions of gallons per day into our ocean. UH Manoa researchers say South Maui has the most polluted near-shore waters in the state.

The last part is key; so long as we treat water on our island as an infinite supply which can be degraded and sent to the ocean, we face the potential for a shocking realization that we do not have enough water. Obviously nobody wants to take credit for this bad and getting worse situation, but as with all sustainability issues, we can change our perspective and practices just a bit and find helpful improvement opportunities. These can be in our development patterns and practices, our consumption, the way we process 'used'; water and certainly how we dispose of it. But most of all and ideally we can rise to the challenge of looking at these things more comprehensively and work in concert with the natural hydrologic cycle, and more specifically by seeing water as a system, much the way early Hawaiians did

with their ahupua'a design.

Here are some approaches we can try in order to keep control of our water destiny:

- It is careless to rely on our limited lens unless and until we can construct a sophisticated monitoring structure to at least indicate if saltier areas are growing, allowing us to curtail use before irretrievable damage occurs.
- Areas to be built can look to established 'low impact development' standards which provide a wide variety of means to avoid more impervious surfaces. These include, for example, asphalt and concrete materials for parking, driveways and low speed areas which allow water to run through them.
- Less pavement can also be a goal across the board; shared parking spaces, narrower roadway widths where appropriate, alternatives to new roads in our future.
- Construction of truer 'rain gardens', also called bio-retention ponds on occasion, which are designed for infiltration, not with escape pipes to the stormwater system.
- 5. Education programs to help us understand about conservation, why we shouldn't water lawns during the day, how greywater can be reused on an individual home basis.
- Streams are prized resources for Maui and need protection.
- All of the water we extract or harvest can be cleaned, redirected and reused for a variety of purposes.
- Again the last point should be the one

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emphasized. Original Hawaiians built systems which used water for crop and fish production, drinking and bathing, and still were able to allow streams to run their natural course. This was done with much lower impact technology than we now experience. Today, a community in which I once lived is treating wastewater to the point that it becomes a drinking resource – actually the technology is similar to that used for desalinization, but is a bit easier, doesn't create the pollutants and provides a double benefit of waste removal.

*As I write the last comment, the political side in me says many, or most folks will cringe at the thought of drinking 'wastewater', but just think harder; it's what we've always been doing. It's just that we trust the earth to filter the water we find in our aquifer, and we forget it was once mixed with natural wastes and pollutants at the surface. It's all a part of a big, healthy system; oceans evaporate, clouds form, rain falls, water collects and is used and filtered, then ultimately flows back to the ocean. Sometimes technology can help us mimic the natural system and this is one case.
Drink, rinse and repeat.*

It is the whole system we need to consider and protect. Temporary diversions are possible, just like in an ahupua'a system. But if we tax the system too much and destroy an element, the whole thing can break down. Call us stewards, or managers or consumers if you will, it is in all our interests to make sure this one stays healthy. So be prepared for creative new ideas, heck even join in creating them. We are rich just because we get to live here, let's keep it that way.



Maui County Farmer's Markets

Rest
Local

Maui Island:

Farmer's Market of Maui-Kihei
61 S. Kihei Rd., Kihei
Mon-Thurs 8 a.m. - 4 p.m.
Fri 8 a.m. - 5 p.m.
808-875-0949

Upcountry Farmer's Market
Kula Malu Town Center
55 Kiopaa St., Pukalani
Sat 7 a.m. - 11 a.m.

Ono Farms Farmstand
Hana Town Center
Daily 10 a.m. - 6 p.m.

Hana Fresh Farmer's Market
4590 Hana Hwy., Hana
Mon - Fri 10 a.m. - 2 p.m.

Napili Farmer's Market
4900 Honoapiilani Hwy., Lahaina
Wed & Sat 8 a.m. - 12 p.m.

Kula Country Farms
6240 Kula Hwy., Kula
Tues - Fri 10 a.m. - 5 p.m.
Sat & Sun 10 a.m. - 4 p.m.

Lipoa Farmer's Market
95 E. Lipoa St., Kihei
Sat 8:30 a.m. - 10:30 a.m.

Kumu Farms at Maui Tropical Plantation
1670 Honoapiilani Hwy., Wailuku
Tues - Sat 10 a.m. - 4 p.m.
Launiupoko Farmer's Market
Launiupoko Beach Park, Lahaina
Honoapiilani Hwy. at Kai Hele Ku St.
Sat 8 a.m. - 12 p.m.

Molokai:

Kumu Farms
551 Huaai Rd., Kualapuu
Tues - Fri 10 a.m. - 4 p.m.

Lanai:

Lanai Market
Dole Park
Saturdays 8 a.m. to 1 p.m.

***Not all produce is locally grown and organic. Some produce is grown on Maui Island and some comes from other Hawaiian Islands. Please consult individual farmer's markets for accurate information.*

Restaurants Featuring Locally Sourced Ingredients

North Shore Maui

Hana Ranch Provisions
71 Baldwin Ave, Paia, 96779
808-863-368
Facebook.com – hanaranchprovisions

Paia Fish Market
100 Baldwin Ave, Paia 96779
Paiafishmarket.com
808-579-8030

Mama's Fish House
799 Poho Place, Paia 96779
Mamasfishhouse.com
808-579-8488

Flatbread Pizza Company
89 Hana Hwy, Paia 96779
Flatbreadcompany.com
808-579-8989

Maka by Mana
49 Baldwin Ave., Paia, 96779
Makabymana.com
808-579-9620

East Side Maui

The Preserve Kitchen and Bar
5031 Hana Hwy, Hana 96713
Travaasa.com/hana/hana-dining
808-248-8211

West Side Maui

Leoda's Kitchen and Pie Shop
820 Olowalu Village Rd., Honoapi'ilani
Hwy

Lahaina, HI 96761
808-662-3600

Taverna
2000 Village Rd in the Kapalua Resort,
Kapalua HI 96761
Tavernamaui.com
808-667-2426

Pi Artisan Pizzeria
900 Front Street, Lahaina, 96761
Pi808.com
808-667-0791

South Side Maui

Fork and Salad
1279 S. Kihei Rd. Unit 204, Kihei. HI
96753
Forkandsalad.com
808-879-3675

Humuhumunukunukuapua's
3850 Wailea Alanui Dr., Wailea, HI 96753
Grandwailea.com – humuhumu...
808-875-1234

Monkeypod Restaurant
10 Wailea Gateway Pl, Ste b-201, Kihei, HI
96753
Monkeypodkitchen.com
808-891-2322

Nalu's Maui
1280S. Kihei Rd, Kihei, 96753
Nalusmaui.com
808-891-8650

Continued on Pg. 51

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Restaurants Featuring Local
Ingredients Continued from Pg. 49

Central Maui

Mill House Maui
16 Honoapi'ilani Hwy, Waikapu HI 96793
Millhousemaui.com
808-270-0333

Maui Fresh Sreatery
137 E. Kaahumau Ave, Kahului, HI 96732
Mauifreshstreatery.com
808-344-7929

Fatt Chicks Burgers Brews and Grill
200 Halewaiu Rd, Wailuku, HI 96793
Fattchicksburgers.com
808-242-6666

Saltimbocca
300 Maalaea Rd, Wailuku, 96793
Saltimboccamau.com
808-243-3463

West Side
Leoda's Kitchen and Pie Shop
820 Olowalu Village Rd., Honoapi'ilani
Hwy
Lahaina, HI 96761
808-662-3600

Taverna
2000 Village Rd in the Kapalua Resort,
Kapalua HI 96761
Tavernamaui.com
808-667-2426

Pi Artisan Pizzeria
900 Front Street, Lahaina, 96761
Pi808.com
808-667-0791

Volunteering Opportunities Cont. from Pg. 41

native Hawaiian bird species, including ae'ō (stilt) and 'alae ke'oke'ō (coot). Native plants such as naupaka, 'ulei, 'akia, 'a'ali'i, pohinahina, and loulou are located on the Refuge. Additionally, 'uhaloa (used in Hawaiian medicine practice) and pili (grass used for the roof of traditional hale) are found here.

Quiet and pristine, the Waihe'e shoreline is a favorite retreat for endangered Hawaiian monk seals and nesting green sea turtles. Off the coast, the extensive reef is one of the longest and widest on Maui. It's believed that this reef system provided excellent fishing in ancient times and it is, in fact, still a favorite among local fishermen today.

The public is encouraged to get involved by participating in future volunteer days or free guided tours through our Talk Story on the Land environmental education series.

The Hawaiian Islands Land Trust ensures that this rich cultural site, once slated for development as a destination golf resort, will be forever protected.

Maui Ocean Center
www.mauiocceancenter.com
808-270-7000
Call or Check Website for Details

O'o Farms
www.oofarms.mybigcommerce.com
808-667-4341
Call or Check Website for Details

Journal of the Alaska Summer 2019

Locally Sourced

*Quiche Made With
Goat Milk Chevre*

Grain-Free Quiche Crust

*1C Almond Flour
1C Coconut Flour
1/2 C Melted Butter or Non-Dairy Butter
(I prefer Miyoko's Vegan Cultured Butter
or Kerrygold)
1 Egg
Pinch of sea salt*

*Mix all ingredients until a dough ball
forms, press into buttered pie pan.*

Bake for 10-12 minutes at 375.

Savory Quiche:

*6 Eggs
1 Roasted red bell pepper, diced
3 Tbsp chopped parsley
1/2 tsp sea salt
2-3 Tbsp Surfing Goat Dairy Chevre
Black Pepper, to taste*

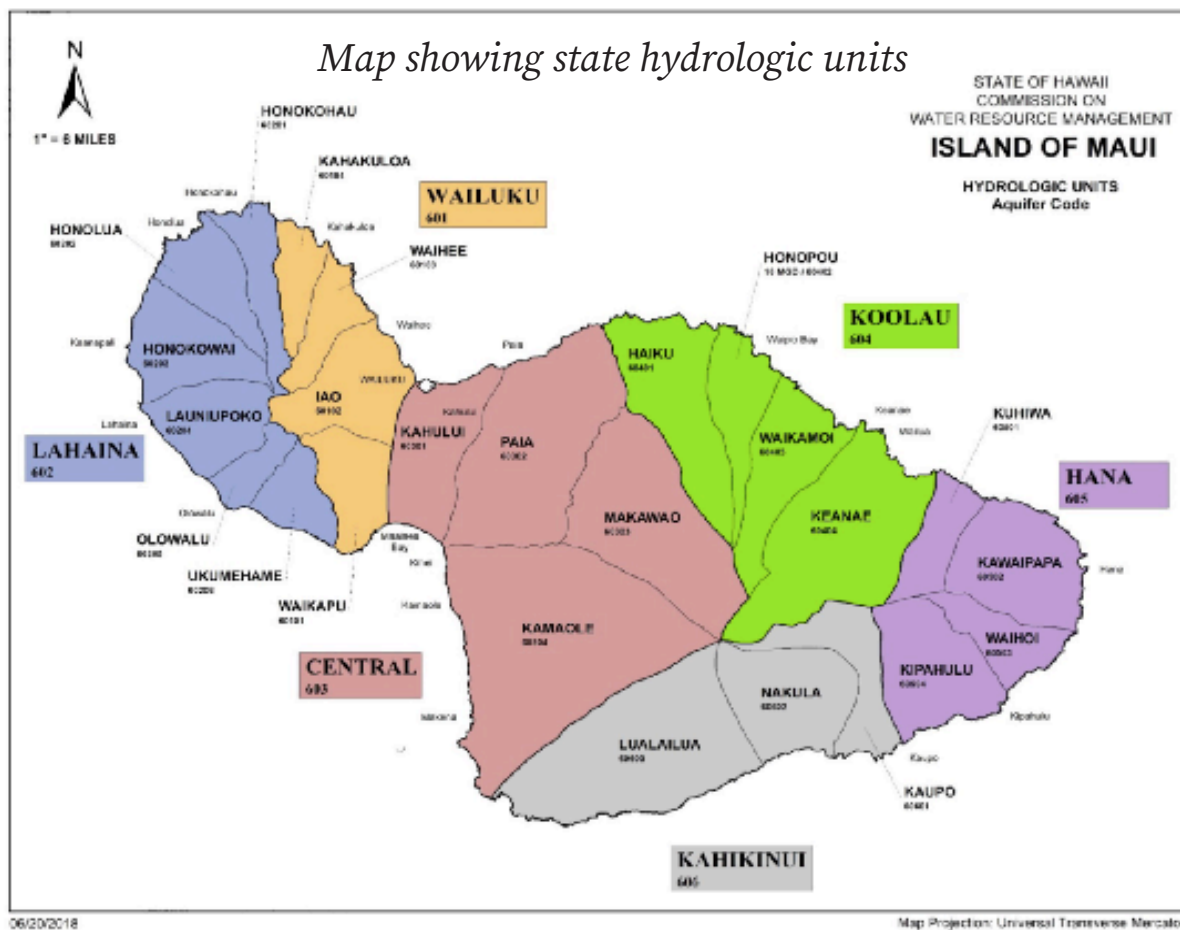
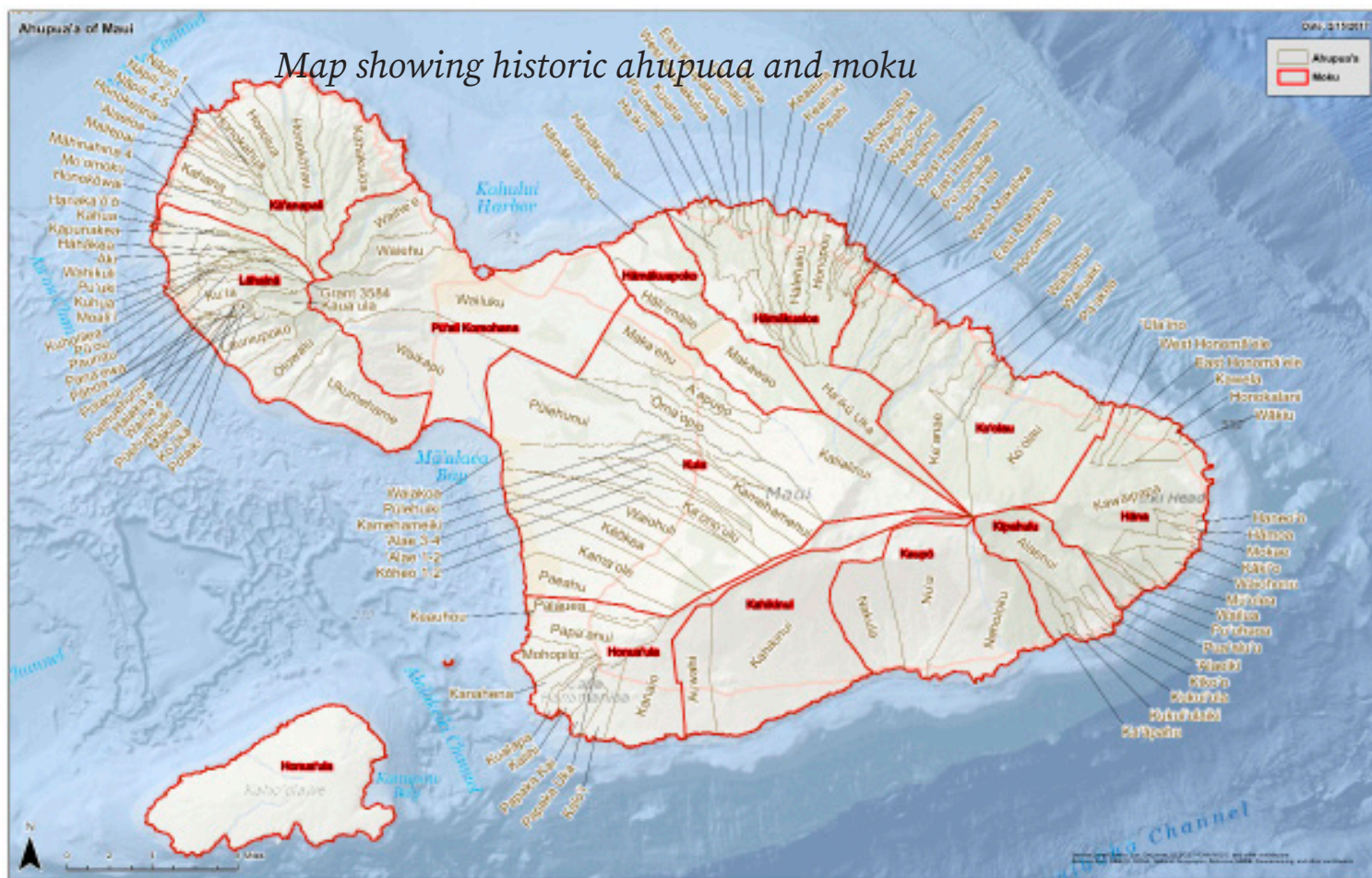
*Whisk eggs with salt, pepper, parsley,
fold in roasted red pepper and goat
cheese. Pour into prepared pie shell and
bake at 375 for 45 minutes or until a
skewer comes out clean.*



Chef Hilary Barsby is a 10-year Maui resident and graduate of the local Maui Culinary Academy, as well as holding a secondary certificate in plant-based cuisine. She has been serving families and individuals island wide for the last 2 years through her private chef company; Healthy Maui Chef. She has held numerous positions in the food service industry including front of the house and back of the house, from retreat centers, catering companies to most recently high-end hotels.

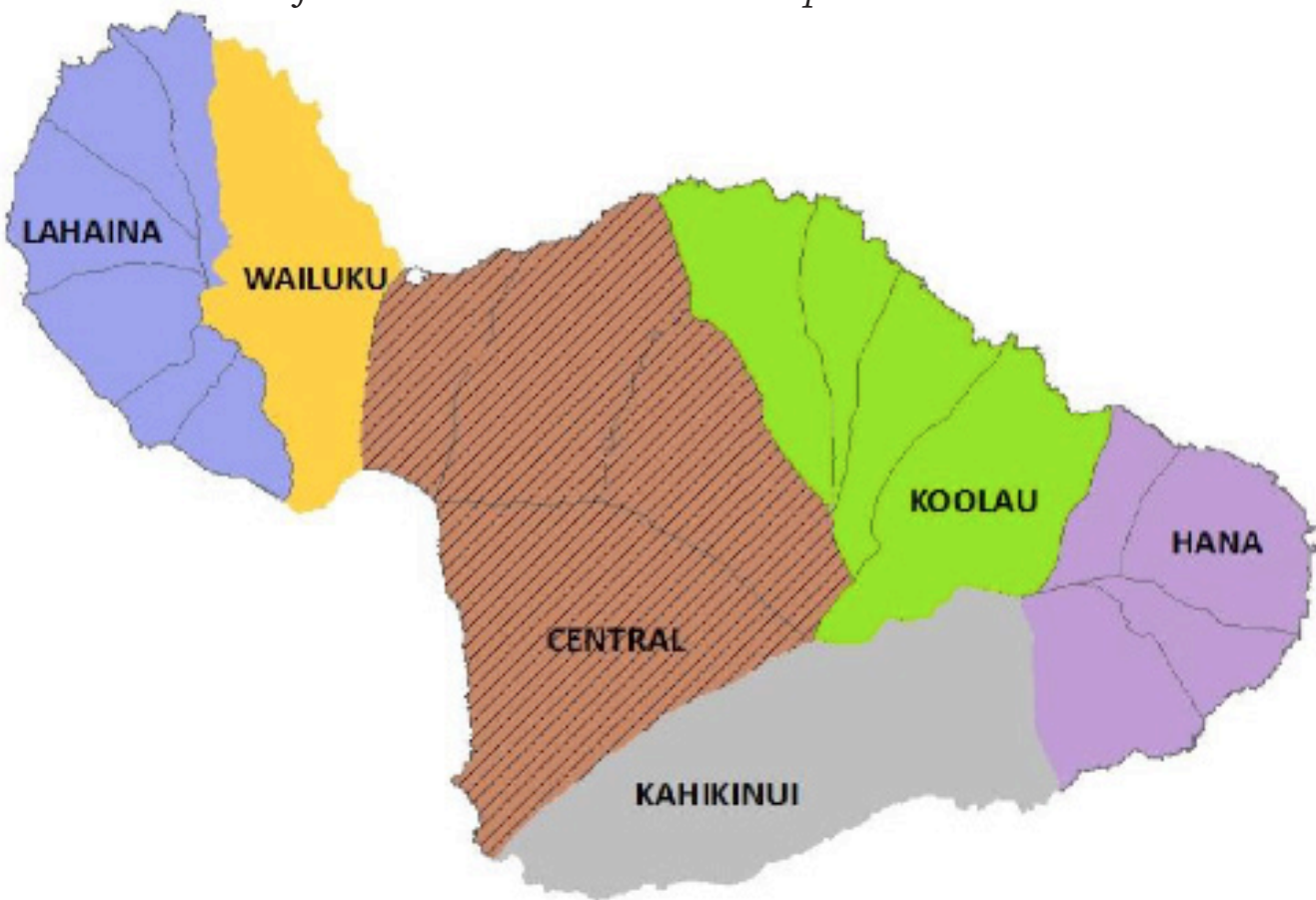
Hilary has a passion for creating food that is good for you without compromising on flavor. She was diagnosed with Celiac's disease 2 years ago and this was a pivotal moment in her career. Not wanting to change her path, she decided to embrace her allergy head on, learning more about it and other food allergies and restrictions on the way. Through her exploration of different food allergies she discovered she feels best when eating a mostly plant based diet with limited amounts of dairy and animal protein.





Notice some of the similarities between original ahupuaa/moku designations and the hydrologic units designated by the State CWRM. At the same time, state designated hydrologic units fit neatly into Maui designated sectors.

Maui Dept. of Water Supply Sectors taken from the Water Use and Development Plan



The varying community and conservation plans, numerous oversight departments and commissions, along with conflicting interests, are daunting and may be confusing to even the most educated individual. In order to ensure the health and abundance of our water supply, the entire community and government offices would have to be on board with integrated water resource management which would use computer programs to determine correlations between the scientific aspects of island hydrology and all aspects of human activity. Everything we do would have to be de-politicized and tied to conservation instead.

Additional Interesting Reads on Water:

Environment Hawaii - an extensive library of stories - www.environment-hawaii.org

Ola I Ka Wai - A Legal Primer for Water Use and Development in Hawaii - by D. Kapua 'ala Sproat- www.law.hawaii.edu



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Kihei, HI 96753
808-875-8065

Goodwill
250 Alamaha St,
Kahului, HI 96732
808-442-8989

Rainbow Attic
www.rainbowatticmaui.com
1881 South Kihei Rd, Suite B5
Kihei HI 96753
Located next to Foodland in Kihei
Town Center
808-874-0884

*This list is not all-inclusive. If you have an upcycling business that you would like to include in this listing, please send it to info@sustainablealoha.solutions

*Maui County Recycling Info:
Please go to MauiCounty.gov/recycle*

Recycling Hotline: 808-270-7880

Lanai 800-272-0125 Ext. 7880

Molokai 800-272-0117 Ext. 7880

There are recycling centers located around the island. Please go to the county website for locations and hours of operation.





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your help!*

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