

2017
Hawaii Island
Annual Report



SWCD * NRCS
“working together for a better future”



USDA is an equal opportunity employer and provider

Message from the Mayor

Harry Kim
Mayor



Wil Okabe
Managing Director

Barbara J. Kossow
Deputy Managing Director

County of Hawai'i Office of the Mayor

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MAYOR'S MESSAGE

On behalf of the people of the County of Hawai'i, it is an honor to extend our heartfelt thanks to all the staff and volunteers of the Hawai'i Island Soil and Water Conservation Districts, whose achievements are documented in the 2017 SWCD Annual Report.

Often times unsung heroes, the Hawai'i Island Soil and Water Conservation District volunteers work tirelessly to preserve and protect Hawai'i's natural resources and our pristine environment.

This dedication provides technical conservation assistance, continuing education and underscores the value of protecting these essential agricultural resources.

Your work truly benefits the people of Hawai'i now and for generations to come.

Aloha,

A handwritten signature in cursive script that reads "Harry Kim".

Harry Kim
MAYOR



County of Hawai'i is an Equal Opportunity Provider and Employer.

Hilo Field Office Staff Servicing Hamakua, Waiakea, Puna and Ka'u Districts

The Hilo Field Office (comprised of members of NRCS, Puna, Ka'u, Hamakua and Waiakea Soil and Water Conservation Districts) focused their 2017 fiscal year on working together to help people achieve their natural resource and business goals. Covering our 1.3 million acres of cropland, pastureland, rangeland and forestland we assisted over 100 cooperators. Site visits were completed for each request and the necessary assistance provided to meet their needs which comprised of: soil erosion, noxious and invasive weeds and animals, forest stand health, pasture health and economic impacts on agricultural production.



(from Left to Right)

Kanoe Malani, Soil Conservationist/Administrative Assistant; Kori Hisashima, District Conservationist; Kamran Fujimoto, Soil Conservationist; Amy Koch, Soil Scientist; Andrew Stout, Civil Engineer; Cristin Cantan, Program Support Specialist; Amelia Kajiyama, Soil Conservationist; Jennifer Lopez Reavis, District Secretary/Conservation Aide; Alex Gerken, CREP Planner; Spencer Nagata, Soil Conservationist; Laila Jayyousi, Soil Conservationist;



Waiakea Soil and Water Conservation District



Leslie Takayama
Chairman

Susan Litteral
Vice Chairman

Amy Bugado
Treasurer

George Mikami
Secretary

Harry Toki
Director

Chairman Takayama speaks on behalf of Waiakea SWCD

The mission of the Waiakea Soil and Water Conservation District (SWCD) is to preserve our land and water resources by assisting in planning and education. The Waiakea Soil and Water Conservation District provides conservation plans for individual agricultural landowners to help control surface water and reduce sediment runoff. The Waiakea District, being in an urban setting, also assists on flood control projects along with the County Department of Public Works (DPW) and Natural Resource Conservation Service (NRCS) with planning and annual inspection of such projects. Plans are also provided for USDA NRCS Farm Bill cooperators, primarily for Environmental Quality Incentive Program (EQIP) with the District acting as a Technical Service Provider (TSP).

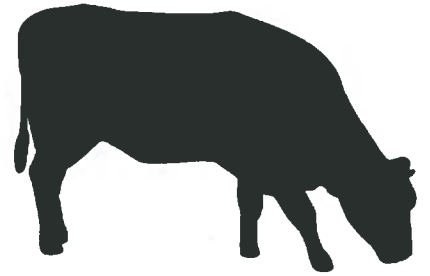
The District would like to thank its partners the County of Hawaii Department of Research & Development, County of Hawaii Department of Public Works, USDA Natural Resources Conservation Service, the University of Hawaii Cooperative Extension Service and the State Department of Land and Natural Resources for all their assistance in our goals. We also would like to thank the cooperators for their earnest efforts towards helping to create and implement the plans.

The Waiakea SWCD would also like to thank HACD for all their efforts to secure funding from the State Legislature. We at the Waiakea SWCD would like to join with all District Directors to come up with new ideas for better funding. One idea our District wants to promote is the potential use of lands controlled by the Department of Land and Natural Resources. If part of the income from State land leases can be directed to the Districts, we may have sufficient funding to carry out our mission. Or if given the land we could produce and sell plant material for windbreaks, ground covers, forage, or native species for natural area restoration. The State is land rich. Let's see if we can tap this wealth for the benefit of conservation.

Waiakea SPOTLIGHTED COOPERATOR OF THE YEAR

WAIAKEA SWCD SPOTLIGHTED COOPERATOR 2017 "Michael Watanabe"

Michael Watanabe owns and leases another 7.5 acre parcel from his family, totaling 15 acres in the Panaewa subdivision within the Waiakea Soil and Water Conservation District. Both parcels are dedicated to pasture, where he runs two separate grass finishing steer herds.



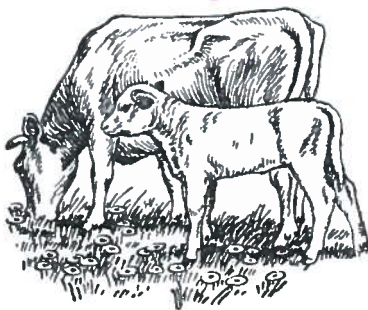
Before Brush Clearing

Michael Watanabe started working with NRCS employee Spencer Nagata back in 2016 to develop a conservation plan. After that was completed, his plan was approved for the EQIP National Water Quality Initiative funding in 2017. Major resource concerns were excessive sediment in surface water. With the use of a dozer he has already removed 2.5 acres of

dense thickets of albizia and candle bush (*Senna alata*). He is in the process of re-seeded parts of the pasture where he had cleared. He will also be installing over 2100' of woven wire fence to create 4 paddocks to rotate his steers through. Although Mike has many more projects to complete, we look forward to working with such a great cooperater.



After Brush Clearing



Congratulations to Michael Watanabe for being a dedicated rancher, and being selected for the Waiakea SWCD 2017 Spotlight Rancher Cooperator of the Year Award.

PUNA Soil and Water Conservation District



Oliver English (Chairman)



David Schell (Sec./Treas)



Atto Assi (Director)



Leanne (Director)



Aileen Yeh (Vice Chair)

Puna SWCD Chairman's Message

The Puna Soil and Water Conservation District (SWCD) have been instrumental in conservation planning and accomplishments throughout the agriculture lands in the Puna District.

With the assistance of district employees, Amelia Kajiyama, Jennifer Reavis, and part time employee Kamran Fujimoto, the Puna District had a very productive year and was able to assist 70+ Cooperators in 2017. The District continues to be one of the fastest growing districts in the State of Hawaii.

Animal waste continues to be a high priority in the district. Invasive species are increasing in this district as more nurseries and potted plant cooperators start to expand. The Coqui frogs are also spreading to higher elevations. Other invasive pests of interest include the Nettle Caterpillar, Fire Ants, and pests such as the Varroa Mites and Small Hive Beetles affecting our bees and their hives.

We would like to thank the many governmental agencies that assist and support the District programs. The State Legislature through DLNR, USDA Natural Resource and Conservation Service (NRCS), the University Extension Service, and Mayor Kim's Office and the County Department of Research and Development for funds to hire our District Employees for implementation of the Hawaii County Grading Code.

Puna Spotlighted Cooperator of the Year

PUNA SWCD Spotlighted Cooperator

Aileen Yeh, Owner and Operator of Wung Ranch in Upper Puna.

Mrs. Yeh's 412 acre cattle ranch has her very busy on top of her other responsibilities including being a Board Member of the Hilo Farm Bureau, Member of the Big Island RC&D council, running her native plant nursery and being the Vice Chairman for the Puna Soil and Water Conservation District board.

Aileen is interested in improving her pasture quality and quantity. By signing up with EQIP, her 2016 Conservation Plan is focusing on removal of invasive plant species such as rubus and strawberry guava, which is rapidly spreading on her ranch. Brush management, Herbaceous Weed Control and Prescribed Grazing are among the practices that will assist her to keep on top of things at the ranch.



*Brush Management: Treatment of
Strawberry Guava while keeping
Native Hapuu alive*



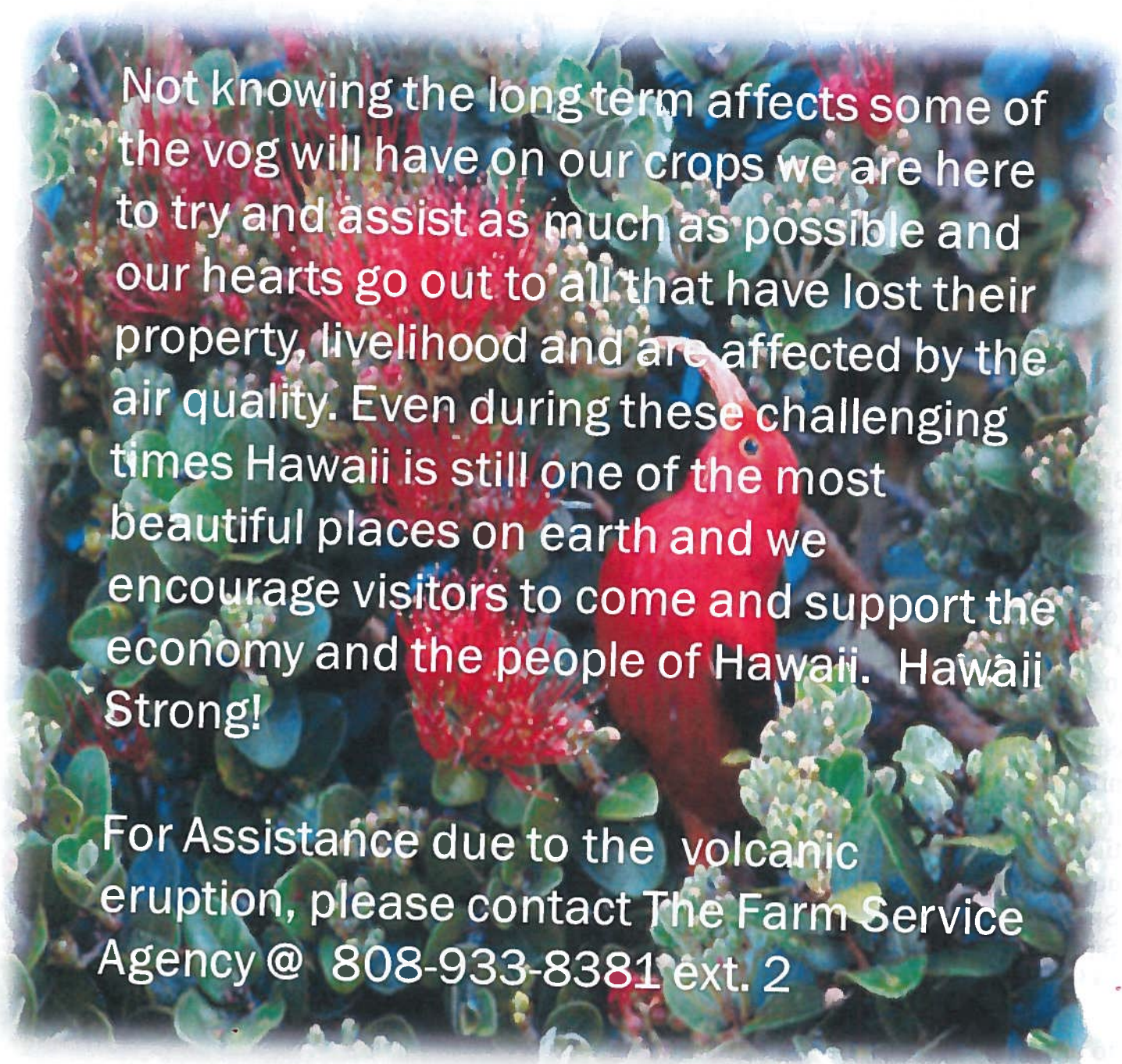
Aileen Yeh at her ranch

Mrs. Yeh is also interested in planting native species on the ranch which she has been doing over the years.

Congratulations Aileen Yeh for being selected Puna SWCD 2017 Spotlight Rancher Cooperator of the Year.



SWCD's reaching out.....



Not knowing the long term affects some of the vog will have on our crops we are here to try and assist as much as possible and our hearts go out to all that have lost their property, livelihood and are affected by the air quality. Even during these challenging times Hawaii is still one of the most beautiful places on earth and we encourage visitors to come and support the economy and the people of Hawaii. Hawaii Strong!

For Assistance due to the volcanic eruption, please contact The Farm Service Agency @ 808-933-8381 ext. 2

KA'U Soil and Water Conservation District



Chairperson
Brenda Iokepa-Moses



Vice Chairman
John Cross



Secretary/Treasurer
Tyler Johansen



Director
Lee Segawa

Ka'u SWCD Chairperson's Message

Ka'u Soil and Water Conservation District (KSWCD) is fortunate to have a Board of well rounded and dedicated volunteers from the Ka'u Community. Current board members are Brenda Iokepa-Moses, Chairperson; John Cross, Vice Chairperson; Tyler Johansen, Secretary/Treasurer; Lee Segawa, Director. We would like to welcome Lee, our newest director serving the district. Board Members all bring something different to the table and this diversity helps them in their decision making and recommendations. The present board is currently looking for a new board member from the community to serve as a director and enable us to operate as a full service 5 member board. "We all work together on our own time, traveling to and from meetings on our own dime with one common goal to do our part to help preserve the land and water resources by assisting in the planning and preparation of the lands as well as facilitating education for the farmers" said Brenda Iokepa-Moses, chairperson. We are supported by Jennifer Lopez Reavis heading the Field Office Administrative staff that not only handles our district but also the districts of Puna and Waiakea. We would like to welcome our newly hired full time planner Ryan Belcher who will be assisting the Waiakea, Puna & Ka'u SWCD's. A new addition to the East Hawaii Soil and Water Conservation Districts working as a Conservation Specialist is Meghan Mulley. Seasoned part time planner Kamran Fujimoto reaches out to farmers on weekends and after hours to make it more convenient for them.

With the new challenge of the recent volcanic activity, we would like to offer assistance to our farmers informing them of the programs being offered.

A special mahalo to Mayor Harry Kim, the County of Hawaii R&D, Department of Public Works, Department of Land and Natural Resources, Natural Resources Conservation Service, and other affiliated agencies for their continued support of the agricultural community.

KA'U SWCD Spotlighted Cooperator of the Year

Ka'u SWCD Spotlighted Cooperator of the Year

Sergio Guerrero and his wife own a 24 acre macadamia nut farm in Kau. They have been farming for several years and signed up with NRCS to help resolve their resource concerns in 2016. They signed up for mulching for 3 years, Windbreak Establishment, Wildlife Habitat (planting trees and shrubs that support native wildlife) and Upland Wildlife Habitat Management. The first year of mulching went pretty smoothly and they are noticing a positive difference in a short period of time.



Sergio and His wife after applying mulch to their Macadamia Nut Field



Newly applied mulch to the macadamia nut

The Guerrero's have been working with Soil Conservationist Laila Jayyousi out of the Hilo Field Office. Their conservation plan is planned for a 3 year period. They buy the mulch and spread it with their small tractor and by hand. The work they have done looks fantastic and will help the farm in the long term.

Congratulations to the Guerrero's for being selected as Kau SWCD Spotlight Farmer of the Year!

Kona SWCD Chairperson's Message

Over the past year North and South Kona Districts had plenty of rain and that made everyone happy. Some of our producers likely had some water issues due to the prevalence of micro-climates but overall our producers were able to focus on matters other than water, which has been a rare blessing. Our sympathies are with our friends and fellow-agriculturalists in Puna who have been dealt a devastating blow by nature. You have our support and look forward to seeing your characteristic resilience.

There is a continued increase in the interest in Kona to reforest our landscapes. We have many landowners who obtain assistance from NRCS and many who move forward on their own. One of the great NRCS projects that is coming on-line relates to the lands of the Kuamo`o Battlefield and Burial Grounds. The nonprofit group Aloha Kuamo`o `Āina has acquired the land and will protect it into perpetuity. The Kuamo`o Battle, also known as the Battle of 1819, pitted one Hawaiian against another. Chiefess Manono cried out in death for the warriors to "Mālama kō aloha" - "keep your love". It was a plea to both sides, no matter what, to keep their love for their fellow Hawaiian. She did not want this battle to end relationships between families and friends. She wanted her people to know peace. One of the goals of Aloha Kuamo`o Aina is to create a place that was of war but is now of peace. To that end they have started to reforest the land and so far their efforts have been highly successful. The Kuamo`o Battlefield has many valuable cultural resources within its boundaries and protecting those are also a high priority.

There are many other forestry project going on from installing windbreaks to restoring acres to their natural beauty on both private land and public land. Palamanui College is working on re-establishing native forest land on college (state) property. A stand of Wiliwili trees were located within their 500 acres and we are very excited to see their progress. We believe that there are great benefits to educating our young adults on the opportunities associated with a restoration economy.

We continue to do our site visits (almost 50 this year) and assist our producers with improving their soil. Every cooperater who invites us to their land receives a soils folder with a wealth of information from bio-char to cover crops and to herbicide application techniques to help them improve their soil. When it is available we will give those we visit a pound of buckwheat seed so that they can see first-hand what cover crops can do for their land.

The Kona SWCD worked with the Big Island Resource Conservation and Development Council (BIRC&D) to obtain funding for a booklet about Kona's natural resources, their current state and how to protect and improve them. BIRC&D worked with Councilmembers Eoff, David, and Kanuha each donating funds to cover the development and print costs of our booklet. As the Chair for the Kona SWCD we are happy to report it is ready for distribution and use as an education tool.

KEALAKEKUA FIELD OFFICE AND THE KONA SWCD DIRECTORS

Kona's Office Staff



From left to right: Jessica Schmelz, District Conservationist; Carl Rossetti, Civil Engineering Technician
Jacky Vega, Soil Scientist; Laura Nelson, Soil Conservationist at the Kona Coffee Expo 2018



Mary Robblee, SWCD Staffer



Mike Kolman, Soil Scientist



Ben Barnette, Cultural Resources Specialist

Kona SWCD Directors



Rick Robinson-Director



Pepe Miranda-Treasurer



Jeff Knowles-Vice Chair



Tom Greenwell, Secretary



Greg Hendrickson, Chair

Kona SWCD Cooperator of the Year in Farming

Kona's Cooperator of the Year

We had two producers honored as the Kona SWCD 2017 Cooperator of the Year. Ken Verosko and his partner Beth Smith are our Farmers of the Year because of their dedication to protecting the land. They own the South Kona Fruit Stand and are true believers in the value of conservation cover. They know some of their challenges would have been worse if not for their cover, you see, they live along Kiilae Stream, one of only two "blue line streams" on United States Geological Survey (USGS) maps. In 2007 the South Kona Fruit Stand suffered terrible damage during a flash flood. The land was severely damaged as well. Ken and Beth are ones who do not know the meaning of the word defeat. After every disastrous event they simply keep going. In August and September of 2015 it was one flash flood event after another. Again, they did not know the mean of the word quit and after a couple months and a lot of work they were reseeded their orchards and planting tropic lalo sprigs. They know, as bad as things have been with flooding, without the ground cover it could have been worse, they may not have been able to recover.



A papaya orchard, destroyed 2007



the S. Kona Fruit Stand itself, significantly damaged



Soil, ground cover and mulch all gone with nothing but pahoehoe in its place. This was the result of the multiple flash

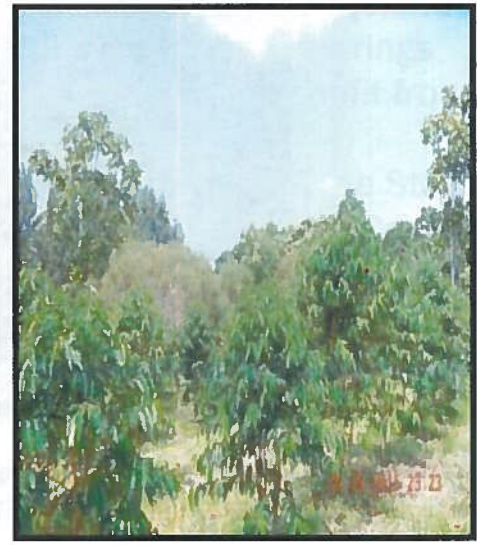
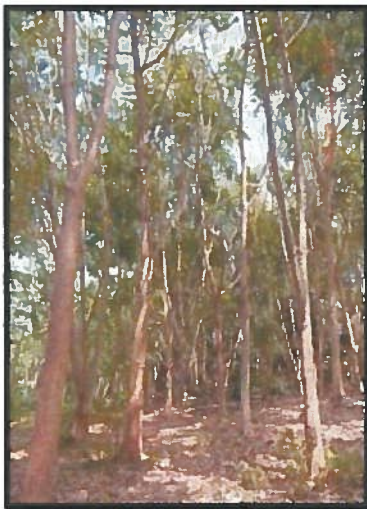


Conservation cover and the way Ken and Beth like their farm to look and put a lot of effort into making and keep

Kona SWCD Cooperator of the Year in Agroforestry

Our second Cooperator of the Year, for Agroforestry, is Sandra Scarr and Daily Fix coffee.

Aside from growing delicious Kona Coffee Sandra also raises Labrador retrievers and for them, she grew a forest so they could have loads of fun. Sandra also planted native trees in her coffee orchard to provide biodiversity to the environment.



A variety of photos from Sandra Scarr's farm where she produces Daily Fix Coffee. She reports her labs love the forest where they are free to run and play.

Mauna Kea SWCD Directors and the Waimea Field Office Staff

MAUNA KEA SWCD DIRECTORS



Pono von Holt
Chairperson



Charlie White
Director



The late Monty Richards
Director



Brad Lau
Treasurer

WAIMEA FIELD OFFICE STAFF



Waimea Field Office Photo: Left to Right- Reése Libby: NRCS Geographer/ Cartographer, Jill Ficke-Beaton: NRCS Soil Conservationist, Andrew Stout: NRCS Civil Engineer, Alyssa Fujii: MKSWCD Conservation Specialist/ Administrative Assistant, Cinda Mattrocce: NRCS Rangeland Management Specialist, Alex Beaton: NRCS Soil Conservationist, Carolyn Wong: NRCS State Grazing Land Management Specialist.

Mauna Kea Soil and Water Conservation District

Mauna Kea SWCD Chairman's Message

Greetings from the Mauna Kea District! This past year has been a busy and productive year for our district. Across the 740,000 acres that make up the Mauna Kea Soil and Water Conservation District there are a multitude of different agricultural and conservation achievements, and innovations happening every day. It is a privilege and an honor for the MKSWCD to assist our producers and land stewards in their work. We understand that being an agricultural producer in Hawai`i is not just a career but a passion, a tradition, and a challenge. The district is proud to support our community through the development of conservation plans, the compliance with the Country Grading and Grubbing Ordinance, participation in community education and outreach activities and technical assistance.

The district board meets every second Wednesday of the month from 4-6pm in the USDA-NRCS Waimea Field Office. This meeting is open to the public and participation is welcome.

The NRCS Waimea Field office has seen a few changes through this past year. Cinda Mattrocce was hired in November 2017 as a Rangeland Management Specialist. Cinda came to NRCS from the Forest Service working as a Rangeland Management Specialist in the Big Horn National Forest in Wyoming. She brings with her an abundance of knowledge that our community will greatly benefit from.

The Mauna Kea District would like to thank the County of Hawai`i, the State Department of Land and Natural Resources, and the University of Hawai`i Cooperative Extension Service, and others for their financial and technical support that allows us to serve our conservation and agricultural community.

We would also like to thank the NRCS Waimea Field Office staff for the continued support throughout the many years of our partnership. Also, the hardworking cooperators of the Mauna Kea District that are such a pleasure to work with! We look forward to another great year of success!

Kona SWCD Farmer of the Year

Antonette “Toni” Reed 2017 Farmer of the Year

Antonette “Toni” Reed has been selected as the 2017 Farmer of the Year for the Mauna Kea Soil and Water Conservation District.

Toni spent about 2 months searching for the variety of tomato she was most interested in. During this time, she was able to taste the different varieties and the many different flavors they had. Some of which were not vine ripened and had chemical use on them to enhance ripening. Toni could taste the “waxiness” of the tomatoes that had chemical use for ripening. After having this experience Toni decided when growing her tomatoes she would go pesticide free and vine ripened. Through these months of searching Toni finally selected the variety she liked the best, called “Blue Beauty” which is an heirloom tomato.



Travis talking with Toni at her farm.



Purple cauliflower

Toni and her husband went through the WOW Farm program to get one High Tunnel to start their farming journey, “Mo Betta Farm”. During this time, Toni has spent some 20 years in the filming industry but was brought home due to her husband’s health. After his passing, Toni decided she needed to keep busy, so she purchased two more High Tunnels from WOW Farms. Not long after, she got awarded a contract for two more High Tunnels through NRCS EQIP. This total brings Toni to five High Tunnels to grow crops in by herself.

Mauna Kea SWCD Farmer of the Year cont.....

Toni markets her tomatoes to a few local restaurants in Waimea town. She really values the “Farm to Restaurant” motto in which she provides very fresh produce to her customers. Within a few hours of harvesting her crop, she delivers it to the restaurant.

She also tried planting a few varieties of cauliflower more recently. The two varieties she planted were “Graffiti” which is purple and white and “Purple” which is only purple. She had a mystery challenge to face not long after the cauliflower got established. All of her tomato plants that were in the same High Tunnel as the cauliflower started to die. This stunned Toni, she just couldn’t figure out what the issue was. She searched the web and found that the cauliflower gives off a gas that kills the tomatoes.

Along this journey, Toni has learned a lot through her experiences. She loves what she does and takes great pride in her produce. She has been experiencing the tough growing times for tomatoes and is looking into different crops that are better suited for different times of the year and can be sold locally. Toni feels great knowing she provides farm fresh produce to local restaurants around Waimea town where many of her friends and family dines. It has been a great pleasure working with Toni and her willingness to share her experiences with all of us.



Doug Maguire with Toni Reed



Blue Beauty Tomato

Mauna Kea SWCD Rancher of the Year

Theodore “Teddy” Bell Jr. 2017 Rancher of the Year

Theodore “Teddy” Bell Jr. has been selected as the 2017 Rancher of the Year for the Mauna Kea Soil and Water Conservation District.



*Alex Beaton, Teddy Bell Jr. & Jill Ficke-Beaton at
Teddy's pasture*

Teddy has a lifelong history of ranching in Hawaii. He also has a long history of implementing conservation practices within his operation. Teddy inherited the property he ranches on today from his father who also implemented conservation practices on the same land since 1967.

As we all know, fireweed can be very difficult to control and even harder to eradicate from pastures. The weather plays a factor by providing “good” growing conditions for the fireweed. Teddy decided he was going to battle the fireweed and hopefully succeed. In 2012 Teddy came to NRCS for assistance in Fireweed control. He implemented Herbaceous Weed Control, paddock by paddock, following his cattle in rotation as it made it easier due to the grass being eaten down. Teddy has successfully conquered the Fireweed battle on his 300 acres. Teddy’s words of wisdom to others as they would stop and

tell him, “That’s a waste of your time and money”, his response is “If you don’t do something about it now, it won’t change”.



Before Herbaceous Weed Control

Mauna Kea SWCD Rancher of the Year cont.....



After Herbaceous Weed Control

Teddy continues to spot spray as needed on his own time in order to keep the Fireweed under control. He also has continued working with NRCS to build upon the foundation he has started to maintain a functional operation.

Along this journey, and as it continues, Teddy has learned a lot through his experiences. He loves what he does and takes great pride in his hard work he put into the land. He knows the capability of his land and how to be successful. He continues to push forward with great management and strive to continuous improvement of the land. Teddy is a great example of being a good steward of the land. It has been great working with Teddy and using him as an example of success!



Alex & Teddy

HAMAKUA Soil and Water Conservation District



*Doug Beaton
Chairman*



*Troy Keolanui,
Vice Chairman*



*Virginia Alderson
Secretary*



*Dylan Shropshire
Treasurer*



*Marissa Harman
Associate Director*

Hamakua Chair's Message

As 2017 comes to an end, we are obligated to reflect on our challenges and accomplishments so that we can continue to move forward with providing valuable services for our community and producers. The need for those services continues to grow as our district is a very active agricultural area with operations ranging from small subsistence farms to large commercial operations. The demand for conservation planning services to conserve those resources will only increase as our population and population densities continue to rise. The agriculture residential interface will continue to increase as well, creating challenges for both the agricultural communities as well as the public.

The Hamakua SWCD, in partnership with the USDA Natural Resources Conservation Service, welcomed 22 new cooperators and approved 20 conservation plans in 2017. Over 6,700 acres of land have been included in our 2017 plans and will be implementing practices to address the identified resource concerns. The district also took part in several outreach activities including an educational session on Soil Conservation Planning and Principles at the Hamakua Harvest Farmer's Market in Honoka'a, Kamehameha Middle School Career Day, The student AgVenture event hosted by the 4-H and the UH Extension Service, and volunteering at the 2017 Hawaii County Conservation Awareness Contest hosted by the Ka'u SWCD.

The Hamakua SWCD would like to acknowledge and extend our deepest appreciation to the County of Hawaii, the USDA Natural Resources Conservation Service, and the State Department of Land and Natural Resources for providing the financial and technical support that enables us to provide free conservation planning to for our district. The HSWCD Board would like to also thank Kanoë Malani, Hamakua SWCD Soil Conservationist and Administrative Assistant, for being their person in the field and the office and commend her for her dedication and commitment to conservation. Most of all, the Board wishes to thank all of the farmers, ranchers and foresters for their voluntary cooperation with the district and for willingly implementing conservation on the land they control and for understanding the value and impact it has on the environment and their sustainability.

DEPARTMENT OF LAND AND NATURAL RESOURCES

LAND
Division

STATE OF HAWAII, DEPARTMENT OF LAND AND NATURAL RESOURCES



About The Department of Land and Natural Resources (DLNR) Land Division is responsible for managing State-owned lands in ways that will promote the social, environmental and economic well being of Hawaii's people and for ensuring that these lands are used in accordance with the goals, policies and plans of the State. Lands that are not set aside for use by other government agencies come within the direct purview of the division. These lands are made available to the public through fee sales, leases, licenses, grants of easement, rights-of-entry, month-to-month tenancies or kept as open space area.

Besides maintaining an inventory of State-owned lands, the division serves as an office of record and maintains a central repository of all government documents relating to land dating back to the "Great Mahele" of 1848...

On the island of Hawaii, there are approximately 100+ leases and permits issued for agriculture and pasture purposes. These leases and permits encumber over 114,000 acres of land. The DLNR requires all its tenants to apply as cooperators with their respective Soil and Water Conservation District and submit a plan for approval by the Chairperson of the Board of Land and Natural Resources. This requirement insures the land is kept in a productive state while encouraging our tenants to carry out good conservation practices.

State Department of Agriculture

Bio-control of Strawberry Guava (*Psidium cattleianum*) in Hawaii

Hawaii Department of Agriculture Plant Pest Control Branch

Strawberry guava (*Psidium cattleianum*) is native to Southeastern Brazil, where it is established in the sandy coastal plains to higher forest elevations up to 4,000 feet. It thrives in tropical to sub-tropical climates and can tolerate repeated winter frost. In Brazil, the typical height for strawberry guava ranges up to 16 feet, fruit may vary in color from red to yellow.

Strawberry guava was introduced to Hawaii by a priest in the 1820's as a table-fruit, however became established in Hawaiian forest ecosystems and currently considered one of the most disruptive alien weeds. Strawberry guava infest thousands of acres of forest on all of the major Hawaiian Islands, it forms dense thickets up to 30 feet in height. A combination of rapid growth rate, heavy fruit drop, lack of natural plant pathogens, and predators make it the perfect forest weed. Many non-native birds, rodents and feral hogs consume the fruit, move to new locations, creating new thickets by defecating seeds. Strawberry guava will overcrowd, compete and displace many rare and endangered native plants. The vast amounts of fruit produced by strawberry guava can also have a negative impact on Hawaii's agricultural

fruit crops, by providing an alternate host for the Mediterranean fruit fly. Dense root masses can absorb, block or alter the natural flow of rain from entering fresh water aquifers. It is estimated that there is at least 300,000 acres of strawberry guava on Hawaii Island alone.

In Hawaii, strawberry guava is commonly controlled by cutting, bulldozing and/or application of herbicides. However, repeat applications are necessary, which prove to be difficult, time consuming, and expensive. Another alternative is Biological control.



Galls formed by *Tectococcus ovatus*

The Institute of Pacific Islands Forestry of the USDA Forest Service has done research on *Tectococcus ovatus* Hempel for over fifteen years, it has been evaluated carefully both in its native range and under special quarantine in Hawaii to reduce the risk of non-target species.

State Department of Agriculture Continued.....

The US Forest service conducted host test studies with dozens of native, non-native plants related to strawberry guava. In Hawaii, the family *Myrtaceae* is represented by 49 species in 9 genera, including 8 native species. All laboratory test and field observations indicate that *Tectococcus* is highly host specific to strawberry guava. In November 2011, the Hawaii Department of Agriculture, USDA Animal and Plant Health Inspection service, US Fish and Wildlife services, State of Hawaii Board of agriculture and the public reviewed the final environmental assessment (EA) and decided that *Tectococcus* could be utilized as a biological control for strawberry guava.



*Strawberry Guava Plants before being inoculated:
Note the monotypic stand of Strawberry Guava*

The Brazilian scale, *Tectococcus ovatus* Hempel (Hemiptera: Eriococcidae) is a small scale insect that creates galls on young leaves. A single female remains enclosed in the gall throughout her life, producing a several hundred eggs in a matrix of wax filaments, which help the crawlers



Plants after two years of observations: Note the defoliation of the plant canopy and regrowth of Uluhe Ferns

to float in the wind. Under laboratory conditions, *Tectococcus* reproduces continuously with a generation time of 6 to 10 weeks. Reproduction is facultatively parthenogenetic but there is at least one alternation of generations each year. The crawlers emerge from a small orifice at the tip of each gall, crawls upwards on branches, in search of soft, young leaf tissue. Once a suitable material is identified, it will settle, feed, and a gall will form around the nymph. A single leaf may support dozens of galls. The developing galls change the morphology of leaves, making it difficult for photosynthesis to occur. Sugar and carbohydrate production is altered, and the energy for fruit and seed formation is reduced.

Heavy infestations can cause premature leaf drop, in some instances, the majority of the plant becomes defoliated. When the plant pushes out a new flush of foliage, *Tectococcus* once again infest new leaf tissue. This cycle may take up to two years, stunting the entire plant until it exhausts much of its stored energy reserves. Sometimes other plants (Grasses, ginger, ferns, shrubs, etc.) will out compete and over take it.

Tectococcus ovatus will not outright kill strawberry guava, however it can be used as a tool to slow the spread by reducing fruit and seed production, weaken plant vigor which enhances mechanical and chemical control methods.

**UNIVERSITY OF HAWAII
COLLEGE OF TROPICAL AGRICULTURE
AND HUMAN RESOURCES (CTAHR) CAN HELP YOU**

The University of Hawaii at Manoa, College of Tropical Agriculture and Human Resources (CTAHR) through the activities of the Cooperative Extension Service is responsible for providing community-based educational programs in agriculture and human resources. The Cooperative Extension Service is able to provide services to the public and your community through the work of county extension personnel.

County Extension Agents are University of Hawaii faculty members who work out of Extension Offices throughout the State. On the Big Island, the two principal Extension Offices are in Hilo (East Hawaii) and in Kainaliu (West Hawaii). County Agents are available for individual consultations or can provide educational workshops and short courses covering topics in agriculture, urban horticulture, aquaculture, home economics, leadership, family living, youth activities, community development, nutrition and health. Educational materials such as brochures, publications and videos are also available at extension offices for use by the general public. Services provided by County Agents are generally provided free of charge except those provided by the Agricultural Diagnostic Service Center that provides soil, tissue, water, feed and forage analysis, as well as, insect disease and nematode identification for a nominal charge.

CTAHR also maintains a network of eight agriculture research stations on the island, each with a unique environment. Researchers and extension faculty from CTAHR, other units of UH-Manoa, UH-Hilo, Hawaii Agriculture Research Center, U.S. Dept. of Agriculture, University of Wisconsin, and others utilize the stations for research on a variety of agricultural crops, forest trees and livestock; demonstrations on a new cultural techniques and cultivars; instruction; and work on native endangered plant species. A list of county extension agents, specialists and researchers who are assigned to the Big Island of Hawaii can be obtained by contacting the office in your area. CTAHR also has a number of agriculture researchers and specialists stationed on the Big Island to conduct research to solve high priority problems associated with various agricultural commodities. These researchers and specialists provide information to the extension agents who in turn are responsible for developing educational programs for the public. The extension agents are your link to the University and its community-based educational program.

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