

WATER RESOURCES COMMITTEE
Council of the County of Maui

M I N U T E S

Council Chamber

September 19, 2018

CONVENE: 9:15 a.m.

PRESENT: VOTING MEMBERS:

Councilmember Alikea Atay, Chair
Councilmember Elle Cochran, Vice-Chair
Councilmember Stacy Crivello (out at 10:57 a.m.)
Councilmember Kelly T. King
Councilmember Yuki Lei K. Sugimura (in at 10:56 a.m.)

EXCUSED: Councilmember Robert Carroll
Councilmember Mike White

STAFF: James Krueger, Legislative Analyst
Stacey Vinoray, Committee Secretary

Ella Alcon, Council Aide, Molokai Council Office (via telephone conference bridge)
Denise Fernandez, Council Aide, Lanai Council Office (via telephone conference bridge)
Dawn Lono, Council Aide, Hana Council Office (via telephone conference bridge)

ADMIN.: Gladys Baisa, Director, Department of Water Supply
Jennifer Oana, Deputy Corporation Counsel, Department of the Corporation Counsel
Eva Blumenstein, Planning Program Manager, Department of Water Supply
Robert De Robles, Planner VI, Department of Water Supply

OTHERS: Nicklos Dudley, Hawaii Agriculture Research Center
Manoa Kaiokulani Martin
Chris Brosius, Manager, West Maui Mountains Watershed Partnership

Plus (1) person in gallery

PRESS: *Akaku Maui Community Television, Inc.*

CHAIR ATAY: . . . *(gavel)* . . . Good morning, everyone. It's time 15 minutes after the hour of 9:00 a.m. on this Wednesday, September 19, 2018. This is the Water Resources Committee meeting. I want to welcome everyone and ask that the Chambers come to

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order and decorum and with that requesting everyone to, whoever has any noise-making device to silence them especially silencing the cell phones. I want to introduce myself, Alika Atay as Chairman for the Water Resources Committee meeting and then we also have Vice-Chair present, Elle Cochran.

VICE-CHAIR COCHRAN: Aloha and good morning, Chair.

CHAIR ATAY: Thank you. We have Member Kelly King present.

COUNCILMEMBER KING: Good morning, Chair.

CHAIR ATAY: Good morning. And also present, we have Member Stacy Crivello.

COUNCILMEMBER CRIVELLO: Aloha, Chair.

CHAIR ATAY: This here forms us as a bare quorum status. Today we have absent Yuki Lei Sugimura. We have absent, excused, Robert Carroll, and absent and excused, Mike White. Members, we...also in the Chambers this morning's meeting we do want to recognize the administration, Director of Water Supply, Gladys Baisa.

MS. BAISA: Good morning, Chair.

CHAIR ATAY: Good morning. We have Planning Program Manager from the Department of Water Supply, Eva Blumenstein.

MS. BLUMENSTEIN: Good morning, Chair.

CHAIR ATAY: And we have Department of Water Supply Planner out in the Chamber, Robert De Robles. And representing Corporation Counsel, we have Jennifer Oana.

MS. OANA: Good morning, Chair.

CHAIR ATAY: This morning, I also want to recognize in attendance Committee Staff, Stacey Vinoray, Committee Secretary, Legislative Analyst, James Krueger, and our District Office Staff out in Hana, Dawn Lono, out in Lanai, Denise Fernandez, and on Molokai, Ella Alcon. I also want to recognize the in-office staff for myself, the Policy and Legislative Analyst Trinette Furtado and Brian Bardellini. This morning, we also have others visiting and presenting today. We have Nicklos Dudley, Hawaii Agriculture Research Center, as well as Chris Brosius, West Maui Mountains Watershed Partnership. Members, we have one item on today's agenda and that's WR-5, focused on the Watershed Management and Protection. Before we move into the meat of the meeting, I would like to begin by taking public testimony. Staff?

. . . BEGIN PUBLIC TESTIMONY . . .

MR. KRUEGER: Mr. Chair, there is no one signed up in the Chambers to testify.

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CHAIR ATAY: Thank you. I want to reach out to the District Offices asking anyone wishing to testify here in the Chamber at this time please sign up at the desk in the lobby and if testifying from a remote site please sign up with the District Office Staff. Testimony will be limited to the item listed on the agenda today and pursuant to the Rules of Council each testifier will be allowed to testify for up to three minutes per item. When testifying please state your name and any organization you may be representing. Reaching out to the District Office, Hana Office, Dawn Lono, do you have anyone wishing to testify?

MS. LONO: Good morning, Chair. This is Dawn Lono at the Hana Office and there is no one waiting to testify.

CHAIR ATAY: Thank you. Lanai Office, Denise Fernandez, do you have anyone wishing to testify?

MS. FERNANDEZ: Good morning, Chair. This is Denise Fernandez on Lanai and there is no one waiting to testify.

CHAIR ATAY: Molokai Office, Ella Alcon, do you have anyone wishing to testify?

MS. ALCON: Good morning, Chair. This is Ella Alcon on Molokai and there is no one here waiting to testify.

CHAIR ATAY: Staff, is there any last-minute request? Okay. Once there's...seeing that there is no one here and no one else wishing to testify, if there are no objections, I will close public testimony.

COUNCILMEMBERS VOICED NO OBJECTIONS.

. . . END OF PUBLIC TESTIMONY . . .

WR-5 WATERSHED MANAGEMENT AND PROTECTION (CC 17-79-)

CHAIR ATAY: Okay. Members, we have agenda item WR-5, the Watershed Management and Protection. We will...you know, the previous meeting we had we hosted representatives from Auwahi Forest Restoration Project, as well as the Puu Kukui Watershed Preserve. We had the opportunity to review their work and anyone in the audience as well as out there if you would like to reference those presentations in the future they are also available for your review in Granicus. Once again, this meeting is continuing the education and understanding of our watershed partnership grants that the County's Department of Water Supply supports. So, for today's meeting, we have with us Nicklos Dudley from Hawaii Agriculture Research Center and Chris Brosius from the West Maui Mountains Watershed Partnership to give presentations on their respective organization's work. It is the Chair's intention to receive presentations from these two organizations today and to schedule presentations from the remaining partnerships for

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future Committee meetings. However, before I begin with the presentation I would like to ask if Director Baisa has any opening comments?

MS. BAISA: Good morning, Chair and Members. And thank you very much for the opportunity to be here today. The watershed partnership grants are very important and our Department is charged with recommending the selections to Council for funding and for managing the grants and making sure that the deliverables are received and the reports are made and everything's in order. We also recommend the funding to Council and the Council has the final decision on how much is awarded and to whom. This morning, I am very happy to have two of our very long time and important grantees with us. And I also have my Chief of Planning and Water Resources, Eva Blumenstein, with me and she has all of the details and so I will be relying on Eva to handle most of if there any questions. Thank you again for the opportunity to present. This is a very, very important service in our community. We have got to preserve our watersheds or restore those that need restoration because this is a lot of where our water source comes from and it is important. I also want to thank the County of Maui, you know, in meeting with people around the State I'm very proud to always hear that Maui County does more than anybody else in this area and I think that our Councilmembers deserve and our Mayor and everybody who is a part of that funding you all deserve a big pat on the back. Thank you for the investment and we hope that you'll be able to see where your money's going today. And I'd like to thank the partnership members for being here. Thank you.

CHAIR ATAY: Thank you, Director. Ms. Blumenstein, is there anything you would like to add?

MS. BLUMENSTEIN: Thank you, Chair. Yeah, just thank you, we appreciate the opportunity that you let all our grantees present the big picture also of their projects. The Department, as you know, we provide a rate funded grant subsidies to projects but those are just a component of all the important work that these watershed managers do. They're all based on the watershed management plan and they by necessity have to take this very holistic approach. That said, we're trying to target those projects that benefit our customers and service areas and that's not always possible to really define but we want to...our intent is so that we can provide consistent funding for those core deliverables year after year so that we know that the grantees can rely on that and also allow them to leverage funds from other sources that way, so really appreciate the opportunity that they can kind of present this bigger picture. Thank you.

CHAIR ATAY: Thank you. Members, you know, we do have 11 or 12 partnership grantees that receive funding and in the past year or so we would always be bringing them in all in one day in one meeting trying to get all 11 grantees time to educate us as Members to allow us to understand their deliverables and where the future fundings would go. What I've chosen to do in this process is to allow the grantees more time to educate us about their specific projects that they're working on so that you as members can get more information to make better decisions of the future funding that we're gonna be directing towards. So, today we've been able to invite two of the grantees and we're gonna start things off by turning things over to Mr. Dudley with the Hawaii Agriculture Research Center for his presentation. Mr. Dudley?

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. . . BEGIN PRESENTATION . . .

MR. DUDLEY: Aloha and good morning, Chairman Atay and Members of the Council, Director Baisa. I'm gonna just run down here to the corner. I appreciate the opportunity to present to you and give you an update on my team's work with deploying wilt resistant koa in Maui's watersheds. So with that, I will begin my presentation. Okay, well, first of all, we consider koa to be one of the most important endemic tree species in Hawaii from a cultural, economic, and ecological perspective. And as a...as an aside, koa is an autotetraploid. It's related to an Australian acacia and it was believed to be introduced to Hawaii about 5 million years ago in a single introduction event. You know it's clearly important for ecological reasons. It provides habitats for many native birds and insects. It's a nitrogen fixing tree species. It has a very critical role in the watershed and it's also a dominant tree species in many of our native ecosystems. Historically, it has a significant cultural role. It provides logs for ocean going canoes. It has...it's integral in many Hawaiian ceremonies, as well as used as dyes and other things like that. We also know koa for its beauty and its economic importance as a forest product. Oops, excuse me, I'll go back here. Okay, so, here we go. So, there we go, excuse me. So, why is it important to restore with koa and do reforestation? Owing to its high ecological value, economic value, and cultural value there's a strong interest in genetic conservation of remnant koa populations. Restoration and reforestation can be severely impeded by koa wilt. HARC, my organization in collaboration with the Forest Service and others have developed a program to select and conserve koa populations with genetic resistance to this disease. Our goal then is to be able to provide high quality seed stocks of eco-region, a specific koa seed for restoration and reforestation purposes and which fit in to the goals of watershed protection and restoration in County of Maui. So, let's talk a little bit about koa populations. Well, first of all, we know that they're discontinuous by island and also discontinuous within island. We have windward populations, we have leeward populations, we have high populations, and fragmented low-elevation populations. There's a geochronology which occurs. The oldest populations occurring on the island of Kauai and the youngest populations occurring on the island, the Big Island of Hawaii. Within these islands, there's also population fragmentation which causes a lack of gene flow and on top of that there are pests and pathogens which also further reduce the gene flow and constrict those populations. Just real quickly, we know that since koa is a tetraploid, it is highly variable, and we notice that we have a leaf width and we have seed pod differences, we have leaf width differences, and some of those differences relate to the fact that on the windward side koa functions primarily as a rainforest species, and then on the leeward side it functions as a cloud forest species, and thus the requirement to have a wider leaf to catch the cloud fogs and mists. So...oops, I'm a...I think I'm...oh, here we go. So, just real quickly, our view is that we're very interested in keeping these genetically discreet populations separate. So, we keep these populations separate by island, we keep these population separate by aspect within island, and we keep these populations separate by elevation. Oh, can you...so, can you hear my okay? Have we missed anything? Okay. So, we did a study funded by the Forest Service where we did a 300 leaf...we collected leaves from 300 different koa trees. And just real quickly, these populations segregate. On Maui we have a low-elevation population on the windward side, then we have a high-elevation

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population on the windward side. So, the...there's a population difference genetically between high elevation types and low elevation types. On the Big Island, it's separated again by windward high and low. There's an outlying population in koaia in Kohala. There's a south slope population and a leeward population. On Oahu, the Koolau populations are genetically different than the Waianae populations. In Kauai, they're in the wet zone of Kokee, the population is a little bit different than the leeward population. So, that was...that study was done by morphological characteristics first then validated through GBS, which is genotype by sequencing. So, the problem is there's high mortality of seedlings, saplings, and crown dieback in older forest stands and the primary pathogen is *Fusarium oxysporum*, which causes this vascular wilt disease. Okay, and here is the life cycle or the pathosystem of *Fusarium*. In its resting state, it existed as a chlamydospore in the soil, it's activated by root enzymes on the koa tree, it penetrates the roots and enters the vascular system. It causes blockage of the products, photosynthesis in the canopy and interferes with translocation of water and nutrients from the roots, and in many cases causes mortality. So, the solution is to plant wilt resistant koa. And now, I'm happy to report thanks in large part to the support that I get from you folks, we have a genetic tool to use for restoration and reforestation and koa is now a sustainable...we think koa can be very sustainable resource and this will help ensure healthy watersheds, healthy forests, and also provide a certain level of biosecurity. So, how do we do this? So, we go out into remnant native populations and collect seed. We have a...oops, excuse me. So, our methodology for seed collection when we go out into these remnant populations is to collect from dominant or codominant mother trees with vigorous canopies. We target 25 mother trees per stand for collection and we sample between mother trees 50 to 100 meters apart. The reason for that is we want to avoid relatedness. So, our assumption is the closer the mother trees are, the closer the trees are to each other the more related they will be to each other, and so this ensures a certain level of genetic diversity. When possible, we collect seed from different quadrants of the canopy and the reason for that is koa's insect pollinated and it's possible that we may have a different pollen parent on one aspect of the tree versus the other. And so, this helps us to ensure that we have a high level of diversity which is our goal. So, this is a recent collection in the leeward side of Haleakala. The...if you can see, and you can reference that in your handout also if you can't pick it up on the screen, but these represent mother trees in Kahikinui, the northern, the upper part of Haleakala Ranch, and also in Nakula NAR section. And I'll be referencing the seed of this that we collected from these mother trees in a moment, later on in the presentation. So, these represent individual collections and this is the clean seed. So, once we have the seed we now have to screen it to segregate the populations between susceptible and tolerant. So, these are our screening methods. Previously, we've surveyed the forest and we've collected diseased koa tissue, we've isolated *Fusarium*, this is one of our nasty isolates that we know causes mortality. We grow it. We have a cocktail of those that we use to ensure that we are challenging the seedlings with virulent isolates. We grow these out in much like a mushroom in a perlite cornmeal mix. It's powdered and then mixed with our potting soil and then we transplant germinated seedlings into our containers. And this is an example of each individual tray is a different seed source and this is an example of one of our screening trials that was done, you know, last year. This is a healthy seed source.

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CHAIR ATAY: Mr. Dudley?

MR. DUDLEY: Yes?

CHAIR ATAY: I think Member has a...

COUNCILMEMBER KING: Yeah, I just...I have some other questions but I just want before we leave this area I just wanted to ask you before I forget, how do you know that those seeds that you're collecting are resistant?

MR. DUDLEY: We don't.

COUNCILMEMBER KING: Oh.

MR. DUDLEY: That's why we're testing it.

COUNCILMEMBER KING: Okay. So, this is all...

MR. DUDLEY: No, this is...

COUNCILMEMBER KING: Presuming because of the trees that you picked it from, okay.

MR. DUDLEY: Right. So, let me go back to...so, right, at this point, we have a population and we have to screen it for either susceptibility or tolerance and this is how we do that. This is our screening...oops, am I going...oops, going the wrong way, sorry. So, this is...

CHAIR ATAY: Mr. Dudley, can you use the mic?

MR. DUDLEY: Sorry. So, this is our screening trial, so we've collected the seed and this is our methodology and these are our screening trials.

COUNCILMEMBER KING: Okay.

MR. DUDLEY: Okay, so each tray represents a different mother tree that's being challenged by virulent isolates of koa wilt.

COUNCILMEMBER KING: Okay. And those are all trees that were healthy when you picked the seeds from the...

MR. DUDLEY: Right.

COUNCILMEMBER KING: Okay.

MR. DUDLEY: Those are all trees and this is a healthy seed source. This is a susceptible seed source. And so, does that clarify things a little bit?

COUNCILMEMBER KING: Yeah. Just a...I just didn't want to get too far into it.

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MR. DUDLEY: Okay. Right, right, right, right. So, there's a lot of moving parts here, and so here is...okay, so the screening trials, we generally...so, we'll go back here, there's about 50 to 80 different families. A family is all the seed from one mother tree and we run those trials to determine susceptible and resistance and those that are determined primarily by survival, percent survival. So, we screened over 200 Maui families from West Maui, leeward Haleakala and windward Haleakala. We retest the seed to verify results and these are just some technical points, all the seed were open pollinated, we don't know the pollen parent, primarily wild populations and, you know, we hope we'll be able to continue collecting and screening over time. So, once the wilt resistant seed...these are ready to deploy in our, one of our koa seed orchard sites. So, this is our windward site above Olinda Road on a lower slope at about 3,500 feet on Haleakala Ranch. So, last year was our first year that we actually were able to harvest seed from that site. This is an example of some of the seed. This is an example of one of our healthy mother trees. We planted recently, about 18 months ago, we installed another orchard based on the collection that we did in leeward Haleakala. This is Haleaimakani site. If you're familiar with the Nene pens on the leeward side, it's adjacent to the Nene pens, and this is a view of the trees, so this is about six months, this is about 12 months, and this is fairly, it has a fairly sharp slope but it's a very good site. We're excited about this because we think there's a real need to have reliable seed sources and quantities of seed to reforest in Kahikinui and other places on the leeward side. Locations of our koa site...here's the Haleaimakani site. We have a site at the Kula Forest Reserve. We also have a site at Ulupalakua Ranch, and then Mahanalua. There's two sites. One is the seed orchard site and one is the demonstration planting. We have also screened seeds with the Puu Kukui Watershed. But we have yet to install a seed orchard site there. So, the benefits of watershed restoration with koa are as follows, we believe that there'll be increased rates of cloud fog intercept. Having koa in the ground will contribute to groundwater recharge by reducing runoff and transpo-evaporation [sic]. It motivates landowners to manage and control invasive species. It increases habitat diversity for threatened and endangered species, and koa can also be a long-term sink for carbon. So, this is a shot of koa in a mauka pasture. Mahalo and aloha. Thank you for your time and attention and your financial support and here's other folks that I'd like to acknowledge that have helped with the program over the years. And, we appreciate your...so, I'm happy to field any questions you might have. And again, I sincerely appreciate your support and it's allowed us to bring the program to its current state, and we're just at a point, just as an aside, we're now at a point where these orchards are starting to produce seed and we are working with our watershed partners and others to actively distribute those seed and seedlings to get them out in the landscape on Maui. So, thanks again.

. . . END PRESENTATION . . .

CHAIR ATAY: Thank you, Mr. Dudley. Members, do you have any questions? Ms. King?

COUNCILMEMBER KING: Okay. Thank you. I'm gonna start with my most recent...because I've been taking notes and...start with my most recent, I'll go back, or maybe I'll start

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with the oldest question I have which is the first thing you said was that koa was introduced by a single event. And you did...what was that...was that a...

MR. DUDLEY: So it's thought...I...so, recently a paper came out, it's really intriguing, so it's, it was considered to be one of the most long distance plant introduction events that has been recorded. So, now with the, you know, genetic tools that are available that weren't available before we've always known and suspected that, well, not always, but it's been common knowledge for a number of years that a progenitor of Acacia koa is a relative from Australia, Acacia melanoxylon, and...so, there was a scientist from South Africa that was able to do DNA testing, and I don't have the citation in my fingertips, but he wrote a paper on this long distance introduction event. And I think the more fascinating thing is that this author put forward that a sea bird then took koa seed to the island of Reunion in the Pacific Ocean, which is 7,000 miles away and there's a related Acacia species there, Acacia heterophylla, which is genetically very, very similar to koa.

VICE-CHAIR COCHRAN: The microphone, you move when you talk with your hands.

MR. DUDLEY: Okay. So, I'll repeat that. So, from Australia to Hawaii, from Hawaii to the island of Reunion, and that's the...anyway, I think it's a fascinating story.

COUNCILMEMBER KING: No, the reason I was asking is because I was at a invasive species presentation on the Big Island recently and they were talking about the difference between a native species and endemic versus introduced and they consider anything that came by boat or by man it was introduced and that it's native or endemic if it comes through like what you're talking about an event where like a bird dropped it or, you know, some kind of a ocean event or something like that, so...

MR. DUDLEY: Right, right. Well, I would just add a couple of things. One is that there is something that happened to koa. So, it's progenitor or ancestor from Australia is a diploid and koa became a, we call it, autotetraploid. How that happened is kind of unknown but somehow the number of chromosomes doubled, went from, it went from 26 to 52. And the other point I'd like to make, and I, you know, the other point I'd like to make is that it's likely the, you know, the center of origin or the place of introduction is a location on Kauai and what's speculated is that now you have koa that's kind of evolved into its own species because it's a tetraploid and then you have 5 million years of evolution and, you know, various generations. So, you know, there's kind of a huge difference between something that was introduced, you know, say 100 years ago or versus 5 million years ago and then kind of evolved in the landscape.

COUNCILMEMBER KING: Okay. Let me just ask, if I can, I just have two more questions but I'm gonna ask you for the nickel answer instead of a dollar answer.

MR. DUDLEY: I'll try.

COUNCILMEMBER KING: So, you know, no, I was just curious your, with the wilt resistant koa that you're developing. Is that gonna...is that different throughout the different genotypes you have wilt resistant koa in several different genetic --

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MR. DUDLEY: Right, so let me see if I can...

COUNCILMEMBER KING: --or is it just one? Are we just looking at one genetic type now that's wilt resistant?

MR. DUDLEY: Yeah, so the answer to that is...and I think I've done something wrong here. The answer to that is we are trying to develop wilt resistance. So, on Maui, we think there are several different populations that we're working with, a windward population, a leeward population, and a West Maui population, and it's likely that...so, the, unfortunately, when we screened the low-elevation population we did not find anything that had resistance.

COUNCILMEMBER KING: Oh.

MR. DUDLEY: So, the higher elevation population was the one that had resistance and is the one that captures that resistance in that Mahanalua site.

COUNCILMEMBER KING: Okay. And you don't know if that will grow in the lower...are you gonna test that in the lower elevation?

MR. DUDLEY: Yeah, so the answer to that is they haven't had the opportunity, but now we have seed and we possibly could.

COUNCILMEMBER KING: Okay.

MR. DUDLEY: We think that there's gonna be an elevational restriction. With that said, we now are developing or you've seen the Haleaimakani site and that's a leeward population, and so and then there's a third population. I consider the West Maui population of koa, you know, physically, it's physically removed and I haven't been able to, you know, we hope to get future funding to complete this picture. But the answer is our goal is to develop, you know, so this helped us developed seed zones, and so for Maui there's roughly three, for Oahu there's a Waianae population, and this is very preliminary and needs to be refined, so there's Koolau side and there's a Waianae side. On the Big Island, we did a lot of sampling or the project did a lot of sampling and we can see that there's, one two...three...four...five koa populations on the Big Island or genetically distinct populations.

COUNCILMEMBER KING: And you...did you do the wilt resistant testing on those or not? Just yes or no.

MR. DUDLEY: So, the answer is yes. The answer is yes and it's funded...so, we do what...we have a Statewide program and we have...we don't have every population on the Big Island represented but we have three of the five populations represented. And then, we do have a Kauai leeward population right now.

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COUNCILMEMBER KING: Okay. And then my last question is, who is the distribution...where are you gonna be distributing the seeds or do you already have some of the ranches...

MR. DUDLEY: Right, right. So, I'm gonna ask for...

COUNCILMEMBER KING: Or is that a...

MR. DUDLEY: I'm gonna ask for a little help on that answer because I have my outreach coordinator with me, I'd like to introduce Manoa...I mean Kaio Martin and she'll...she helps with the distribution. Can I just give it over to Kaio for a second? Because she helps us...she is integrally involved, she's an integral part of this distribution and outreach.

COUNCILMEMBER KING: Is Stevie Whalen still at HARC?

MR. DUDLEY: Yes.

CHAIR ATAY: Can you identify yourself?

MS. MARTIN: Hi, aloha, my name is Manoa Kaio Martin. I'm from Haneoo, Maui, in Hana, and I work with Nick on all of the different Maui koa sites. So, because we had the success on this last year of our first seed collection from Mahanalua, the trees were old enough, which was really amazing 'cause I took part in planting them about five-and-a-half years ago, so it was a really special time to be able to gather those seeds. We have the opportunity now to reach out and build partnerships within our community. And so, just this year we've been doing that and have had success with seed propagation from those seeds that were collected and are now working on partnerships with kind of a diverse group because I feel like it's important to involve the keiki as well as the adults in the education process of what this all means. So, this year because we have the seeds and are growing out the seedlings here on Maui, I'm also the farm manager for the Maui Farm in Makawao, so we've partnered with them as a site for education on this project and are working with the school garden networks throughout Maui County, in particular Pomaikai has come onboard, grades first through fifth grade. They'll be doing educational field trips up to the farm and then also taking part in visiting the sites and being able to learn the propagation as well as, you know, with that we gather information on where their families are and where they live and then they'll be able to take seedlings home and plant them. Kula Elementary School, we got some of the seedlings that were started. We had extra from West Maui and so Punana Leo O Lahaina got about 150 seedlings. This last celebration of the arts we gifted them with that, so they have two sites in the Lahaina region that they were gonna be planting those out as a school and I will then go and visit with them and do the educational process with them as far as learning about how to grow out, how to trim for seeds, pruning for seeds versus koa logs. We're also working with the AmeriCorps Project Kupu and trying to reach out to different areas now that we have our seed source, which is an amazing thing and it...the weather affects everything. This year, a lot of our flowers were on the ground when we went to go check out trees so it all differs, yeah, but we're excited to be able to have the disease resistant seeds now.

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COUNCILMEMBER KING: Did you get anything wiped out in any of the storms?

MS. MARTIN: We got actually most of our flowers wiped out in the Mahanalua site in that...remember that wind storm that came in, what was it, like April, March that came down, so the trees were flowering kind of off season this year, they were actually doing a double flowering. I think it had a lot to do with the temperatures and the global warming kind of thing, so when that happened the trees had just started flowering and they hadn't had a chance yet to be pollinated and go into actually creating seeds, so when we went up to go check the site, Mahanalua, we were walking through it and thinking where did all the flowers go and stuff. And we looked, you know, in the brush of the leaves off on the ground and realized that a lot of them have been blown off, so it's very special when we do have the success of being able to gather the seeds and it'd be a take, yeah.

CHAIR ATAY: Thank you for sharing. Member Cochran, you had a question?

VICE-CHAIR COCHRAN: Yeah, thank you. Are you through, Ms. King?

COUNCILMEMBER KING: Yeah, no, I just thought that was fascinating that you're involving the children in these work groups because I think it's really important.

MS. MARTIN: Thank you.

VICE-CHAIR COCHRAN: Yeah, thank you.

COUNCILMEMBER KING: Can grow up with the koa trees.

MS. MARTIN: It is. It's growing native keiki and it's an amazing thing when they go home with this knowledge and this interest, you know. They share it with their parents and it creates this, then, awareness within the home and we believe that that's how things can grow, you know, and if they come home with a koa tree that they're excited about and it's like disease resistant it may spark something in their parents and be like, oh, what is that, so it's a whole process, yeah.

VICE-CHAIR COCHRAN: Yeah. Thank you. I do have...thank you for being here and the work you do. It's so important for both of you. And I know in your presentation you mentioned Puu Kukui Watershed you have yet to have a site installation at this time but then you brought up that Pomaikai has gotten on board, so I just want to wanted to find out where is that and any efforts that is now in play? And then Punana Leo O Lahaina, is that the newly established school at Waiola Church that you're talking about, that chapter --

MS. MARTIN: Yes.

VICE-CHAIR COCHRAN: --that have gotten the 150? And then where were their two sites?

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MS. MARTIN: They haven't quite determined them yet, but they said they have two different areas with aina that they were gonna plant them out in, so we're just trying to nurture that and get them in the ground and go and do a field trip up there with them and stuff like that. I think it was some of the kumus that had ohana that have the different areas where they might be able to plant them and we're encouraging them to do it as a seed site. And it's Pomaikai Elementary actually the one...yeah.

VICE-CHAIR COCHRAN: So, not Crozier?

MS. MARTIN: No.

VICE-CHAIR COCHRAN: Okay. So different Pomaikai.

MS. MARTIN: Yeah.

VICE-CHAIR COCHRAN: I thought Pomaikai Crozier and then school, two different things. Okay. Oh, okay, okay. And so then, the, sorry, a follow-up. In reference to the strains or genotypes of the koa, these are coming from Upcountry, and so the ones given to West Maui are Upcountry koas that are gonna be planted?

MS. MARTIN: No, no.

VICE-CHAIR COCHRAN: No.

MS. MARTIN: They were from the West Maui seedlings that were grown out in the nursery on Oahu. There were just extra that were propagated, so Nick sent them over to me as a, like hookupu, like free, 'cause I told him I was going out to the celebration of the arts and it was on the west side and that there might be an organization that would want the trees. Or I was trying to even just connect with individuals who were there at the celebration to send these disease resistant koa trees home with them because that's kind of where we're at now since we have them, it's like put in them in the aina, yeah.

VICE-CHAIR COCHRAN: Yeah. Okay. Well, very good. And the school is at my church, Waiola, I'm a board member of that church too and I'm also on the board of trustees, so definitely would love to assist and work however I can and then also live in Honolua Valley where Pomaikai Crozier and Puu Kukui Watershed does work up at Field 52. And so would be more than happy...I have about four acres myself, which I could, you know, assist, too, in planting and help enrich our lands with our koa.

MS. MARTIN: That would be wonderful.

MR. DUDLEY: Just a couple quick comments. So, first of all, I've actually started working with Maui Pine about almost 20 years ago and we did a collection from Honokohau Valley through, you know, the Maui, you know, the Maui Pine fields all the way to the gulch that separates Maui Pine from, you know, --

CHAIR ATAY: Sugar.

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MR. DUDLEY: --used to be Pioneer Mill. And so, that collection is up above the airport in field, I think, it's 26 and we have gone in and flagged, did a collection, and identified resistant mother trees. And so, we have a...our big issue was the expensive fencing, site prep, and ungulate control, and we were not, you know, we'd love to explore ways to get a seed orchard site on the west side that would be cared for.

VICE-CHAIR COCHRAN: Okay.

CHAIR ATAY: How old is that Field 26 planting?

MR. DUDLEY: Twenty-six, so there was a series of plantings from 2002 to 2006.

CHAIR ATAY: Okay.

MR. DUDLEY: And that's the primary source of...so, it's a pretty diverse collection because we did...so...and we know that there are resistant mother trees there and we do have a number of those seed banked, so we're, you know, almost ready to, you know, plant, you know, we're...we just need the site.

CHAIR ATAY: Okay, Member Cochran, you have a follow-up question?

VICE-CHAIR COCHRAN: Okay. Great. Thank you. Yeah and thank you so much for your time. I don't know if Ms. --

MS. MARTIN: Thank you.

VICE-CHAIR COCHRAN: --Crivello had...

CHAIR ATAY: Member Crivello?

VICE-CHAIR COCHRAN: Okay.

CHAIR ATAY: I...

VICE-CHAIR COCHRAN: I did, sorry.

CHAIR ATAY: Okay.

VICE-CHAIR COCHRAN: The...so, 5 million years ago, introduced somehow, you know, to us and --

MR. DUDLEY: Give or take 100,000.

VICE-CHAIR COCHRAN: --the disease, this disease is just by _____ age from 5 million years later things are just starting to deteriorate naturally or man-made?

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MR. DUDLEY: So, the, you know...right.

VICE-CHAIR COCHRAN: Or man introduced?

MR. DUDLEY: So, what we can say about the disease is we do not know the origin.

VICE-CHAIR COCHRAN: Okay.

MR. DUDLEY: And it was identified by a pathologist in 1982 by the name of Don Gardner who worked for USGS and then...so, you know, the story back then was koa was, you know, my estimation, koa was extract...mined essentially, from the forest and the regeneration wasn't much of a concern and, you know, the land use model was sugar cane, pineapple, and ranching. And so, fast forward now when...and, you know, the earlier efforts that koa, you know, reforestation succeeded where wilt wasn't an issue at high elevation sites on the Big Island but failed at low elevation sites on Maui, on the Big Island, you know, on Oahu. And, you know, we started scratching our heads and saying well, you know, what's the problem here? And then we went back and realized, you know, it was a disease issue. And so, we think that we have a leg up. We are kind of at a threshold to where we might be able to do this on a, you know, landscape level now and, you know, wouldn't it be a wonderful thing to, you know, reforest some of our mauka abandoned cane land, abandoned pineapple land, marginal ranch land in a native forest tree species. So, that's my vision.

CHAIR ATAY: Thank you for that great segue to my questions.

VICE-CHAIR COCHRAN: And...sorry. One last question, sorry, Chair, real quickly, maybe. So, the haole koa, I...there must be some scientific name to that one. We all call it the haole koa.

MR. DUDLEY: It's the *Leucaena leucocephala*.

VICE-CHAIR COCHRAN: Okay, that one.

MR. DUDLEY: So, anyway, yeah.

VICE-CHAIR COCHRAN: And the Formosa koa, which is just like rampant and over taking, which are --

MR. DUDLEY: Yes.

VICE-CHAIR COCHRAN: --headaches.

MR. DUDLEY: That's also an acacia but it's from Formosa.

VICE-CHAIR COCHRAN: So, my thought is, is there a way to give them the disease? To get rid of them and wilt 'em off the face of the earth?

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MR. DUDLEY: I wish I was smart enough to answer that question.

VICE-CHAIR COCHRAN: I'm kind of joking but not really.

MR. DUDLEY: Yeah, anyway, right.

VICE-CHAIR COCHRAN: It's like I don't know is there...

MR. DUDLEY: Yeah, so, it's...you know, so the answer is I don't know. And I think that, you know, managing those two invasives is a huge task and there may be a biocontrol but we haven't quite found it yet.

VICE-CHAIR COCHRAN: All right. Well, thank you.

CHAIR ATAY: Mr. Dudley, I have a series of questions --

MR. DUDLEY: Okay.

CHAIR ATAY: --for you. And the main reason why, and I think there's people out in the audience, the general public wondering why we're discussing koa in a Water Resource meeting and the correlation and the connection is to strengthen our watersheds, to strengthen our ability to collect and generate more water into our water aquifers. At our previous Water Resource Committee meeting, we had a presentation from Mr. Art Medeiros and he showed us two, for me, very important slides. One of the slides he had was an old native forest and he showed the map of Maui and all the green that Maui had covered, was covered with a native forest, and then the other slide was the Maui of today and a bigger section of what used to be green is now red, meaning that there is no forest existing. And as I looked at that, it was quite evident from the elevations from Kula coming through Pukalani going through Makawao, going all the down along Baldwin Avenue towards Hookipa was where koa once was forested, yeah. And so, in the quest of our kuleana of taking care of our watershed and our future ability to keep on regenerating our water aquifer with interest, I am interested in your project of the ability to reforest our lands that were once native forests. We have this opportunity of some 36,000 acres in the central part of Maui, which you just said what about, yeah, our cane fields. So, let's assume we have that opportunity, how many trees must we plant or can we plant per acre?

MR. DUDLEY: That's actually a pretty easy question. So, our spacing is around roughly 650 trees per acre and it can vary depending on spacing 450 to 650 and, you know, that's...and so, just to do the math it's about 5 to 6,000 seed per pound, and so you can reforest about 10 acres per pound.

CHAIR ATAY: Okay.

MR. DUDLEY: And we had...so as our orchard start to produce, our first harvest of seed was about eight pounds. And, you know, we...and that was only from a few trees in the site. And so, we expect that...and that's the whole purpose of these seed orchards is to

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produce seed for restoration and reforestation and be able to do things not at a micro plot level but move toward landscape level restoration where you might be able to make a watershed-level impact.

CHAIR ATAY: Okay, so with that and knowing the ecoregions of the seeds that's needed, looking...let's take this central valley of Haleakala, you know, and basically, it's collecting two types, one from the windward, one from the leeward, we taking the one from the leeward, which is Kahikinui, collecting those, bringing it down around Kula, Omaopio, coming probably as far over as Pukalani and then Makawao, Haliimaile, Haiku is the windward-type seeds, right. And so, I'm looking at that as a way for our island to increase the catchment of water for our future generations, and so with that, you know, we must be addressing soil remediation and the planting of the trees must be addressing carbon sequestration. You know, I recently returned from San Francisco in attendance at the Global Climate Action Summit and that's been the big push for us to prepare for the change of climate that's gonna occur. People forget we live on an island and we need to prepare for our future generation's survival. So, with interest, your study, your research, the ability to restore our watersheds through the planting of koa, if you're saying then, I'm looking at...let's say we have 10,000 acres to plant, you know, how do we get us up and ready and how do we get nurseries created and create jobs to reforest our island once again? We went through a series and a period here where agricultural type of farming took out our forest but it also took away our island's ability to generate more water and that's where I think this Committee's kuleana is to how do we move us forward in the management of our watershed and protecting our availability of water. So, how do I get more seeds produced? And how do I get windward seeds? And how do we get leeward seeds?

MR. DUDLEY: You know, I...so the answer I think, you know our goals are in alignment and it now becomes a function of, you know, the biological piece. Our orchards are coming into production. We are...I don't know if, you know, at maximum production, you know, if I'll be producing, you know, if they'll produce 25 pounds of seed or 100 pounds of seed and those are some of the questions that your support will help us get to. And, you know, the exciting piece to me is, you know, having done this for a number of years is to finally, you know, feel that the climate is right from, you know, a social perspective, as well as a biological perspective where we may think now about how to restore our watersheds in such a way that native plant material is a critical piece to it, and that's, you know, a huge shift from, you know, the view of, say, 50 years ago or even 25 years ago, so again I appreciate your support because it allows us to implement this vision.

CHAIR ATAY: Thank you. And I want to, before we come to a close here, I do want to emphasize to the Members of the Committee, as well as to the Administration, that this is what we're gonna have to plan for in our budgeting is increasing nursery of plantings to get more of native trees planted into our ground so that we also can address the issue of carbon sequestration and creating that exchange of climate change, as well as creating the opportunity of bringing more water to our island. Members, any closing...okay, Member King?

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COUNCILMEMBER KING: Yeah, I just wanted to make the point that, you know, if we're look...and I think we should look at continued, if not, increased funding, but what I would like to see to that end is a plan for, you know, what we're trying to reforest, like where were the forests, what are we trying to reforest, what amount is that, you know, as you...and I think what you said something, like, you don't know if you're gonna get 25 pounds or 100 pounds. I don't know if you're talking per tree per year, is that...

MR. DUDLEY: Right, right. So, the --

COUNCILMEMBER KING: Okay.

MR. DUDLEY: --productivity of the orchards, you know, we're still...

COUNCILMEMBER KING: Right. No, I understand that, but I mean, what would the goal be? Where was the forestation before if we're gonna at least restore what it was before we started cutting down the trees to plant other stuff, and so that we have a goal in mind when we, if we're gonna go for increased funding?

MR. DUDLEY: So, there's actually some fairly good maps that indicate critical watersheds and how the habitat, you know, koa zones fit over that and so that's...

COUNCILMEMBER KING: Right, and you don't have to answer now, I'm just saying that that would be really helpful to, I think, to the whole Council to see what would be the plan for particularly for what, for your project, for expanding your project because there are other projects that are going to integrate with that.

MR. DUDLEY: Right, right, right.

COUNCILMEMBER KING: So...

MR. DUDLEY: And I think just, you know, my view is that there's a significant amount opportunity for me to coordinate my work more closely with the watersheds partners, you know, they are --

COUNCILMEMBER KING: Right.

MR. DUDLEY: --kind of the on, the boots on the ground and as well as others, but, you know, we're at a point we're actually making seed and that's kind of the exciting thing for me.

COUNCILMEMBER KING: Yeah.

MR. DUDLEY: And the next piece is as you, you know, how do you distribute it, where is the critical, you know, where is, where are the critical watersheds and, you know, using a stepwise approach to, you know, doing these, you know, landscape level restorations.

COUNCILMEMBER KING: Yeah. Thank you. Thank you, Chair.

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CHAIR ATAY: I think Member Cochran you had a hand?

VICE-CHAIR COCHRAN: Yeah. Thank you, Chair. And so, I'm looking at...I know...do you know off the top of your head maybe about the funding...how much funding...looks like you get from our Department of Water Supply, USDA, Hawaii Division of Forestry and Wildlife, is there a...

MR. DUDLEY: Yeah, so it varies from year to year.

VICE-CHAIR COCHRAN: Oh, okay.

MR. DUDLEY: And so, specifically for next fiscal year I'll get about \$60,000.

VICE-CHAIR COCHRAN: Through us?

MR. DUDLEY: Through...

VICE-CHAIR COCHRAN: What...Department of Water Supply?

MR. DUDLEY: From Department of Water Supply.

VICE-CHAIR COCHRAN: Okay. Well, I was just...because you are...looks like your efforts are assisting Statewide, so I just wanted to make sure that collectively Statewide we're, you're being assisted.

MR. DUDLEY: Yeah, so, you know, just to be clear the Maui money stays on Maui.

VICE-CHAIR COCHRAN: Okay. Okay, all right. That's what I wanted to know if we were funding you and you were...I mean, not that we don't want to take care of our sister islands, it's just...

MR. DUDLEY: Yeah. I mean, I just want to be clear about that.

VICE-CHAIR COCHRAN: Okay.

MR. DUDLEY: And so, our, the Maui money stays on Maui.

VICE-CHAIR COCHRAN: Okay.

MR. DUDLEY: The oversight of how the money's spent is rigorous and --

VICE-CHAIR COCHRAN: Okay.

MR. DUDLEY: --so that's what I have to say about that.

VICE-CHAIR COCHRAN: Okay. No, that was it.

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CHAIR ATAY: Thank you.

VICE-CHAIR COCHRAN: I just wanted to double check on that.

CHAIR ATAY: Thank you, and thank you to Ms. Martin for your presentation and what you shared because your outreach efforts I was noting some of the projects that this project reaches out to are also other projects that we, the County Council, also funds, you know, like the afterschool programs, the School Garden Network. You know, so there's some multiple other projects in the community that are also participating with this koa project. But, so thank you to both of you for being here. There being no other questions we can close this portion of presentation out. I will recess for a five-minute break and allow our next presenter time to get set up. Once again, Mr. Dudley, thank you.

MR. DUDLEY: Yeah. Thank you. Thank you for your time and attention.

CHAIR ATAY: Recess. . . . (*gavel*) . . .

RECESS: 10:20 a.m.

RECONVENE: 10:33 a.m.

CHAIR ATAY: . . . (*gavel*) . . . Thank you, Members, for reconvening and I'm continuing this Water Resources Committee meeting on this Wednesday, September 19, 2018. For the record, we do have our Committee Members, Kelly King, Elle Cochran, and Stacy Crivello, and myself. So, as a reminder, Members, we are still operating at bare quorum and so if you do have an emergency or need to use the bathroom or anything please let me know and we can go into recess. With that, we're continuing our presentation in regards to WR-5, Watershed Management and Protection. And we now want to turn things over to, attention to Mr. Chris Brosius from the West Maui Mountains Watershed Partnership. Good morning.

. . . BEGIN PRESENTATION . . .

MR. BROSIUS: Good morning, Chair Atay. Thank you very much, Councilmembers, Members of the Water Resource Committee. Thank you for your commitment to watershed protection. Thank you to Department members that are here as well. My name is Chris Brosius. I'm the Program Manager for the West Maui Mountains Watershed Partnership. I have over 12 years' experience and I hope to not take 12 years to tell you the story, but it is a long one and we've accomplished a lot. I wanted to start off with a little bit of background. These are the partners that have lands within the watershed partnership. This hasn't changed very much in the 20 years, this is our 20th anniversary coming up that we've been in existence. The only notable change in recent time is the acquisition of some of the watershed in, from Wailuku Water Company to Hanalua Ranch, LLC in the Waikapu area in the lower right. Other than that, it's pretty much the same. Starting off with a little bit of money talk. We, in Fiscal Year '18, we managed

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to do \$956,000 worth of business. We had approximately 430,000 coming from the County of Maui. So, thank you, thank you, thank you, yes, the County does provide a backbone for us in terms of sustaining core management to help these lands and the threats that happen to them. We also get money from The Nature Conservancy and the State of Hawaii. We get some funds from Fish and Wildlife and some foundations. This just happened to be the split for this year. There are larger funds that do come in from the State. There are other contributions at the watershed level that come from Maui Pine for their land, so on and so forth. So this isn't the entire picture. This is just what funds my program. The list of, over here on the right, for FY '19 are new kinds of funds that will be coming in, so we're trying to diversify, we're getting funds from the Department of Health, Forest Service, NOAA, and Department of Aquatic Resources are tag teaming to build fence and NRCS funds are in the pipeline coming in to do work in woody weed control, especially strawberry guava removal. The core of the partnership is really the people. These are...we have a supporting nonprofit. We have a bunch of vibrant committed partners that are likeminded and very supportive of the work we do. We also do outreach. We take legislators out to the field, try to get everybody involved and ingrained in what we do and make sure they understand the importance in the work we do. We also get support on the State level through the Hawaii Association of Watershed Partnerships. There are ten Statewide, four in Maui County, and we're an active member there. We network for information for technology, for support, for moral support, and it's really awesome to see the examples that first started in Maui County go Statewide over the, excuse me, I think it's like 18 years or 20 years of existence. We're also supported through the Hawaii, University of Hawaii, its Pacific Cooperative Studies unit. Our staff is administered through UH, and the work that these people do is incredible. They're busting their butts, hiking up and down the steepest slopes in Hawaii, hanging from ropes, you know, drilling into hard rocks, identifying hundreds of species, building fence, craning necks out of helicopters, and treating invasive weed species. These guys do a lot for very little and relatively speaking and it's a commendable job, and I, we couldn't do it without them. We have a 13-member staff at present. We also are supported by members of public. We invite people into the field to perform stewardship activities whether it's out planting or invasive weed removal. This is an opportunity to get people on the ground integrated and connected to this forest, and without their knowledge and sharing that in the public, we don't have as much support for the work we do. We don't have as much acknowledgment for the work we do, so we try and do this all the time. It's also important to acknowledge the cultural connection that has really fed and, kind of, steered the value system and for protection in this landscape and people get to express themselves through, in traditional ways by placing their hands on their kupuna. This is a koa tree that's being succumbed by invasive strawberry guava around it, and hula practitioners before entering the forest we'll pay homage with dance. . . .*(video plays with Hawaiian chant)*. . . Often this sets the tone for the work that we do. We operate in the water cycle. You guys all know this, I'm not gonna spend a lot of time, but I just want to say that the green surfaces of our islands are where we're trying to do the work. This is the only tangible part of this entire system where we can make a difference, but there are also so many threats to this surface that we try to make a difference for. The two principle focus for our work is to recharge our island aquifers and we do that by protecting the green landscapes, the native forest. And, you know, our landscape is 70 percent native dominated. All the

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work we do protects this cover type and allows fresh clean water to flow to your faucets. . . .(video plays). . . This is Honokohau Valley. We're standing at the top near Puu Kukui . . .(inaudible). . . the top. Two quick stories about this site. First time I was up there I got pelted by clouds. I could hardly see this view, within seconds I was wearing a wool cap and water started to stream down my face and down my neck and it was so cold, but it dawned on me in that moment that, you know, I have a microfiber hat and all around me is microflora. Everything is collecting water at a humongous rate and we're very lucky to have this forest cover. I took my hat off. I wrung it out. It was soaked solid within probably two minutes. So, that's an analogy for what this forest does every second of every single day. This is what makes it critical for our water supply. Also, if this forest were not here, what is the cost of not having this forest? What...if this was a landscape like Kahoolawe, you know, I would...I feel for the people of Honokohau from the recent storms, but I'm pleased that this forest was working the way it should have to have diminished the impact that they suffered. And so, that's another reason why we do what we do. The clouds obviously contribute water on top of regular precipitation. If the forest is there, it collects, and flows and streams and into our water supply. This map is one of my favorites because it really shows two things. It shows the recharge area at the core of the mountain in blue and green and also shows how dependent we are on this landscape for water supply in the areas that are red. Without that core water recharge area, we would not be able to sustain the functions of life that we have here on Maui, where we live, where we work. And that core area is made up of that critical assemblage of native vegetation. That native vegetation footprint is only 7 percent of the island of Maui, but we are 100 percent dependent upon that landscape. We are also finding new species. Recently, there was a *Stenogyne* or a native mint, so the flora and fauna continue to, we continue to learn from. Here are some of the more common species gleaning water from the air. This is a native Ohia that's doing its work for the watershed. And we also have the native flora and fauna that help to pollinate and clean leaves and control insect populations. *Gloria-montis*. And the native understory at the top of the mountain, working together, multi-canopies as a giant living sponge to collect these water resources for our island. Okay, so that's everything that we're trying to protect. When it comes to managing this and protecting this ecosystem or these systems these are the things that we focus on: invasive species control, watershed monitoring, education and outreach, and coordinating it all. One of the major threats has been feral ungulates. These are the four bad boys that we've experienced in the watershed. We monitor for them through a variety of ways, whether it's game cameras, putting out a salt block to see if there's a population around, doing thermal aerial surveys looking for these species in the forest. And when we started the left-hand map in 1999 it looked like this. The heavy activity areas in red, the light and medium in yellow and the areas with, theoretically, no animals in green, but if you looked on the map on the right where we are today green is good. We've done a bang-up job trying to limit the distribution of these animals and the impacts that are related with them. So, we've made a lot of progress in 20 years. This was a forest, Ohia forest that was knocked over and barren from feral cattle. This is feral goats in the Ukumehame area that once were nibbling away at the upper reaches of those watersheds. We still have some pig damage but not like it was. This is up above Wailuku Heights. And, of course, pigs like to wallow, they'll go stream side and denude the stream banks and render these areas susceptible to erosion. When that happens places like Honolua can

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look like this. I'll say that this wasn't totally ungulate disturbance responsible for all of this, but this is the kind of picture, this is what can happen when you do not manage your landscape and it ends up looking like a place like Kahoolawe, for example. Fences are the solution for the most part. You can see on this fence, this picture on the right outside the watershed on the left, inside the watershed on the right. So, actively these processes continue to happen outside of our project area. We build these fences. Our crew works tirelessly. I shouldn't say tirelessly 'cause they are often tired. They work really hard actually. I hear about that a lot. And, but I commend them for the tough work that they do, hanging on ropes trying to get this work down, pounding t pins and sometimes really hot, inhospitable environments. This is what our fenced area footprint looks like. Just wanted to say, we have 24 miles to date. Over 30,000 acres protected behind fence and that represents 64 percent of this watershed. So, in 20 years we've managed to gain a lot. We're currently working in, on this line right here in yellow and extending on the leeward side, which is arguably more critical because of the water demand there being such a tight margin, if you will, between use and supply. Our ungulate control program while we're, we...in the last 12 years or so we've increased from like 35 percent up to 64 percent of our footprint. We've also managed at the same time to bring our ungulate control numbers from, numbers up in the hundreds down to two last year. So, a huge steady improvement and we need funds to basically sustain this and expand our footprint, so we can do more good work. To corroborate this, we have these monitoring transects. The green bars represent the area of that we monitor throughout the watershed, so we're just monitoring these little strips as indicators of what the impact is on the land. So, today we have over 100 acres that we're monitoring and these transects, you know, we started with off more like around 30, sorry if I'm in the way, I'm doing my best Guy Hagi here, and back when we started the area disturbed was about 4.8 percent of any part of the forest. If you amplified that across the landscape that would represent approximately 2,500 acres of denuded earth at any given time. Today, because of our control efforts across that landscape, we're down to a fraction of a percent, so just maybe under 100 acres, under 10, 20 acres, sorry I haven't done the math but those are the kinds of numbers that come to mind. So, success. Moving on to invasive weed control. Our biggest problem by far is strawberry guava, so this is like our type species that I'll speak to you about today. It's a water hog, it's known to, by UH, and it has been documented to consume 53 percent more water during drought periods than our native forest and 27 percent more water during regular wet periods. So, it is a water hog. We have areas in green again that are good, that are thought to be strawberry guava free. The areas in yellow represent our management footprint. The blue points are control points, and the areas in red are kind of more infested by guava, and we're trying to work our way out from the recharge core out toward the periphery, and we use multiple methods to try and control this species. The understory is bare. You can see on the left there is nothing else that this guava supports. There's no multi-canopy, understory, nothing to really stop erosion, nothing to really benefit from the system except for the guava itself. The only thing it seems to perpetuate is more guava in the understory, and you can see it taking over in that green or red blob there. We map it. We're using high-res imagery to try and map their locations to develop strategies that help us inform where we go and how we use our few resources, our critical resources to best control these populations. We're working with USGS that's supported by DWS in part to help assess transpiration rates of the species

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at a local level and these are some shots of a CO2 monitoring device that assesses transpiration rates in the leaf surfaces. And, we are physically in controlling the species. You can see here Waihee Ridge, the crown is gone, the understory is coming back. We're also using tools like HBT on the left to try and treat strawberry guava very surgically in places that we wouldn't be able to reach it otherwise on steep cliffs for example. Sorry, herbicide ballistic technology, if you're familiar with James Leary's program, this is something that we've been doing on a trial basis. And, our studies are probably wrapping up this year and I hope to have better results for you in the future. We're also using things like natural enemies. This scale insect, *Tectococcus ovatus* is being introduced to try and slow the spread of the species, slow the reproductive rate, and we're looking at novel techniques like these . . . (*inaudible*) . . . methods to try and spread the insect into the canopy. And, we have some early good results. This is what it looks like when it's on the plant and this is an example of the spread of distribution over a three-year period. It's basically been able to spread from one site about an acre distant. So, it's a very slow mover. It may take a very long time to get effect but we hope, we're hopeful with good results. Another species that we look, just found out...so, strawberry guava is far and wide, it's 3 to 5,000 acres of coverage in West Maui, that's like 10 percent of this landscape. So, it's a big problem. Other problems we have to track are more insipient and this is one of the bad boys. You may be more familiar with from East Maui along the flume road, for example at Kahakapao. This is a scourge of a native wet forest. It takes over everything, basically doesn't allow the reproduction of the forest. And so, eventually that forest is gonna become nothing but this Himalayan Ginger. Right now, we have identified an 11-acre site. We just happen to see it under the canopy during aerial surveys and we're beginning to treat it, but the problem is that it's all repel work, you know, we have to be on ropes to access these things. So, we're going to have to try and figure out methodologies to try and get this thing under control before it spreads like fire throughout the rest of the watershed. So, this is an example of a insipient problem, established on East Maui, just the first population known to West Maui. You can see the seeds in red, they're yummy for birds, they get bird dispersed. Who knows where this came from, maybe Wailuku Heights, a residential population and this is gonna be an all-out effort for which we could use more support. Other species are...you may have seen before, you know, we have the albizia trees in Waiehu. We have Australian tree ferns that are ornamental plants everywhere. And, we also have mules foot fern and . . . (*inaudible*) . . . and a whole suite of about 21 priority invasive weeds that are a problem that we are...because we've done so well, the ungulate program we are now trying to shift resources toward the weed control program. So, hopefully we can get your support for these in the future. This graph shows our effort, staff hours on the blue line, relative to the amount of individuals control. And, we're often just controlling the outlying plants just trying to suppress the spread of these populations, so if 18,000 plants in 2014 doesn't sound like too much we have yet to get into the meat of the problem, right, we're just kind of getting into there. So, like this last year, we had over 1,000 staff hours and we were able to do 11,000 plants, but you can see the tight correlation. Staff hours equal number of plants, about ten stems per hour when you're dealing in low-density areas, so the more resources we have the more that we can control. We're always vigilant about forest pests. You may have heard about rapid Ohia death. I think it's up to, I'm sorry if I'm gonna get this wrong, but I want to say it's at least 75,000 acres on the Big Island, West Maui Watershed's 50,000 acres. Big problem.

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You know, this thing could be a problem. We need interisland biological control efforts, excuse me, bio...well to keep the transfer of invasive species from island to island, we need to limit that from biosecurity, that's the word I was looking for to...and we want to practice, you know, keeping everything clean before we take it into forest and education the public about this. We are going to be increasingly hyper vigilant about this effort and hopefully we will focus on early detection to try and nip it in the bud if it gets here, but the key is not to let it get here. We can't let it get here. This is one of those cats you just don't want to get out of the bag. Turbidity, we do some water quality monitoring and we've been doing this in Honolua Stream where we have a turbidity son, which measures the level of clarity within the water. This is kind of a pilot study for us, but we're continuing to do this so that we understand what water quality looks like in a well-managed forest. That information can hopefully be used by makai coordinating groups to know, like, okay, what is a background level in an environment that is not necessarily impacted by human impacts, so this is the power of this information, so hopefully we can continue that. Outreach and education is always something that we're trying to do more and more of. We do outreach booths, we go into classrooms, we do public presentations, and one of the key programs that we've done traditionally is a cooperative program with Maui Economic Development Board called Water Story, where we basically ensure that participants understand the connection between the forest and the faucet. They understand the value of water resources and the how the forest provides those water resources and then influences every aspect of life. We want them to know where the water comes from ultimately and that it starts from a drip off a leaf of a Ohia tree and then 25 years later gets to their tap. So, taking the kids out into the forest to do stewardship is also a huge and influential experience in their lives and it pays off for us in the long-term. We also take other groups to go up in the forest, experience the native forest, and not only control invasive species, but we're now shifting into restoration. This is Waihee Ridge Trail. We're developing little native forest out plantings in our clearing sites that once had strawberry guava. And this is a graph of our stewardship program and you can see the blue line is basically a summary of all the bars and we have an upward trend. And, we've been interacting through various means, interpretive hikes, outreach booths, all those things I listed before and getting into the ears of thousands of people, so that's really good. We also do mentoring through the Kupu AmeriCorps program. And for now, I wanted to shift gears quickly to two programs. One about dirt bike, this dirt bike disturbance, this is something that's kind of unfunded and I wish we had more capacity to do from Iao to Waihee. These are the damages about 40 shipping containers of soil lost from 2.2 miles of trail that was measured very meticulously from this section of trail right here and you can see all in the brown lines about, I think, it's 21 miles or so of trail that is subject to erosion and for every mile there's 5.8 cubic feet of soil lost on those trails, so major contributor of loss. Solution, we have a few prototypes, dirt bike barriers, we tried felling trees, we tried building fence, brick and mortar was the way to go and you can see how it's all overgrown now. There was a dirt bike trail blazing perpendicular to this and so we think we have a good method to disrupt some of the use. Last subject is fire and this is probably all on the forefront of our minds through the major events during Hurricane Lane in Lahaina. We as a watershed partnership are concerned about the burning of the mauka forest, but we are part, we are the other half of the wild land urban interface. What's good for the watershed is good for the community when it comes to fire

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suppression. And, we can...these fires chronically erode at the hydrologic capacity of the forest if we continue to let them burn. So, here's the story. Fires are increasing in size and frequency. You can see by this map provided by UH that the, you know, southwest, West Maui from Lahaina to Maalaea is like the hot zone. We are developing methods and plans to try and address this but this is what they can look like and this is how bad it can get from a watershed perspective. This fire went up to 3,600 feet up above Lahaina several years ago but green doesn't, isn't always fire-resistant. If there's a drought, it will burn. So, droughts are a big problem for us. This is a close up. You can see the shrub line charred. It may never be the same because invasive species can get hold in these areas. If it burns deep enough and hard enough, it'll go right down to the mineral soil layer. And then, if you happen to have a storm event like on the left, then gullies start to form and erode out that ash and organic layer. Eventually, it goes over land flow. It starts to make its way to our streams and gullies and ditches, and it...and this sequence see right here in 40 minutes you can see that it's already like over 300 feet off shore, so, you know, this is what we're trying to prevent at least in terms of our role in forest fire suppression. Communities are hurt by this. This is Maalaea and then here's the harbor, major economic implications as well. You can see the charcoal in my hand in the left-hand picture. Not hard to make association that this was forest fire related soil source.

UNIDENTIFIED SPEAKER: . . .*(inaudible)*. . .

MR. BROSIUS: Pardon me?

UNIDENTIFIED SPEAKER: . . .*(inaudible)*. . .

MR. BROSIUS: No, this was from...was it 2012, 2011? Sorry, my dates are a little foggy. There's so many fires. We do belong to the West Maui Fire Task Force. This is a 110 percent group. Everybody has their day job, they're trying to get, eek out another 10 percent to do this planning. It's made of Fire Department members, County officials, watershed partnerships, landowners, and we're trying to focus on the mapping, planning, communication, fuel reduction, and enhancing access for suppression. This is an outline of some of the fuel breaks that we would like to be able to maintain, and we do have some funds coming in to try and start those efforts, but this is a huge effort. It does require a lot of resources. This is what a fuel break might look like on the dry side. And, last but not least, I wanted to make an invitation on September 27, there's a meeting from 9:00 a.m. to 12:00 p.m. that is being put on by Hawaii Wildfire Management Organization. They're one of the groups that our partnership collaborates with to bring resources to Maui. They're Big Island based but they're Statewide and we're relying a lot on their expertise to help us with our planning process. They helped us develop a community wildfire protection plan for the whole head of West Maui, so that's the nexus through which we can garner Federal funds and qualify for Federal funds coming in. But it would be great if we had some extra funds from the County to even match those Federal funds and get us on a more sustainable fuel mitigation program. So, with that just like to thank you very, very much.

. . . END PRESENTATION . . .

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CHAIR ATAY: Thank you, Mr. Brosius, for your presentation. I do want to welcome Member Sugimura for her joining us. I do want to also note that Member Crivello has left the Chambers. So, Members, we're still here in a bare quorum, so let the Chair know your status and we can take a pause. But once again, I wanna say thank you for your sharing, Mr. Brosius, and now would like to give the Members a opportunity for any questions. Any Members? Member King?

COUNCILMEMBER KING: I feel like I should let Ms. Cochran go first this time.

CHAIR ATAY: Okay. Member Cochran?

VICE-CHAIR COCHRAN: Thank you, Chair.

COUNCILMEMBER KING: I'll go after her. Thank you.

VICE-CHAIR COCHRAN: Sure, thank you, Ms. King. And thank you, Mr. Brosius, for all your work and your crew and everyone. I know it takes a lot of hands to accomplish what you folks are doing. The HBT, what type of herbicide is that? I know we had discussion previously in this Committee in reference to East Maui and the utilization of that. And I think the concern or the concern is the type of herbicide perhaps and it's shooting into some very pristine, you know, watersheds that is our drinking source and all the stuff you've been highlighting. So, how can you...

MR. BROSIUS: How should we feel about that?

VICE-CHAIR COCHRAN: Elaborate more on that.

MR. BROSIUS: Sure. It is Triclopyr. It is being used at a extremely low-dose rate. The label...we follow the label, which is the law in terms of chemical use, and the application rates are in a fraction of 1 percent, less than 1 percent of the allowable rate. So, I don't want to paint a picture that we're going in with boom sprayers and just, you know, hitting the forest far and wide. These are...we are using this as a tactic for which we have no other means of control. The plants that we are treating with it we cannot reach because they're on the sides of thousand-acre cliffs, so and also I would like to add that, you know, we, I mean, I consider my team and myself and most involved environmentalist and we are very concerned about the use of herbicides. We are first and foremost concerned about the exposure to ourselves, you know, so we try and keep it to a minimum, and that is a ethic and a practice that we use throughout weed control programs.

VICE-CHAIR COCHRAN: Okay. Thank you. And then, the other one was the natural enemies that you folks are introducing, that scaly, ugly thing.

MR. BROSIUS: They're kind of cute if you look at 'em close though.

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VICE-CHAIR COCHRAN: Anyhow, but so are we very, very confident that does not affect the good plants in there? Just it targets --

MR. BROSIUS: Yes.

VICE-CHAIR COCHRAN: --only the strawberry guava, --

MR. BROSIUS: Yes.

VICE-CHAIR COCHRAN: --it knows that?

MR. BROSIUS: It went...yeah, no, it's a very good question. I'm sure the question and my response will address the concerns of many people. It is...it has been tested and vetted in quarantine several years ago and tested against many species that were brought in to quarantine with the Tectococcus species and there was no result of it jumping over to those other species and even establishing. Even its most, strawberry guava's most close relative on island being a common guava or it didn't affect the common guava. It was tested against Ohia for example, no affect. It was released a few years ago on the Big Island first and from there we know that there have been no secondary impacts. We had the benefit of seeing them take the first leap, if you will, with that species. Since we have introduced it here, we have seen no secondary impacts, no bridging to other species. So, I think we have based on a scientific process that's given us confidence. Dr. Tracy Johnson with the Forest Service is the lead principal for that project. He's a very smart fellow, very conscientious, very critical about doing the responsible thing. So, we're just hoping that this natural enemy does its job and I am confident that it will stay where it's supposed to be.

VICE-CHAIR COCHRAN: Okay. Thank you. And then lastly, in reference to the turbidity monitoring you mentioned it looks like it ended back in 2015 or at least your graphs only state from 2013 down to 2015. We are now, you know, almost rolling into 2019. So, is that not ongoing or you just don't have data?

MR. BROSIUS: It's an old slide basically. The graphs that I was showing was a wrap-up after the initial three years of the study, and I just wanted them to be in there as an example of the kind of data that we can collect. There was a, let's see, a maintenance issue, so there was a snapshot in time which we were not able to collect data but that has resumed and it is ongoing.

VICE-CHAIR COCHRAN: Okay. Very good. And then MTU, stands for what? It is says low...on the old slide, but average 2.55 NTUs, storm events average 22.45 MTUs. What are MTUs?

MR. BROSIUS: So, it's a mass turbidity unit. It's a unit of measure that basically looks at the optical clarity of the water, so the device shoots light through a water column and depending on the reflectants, I believe, it will measure how opaque the water is, how turbid it is, how thick it is with sediment and other debris in the water. So, the 2.5 level, that base is basically the stream flowing pretty darn clear. The...sorry, was it 22?

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VICE-CHAIR COCHRAN: Yeah, 22.45.

MR. BROSIUS: Right. For storm events...storm events are arbitrarily set at levels that flow "x" number of feet above standard stage level. And so, at those levels this system is only producing 2.55. I don't really have a good...I should have a slide in here that would show you basically how turbid water looks at those different values, that's the most intuitive way. I don't have a good verbal way of describing it but 2.55 is actually on average. It may not be as bad as some of the thickest water coming out from say, you know, an area that is just totally barren without vegetation. I'm sure that would be in the hundreds level.

VICE-CHAIR COCHRAN: Okay. No, thank you, and again thank you for all the hard work you folks do.

MR. BROSIUS: Thank you.

CHAIR ATAY: Member King?

COUNCILMEMBER KING: Thank you, Chair. Yeah, I really appreciate, Chair, these presentations are extremely informative and especially as we approach the budget sessions. So, I wanted to follow up. I knew Ms. Cochran was probably gonna bring this up, so I'm glad you to bring it up first. But I just wanted to follow up on couple of details I had regarding the, what you called the herbicide ballistic technology. And what is the name of that, the herbicide you're using again?

MR. BROSIUS: It's Imazapyr. Oh, excuse me --

COUNCILMEMBER KING: Tri-something.

MR. BROSIUS: --Triclopyr.

COUNCILMEMBER KING: How do you spell that?

MR. BROSIUS: T-R-I-C-L-O-P-Y-R.

COUNCILMEMBER KING: Okay. And but you said you're using that because you can't reach the strawberry guava but...

MR. BROSIUS: Not manually in person 'cause of being on the slopes.

COUNCILMEMBER KING: Okay. But, don't you have to be able to reach it to do this HBT?

MR. BROSIUS: So, the herbicide ballistic technology, I definitely skipped over this in the interest of time.

COUNCILMEMBER KING: Yeah.

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MR. BROSIUS: But the application device is a novel device. It's using a paintball gun delivery system.

COUNCILMEMBER KING: From the air?

MR. BROSIUS: From the air --

COUNCILMEMBER KING: Okay.

MR. BROSIUS: --and the capsules are impregnated with a known dose of herbicide --

COUNCILMEMBER KING: Okay.

MR. BROSIUS: --and it is applied to the crown and the trunk of the trees.

COUNCILMEMBER KING: Oh, okay. So, from the air. Wow, that's pretty impressive.

MR. BROSIUS: Yeah. And the precision of these devices is really high as you know if you're ever been stung by a paintball. It's a...

COUNCILMEMBER KING: I never have.

MR. BROSIUS: You know, it really makes an impression on you. But, you know, this is something that I've participated myself and I think in the slide that I showed the accuracy of the treatment is really high. There's very little adjacent effect because of the, if you have a good shooter and you have a good pilot and you're doing it in the right conditions, which we do, I think that it's a very effective and well-applied dose.

COUNCILMEMBER KING: And you have to shoot it into every single tree?

MR. BROSIUS: Ideally. But what we're doing, you know, it's a costly process, obviously all those inputs cost money.

COUNCILMEMBER KING: Yeah.

MR. BROSIUS: So, we are using this tool as a containment tool. We're working on the fringes of the population if you imagine, you know, larger trees down low and then a gradient of size classes moving their way into the forest. What we're trying to do is use the HBT in the areas where they're just starting, where the trees are small, and that keeps the dose down. It helps us contain the spread of the species. This is not something that we could probably ever afford to do on a large scale. You know, this is creeping up cliffs that are 3,000 feet tall. We don't have 3,000-foot rope, man hours. The alternative in my mind is if we let it go then this species would spread to the point where, you know, if it does really consume 53 percent more water resources, this whole landscape could become guava. So, we're challenged to find alternatives that make sense with this huge

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problem on our hands, and I think that this is a responsible or at least one of the best alternatives that we have.

COUNCILMEMBER KING: Okay, and I appreciate your conscientiousness. That snail, I had the same question as Ms. Cochran. But so the *Tectococcus ovatus*, if you're using that on the strawberry guava and you are able to eliminate like a stand of trees what happens to those things? Do they just die those snails?

MR. BROSIUS: Yeah, that's a good question. They're a scale insect. They form those kind of galls on the tree. So, theoretically, biological theory is when you introduce something and its host starts to degrade so does the species that, you know, that is responsible for that degradation. And I think guava is probably gonna be here for a long time. So, I'm theorizing that it will reach an equilibrium. Again, it is not...the insect, as far as we know, does not remove the plant. What it does is it infects it, basically gives it a sickness and renders it less reproductive or less capable of spreading. So, we do not anticipate that this insect will actually cause the current distribution of the forest to decline.

COUNCILMEMBER KING: Okay.

MR. BROSIUS: What we're trying to do is keep the forest from spreading further.

COUNCILMEMBER KING: Oh, so it's not like rapid Ohia death where it's going to just kill off whole stands?

MR. BROSIUS: No, not that virulent. You will still have some fruiting. You will still have, you know, the forest there.

COUNCILMEMBER KING: Okay. And then my last question, Chair, is about the invasive ungulates and I know fencing has been working on watersheds across the State, but one of the things I've been hearing from some folks, especially folks on Molokai is the fencing pushes the ungulates into areas where people are farming. So, I mean are you...so, my question is do you feel like you're reducing the number of ungulates or just moving them to outside the fence? I mean, is there like a hunting effort going on at the same time or an effort to actually reduce the invasive ungulates or are we just moving them? You know, now we're seeing wild pigs in the Kealia Pond, for instance, and I don't know if that has, if that is an effective of fencing some of the areas and pushing them around, pushing the ungulates in other areas.

MR. BROSIUS: I see. I've also heard of this concern and it's complicated. There are many factors that are involved with the hog populations or the feral animal populations. I think one of the leading changes is land use. I think, you know, for example, Kealia, if we were to look there, I think the fallow nature of the A&B lands that were once sugar cane are now prime habitat for the feral pigs. So, their populations...

COUNCILMEMBER KING: I'm talking about in the wetlands. So, they're actually in the wetlands --

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MR. BROSIUS: Yeah, yeah.

COUNCILMEMBER KING: --you know, and that's been --

CHAIR ATAY: . . .*(inaudible)*. . .Kealia.

COUNCILMEMBER KING: --the wetlands have been there for years and I've never seen this happen before.

CHAIR ATAY: Yeah, Kealia.

MR. BROSIUS: So, the land use changed along those lines as well. I believe that the plantations and the landowners used to have more capacity to control those problems in the past and the crop rotations...now a lot of those adjacent lands are more hospitable to those animals, and so they are now reproducing there. For pigs, two years, two animals, you know, you can have 30 more pigs, you can have 60 more pigs, so it doesn't take long for them to rapidly reproduce --

COUNCILMEMBER KING: Right.

MR. BROSIUS: --and take over. So, to speak directly to your question about do we displace animals, are we responsible for that, I think we, with our fencing program we've kind of put a cap on a preexisting population not allowing them to go past those fences anymore and get into our watershed areas. I do not think that the water...the pigs are very nomadic. They went mauka and makai before. We're just not necessarily allowing them to go mauka now. So, I think probably the makai population had the same potential before we started our work as it does now. So, in my opinion, I don't think that our work has a huge impact on what's happening in the makai areas.

COUNCILMEMBER KING: Okay. Yeah, you know, I think there needs to be some more effort and I'm not saying it's your responsibility but there needs to be some more effort on these invasive ungulates outside the fence area too, because I've seen especially on the watershed in Molokai where, you know, it looks like if you look at it from above right below the fence line it's bald.

MR. BROSIUS: Yeah.

COUNCILMEMBER KING: So, and the folks there are saying we're down there trying to farm taro or we're trying to do, you know, farming and now all the ungulates are because they can't go up, they're coming down. So, yeah, maybe...I just wanted to bring that up as an issue that I think we're probably going to hear more about, and maybe as a County we need to...and so, that's why I was asking if you're doing hunting, 'cause I know on Molokai they also are doing hunting. They bring hunters inside the watershed to, especially for the pig population, but I didn't know if we were doing any of that here. It used be, years ago, when we had invasives in Haleakala, which I don't think we have as many anymore, but they were rounding them up with a helicopter and shooting them and, you know, that was a way of actually not just pushing them out of the crater but

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actually, you know, eliminating the population. So, that's something we're probably going to have to be looking at as a County how to balance that, the fencing out with what's happening below the fence line.

MR. BROSIUS: Yeah, I agree it is a big problem. Essentially, the destruction that we were facing above that we've done a good job of eliminating or at least managing is now makai as you're saying, but I do think it's more land use oriented. I wish that people had more access to fallow lands so that they could hunt out those populations, and I'm not so sure either if, you know, there is a blanket approach. Every land unit has its own challenges. There is some parts are really hard to get to, hunters go, but they can't get everywhere. And, I do think that as you're pointing out it's going to be a bigger issue and it's still an issue that's going to affect our makai resources too. You know, the soil disturbance, everything. So, let me know how I can help.

COUNCILMEMBER KING: Okay. Well, thank you.

MR. BROSIUS: It's just a little outside of our box of where we're allowed operate.

COUNCILMEMBER KING: Yeah, no, thank you for the presentation. It was really informative. I would add some of that information into this presentation about what you just informed us about as far as the, you know, what herbicides you're using and then, you know, the species you brought in for. I mean, 'cause that's always going to be the first question I think you're gonna get from any public...

MR. BROSIUS: I was expecting it.

COUNCILMEMBER KING: Yeah.

MR. BROSIUS: And thank you for the questions. I wasn't trying to avoid the information.

COUNCILMEMBER KING: No, no, I'm sure you weren't.

MR. BROSIUS: As much in trying to keep the presentation to a sizable time.

COUNCILMEMBER KING: Well, thank you and thank you for your work.

MR. BROSIUS: Thank you.

CHAIR ATAY: Member Sugimura, do you have questions for Mr. Brosius?

COUNCILMEMBER SUGIMURA: I do. So, do we have more presentations? I'm sorry. Chair, I want to apologize for being late but there was a huge water leak and I said interesting I'm going to Water Committee, it's on Alae Road and I got calls from the residents, so I did some visits. But it's been leaking since September 8th so they finally called me and there was somebody from the Water Department there looking at it. Just so happen he drove up same time. But, so sorry I was late. I need to still continue on with my committee things, I mean, my community things. But just a question for you, I see you

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get like 485,000 or requested from the Water Department for this coming year and you also do use this for to receive, you get three times or you match it with other funding sources so thank you for being resourceful. On your second point in your letter could you explain this, our acres protected from ungulates have increase more than 10,000 acres in the last five years and is protected [sic] to be 31,300 acres in Fiscal Year 2019 is 66 or 66 percent of the watershed. So, sorry if you already explained that but it's kind of an interesting statement to me. How much more help that you need?

MR. BROSIUS: So, I did touch on that in the presentation. I think the essence of your question to confirm the monetary amounts I think Council approved and the Mayor's budget approved 450,000 for the next year. Originally, there was 485 in the budget but that was slightly reduced. So, for the coming year we'll have 450. And, we also had a pre-proposal just go in to the Department that will be vetted. We're asking for, I think, there was a last minute change but roughly \$580,000 in programs. So, the other part of your question...

COUNCILMEMBER SUGIMURA: Wait, what does that mean? So, you're getting 450 through this Budget Session, I mean, in the Mayor's budget and you're saying...

MR. BROSIUS: In FY '19 and then --

COUNCILMEMBER SUGIMURA: Oh.

MR. BROSIUS: --so we're going through a pre-approval process for FY '20.

COUNCILMEMBER SUGIMURA: I see. I get it.

MR. BROSIUS: So, we're at...just I wanted to give the progression of what we're, what we have in the pipeline and what we have that we're requesting for the future. Your other question had to do with the footprint of our ungulate management, I believe, and so, basically there was a lesser number that we were covering with our management footprint. We break those numbers down. Yes, there's 30 plus thousand acres that are under management overall, but this grant would only cover a portion of that. You know, we have other funds coming from other entities that help us control the other parts so that's the reason for the difference in the numbers and the larger number is basically there to show that we've, on a grand scale, we've had a larger level of success and DWS and the County help us do this part of it.

COUNCILMEMBER SUGIMURA: So, one last question.

CHAIR ATAY: Yes.

COUNCILMEMBER SUGIMURA: So, do you get other funding through County resources or is this the primary?

MR. BROSIUS: So this is the primary.

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COUNCILMEMBER SUGIMURA: Primary.

MR. BROSIUS: We have recently requested funds through a letter of interest or inquiry to OED for fire mitigation help but that was not awarded and the reason why we do that is because, you know, maybe fire and the areas where we need to suppress it are a little outside the water recharge box or the core of the mountain so it's just a question of, like, who's kuleana is it to fund. And we are getting funds for that to start some fire fuel mitigation from the Forest Service this year, and so that'll help us get a start but as I mentioned in the presentation it'll be nice to have some matching funds, additional matching funds from some source of the County.

COUNCILMEMBER SUGIMURA: Thank you.

CHAIR ATAY: Okay. Thank you. Thank you for your sharing. You know, from your original posting, definitely we've come a long way in 20 years.

MR. BROSIUS: Yes.

CHAIR ATAY: And I think, you know, the areas of ungulate control and fencing, the investment in fencing many people must realize the connection and importance of this West Maui Mountain watershed, you know. A large part of our Iao-Wailuku Aquifer comes as a result of your guys' effort on that mountain. The high production of water that we get. A lot of people are unaware that water is what is providing to Wailea, Kihei, and Makena, that this water from this mountain is piped all the way to South Maui. So, your 20-year effort, you know, I want to say thank you to your agency but also, you know, in this watershed partnership movement I got to say and applaud all the field crews in this field of conservation. You guys can see these guys are hanging by repels, by helicopters, trying to fight this issue of invasive species and the impact of the invasive species. It was 20 years ago that I hiked in the forest of both East Maui and West Maui and I know the impact of that strawberry guava, that was 20 years ago and you still have that problem, you know. And to now know that ginger is now crossed over from East Maui, yeah, and now entered West Maui. We have to heed the importance of fighting and specifically these two invasives on this mountain. And so, with that my question is would you have the ability or capability if we send you funding for summer hire, summer workers sending high school kids, sending college kids to eradicate the ginger and the strawberry guava, would that be a problem for you to handle the, collecting the manpower and keeping track of that? Or would it be best we have another agency that does that or...I'm just thinking we need to solve what's coming is this ginger and this strawberry guava which will change the floor of this watershed forest.

MR. BROSIUS: Yes and no. I think that there are site appropriate areas that people can access without high levels of training and with safety in mind. So, can we handle it? We currently have in our next year's proposal request for outreach and education coordinator and part of their responsibilities would be stewardship coordination. So, we want to mobilize more people with that capacity and that leadership installed. So, the answer is yes. If we are given the resources, we can develop the capacity to do it. We have the knowledge and we have the ability and the training. It's just a question of

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getting enough bodies to manage additional resources when the ask is made of the public or the schools or workforce that you're wanting to apply, so, yeah.

CHAIR ATAY: I'm just...Members, I'm just thinking, you know, we sit in this Committee and why we having this educational opportunity of this meeting is let's come to solutions of how to help address the care of our watershed and you've highlighted some of the problem areas. And, so I'm saying, how do we help solve this problem and one of the other way, is how do we help our future generation of young Maui people to be connected to this aina and to care for their land, at the same time give them a summer employment opportunity, a job creation, but yet doing good for our island. So, I'm hoping that we understand this problem and see the opportunity of, I think, the necessity of stopping the forward advancement of the ginger and the strawberry guava on this mountain, because it's so important of the amount of water that we get from this mountain. Member Cochran?

VICE-CHAIR COCHRAN: Chair. Sorry, Chair. Yes, so, thank you for about the stewardship part and funding would allow you to reach out more. So, would that be inclusive of sort of the volunteer tourism type efforts that, you know, they can assist? Seeing a lot of the resorts are some of the biggest users of our water perhaps, you know, the visitors can be a part of and understand the connection between the two, you know, the watershed and their visits but also, yeah, and of course, ourselves too. But I think...would that be part of the picture?

MR. BROSIUS: I think it could easily be part of the picture. It makes a lot of sense, you know, to invite some of the biggest benefactors of water supply to the table to help, you know, empower the stewardship of this landscape that they're benefiting from.

VICE-CHAIR COCHRAN: Yeah, very good.

MR. BROSIUS: So, I totally agree with that.

VICE-CHAIR COCHRAN: Excellent. And maybe, and, Mr. Chair, maybe briefly your relationship with the West Maui Ridge to Reef, I know you were at that meeting, so how, what's your role or interaction with the West Maui Ridge to Reef initiatives?

MR. BROSIUS: So, the West Maui Ridge to Reef initiative kind of covers the lower two-thirds of the watersheds expanding from Honolua all the way south to Honokowai. So, that's their focus area and it's meant to be kind of a case study if you will of mauka to makai management. They're really focused on the agricultural, urban and coastal landscapes to try and protect coral reefs and make sure that they continue to thrive or, excuse me, don't degrade anymore, I should say, and maybe have a chance to recover. My role in that is as an advisor, because I help them manage the upper third of the watershed and where a lot of the rainfall starts and where some of the erosion could occur. So, my role in that as a manager to try and manage that upper third landscape and then also help inform what I know that may work to benefit those lower areas as well. So, I don't know if that answers your question.

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VICE-CHAIR COCHRAN: Yeah. Okay. Thank you. Just a brief...and lastly, I know the African tulip is an issue over on the east end and it's starting to creep around West Maui in the Honolua area and places. Is that on any of your folks' radar? Is that something that we can nip?

MR. BROSIUS: Yeah, it's on West Maui's most wanted list for sure.

VICE-CHAIR COCHRAN: Okay.

MR. BROSIUS: It's a...sorry.

VICE-CHAIR COCHRAN: Yeah, so well, because I know that some of the heavily invasive stuff are highly targeted and a lot of efforts go into it, but I also look at the ones that are just starting if we can nip it early on it won't get to that, you know, point that strawberry guava is at and all these others. So, just wondering if we can, like, get rid of, oh, here it's starting, let's get rid of it and continue to work on the heavy stuff.

MR. BROSIUS: Yes. That is certainly a strategy that we very much look at. You know, if there's an opportunity to nip the species in the bud we will try and carve out some resources to do that, like, you know, the Himalayan ginger issue. So, the list of species is long and certainly Africa tulip is on it. So, we have to look at it through a two lens approach, insipient species suppression and the, you know, those species that are kind of common, right, like strawberry guava. So, we try and do...what gives us clarity is that we focus on the core of the mountain and work our way outward and whatever species that we engage upon at that particular interface that are considered major habitat modifiers are the ones that we prioritize the most. In this way, we protect the core of our watershed, the most pristine areas, the most biologically diverse areas, and the most productive when it comes to water production. So, if we try and put out all those fires around the periphery of the mountains sometimes we can get super spread thin and we already are spread thin. So, I definitely appreciate your observation about African tulip. I'm aware of African tulip, Iao, Waikapu, it's all around, it's just not that spread. You know, so, it's a challenge to identify clear priorities, but we know that we don't want African tulip up high, so we are engaging it where we see it up high and working our way down.

VICE-CHAIR COCHRAN: Okay. No, very good. Thank you, again, for the effort.

MR. BROSIUS: Yeah.

VICE-CHAIR COCHRAN: Thank you, Chair.

CHAIR ATAY: Okay. Member King?

COUNCILMEMBER KING: Thank you. So, I kind of wanted to talk about...ask you little bit about the, going back to the Himalayan ginger because I heard you say that you thought it got started up in Wailuku Heights. Is that what...was that the statement?

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MR. BROSIUS: It's just a theory.

COUNCILMEMBER KING: Okay. But, I mean, is there an education piece going out to the general community about how invasive this is because it's a very pretty flower and so people are planting it like ornamentals --

MR. BROSIUS: Yeah.

COUNCILMEMBER KING: --and I think if people knew that it was invasive along with the African tulip and some of these other, the trees that are...they're in my neighborhood and people put them in deliberately because they think they're pretty. So, I mean, if we knew, you know, if it was, that push was a little more widespread about what plants that are being brought in that are invasive that are threatening our watershed and how threatening that is. And then the other comment I wanted to make, Chair, was that I'm glad you're increasing the number of volunteers and I think the tourism volunteer is really an untapped source if we could create programs through the Maui Visitors Bureau with, you know, and give tourists opportunity to be involved because a lot of people come over here and they want to do stuff. They want to do important things. They want to contribute. But my feeling and I understand your concern about giving students job, but my feeling was when you stated in your beginning of your presentation that you have a 13-member staff and then later on you talked about you can do more if you had more money, my feeling was that what you're doing with this staff that's, you're paying are things that are too dangerous for volunteers and students and tourists to do, so, you know, that, I think that needs to be looked at as like how much more do we need to do that is that really requires professionals and then bring in the volunteers for the on the ground, you know, things you can hike to and affect change there, but I don't think you can put students or tourists dangling from a helicopter doing this --

MR. BROSIUS: No ma'am.

COUNCILMEMBER KING: --you know, herbicide ballistic technology. So that would be a good, that would be kind of a good thing for us to look at as we go into Budget Session is, you know, where the money goes most effectively if you were to increase your staff via our budget and then where you could increase the volunteerism to effectively complement that where it's able to knowing that we only have so many dollars in our budget but we do have to prioritize. So, in my mind these efforts for the watershed should be top priority but we also have to balance them against what we're doing with affordable housing and some, you know, at the bottom of the ridge to reef efforts as well. But that would help me as a Councilmember to see we have, you know, with 13-staff members, these are the activities they engage in, if we had 18 we could do this much more, you know, and possibly even increase our volunteerism to increase the total effectiveness, that kind of thing.

MR. BROSIUS: I like the way you're thinking. Yeah, I think that the benefit of integrating the volunteers or students or tourists is knowledge exchange but also trying to use their efforts in areas that will make a true difference because nobody wants to go up there and feel like they're wasting their time.

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COUNCILMEMBER KING: Right.

MR. BROSIUS: There are a few places where they can make a difference, so I do feel like their efforts would also make management sense, that it will also be safe. And, yes, of course, our staff do, are trained to work in those remote areas where it's more challenging for your average person, so additional staff would help us bring that line of invasion down to the masses if you will and put more effective management resources in the reach of the larger population of volunteers and tourists and whatnot.

COUNCILMEMBER KING: Yeah. And I think on student level more and more school are requiring community service for graduation. I've been, I've actually been attending some of these presentations that these students have to do and they're pretty extensive so there's another untapped, I think, volunteer pool out there where they can actually fulfill their, you know, it wouldn't cost anything. I don't think you have to pay them but I think they can fulfill require graduation requirements and do something really worthwhile.

MR. BROSIUS: Quickly, two stumbling blocks, somebody to have, like an outreach to coordinate all that because it does take a lot of time and vehicles to try and transport those people.

COUNCILMEMBER KING: Right.

MR. BROSIUS: Those have been two of the hitches that have helped prevented us from really building that program. And, I'm hopeful once it's built that we can expand it to the vision that I think you all are painting. So, in a long-term plan I think we could build in the numbers and do the projections like you're suggesting.

COUNCILMEMBER KING: Yeah in the business world we call it, you know, cost benefits and return on investment so if you can show that you know if you can show the investment that we would be making and what the return would be I think that's a really good strong argument for funding.

MR. BROSIUS: Yeah, and cost avoidance too when it comes to...

COUNCILMEMBER KING: Right. Right. Avoided costs. Thank you.

CHAIR ATAY: Thank you, Mr. Brosius, for your presentation and sharing of what's going on in the West Maui Mountains. At this time I'd like to offer Administration and Water Department staff any comments?

MS. BAISA: Thank you, Chair. On behalf of the Department, again, I'd like to thank you for bringing the watershed partners in. This is really helpful. It helps all of us learn and make the best decision so we can get the most bang for the buck, and I'd like to give a chance to Eva. You want to tell them what the schedule is going on with this? This, the grand schedule, any reviews?

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MS. BLUMENSTEIN: Yeah, so moving forward into Fiscal Year '20, we have just received the proposals from our grantees and we're looking forward to meeting with our grant analysis committee this, just in a couple of days. So, when we come in front of this body again closer to budget we will just narrow in on...now you have so much of the background information so we can really just narrow in on the differences from year to year, any, you know, expanded scopes and really be effective with our time. So, we'll keep you posted.

MS. BAISA: So, Chair, the timing is absolutely perfect. And, again, thank you for the opportunity.

CHAIR ATAY: Yeah, thank you for that information on the grant timeline. You know, it's been interesting because we've only had two meetings and we've had presentations by four grantees and I think every one of them we've realized that there's other granting needs or grant opportunities that possible, need possible funding that is not currently being funded or needs for expansion of funding for some ideas. I do want to push out the wildfire management meeting that's coming up and, you know, I'm hoping that we can be in attendance because the connection of either State funding and Federal funding and looking after, you know, I think your partnership, what you guys got hit by at least four different fires in the last decade or so? I mean, some fairly large fires, yeah?

MR. BROSIUS: Maybe 40 fires in the last decade or so.

CHAIR ATAY: Yeah.

MR. BROSIUS: But, yeah, major mind-blowing --

CHAIR ATAY: Major, yeah.

MR. BROSIUS: --fires, maybe four in the last few years.

CHAIR ATAY: Right.

MR. BROSIUS: We just had 2,500 acres around the Lahaina area.

CHAIR ATAY: So, the involvement of wild land fires affecting our watershed is important to be aware of and addressing and looking after additional potential funding from the Federal level from the wildland fire potential funding to see how much or how little of a minimum involvement that the County can invest in and hopefully getting larger grant support from the Federal government.

MS. BLUMENSTEIN: Yeah, I'd just like to add there's multiple efforts going on both on the State level where there's an inventory of land that is actively managed as buffers or just managed for fire, and also we have extended a invitation for this month's workshop to County Department of Parks and Long Range Planning so there'll be a few County folks

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there too to really stay involved in this process. We appreciate it. We understand that the importance on the collaboration between the different agencies.

CHAIR ATAY: Okay. I want to say thank you to the Staff for your support, Administration, Water Department, most especially today, thank you to Mr. Dudley from the Hawaii Agriculture Research Center and Mr. Brosius from the West Maui Mountains Watershed Partnership for your sharing and manao and involvement with our watershed management. At this time, we want to defer the matter as we continue with the watershed management.

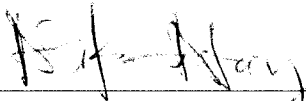
COUNCILMEMBERS VOICED NO OBJECTIONS. (Excused RC, SC, MW)

ACTION: DEFER.

CHAIR ATAY: I want to say thank you to everyone. Our next Committee meeting is gonna be scheduled for Wednesday, October 3, 2018, and there being no further business, this meeting of the Water Resources Committee is adjourned. . . . *(gavel)* . . .

ADJOURN: 11:48 a.m.

APPROVED BY:



ALIKA ATAY, Chair
Water Resources Committee

wr:min:180919:mb

Transcribed by: Michelle Balala

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CERTIFICATE

I, Michelle Balala, hereby certify that the foregoing represents to the best of my ability, a true and correct transcript of the proceedings. I further certify that I am not in any way concerned with the cause.

DATED the 9th day of October, 2018, in Kihei, Hawaii



Michelle Balala