

**MICONIA MEETING NOTES
MAUI INVASIVE SPECIES COMMITTEE
FRIDAY, OCTOBER 1, 2004**

ATTENDANCE: Anders Lyons, Nathan Varns, Lloyd Loope, Steve Anderson, Jeremy Gooding, Amy Villamagna, Randy Bartlett, Pat Bily, Glenn Shishido, Teya Penniman, Kerri Fay, Ian Bordenave, Mike Ade, Aaron Kogan, Arnie Peterson, Elizabeth Anderson

INTRODUCTIONS & ANNOUNCEMENTS; ADOPTION OF AGENDA

- Jeremy announced that Kerri Fay will be leaving the Hana miconia operation. She has accepted a job with The Nature Conservancy. Kerri's last day with MISC will be October 15. Kerri has done an awesome job in Hana and will be very much missed.

- Teya: Jim Tate, the science advisor for Secretary of Interior Gale Norton, was here yesterday and we pulled together a last minute tour for him. He wanted to get a feel for our operations. We already had heliops scheduled in Hana and he came along and spent the day with us. We were able to give him a good tour of miconia-land and we toured him around the rest of the island to look at other threats. Jeremy did a great job of narrating and it was good to have a Department of Interior employee along to answer questions. Jim had a chance to meet the local crew and we got him up into the core. It was a good day. A big thanks to Jeremy and Kerri for their help. Jeremy: we covered all the big nasty aliens with him (goats, pigs, deer, pampas grass, fountain grass, guava, ginger, etc.). Jim is the DOI person for the National Invasive Species Council and he missed the March field trips we put together so this was a really good opportunity.

"ECONOMICS OF MICONIA" PROJECT

- Teya: USDA has a program to look at the economics of invasive species. We put in a proposal in conjunction with Anne Marie LaRosa from the Forest Service to look at the potential economic impacts of miconia. The proposal was funded and is being conducted via a graduate program approach. We are very fortunate to have Amy Villamagna working on the project. Amy just started a PhD program in Natural Resource Environmental Management. Amy is natural-resource oriented and the folks she is working with are very economics-oriented so there should be a good balance on the project. I want to look at this as a management tool and evaluate how are things being done differently on different islands.

- Amy: I am entering this program foreign to the economic analysis portion, but I have advisory economics faculty. The proposal is done and I've spent time with Teya assessing what the project products will be. The main objectives are to document management activity strategies and costs incurred by all the ISCs and to establish biological models of miconia spread. We are using a stratified diffusion model. We will need data input and we think there will be data gaps that we may need to fill in over the next year or so. We hope to be able to simulate the invasion over the East Maui Watershed and then validate the model and apply it the other islands to try to predict areas that may be at high risk. The end product is applying the model as a predictive tool. We will need to evaluate the model to see how robust it is and then determine the role it will play in management. At the end of two years we want to have something that will be useful for management and will help to get additional funding. The original funding for the project is for two years and we are looking at getting additional extension funds. Lloyd: is bio-control a part of this? Amy: no. Teya: it would be nice to know how much money has been spent to date. Lloyd: it is an ideal situation to have a natural resource person working with the economics folks.

KNOWLEDGE OF INVASION AND ACCOMPLISHMENTS TO DATE

- Jeremy: we really haven't discovered any significant changes regarding the scope of the invasion over the past year or so. From 1999 through 2002, we were always finding new outlying populations. We haven't found anything new in the last two years. We still find fruiting trees in areas that we have hit. We obviously miss some. Lloyd: the lack of new outliers isn't from a lack of looking. Jeremy: no, we are fairly confident that we have defined the scope of the population. We still have these classic little sub-cores. We consider Keanae and Nahiku to be outliers with the exception of Nahiku makai.
- Jeremy: as far as accomplishments go, we are still doing ~40 hours of flight time per month. Our flight time is primarily used for spot spraying. You can compare the quantity of effort from year to year via the flight lines. I want to stress that in 2003 and 2004, the fact that we have more blobs on the map doesn't mean there is more miconia. It just means that we spent more time looking. We went from 30 hours of helicopter time a year to 40 hours a month. We have broken the majority of East Maui, that may have miconia, into management units. We have aerial units and ground units. The aerial units are based on land forms that the pilots can identify easily. We found that the original core units were too big. Two months ago we broke the big units into smaller units and then into a grid system. This works better for the pilots. The core area is broken into 25 acre units. The other unit type is ground units. Previously each day of effort put in by a ground crew became a polygon with an associated number of plants, etc. Under this system the data entry for the crew leader was very intensive. We revised this method to a system of semi-permanent and repeatable units. We can go in and establish a unit, sweep it, and know how many targets we have and how much time it took. We have been merging the old data into the new system. Aaron and Kerri have been doing the data conversion. With this information we can take the effort that these units required and use that as an indicator across the miconia footprint to generate the first realistic estimate of what this is going to cost. This estimate was promised to the Mayor a year ago and we are finally to a point where we can start coming up with a figure.
- Lloyd: It would be a bad thing if we were given the money we say it will take to eradicate miconia. I think we will see that it is not cost effective. We need funding for invasives, but if miconia gets 90% of the available funding, that is not good. I'm encouraged to learn that we are getting close to containment. If the footprint isn't spreading, that is good. We need bio-control. We don't want to let up, but I am strongly against coming up with a dollar figure for eradication.
- Randy: why are we not going after fruiting trees in the core? Jeremy: we are. We spend a lot of time in the core. We fly the outliers first and then the remaining time goes to the core. If we ignored the outliers, we could do more in the core. Steve: what are your thoughts on how much of the miconia is detectable from the air? We are basing the known footprint on aerial survey. This is a concern. Jeremy: we are working on that. We have units that have been run through by both ground and air and we are working on an estimate of what was missed with each method. The results will vary based on terrain, canopy, level of infestation, and age of plants. Steve: it is great that you are doing the comparison, but the only really valid footprint must be from the ground. Jeremy: in the long-term we must have more ground crews. We have inadequate ground effort and resources. Our goal is to revisit every 2-3 years and right now we can't do that.
- Teya: there was one announcement I forgot to make earlier. We just submitted a Community Development Block Grant (CDBG) proposal for \$100,000 through Tri-Isle. If the proposal is funded, we would be able to create three new positions in Hana. CDBG is an economic development program.
- Pat: I need to back up for a minute. What I'm not seeing reflected on the map are the five other separate populations that are out there. The map is deceptive. There are other outliers we need to stay on top of. The map we always see doesn't reflect the five outlying populations. Two of these may be eradicated, but they do need follow-up. Jeremy: we do have the information on those populations.

- Pat: one of the Windward pilots, TC, saw a big fruiting tree in Haiku or Huelo. This is an area where, unlike the Hana area, you have multiple landowners. It really becomes a complex question. We could have other populations lurking that we don't know about. The cost will be huge because of logistics for these sites. Also, what about the Kaupo site? Jeremy: do you have any ideas on how we should proceed regarding the Haiku report? We did a flight and failed to find it. Do we wait and hope the cops or DEA spot it as they keep flying the area or should we go in and do something intensive? It would be difficult for us to do the flight on the NPS contract because of the land ownership. Pat: TC says it was in Haiku, but I'm not sure. It may be closer to the Twin Falls population. When we are dealing with non-EMI or DLNR owned land, we get into a much more complicated situation. I've asked the Windward pilots to keep looking for it. My weed budget for Waikamoi is what we used for the flight. I have enough money for one more hour of aerial reconnaissance. Does MISC have some funds for this if we can't do it on the NPS contract? This is in close proximity to natural areas. You can follow those gullies up to Makawao Forest Reserve and into Waikamoi. This is a huge threat if we find an established population. Lloyd: what about enlisting the public in that area to look. Pat: the folks in that community don't want to be bothered with the government. I used to leave flyers and there are Huelo and Haiku community associations, but there are some hard to reach people in some of those areas. We do have the new law to fall back on if the plant is confirmed. Jeremy: I propose we try a two hour flight in the next couple of months. We will find a way to fund the flight. If we don't find the plant, we will have to wait for more information or fly the area every couple of months to check.
- Arnie: how do we define the footprint? Do we include Haiku, etc.? Jeremy: yes. There has been no significant change in the footprint in the last two years. We find miconia in areas where we expect to find it and when we look in other areas we don't find it. We still have a party-line goal of "zero fruiting trees." What we see on the maps doesn't mean there are more flowering plants. It just means we started looking more. It is pretty obvious that we don't have a handle on fruiting trees in the core, but we do have a handle on the area from Olopawa to Keanae excluding Nahiku makai.
- Mike: we have a lot of challenges in Lower Nahiku. There are multiple landowners and most of them don't like the government or anything associated. The area is steep with ridges and gulches, full of mosquitoes, and thick with hau and uluhe. It is rough terrain and there are no defined property lines. It is hard to know where you are and difficult to get a GPS signal. I have a couple of cooperative residents who are doing leg-work and talking to the other residents. We really need to emphasize that we are not the pakalolo police and we are just looking for the miconia. Jeremy: we can't fly that area because it is private property. Only the cops can fly there. The situation in Lower Nahiku is alarming. We don't have a comprehensive program there, but we do have it contained. We have basically cut a fire line around Lower Nahiku. Mike will continue to develop and maintain a relationship with the residents. A regular presence really helps. Mike: the Keanae folks are really pro miconia killing. We don't have a problem there.
- Jeremy: during the "Kerri Dynasty" we have been putting in a consistent, coordinated effort. We are choosing areas and putting an X across them and then we aren't going back for 2-3 years. Keanae is on that list. Pat: from my observations when we first started in that area, we found fewer plants makai than mauka. Jeremy: we are not finding significant numbers makai of the highway and I have no way to explain that. Aaron: for a lot of the ground work we aren't getting points on each plant because of satellite GPS coverage. Jeremy: we have found that quarterly numbers are more meaningful than months. A few bad weather days or training can cause monthly data to look like we were unproductive. We can extend the analysis to a six month periods if we find there is a lot of variation. With the quarterly effort we are also using the information to help refine cost estimates for miconia control. Steve: so ultimately you are looking at the management units from when we started to when they are pau. We will be able to look at density of flowering or non-flowering plants for the unit of time. We know how much effort it takes MISC to do work on private land and we can use that information for the outlier private land areas. Teya: we are also trying to characterize the units better re: substrate, slope terrain, plant cover, etc. Pat: is there a simple way to store that information? Aaron: yes, we just built a database. This is not really a data/GIS process but more anecdotal information from the crews.

- Jeremy: we sat down at heliops recently and re-estimated the footprint on Maui with buffers. The suspect area where we are likely to find plants is 30,000 acres. The area where we expect to find plants is 7,500 acres and the area where miconia is thick is ~2,500 acres. We will probably shift gears in future heliops to fly slower in outlier areas and then not go back to those areas as frequently. Right now we go back every 2-3 missions and we find more small plants. We need to do the outliers slower and then give the plants more time to get big between revisits. Teya: when you sweep a very steep gulch, do you have a protocol for how many passes you make? Jeremy: that depends on the pilot's style and I prefer to leave it that way. You see things differently from different angles. Randy: when you do helicopter sweeps, do you break up the unit? Jeremy: that depends on what we expect to find. In areas where we don't expect to find anything, we send the helicopter in without a spray unit, but with three spotters and we fly more methodically. Aaron: we are trying to get two GPS screens set up so the pilot can see as he goes and get really tight lines. When they can see the lines, we get really good coverage. Jeremy: in high density areas the spotters are taking lumped data. Each dot could represent 1-100 plants, but in outlier areas we do one dot for each treated individual.
- Jeremy: the issue of not being able to see the blue dye is an ongoing problem for which there doesn't seem to be a good solution. The red dye is easy to see, but it gums up the units. We rely on repeated entries into a unit. The pilots spray and move on and then we go back in 2-3 weeks when we can see the plants starting to die. Pat: do you think a different surfactant would be helpful? Jeremy: when I was in Florida at the conference, there was a trade show. I approached a number of vendors and nobody came up with anything.

STATUS OF DATA MANAGEMENT

- Jeremy: we are in the process of downloading Kerri's head to Aaron's head so that he can download to the new Hana supervisor. We still have information in Pat's head that hasn't been dumped. Pat: a majority of it has been transferred. Jeremy: I am thinking some four days with Pat and someone from MISC who will be around for awhile would be good.
- Arnie: one more note on accomplishments – do we have any way of assessing our success or effectiveness? Can we say we have put this much effort in and we've had this much change as a result? Randy: we aren't there yet. Teya: we did look at the numbers year-by-year for the strategy workshop. Randy: we aren't seeing a downward trend. Jeremy: if we filtered out the Hana core, the information we have would be more meaningful. The Hana core throws things off. Aaron: the repeatable units are going to be very helpful in data analysis in the long-term. Ian: from a ground crew perspective, we see a lot of fragmentation in terms of where the mature plants are. The information really isn't reflected on these maps. The overall flowering population may be going down, but the distribution is more fragmented. Jeremy: to date we are looking at miconia effort on a population scale. In the long-term, that information isn't really meaningful. With the management unit approach, on re-entry we will start to see if we are being successful. We won't really be able to assess effectiveness for another couple of years until we re-enter the units. In regard to Ian's observation, we are aware that there are fruiting populations in specific areas that have not been treated. We are attempting to contain the core.
- Kerri: I have been keeping close track of what were are doing on the ground and passing the information to Aaron. Aaron: we have been in this conceptual divide between the Hana and Piiholo worlds. We are trying to get past that. We are working on getting Internet access for the Hana crew so the datasets can talk and be merged. I will be giving more and more support to Hana. We are merging the Piiholo and Hana miconia data. We found that we had a lot of duplicates and we have put a lot of effort into purging. As we have merged everything into one shape file, we are finding some holes. We are cleaning up and organizing and making sure Hana has more technical support. We are also evaluating the data to make sure we are collecting good data that makes sense. Is the data we collect enough? Does it answer our questions? The goal is an easy-to-use system that doesn't require me to do all the data work. I hope to empower the crews to do more on their own. We've come a long way, but we have a ways to go before we can answer all the questions we want. Teya: Lissa will be taking over some of the data responsibilities while Kerri's position is vacant. Aaron: hats off to Kerri - she has done a great job out there!

CURRENT STRATEGY

- Jeremy: based on funding we have a requirement to protect Kipahulu Valley as our number one priority. The first area that the crew swept was maybe not the most biologically significant, but we swept areas necessary to protect Kipahulu. Then the ground crews moved out to finish containing the core. We are calling the first stage of core containment done. Now we are knocking off areas the previous EEWf and MISC-based crews did 2-3 years ago. We continue to try to finish units rather than jumping around. In the coming months we want to finish the areas above Nahiku, finish lower Wailua and Keanae, and after that entertain a greater push in Nahiku. Pat: there needs to be more Huelo follow-up work. We might not have put enough effort into Huelo. We need to do some survey work. Lloyd: if anyone in the NPS questions us from a funding standpoint, looking at the first graphic showing the work around Kipahulu really addresses the issue.

CURRENT AND PROJECTED FUNDING AND STAFFING

- Jeremy: we are operating off of several sources of funds. Steve: the funds we currently have in the Unit will carry us through Federal FY05. The next NRPP round will be to carry us for FY06. We basically have two more years of funding available. The CCI funding we have going into the Unit is for one additional year of ground crew support. We have applied for one more year of CCI. If we get that, it will likely be the last. This current fiscal year will be a peak of funding and it will tier down from there. There is some base funding at the park. There is a total of ~\$200,000 per year in base funds. These funds have been covering the helicopter contract, part of Jeremy's salary, and bio-control research. There has been \$50,000 per year going into bio-control. Jeremy: if the EPMT survives review, in a calendar year from now we may have \$300,000 to be divided up for the Hawaii parks. We could get up to half of that. Teya: kudos to Steve for all the funding he has brought in to this program.
- Teya: we have done a great job of finding money to date and we have educated people about the problem. We need to look at tapping into other Federal sources in the future. We need a strategy. Steve: we have tapped out the bread and butter channels in the NPS. I don't think that a change in fee demonstration legislation will help. You've been well supported by the County. Teya: I think we need to look at other Federal sources as well as things like the Noxious Weed Bill. We need to be very proactive. We have accomplished a huge amount with County and local-based Federal funding. We need to go to a higher level.
- Steve: do we continue with the current strategy at our maximum funding level without knowing what we will have in the future? Jeremy: I think we should continue with the assumption that we will find funding. If we start to second-guess ourselves, we have a problem. Pat: we can't afford to lose ground. Steve: are we putting enough of an effort out beyond the core? Can we look at ground control units in relation to the 30,000 acre footprint? I am not clear where the ground work has been done in relation to the footprint. Arnie: we may need to redefine our footprint. Jeremy: I would overlay ground accomplishments on the mid-level footprint minus the core. That intermediate number is what we should use for ground accomplishments. Pat: we need to not forget possible different techniques that have been discussed (eg. fencing and goats, bulldozing, etc.). We might be able to get funds for a goat-proof fence. In New Zealand they have had success with the animal control option on a night shade. We need to look at other methods that could make us eligible for other funding sources. Jeremy: we need to not drop these ideas. It would be easy to build a fence in there with the roads in.

OUTLIER POPULATIONS

- Jeremy: we will go in and look for the Haiku plants. Pat: you need to designate a management unit around that tree that was taken out of Twin Falls. Mike: I killed it twice. It was on a pali with prop roots at least 25 feet high. I went back two months after the initial control and there was still tissue hanging on so I ripped it out. It did have flowers. Pat: if you project a radius, we should define a sweep area. When something just starts flowering, the dispersal will mostly be under the tree. After the plant is there for awhile, wider dispersal becomes more likely. Some pretty intense intervals could be in order at first. Teya: with a seemingly isolated fruiting tree how far would you recommend? Jeremy: 12 km aerial searches, but that is not feasible for a ground crew. Pat: a localized search will give you a good index of the potential although it doesn't rule out longer distance. This is in the potential flight path of the conures. Maybe 400 meters.

- Jeremy: it is time to reopen the Kaupo issue and look around that area. It would be a real problem if miconia made it into Manawainui. It is a good time to look now since we had a wet spring. Pat: we could probably draw a parallel with Wailuku - a dry habitat where it got going in a wetter ditch kind of area. Jeremy: we should treat Kaupo like Twin Falls and do helicopter searches with ground follow-up. Pat: when we do an information exchange, I'll give you some recommendations on individual satellites.
- Arnie: a long term objective for the outliers would be eradication. What is our ultimate goal if we have only 1 ½ years of "high" funding left. Jeremy: if we were really only holding the line and waiting for bio-control, we wouldn't be doing the Hana core at all. We don't think eradication is realistic, but we are acting like we are heading there. We are heading for eradication on outliers. Lloyd: we look at bio-control as the long-term solution, but we don't know if it is. I don't think we can eradicate miconia, but we know what it can do to the watershed and the park. We can't just not do anything. We do really need to articulate our strategy. We aren't confident we will always have the NPS funding. Steve: given the prognosis for funding, are we doing what we should be doing?
- Teya: one remaining question on the outliers is responsibility. Pat: initially I worked this out with the old MISC management. I would continue to visit outliers and share data, but expansion isn't possible for me. I need MISC help. Is MISC be willing to contact the landowners and get permissions? We haven't moved forward on that and it will be a complex problem. I can't do it. TNC will continue to scout the areas I have been doing where the former cores were. Teya: we should have a small meeting soon to go over the details on these areas. Pat the strategy for no fruiting tress is important and realistically it reflects the nuts and bolts of this battle. Localized eradication on outliers helps to consolidate resources.

STATUS OF AND OPTIONS FOR BIO-CONTROL WORK

- Jeremy: we need to map the spread of the bio-control that was released in the past. Lloyd: it seems logical to say it hasn't been very effective. Pat: did we monitor the areas that were sprayed? Jeremy: there was no pre or post monitoring. Lloyd: limited data showed it was effective on small plants, but we haven't seen any big die offs. It would be helpful to get the findings from the Big Island.
- Teya: Tracy Johnson (UH Hilo) and Edgar Rojas (from Costa Rica) were here a couple of months ago. We took them on an over-flight. They have a number of new agents that they are ready to transfer to Hawaii. We need to make sure we ask for HISC funding for bio-control.

COST MEASURES & DEVELOPMENT OF LONG-TERM STRATEGY

- Jeremy: we keep doing what we are doing and look for additional funding. Teya: I will put together a draft approach to cost measures and send it around for input. Jeremy: we have eight people full-time in Hana now. We will have a big gap with Kerri leaving. Mike will be spending more time out there to fill in the gap and we hope to have the new person better integrated with the Piiholo operation.

PARTICIPATION OF NON-MISC CREW IN MICONIA WORK

- Jeremy: the question of having the EMWP field crew work on miconia has come up on a number of occasions. Alex first approached us a couple of years ago and the topic keeps coming up. My opinion is that by having EMWP doing miconia on a regular basis we are taking a big risk. I fully realize we have good decontamination procedures and dedicated gear, but I don't feel like anything is 100% effective. It seems silly to argue against getting free labor, but there are so many other targets that EMWP can work on that present less risk. The MISC level of risk is low because we work in less pristine areas (eg. Kihei and Kapalua). A MISC person going into Honomanu is an issue as well, but it is a separate issue. In my opinion EMWP should be doing other targets, such as pampas grass, which will take the load off of MISC so they can do more miconia. I would like some closure on this topic. If I am told I have to incorporate EMWP I will, but I am on record as saying it is too great a risk.

- Arnie: can we clarify the risk a little? For example, Pat does miconia work and then goes into the forest. No matter how good your decon procedures are, there are seeds that get through. Jeremy: Pat is one person and not a crew of six. Pat: prior to MISC I had a crew helping me and I still have a lot of the same gear. If you go to Keanae, are you using the same gear you use in the Hana core? The EMWP folks don't want to adopt this as a regular thing. This issue needs to make us keenly aware of how we deal with decon – are the methods we use adequate? Arnie: you have to bring in the MISC issue. Jeremy: we need to look at the MISC crew as a separate issue. Anders: do you feel it is fair to say that if EMWP is a risk, MISC crew is also a risk if they go into pristine forest? Do we fall into the same risk category for both directions?
- Steve: I flash back on two things. One is the interpretive prop that Pat made a number of years ago that really shows how small the seeds are. Secondly, back in the good old days when we were trying to figure out how to deal with miconia and Australian tree ferns, either Art, Chuck or I vectored miconia into Kipahulu Valley. It has happened. Lloyd: that really dramatized the issue. Those three people always took it seriously and it can happen to anyone. Steve: it is a probability/risk issue. How important is the cross-training? Is it worth the risk? Jeremy: there is wiggle room. We can write a protocol where EMWP only works in lowest seed density areas (i.e. areas that Pat has eradicated). The potential risk is much lower, but having said that I don't think there has been a constructive effort to work on this issue. We have to work together to make it happen. I have confidence in that crew, but this must be a coordinated effort.
- Pat: I am not sure in the big picture that the EMWP crew is going to be that important. This has really brought into focus the question re: the MISC crew going into pristine forest. Randy: I agree with Jeremy that we are better safe than sorry. We have had experience with tibouchina vectoring. EMWP has enough work to do. There is value in cross-training, but the risk is too high. Arnie: how should that effect the Piiholo crew when they spend a week in Hana and then come back and work in other areas? Randy: in places like Kihei and Kapalua there is minimal risk of miconia transfer. Arnie: but what about areas like Honomanu? Do we keep the MISC crews out of pristine areas? Teya: if our crew doesn't occasionally get into a pristine area, we have a problem from an employee retention standpoint. Anders: there seems to be a consensus re: the risk of transport into pristine areas. I think it would be useful to convene a small committee (Jeremy, Pat, Arnie, & Jordan) to address the details and make a proposal to MISC and EMWP.