

MAUI INVASIVE SPECIES COMMITTEE
Meeting Minutes
Friday, April 15, 2011

ATTENDANCE: Randy Bartlett, James Leary, Lloyd Loope, Mark White, Forest Starr, Kim Starr, Bob Hobdy, Pat Bily, Fern Duvall, Kerri Fay, Jay Penniman, Luke McLean, Isabelle Walker, Elizabeth Speith, Dan Eisenberg, Fernando Juan, Aiona Kaiakalanie, Mike Ade, Brooke Mahnken, Adam Radford, Chuck Chimera, Stephanie Miller, Lissa Fox, Teya Penniman, Elizabeth Anderson

ATTENDING VIA WEB-COM: Josh Fisher

- The meeting was called to order by Pat Bily (TNC/MISC Chair) at 9:10am.
- Introductions were made around the table.
- Minutes from the February 25, 2011 meeting were approved. They will be posted on the website.

ANNOUNCEMENTS

- Elizabeth: we may still have a couple of slots left in our Wilderness First Aid courses – June 13-15 and June 22-24. The cost is \$200/person for the three day course. If you or one of your staff is interested, let me know.
- Teya: Tri-Isle had to move out of their office yesterday. The RC&Ds have been shut down. Tri-Isle will continue to operate as an independent entity. They are looking for office space, a new PO Box, etc.
- Pat: I testified last night at the budget hearing in Paia. It was well received by the Council members. We do have their support. They are behind what MISC and the Watershed partnerships are doing. Teya: the last budget hearing will be in Kahului on Monday.

TECHNOLOGY & INVASIVE SPECIES

James Leary, CTAHR – HBT and Other Cool Tools

- James: HBT started off as a concept where at first we got a lot of snickers. HBT is the process of encapsulating herbicide into 68 caliber projectiles that are administered with a pneumatic air gun. The range is 150 feet. We are trying to determine if this is an effective method. It is critical to match the chemistry with the target. HBT is a very unique application technique. The real utility of HBT is if you are able to reduce your payloads. The efficacy question is the key. Ultimately to evaluate real utility in the field we need to look at adaptive management. HBT is still in the R&D phase. We have an SOP for HBT for miconia under review with RCUH and we have a label for the chemical. MISC will need to specify its needs in an SOP in order to use the technology. Imazapyr has a long interval for showing results unfortunately. The current HBT label is HBT-Imaz. There needs to be a high dexterity in application technique – a surgical method of application. We need to be able to carve out exactly where we want to treat with precision and long range accuracy. As we increase the sophistication of our tools, it will require a higher skill set with our crews on the ground.
- James: our Hana experimental operation (code name Road Block) focused on the road system in the core infestation. We focused on 6.7 miles of the core road system (350 acres). Applicator unit specs = BT® TM7, Electro-pneumatic solenoid, semi/3-rnd burst/full automatic (15 p/s), Muzzle velocity- 100 m/s @ 200psi, Effective range- 30 m. Ammunition specs = BBT-TCP200, 0.68 caliber gelatin capsule, Active ingredient- Triclopyr (200 mg/projectile). The formulation is waterless. Accuracy is good at 50 feet and after that it decreases. It is important to know where to target on the plant. We worked as a four member team with two point applicators (target acquisition and treatment), one resource facilitator (consumables replenishment - compressed air and ammunition), and one rear vehicle support operator (mobile operational batch inventory). It is important to keep payloads replenished for efficiency. I estimate a 50 foot (20 meter) buffer on either side of road. The goal was to get all targets in visible range. We aim for the axial points of the plant. A small plant just gets ones shot. On larger branching plants you have more axils.

- James: we captured a way point for each application. The point was taken where the applicator was, not the target. I wanted the time stamp so I could see how many targets we could acquire. The limitation for each round was the 2,000 unit payload. Sweep times and distance were consistent. We acquired 769 targets in a 2.5 hour time period. This is over 100 targets an hour in the core infestation. Sweep efficiency is density dependent. In lower density areas, the technique will be less efficient. We have a high level of efficacy with HBT on miconia. Miconia is not the easiest target for HBT. The architecture plays a big role. We had 60-70% accuracy on hitting the target for this trial (Nov. 2010). We returned in February (over 100 days from application) and found that of 769 targets, we had 95 survivors. Eighty-eight percent of targets were effectively lethally controlled. We did visual surveys for survivors. We have administered a follow-up. It is a progressive strategy in ground operations. I want to know what it is telling us at the fourth run. We run the course again looking for the same parameters.
- Josh: does a partial kill cause flowering? James: I think that is a possibility. We need to do follow-up treatments to mitigate that from happening. There is also the issue of new recruitment. HBT on the ground is a progressive management strategy. It will take multiple iterations. We need to outpace the biology of the plant. Improvements in efficacy will help move us towards that goal. We were able to cover 61 acres, which is 23% of the core. At the least if you have limited helicopter time, ground operations can accommodate the buffers on the core roads. The pace will always be the same regardless of how many targets there are. It took 53 person hours to run the course. Time on target was less than a minute.
- James: our HBT helicopter operation was code named Hot Mic. HBT will not replace the spray ball in helicopter operations. HBT is size limited and is best for targeting smaller, inaccessible targets. The spray ball is more effective for larger branching canopy. As we become more experienced, we will know what to hit and what not to hit. HBT is good for aerial targets that would be inaccessible with current techniques. SOPs are under review at RCUH. The pilot is the targeting system - they will see the target before you do. The best seat for the applicator is behind the pilot. Good pilot / applicator communications are vital. It is also important to match the consumables with the fuel cycle. You don't want to run out of fuel before HBT and you don't want to run out of consumables before fuel. It may also be helpful to have a navigator for data collection. A three person flight team will probably be best. With four people weight becomes an issue.
- James: we flew Wailua Gulch at the end of November 2010. The site is nine miles from the core infestation on a cliff face. Without HBT, these types of sites have had to be dealt with via rappelling. Rappelling is a huge time investment and there is a substantial risk to personnel. Adam: you are looking at the wall with this method rather than from above as you are with the spray ball. You are able to capture more targets. James: so far we have made five runs. Payloads were limiting factors again. We are working to be closer matched with the fuel cycle. We were able to control 129 targets/hour from air. These are inaccessible targets. The spray ball is a better system for targets that are accessible. Pat: how much of a collateral damage issue is there? There is a fair amount of drift with the spray ball. This is an important factor as we get into better habitat. James: the amount of herbicide with paint balls is really minor. Rotor wash is only an issue if we are close to the cliff face. With HBT we can do recon where we can actively treat as we spot. You can't really do this with the spray ball because of the long line attached. Miconia is sensitive to Triclopyr and it is soft. This makes it a good target. Pampas is high on the list as a possible target as well.
- James: this technology is not something that is going to be available on the shelf. It will need to be proposal-based and requires some technical skills. We need to build success stories. Yesterday in Hanawi we were able to control targets along a power line. These are targets you can't get with a spray ball. On Kauai, they still can address miconia. They don't have enough flight time. They only have six hours per year. Now is the time to deal on Kauai. Nelson Paint Company will manufacture the product and Wilbur-Ellis Company will market the product. These guys aren't familiar with weed management at this level. They are accustomed to dealing with agricultural volume, not one plant in 100 acres.

- James: this concept has been well received in places on the mainland where I have given presentations. Morale is a huge issue on the ground. It is a real impediment if you are not getting results. The entertainment value of HBT is not to be dismissed. I try to highlight that in addition to the sophistication of the technique. I am not interested in having everyone use it. I want this in the hands of skilled technicians who are dedicated. Teya: that was a great summary - thank you. It is helpful to see what you are doing. It will be particularly relevant when we are able to look at actual cost estimates.
- James: I am also working on an incision point application technique. This is a refinement for woody shrubs and arboreal targets. You expose the cambium and administer a metered-specific dose. There have been 6-7 weed targets identified for testing. Triclopyr has under performed in this technique. There are other highly effective chemicals for targeting with 4 ml of herbicide. We are working to match the chemistry with the target. You can treat 200-300 targets with a small backpack. Compared to standard basal bark you are talking a much smaller payload. The calibration of basal bark application is difficult. Many people over apply.

Kerri Fay, TNC – High Resolution Imagery for Invasive Plants

- Pat: Kerri Fay is going to talk to us about the Resources Mapping Project. The project is acquiring high resolution photos across critical parts of east and west Maui. Kerri has been on the ground field testing the technique. Kerri: in 2009, TNC Maui, and the East and West Maui Watershed Partnerships contracted with Resource Mapping for natural color and multispectral images of over 2,700 acres on Maui and analysis of the images for certain weeds. In most of the east Maui areas we were looking for strawberry guava and ginger. On west Maui we were looking primarily for strawberry guava. We also looked at miconia on east Maui. Work was also done on other islands. Molokai is looking primarily at Australian tree fern. The photos are taken from a fixed-wing aircraft. The product we will receive includes images and analysis, in the form of shape files. They will find the weeds we asked for. They are doing the analysis visually for now. This technology is really in the R&D phase. They are constantly tweaking things.
- Kerri: there are a number of considerations for acquiring images. Time of day is one - you can't fly early or late because of shadows. High overhead clouds cast fewer shadows. Wind speed and turbulence must also be considered. Aerial imagery isn't perfect. There are spatial distortions near the edges that will cause mismatches at the boundaries. The images tend to be darker at the edges. To acquire the photos they fly at 1,200 feet above ground level for 2 cm data, 800 feet for 1cm data. They fly about 85 to 95 miles per hour and use two natural color professional Canon cameras. The shutter speed for NC cameras is between 1/1200th of a second and 1/2000th of a second.
- Kerri: ideally the images overlap so you can view them in stereo. Viewing in stereo is good for measuring height and seeing depth. The overlap for the natural color images is 10-30% and the multispectral is 50-60% for 2 cm data. The overlap for 1cm data is 0-10% and 30% respectively. The best resolution they've gotten so far is 0.8 cm, no overlap and very small footprints. Land coverage per picture varies with changing terrain and resolution so each image would have to be looked at separately. (2-4 acres). The number of pixels per image is not known because they force all the imagery into 1-2 cm resolution even though the image may be more coarse or fine, this is unavoidable with the processing software which is ERDAS LPS (Leica Photogrametry Suite). They have at least 2 TB of storage in the plane while flying. They georeference the multispectral imagery but not the natural color (they pin the color to a centerpoint which was recorded with GPS), which puts it in approximately the right position. They mosaic the multispectral but not the color. We did find satellite imagery that is georeferenced. You have to have something that is georeferenced behind the image. You should map to the georeference not to the natural color. A mosaic data set built in ArcGIS is an easier way to look at the images. When you put the centerpoints on the mosaic, you can reference the number of the image and then you can load the ones you want to look at into ArcGIS.

- Kerri: the number of images received varies because each image is a different size. As of March 2011 we've received the following:

Maui

- West Maui: 12,564 images (2 days, 138 GB)
- East Maui: 24,255 images (5 days, 320 GB)

Molokai

- Central: 12,000 images (4 days, 68 GB)

- Kerri: West Maui was a real challenge. They ran into a lot of turbulence. They don't want to go back there! The images are smaller and the overlap is not good. You need 60% overlap for good stereo viewing. They were ferrying from the Big Island so they only wanted to come over when the weather is perfect
- Kerri: after flying, Stephen comes up with Rule Sets for looking at the photos based on the characteristics of the specific weed. He makes two sets of shape files for us – one that he is sure of and one with maybes. For miconia key characteristics were: 1) has large dark green (slight purple) ovate leaves with prominent mid vein, 2) leaves will show glossy under full sun conditions, and 3) leaves closely gathered around stem showing 3 to 6 oriented horizontally to the sky. The Rule Set for miconia is as follows:
 - Must have the first main characteristic and one other to be considered a positive ID.
 - If it has either of the two less weighted of the main characteristics you may consider having a "possible" class.
 - The most weighted characteristics are all related to a single leaf. Relative size, color, and leaf shape.
- A number of hints were useful for miconia identification:
 - Can be found in understory or out in the open.
 - Best scale for analysis is between 1:110 and 1:160
 - Full sun conditions are NOT optimal for detection of this species.
 - Often found in clumped distribution but not a necessity.
 - Sometimes the purple underside of the leaf is evident and a big giveaway.
- Mark: he will try to come up with a number for the percent of the plants that may be found. That number may be very low, but if you pick up 10% of the outliers that you didn't know about, that is a net gain. The plant must be visible through the canopy to show up. Kerri: we ground-truthed some of his points. In one instance, he had identified 16 plants and we went in on the ground and found thousands. The area was in the core. On the ground we found 50 plants in the 3-6 meter tall range. The majority of what we found was very small. It is the tip of the iceberg. If you find a miconia in an outlying area, you will need to go in on the ground.
- James: so with all this footage we are still using manual scrubbing? Kerri: yes. Stephen says the eyeball is better than an algorithm. He also thinks that someone who has been there is the best one to look at the pictures because they know what else is out there. Aggressive plants that are photosynthesizing are bright colors. The native plants tend to be darker. Pat: the brightness of the fast growing plants is a good rule of thumb. Mark: we are finding more Australian tree fern on east Maui than we expected. We don't really know if we can have a successful control program. They are testing control on Kauai. It is mostly clustered around Nahiku on Maui. Fern: I have seen it coming up under monotypic stands of eucalyptus, which usually doesn't happen. James: the architecture of that canopy makes it a modifier. It is really dark underneath. Lloyd: after the hurricane it seemed there was a lot more on Kauai. That might have been a factor.

- Kerri: some other applications for this technology include mapping rare plants, forest types, and forest health. Looking at change over time and various management activities like finding plunge pools, knowing where to tie your fences, knowing where the hau is, etc. Jay: the imagery you are collecting now could be used in the future in a software program as a baseline. I had a proposal from Stephen to do Lanai and I am getting some resistance because it seems there is an expectation that it will be a silver bullet and the product isn't everything we want yet. Pat: you have to remind people that this technology is still in the infancy stage. The more you do, the better it gets. Lloyd: my reaction is that a valuable use would be for biocontrol monitoring to assess before and after. Kerri: on Kauai they have started a monitoring project. They did images a couple of years ago and then they sprayed the tree ferns. They just did follow-up images although it may be too early for the second round.
- Kerri: some of the lessons learned include: It is not the magic bullet. You need patience. It is important to have a central clearinghouse for the data. Don't expect to be able to see understory weeds or weeds with small leaves. Mark: the cost was \$2/acre to fly and \$1/acre for analysis. The cost has probably gone up a bit. Lanai would be easier to fly. It depends on what you want by when and how urgent that is. It is a bit of a gamble if you have an urgent need. In another year it will be a lot more solid. If you need accurate information right now, you may want to go with a ground survey. Lloyd: is Kahili ginger one of the targets? Kerri: that one is debatable. You can see it in the openings. Jay: the proposal Stephen gave me includes using a whole new camera system. Mark: at this resolution he is the only show in town. Randy: it is an R&D project. Just to have all the shots is something. We can always look back on them as a baseline and when the technology improves we will be able to make comparisons. The images will get better, but we will still be able to go back to these images in the future.
- Kerri: what is your goal for Lanai? Fern: looking at the forest and incipient weeds. Mark: on Lanai even mapping the heavily infested areas would be helpful. Kerri: having goals for image management is important. They are initially organized by date and then when you make the mosaic data set you can find the images that you want to look at. James: we were up in west Maui recently and found six strawberry guava. We were really close and yet we were barely able to detect it vs. ohia. I can't image how hard it would be to do this with imagery. Kerri: when Stephen makes his rule sets, he wants us to identify the plants in that specific forest type. Pat: we are all facing severe cut backs which will limit our helicopter time. In the long run, we need another way to scan areas. The price is cheap relatively speaking. Teya: thanks to TNC for taking the lead on using this technology.

UPDATES

Staffing

- Teya: we are in the process of hiring one position here at Piihola. We lost a number of staff at the beginning of the year, but we are just hiring one replacement at this time. We are rehiring Russell Suzuki in an intermittent status to help with pampas heliops. We are looking at hiring one or two temp hires for Hana over summer and we just got approval on Justin Avelino for MoMISC. He worked for TNC on Molokai in the past. We are hoping to have a couple of AmeriCorps interns this summer.

Funding

- Teya: the Fish and Wildlife Service asked the ISCs to pull together information on our needs and shortfalls for the next couple years. The state added \$23,000 to this year's funding. We are using the additional funds for pampas heliops. Next year from the Forest Service we expect less or the same funding. County funding should be level for next year. There will be a significant reduction in funding from the NPS over the next couple of years. At present, miconia heliops is only funded through August. Josh: we just received an email on discretionary funding. We have a green light for \$163,000 spread among the ISCs and there is another \$41,000 on hold. This is out of \$4 million in proposals. Teya: that is excellent news. Josh: there were a lot of things that didn't get funded. Teya: our Milagros fundraiser netted \$328 from the restaurant and \$120 from the donation box. Thanks to all for participating.

Public Relations

- Lissa: we are ramping up for fair season. We just finished the Ag Fair. Thanks to Pat for coming and helping out. The Taro Festival and Molokai Ag fest are coming up. Abe has joined the MISC PR team and is starting to do class visits.

Other Items

- *Tumbleweed*: Teya: we received an email from Megan Webster from Puu Kukui regarding a tumbleweed site on west Maui. It is not known to be widespread on the west side. Forest and Kim went and checked it out. Forest: the core area is the size of this yurt. It is all right along the round. The site is easily accessible. It would take repeat visits. We did about six miles of surveys along the pineapple roads. It will spread if it is not controlled. Teya: do we see a continued role for MISC given that it is not known to be widespread on the west side? Forest: the operation is organic, but the site where the tumbleweed is isn't in the pineapple field. Kim: Maui Land & Pineapple is the property owner. Wes Norhara is planning on treating the site with Round-up, but it will need follow-up. Teya: we will put it on the agenda for the plant priority setting meeting in August. Forest: it will be too late in August.
- Teya: it would be a beneficial thing for MISC to do something if it is not a major time investment. If, in the ideal world, it really is a small incipient population, it may be worth working on. If we get information later that it is more widespread, then we drop it. Pat: if we can be a player and enabler it is worth it, but we don't take the full responsibility. Budgets are shrinking and we really have to be careful about what we take on. Mike: if we do it, what are we doing with the biomass? Forest: there are no big plants yet. If we get on it now, it won't get big. Teya: between now and August we will do one or two treatments and get a better handle on how extensive it is. We will revisit the topic at the August meeting. Randy: we need to reassess as we go. If you see a big ball, then you don't do it. Forest: treatment needs to be repeated in a timely manner. Adam: we should talk with Wes and see what he is willing to do himself.
- *Dengue Fever*: Teya: I talked to Dr. Pang yesterday and they are planning to have Community Work Day help out. They will help out up to a limit. He is looking for some help with clean-up at the known sites. I think it is reasonable to help on a limited basis. It is a serious public health issue. We do get a lot of funding from County. If it turns into a major event, there will possibly be other funding. Mark: it is surprising that there hasn't been more press. There are a lot of confirmed cases already. Fern: the flight distance of the mosquito is how they determine where to go. It can be up to 2/10th of a mile. The people that did it before (Imi, Kanamu) shouldn't help this time. Re-infection is a concern. Pat: I think we can be a little bit of help with sanitation. Fern: they are suggesting clearing around houses. The public is more receptive than last time and they understand what needs to happen. There is much more public support than last time. It is rampant worldwide right now. Lloyd: supposedly this is the only place where dengue has been successfully eradicated. Teya: we will do a little. Lissa: it may be a good opportunity to do a community volunteer program.
- *Mullein*: Teya: mullein was discovered by the Leeward Haleakala Watershed Restoration Partnership in the park by Science City on the side of the road. James: I recently met with Mauna Kea management group. They are highly motivated to begin management of the Saddle Road. Mullein needs to be better managed on the Big Island if we are going to manage it here. MISC will work with Leeward folks to do surveys in the area.

Next Meeting: June 17, 2011, Miconia Review - *Note Date Change*