

New Population? Y / N
 _____ Entered into GIS?

Rare Snail Observation Form

Scientific Name: _____ Date: _____
 Pop Ref Code: _____ Range: _____
 Elevation: _____ ft/m Observers: _____ Aspect: _____

Location/Flagging Scheme (orange/blue):

Weather: _____ Effort (people hours): _____

GPS? Y / N Coordinates: _____ Photo Y / N?

Predation: Ground search conducted for fresh shells? Y / N Area searched: _____ m²
 People Hours: _____ # intact _____ #rat damaged _____
 Empty shells collected for reference? Y / N

Population Structure:

Small	Medium	Large

Achatinella mustelina: small ≤ 8 mm, medium 8-18 mm, large ≥ 18 mm

Koolau *Achatinella*: small ≤ 7 mm, medium 7-15 mm large ≥ 15 mm

Threats/Management Recommendations/Actions Taken/Notes:

Count/Density: _____ SNAILS _____ SNAIL HOURS

SKETCH MAP OF SITE (indicate area ground searched):

Snail meeting agenda

Kewalo Marine Laboratory library
May 12, 2004
8 a.m. – 10 a.m.

- 8:00-8:15 Update on status of captive snails
8:15-8:30 Summary of upcoming Oahu IP proposed snail management recommendations
8:30-8:45 Funding status
8:45-9:15 Discuss Army responsibility to do genetic testing on captive snails
9:15-10:00 In situ management (snail management handout)
- Enclosure construction
 - New ESU designations, and management of 8 vs. 10 populations
 - *Euglandina* research possibilities?

Attendees:

Patrice Ashfield, Michelle Mansker, Mike Hadfield, Lorena Wada, Dan Sailer, Kapua Kawelo, Vince Costello, Leilani Durand, Steve Miller

Meeting notes:

Kapua summarized the Army's new snail binders organization system.

Snail status update:

Mike had been concerned about flatlines in growth for captive snails. Took some *A. fuscobasis* and removed 5 adults from terraria and moved them to other terraria, numbers immediately jumped. Source populations also jumped. Apparently there is a density factor, even in the largest terraria. They were separated on Nov. 20th, and between then and April 26th, from *A. partulina*, 5 separate adults produced keiki, which is an 80% reproductive rate, which is very high. The 5 adult *A. fuscobasis* produced 5 keiki, while the source population 26 adults had 12 keiki. There are apparently some density factors at work, which is generally an easy problem to solve. Currently space is limited in the environmental chambers. One of the chambers has been down for the last 6 months. The company the chamber was purchased from won't help because the chambers are 6 years old or more, so Mike's lab is trying to fix them in-house. Hopefully they will get broken one back in operation soon. Originally it was thought that population numbers were declining due to high mortality, but it was a low birth rate.

Vince: some of the populations we brought in last year, it looks like some of those populations have doubled over the year.

Mike: we don't like to start with low numbers, 7 or more seems to be working. Terraria with 25 or more adults seem to have overcrowding problems.

Tap: this just underscores what we've already said, we need to secure some outside places to reintroduce these snails.

Vince: there are more than 300 *fuscobasis* now.

Tap: and it's not great that they're all in one place, that has its own inherent risks. We're working hard to figure out funding sources to get snails out of the lab. We'd like to look at the Army's funding sources and look at partnering to do things like that.

Mike: the State said they were purchasing materials for exclosures, but I'm not sure what the status is.

Vince: the materials are up at the Nike site, but we're not sure when they'll build.

Tap: (Steve Miller just entered) Do you know what the state will do with their recycled plastic planks that are supposed to be used for an exclosure?

Steve: I don't know.

Tap: I haven't seen anything from Brent, section 6 related, for the new fiscal year yet.

Oahu Implementation Plan:

Kapua: Michelle's going to be the Oahu IP point of contact, and Patrice will be involved, too. After having learned a lot about plan writing from the Makua IP, we wanted to streamline the process and have subcommittees. So pretty much for snails, it's mainly Koolau species. We'd like to have Mike, Vince, Talbert, USFWS, and whoever else from our team has specific knowledge. In terms of developing SPs, we have our digital information organized. We expect to have someone on the Oahu IP job at the end of the month. The person writing it will be an RCUH employee.

Dan: it'll include the expanded South Range area to be used for transformation?

Kapua: yes, but there won't be much impact from that.

Dan: well, the firing range is potentially pretty close to Puu Hapapa, and there are potential fire impacts.

Kapua: probably what we'd be doing initially is developing species background information, and asking Mike for information on the snails.

Mike: so that's already started?

Kapua: once the person is hired we'll start, but we've got a lot of the associated data organized. And we'll hopefully be doing less off-site management for snails, because the threat from

training is so low to Koolau snails, we'll be focusing on on-site management. So we'd want to review the genetics information.

Mike: I hired someone who started the first day of March. Bjorn Erickson, he's got a background in molecular biology, so he's now working on building the microsatellite library, and it's about $\frac{3}{4}$ of the way along.

Steve: is that per species?

Mike: no, it should be useful across species. These are snails that died in the lab and are well preserved, so we have the larger tissue samples that we need for this research.

Funding update:

Leilani: the \$78k we requested for this year should be in Mike's RCUH account right now. The cost estimates for the next 33 years were recently completed, and we included \$50k/year to cover the cost of supplies and one person to raise snails in the lab.

Tap: does this also cover the Oahu IP?

Kapua: no, this is just Makua. Until the Oahu IP is written we don't know how much money we'll ask for.

Tap: right now we're doing all the funding of the captive facility, and it's getting harder for us to secure funds. Right now we're funding Mike at \$83k for the captive facility, but when you're funding the Oahu IP we'd like to look at potentially sharing that cost. I know that you guys need to know way in advance what you may need.

Steve: do have any idea when you'll get money into your budget for the Oahu implementation stuff?

Kapua: We need to find out from the USFWS if we are supposed to develop urgent actions.

Michelle: I'm not sure. Maybe for *Eugenia*.

Kapua: unless the team identifies that money is needed right away I don't see us getting money before the plan is finalized. That should be in December 2005, so money would be available for '06.

Tap: so you'd put in your request for funds in '05?

Kapua: yes, and we'd put in money earlier for *Eugenia* and things that are high priority. Because snails are so far removed from training, they weren't put in the list of things that need funding right away.

Dan: Training will have consequences for Ekahanui snails. Is there any more immediate money for more 'elepaio baiting that will also affect the snails?

Kapua: we can do baiting in Ekahanui as part of the Makua funding, that's one of the ESUs. 'Elepaio baiting will be more intensive so won't be funded until the plan is. We may be doing management of 'elepaio offsite, so in the next 3 years we'd be supporting you guys in larger-scale rat baiting.

Tap: so after 2006?

Kapua: USFWS could ask Joel if there are things we could fund sooner.

Steve: I asked because 5 of the non-*mustelina* species are in the Oahu BO. I think you guys need to plan right now for getting funding into the captive propagation component because the program is already going. What we need to get from Mike is what are the costs associated with the 5 species we currently have in captive propagation. It's critical because by 2006 we're looking at as much as a 20% budget cut in our own budget, so it's going to fall to the Army more and more to make sure that the captive propagation program is sustained.

Michelle: I can talk to Joel and let him know we need to make sure there's no gap in Mike's funding.

Kapua: at our last IT meeting we discussed funding, and the Army isn't happy with the money we requested as part of the full IP. So we asked the USFWS to scale down and focus on 3 populations/species. We cut the requested funds in half, but so far we've never received full funding from the Army, and we're not sure if we will next year. So maybe we should ask the State if they can contribute.

Mike: we used to get section 6 money from the state, but not anymore.

Tap: we need to get ahold of someone from the State; we need permission to collect snails for propagation from Waianae Kai, and to find places to put snails from the lab back out into the wild. I'm just having a really difficult time getting a response from anyone from the State. But we'll keep trying, and we'll try to get funding from other places. If we partner and look for multiple sources we should be able to cover Mike's propagation needs.

Kapua: I just need to talk to Joel about funding what we can for the Oahu IP, and funding things up front.

Genetic testing:

Kapua: we haven't yet talked about the Army's responsibility to do genetic testing on captive snails. And the change in ESUs hasn't been discussed. I wanted to bring this to the USFWS representatives. We were originally going to manage 10 populations from 8 ESUs, two populations from the two larger ESUs and one population from each of the smaller ESUs. Now that there 6 ESUs should we manage 8 populations?

Mike: I still agree with the logic of our original discussions. Managing 8 populations makes sense.

Kapua: old ESUs C, D, and E are now one. So how do we treat those? Another issue to discuss is that at Schofield West Range, our access has been terrible. I'd like to think that the Army would give us more access and we could manage that population, but I don't know. It seems like with the Oahu BO it should have changed, but it didn't.

Steve: does that affect all of the C sites?

Kapua: no, the other C sites are really steep. There's another option, Manuwai gulch is one gulch west from Palikea Gulch, and we haven't really looked for snails there, but I was going to suggest that we maybe have Vince do some surveys out there and try to find an area with a high density of snails where we could do management. But I don't know if we need to do more genetics on any new population we might find there?

Mike: doing genetics would be the best thing to do.

Kapua: okay, we'll plan on doing that. I guess we need to still answer the question of how many populations to manage in ESU C. The management options in that ESU aren't really great.

Mike: I thought we were ending up with 8 managed populations. B and D in the new scheme would be the only ESUs duplicated.

Kapua: that's what we have here in our proposal right now.

Mike: I think that's totally reasonable.

Kapua: anyone here is welcome to join us in the field for our snail searches or to help with management.

Mike: Shaun would like to go, but he's leaving to go to grad school. He'll only be here through July.

Kapua: and then the issue of genetics testing for captive snails. It's not in the IP, but Mike thinks it's an important component of managing the captive snails.

Mike: our concern is inbreeding. Since they're all hermaphrodites it makes the situation better. This year we've noticed that *apexfulva* is reproducing from only 1 adult. I've been worried for a long time about all the species where the populations are very small.

Kapua: should we worry about that then for the Oahu IP?

Mike: I'm sure there are still more pockets of snails out there that we haven't found. But genetics testing should be part of the management scheme.

Kapua: I could see doing genetics on those populations every 5 years.

Mike: it's not a big expense, so I don't think it requires more money than you have right now for the Makua IP.

Kapua: we'll work on the estimate for maintaining the snails and doing the genetics work.

Steve: the new Koolau snails opens up a whole new arena of questions. What do we need in terms of genetic analysis to determine if these are all legitimate species? The next thing would be, within a species do we need to assess for any ESUs? This could affect how many populations should be managed. Even if we end up with things that look like the same ESUs, if they're covering a large enough range, we're going to want to stabilize something that represents the extremes of the range. We're also basing all our determinations on just one gene, so managing 8 populations for the Makua IP seems reasonable, and we're going to want to do the same type of assessment for the Koolau snails.

Mike: *A. livida* and *A. byronii* are the two we really need to look at.

Kapua: we need to start working on this soon.

Mike: we don't have as many samples for the Koolau snails, so more sampling needs to be done. The one thing we know about *livida* and *sowyerbyana* is that all *livida* is senestral and all *sowyerbyana* is dextral.

Kapua: I wonder if the ESU discussion is moot for the Koolau snails because there are so few sites.

Steve: for now it is. For now preserving the field populations that are out there are the two critical things that need to be done right away, and then considering where we want to reintroduce snails. Where we have large populations in the lab, getting them back into the field.

Mike: and the problem with the Koolau locations is that most of the populations have gone way down since we first started looking at them.

Steve: the other thing I'd try to do for the areas where we used to see snails and aren't seeing them anymore is do a lot of surveys and get any snails we find into the lab.

Kapua: this leads into struggles we've been having with field management of *Achatinella*. Unfortunately a lot of these ESUs are in really steep habitat, and the snails are scattered, so they don't lend themselves to enclosure construction. We wanted to ask you guys what you think we should do for *Euglandina*. We want to manage snail populations that will be in larger-scale ungulate enclosures and conduct weed control on a large scale. We'll monitor them regularly and do rat baiting, but we don't know what to do about *Euglandina*. We have money to fund research for *Euglandina* attractants or baits.

Mike: I developed a bait, but we couldn't use it. *Euglandina* is so spotty, and the bait doesn't hold up on the field. Are you seeing lots of *Euglandina* in the Koolaus?

Vince: we don't see a lot. We're in the field often, and you may go months without seeing a live one, and then you may see several.

Mike: it might be that you if you get rats under control *Euglandina* is less of a problem.

Kapua: and then having a good backup population in the lab is really important.

Tap: I would say right now mechanically killing them may be your best option. Maybe we could wait and see, if we have bait and it isn't working.

Kapua: do you know anybody who would want to do more research on *Euglandina* and developing a bait?

Mike: we worked with the capsaicin guy, but when it didn't work for us we didn't hear from him again.

Kapua: one thing we've been thinking of is trying to develop a screen or something to cover an area so *Euglandina* couldn't get in. But we're not sure how big the *Euglandina* babies are.

Mike: there are areas on the north summit of the Koolaus that are flat enough to put up exclosures. Maybe thinking about small exclosures is the way to go.

Dan: maybe we should do some releases in areas where we're controlling rats and monitoring them to see what happens. Do periodic searches for *Euglandina* and continue controlling the rats.

Mike: I haven't seen an area where anyone has successfully controlled the rats.

Dan: at Puu Hapapa we have about 15 stations in the area, but we haven't had time to do the monitoring to see if the populations of snails have decreased or not, but we're still going to keep on baiting in these areas. We could then look at doing releases.

Kapua: at Makaha the snails are widely scattered, so baiting across the whole area would be difficult. It may work better to move the snails to one area and bait in that area.

Mike: yes, but remember, snails don't like to get moved.

Kapua: well maybe we could move snails from the lab into those areas.

Mike: we created a net with nylon window screen to protect the snails, but we couldn't keep the snails in. I think it created a microclimate they didn't like.

Kapua: it's good to hear from you guys that our proposal to put snails in ungulate exclosures and weed and rat bait in those areas is a good start. And we'll see how it goes with the State and their new exclosure.

Mike: have you met Jenny Davidson? She just moved out here, and she's an expert on the fungus killing oak trees on the mainland. She's a good tree pathologist who may be interested in black twig borer. She's in the zoology department.

Dan: TNC recently received funding for a small fence at Puu Hapapa, so hopefully we'll be building toward the end of this year. There are many snails up there.

Kapua: and we did fence the South Range population, and the 'ie'ie is looking better and mamaki is coming up. The exclosure is about one acre.

Vince: we did a snail count in the Kahanahaiki exclosure last week, and we found 68 snails inside the exclosure, and we're starting to look outside the exclosure and mark them. We're wondering if you're interested in going sometime to Pahole?

Mike: yes, and I'd like to get both of my assistants out there.

Michelle: I'd like to go too.

Mike: the next 3 weeks are a good time to do this.

Mike: I have accepted a new grad student, Kevin Gill, and he really wants to do field ecology with the tree snails. I'd like to get him working with you guys in the northern Koolaus. When Kevin gets here and gets started I'll let you know. I'll be supporting him on the USFWS grant.

Mike: what about the *concovospiras*?

Dan: they're pretty far out there, and there's very little management being done for them. North Palawai may also have some live ones, but I haven't seen them. That's another project that would require help. We're trying to get money to build a fence in North Pualii, so that would help.