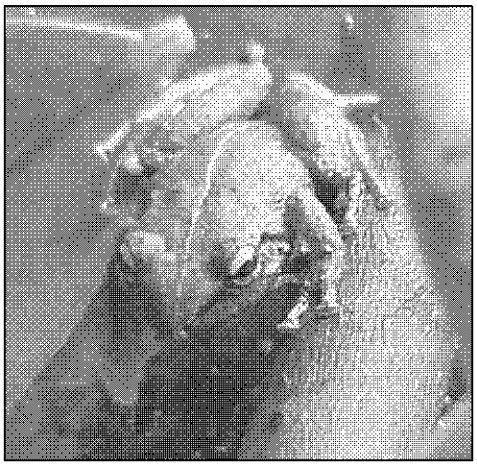
Coqui Control, Monitoring and Outreach Program
Hawaii Volcanoes National Park



2008 Annual Report

Kim Tavares

Project Objectives

Prevent Coqui populations from establishing at HAVO

Support neighborhood volunteer force around HAVO

Promote Coqui awareness & prevention, recruit volunteers

Map Coqui distribution throughout project area

Collaborate with other federal, state and county Coqui control efforts

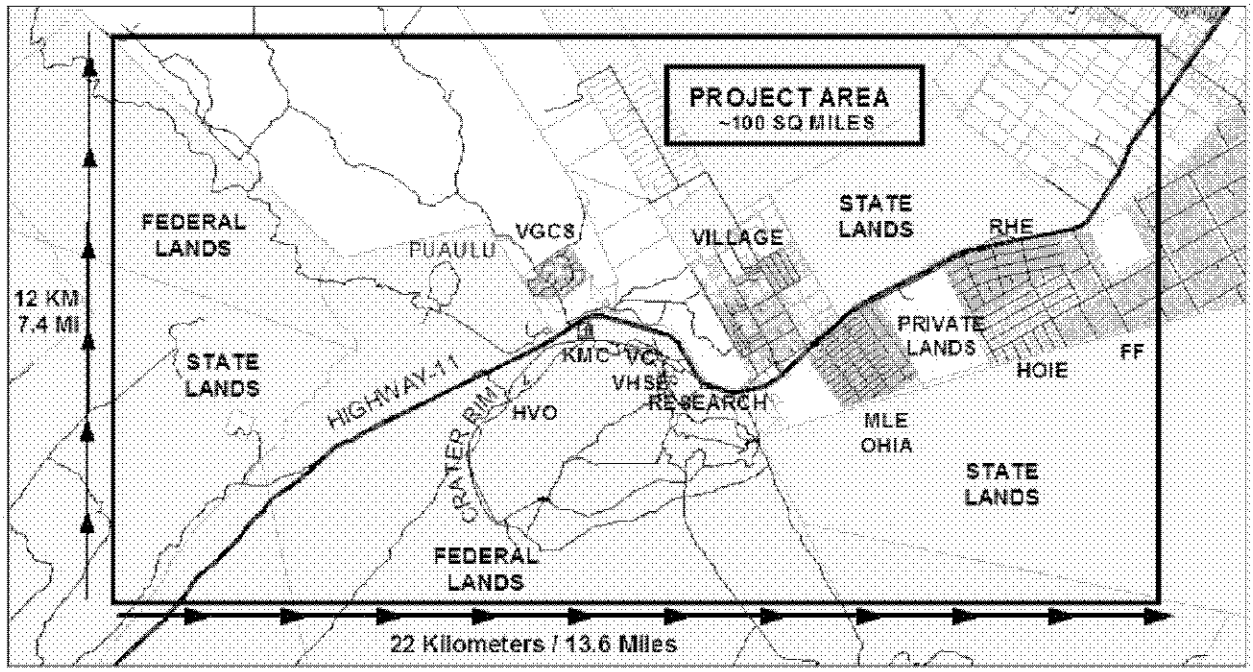
Facilitate resources to eradicate new, small infestations around the Park

Project Area

Hawaii Volcanoes National Park

Neighborhoods Bordering the Park Entrance

Other lands near National Park and State Forest Reserves



Coqui Control at Hawaii Volcanoes, a Cooperative Effort

Equipment

Hawaii Volcanoes NP funding for this project included the purchase of a 55-gallon portable drum drench unit, for spot treatments around the park. It was used primarily around the Volcano House in 2008. The Volcano Coquistadores (community volunteers) 200-gallon big-rig drencher went to work on the larger site along the highway "Fault Zone', Ka`u side of the rain shed back gate.

Supplies

Big Island Invasive Species Committee (BIISC) contributed citric acid for work within the Park. BIISC also contributes two cell phones to the project, and field work and Coqui location report data generated by the use of these numbers is shared with BIISC.

People

The park provides for a part-time cooperator to conduct outreach, provide training and coordinate efforts by NPS staff and community volunteers to search and remove frogs from within the park and the adjacent communities in the Volcano Area. Increasingly, regular park users (staff, visitors, vendors) are becoming aware of the transport issues related to frogs hitch-hiking on motor vehicles and are contributing their time to the project. More than a few casual conversations included a second or third party report of the capture or retrieval of a frog from a parked vehicles or, run over in parking lots. The park would be infested by now, after nine vigilant years of protection, if not for the assistance of these resilient, dedicated NPS employees: Wolfie, Faelyn. Bobby, Anson and many others from all divisions, and several HVO staff who regularly report and usually capture stray Coqui around HAVO parking lots.

The County, USDA-WS and BIISC Coqui control teams also monitored sites several times per month during the summer. So far, the "Hilo" teams have not heard frogs in the park. This is due largely to the rapid response service HAVO volunteers provide, and often because the weather is not "just right."

A large job involving traffic control along the highway was accomplished in 2008 that included staff from several divisions. Interpretation and Protection had a road-work road block to make traffic slow down around the work. Several other park staff participated in a safe and successful Coqui drench operation.

A noticeable new project began at the end of 2008. A Coqui barrier fence experiment was constructed along the roadside in the research area across from the lawn between BRD and RM-Shop. These barriers were first explored by State Dept. of Agriculture pest controllers working with nursery operators. The material is a woven synthetic material that is difficult for Coqui to cling to on the under side of a ninety degree angle. While nursery operators searched for something to keep frogs out of greenhouses, the objective of the experimental fence at RM is slightly different. In this case, it is to discourage frogs from moving away from the paved area after jumping off vehicles. Anson Smith is accomplishing the installation, modification and improvements to the barriers. Maintenance staff removed ginger plants and replaced them with gravel that is used to bury the bottom of the barrier fabric. The first evidence of its results will emerge as the weather reaches optimum frog-calling in 2009. Every frog heard and drenched (even if it is hand captured) should be reported and tallied around the barrier test sites. The question remains, where will they go?

2008 HAVO Coqui Season Summary

The activity began in April and lasted thru October. It was a less active season, credited to cooler evening temperatures that never warmed to the 70's (Fahrenheit), less rain and more vog than in recent history. Reports per neighborhood, per week during the peak, were unusually few, and often repeated previously reported locations. Some frogs called before or after the active months, usually after a sunny day, and before the sun set, while it remained warm. Few calls were heard into the night or long enough to warrant a hunt after mid-October.

Park Sites:

Site	At Large	Destroyed
Crater rim (8 areas)	7	13
Highway – Ka`u (3 areas)	0	8
Highway – Puna (1 area)	1	3

Near Neighbors:

Site	At Large	Destroyed
Highway Buffer (4 areas)	67	33
Buffer Neighborhoods (6 areas)	61	71

Upper Puna Neighbors:

Site	At Large	Destroyed
Neighborhoods within 5 miles (3 areas)	80	103

Discontinued Monitoring on Areas More than 5 Miles outside Park Entrance

Coqui Sites | Crater Rim

2008: Coqui are coming to Hawaii Volcanoes primarily with vehicle traffic. The traffic is not limited to any specific kind, i.e., visitors, park employees and delivery vehicles. Repeated reports came from Volcano Highway (H-11) at the Park entrance to the Visitors Center and to Volcano House. Coqui reports followed high vehicle traffic, as reported areas shifted from previous years, following volcanic activity to the summit. Fewer reports came in during 2008 for east side sites like Thurston Lava Tube and Kilauea Iki parking, while more reports happened on the north and north west segments, from the Visitors Center to the Observatory, and included a new location, Kilauea Overlook.

Number of Coqui Locations Reported in 2008

(1) Housing Loop including Environmental Education Center
(1) Kilauea Overlook Picnic Area
(2) Kilauea Military Camp
(1) RM-CCR intersection to Thurston Lava Tube
(3) Service areas for research, RM, BRD
(1) Steam Flats (roadside, highway side, before parking area)
(1) Visitors Center/Headquarters-Volcano Art Center
(5) Volcano House

Follow Up and Treatment Data:

Sites: 15

Coqui Captured: 13

Spot Drenched: 3 Volcano House sites; ~ 6 Coqui (possibly 2 females)

Coqui at Large: 7

- Quarters 16 (1)
- Stop sign at Crater Rim T (1)
- Roadside near steam flats (1)
- Volcano House service area (3)
- Volcano House employee parking (1)

Re-introduced Sites: 3

- Visitors Center
- Volcano House
- Magma House

Established Sites: 0

Coqui Sites | Ka`u Boundary – Highway

2008: There were several instances of new callings spots along the Ka`u portion of the highway going though the Park. In the re-introduced sites category, rain shed highway gate area continues to produce new calling spots. Additionally, an unusually high number of calling frogs occurred at the "Fault Zone" strip of highway this year. It may have been a hatch-out of eggs that went undetected in the 2007 season, or some event delivered several frogs to this area over winter.

Resources management staff borrowed the Volcano "Big-Rig" 200 gallon tank and sprayer to drench frogs at the "Fault Zone" site. Interpretation, Protection, Fee Collection staff and Wolfie Thomas, the Park IT guy, worked together with Resources Management to douse eight or nine frogs along the highway. A road block was set up and traffic was slowed around the work area, providing a safe work environment for the event. Though it is drier at Namakani Paio than other areas along the highway, Coqui are reported here from time to time. It is unlikely that frogs would establish populations here, however one called out and was captured again this season.

A new site was reported on private property across the highway adjacent to the park late in 2008. It has not been surveyed yet but is a high priority for 2009.

Number of Coqui Locations Reported in 2008

(6) H-11 Fault Zone
(1) H-11 Rain-shed Access
(1) Namakani Paio Campgrounds

Follow Up and Treatment Data:

Sites:	8
Coqui Captured:	5
Spot Drenched:	2 highway sites; ~ 7 Male Coqui
Coqui at Large:	0
Re-introduced Sites:	3 (All)
Established Sites:	0 ?

Coqui Sites | Puna Boundary – Highway

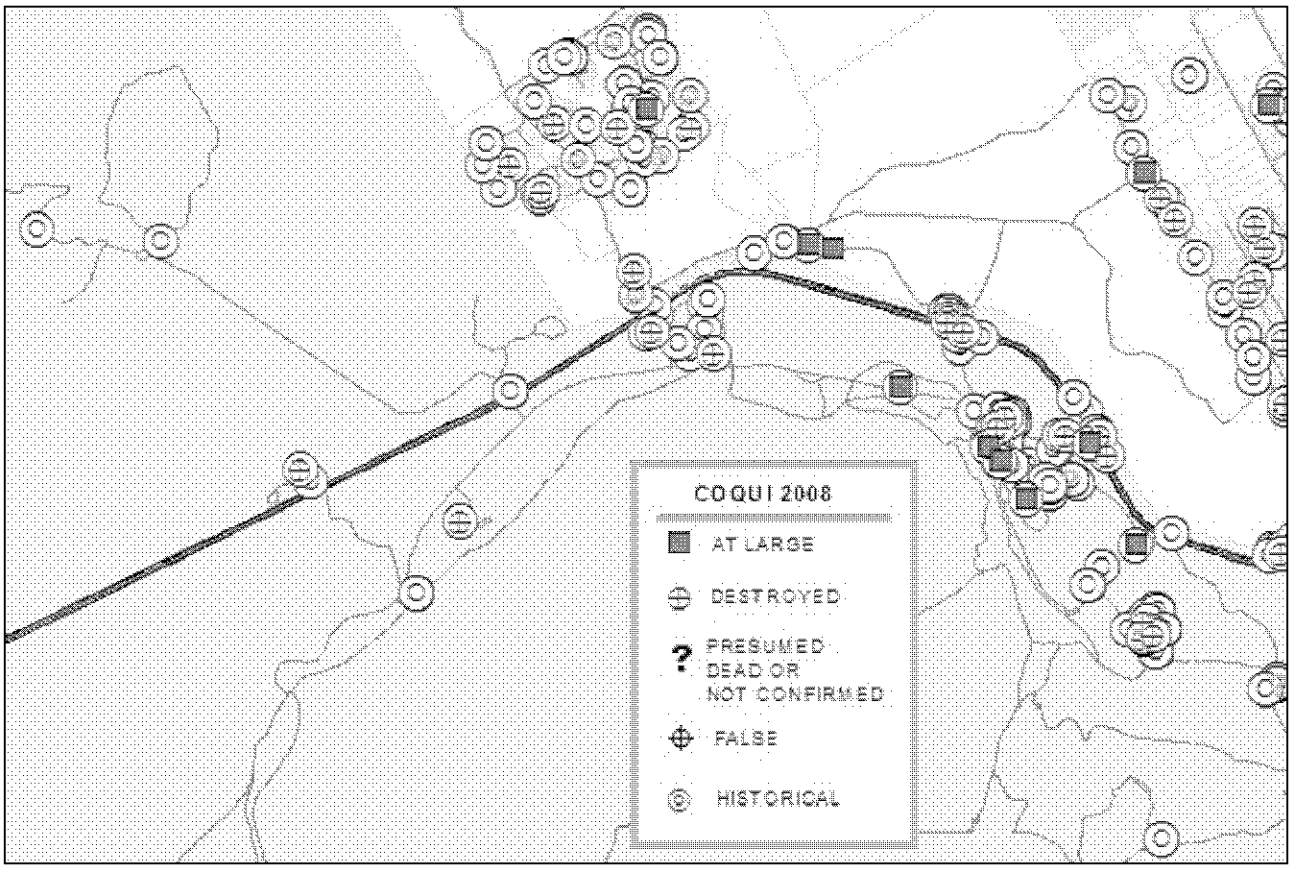
2008: Activity around the Park entrance station was minimal or went unreported. Most activity was at the highway junction with the entrance road.

Number of Coqui Locations Reported in 2008

(4) Park Entrance Intersect H-11

Follow Up and Treatment Data:

Sites:	4	
Coqui Captured:	3	
Spot Drenched:	0	
Coqui at Large:	1	"28 miles to Hilo" sign
Re-introduced Sites:	1	Park Entrance, H-11 Intersection
Established Sites:	0	



Coqui Sites | Highway Buffer – Haunani Rd (VILL) to Ali`i Kane Rd (RHE)

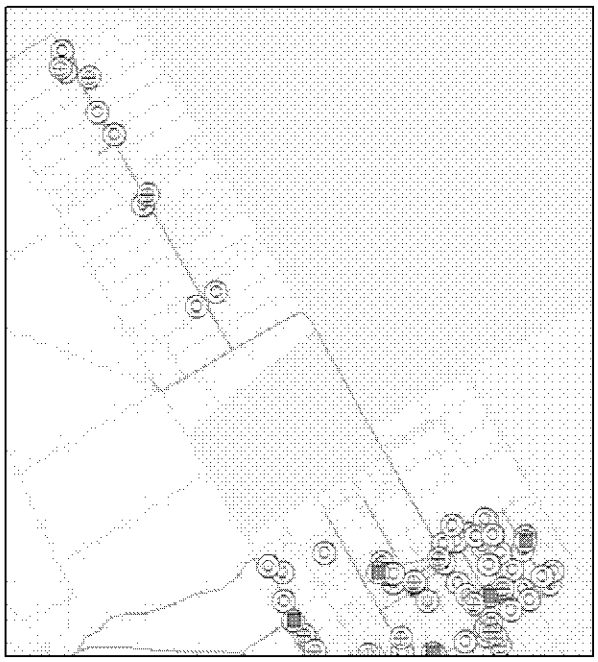
2008: Coqui are frequently found at roadside locations near intersecting streets along Highway-11. At end of 2008 season, all sites in this section require more citric drench work. Some sites had work done this year, primarily by USDA-COH-BIISC (gov't staff & supplies) and others were done by NPS staff and Volcano volunteers, but still more follow up is required to extinguish these populations.

Number of Coqui Locations Reported in 2008

(9) Highway near Volcano Village
(1) Highway near Mauna Loa Estates
(4) Highway near Ohia Estates
(19) Volcano Transfer Station & Highway

Follow Up and Treatment Data:

Sites: 33
Coqui Captured: 33
Spot Drenched: 1 (volunteers)
*Many (State crews on State land)
Coqui at Large: 67

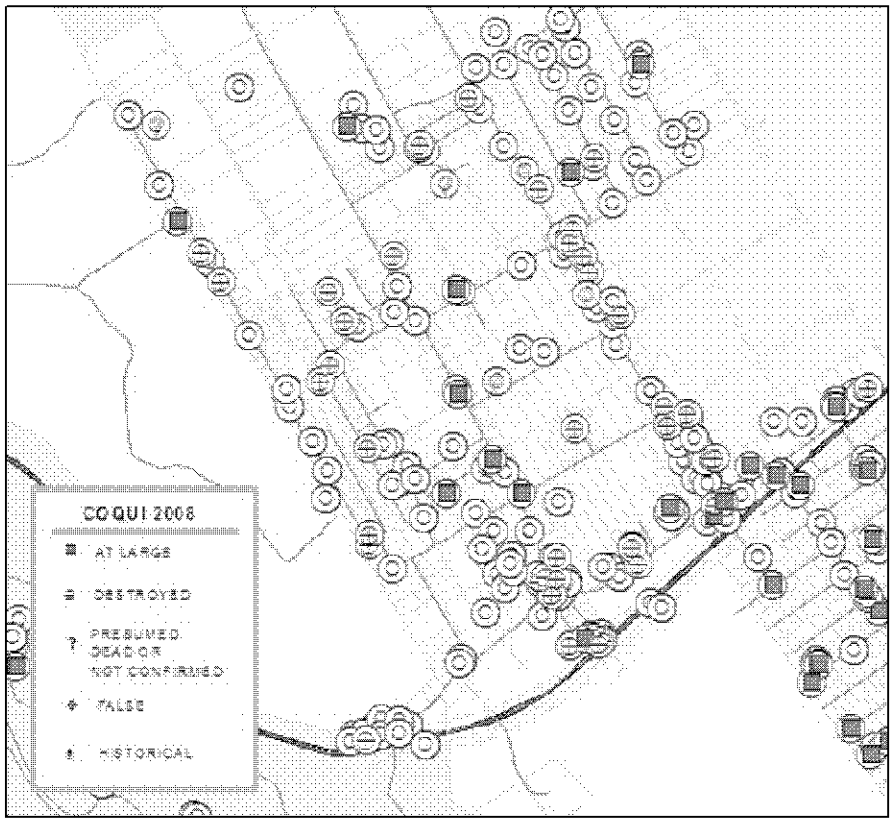


Map 3 (a) below / Map 3 (b) above * Related to NEXT Section

Re-introduced Sites: (All)

Established Sites: 2

- Volcano transfer station (entire perimeter)
- Former quarry (~50 square meters)



Coqui Sites | Neighborhoods Buffering HVNP

2008: Numbers of Coqui incidents seem to be leveling off. Occurrences in each subdivision vary, but overall, frog locations reported in buffering neighborhoods remain at around 100 per season. Several 2008 sites were at, or near, sites reported in previous years. Only one confirmed breeding site exists. It was treated in 2007 and re-treated in 2008. It has not spread. Another breeding site may exist in Ohia Estates, but data is scarce and re-introduction is also highly probable at the same site. It will soon become unmanageable unless drenching occurs there in 2009.

Equipment: Ample equipment exists to continue successful Coqui control in these neighborhoods. Drenchers include a 200-gallon drench rig for more than three or four frogs and two 55-gallon drenchers for treating two or three thickly vegetated sites per fill. Funding for all equipment came from cash donations by Volcano area residents, organizations and businesses.

Supplies: Three communities were granted County mini grants (Village, Cymbidium, Ohia). These grants provided a means for neighborhoods to gear up for Coqui surveys (headlamps, batteries, flagging tape and rain gear) and to purchase enough citric acid to get through the 2009 season. Mauna Loa Estates was among the first to receive a mini grant in Volcano, and that was granted in 2007. The remaining citric supplies from this grant were depleted in 2008.

Neighborhood	# Volunteers	# Drum Haulers	200-gal "Big Rig" Trailer Pullers
Golf Course	Several	Village volunteers	not applicable (no big jobs)
Village/Cymbidium	~6 Regular	2	no data
Mauna Loa Estates	~2 Regular	Other Neighborhoods	0
Ohia Estates	unreported	Other Neighborhoods	1

People: The "Volcano Coquistadores" is a small but growing group of volunteers who reside in neighborhoods around the Park, and who are serious about keeping Coqui from establishing in their neighborhoods.

Coquistadores went out regularly during the summer, sometimes several times per week, to survey for Coqui and to capture or drench them. Outreach and training new recruits are ongoing steps toward sustaining a Coqui-free environment around Volcano. Coquiastadores set up a Coqui info table at the Cooper Center Farmers Markets, on Sundays during peak-season, so people can report Coqui locations and sign up to volunteer.

Volcano Coquistadores Meet Monthly during the Summer

Coqui Sites | Neighborhoods Buffering HVNP (cont'd)

Number of Coqui Locations Reported in 2008

(3) Golf Course
(1) Wong Ranch (KS / Keauhou)
(46) Volcano Village
(3) Cymbidium
(25) Mauna Loa
(18) Ohia

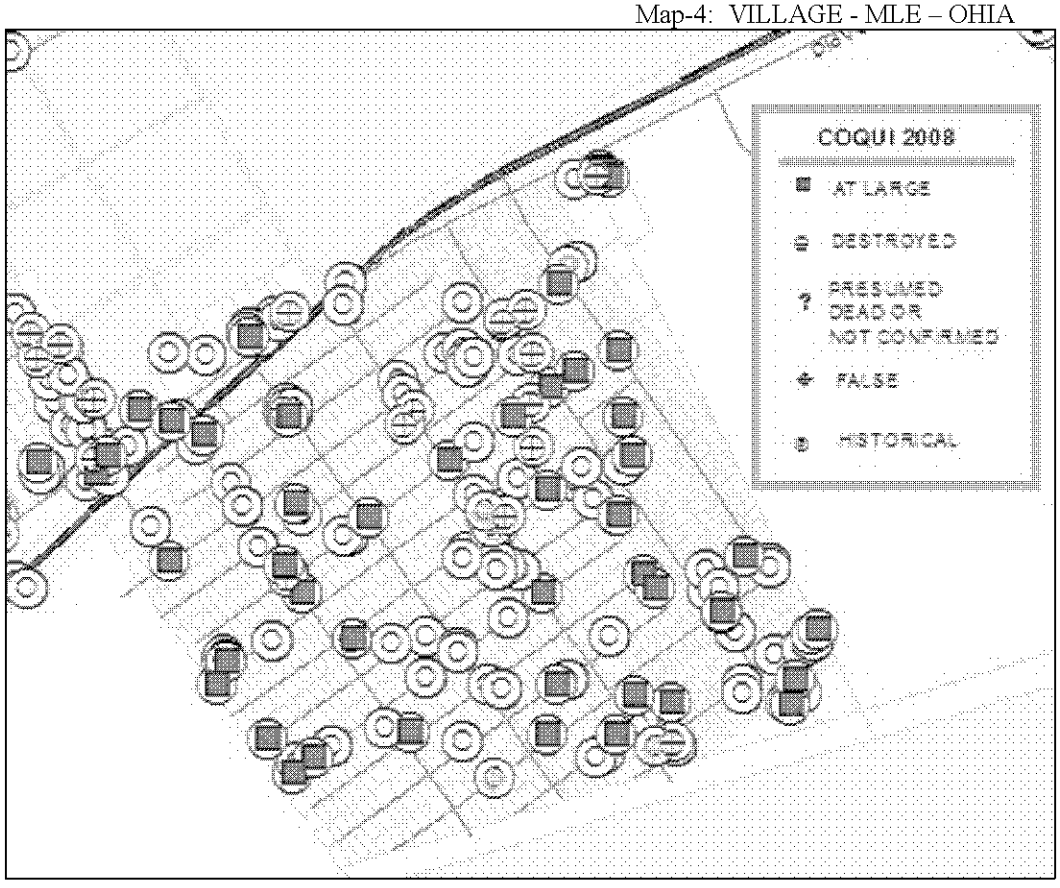
Follow Up and Treatment Data:

Sites:	96
Coqui Captured:	27
Spot Drenched:	18
Coqui at Large:	61
Re-introduced Sites:	(Nearly All)
Established Sites:	0

Coqui Hotline Alert Sign at Volcano TX-STN

(Perhaps too near the pig-hunter check-in station)

Map-4: VILLAGE - MLE – OHIA



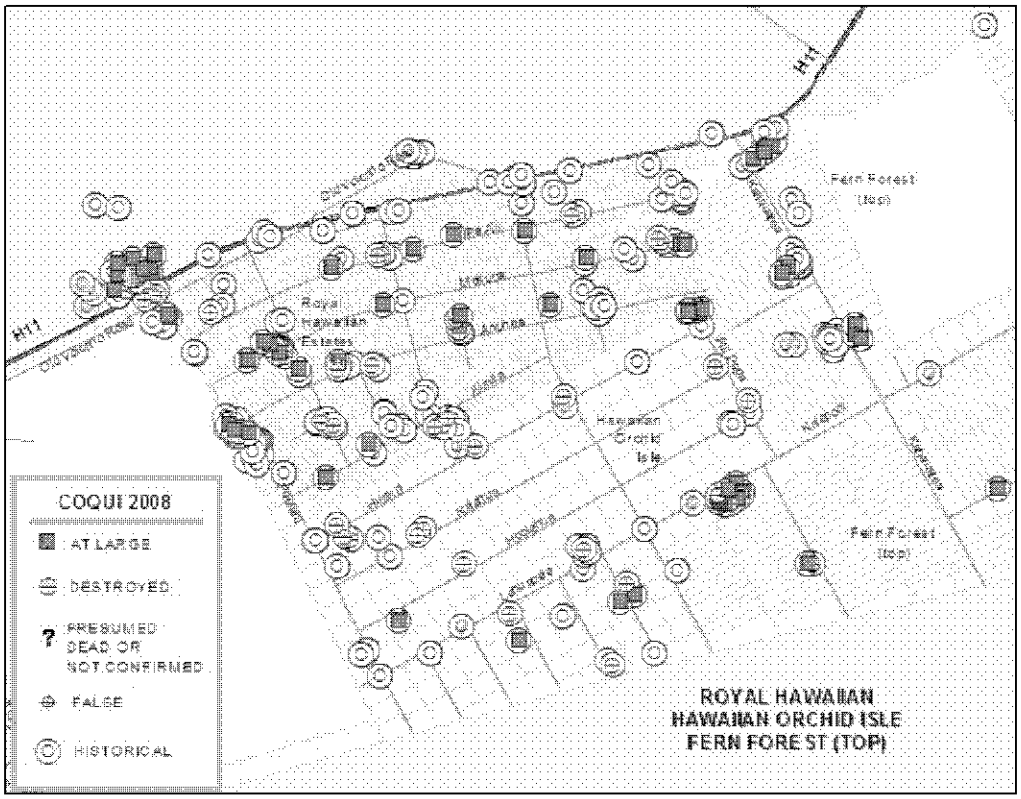
Coqui Sites | Neighborhoods Near HVNP Buffer Neighborhoods

2008: The largest and most infested section is also the most distant from Hawaii Volcanoes. Coqui control is primarily for neighborhood peace and quiet, but is ultimately a means to prevent infesting bordering State Natural Area Reserve Kahauale`a, adjacent to HVNP Thurston Lava Tube and East Rift boundaries. Even with much effort in citric drenching, sites continue to re-infest. Jobs that involve multiple trips per season and five or more bags of citric acid are more than the available resources can afford, so several sites will be more densely populated, and possibly include more area by 2009. The road-grid and parcel layout for this area works in favor of Coqui prevention, with several defensible spur roads that dead-end at the NAR boundary.

Equipment, Supplies and People: Two volunteer groups received COH Mini-Grants. Coqui controllers in RHE and FF (top) received reimbursements for citric acid, supplies and outreach display materials. Cash donations solicited from HOIE property owners resulted in the purchase of a "Silent Night" drum drencher, the fourth 55-gal portable unit in Volcano.

Neighborhood	# Volunteers	# Drum Haulers	200-gal "Big Rig" Trailer Pullers
Royal Hawaiian	4	1	2
Orchid Isle	2	1	1
Fern Forest (top)	2	1	0

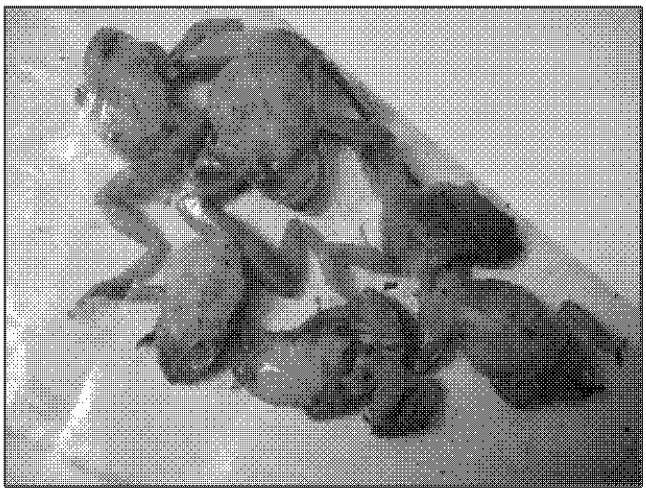
Map-5: RHE – HOIE – FF (within 5 miles of HVNP)



Coquistadores of RHE and HOIE went out regularly during the summer, sometimes several times per week, to survey for Coqui and to capture or drench them. Contacting land owners with Coqui for access permission and to recruit help is an essential task for current volunteers. Winning back the peace in RHE will requires more volunteers willing to learn and do! This entire area needs people to accurately locate calling frog locations for drench crews, more drum drenchers so more crews can be formed and more big-rig team trainee volunteers in 2009.

Number of Coqui Locations Reported in 2008

(57) Royal Hawaiian Estates
(22) Hawaiian Orchid Isle Estates
(38) Fern Forest (top)



Coqui captured from transplanted palm trees, HOIE-2008

Follow Up and Treatment Data:

Sites:	117
Coqui Captured:	103
Spot Drenched:	40
Coqui at Large:	80

Re-introduced Sites:

Most roads with frogs had frogs in the past. Most roads now have had frogs. Few roads don't have frogs. Fortunately, those few are the spur roads that dead end at the forest reserve. The nearest forest reserve intrusion of any concern is at the end of Captain's Drive (Ala Kapena) towards the CLOSED trail to Pu`u O`o.

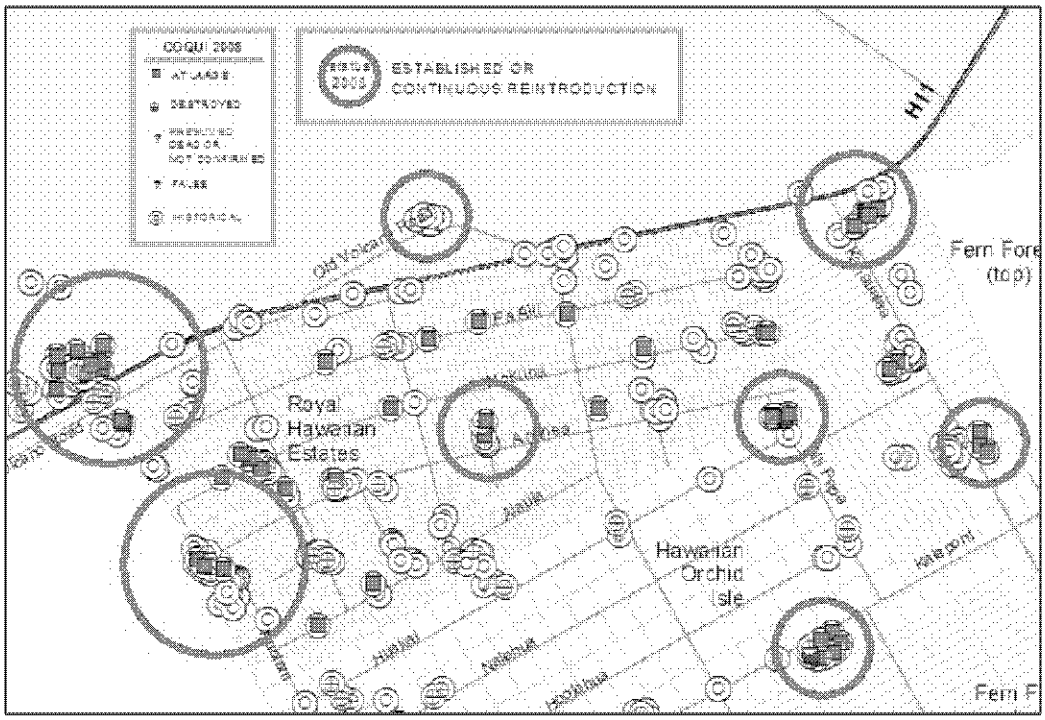
No Established Sites in Hawaiian Orchid Isle Estates (HOIE)

Map-6: RHE Established Sites

Established Sites in Royal Hawaiian Estates (RHE)

-Anuhea (top)
-Anuhea Rd nr Anuhea Pl
-Anuhea Rd near Wohi
-Anuhea Rd near Kanilehua
-Alii Papa (possibly in 3 spots)

Mokuna may have one or two established spots



Established Sites in Fern Forest to Kahauale`a (FF-TOP):

-Near Hwy (residential)
-Kahauale`a Rd, aprx 1-mile off hwy

Coqui Sites | Areas of Discontinued Monitoring

2008: There are too many established populations and not enough resources for this project to continue monitoring or control work in the following areas, greater than five miles from the Park Entrance:

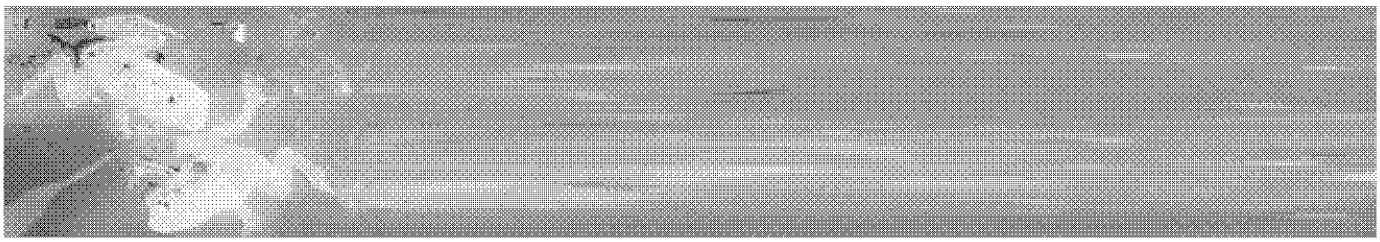
Fern Forest (Kahauale`a to S.Glenwood/Captain's Drive)
Fern Forest (S.Glenwood/Captain's Drive to Eden Roc Border)
Glenwood (mauka roads)
Ihope Road – Ola`a Forest
Stainback – Ola`a Forest
All Lower Elevation Sites Previously Monitored (Glenwood to Mt. View)

Logistics | Water and Equipment Storage Notes

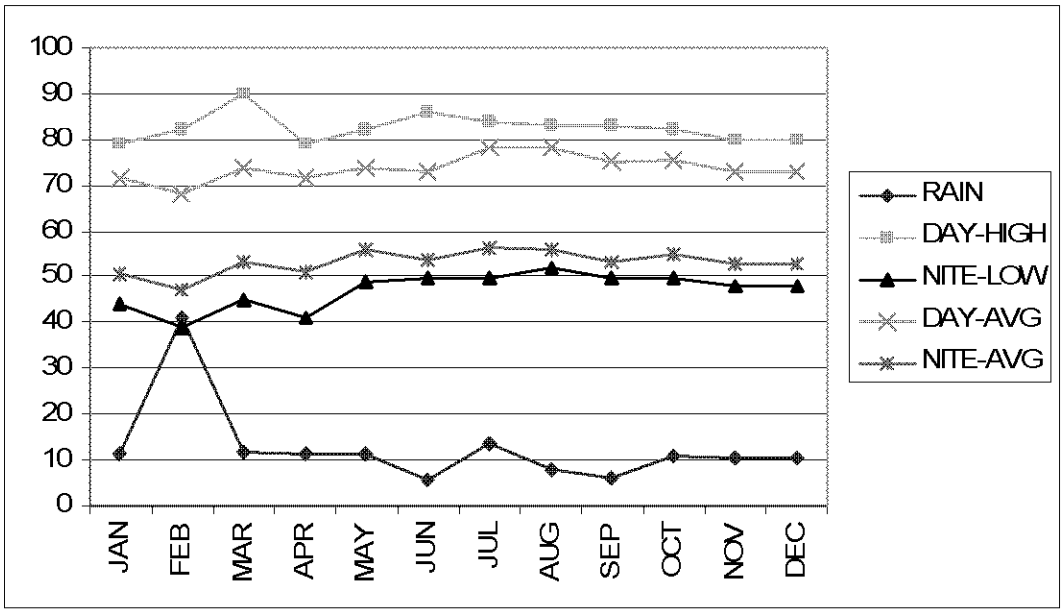
While it is easier for drench crews to prep from a base with ample water, than to attempt permission to use on-site supplies, not having to haul water reduces costs for added fuel usage, and wear and tear on volunteers' personal vehicles.

Citric acid in the form of sugar gets dissolved by agitating it in a tank full of water (40 or 200 gallons per tank for this project). To date, most Coqui drench teams prefer to mix water before going on the road. It works out better, logistically for the work crews, but from an outreach perspective it removes the educational part of the effort to "behind the scenes", and results in people not understanding the necessary prep and post-work clean up time it takes for a twenty-five minute, 40 gallon treatment on three or four frogs.

Frogs call during the summer when people are conserving water, so establishing a Coqui-dedicated water cache or two would be extremely helpful. Also helpful would be a volunteer base yard that would include ample storage (30' x 40') for Coqui control and other volunteer equipment and supplies. A cage-type covered storage within the fenced and locked facility could hold three pump units on trailers and a row or two of drums, and still be large enough for two or three pallets of citric acid. .



WEATHER DATA from 2650 FT Elevation



Rain in INCHES / Temps in FAHRENHEIT

(Readings from 2560 ft, the lowest elevation within the project area.)

Sites closer to the Park and within the Park are among the highest elevations within the project area. Temperatures are usually five or more degrees cooler at the Park than the chart describes. Audible Coqui are most active when evening temps are around or above 70F, mixed with light rain or a humid environment (wet ground and vegetation), without wind. Male calling is infrequent during periods of extended drought, and during gusty or high winds. Most calling is just before and after dark, give or take a few hours, depending on the combination of weather related conditions.

Frog proximities to roads and parking lots continue to support theories that most frogs arrive by motor vehicles and human activities. Visitor attractions and service areas are proven spots for introduction or re-introduction. The areas of primary concern are around the entrance to HVNP, along with places within the Park where motor vehicles from infested areas travel. Along with staff and visitor vehicles, Coqui also come with trailers, equipment, deliveries, shipping and recycling containers, etc. *E. coqui* is not yet established in any known location of the Park, however data generated next season will confirm this or not. Two females laden with eggs were found in the Park and reported captured in 2008.